

CAT.No.F072-4

# ➤ **Semiconductor Short Form Catalog**



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#### **Special Applications**

Transportation device (automotive, marine, etc), communication devices for core network, traffic signal devices, fire prevention/anticrime devices, various safety devices, medical devices, etc.

#### **Specialized Applications**

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**RECTIFIER DIODES**

.....

**SCHOTTKY BARRIER DIODES**

.....

**SUPER FAST RECOVERY DIODES**

.....

**POWER MOSFETs**

.....

**SIDAC**

.....

**SURGE ABSORBERS**

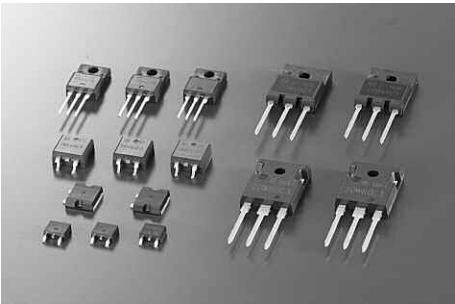
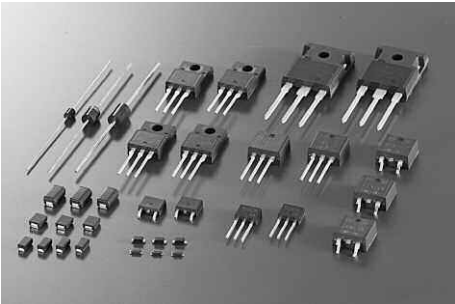
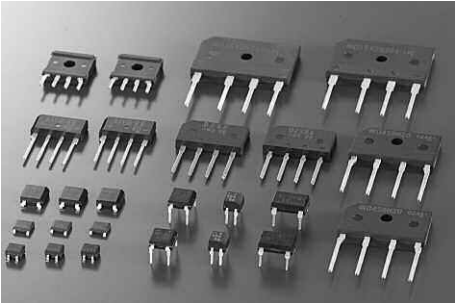
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**POWER ICs**

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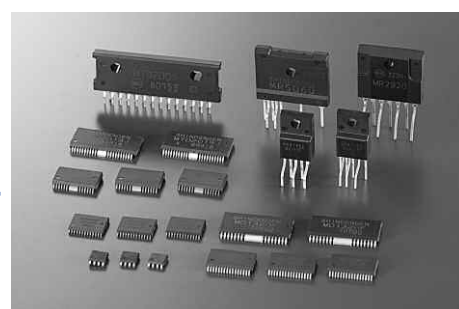
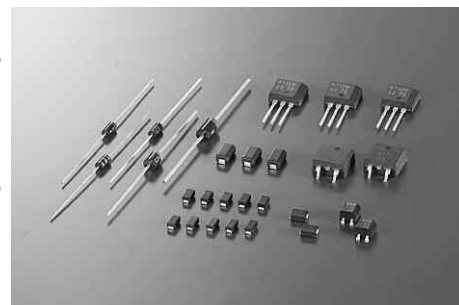
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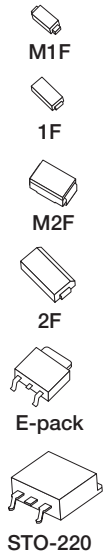
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## Single

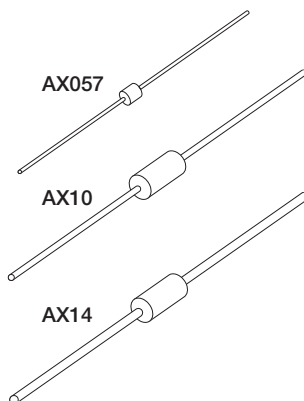
### Surface Mount



| Type No.   | Absolute Maximum Ratings |                                      |                         |                        |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                    |                                    |                                    | Outline |      |
|------------|--------------------------|--------------------------------------|-------------------------|------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|---------|------|
|            | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>a</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RM</sub><br>[V] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | θ <sub>jI</sub><br>(max)<br>[°C/W] | θ <sub>ja</sub><br>(max)<br>[°C/W] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package | Fig. |
|            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                    |                                    |                                    |         |      |
| M1FE40     | 2                        | 103*2                                | 25                      | 400                    | -55 to 150               | 150                    | 1.1                            | 1                                   | 10                                                                 | 20                                 | 80                                 | 18                                 | M1F     | 12   |
| M1F60      | 1                        | 25                                   | 25                      | 600                    | -55 to 150               | 150                    | 1.1                            | 1                                   | 10                                                                 | 20                                 | 108                                | —                                  |         |      |
| M1F80      |                          |                                      |                         | 800                    | -55 to 150               |                        |                                |                                     |                                                                    |                                    |                                    |                                    |         |      |
| D1F60      | 1                        | 25                                   | 25                      | 600                    | -55 to 150               | 150                    | 1.1                            | 1                                   | 10                                                                 | 23                                 | 108                                | —                                  | 1F      | 13-1 |
| D1F60A     | 1.2                      |                                      | 45                      | 600                    |                          |                        | 0.97                           | 1.2                                 |                                                                    |                                    |                                    |                                    |         |      |
| D2F60      | 1.4                      | 25                                   | 60                      | 600                    | -55 to 150               | 150                    | 1.05                           | 1.4                                 | 10                                                                 | 24                                 | 90                                 | —                                  | 2F      | 16-1 |
| M2F60      | 1.2                      | 51                                   | 50                      | 600                    | -55 to 150               | 150                    | 0.97                           | 1.2                                 | 10                                                                 | 33                                 | 90                                 | —                                  | M2F     | 15-1 |
| M3FE40*3   | 3                        | 76*1                                 | 75                      | 400                    | -55 to 150               | 150                    | 1.1                            | 3                                   | 10                                                                 | 25                                 | 110                                | 25                                 |         |      |
| M3F60      | 3                        | 100*1                                | 90                      | 600                    | -55 to 150               | 150                    | 1.05                           | 3                                   | 10                                                                 | 16                                 | 55                                 | —                                  |         |      |
| D3F60      | 3                        | 80*1                                 | 150                     | 600                    | -55 to 150               | 150                    | 1.05                           | 3                                   | 10                                                                 | 23                                 | 80                                 | —                                  | 2F      | 16-1 |
| D4F60      | 4                        | 68*1                                 | 200                     | 600                    | -55 to 150               | 150                    | 0.95                           | 4                                   | 10                                                                 | 23                                 | 80                                 | —                                  |         |      |
| ☆DE5VE40*3 | 5                        | 130*2                                | 80                      | 400                    | -55 to 150               | 150                    | 1                              | 5                                   | 10                                                                 | —                                  | —                                  | 4                                  | E-pack  | 31-5 |
| DF25V60    | 25                       | 136*2                                | 400                     | 600                    | -55 to 150               | 150                    | 1.1                            | 25                                  | 10                                                                 | —                                  | —                                  | 0.5                                | STO-220 | 36-2 |

☆: New product \* 1:  $T_I$  \* 2:  $T_c$  \* 3: High ESD Capability

### Axial



| Type No. | Absolute Maximum Ratings |            |           |          |            |       | Electrical Characteristics |            |                     |               |               |  | Outline |            |      |
|----------|--------------------------|------------|-----------|----------|------------|-------|----------------------------|------------|---------------------|---------------|---------------|--|---------|------------|------|
|          | $I_o$                    | Conditions | $I_{FSM}$ | $V_{RM}$ | $T_{stg}$  | $T_j$ | $V_F$                      | Conditions | $I_R$               | $\theta_{jI}$ | $\theta_{ja}$ |  | Package | Color Code | Fig. |
|          | [A]                      | $T_a$ [°C] | [A]       | [V]      | [°C]       | [°C]  | (max) [V]                  | $I_F$ [A]  | $V_R = V_{RM}$ [μA] | [°C/W]        | [°C/W]        |  |         |            |      |
| D1N60*2  | 1                        | 25         | 30        | 600      | -55 to 150 | 150   | 1.05                       | 1          | 10                  | 10            | 113           |  | AX057   | —          | 1    |
| S2V60*2  | 1.7                      | 40         | 60        | 600      | -55 to 150 | 150   | 1.05                       | 1.7        | 10                  | 8             | —             |  | AX10    | Blue       | 6-1  |
| S3V60*2  | 3.5                      | 40         | 120       | 600      | -55 to 150 | 150   | 1.05                       | 2.6        | 10                  | 6.5           | —             |  | AX14    | Blue       | 8    |

\* 1: Spec Code 7□□□ \* 2: Spec Code 5□□□ (See page 46 for the last 3 digits of the Spec Code)

## Twin

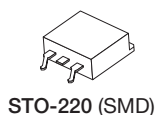
### Array



| Type No. | Absolute Maximum Ratings |            |           |          |            |       | Electrical Characteristics |            |                     |               |               |  | Outline |      |
|----------|--------------------------|------------|-----------|----------|------------|-------|----------------------------|------------|---------------------|---------------|---------------|--|---------|------|
|          | $I_o$                    | Conditions | $I_{FSM}$ | $V_{RM}$ | $T_{stg}$  | $T_j$ | $V_F$                      | Conditions | $I_R$               | $\theta_{jI}$ | $\theta_{ja}$ |  | Package | Fig. |
|          | [A]                      | $T_a$ [°C] | [A]       | [V]      | [°C]       | [°C]  | (max) [V]                  | $I_F$ [A]  | $V_R = V_{RM}$ [μA] | [°C/W]        | [°C/W]        |  |         |      |
| S1NAD80  | 3                        | 102        | 110       | 800      | -55 to 150 | 150   | 1.05                       | 0.75       | 10                  | 15            | 84            |  | 1NA     | 27-2 |

Array type

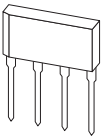
### Doubler



| Type No. | Absolute Maximum Ratings |            |           |          |            |       | Electrical Characteristics |            |                     |               |  |  | Outline |      |
|----------|--------------------------|------------|-----------|----------|------------|-------|----------------------------|------------|---------------------|---------------|--|--|---------|------|
|          | $I_o$                    | Conditions | $I_{FSM}$ | $V_{RM}$ | $T_{stg}$  | $T_j$ | $V_F$                      | Conditions | $I_R$               | $\theta_{jc}$ |  |  | Package | Fig. |
|          | [A]                      | $T_a$ [°C] | [A]       | [V]      | [°C]       | [°C]  | (max) [V]                  | $I_F$ [A]  | $V_R = V_{RM}$ [μA] | [°C/W]        |  |  |         |      |
| DF5VD60  | 5                        | 140        | 140       | 600      | -40 to 150 | 150   | 1.05                       | 2.5        | 10                  | 2             |  |  | STO-220 | 36-5 |
| DF15VD60 | 15                       | 127        | 190       | 600      | -40 to 150 | 150   | 1.05                       | 7.5        | 10                  | 1.6           |  |  |         |      |

# Rectifier Diodes .....

## SIP Bridge Diodes

|                                                                                                                                       | Type No.   | Absolute Maximum Ratings |                                      |                         |                        |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                   |                                    |                                    | Remarks    | Outline    |      |    |
|---------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------|--------------------------------------|-------------------------|------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------|------------|------|----|
|                                                                                                                                       |            | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RM</sub><br>[V] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | θ <sub>j</sub><br>(max)<br>[°C/W] | θ <sub>ja</sub><br>(max)<br>[°C/W] | θ <sub>jc</sub><br>(max)<br>[°C/W] |            | Package    | Fig. |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
| <br>1V                                               | S1VB60     | 1                        | 25*1                                 | 30                      | 600                    | -40 to 150               | 150                    | 1.05                           | 0.5                                 | 10                                                                 | 16                                | 62                                 | —                                  | —          | 1V         | 55   |    |
|                                                                                                                                       | S1VB80     |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | S1VBA60    | 1                        | 25*1                                 | 50                      | 600                    | -40 to 150               | 150                    | 1.05                           | 0.5                                 | 10                                                                 | 16                                | 62                                 | —                                  | Large IFSM | 1V         | 55   |    |
|                                                                                                                                       | D2SBA60    | 1.5                      | 25*1                                 | 60                      | 600                    | -40 to 150               | 150                    | 1.05                           | 0.75                                | 10                                                                 | 10                                | 47                                 | —                                  | —          | 2S         | 56   |    |
|                                                                                                                                       | D2SB60     | 1.5                      | 25*1                                 | 80                      | 600                    | -40 to 150               | 150                    | 1.05                           | 0.75                                | 10                                                                 | 10                                | 47                                 | —                                  | —          | 2S         | 56   |    |
|                                                                                                                                       | D2SB60A    | 2                        | 115*2                                | 120                     | 600                    | -40 to 150               | 150                    | 0.95                           | 1                                   | 10                                                                 | 10                                | 47                                 | —                                  | —          | 2S         | 56   |    |
|                                                                                                                                       | ☆UD2KB80   | 2                        | 143                                  | 62                      | 800                    | -55 to 150               | 150                    | 1.05                           | 1                                   | 10                                                                 | 15                                | 55                                 | 1.5                                | UL®        | D3K        | 54   |    |
|                                                                                                                                       | ☆UD3KB80   | 3                        | 140                                  | 90                      | 800                    | -55 to 150               | 150                    | 1.05                           | 1.5                                 | 10                                                                 | 15                                | 55                                 | 1.5                                | UL®        | D3K        | 54   |    |
|                                                                                                                                       | D3SBA60    | 4                        | 108                                  | 80                      | 600                    | -40 to 150               | 150                    | 1.05                           | 2                                   | 10                                                                 | 6                                 | 30                                 | 5.5                                | UL®        | 3S         | 57   |    |
|                                                                                                                                       | D3SB60     | 4                        | 108                                  | 120                     | 600                    | -40 to 150               | 150                    | 1.05                           | 2                                   | 10                                                                 | 6                                 | 30                                 | 5.5                                | UL®        | 3S         | 57   |    |
|                                                                                                                                       | D3SB80     |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | D4SB60L    | 4                        | 111                                  | 150                     | 600                    | -40 to 150               | 150                    | 0.95                           | 2                                   | 10                                                                 | 6                                 | 30                                 | 5.5                                | UL®        | 3S         | 57   |    |
|                                                                                                                                       | D4SB80     |                          | 108                                  |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | ☆UD4KB80   | 4                        | 138                                  | 135                     | 800                    | -55 to 150               | 150                    | 1.00                           | 2                                   | 10                                                                 | 15                                | 55                                 | 1.5                                | UL®        | D3K        | 54   |    |
|                                                                                                                                       | D5SBA60    | 6                        | 111                                  | 120                     | 600                    | -40 to 150               | 150                    | 1.05                           | 3                                   | 10                                                                 | 5                                 | 26                                 | 3.4                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D5SB60     | 6                        | 110                                  | 170                     | 600                    | -40 to 150               | 150                    | 1.05                           | 3                                   | 10                                                                 | 5                                 | 26                                 | 3.4                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D5SB80     |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    | Large IFSM | 5S         | 58   |    |
|                                                                                                                                       | D6SB60L    | 6                        | 112                                  | 170                     | 600                    | -40 to 150               | 150                    | 1.05                           | 3                                   | 10                                                                 | 5                                 | 26                                 | 3.4                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D6SB80     |                          | 110                                  |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | D10XB60    | 10                       | 100                                  | 120                     | 600                    | -40 to 150               | 150                    | 1.1                            | 5                                   | 10                                                                 | 6                                 | 26                                 | 2.3                                | UL®        | 3S         | 57   |    |
|                                                                                                                                       | D10XB80    |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | D10XB60H   |                          | 112                                  | 170                     | 600                    | -40 to 150               | 150                    | 1.05                           | 5                                   | 10                                                                 | 6                                 | 26                                 | 1.9                                | UL®        | Large IFSM | 3S   | 57 |
|                                                                                                                                       | D15XB60    | 15                       | 100                                  | 200                     | 600                    | -40 to 150               | 150                    | 1.1                            | 7.5                                 | 10                                                                 | 5                                 | 22                                 | 1.5                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D15XB80    |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | ☆D15XB100  |                          | 110                                  | 200                     | 1000                   | -55 to 150               | 150                    | 1.05                           | 7.5                                 | 10                                                                 | 5                                 | 23                                 | 1.2                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D15XB60H   |                          | 107                                  | 240                     | 600                    | -40 to 150               | 150                    | 1.05                           | 7.5                                 | 10                                                                 | 5                                 | 22                                 | 1.5                                | UL®        | Large IFSM | 5S   | 58 |
|                                                                                                                                       | D20XB60    | 20                       | 87                                   | 240                     | 600                    | -40 to 150               | 150                    | 1.1                            | 10                                  | 10                                                                 | 5                                 | 22                                 | 1.5                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D20XB80    |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | D25XB60    | 25                       | 98                                   | 350                     | 600                    | -40 to 150               | 150                    | 1.05                           | 12.5                                | 10                                                                 | 5                                 | 22                                 | 1                                  | UL®        | 5S         | 58   |    |
|                                                                                                                                       | D25XB80    |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | ☆D25XB100  |                          | 106                                  | 350                     | 1000                   | -55 to 150               | 150                    | 1.05                           | 12.5                                | 10                                                                 | 5                                 | 23                                 | 0.8                                | UL®        | 5S         | 58   |    |
|                                                                                                                                       | ☆D50XB80   | 50                       | 95                                   | 600                     | 800                    | -40 to 150               | 150                    | 1.05                           | 25                                  | 10                                                                 | —                                 | 16                                 | 0.5                                | UL®        | TSB(4PIN)  | 59   |    |
|                                                                                                                                       | ☆US4KB80R  | 4                        | 125                                  | 150                     | 800                    | -55 to 150               | 150                    | 1.0                            | 2                                   | 10                                                                 | 5                                 | 35                                 | 3.5                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US6KB80R  | 6                        | 116                                  | 175                     | 800                    | -55 to 150               | 150                    | 1.0                            | 3                                   | 10                                                                 | 5                                 | 35                                 | 3.0                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US8KB80R  | 8                        | 108                                  | 200                     | 800                    | -55 to 150               | 150                    | 1.0                            | 4                                   | 10                                                                 | 5                                 | 35                                 | 2.8                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US10KB80R | 10                       | 100                                  | 150                     | 800                    | -55 to 150               | 150                    | 1.10                           | 5                                   | 10                                                                 | 5                                 | 35                                 | 2.5                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US15KB80R | 15                       | 101                                  | 200                     | 800                    | -55 to 150               | 150                    | 1.10                           | 7.5                                 | 10                                                                 | 5                                 | 35                                 | 1.5                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US20KB80R | 20                       | 97                                   | 240                     | 800                    | -55 to 150               | 150                    | 1.10                           | 10                                  | 10                                                                 | 5                                 | 35                                 | 1.2                                | UL®        | D6K        | 53   |    |
|                                                                                                                                       | ☆US30KB80R | 30                       | 97                                   | 350                     | 800                    | -55 to 150               | 150                    | 1.10                           | 15                                  | 10                                                                 | 5                                 | 35                                 | 0.8                                | UL®        | D6K        | 53   |    |
| ☆: New product                      * 1: Ta                      * 2: Tj                      UL®: UL recognized (UL File No.E142422) |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       |            |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |
|                                                                                                                                       | </         |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |                                    |            |            |      |    |

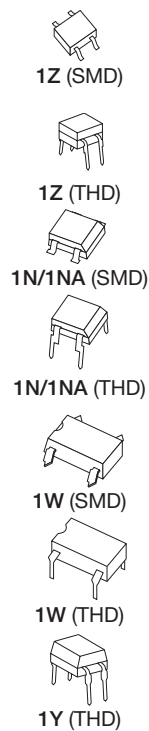
☆: New product

\* 1: Ta

\* 2: Tj

UL®: UL recognized (UL File No.E142422)

## DIP Bridge Diodes



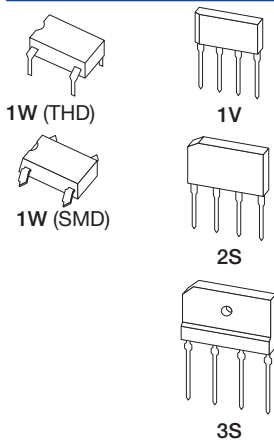
| Type No.   | Absolute Maximum Ratings |                                      |                  |                 |                  |                | Electrical Characteristics |                              |                                                            |                          |                          | Remarks                | Outline |      |
|------------|--------------------------|--------------------------------------|------------------|-----------------|------------------|----------------|----------------------------|------------------------------|------------------------------------------------------------|--------------------------|--------------------------|------------------------|---------|------|
|            | I <sub>o</sub>           | Conditions<br>T <sub>a</sub><br>[°C] | I <sub>FSM</sub> | V <sub>RM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub> | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | θ <sub>jI</sub><br>(max) | θ <sub>ja</sub><br>(max) |                        | Package | Fig. |
|            |                          |                                      |                  |                 |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |
| S1YB60     | 0.4                      | 40                                   | 30               | 600             | -40 to 150       | 150            | 1.05                       | 0.2                          | 10                                                         | 20                       | 150                      | —                      | 1Y      | 22-1 |
| S1ZB60     | 0.8                      | 25                                   | 30               | 600             | -40 to 150       | 150            | 1.05                       | 0.4                          | 10                                                         | 20                       | 76                       | —                      | 1Z      | * 1  |
| S1ZB80     |                          |                                      |                  | 800             |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |
| D1UBA80    | 1                        | 25                                   | 30               | 800             | -55 to 150       | 150            | 0.95                       | 0.4                          | 10                                                         | 25                       | 62.5                     | —                      | SOPA-4  | 33   |
| S1NB60     | 1                        | 25                                   | 30               | 600             | -40 to 150       | 150            | 1.05                       | 0.5                          | 10                                                         | 15                       | 68                       | —                      | 1N      | * 2  |
| S1NB80     |                          |                                      |                  | 800             |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |
| S1NBB80    | 1                        | 26                                   | 50               | 800             | -40 to 150       | 150            | 1.05                       | 0.5                          | 10                                                         | 15                       | 68                       | —                      | 1NA     | * 3  |
| S1WB(A)60  | 1                        | 25                                   | 30               | 600             | -40 to 150       | 150            | 1.0                        | 0.5                          | 10                                                         | 10                       | 65                       | —                      | 1W      | * 4  |
| S1WB(A)80  |                          |                                      |                  | 800             |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |
| S1WB(A)60B |                          |                                      | 50               | 600             |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |
| S1NBC60    | 1.5                      | 105*5                                | 60               | 600             | -55 to 150       | 150            | 1.05                       | 0.75                         | 10                                                         | 15                       | 68                       | Large I <sub>FSM</sub> | 1NA     | * 3  |
| S1NBC80    |                          |                                      |                  | 800             |                  |                |                            |                              |                                                            |                          |                          |                        |         |      |

\* 1: SMD Package Fig.23-1; THD Package Fig.24  
 \* 3: SMD Package Fig.27-1; THD Package Fig.28

\* 2: SMD Package Fig.25; THD Package Fig.26  
 \* 4: SMD Package Fig.29; THD Package Fig.30

\* 5 : T<sub>j</sub>

## Low Noise Bridge Diodes



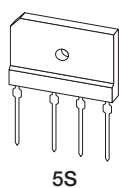
| Type No.  | Absolute Maximum Ratings |                              |                  |                 |                  |                | Electrical Characteristics |                              |                                                            |                          |                          |                          |                          | Remarks                                                                               | Outline    |      |     |
|-----------|--------------------------|------------------------------|------------------|-----------------|------------------|----------------|----------------------------|------------------------------|------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------------------------------------------------------------------|------------|------|-----|
|           | I <sub>o</sub>           | Conditions<br>T <sub>c</sub> | I <sub>FSM</sub> | V <sub>RM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub> | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | t <sub>rr</sub><br>(max) | θ <sub>jI</sub><br>(max) | θ <sub>ja</sub><br>(max) | θ <sub>jc</sub><br>(max) |                                                                                       | Package    | Fig. |     |
|           |                          |                              |                  |                 |                  |                |                            |                              |                                                            |                          |                          |                          |                          |                                                                                       |            |      | [A] |
| LN1WBA60  | 1.1                      | 25*1                         | 50               | 600             | -40 to 150       | 150            | 1.0                        | 0.55                         | 10                                                         | 5                        | 10                       | 65                       | —                        | —                                                                                     | 1W         | * 2  |     |
| LN1VB60   | 1.2                      | 25*1                         | 50               |                 |                  |                | 1.0                        | 0.6                          |                                                            |                          | 16                       | 62                       | —                        | —                                                                                     | 1V         | 55   |     |
| LN4SB60   | 4                        | 111                          | 150              |                 |                  |                | 0.95                       | 2                            |                                                            |                          | 6                        | 30                       | 5.5                      |  | 3S         | 57   |     |
| LN6SB60   | 6                        | 111                          | 170              |                 |                  |                | 1.05                       | 3                            |                                                            |                          | 5                        | 26                       | 3.4                      |  | 5S         | 58   |     |
| LN15XB60  | 15                       | 100                          | 200              |                 | -55 to 150       | 150            | 1.1                        | 7.5                          |                                                            |                          | 5                        | 23                       | 1.5                      | —                                                                                     | Large IFSM | 5S   | 58  |
| LN15XB60H |                          | 106                          | 290              |                 |                  |                | 1.05                       |                              |                                                            |                          |                          |                          |                          |                                                                                       |            |      |     |
| LN25XB60  | 25                       | 85                           | 350              | —               | -55 to 150       | 150            | 1.05                       | 12.5                         | 5                                                          | 23                       | 1.3                      | —                        | 5S                       | 58                                                                                    |            |      |     |

\* 1: T<sub>a</sub>

\* 2: SMD Package Fig.29; THD Package Fig.30

UL<sup>®</sup>: UL recognized (UL File No. E142422)

## Low V<sub>F</sub> Bridge Diodes



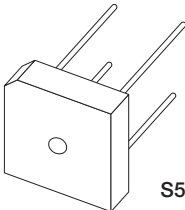
| Type No. | Absolute Maximum Ratings |                              |                  |                     |                 |                 |                  |                | Electrical Characteristics |                         |                              |                                                            |              |                          |                          | Remarks | Outline                                                                             |         |      |
|----------|--------------------------|------------------------------|------------------|---------------------|-----------------|-----------------|------------------|----------------|----------------------------|-------------------------|------------------------------|------------------------------------------------------------|--------------|--------------------------|--------------------------|---------|-------------------------------------------------------------------------------------|---------|------|
|          | I <sub>o</sub>           | Conditions<br>T <sub>c</sub> | I <sub>FSM</sub> | I <sub>FSM1</sub> * | I <sub>2t</sub> | V <sub>RM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F</sub><br>(max)    | V <sub>F</sub><br>(typ) | Conditions<br>I <sub>F</sub> | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | trr<br>(max) | θ <sub>jI</sub><br>(max) | θ <sub>ja</sub><br>(max) |         | θ <sub>jc</sub><br>(max)                                                            | Package | Fig. |
|          |                          |                              |                  |                     |                 |                 |                  |                |                            |                         |                              |                                                            |              |                          |                          |         |                                                                                     |         |      |
|          |                          |                              |                  |                     |                 |                 |                  |                |                            |                         |                              |                                                            |              |                          |                          |         |                                                                                     |         |      |
| [A]      | [°C]                     | [A]                          | [A]              | [A]                 | [V]             | [°C]            | [°C]             | [V]            | [M]                        | [M]                     | [A]                          | [μA]                                                       | [μs]         | [°C/W]                   | [°C/W]                   | [°C/W]  |                                                                                     |         |      |
| LL15XB60 | 15                       | 124                          | 200              | 630                 | 200             | 600             | -55 to 150       | 150            | 0.90                       | 0.86                    | 7.5                          | 10                                                         | 3            | 5                        | 25                       | 1       |  | 5S      | 58   |
| LL25XB60 | 25                       | 113                          | 300              | 945                 | 450             | 600             | -55 to 150       | 150            | 0.92                       | 0.87                    | 12.5                         | 10                                                         | 3            | 5                        | 25                       | 0.8     |                                                                                     |         |      |

\* : I<sub>FSM1</sub>: Pulse width 1ms

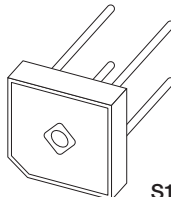
UL<sup>®</sup>: UL recognized (UL File No. E142422)

# Rectifier Diodes .....

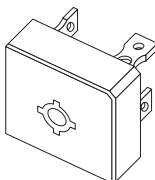
## SQIP Bridge Diodes



S5VB



S10VB



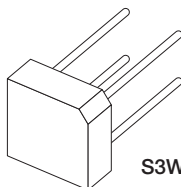
S15VB

| Type No. | Absolute Maximum Ratings |                                      |             |            |              |            | Electrical Characteristics |                         |                               |                        |                        |         | Outline |  |
|----------|--------------------------|--------------------------------------|-------------|------------|--------------|------------|----------------------------|-------------------------|-------------------------------|------------------------|------------------------|---------|---------|--|
|          | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>a</sub><br>[°C] | IFSM<br>[A] | VRM<br>[V] | Tstg<br>[°C] | Tj<br>[°C] | VF<br>(max)<br>[V]         | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | θj/<br>(max)<br>[°C/W] | θjc<br>(max)<br>[°C/W] | Package | Fig.    |  |
|          |                          |                                      |             |            |              |            |                            |                         |                               |                        |                        |         |         |  |
| S2VB60   | 2                        | 40                                   | 40          | 600        | -40 to 150   | 150        | 1.05                       | 1                       | 10                            | 7                      | —                      | S2VB    | 61      |  |
| S4VB60   | 4*1                      | 40                                   | 80          | 600        | -40 to 150   | 150        | 1.05                       | 2                       | 10                            | 4.5                    | —                      | S4VB    | 62      |  |
| S5VB60   | 6*1                      | 40                                   | 200         | 600        | -40 to 150   | 150        | 1.05                       | 3                       | 10                            | 3                      | —                      | S5VB    | 63      |  |
| S10VB60  | 10*1                     | 40                                   | 200         | 600        | -40 to 150   | 150        | 1.05                       | 5                       | 10                            | 2.8                    | —                      | S10VB   | 64      |  |
| S15VB60  | 15*1                     | 83*2                                 | 200         | 600        | -40 to 150   | 150        | 1.05                       | 7.5                     | 10                            | —                      | 2.3                    | S15VB   | 65      |  |
| S25VB60  | 25*1                     | 85*2                                 | 400         | 600        | -40 to 150   | 150        | 1.05                       | 12.5                    | 10                            | —                      | 1.5                    | S25VB   | 66      |  |
| S25VB80  |                          |                                      |             | 800        |              |            |                            |                         |                               |                        |                        |         |         |  |
| S50VB60  | 50*1                     | 95*2                                 | 500         | 600        | -40 to 150   | 150        | 1.05                       | 25                      | 10                            | —                      | 0.5                    | S50VB   | 67      |  |
| S50VB80  |                          |                                      |             | 800        |              |            |                            |                         |                               |                        |                        |         |         |  |

\* 1: With heatsink

\* 2: Tc

## Input/Output In-line Terminal Type



S3WB



S15WB

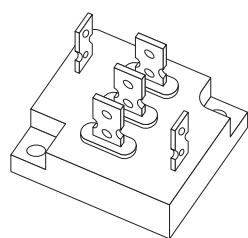


S20WB

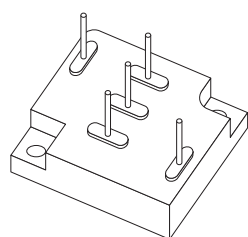
| Type No. | Absolute Maximum Ratings |                                      |                         |                        |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                   |                                    | Outline |      |
|----------|--------------------------|--------------------------------------|-------------------------|------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|-----------------------------------|------------------------------------|---------|------|
|          | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>c</sub><br>[°C] | I <sub>FSM</sub><br>[A] | V <sub>RM</sub><br>[V] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | θ <sub>j</sub><br>(max)<br>[°C/W] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package | Fig. |
|          |                          |                                      |                         |                        |                          |                        |                                |                                     |                                                                    |                                   |                                    |         |      |
| S3WB60   | 2.3                      | 40 *                                 | 120                     | 600                    | -40 to 150               | 150                    | 1.05                           | 2                                   | 10                                                                 | 5.5                               | —                                  | S3WB    | 68   |
| S10WB60  | 10                       | 74                                   | 170                     | 600                    | -40 to 150               | 150                    | 1.05                           | 5                                   | 10                                                                 | 4                                 | 3.9                                | S10WB   | 69   |
| S15WB60  | 15                       | 77                                   | 200                     | 600                    | -40 to 150               | 150                    | 1.05                           | 7.5                                 | 10                                                                 | 2                                 | 2.5                                | S15WB   | 70   |
| S20WB60  | 20                       | 76                                   | 500                     | 600                    | -40 to 150               | 150                    | 1.05                           | 10                                  | 10                                                                 | 2                                 | 2                                  | S20WB   | 71   |
| S20WB80  |                          |                                      |                         | 800                    |                          |                        |                                |                                     |                                                                    |                                   |                                    |         |      |

\* : T<sub>a</sub>

### 3 Phase Bridge Diode Modules



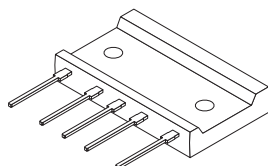
SVT



SVTA

| Type No.  | Absolute Maximum Ratings |                                      |             |            |              |                        | Electrical Characteristics     |                                     |                                                                    |                                    |  | Outline |      |
|-----------|--------------------------|--------------------------------------|-------------|------------|--------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|------------------------------------|--|---------|------|
|           | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>c</sub><br>[°C] | IFSM<br>[A] | VRM<br>[V] | Tstg<br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | θ <sub>jc</sub><br>(max)<br>[°C/W] |  | Package | Fig. |
|           |                          |                                      |             |            |              |                        |                                |                                     |                                                                    |                                    |  |         |      |
| S10VT60   | 10                       | 137                                  | 170         | 600        | -40 to 150   | 150                    | 1.05                           | 3.5                                 | 10                                                                 | 0.65                               |  | SVT     | 74   |
| S10VTA60  |                          | 137                                  | 170         | 600        | -40 to 150   | 150                    | 1.05                           | 3.5                                 | 10                                                                 | 0.65                               |  | SVTA    | 73   |
| S10VT80   |                          | 137                                  | 150         | 800        | -40 to 150   | 150                    | 1.05                           | 3.5                                 | 10                                                                 | 0.65                               |  | SVT     | 74   |
| S10VTA80  |                          | 137                                  | 150         | 800        | -40 to 150   | 150                    | 1.05                           | 3.5                                 | 10                                                                 | 0.65                               |  | SVTA    | 73   |
| S15VT60   | 15                       | 132                                  | 200         | 600        | -40 to 150   | 150                    | 1.05                           | 5                                   | 10                                                                 | 0.6                                |  | SVT     | 74   |
| S15VTA60  |                          | 132                                  | 200         | 600        | -40 to 150   | 150                    | 1.05                           | 5                                   | 10                                                                 | 0.6                                |  | SVTA    | 73   |
| S15VT80   |                          | 132                                  | 200         | 800        | -40 to 150   | 150                    | 1.05                           | 5                                   | 10                                                                 | 0.6                                |  | SVT     | 74   |
| S15VTA80  |                          | 132                                  | 200         | 800        | -40 to 150   | 150                    | 1.05                           | 5                                   | 10                                                                 | 0.6                                |  | SVTA    | 73   |
| S20VT60   | 20                       | 128                                  | 300         | 600        | -40 to 150   | 150                    | 1.05                           | 7                                   | 10                                                                 | 0.55                               |  | SVT     | 74   |
| S20VTA60  |                          | 128                                  | 300         | 600        | -40 to 150   | 150                    | 1.05                           | 7                                   | 10                                                                 | 0.55                               |  | SVTA    | 73   |
| S20VT80   |                          | 128                                  | 300         | 800        | -40 to 150   | 150                    | 1.05                           | 7                                   | 10                                                                 | 0.55                               |  | SVT     | 74   |
| S20VTA80  |                          | 128                                  | 300         | 800        | -40 to 150   | 150                    | 1.05                           | 7                                   | 10                                                                 | 0.55                               |  | SVTA    | 73   |
| S30VT60   | 30                       | 121                                  | 400         | 600        | -40 to 150   | 150                    | 1.05                           | 10                                  | 10                                                                 | 0.5                                |  | SVT     | 74   |
| S30VTA60  |                          | 121                                  | 400         | 600        | -40 to 150   | 150                    | 1.05                           | 10                                  | 10                                                                 | 0.5                                |  | SVTA    | 73   |
| S30VT80   |                          | 121                                  | 400         | 800        | -40 to 150   | 150                    | 1.05                           | 10                                  | 10                                                                 | 0.5                                |  | SVT     | 74   |
| S30VTA80  |                          | 121                                  | 400         | 800        | -40 to 150   | 150                    | 1.05                           | 10                                  | 10                                                                 | 0.5                                |  | SVTA    | 73   |
| S30VTA160 |                          | 116                                  | 350         | 1600       | -40 to 150   | 150                    | 1.05                           | 10                                  | 100                                                                | 0.5                                |  | SVTA    | 73   |

### 3 Phase SIP Bridge Diodes



TSB (5PIN)

| Type No.   | Absolute Maximum Ratings |                                      |             |            |              |            | Electrical Characteristics |                         |                               |                        |                        | Remarks         | Outline       |      |
|------------|--------------------------|--------------------------------------|-------------|------------|--------------|------------|----------------------------|-------------------------|-------------------------------|------------------------|------------------------|-----------------|---------------|------|
|            | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>C</sub><br>[°C] | IFSM<br>[A] | VRM<br>[V] | Tstg<br>[°C] | Tj<br>[°C] | VF<br>(max)<br>[V]         | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | θja<br>(max)<br>[°C/W] | θjc<br>(max)<br>[°C/W] |                 | Package       | Fig. |
|            |                          |                                      |             |            |              |            |                            |                         |                               |                        |                        |                 |               |      |
| ☆ D30XT80  | 30                       | 117                                  | 300         | 800        | -40 to 150   | 150        | 1.05                       | 10                      | 10                            | 16                     | 0.5                    | UL <sup>®</sup> | TSB<br>(5PIN) | 60   |
| ☆ D45XT80  | 45                       | 101                                  | 400         | 800        | -40 to 150   | 150        | 1.05                       | 15                      | 10                            | 16                     | 0.5                    | UL <sup>®</sup> |               |      |
| ☆ D45XT160 | 45                       | 97                                   | 330         | 1600       | -40 to 150   | 150        | 1.05                       | 15                      | 100                           | 16                     | 0.5                    | UL <sup>®</sup> |               |      |

☆: New product

UL<sup>®</sup>: UL recognized (UL File No. E142422)

### Twin Diode Modules

| Type No. | Absolute Maximum Ratings |                                      |             |            |              |            | Electrical Characteristics |                         |                               |                        | Remarks | Outline |      |
|----------|--------------------------|--------------------------------------|-------------|------------|--------------|------------|----------------------------|-------------------------|-------------------------------|------------------------|---------|---------|------|
|          | I <sub>o</sub><br>[A]    | Conditions<br>T <sub>C</sub><br>[°C] | IFSM<br>[A] | VRM<br>[V] | Tstg<br>[°C] | Tj<br>[°C] | VF<br>(max)<br>[V]         | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | θjc<br>(max)<br>[°C/W] |         | Package | Fig. |
|          |                          |                                      |             |            |              |            |                            |                         |                               |                        |         |         |      |
| D30VC60  | 30                       | 124                                  | 300         | 600        | -40 to 150   | 150        | 1.05                       | 15                      | 10                            | 0.9                    | *       | D30VC   | 76   |

\*: Center-tap



# Schottky Barrier Diodes .....

## Single

### Surface Mount



1F



M1F



M2F



2F



E-pack

| Type No. | Absolute Maximum Ratings |                |                                      |                  |                  |                | Electrical Characteristics |                                     |                                                            |                         |                         |                          |                          | Outline |      |
|----------|--------------------------|----------------|--------------------------------------|------------------|------------------|----------------|----------------------------|-------------------------------------|------------------------------------------------------------|-------------------------|-------------------------|--------------------------|--------------------------|---------|------|
|          | V <sub>RM</sub>          | I <sub>O</sub> | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>J</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | C <sub>j</sub><br>(typ) | θ <sub>j</sub><br>(max) | θ <sub>ja</sub><br>(max) | θ <sub>jc</sub><br>(max) |         |      |
|          | [V]                      | [A]            |                                      | [A]              | [°C]             | [°C]           | [V]                        |                                     | [mA]                                                       | [pF]                    | [°C/W]                  | [°C/W]                   | [°C/W]                   | Package | Fig. |
| M1FP3    | 30                       | 1.29           | 25 *2                                | 30               | -55 to 125       | 125            | 0.40                       | 1.1                                 | 2.5                                                        | 90                      | 20                      | 108                      | —                        | M1F     | 12   |
| M1FH3    |                          | 1.5            | 105                                  | 30               | -55 to 125       | 125            | 0.36                       | 1.5                                 | 1.0                                                        | 80                      | 20                      | 80                       | 18                       | M1F     | 12   |
| D1FP3    |                          | 2              | 98 *1                                | 60               | -55 to 125       | 125            | 0.40                       | 2                                   | 4.5                                                        | 130                     | 23                      | 108                      | —                        | 1F      | 13-1 |
| D1FH3    |                          | 3              | 95                                   | 60               | -55 to 125       | 125            | 0.36                       | 3.0                                 | 2.0                                                        | 130                     | 18                      | 65                       | 16                       | 1F      | 13-1 |
| D3FP3    |                          | 3              | 74 *1                                | 150              | -55 to 125       | 125            | 0.40                       | 4                                   | 10                                                         | 300                     | 24                      | 90                       | —                        | 2F      | 16-1 |
| M1FM3    |                          | 3              | 100                                  | 30               | -55 to 150       | 150            | 0.46                       | 1.5                                 | 0.05                                                       | 80                      | 20                      | 80                       | 18                       | M1F     | 12   |
| D1FM3    |                          | 5              | 83                                   | 90               | -55 to 150       | 150            | 0.46                       | 3.0                                 | 0.1                                                        | 130                     | 18                      | 65                       | 16                       | 1F      | 13-1 |
| M2FH3    |                          | 6              | 70                                   | 110              | -55 to 125       | 125            | 0.36                       | 6                                   | 4                                                          | 240                     | 16                      | 55                       | 14                       | M2F     | 15-1 |
| M2FM3    |                          | 6              | 99                                   | 120              | -55 to 150       | 150            | 0.46                       | 6                                   | 0.2                                                        | 240                     | 16                      | 55                       | 14                       | M2F     | 15-1 |
| DE10P3   |                          | 10             | 95                                   | 200              | -55 to 125       | 125            | 0.40                       | 8                                   | 25                                                         | 600                     | —                       | —                        | 4                        | E-pack  | 31-4 |
| DE10S3L  |                          | 10             | 124                                  | 250              | -55 to 150       | 150            | 0.45                       | 8                                   | 10                                                         | 640                     | —                       | —                        | 4                        | E-pack  | 31-4 |
| D1FS4    |                          | 40             | 1.1                                  | 51 *2            | 30               | -55 to 150     | 150                        | 0.55                                | 1.1                                                        | 1                       | 65                      | 23                       | 108                      | —       | 1F   |
| M1FS4    | 1.33                     |                | 25 *2                                | 30               | -55 to 150       | 150            | 0.55                       | 1.1                                 | 0.8                                                        | 50                      | 20                      | 108                      | —                        | M1F     | 12   |
| M1FJ4    | 1.5                      |                | 31 *2                                | 30               | -55 to 150       | 150            | 0.57                       | 1                                   | 0.05                                                       | 65                      | 20                      | 108                      | —                        | M1F     | 12   |
| D1FS4A   | 1.5                      |                | 28 *2                                | 60               | -55 to 150       | 150            | 0.45                       | 1.1                                 | 2                                                          | 95                      | 23                      | 108                      | —                        | 1F      | 13-1 |
| D2FS4    | 1.6                      |                | 34 *2                                | 60               | -55 to 150       | 150            | 0.55                       | 1.6                                 | 2.5                                                        | 150                     | 24                      | 90                       | —                        | 2F      | 16-1 |
| D1FJ4    | 2.0                      |                | 117 *1                               | 50               | -55 to 150       | 150            | 0.57                       | 1.5                                 | 0.2                                                        | 96                      | 23                      | 108                      | —                        | 1F      | 13-1 |
| D3FS4A   | 2.6                      |                | 34 *2                                | 150              | -55 to 150       | 150            | 0.45                       | 2.6                                 | 5                                                          | 340                     | 23                      | 80                       | —                        | 2F      | 16-1 |
| DE3S4M   | 3                        |                | 121                                  | 70               | -40 to 150       | 150            | 0.55                       | 3                                   | 2.5                                                        | 150                     | —                       | 55                       | 12                       | E-pack  | 31-2 |
| DE5S4M   | 5                        |                | 101                                  | 80               | -40 to 150       | 150            | 0.55                       | 5                                   | 3.5                                                        | 180                     | —                       | 55                       | 12                       | E-pack  | 31-2 |
| D1FS6    | 60                       |                | 1.1                                  | 25 *2            | 40               | -55 to 150     | 150                        | 0.58                                | 1.1                                                        | 1                       | 50                      | 23                       | 108                      | —       | 1F   |
| M1FS6    |                          | 1.2            | 25 *2                                | 40               | -55 to 150       | 150            | 0.58                       | 1.1                                 | 1                                                          | 53                      | 20                      | 108                      | —                        | M1F     | 12   |
| D2FS6    |                          | 1.5            | 31 *2                                | 60               | -40 to 150       | 150            | 0.58                       | 2                                   | 2                                                          | 120                     | 24                      | 90                       | —                        | 2F      | 16-1 |
| D3FS6    |                          | 3              | 87 *1                                | 80               | -55 to 150       | 150            | 0.58                       | 3                                   | 2.5                                                        | 130                     | 24                      | 90                       | —                        | 2F      | 16-1 |
| DE3S6M   |                          | 3              | 117                                  | 80               | -40 to 150       | 150            | 0.58                       | 3                                   | 2.5                                                        | 130                     | —                       | 55                       | 12                       | E-pack  | 31-2 |
| DE5S6M   |                          | 5              | 96                                   | 90               | -40 to 150       | 150            | 0.58                       | 5                                   | 4.5                                                        | 200                     | —                       | 55                       | 12                       | E-pack  | 31-2 |
| D1FJ10   | 100                      | 1.0            | 52 *2                                | 50               | -55 to 150       | 150            | 0.72                       | 1                                   | 0.2                                                        | 63                      | 23                      | 108                      | —                        | 1F      | 13-1 |
| D3FJ10   |                          | 3              | 92 *1                                | 100              | -55 to 150       | 150            | 0.74                       | 3                                   | 0.4                                                        | 143                     | 23                      | 115                      | —                        | 2F      | 16-1 |

☆: New product ★: Under development \* 1: T/ \* 2: Ta

### Axial

AX057

AX078

AX14

| Type No. | Absolute Maximum Ratings |                |                                   |                  |                  |                | Electrical Characteristics |                                  |                                                            |                         |                           |                          | Outline |               |      |
|----------|--------------------------|----------------|-----------------------------------|------------------|------------------|----------------|----------------------------|----------------------------------|------------------------------------------------------------|-------------------------|---------------------------|--------------------------|---------|---------------|------|
|          | V <sub>RM</sub>          | I <sub>O</sub> | Conditions<br>T <sub>a</sub> [°C] | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>J</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | C <sub>j</sub><br>(typ) | θ <sub>j</sub> /<br>(max) | θ <sub>ja</sub><br>(max) |         |               |      |
|          | [V]                      | [A]            |                                   | [A]              | [°C]             | [°C]           | [V]                        |                                  | [mA]                                                       | [pF]                    | [°C/W]                    | [°C/W]                   | Package | Color<br>Code | Fig. |
| D1NS4 *2 | 40                       | 1              | 59                                | 30               | -55 to 150       | 150            | 0.55                       | 1                                | 0.8                                                        | 50                      | 10                        | 113                      | AX057   | —             | 1    |
| D2S4M *2 |                          | 2              | 122 *1                            | 60               | -40 to 150       | 150            | 0.55                       | 2                                | 2                                                          | 95                      | 17                        | 105                      | AX078   | Silver        | 5-1  |
| D3S4M *2 |                          | 3              | 63                                | 80               | -40 to 150       | 150            | 0.55                       | 3                                | 3.5                                                        | 150                     | 6.5                       | 36                       | AX14    | Silver        | 8    |
| D1NS6 *2 | 60                       | 1              | 46                                | 30               | -55 to 150       | 150            | 0.58                       | 1                                | 1                                                          | 53                      | 10                        | 113                      | AX057   | —             | 1    |
| D2S6M *2 |                          | 2              | 119 *1                            | 60               | -40 to 150       | 150            | 0.58                       | 2                                | 2                                                          | 120                     | 17                        | 105                      | AX078   | Blue          | 5-1  |
| D3S6M *2 |                          | 3              | 133 *1                            | 80               | -40 to 150       | 150            | 0.58                       | 3                                | 2.5                                                        | 130                     | 6.5                       | 62                       | AX14    | Blue          | 8    |

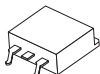
\* 1: T/ \* 2: Spec Code 5□□□ \* 3: Spec Code 7□□□  
(See page 46 for the last 3 digits of the Spec Code)

## Center Tap, Common Cathode

### Surface Mount



E-pack



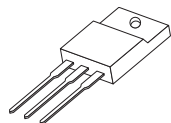
STO-220

| Type No.  | Absolute Maximum Ratings |                       |                                      |                         |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                 |                                    | Outline |      |
|-----------|--------------------------|-----------------------|--------------------------------------|-------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|---------------------------------|------------------------------------|---------|------|
|           | V <sub>RM</sub><br>[V]   | I <sub>O</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[mA] | C <sub>j</sub><br>(typ)<br>[pF] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package | Fig. |
| DE5PC3    | 30                       | 5                     | 90                                   | 90                      | -55 to 125               | 125                    | 0.4                            | 2.5                                 | 6                                                                  | 180                             | 12                                 | E-pack  | 31-1 |
| DE5SC3ML  |                          | 5                     | 110                                  | 90                      | -55 to 150               | 150                    | 0.45                           | 2.5                                 | 3.5                                                                | 190                             | 12                                 | E-pack  | 31-1 |
| DE10PC3   |                          | 10                    | 97                                   | 80                      | -55 to 125               | 125                    | 0.4                            | 4                                   | 10                                                                 | 290                             | 4                                  | E-pack  | 31-1 |
| DE10SC3L  |                          | 10                    | 124                                  | 100                     | -55 to 150               | 150                    | 0.45                           | 4                                   | 5                                                                  | 290                             | 4                                  | E-pack  | 31-1 |
| DF20PC3M  |                          | 20                    | 105                                  | 200                     | -55 to 125               | 125                    | 0.4                            | 8                                   | 35                                                                 | 560                             | 1.6                                | STO-220 | 36-1 |
| DF30PC3M  |                          | 30                    | 97                                   | 300                     | -55 to 125               | 125                    | 0.4                            | 10                                  | 50                                                                 | 840                             | 1.6                                | STO-220 | 36-1 |
| DF30SC3ML |                          | 30                    | 119                                  | 350                     | -55 to 150               | 150                    | 0.45                           | 12.5                                | 10                                                                 | 820                             | 1.6                                | STO-220 | 36-1 |
| DF40PC3   |                          | 40                    | 105                                  | 350                     | -55 to 125               | 125                    | 0.4                            | 15                                  | 45                                                                 | 1160                            | 0.8                                | STO-220 | 36-1 |
| DF40SC3L  |                          | 40                    | 112                                  | 400                     | -55 to 150               | 150                    | 0.45                           | 15                                  | 17                                                                 | 1200                            | 1.5                                | STO-220 | 36-1 |
| DE5SC4M   | 40                       | 5                     | 101                                  | 80                      | -40 to 150               | 150                    | 0.55                           | 2.5                                 | 3.5                                                                | 150                             | 12                                 | E-pack  | 31-1 |
| DE10SC4   |                          | 10                    | 132                                  | 100                     | -55 to 150               | 150                    | 0.55                           | 5                                   | 3.5                                                                | 210                             | 4                                  | E-pack  | 31-1 |
| DF10SC4M  |                          | 10                    | 125                                  | 100                     | -40 to 150               | 150                    | 0.55                           | 5                                   | 3.5                                                                | 180                             | 3                                  | STO-220 | 36-1 |
| DF15SC4M  |                          | 15                    | 129                                  | 150                     | -40 to 150               | 150                    | 0.55                           | 7.5                                 | 5                                                                  | 340                             | 1.7                                | STO-220 | 36-1 |
| DF20SC4M  |                          | 20                    | 122                                  | 230                     | -40 to 150               | 150                    | 0.55                           | 10                                  | 7.5                                                                | 390                             | 1.7                                | STO-220 | 36-1 |
| DF30JC4   |                          | 30                    | 115                                  | 250                     | -55 to 150               | 150                    | 0.61                           | 15                                  | 0.7                                                                | 560                             | 1.6                                | STO-220 | 36-1 |
| DF30SC4M  |                          | 30                    | 112                                  | 360                     | -40 to 150               | 150                    | 0.55                           | 15                                  | 10                                                                 | 590                             | 1.6                                | STO-220 | 36-1 |
| DF40SC4   |                          | 40                    | 106                                  | 350                     | -55 to 150               | 150                    | 0.55                           | 20                                  | 14                                                                 | 860                             | 1.5                                | STO-220 | 36-1 |
| DE5SC6M   | 60                       | 5                     | 92                                   | 80                      | -40 to 150               | 150                    | 0.58                           | 2.5                                 | 2.5                                                                | 130                             | 12                                 | E-pack  | 31-1 |
| DF10SC6   |                          | 10                    | 132                                  | 150                     | -55 to 150               | 150                    | 0.58                           | 5                                   | 4.5                                                                | 260                             | 2.0                                | STO-220 | 36-1 |
| DF25SC6M  |                          | 25                    | 115                                  | 300                     | -40 to 150               | 150                    | 0.58                           | 12.5                                | 10                                                                 | 490                             | 1.6                                | STO-220 | 36-1 |
| DF30JC6   |                          | 30                    | 108                                  | 250                     | -55 to 150               | 150                    | 0.69                           | 15                                  | 0.7                                                                | 490                             | 1.6                                | STO-220 | 36-1 |
| DF10SC9   | 90                       | 10                    | 131                                  | 150                     | -55 to 150               | 150                    | 0.75                           | 5                                   | 3                                                                  | 185                             | 1.2                                | STO-220 | 36-1 |
| DF20SC9M  |                          | 20                    | 111                                  | 200                     | -40 to 150               | 150                    | 0.75                           | 10                                  | 10                                                                 | 370                             | 1.6                                | STO-220 | 36-1 |
| DF15JC10  | 100                      | 15                    | 126                                  | 150                     | -55 to 150               | 150                    | 0.86                           | 7.5                                 | 0.6                                                                | 200                             | 1.8                                | STO-220 | 36-1 |
| DF20JC10  |                          | 20                    | 121                                  | 200                     | -55 to 150               | 150                    | 0.86                           | 10                                  | 0.7                                                                | 260                             | 1.6                                | STO-220 | 36-1 |
| DF30JC10  |                          | 30                    | 116                                  | 300                     | -55 to 150               | 150                    | 0.86                           | 15                                  | 1.0                                                                | 390                             | 1.3                                | STO-220 | 36-1 |
| DF10NC15  | 150                      | 10                    | 123                                  | 100                     | -55 to 150               | 150                    | 0.88                           | 5                                   | 0.2                                                                | 110                             | 3.0                                | STO-220 | 36-1 |
| DF15NC15  |                          | 15                    | 126                                  | 150                     | -55 to 150               | 150                    | 0.88                           | 7.5                                 | 0.3                                                                | 155                             | 1.8                                | STO-220 | 36-1 |
| DF20NC15  |                          | 20                    | 121                                  | 200                     | -55 to 150               | 150                    | 0.88                           | 10                                  | 0.4                                                                | 200                             | 1.6                                | STO-220 | 36-1 |
| DF30NC15  |                          | 30                    | 115                                  | 300                     | -55 to 150               | 150                    | 0.88                           | 15                                  | 0.5                                                                | 300                             | 1.3                                | STO-220 | 36-1 |

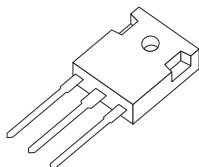
Center-tap

# Schottky Barrier Diodes .....

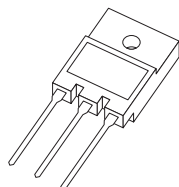
## Three Terminal Type



FTO-220  
FTO-220A  
FTO-220G



MTO-3P/MTO-3PT



ITO-3P

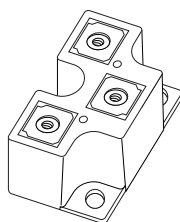
| Type No.   | Absolute Maximum Ratings |                       |                                      |                         |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                 |                                    | Outline  |      |
|------------|--------------------------|-----------------------|--------------------------------------|-------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|---------------------------------|------------------------------------|----------|------|
|            | V <sub>RM</sub><br>[V]   | I <sub>O</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>stg</sub><br>[°C] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[mA] | C <sub>j</sub><br>(typ)<br>[pF] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package  | Fig. |
|            |                          |                       |                                      |                         |                          |                        |                                |                                     |                                                                    |                                 |                                    |          |      |
| ☆SG10SC4M  | 40                       | 10                    | 150                                  | 150                     | -55 to 175               | 175                    | 0.52                           | 5                                   | 0.5                                                                | 157                             | 3.0                                | FTO-220G | 52   |
| ☆S30SC4MT  |                          | 30                    | 132                                  | 300                     | -55 to 150               | 150                    | 0.55                           | 15                                  | 1.5                                                                | 410                             | 0.8                                | MTO-3PT  | 96   |
| D30SC4M    |                          | 30                    | 112                                  | 300                     | -40 to 150               | 150                    | 0.55                           | 15                                  | 10                                                                 | 590                             | 1.6                                | ITO-3P   | 44-1 |
| ☆S60SC4MT  |                          | 60                    | 127                                  | 500                     | -55 to 150               | 150                    | 0.55                           | 30                                  | 3                                                                  | 790                             | 0.5                                | MTO-3PT  | 96   |
| ☆SG10SC6M  | 60                       | 10                    | 145                                  | 140                     | -55 to 175               | 175                    | 0.56                           | 5                                   | 0.5                                                                | 165                             | 3.0                                | FTO-220G | 52   |
| ☆SG20SC6M  |                          | 20                    | 107                                  | 200                     | -55 to 150               | 150                    | 0.61                           | 10                                  | 0.8                                                                | 250                             | 2.5                                | FTO-220G | 52   |
| D25SC6M    |                          | 25                    | 117                                  | 300                     | -40 to 150               | 150                    | 0.58                           | 12.5                                | 10                                                                 | 490                             | 1.5                                | ITO-3P   | 44-1 |
| ☆SG30SC6M  |                          | 30                    | 100                                  | 300                     | -55 to 150               | 150                    | 0.61                           | 15                                  | 1.2                                                                | 385                             | 2.0                                | FTO-220G | 52   |
| ☆S60SC6MT  | 90                       | 60                    | 121                                  | 470                     | -55 to 150               | 150                    | 0.67                           | 30                                  | 2                                                                  | 640                             | 0.5                                | MTO-3PT  | 96   |
| ☆SG10SC9M  |                          | 10                    | 139                                  | 150                     | -55 to 175               | 175                    | 0.75                           | 5                                   | 0.5                                                                | 140                             | 3.0                                | FTO-220G | 52   |
| D20SC9M    |                          | 20                    | 111                                  | 200                     | -40 to 150               | 150                    | 0.75                           | 10                                  | 10                                                                 | 370                             | 1.6                                | ITO-3P   | 44-1 |
| ☆SG20TC10M |                          | 20                    | 140                                  | 200                     | -55 to 175               | 175                    | 0.86                           | 10                                  | 0.03                                                               | 185                             | 2.2                                | FTO-220G | 52   |
| ☆SG30TC10M | 100                      | 30                    | 126                                  | 300                     | -55 to 175               | 175                    | 0.86                           | 15                                  | 0.04                                                               | 242                             | 2.0                                | FTO-220G | 52   |
| ☆SG40TC10M |                          | 40                    | 116                                  | 350                     | -55 to 175               | 175                    | 0.86                           | 20                                  | 0.06                                                               | 362                             | 1.8                                | FTO-220G | 52   |
| ☆SG20TC12M | 120                      | 20                    | 137                                  | 200                     | -55 to 175               | 175                    | 0.87                           | 10                                  | 0.03                                                               | 175                             | 2.2                                | FTO-220G | 52   |
| ☆SG30TC12M |                          | 30                    | 122                                  | 300                     | -55 to 175               | 175                    | 0.87                           | 15                                  | 0.04                                                               | 228                             | 2.0                                | FTO-220G | 52   |
| ☆SG40TC12M |                          | 40                    | 112                                  | 350                     | -55 to 175               | 175                    | 0.87                           | 20                                  | 0.06                                                               | 336                             | 1.8                                | FTO-220G | 52   |
| ☆SG10TC15M |                          | 10                    | 153                                  | 120                     | -55 to 175               | 175                    | 0.88                           | 5                                   | 0.015                                                              | 92                              | 2.5                                | FTO-220G | 52   |
| ☆SG20TC15M | 150                      | 20                    | 136                                  | 200                     | -55 to 175               | 175                    | 0.88                           | 10                                  | 0.03                                                               | 159                             | 2.2                                | FTO-220G | 52   |
| ☆SG30TC15M |                          | 30                    | 122                                  | 300                     | -55 to 175               | 175                    | 0.88                           | 15                                  | 0.04                                                               | 209                             | 2.0                                | FTO-220G | 52   |

☆: New product

Center-tap



## SBD Module



Module

| Type No. | Absolute Maximum Ratings |                       |                                      |                         |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                 |                                    |         | Outline |      |
|----------|--------------------------|-----------------------|--------------------------------------|-------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|---------------------------------|------------------------------------|---------|---------|------|
|          | V <sub>RM</sub><br>[V]   | I <sub>O</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>stg</sub><br>[°C] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[mA] | C <sub>j</sub><br>(typ)<br>[nF] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Remarks | Package | Fig. |
|          |                          |                       |                                      |                         |                          |                        |                                |                                     |                                                                    |                                 |                                    |         |         |      |
| D120SC4M | 40                       | 120                   | 90                                   | 800                     | -40 to 125               | 125                    | 0.58                           | 60                                  | 40                                                                 | 2.1                             | 0.34                               | * 1     | Module  | 77   |
| D180SC4M |                          | 180                   | 83                                   | 800                     | -40 to 125               | 125                    | 0.58                           | 60                                  | 40                                                                 | 2.1                             | 0.25                               | * 2     | Module  | 79-1 |
| D240SC4M |                          | 240                   | 77                                   | 1600                    | -40 to 125               | 125                    | 0.60                           | 120                                 | 80                                                                 | 4.2                             | 0.23                               | * 1     | Module  | 77   |
| D360SC4M |                          | 360                   | 64                                   | 1600                    | -40 to 125               | 125                    | 0.60                           | 120                                 | 80                                                                 | 4.2                             | 0.18                               | * 2     | Module  | 79-1 |
| D120SC6M | 60                       | 120                   | 85                                   | 800                     | -40 to 125               | 125                    | 0.67                           | 60                                  | 40                                                                 | 2.2                             | 0.34                               | * 1     | Module  | 77   |
| D180SC6M |                          | 180                   | 78                                   | 800                     | -40 to 125               | 125                    | 0.67                           | 60                                  | 40                                                                 | 2.2                             | 0.25                               | * 2     | Module  | 79-1 |
| D240SC6M |                          | 240                   | 71                                   | 1600                    | -40 to 125               | 125                    | 0.67                           | 120                                 | 80                                                                 | 4.4                             | 0.23                               | * 1     | Module  | 77   |
| D360SC6M |                          | 360                   | 58                                   | 1600                    | -40 to 125               | 125                    | 0.67                           | 120                                 | 80                                                                 | 4.4                             | 0.18                               | * 2     | Module  | 79-1 |

\* 1



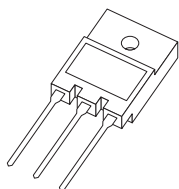
\* 2





## Center Tap, Common Anode

### Three Terminal Type



ITO-3P

| Type No.        | Absolute Maximum Ratings |                |                              |                  |                  |                | Electrical Characteristics |                              |                                                            |                         |                          | Outline |      |
|-----------------|--------------------------|----------------|------------------------------|------------------|------------------|----------------|----------------------------|------------------------------|------------------------------------------------------------|-------------------------|--------------------------|---------|------|
|                 | V <sub>RM</sub>          | I <sub>O</sub> | Conditions<br>T <sub>C</sub> | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub> | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub> | C <sub>j</sub><br>(typ) | θ <sub>jc</sub><br>(max) | Package | Fig. |
|                 | [V]                      | [A]            |                              | [A]              | [°C]             | [°C]           | [V]                        |                              | [mA]                                                       | [pF]                    | [°C/W]                   |         |      |
| <b>D25SC6MR</b> | 60                       | 25             | 117                          | 300              | -40 to 150       | 150            | 0.58                       | 12.5                         | 10                                                         | 490                     | 1.5                      | ITO-3P  | 44-2 |

Center-tap (R) 

# Schottky Barrier Diodes ..... High frequency rectifying

## Array

### Surface Mount



1Z

| Type No. | Absolute Maximum Ratings |     |                  |      |            |     | Electrical Characteristics |                  |                       |             |                        |                        | Outline |      |
|----------|--------------------------|-----|------------------|------|------------|-----|----------------------------|------------------|-----------------------|-------------|------------------------|------------------------|---------|------|
|          | VRM                      | Io  | Conditions<br>Ta | IFSM | Tstg       | Tj  | VF<br>(max)                | Conditions<br>IF | IR<br>(max)<br>VR=VRM | Cj<br>(typ) | $\theta_{jI}$<br>(max) | $\theta_{ja}$<br>(max) | Package | Fig. |
|          |                          |     |                  |      |            |     |                            |                  |                       |             |                        |                        |         |      |
| S1ZAS4   | 40                       | 1.2 | 49               | 40   | -40 to 150 | 150 | 0.55                       | 1                | 1                     | 65          | 25                     | 93                     | 1Z      | 23-2 |

★: Under development

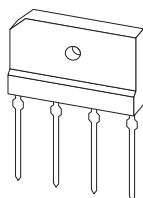
Array type



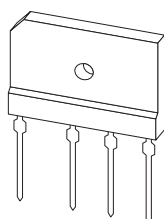
\* 1: Per diode at two elements operation

## Schottky Barrier Diode Bridges

### Single Inline Package



3S



5S

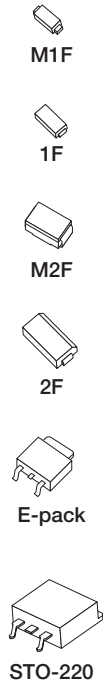
| Type No.  | Absolute Maximum Ratings |    |                  |      |            |     | Electrical Characteristics |                  |                               |             |              | Outline |      |
|-----------|--------------------------|----|------------------|------|------------|-----|----------------------------|------------------|-------------------------------|-------------|--------------|---------|------|
|           | VRM                      | Io | Conditions<br>Tc | IFSM | Tstg       | Tj  | VF<br>(max)                | Conditions<br>IF | IR<br>(max)<br>VR=VRM<br>[mA] | Cj<br>(typ) | θjc<br>(max) | Package | Fig. |
|           |                          |    |                  |      |            |     |                            |                  |                               |             |              |         |      |
| D4SBS4    | 40                       | 4  | 116              | 60   | -55 to 150 | 150 | 0.55                       | 2                | 2                             | 95          | 5.5          | 3S      | 57   |
| D4SBS6    | 60                       | 4  | 114              | 60   | -40 to 150 | 150 | 0.62                       | 2                | 2                             | 180         | 5.5          |         |      |
| D10SBS4   | 40                       | 10 | 67               | 100  | -55 to 150 | 150 | 0.55                       | 5                | 3.5                           | 180         | 5.5          |         |      |
| D15XBS6   | 60                       | 15 | 59               | 150  | -55 to 150 | 150 | 0.63                       | 7.5              | 6                             | 410         | 3.5          |         |      |
| ☆D20XBS6  | 60                       | 20 | 100              | 200  | -55 to 150 | 150 | 0.63                       | 10               | 8                             | 370         | 1.5          | 5S      | 58   |
| ☆D4SBN20  | 200                      | 4  | 103              | 60   | -55 to 150 | 150 | 0.9                        | 2                | 0.0015                        | 60          | 6            | 3S      | 57   |
| ☆D6SBN20  | 200                      | 6  | 110              | 120  | -55 to 150 | 150 | 0.9                        | 3                | 0.002                         | 85          | 3.4          | 5S      | 58   |
| ☆D15XBN20 | 200                      | 15 | 106              | 200  | -55 to 150 | 150 | 0.9                        | 7.5              | 0.005                         | 190         | 1.5          |         |      |
| ☆D30XBN20 | 200                      | 30 | 91               | 350  | -55 to 150 | 150 | 0.9                        | 15               | 0.01                          | 360         | 1            |         |      |

☆: New product

# Super Fast Recovery Diodes ..... High frequency rectifying

## Single

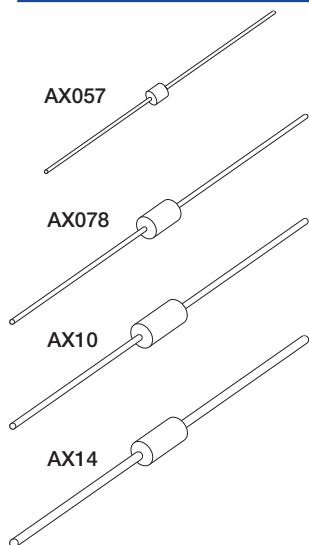
### Surface Mount



| Type No.  | Absolute Maximum Ratings |     |            |      |            |      | Electrical Characteristics |            |                         |               |                 |                 |                 | Outline |      |
|-----------|--------------------------|-----|------------|------|------------|------|----------------------------|------------|-------------------------|---------------|-----------------|-----------------|-----------------|---------|------|
|           | VRM                      | Io  | Conditions | IFSM | Tstg       | Tj   | VF                         | Conditions | IR                      | trr           | θj/             | θja             | θjc             | Package | Fig. |
|           | [V]                      | [A] | Tc<br>[°C] | [A]  | [°C]       | [°C] | (max)<br>[V]               | IF<br>[A]  | (max)<br>VR=VRM<br>[μA] | (max)<br>[ns] | (max)<br>[°C/W] | (max)<br>[°C/W] | (max)<br>[°C/W] |         |      |
| M1FL20U   | 200                      | 1.1 | 25 *1      | 30   | -55 to 150 | 150  | 0.98                       | 1.1        | 10                      | 35            | 20              | 108             | —               | M1F     | 12   |
| D1FL20U   |                          | 1.1 | 25 *1      | 20   | -55 to 150 | 150  | 0.98                       | 1.1        | 10                      | 35            | 23              | 108             | —               | 1F      | 13-1 |
| ☆M2FL20U  |                          | 1.5 | 31 *1      | 50   | -55 to 150 | 150  | 0.92                       | 1.5        | 10                      | 35            | 33              | 90              | —               | M2F     | 15-1 |
| ☆M3FL20U  |                          | 3   | 75 *2      | 75   | -55 to 150 | 150  | 0.95                       | 3          | 10                      | 35            | 25              | 110             | —               | M2F     | 15-1 |
| D2FL20U   |                          | 1.5 | 25 *1      | 50   | -55 to 150 | 150  | 0.98                       | 1.5        | 10                      | 35            | 24              | 90              | —               | 2F      | 16-1 |
| DE3L20U   |                          | 3   | 113        | 60   | -55 to 150 | 150  | 0.98                       | 3          | 10                      | 35            | —               | 55              | 12              | E-pack  | 31-2 |
| M1FL40    | 400                      | 1.0 | 25 *1      | 25   | -55 to 150 | 150  | 1.3                        | 1          | 10                      | 50            | 20              | 80              | 18              | M1F     | 12   |
| D1FL40    |                          | 0.8 | 25 *1      | 25   | -55 to 150 | 150  | 1.3                        | 0.8        | 10                      | 50            | 23              | 108             | —               | 1F      | 13-1 |
| ☆D1FL40U  |                          | 1.5 | 103        | 30   | -55 to 150 | 150  | 1.2                        | 1          | 10                      | 25            | 23              | 157             | —               | 1F      | 13-1 |
| D2FL40    |                          | 1.3 | 25 *1      | 40   | -40 to 150 | 150  | 1.3                        | 1.3        | 10                      | 50            | 24              | 90              | —               | 2F      | 16-1 |
| DE3L40    |                          | 3   | 99         | 50   | -55 to 150 | 150  | 1.3                        | 3          | 10                      | 50            | —               | 55              | 12              | E-pack  | 31-2 |
| D1FK60    |                          | 0.8 | 29 *1      | 20   | -55 to 150 | 150  | 1.3                        | 0.8        | 10                      | 75            | 23              | 108             | —               | 1F      | 13-1 |
| D2FK60    | 600                      | 1.5 | 101 *2     | 40   | -55 to 150 | 150  | 1.3                        | 1.5        | 10                      | 75            | 24              | 90              | —               | 2F      | 16-1 |
| DE5L60    |                          | 5   | 57         | 60   | -55 to 150 | 150  | 2.0                        | 5          | 10                      | 50            | —               | —               | 12              | E-pack  | 31-2 |
| ☆DE5L60U  |                          | 5   | 91         | 60   | -55 to 150 | 150  | 3                          | 5          | 25                      | 25            | —               | —               | 4               | E-pack  | 31-2 |
| ☆DF8L60US |                          | 8   | 66         | 60   | -55 to 150 | 150  | 3.6                        | 8          | 50                      | 25            | —               | —               | 2.3             | STO-220 | 36-2 |
| DF10L60   |                          | 10  | 105        | 100  | -55 to 150 | 150  | 1.9                        | 10         | 10                      | 50            | —               | —               | 2               | STO-220 | 36-2 |
| DF20L60   |                          | 20  | 84         | 170  | -55 to 150 | 150  | 1.9                        | 20         | 25                      | 70            | —               | —               | 1.5             | STO-220 | 36-2 |
| DF20L60U  | 700                      | 20  | 93         | 160  | -55 to 150 | 150  | 3.0                        | 20         | 25                      | 35            | —               | —               | 0.9             | STO-220 | 36-2 |
| D1FK70    |                          | 0.8 | 32 *1      | 25   | -55 to 150 | 150  | 1.3                        | 0.8        | 10                      | 400           | 23              | 108             | —               | 1F      | 13-1 |

☆: New product ★: Under development \* 1: Ta \* 2: Tj

### Axial

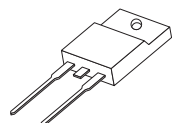


| Type No.   | Absolute Maximum Ratings |     |                          |      |            |      | Electrical Characteristics |                         |                               |              |              |              | Outline       |        |     |
|------------|--------------------------|-----|--------------------------|------|------------|------|----------------------------|-------------------------|-------------------------------|--------------|--------------|--------------|---------------|--------|-----|
|            | VRM                      | Io  | Conditions<br>Ta<br>[°C] | IFSM | Tstg       | Tj   | VF<br>(max)                | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | trr<br>(max) | θj/<br>(max) | θja<br>(max) |               |        |     |
|            | [V]                      | [A] |                          | [A]  | [°C]       | [°C] | [V]                        |                         | [ns]                          | [°C/W]       | [°C/W]       | Package      | Color<br>Code | Fig.   |     |
| D1NL20U *2 | 200                      | 1   | 25                       | 25   | -55 to 150 | 150  | 0.98                       | 1                       | 10                            | 35           | 10           | 113          | AX057         | —      | 1   |
| D2L20U *2  |                          | 1.5 | 125 *1                   | 40   | -40 to 150 | 150  | 0.98                       | 1.5                     | 10                            | 35           | 17           | 105          | AX078         | Red    | 5-1 |
| S2L20U *2  |                          | 1.5 | 25                       | 50   | -40 to 150 | 150  | 0.98                       | 1.5                     | 10                            | 35           | 12           | 83           | AX10          | Red    | 6-1 |
| S3L20U *2  |                          | 3   | 128 *1                   | 60   | -40 to 150 | 150  | 0.98                       | 2.1                     | 10                            | 35           | 6.5          | 60           | AX14          | Red    | 8   |
| D1NL40 *2  | 400                      | 1   | 25                       | 25   | -55 to 150 | 150  | 1.3                        | 0.9                     | 10                            | 50           | 10           | 113          | AX057         | —      | 1   |
| S2L40 *2   |                          | 2   | 25                       | 40   | -55 to 150 | 150  | 1.3                        | 1.1                     | 10                            | 50           | 12           | 83           | AX10          | Yellow | 6-1 |
| D2L40 *3   |                          | 2   | 108 *1                   | 40   | -55 to 150 | 150  | 1.3                        | 1.1                     | 10                            | 50           | 17           | 105          | AX078         | Yellow | 5-1 |
| S3L40 *2   |                          | 3   | 123 *1                   | 60   | -55 to 150 | 150  | 1.3                        | 3                       | 10                            | 50           | 6.5          | 60           | AX14          | Yellow | 8   |
| D1NF60 *2  | 600                      | 0.8 | 25                       | 50   | -55 to 150 | 150  | 1.3                        | 0.8                     | 10                            | 400          | 10           | 113          | AX057         | —      | 1   |
| ☆D1NK60 *2 |                          | 0.8 | 26                       | 35   | -55 to 150 | 150  | 1.3                        | 0.8                     | 10                            | 75           | 10           | 113          | AX057         | —      | 1   |
| S2L60 *2   |                          | 1.5 | 125 *1                   | 50   | -55 to 150 | 150  | 1.5                        | 1.5                     | 10                            | 50           | 12           | 83           | AX10          | Blue   | 6-1 |
| S3K60 *2   |                          | 3   | 123 *1                   | 120  | -55 to 150 | 150  | 1.3                        | 3                       | 10                            | 100          | 6.5          | 60           | AX14          | Blue   | 8   |
| S3L60 *2   |                          | 2.2 | 132 *1                   | 60   | -55 to 150 | 150  | 1.5                        | 2.2                     | 10                            | 50           | 6.5          | 60           | AX14          | Blue   | 8   |

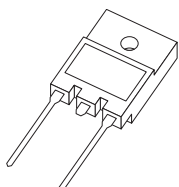
☆: New product \* 1: Tj \* 2: Spec Code 5□□□ \* 3: Spec Code 7□□□  
(See page 46 for the last 3 digits of the Spec Code)

# Super Fast Recovery Diodes .....

## Two Terminal Type



FTO-220



ITO-3P

| Type No.   | Absolute Maximum Ratings |                |                                      |                  |                  |                | Electrical Characteristics |                                     |                                                                    |                                  |                                    | Outline  |      |
|------------|--------------------------|----------------|--------------------------------------|------------------|------------------|----------------|----------------------------|-------------------------------------|--------------------------------------------------------------------|----------------------------------|------------------------------------|----------|------|
|            | V <sub>RM</sub>          | I <sub>O</sub> | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>J</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package  | Fig. |
|            | [V]                      | [A]            |                                      | [A]              | [°C]             | [°C]           | [V]                        |                                     |                                                                    |                                  |                                    |          |      |
| SF3L60U    | 600                      | 3              | 115                                  | 40               | -55 to 150       | 150            | 3.00                       | 3                                   | 25                                                                 | 20                               | 3.8                                | FTO-220  | 47   |
| SF5L60U    |                          | 5              | 96                                   | 60               | -55 to 150       | 150            | 3.00                       | 5                                   | 25                                                                 | 25                               | 3.6                                | FTO-220  | 47   |
| ☆SF8L60USM |                          | 8              | 58                                   | 60               | -55 to 150       | 150            | 3.6                        | 8                                   | 50                                                                 | 25                               | 2.5                                | FTO-220A | 49   |
| SF10L60U   |                          | 10             | 85                                   | 120              | -55 to 150       | 150            | 3.00                       | 10                                  | 25                                                                 | 25                               | 2.0                                | FTO-220  | 47   |
| SF20L60U   |                          | 20             | 68                                   | 180              | -55 to 150       | 150            | 3.00                       | 20                                  | 25                                                                 | 35                               | 1.3                                | FTO-220  | 47   |
| D30L60     |                          | 30             | 85                                   | 600              | -55 to 150       | 150            | 1.5                        | 30                                  | 25                                                                 | 150                              | 1.4                                | ITO-3P   | 43   |

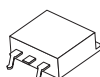
☆: New product

## Center Tap, Common Cathode

### Surface Mount



E-pack

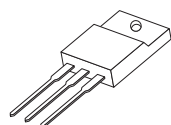


STO-220

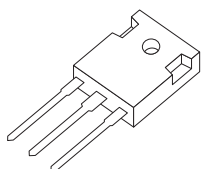
| Type No.   | Absolute Maximum Ratings |                |                                      |                  |                  |                | Electrical Characteristics |                                     |                                                                    |                                  |                                    |                                    | Outline |      |
|------------|--------------------------|----------------|--------------------------------------|------------------|------------------|----------------|----------------------------|-------------------------------------|--------------------------------------------------------------------|----------------------------------|------------------------------------|------------------------------------|---------|------|
|            | V <sub>RM</sub>          | I <sub>O</sub> | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>J</sub> | V <sub>F</sub><br>(max)    | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] | θ <sub>ja</sub><br>(max)<br>[°C/W] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package | Fig. |
|            | [V]                      | [A]            |                                      | [A]              | [°C]             | [°C]           | [V]                        |                                     |                                                                    |                                  |                                    |                                    |         |      |
| DE5LC20U   | 200                      | 5              | 81                                   | 50               | -55 to 150       | 150            | 0.98                       | 2.5                                 | 10                                                                 | 35                               | 55                                 | 12                                 | E-pack  | 31-1 |
| DF10LC20U  |                          | 10             | 127                                  | 80               | -40 to 150       | 150            | 0.98                       | 5                                   | 10                                                                 | 35                               | —                                  | 2                                  | STO-220 | 36-1 |
| DF20LC20US |                          | 20             | 125                                  | 180              | -55 to 150       | 150            | 0.96                       | 10                                  | 10                                                                 | 25                               | —                                  | 1.3                                | STO-220 | 36-1 |
| DF10LC30   | 300                      | 10             | 124                                  | 80               | -55 to 150       | 150            | 1.3                        | 5                                   | 25                                                                 | 30                               | —                                  | 2.0                                | STO-220 | 36-1 |
| DF20LC30   |                          | 20             | 124                                  | 180              | -55 to 150       | 150            | 1.3                        | 10                                  | 25                                                                 | 30                               | —                                  | 1.0                                | STO-220 | 36-1 |
| DE5LC40    | 400                      | 5              | 61                                   | 50               | -55 to 150       | 150            | 1.3                        | 2.5                                 | 10                                                                 | 50                               | 55                                 | 12                                 | E-pack  | 31-1 |

Center-tap

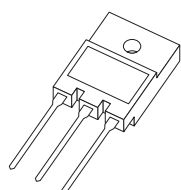
## Three Terminal Type



FTO-220



MTO-3P



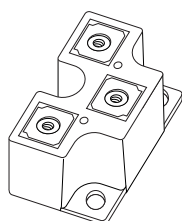
ITO-3P

| Type No.     | Absolute Maximum Ratings |     |                          |      |            |     | Electrical Characteristics |                         |                               |                      |                        | Outline  |      |
|--------------|--------------------------|-----|--------------------------|------|------------|-----|----------------------------|-------------------------|-------------------------------|----------------------|------------------------|----------|------|
|              | VRM                      | Io  | Conditions<br>Tc<br>[°C] | IFSM | Tstg       | Tj  | VF<br>(max)                | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | trr<br>(max)<br>[ns] | θjc<br>(max)<br>[°C/W] | Package  | Fig. |
|              |                          |     |                          |      |            |     |                            |                         |                               |                      |                        |          |      |
| ☆SG5LC20USM  | 200                      | 5   | 134                      | 70   | -55 to 150 | 150 | 0.96                       | 2.5                     | 10                            | 25                   | 3.1                    | FTO-220G | 52   |
| ☆SG10LC20USM |                          | 10  | 122                      | 90   | -55 to 150 | 150 | 0.96                       | 5                       | 10                            | 25                   | 2.8                    | FTO-220G | 52   |
| ☆SG20LC20USM |                          | 20  | 95                       | 150  | -55 to 150 | 150 | 0.96                       | 10                      | 10                            | 25                   | 2.8                    | FTO-220G | 52   |
| ☆S20LC20UST  |                          | 20  | 126                      | 120  | -55 to 150 | 150 | 0.96                       | 10                      | 10                            | 25                   | 1.2                    | MTO-3PT  | 96   |
| D20LC20U     | 300                      | 20  | 112                      | 150  | -40 to 150 | 150 | 0.98                       | 10                      | 10                            | 35                   | 1.7                    | ITO-3P   | 44-1 |
| SF20LC30     |                          | 20  | 112                      | 180  | -55 to 150 | 150 | 1.3                        | 10                      | 25                            | 30                   | 1.5                    | FTO-220  | 48-1 |
| S20LC30      |                          | 20  | 119                      | 180  | -55 to 150 | 150 | 1.3                        | 10                      | 25                            | 30                   | 1.2                    | MTO-3P   | 46-1 |
| D20LC40      |                          | 400 | 102                      | 120  | -40 to 150 | 150 | 1.3                        | 10                      | 10                            | 50                   | 1.7                    | ITO-3P   | 44-1 |
| ☆S20LC60US   | 600                      | 20  | 63                       | 60   | -55 to 150 | 150 | 3.6                        | 10                      | 50                            | 25                   | 1.0                    | MTO-3P   | 46-1 |

☆: New product

Center-tap

## Super FRD Module



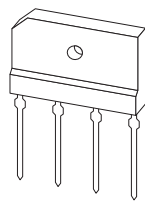
Module

| Type No.  | Absolute Maximum Ratings |                       |                                      |                         |                          |                        | Electrical Characteristics     |                                     |                                                                    |                                  |                                    | Outline |      |
|-----------|--------------------------|-----------------------|--------------------------------------|-------------------------|--------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------------------------------------------|----------------------------------|------------------------------------|---------|------|
|           | V <sub>RM</sub><br>[V]   | I <sub>O</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RM</sub><br>[μA] | t <sub>rr</sub><br>(max)<br>[ns] | θ <sub>jc</sub><br>(max)<br>[°C/W] | Package | Fig. |
|           |                          |                       |                                      |                         |                          |                        |                                |                                     |                                                                    |                                  |                                    |         |      |
| D120LC40  | 400                      | 120                   | 95                                   | 650                     | -40 to 150               | 150                    | 1.3                            | 60                                  | 25                                                                 | 100                              | 0.31                               | Module  | 79-2 |
| D120LC40B |                          |                       | 60                                   |                         |                          |                        |                                |                                     |                                                                    |                                  | 0.5                                |         | 78   |
| D200LC40B |                          | 200                   | 52                                   | 1400                    |                          |                        |                                | 100                                 | 50                                                                 | 150                              | 0.35                               |         | 79-2 |
| D240LC40  |                          | 240                   | 77                                   |                         |                          |                        |                                |                                     |                                                                    |                                  | 0.2                                |         |      |

# Super Fast Recovery Diodes ..... High frequency rectifying

## Super Fast Recovery Diode Bridges

### Single Inline Package



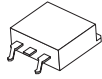
3S

| Type No. | Absolute Maximum Ratings |     |                          |      |            |      | Electrical Characteristics |                         |                               |              |              |              |              | Outline |      |
|----------|--------------------------|-----|--------------------------|------|------------|------|----------------------------|-------------------------|-------------------------------|--------------|--------------|--------------|--------------|---------|------|
|          | VRM                      | Io  | Conditions<br>Tc<br>[°C] | IFSM | Tstg       | Tj   | VF<br>(max)                | Conditions<br>IF<br>[A] | IR<br>(max)<br>VR=VRM<br>[μA] | trr<br>(max) | θjI<br>(max) | θja<br>(max) | θjc<br>(max) | Package | Fig. |
|          | [V]                      | [A] |                          | [A]  | [°C]       | [°C] | [V]                        |                         | [A]                           | [ns]         | [°C/W]       | [°C/W]       | [°C/W]       |         |      |
| D4SBL20U | 200                      | 4   | 108                      | 80   | -55 to 150 | 150  | 0.98                       | 2                       | 10                            | 35           | 6            | 30           | 5.5          | 3S      | 57   |
| D4SBL40  | 400                      | 4   | 91                       | 50   | -55 to 150 | 150  | 1.3                        | 2.5                     | 10                            | 50           | 6            | 30           | 5.5          |         |      |

# Power MOSFETs .....

## CoolMOS C3 series

### Surface Mount

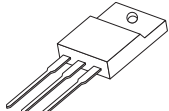


STO-220

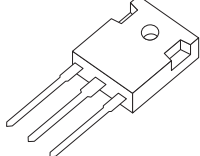
| Type No.  | Absolute Maximum Ratings |                |                |                  |                 | Electrical Characteristics   |                           |                           |                           |                         |                             |                         |                              |                         | Outline |      |
|-----------|--------------------------|----------------|----------------|------------------|-----------------|------------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-----------------------------|-------------------------|------------------------------|-------------------------|---------|------|
|           | V <sub>DSS</sub>         | I <sub>D</sub> | P <sub>T</sub> | V <sub>GSS</sub> | T <sub>ch</sub> | R <sub>DS(ON)</sub><br>(max) | C <sub>iss</sub><br>(typ) | C <sub>oss</sub><br>(typ) | C <sub>rss</sub><br>(typ) | Q <sub>g</sub><br>(typ) | t <sub>d(on)</sub><br>(typ) | t <sub>r</sub><br>(typ) | t <sub>d(off)</sub><br>(typ) | t <sub>f</sub><br>(typ) | Package | Fig. |
|           | [V]                      | [A]            | [W]            | [V]              | [°C]            | [Ω]                          | [pF]                      | [pF]                      | [pF]                      | [nC]                    | [ns]                        | [ns]                    | [ns]                         | [ns]                    |         |      |
| ★F11S60C3 | 600                      | 11             | 40             | ± 30             | 150             | 0.38                         | 1200                      | 390                       | 30                        | 45                      | 18                          | 30                      | 190                          | 32                      | STO-220 | 36-3 |
| ★F15S60C3 |                          | 15             | 45             |                  |                 | 0.28                         | 1600                      | 510                       | 40                        | 56                      | 26                          | 42                      | 240                          | 36                      |         |      |
| F20S60C3  |                          | 20             | 50             |                  |                 | 0.19                         | 2400                      | 780                       | 50                        | 87                      | 32                          | 60                      | 355                          | 60                      |         |      |
| F11S80C3  | 800                      | 11             | 50             |                  |                 | 0.45                         | 1690                      | 740                       | 22                        | 54                      | 21                          | 30                      | 225                          | 35                      |         |      |

★: Under development

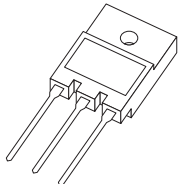
### Three Terminal Type



FTO-220A



MTO-3P



ITO-3P

| Type No.   | Absolute Maximum Ratings |                |                |                  |                 | Electrical Characteristics   |                           |                           |                           |                         |                             |                         |                              |                         | Outline  |      |
|------------|--------------------------|----------------|----------------|------------------|-----------------|------------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-----------------------------|-------------------------|------------------------------|-------------------------|----------|------|
|            | V <sub>DSS</sub>         | I <sub>D</sub> | P <sub>T</sub> | V <sub>GSS</sub> | T <sub>ch</sub> | R <sub>DS(ON)</sub><br>(max) | C <sub>iss</sub><br>(typ) | C <sub>oss</sub><br>(typ) | C <sub>rss</sub><br>(typ) | Q <sub>g</sub><br>(typ) | t <sub>d(ON)</sub><br>(typ) | t <sub>r</sub><br>(typ) | t <sub>d(OFF)</sub><br>(typ) | t <sub>f</sub><br>(typ) | Package  | Fig. |
|            | [V]                      | [A]            | [W]            | [V]              | [°C]            | [Ω]                          | [pF]                      | [pF]                      | [pF]                      | [nC]                    | [ns]                        | [ns]                    | [ns]                         | [ns]                    |          |      |
| F7F60C3M   | 600                      | 7              | 30             | ± 30             | 150             | 0.60                         | 760                       | 250                       | 20                        | 28                      | 14                          | 15                      | 124                          | 18                      | FTO-220A | 50-2 |
| F11F60C3M  |                          | 11             | 45             |                  |                 | 0.38                         | 1200                      | 390                       | 30                        | 45                      | 18                          | 30                      | 190                          | 32                      |          |      |
| F15F60C3M  |                          | 15             | 55             |                  |                 | 0.28                         | 1600                      | 510                       | 40                        | 56                      | 26                          | 42                      | 240                          | 36                      |          |      |
| F20F60C3M  |                          | 20             | 65             |                  |                 | 0.19                         | 2400                      | 780                       | 50                        | 87                      | 32                          | 60                      | 355                          | 60                      |          |      |
| ★F15W60C3  |                          | 15             | 65             |                  |                 | 0.28                         | 1600                      | 510                       | 40                        | 56                      | 26                          | 42                      | 240                          | 36                      | MTO-3P   | 46-2 |
| F20W60C3   |                          | 20             | 75             |                  |                 | 0.19                         | 2400                      | 780                       | 50                        | 87                      | 32                          | 60                      | 355                          | 60                      |          |      |
| F24W60C3   |                          | 24             | 90             |                  |                 | 0.16                         | 3000                      | 1000                      | 60                        | 105                     | 35                          | 60                      | 415                          | 65                      |          |      |
| F35W60C3   |                          | 35             | 100            |                  |                 | 0.10                         | 4500                      | 1500                      | 100                       | 155                     | 60                          | 96                      | 640                          | 90                      |          |      |
| F47W60C3   |                          | 47             | 120            |                  |                 | 0.07                         | 7000                      | 2200                      | 145                       | 235                     | 80                          | 140                     | 1000                         | 140                     |          |      |
| FP11W60C3  |                          | 11             | 45             |                  |                 | 0.38                         | 1200                      | 390                       | 30                        | 45                      | 18                          | 30                      | 190                          | 32                      | ITO-3P   | 44-3 |
| ★FP15W60C3 |                          | 15             | 60             |                  |                 | 0.28                         | 1600                      | 510                       | 40                        | 56                      | 26                          | 42                      | 240                          | 36                      |          |      |
| FP20W60C3  |                          | 20             | 45             |                  |                 | 0.19                         | 2400                      | 780                       | 50                        | 87                      | 32                          | 60                      | 355                          | 60                      |          |      |
| ★FP35W60C3 |                          | 35             | 75             |                  |                 | 0.10                         | 4500                      | 1500                      | 100                       | 155                     | 60                          | 96                      | 640                          | 90                      |          |      |
| F11F80C3M  |                          | 800            | 11             |                  |                 | 40                           |                           |                           | 0.45                      | 1690                    | 740                         | 22                      | 54                           | 21                      | 30       | 225  |

★: Under development

\* CoolMOS is a trademark of Infineon Technologies AG.

# SIDAC (Silicon Diode for Alternating Current) .....

## SIDAC (Bi-Directional Device)

- **Features**
  1. Symmetrical characteristics.
  2. Operating directly from the AC mains, and can be used in all kinds of pulse generating circuits.
  3. The glass passivation ensures high reliability.
- **Applications**
  1. Pulse generation: gas igniters, HID(high intensity discharge) lamp drive circuit, etc.
  2. AC switching: drive circuit for switching power supplies, voltage detecting circuits, etc.
  3. Over voltage protection: AC line surge protection, capacitor rupture prevention, etc.

## Axial

| Type No. | Absolute Maximum Ratings |                       |                                      |                         |                         |                          |                               |                          |                        | Electrical Characteristics |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      | Outline |      |
|----------|--------------------------|-----------------------|--------------------------------------|-------------------------|-------------------------|--------------------------|-------------------------------|--------------------------|------------------------|----------------------------|-----------------------------------|-------------------------------------|----------------------------------|---------------------------------|--------------------------------|-------------------------------------|---------------------------------|--------------------------------------|---------|------|
|          | V <sub>DRM</sub><br>[V]  | I <sub>T</sub><br>[A] | Conditions<br>T <sub>J</sub><br>[°C] | I <sub>TSM</sub><br>[A] | I <sub>TRM</sub><br>[A] | Conditions<br>f<br>[kHz] | di <sub>r</sub> /dt<br>[A/μs] | T <sub>stg</sub><br>[°C] | T <sub>j</sub><br>[°C] | V <sub>BO</sub><br>[V]     | I <sub>DRM</sub><br>(max)<br>[μA] | Conditions<br>V <sub>D</sub><br>[V] | I <sub>BO</sub><br>(max)<br>[mA] | I <sub>H</sub><br>(typ)<br>[mA] | V <sub>T</sub><br>(max)<br>[V] | Conditions<br>I <sub>T</sub><br>[A] | R <sub>s</sub><br>(min)<br>[kΩ] | θ <sub>J</sub> /I<br>(max)<br>[°C/W] | Package | Fig. |
| K1V5     | 40                       | 1                     | 107                                  | 13                      | 25                      | 1                        | 80                            | -40 to 125               | 125                    | 45 to 60                   | 10                                | 40                                  | 0.5                              | 50                              | 1.5                            | 1                                   | 0.1                             | 15                                   | AX10    | 6-3  |
| K1V6     |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 55 to 65                   |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V10    |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 95 to 113                  |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V11    | 90                       | 1                     | 112                                  | 20                      | 25                      | 1                        | 80                            | -40 to 125               | 125                    | 104 to 118                 | 10                                | 90                                  | 0.5                              | 50                              | 1.5                            | 1                                   | 0.1                             | 15                                   |         |      |
| K1V12    |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 110 to 125                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V14    | 115                      | 1                     | 109                                  | 20                      | 25                      | 1                        | 80                            | -40 to 125               | 125                    | 125 to 150                 | 10                                | 115                                 | 0.5                              | 30                              | 1.5                            | 1                                   | 0.1                             | 15                                   |         |      |
| K1V22    |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 200 to 230                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V24    | 180                      | 1                     | 108                                  | 20                      | 25                      | 1                        | 80                            | -40 to 125               | 125                    | 220 to 250                 | 10                                | 180                                 | 0.5                              | 20                              | 1.5                            | 1                                   | 0.1                             | 15                                   | AX10    | 7    |
| K1V26    |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 240 to 270                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V22(W) |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 200 to 230                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V24(W) | 180                      | 1                     | 91                                   | 16                      | 17                      | 1                        | 80                            | -40 to 125               | 125                    | 220 to 250                 | 10                                | 180                                 | 0.5                              | 50                              | 3                              | 1                                   | 0.1                             | 15                                   |         |      |
| K1V26(W) |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 240 to 265                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V36(W) | 270                      | 1                     | 92                                   | 13                      | 15                      | 1                        | 50                            | -40 to 125               | 125                    | 340 to 380                 | 10                                | 270                                 | 0.5                              | 50                              | 3                              | 1                                   | 0.1                             | 15                                   |         |      |
| K1V38(W) |                          |                       |                                      |                         |                         |                          | 80                            |                          |                        | 360 to 400                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V(A)10 |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 95 to 113                  |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      | AX06    | 2-1  |
| K1V(A)11 | 90                       | 1                     | 109                                  | 16                      | 15                      | 1                        | 50                            | -40 to 125               | 125                    | 104 to 118                 | 10                                | 90                                  | 0.5                              | 50                              | 1.6                            | 1                                   | 0.1                             | 20                                   |         |      |
| K1V(A)12 |                          |                       |                                      |                         |                         |                          |                               |                          |                        | 110 to 125                 |                                   |                                     |                                  |                                 |                                |                                     |                                 |                                      |         |      |
| K1V(A)16 | 115                      | 1                     | 98                                   | 16                      | 15                      | 1                        | 50                            | -40 to 125               | 125                    | 145 to 170                 | 10                                | 115                                 | 0.5                              | 50                              | 1.6                            | 1                                   | 0.1                             | 20                                   |         |      |

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)



## SIDAC (Uni-Directional Device)

- **Features**
  1. Uni-directional characteristics.
  2. Smaller package than bi-directional SIDAC.
  3. Switching operation from DC power for pulse generation.
  4. The glass passivation ensures high reliability.
- **Applications**
  1. Pulse generation: gas igniters, negative ion generators, HID (high intensity discharge) lamp drive circuit, etc.
  2. Over voltage protection: DC line surge protection.

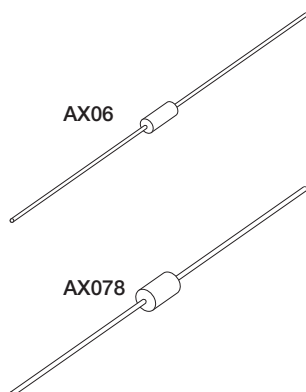
## Surface Mount



| Type No. | Absolute Maximum Ratings |                |                  |        |                  |                |                     | Electrical Characteristics |                     |                    |                    |                    |                |        |         | Outline |    |      |
|----------|--------------------------|----------------|------------------|--------|------------------|----------------|---------------------|----------------------------|---------------------|--------------------|--------------------|--------------------|----------------|--------|---------|---------|----|------|
|          | V <sub>DRM</sub> (A)     | I <sub>T</sub> | I <sub>TRM</sub> | dir/dt | T <sub>stg</sub> | T <sub>J</sub> | V <sub>BO</sub> (A) | I <sub>DRM</sub> (A)       | I <sub>BO</sub> (A) | I <sub>H</sub> (A) | V <sub>T</sub> (A) | R <sub>S</sub> (A) | θ <sub>J</sub> |        |         |         |    |      |
|          | [V]                      | [A]            | [A]              | [Hz]   | [A/μs]           | [°C]           | [°C]                | [V]                        | [μA]                | [mA]               | [mA]               | [V]                | [kΩ]           | [°C/W] | Package | Fig.    |    |      |
| ☆G1VL8C  | 70                       | 1              | 80               | 60     | 150              | -40 to 125     | 125                 | 75 to 90                   | 10                  | 70                 | 1.0                | 100                | 1.5            | 1      | 0.1     | 23      | 1F | 13-3 |
| ☆G1VL10C | 90                       |                | 150              |        |                  |                |                     | 95 to 110                  | 10                  | 90                 | 0.5                | 100                | 1.5            | 1      | 0.1     | 23      |    |      |
| ☆G1VL22C | 190                      |                | 280              |        |                  |                |                     | 5                          | 210 to 230          | 10                 | 190                | 0.5                | 60             | 1.5    | 1       | 0.1     |    |      |

☆: New product

## Axial



| Type No.   | Absolute Maximum Ratings |                |                     |                  |            |                     |                  | Electrical Characteristics |                     |                      |                    |                     |                    |                    |                    |                    | Outline        |         |      |     |     |
|------------|--------------------------|----------------|---------------------|------------------|------------|---------------------|------------------|----------------------------|---------------------|----------------------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|----------------|---------|------|-----|-----|
|            | V <sub>DRM</sub> (A)     | I <sub>T</sub> | Conditions          | I <sub>TRM</sub> | Conditions | di <sub>T</sub> /dt | T <sub>stg</sub> | T <sub>J</sub>             | V <sub>BO</sub> (A) | I <sub>DRM</sub> (A) | Conditions         | I <sub>BO</sub> (A) | I <sub>H</sub> (A) | V <sub>T</sub> (A) | Conditions         | R <sub>S</sub> (A) | θ <sub>J</sub> | Package | Fig. |     |     |
|            | [V]                      | [A]            | T <sub>J</sub> [°C] | [A]              | f [Hz]     | [A/μs]              | [°C]             | [°C]                       | [V]                 | [μA]                 | V <sub>D</sub> [V] | [mA]                | (max) [mA]         | (max) [V]          | I <sub>T</sub> [A] | [kΩ]               | [°C/W]         |         |      |     |     |
| G1V(A)8C   | 70                       | 1              | 98                  | 80               | 60         | 80                  | -40 to 125       | 125                        | 75 to 90            | 10                   | 70                 | 1.0                 | 100                | 1.5                | 1                  | 0.1                | 20             | AX06    | 2-3  |     |     |
| G1V(A)10C  | 90                       |                | 98                  | 80               |            | 80                  |                  |                            | 95 to 110           | 10                   | 90                 | 0.5                 | 60                 | 1.5                | 1                  | 0.1                | 20             |         |      |     |     |
| ☆G1V(A)12C | 100                      |                | 98                  | 80               |            | 80                  |                  |                            | 110 to 130          | 10                   | 100                | 0.5                 | 60                 | 1.5                | 1                  | 0.1                | 20             |         |      |     |     |
| ☆G1V(A)14C | 120                      |                | 98                  | 80               |            | 80                  |                  |                            | 130 to 150          | 10                   | 120                | 0.5                 | 60                 | 1.5                | 1                  | 0.1                | 20             |         |      |     |     |
| G1V(A)15C  | 115                      |                | 98                  | 80               |            | 80                  |                  |                            | 142 to 157          | 10                   | 115                | 0.5                 | 60                 | 1.5                | 1                  | 0.1                | 20             |         |      |     |     |
| G1V(A)20C  | 170                      |                |                     | 80               |            | 80                  |                  |                            | 190 to 210          | 10                   | 170                | 0.5                 | 60                 | 1.5                | 1                  | 0.1                | 20             |         |      |     |     |
| G1V(B)20C  | 170                      |                |                     | 102              |            | 120                 |                  |                            | 220                 | -40 to 150           | 150                | 190 to 210          | 10                 | 170                | 0.5                | 60                 | 1.5            |         |      | 1   | 0.1 |
| G1V(B)22C  | 190                      |                | 102                 | 160              |            | 220                 |                  |                            | -40 to 125          | 125                  | 210 to 230         | 10                  | 190                | 0.5                | 60                 | 1.5                | 1              |         |      | 0.1 | 17  |
| ☆G1V(B)24C | 210                      | 102            | 120                 | 220              | -40 to 150 | 150                 | 230 to 250       | 10                         | 210                 | 0.5                  | 60                 | 1.5                 | 1                  | 0.1                | 17                 |                    |                |         |      |     |     |

☆: New product

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

# Surge Absorbers.....

## Varistors

- **Features**
1. Bi-directional surge absorption is possible.
  2. Low junction capacitance.

- **Applications**
1. Telephone set surge absorption.
  2. Digital communications circuit surge absorption.
  3. ISDN terminal surge absorption.

## Surface Mount



1F



1Y

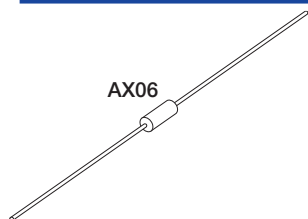
| Type No.  | Absolute Maximum Ratings |                  |                  |                | Electrical Characteristics (Ta=25°C) |                 |                 |                 |                 |                 | Outline |      |
|-----------|--------------------------|------------------|------------------|----------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------|------|
|           | I <sub>o</sub>           | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F1</sub>                      | I <sub>F1</sub> | V <sub>F2</sub> | I <sub>F2</sub> | V <sub>F3</sub> | I <sub>F3</sub> | Package | Fig. |
|           | [mA]                     | [V]              | [°C]             | [°C]           | [V]                                  | [mA]            | [V]             | [mA]            | [V]             | [mA]            |         |      |
| VR61F1 *1 | 370                      | 7.5              | -55 to 150       | 150            | 2.3 ± 0.25                           | 1               | 2.75 ± 0.25     | 10              | 3.1 ± 0.25      | 70              | 1F      | 14-1 |
| VRYA6 *2  | 310                      | 8                | -30 to 125       | 125            | 2.3 ± 0.25                           | 1               | 2.75 ± 0.25     | 10              | 3.1 ± 0.25      | 70              | 1Y      | *3   |
| VRYA15 *2 | 140                      | 6.5              | -30 to 125       | 125            | 5.75 ± 0.62                          | 1               | 6.875 ± 0.625   | 10              | 7.75 ± 0.62     | 70              |         |      |

\* 1: On alumina substrate

\* 2: On alumina substrate, 1 element operation. 2 elements in parallel

\* 3: SMD package Fig. 21; THD package Fig. 22-2

## Axial



AX06

| Type No.   | Absolute Maximum Ratings |                  |                  |                | Electrical Characteristics (Ta=25°C) |                 |                 |                 |                 |                 | Outline |      |
|------------|--------------------------|------------------|------------------|----------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------|------|
|            | I <sub>o</sub>           | I <sub>FSM</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>F1</sub>                      | I <sub>F1</sub> | V <sub>F2</sub> | I <sub>F2</sub> | V <sub>F3</sub> | I <sub>F3</sub> | Package | Fig. |
|            | [mA]                     | [V]              | [°C]             | [°C]           | [V]                                  | [mA]            | [V]             | [mA]            | [V]             | [mA]            |         |      |
| VR-60B(A)  | 500                      | 16               | -30 to 125       | 125            | 1.5                                  | 1000            | —               | —               | 0.2             | 0.02            | AX06    | 3    |
| VR-60BP(A) | 500                      | 16               |                  |                | 1.5                                  |                 | 0.58 ± 0.03     | 1               | 0.2             |                 |         |      |
| VR-51B     | 150                      | 7.5              |                  |                | 1.8 ± 0.25                           | 1               | 2.1 ± 0.25      | 10              | 2.4 ± 0.25      | 70              |         |      |
| VR-61B(A)  | 150                      | 7.5              |                  |                | 2.3 ± 0.25                           |                 | 2.75 ± 0.25     |                 | 3.1 ± 0.25      |                 |         |      |

Spec Code 5□□□ (See page 46 for the last 3 digits of the Spec Code)

## Trunkers

- **Features**
1. High speed response.
  2. Absorption energy tolerance capacity.
  3. Narrow clamping voltage width.

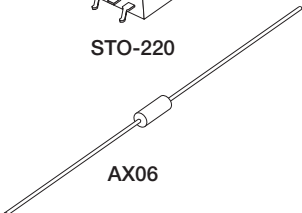
- **Applications**
1. IC protection for telephones.
  2. IC protection against abnormal voltage.
  3. Protection for load dump noise.



1F



STO-220



AX06



MCP

| Type No.   | Absolute Maximum Ratings |            |      |                          |                          | Electrical Characteristics           |                                 |                                     |                                   |                                   |                                      | Outline |      |
|------------|--------------------------|------------|------|--------------------------|--------------------------|--------------------------------------|---------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|---------|------|
|            | PRSM                     | Tstg       | TJ   | V <sub>RM</sub><br>(max) | V <sub>BR</sub><br>(typ) | Conditions<br>I <sub>R</sub><br>[mA] | I <sub>R</sub><br>(max)<br>[μA] | Conditions<br>V <sub>R</sub><br>[V] | r <sub>Z</sub><br>(max)<br>[%/°C] | V <sub>CL</sub> *<br>(max)<br>[V] | Conditions<br>I <sub>PP</sub><br>[A] | Package | Fig. |
|            | [W]                      | [°C]       | [°C] | [V]                      | [V]                      |                                      |                                 |                                     |                                   |                                   |                                      |         |      |
| ST03-58F1  | 300                      | -55 to 150 | 150  | 45                       | 58                       | 1                                    | 5                               | 45                                  | —                                 | 80                                | 4                                    | 1F      | 13-2 |
| ST03-68F1  |                          | -40 to 150 |      | 58                       | 68                       |                                      |                                 | 58                                  | —                                 | 95                                | 3                                    |         |      |
| ST04-14F1  | 400                      | -40 to 150 |      | 12.8                     | 14                       |                                      |                                 | 12.8                                | —                                 | 22                                | 18                                   |         |      |
| ST04-16F1  |                          | -55 to 175 |      | 13.6                     | 16                       |                                      |                                 | 13.6                                | —                                 | 23                                | 15                                   |         |      |
| ST04-18F1  |                          |            |      | 15.3                     | 18                       |                                      |                                 | 15.3                                | —                                 | 26                                | 15                                   |         |      |
| ST04-27F1  |                          |            |      | 23                       | 27                       |                                      |                                 | 23                                  | —                                 | 37                                | 10                                   |         |      |
| ST70-27F   | 7000                     | -40 to 150 | 150  | 23                       | 27                       | 1                                    | 5                               | 23                                  | 0.09                              | 40                                | 180                                  | STO-220 | 36-6 |
| ST70-27MF  | 7000                     |            |      | 23                       | 27                       |                                      |                                 | 23                                  | 0.09                              | 40                                | 180                                  | MCP     | 80   |
| ST80-14MF  | 8000                     |            |      | 12                       | 14                       |                                      |                                 | 10                                  | 0.08                              | —                                 | —                                    |         |      |
| DL04-18F1◎ | 400                      | -55 to 150 |      | 13                       | 18                       | 5                                    | 5                               | 13                                  | —                                 | 27                                | 15                                   | 1F      | 14-2 |
| ST04-27    |                          | -40 to 150 |      | 23                       | 27                       | 1                                    |                                 | 23                                  | 0.09                              | 37                                | 10                                   | AX06    | 2-2  |

☆: New product

◎: Bi-directional type

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

\* : V<sub>CL</sub> 10/1000 μs

## Power Clampers

- **Features**
1. High speed response.
  2. Absorption energy tolerance capacity.
  3. Narrow clamping voltage width.
  4. Reverse blocking type.

- **Applications**
1. Snubber circuit in the primary side of switch-mode power supplies.

| Type No.    | Absolute Maximum Ratings |            |      |                       | Electrical Characteristics |                                |      |                               |     |         | Outline    |        |                                |
|-------------|--------------------------|------------|------|-----------------------|----------------------------|--------------------------------|------|-------------------------------|-----|---------|------------|--------|--------------------------------|
|             | PRSM                     | Tstg       | Tj   | V <sub>RM</sub> (max) | V <sub>BR</sub> (typ)      | I <sub>R</sub> (max)           |      | V <sub>CL</sub> (max)         |     | Package | Color Code | Fig.   |                                |
|             | [W]                      | [°C]       | [°C] | [V]                   | [V]                        | Conditions I <sub>R</sub> [mA] | [μA] | Conditions V <sub>R</sub> [V] | [V] |         |            |        | Conditions I <sub>PP</sub> [A] |
| ST02D-170F2 | 200                      | -40 to 150 | 150  | 145                   | 170                        | 1                              | 5    | 145                           | 280 | 0.75    | 2F         | —      | 16-3                           |
| ST02D-82    |                          |            |      | 67                    | 82                         |                                |      | 67                            | 118 | 1.7     |            | Silver |                                |
| ☆ST02D-140  |                          |            |      | 120                   | 145                        |                                |      | 120                           | 200 | 0.75    |            | Blue   |                                |
| ST02D-170   |                          |            |      | 145                   | 170                        |                                |      | 145                           | 280 | 0.75    |            | Red    |                                |
| ST02D-200   |                          |            |      | 170                   | 200                        |                                |      | 170                           | 300 | 0.75    |            | Yellow |                                |
| ST03D-82    | 300                      | -40 to 150 | 150  | 67                    | 82                         | 1                              | 5    | 67                            | 118 | 2.5     | AX10       | Silver | 6-2                            |
| ☆ST03D-140  |                          |            |      | 120                   | 145                        |                                |      | 120                           | 200 | 0.75    |            | Blue   |                                |
| ST03D-170   |                          |            |      | 145                   | 170                        |                                |      | 145                           | 280 | 1.1     |            | Red    |                                |
| ST03D-200   |                          |            |      | 170                   | 200                        |                                |      | 170                           | 300 | 1.0     |            | Yellow |                                |

☆: New product
 Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

☆: New product

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

## Thyristor Surge Suppressors

- **Features**
1. Bi-directional or uni-directional characteristics.
  2. High speed response.
  3. Large surge current capacity.
  4. Repetitive use against surges is possible.

- **Applications**
1. Lightning surge adsorption for communications circuits.
  2. Lightning surge adsorption for transmitters and switchboards.
  3. Surge protection for ISDN terminals.

## Surface Mount



| Type No. | Absolute Maximum Ratings |            |        |            |      | Electrical Characteristics |       |       |                  |       |       | Remarks | Outline |      |
|----------|--------------------------|------------|--------|------------|------|----------------------------|-------|-------|------------------|-------|-------|---------|---------|------|
|          | ITSM                     | Conditions | VDRM   | Tstg       | Tj   | VBO                        | VCL   | IDRM  | Conditions<br>VD | IH    | Cj    |         | Package | Fig. |
|          |                          |            |        |            |      | (min)                      | (max) | (max) |                  | (min) | (max) |         |         |      |
|          | [A]                      | [μs]       | [V]    | [°C]       | [°C] | [V]                        | [V]   | [μA]  | [V]              | [mA]  | [pF]  |         |         |      |
| KL3Z07   | 30                       | 10/1000    | 5      | -40 to 125 | 125  | 5.5 *                      | —     | 10    | 5                | 50    | —     | —       | 1F      | 14-3 |
| KL3Z18   |                          |            | 15.5 * |            |      | —                          | 10    | 15    | 50               | —     |       |         |         |      |
| KL3L07   |                          |            | 65     |            |      | 80                         | 10    | 58    | 100              | 90    |       |         |         |      |
| KL3N14   |                          |            | 130    |            |      | 195                        | 10    | 120   | 100              | 50    |       |         |         |      |
| KL3R20   |                          |            | 180    |            |      | 250                        | 10    | 175   | 100              | 30    |       |         |         |      |
| KP4L07   | 40                       | 10/1000    | 58     | -40 to 125 | 125  | 65                         | 80    | 10    | 58               | 100   | 90    | —       | 2F      | 16-2 |
| KP4N12   |                          |            | 100    |            |      | 110                        | 135   | 10    | 100              | 100   | 50    |         |         |      |
| KP10L06  |                          |            | 48     |            |      | 55                         | 70    | 10    | 48               | 100   | 235   |         |         |      |
| KU10L08  | 100                      | 10/1000    | 63     | -40 to 125 | 125  | 70                         | 100   | 10    | 63               | 100   | 180   | —       | 2F      | 16-2 |
| KP10L08  |                          |            | 63     |            |      | 70                         | 100   | 10    | 63               | 100   | 180   | —       | 2F      | 16-2 |
| KU10N14  |                          |            | 120    |            |      | 125                        | 195   | 5     | 120              | 100   | 140   | —       | 2F      | 16-2 |
| KP10N14  |                          |            | 130    |            |      | 195                        | 10    | 100   | 100              | 140   | —     | 2F      | 16-2    |      |
| KP15L08  | 150                      | 10/1000    | 63     | -40 to 125 | 125  | 70                         | 100   | 10    | 63               | 100   | 320   | —       | 2F      | 16-2 |
| KU15N14  |                          |            | 120    |            |      | 125                        | 195   | 5     | 120              | 100   | 110   | —       | 2F      | 16-2 |
| KP15N14  |                          |            | 120    |            |      | 125                        | 195   | 10    | 120              | 100   | 200   | —       | 2F      | 16-2 |
| KP15R25  |                          |            | 190    |            |      | 220                        | 290   | 10    | 190              | 100   | 150   | —       | 2F      | 16-2 |

☆: New product

\*: V<sub>BR</sub>

UL®: UL497B recognized File No. E183905

# Surge Absorbers.....

## Surface Mount (Uni-Directional Type)



M2F



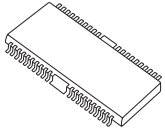
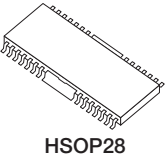
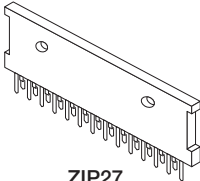
2F

| Type No. | Absolute Maximum Ratings |            |      |           |     | Electrical Characteristics |              |               |                  |             |             | Remarks | Outline |         |      |
|----------|--------------------------|------------|------|-----------|-----|----------------------------|--------------|---------------|------------------|-------------|-------------|---------|---------|---------|------|
|          | ITSM                     | Conditions | VDRM | Tstg      | Tj  | VBR<br>(min)               | VCL<br>(max) | IDRM<br>(max) | Conditions<br>Vd | IH<br>(min) | Cj<br>(max) |         |         | Outline |      |
|          |                          |            |      |           |     |                            |              |               |                  |             |             |         |         | Package | Fig. |
|          |                          |            |      |           |     |                            |              |               |                  |             |             |         |         |         |      |
| [A]      | [ μs]                    | [V]        | [°C] | [°C]      | [V] | [V]                        | [ μA]        | [V]           | [mA]             | [pF]        |             |         |         |         |      |
| KU10LU07 | 100                      | 10/1000    | 58   | -40 to125 | 125 | 62                         | 100          | 10            | 58               | 100         | 200         | UL®     | M2F     | 15-3    |      |
| KP10LU07 | 100                      |            | 60   |           |     | 62                         | 100          | 10            | 60               | 100         | 180         |         | —       | 2F      | 16-4 |

UL<sup>®</sup>: UL497B recognized File No. E183905

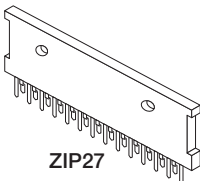
## Stepper Motor Driver ICs

- **Outline** The MTD series is monolithic power ICs that, with fewer external components, can directly drive any motors.
- **Applications**
  1. Stepper motor drive for office equipment products.
  2. Stepper motor drive for industrial robots, automatic equipments.

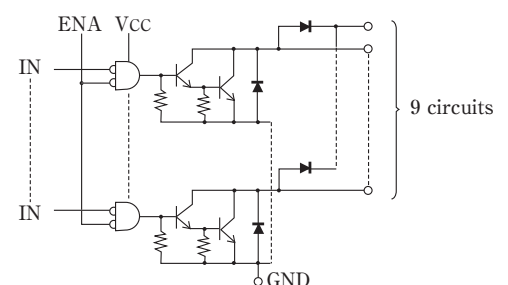
|                                                                                                                                                                                                                                                                                         | Type No. | Operation | Absolute Maximum Ratings (Ta=25°C) |                       |                       | Characteristics                                    | Outline |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------------------------------------|-----------------------|-----------------------|----------------------------------------------------|---------|------|
|                                                                                                                                                                                                                                                                                         |          |           | V <sub>CEO</sub><br>[V]            | I <sub>O</sub><br>[A] | P <sub>D</sub><br>[W] |                                                    | Package | Fig. |
|  HSOP40<br><br> HSOP28<br><br> ZIP27 | MTD1120  | Unipolar  | 80                                 | 1.2                   | 5                     | Constant-Current chopping function (4-Phase Input) | ZIP27   | 89   |
|                                                                                                                                                                                                                                                                                         | MTD1120F |           |                                    |                       | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD1361  |           | 68                                 | 1.5                   | 5                     |                                                    | ZIP27   | 89   |
|                                                                                                                                                                                                                                                                                         | MTD1361F |           |                                    | 1.2                   | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2002F | Bipolar   | 35                                 | 0.8                   | 3                     | Constant-Current chopping function                 | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2003F |           | 30                                 | 1.2                   | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2005  |           | 60                                 | 1.3                   | 5                     |                                                    | ZIP27   | 89   |
|                                                                                                                                                                                                                                                                                         | MTD2005F |           |                                    | 1.0                   | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2006  |           | 35                                 | 1.3                   | 5                     |                                                    | ZIP27   | 89   |
|                                                                                                                                                                                                                                                                                         | MTD2006F |           |                                    |                       | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2007F |           | 50                                 | 1.0                   | 3                     |                                                    | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                         | MTD2009J |           | 35                                 | 1.2                   | 2.9                   |                                                    | HSOP40  | 82   |

## Power ICs for Interface

- **Outline** The MTA Series is monolithic power ICs best fit for use as needle print head drivers of dot matrix printers, and as stepping motor drivers.
- **Features**
  1. The input is TTL and CMOS compatible
  2. Large output I<sub>C</sub>=2A, V<sub>CE</sub>=60V or 80V
  3. Insulated type single in-line packaging with heatsink installed
- **Applications**
  1. Head driver for dot matrix printers, ECR and time recorders
  2. Stepping motor drive for printers, typewriters, FAX, PPC and XY plotters
  3. Driver for all types of solenoids, and displays (LED, etc.)

|                                                                                           | Type No. | Absolute Maximum Ratings (Ta=25°C) |                       |                       | Operation |                |          | Outline |      |
|-------------------------------------------------------------------------------------------|----------|------------------------------------|-----------------------|-----------------------|-----------|----------------|----------|---------|------|
|                                                                                           |          | V <sub>CEO</sub><br>[V]            | I <sub>O</sub><br>[A] | P <sub>D</sub><br>[W] | Input     | Output         | Circuits | Package | Fig. |
|  ZIP27 | MTA001M  | 80                                 | 2                     | 5                     | L Active  | NPN Darlington | 9        | ZIP27   | 89   |
|                                                                                           | MTA011   |                                    |                       |                       | H Active  |                |          |         |      |
|                                                                                           | MTA002   | 60                                 |                       |                       | L Active  | PNP Darlington |          |         |      |

Equivalent circuit (MTA001M)



We are happy to provide circuit design support for safe use of our IC products.  
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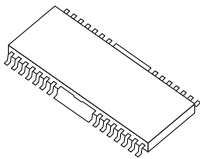
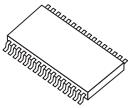
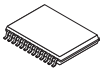
## DC-DC Converter Power ICs

### ■ Outline

The MD Series is a non-isolated, PWM control stepdown DC-DC converter power IC whose MOSFET and drive circuit IC chip integration eliminates the complexity of power supply circuit design. Two rectification systems are available: flywheel Schottky diode type and highly efficient synchronous rectification MOSFET type. A high-performance power supply can be easily realized by choosing a suitable MD chip. The MD Series is available in SMD type HSOP28, SSOP32, LSSOP26, and SOP8 packages.

### ■ Features

1. High-efficiency  
The MD Series consists of a matched control IC and main switching MOSFET in a single package, which allows the construction of a highly efficient power supply with little switching loss and wiring loss.
2. Switching Frequency  
Choose the switching frequency matched to the usage conditions from among 250kHz fixed type, 100kHz/300kHz switched type, and 100kHz to 500kHz adjustable type.
3. Protection Functions  
The MD Series has overcurrent protection, thermal shutdown, undervoltage lockout (UVLO) and etc.

|                                                                                                                                                                                                                                                                                                                                                                                                         | Type No. | Input Voltage [V] | Output Voltage [V]                              | Output Current [A] | Frequency [kHz]           | Operation Temp [°C] | Rectification System | Outline |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------|-------------------------------------------------|--------------------|---------------------------|---------------------|----------------------|---------|------|
|                                                                                                                                                                                                                                                                                                                                                                                                         |          |                   |                                                 |                    |                           |                     |                      | Package | Fig. |
| <br>HSOP28<br><br><br>SSOP32<br><br><br>LSSOP26<br><br><br>SOP8 | MD5001T  | 4.5 to 14         | 0.8 to 12 * <sup>2</sup>                        | 0 to 1             | 100 to 500 * <sup>4</sup> | -40 to 85           | Fly wheel SBD        | SOP8    | 90   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD3221N  | 4.5 to 20         | 2.5/3.3 * <sup>1</sup> 0.8 to 14 * <sup>2</sup> | 0 to 3             | 100/300 * <sup>3</sup>    | -30 to 85           | Synchronous          | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD3221R  |                   | 0.8 to 14 * <sup>2</sup>                        | 0 to 6             |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD3222N  | 8 to 20           | 2.5/3.3 * <sup>1</sup> 0.8 to 14 * <sup>2</sup> | 0 to 6             | 100/300 * <sup>3</sup>    | -30 to 85           | Synchronous          | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1222N  |                   | 2.5 to 12 * <sup>2</sup>                        | 0 to 5             |                           |                     |                      | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1320F  | 12 to 30          | 3.3/5 * <sup>1</sup>                            | 0 to 3             | 250                       | -10 to 80           | Fly wheel SBD        | HSOP28  | 81   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1322F  | 8 to 30           | 2.5 to 12 * <sup>2</sup>                        | 0 to 1.5           |                           |                     |                      | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1320N  |                   | 3.3/5 * <sup>1</sup>                            | 0 to 1.5           | 100 to 500 * <sup>4</sup> | -30 to 85           | Synchronous          | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1322N  |                   | 2.5 to 12 * <sup>2</sup>                        | 0 to 1.8           |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1323R  |                   | 0.8 to 12 * <sup>2</sup>                        | 0 to 5             |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1324R  | 8 to 40           | 2.5 to 12 * <sup>2</sup>                        | 0 to 5             | 250                       | -30 to 85           | Synchronous          | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1333N  |                   | 3.3/5 * <sup>1</sup>                            | 0 to 3             |                           |                     |                      | SSOP32  | 83   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1421N  |                   | 2.5 to 12 * <sup>2</sup>                        | 0 to 3             | 100 to 500 * <sup>4</sup> | -30 to 85           | Synchronous          | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1422N  |                   | 2.5 to 12 * <sup>2</sup>                        | 0 to 3             |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1423N  |                   | 2.5 to 12 * <sup>2</sup>                        | 0 to 3             | 100 to 500 * <sup>4</sup> | -30 to 85           | Synchronous          | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1423R  |                   | 0.8 to 12 * <sup>2</sup>                        | 0 to 3             |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1424R  | 8 to 40           | 2.5 to 12 * <sup>2</sup>                        | 0 to 3             | 100 to 500 * <sup>4</sup> | -30 to 85           | Synchronous          | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1423R  |                   | 0.8 to 12 * <sup>2</sup>                        | 0 to 3             |                           |                     |                      | LSSOP26 | 84   |
|                                                                                                                                                                                                                                                                                                                                                                                                         | MD1620F  | 12 to 57          | 5                                               | 0 to 2             | 250                       | -10 to 80           | Fly wheel SBD        | HSOP28  | 81   |

\* 1: Selectable output voltage 3.3V/5V

\* 2: Adjustable output voltage

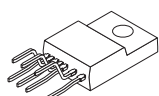
\* 3: Selectable 100k/300kHz

\* 4: Adjustable from 100k to 500kHz

We are happy to provide circuit design support for safe use of our IC products.  
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## Partial Resonance Power Supply ICs : MR series

- **Outline**      The MR series is Partial Resonance Power Supply IC modules featuring standby mode operation for very low power consumption. A main switching device and a control circuit are incorporated in a single package. Highly efficient and low noise power supplies can easily be designed with a minimum number of external components using the MR series IC.
- **Features**
  1. Burst mode operation for very low standby power  
Ex. MR1521 in 100V AC main, 12V, 3.5A power supply: Pin=0. 1W at no-load
  2. High efficiency, low noise
  3. No start-up resistance is required
  4. Over current protection
  5. Over voltage protection
  6. Thermal shutdown



FTO-7P

| Type No. | Maximum Output[W] * |                |               | Main Switch                        |                     | Outline |      |
|----------|---------------------|----------------|---------------|------------------------------------|---------------------|---------|------|
|          | 90 to 132V AC       | 180 to 276V AC | 90 to 276V AC | Device                             | V <sub>DS</sub> [V] | Package | Fig. |
| MR4500   | 12(Peak 20)         | —              | —             | MOSFET                             | 500                 | FTO-7P  | 86   |
| MR4510   | 25(Peak 40)         |                |               |                                    |                     |         |      |
| MR4520   | 50(Peak 80)         |                |               |                                    |                     |         |      |
| MR4530   | 80(Peak 100)        |                |               |                                    |                     |         |      |
| MR4710   | —                   | 25(Peak 40)    | 12(Peak 20)   | 2 nd Generation<br>High Speed IGBT | 900                 |         |      |
| MR4720   |                     | 50(Peak 80)    | 25(Peak 40)   |                                    |                     |         |      |
| MR4010   |                     | 65             | 45            |                                    |                     |         |      |
| MR4020   |                     | 105            | 70            |                                    |                     |         |      |
| MR4030   |                     | 135            | 90            |                                    |                     |         |      |
| MR4040   |                     | 180            | 120           |                                    |                     |         |      |

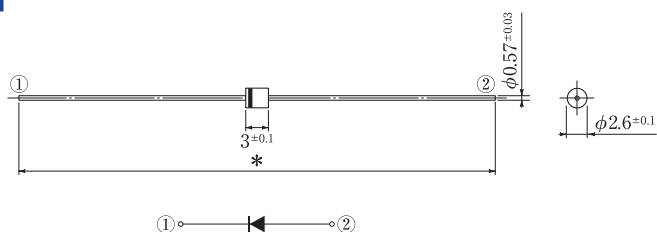
\* : The value is for reference. Maximum output power varies with power supply design.

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# Outline Dimensions.....

[Unit : mm]

Fig.1 Package: AX057



\* Please see the [Code No.(Taping)] or [Quantity and Packing Form]

Fig.2 Package: AX06

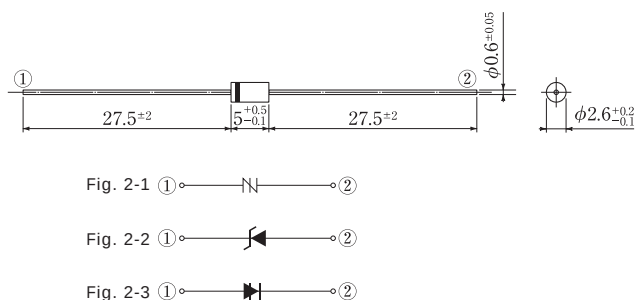


Fig.3 Package: AX06

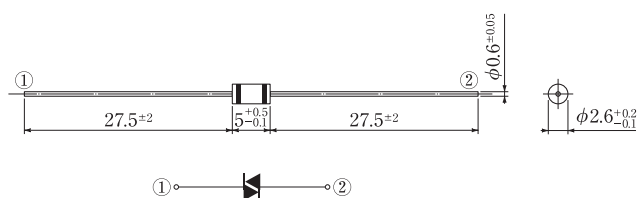


Fig.5 Package: AX078

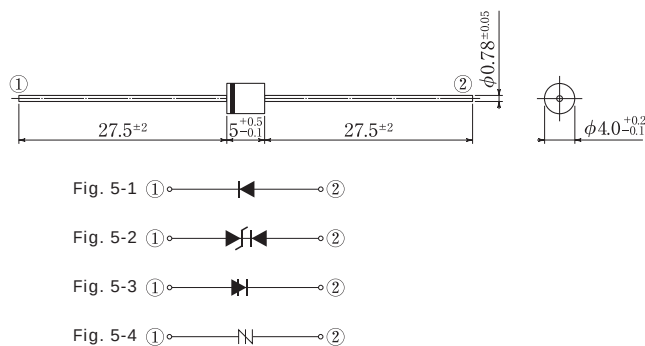


Fig.6 Package: AX10

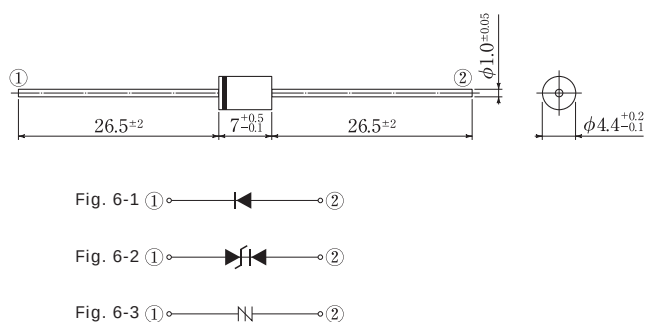


Fig.7 Package: AX10

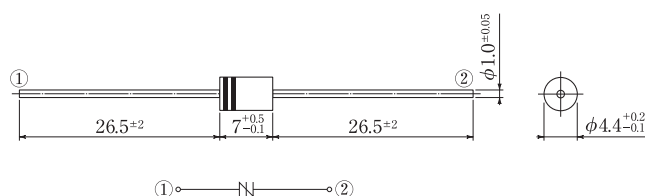


Fig.8 Package : AX14

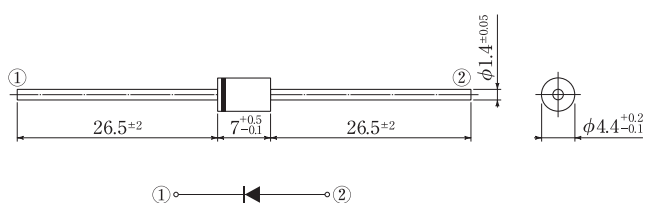




Fig.12 Package: M1F

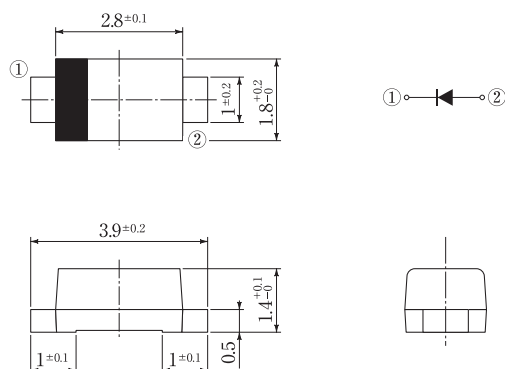


Fig.13 Package: 1F

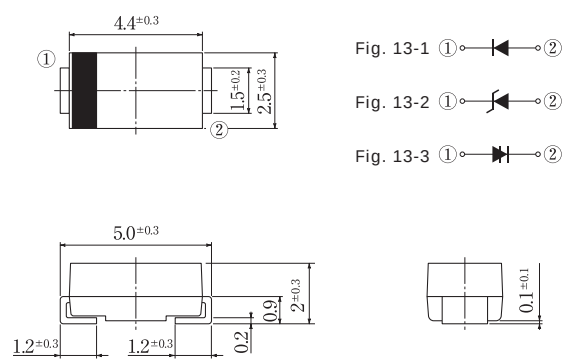


Fig. 13-1 ① —|— ②

Fig. 13-2 ① —|— ②

Fig. 13-3 ① —|— ②

Fig.14 Package: 1F

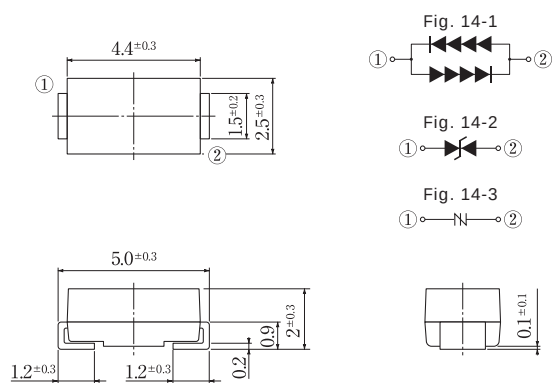


Fig. 14-1



Fig. 14-2



Fig. 14-3

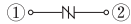


Fig.15-1 Package: M2F

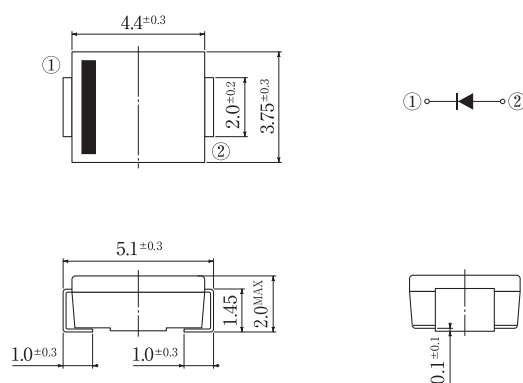


Fig.15-2 Package: M2F

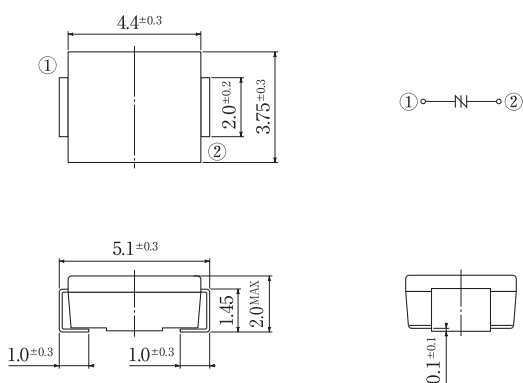
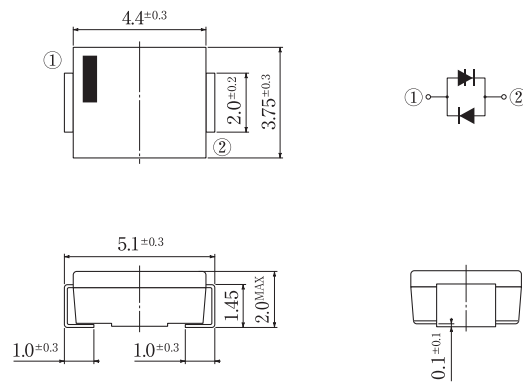


Fig.15-3 Package: M2F



# Outline Dimensions.....

[Unit : mm]

Fig.16 Package: 2F

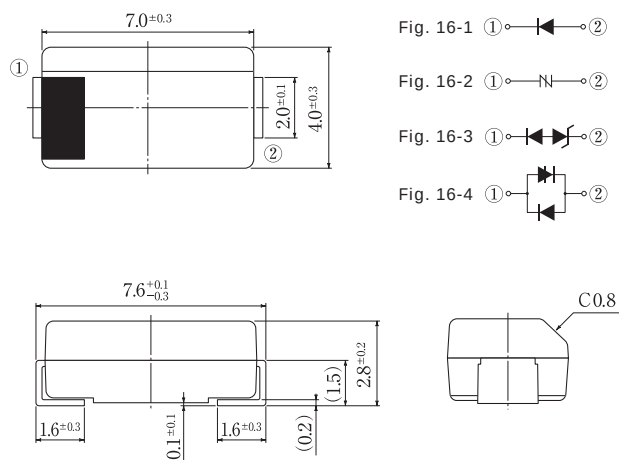


Fig.21 Package: 1Y

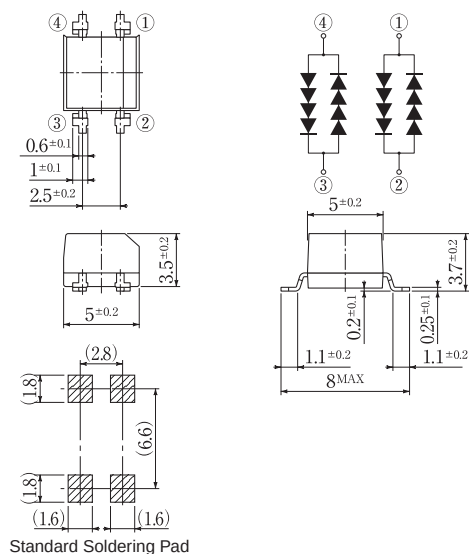


Fig.22 Package: 1Y

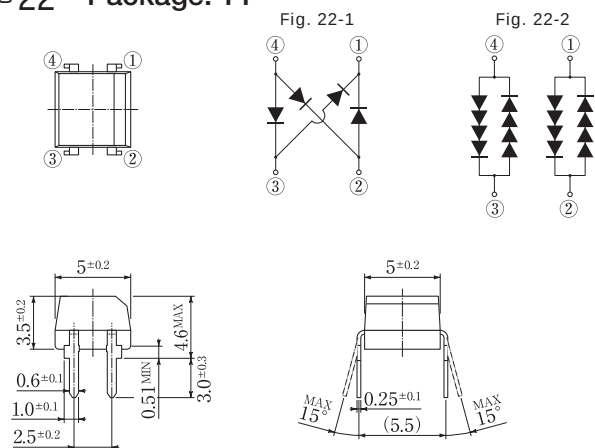


Fig.23 Package: 1Z

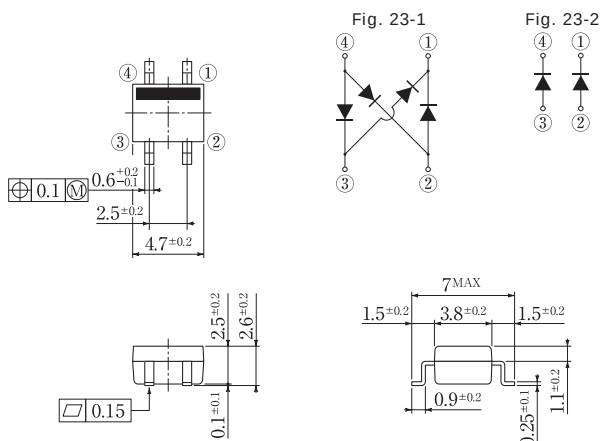


Fig.24 Package: 1Z

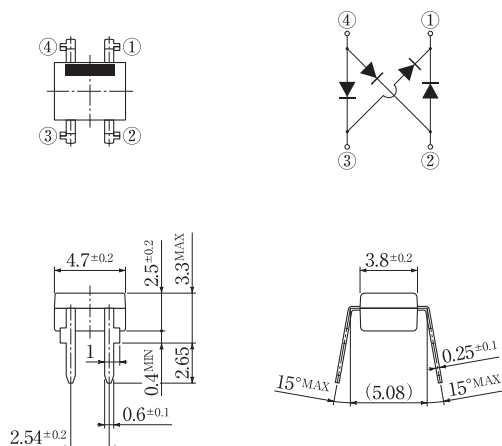


Fig.25 Package: 1N

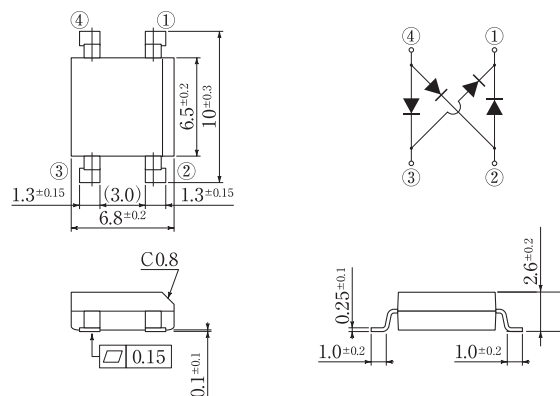


Fig.26 Package: 1N

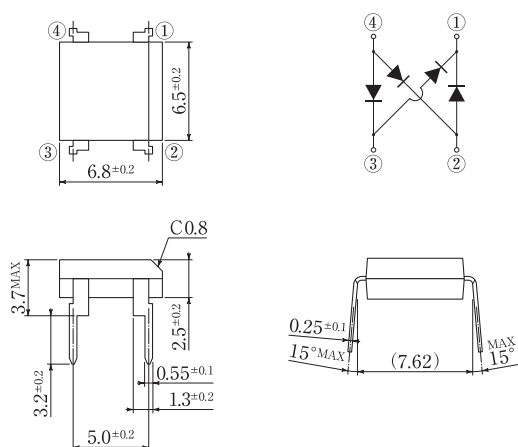


Fig.27 Package: 1NA

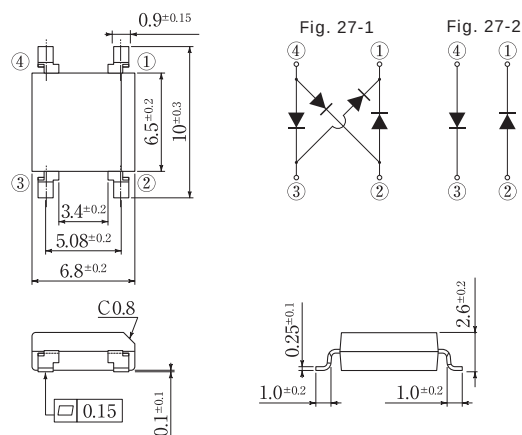


Fig.28 Package: 1NA

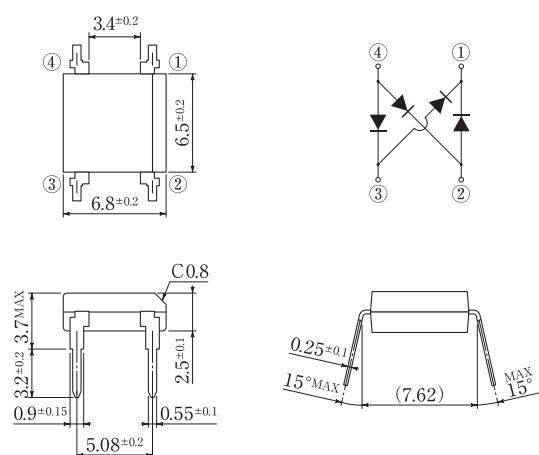


Fig.29 Package: 1W

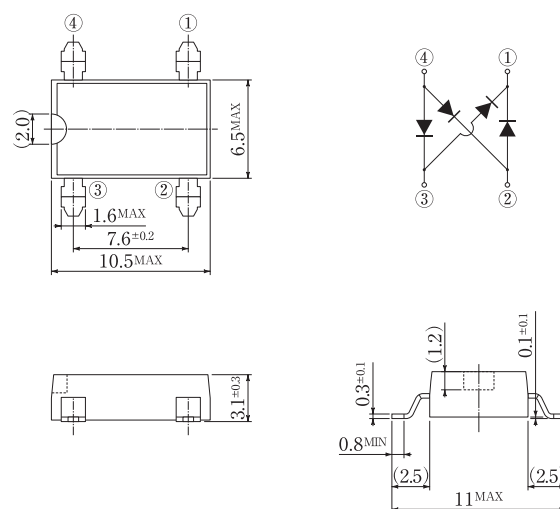


Fig.30 Package: 1W

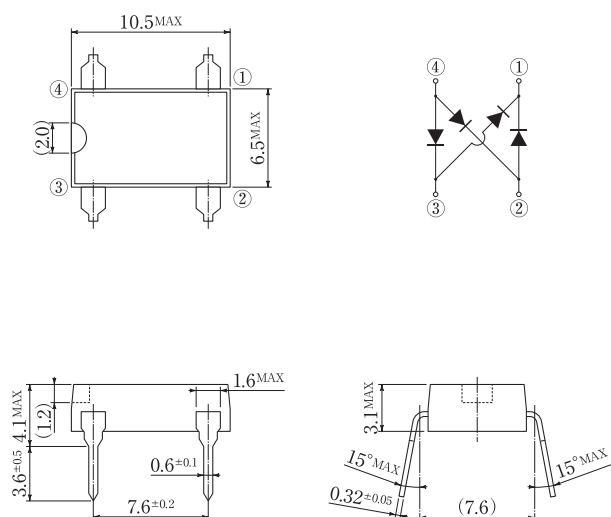
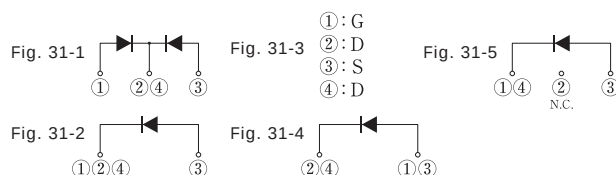
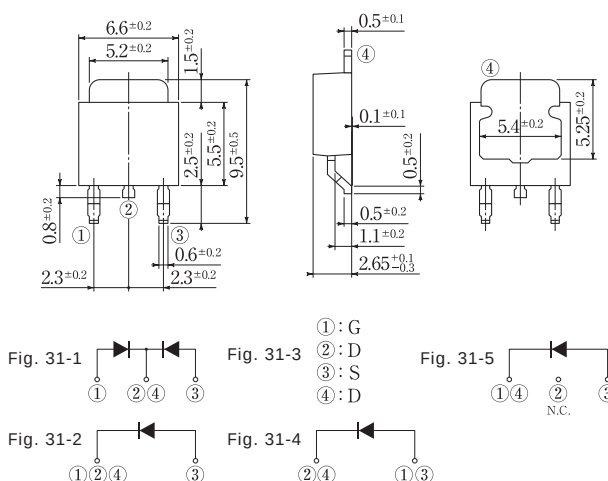


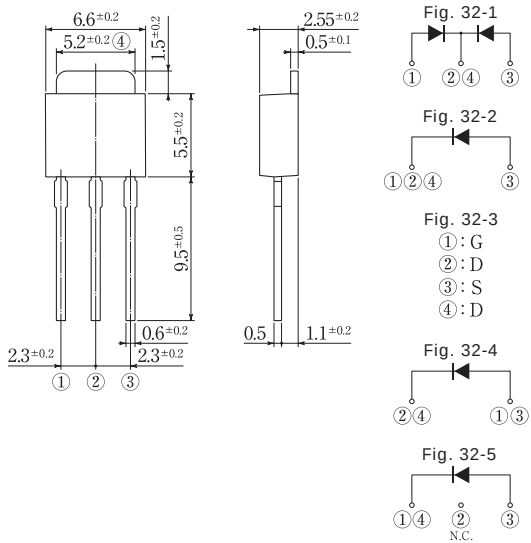
Fig.31 Package: E-pack



## Outline Dimensions

[Unit : mm]

Fig.32 Package: E-pack



**Fig.33 Package: SOPA-4**

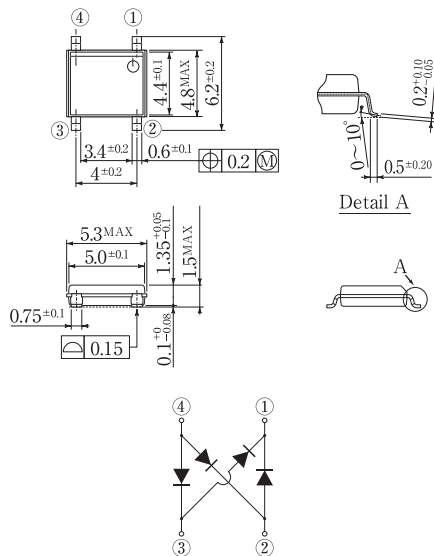


Fig.36 Package: STO-220

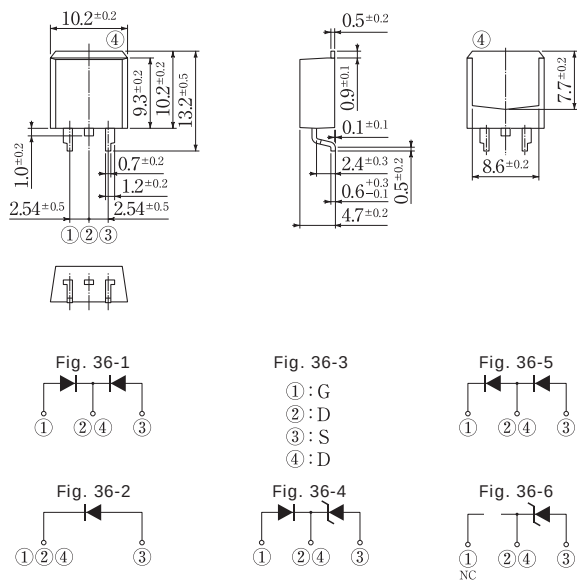


Fig.43 Package: ITO-3P

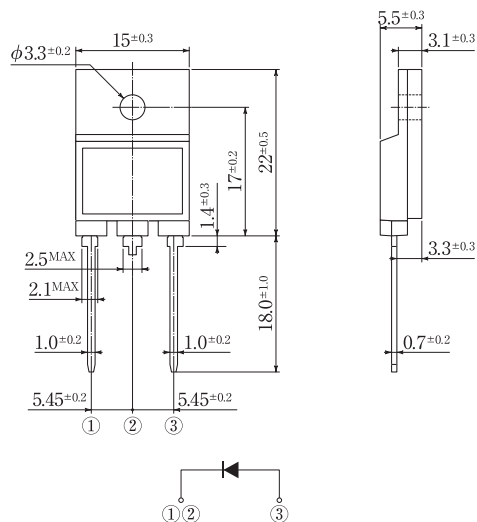


Fig.44 Package: ITO-3P

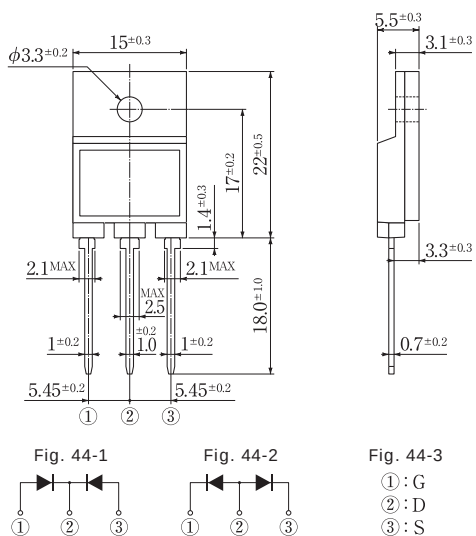


Fig.45 Package: MTO-3P

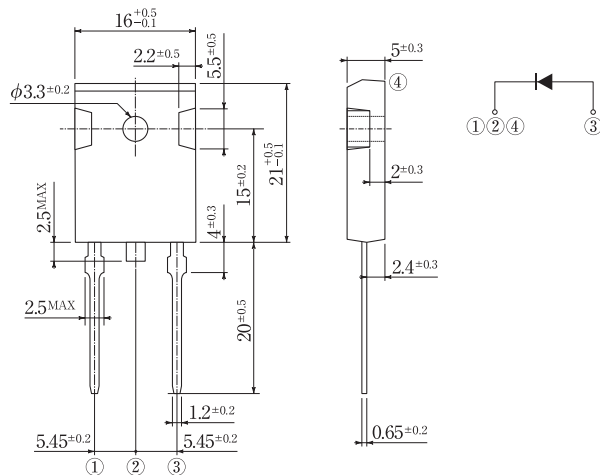


Fig.46 Package: MTO-3P

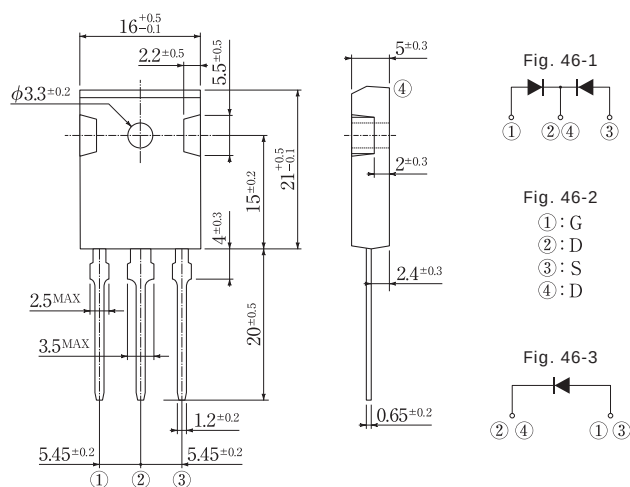


Fig.47 Package: FTO-220

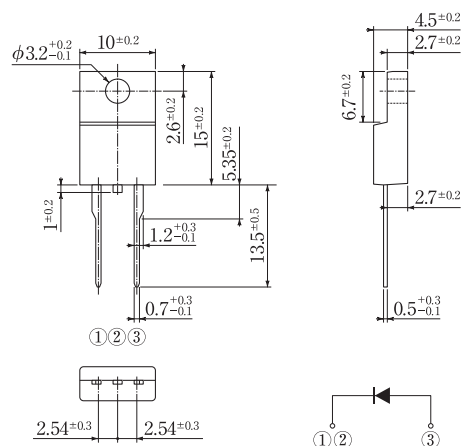


Fig.48 Package: FTO-220

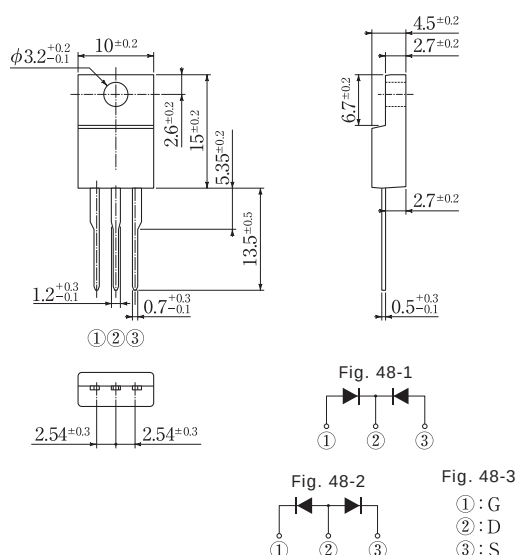


Fig.49 Package: FTO-220A

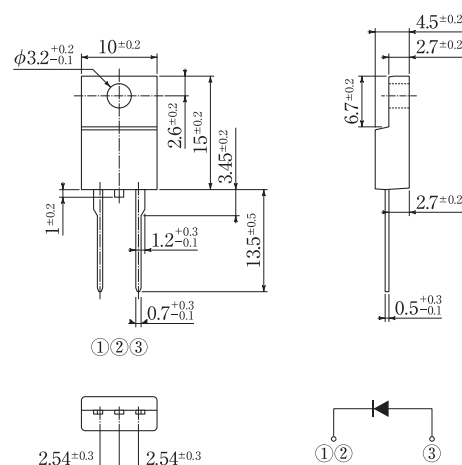


Fig.50 Package: FTO-220A

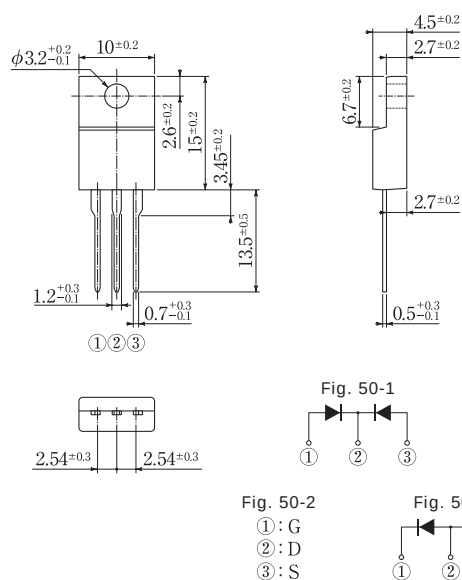
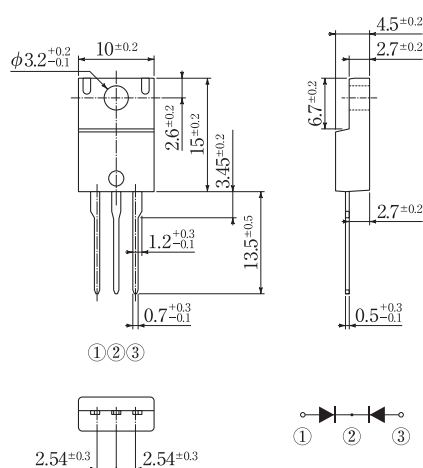


Fig.52 Package: FTO-220G



# Outline Dimensions.....

[Unit : mm]

Fig.53 Package: D6K

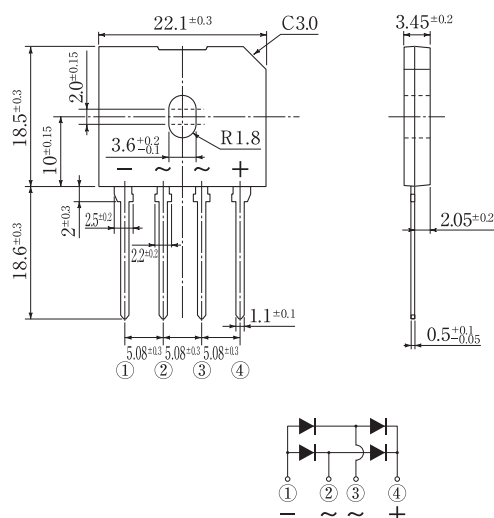


Fig.54 Package: D3K

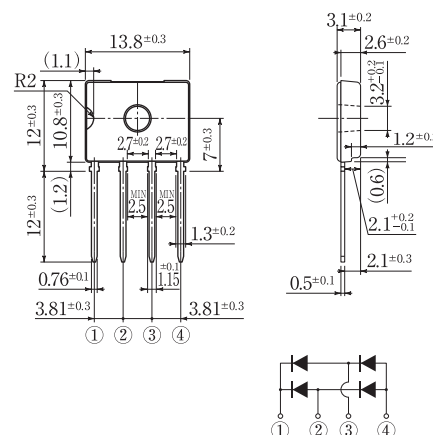


Fig.55 Package: 1V

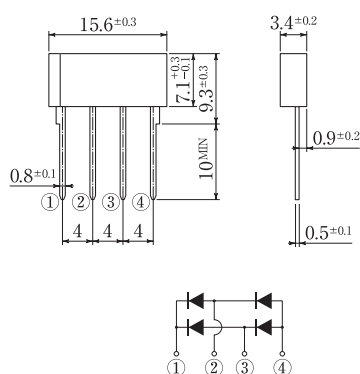


Fig.56 Package: 2S

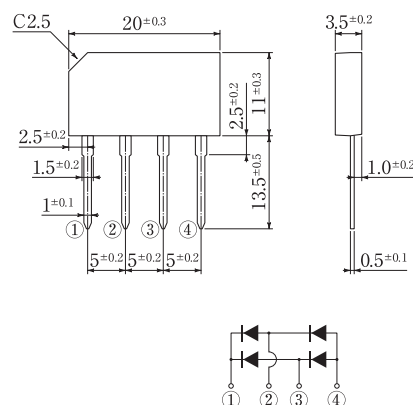


Fig.57 Package: 3S

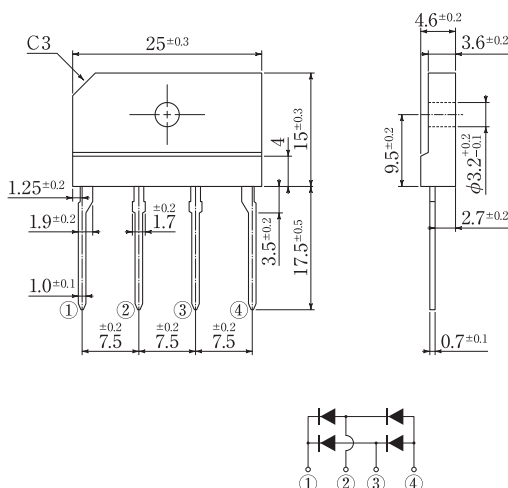


Fig.58 Package: 5S

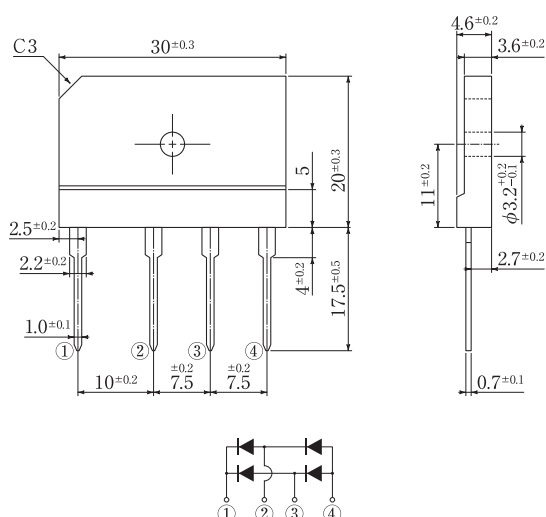


Fig.59 Package: TSB(4PIN)

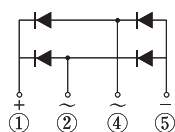
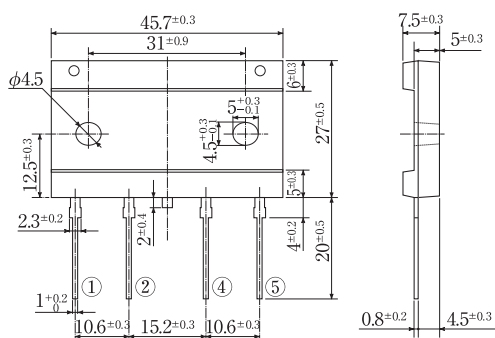


Fig.60 Package: TSB(5PIN)

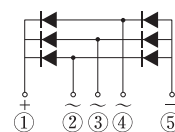
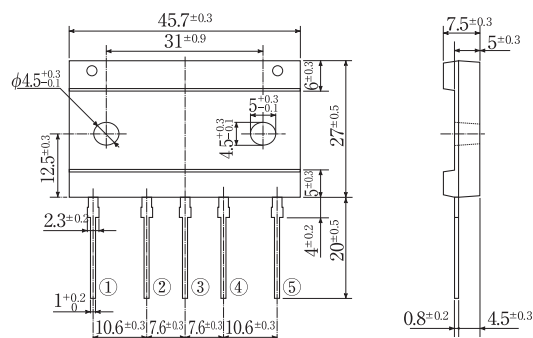


Fig.61 Package: S2VB

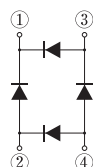
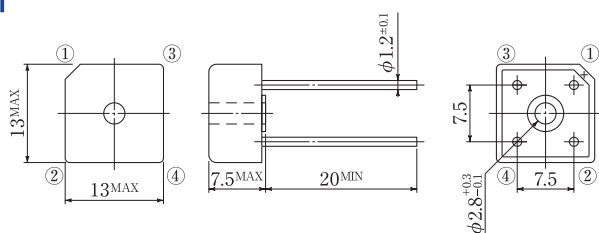


Fig.62 Package: S4VB

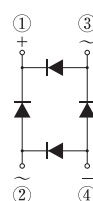
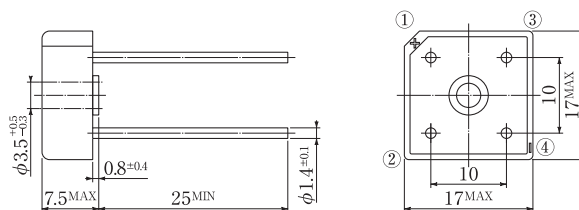


Fig.63 Package: S5VB

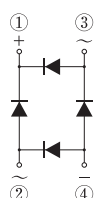
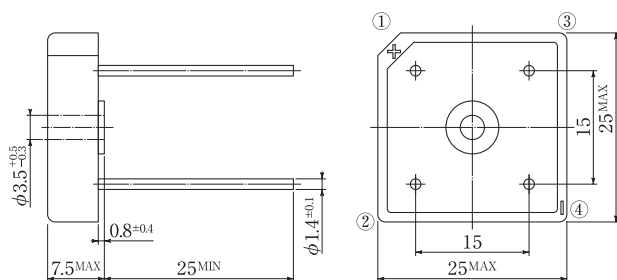
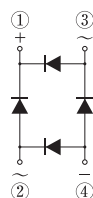
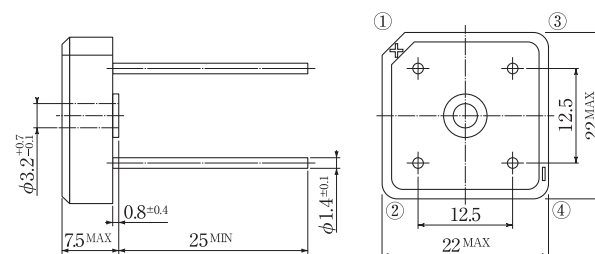


Fig.64 Package: S10VB



# Outline Dimensions.....

[Unit : mm]

Fig.65 Package: S15VB

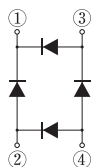
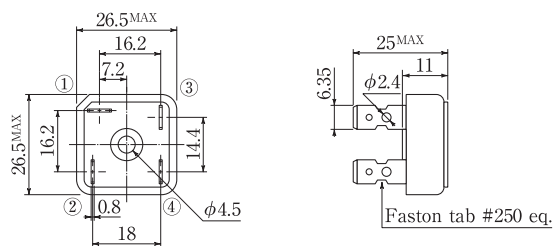


Fig.66 Package: S25VB

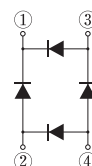
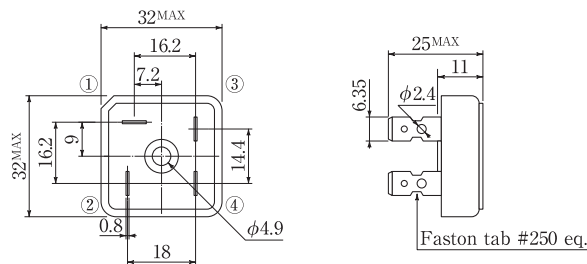


Fig.67 Package: S50VB

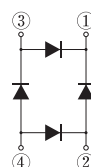
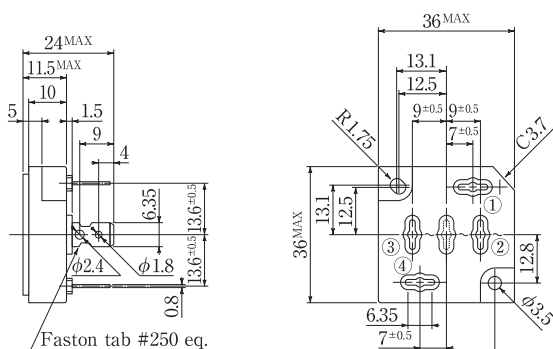


Fig.68 Package: S3WB

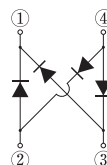
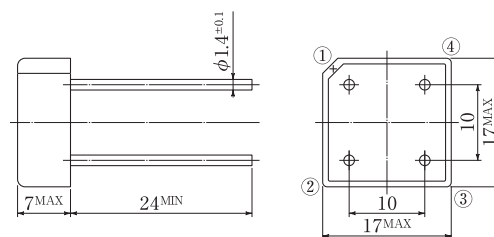


Fig.69 Package: S10WB

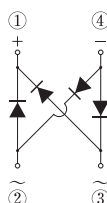
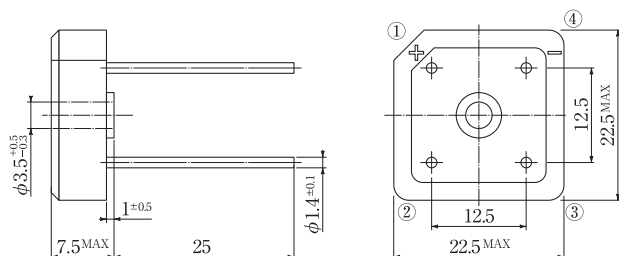


Fig.70 Package: S15WB

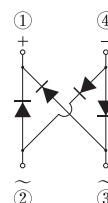
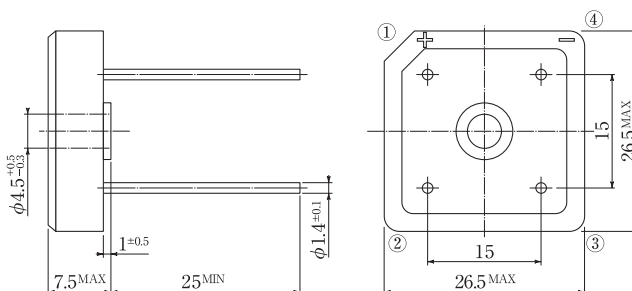




Fig.71 Package: S20WB

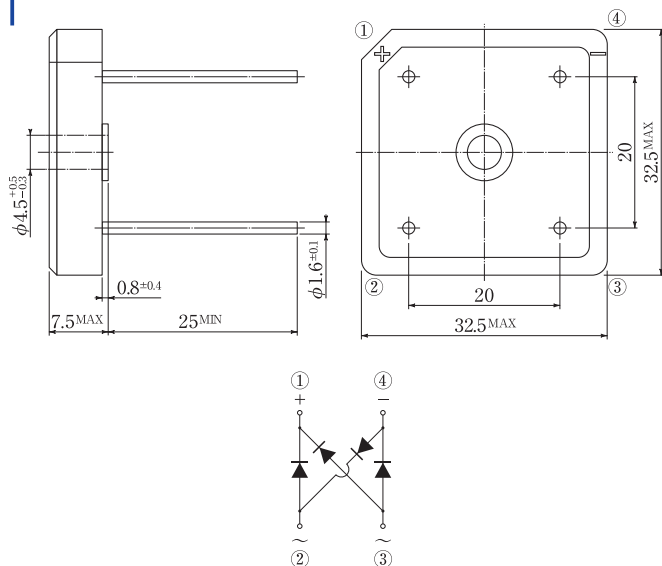


Fig.73 Package: SVTA

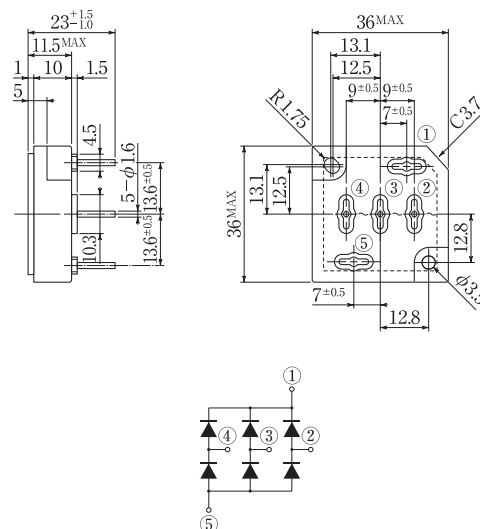


Fig.74 Package: SVT

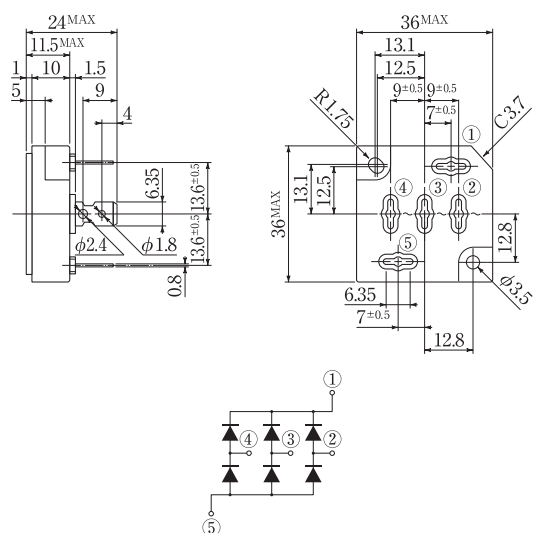


Fig.76 Package: D30VC

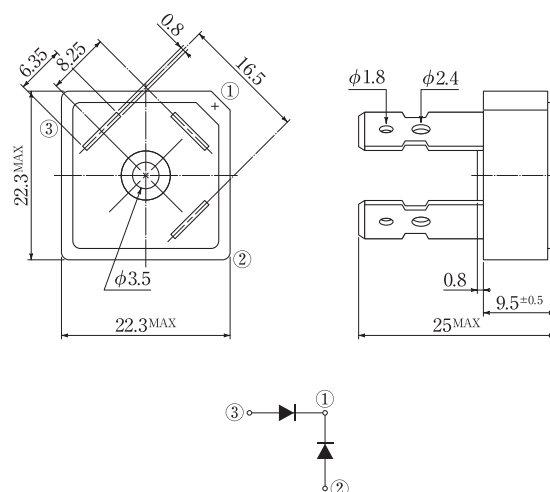


Fig.77 Package: Module

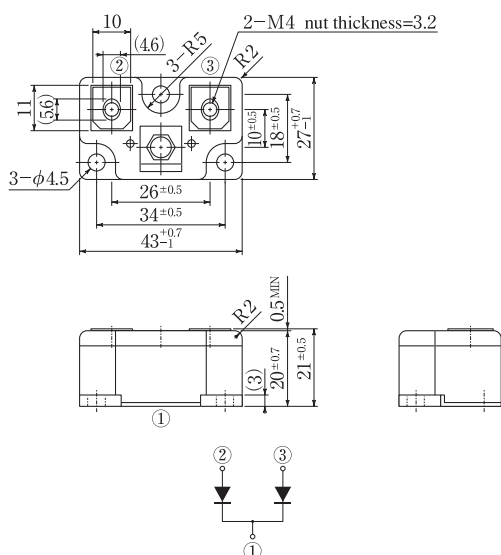
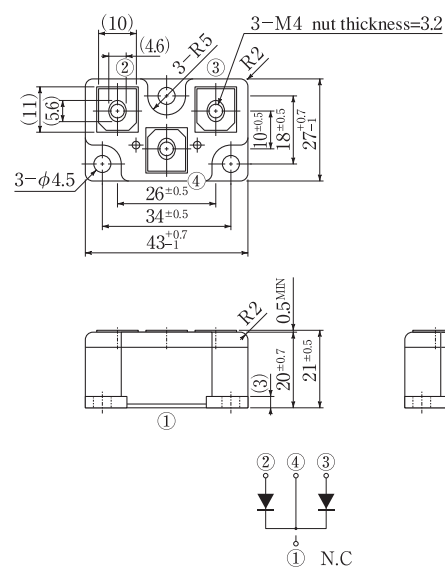


Fig.78 Package: Module



## Outline Dimensions

[Unit : mm]

**Fig.79 Package: Module**

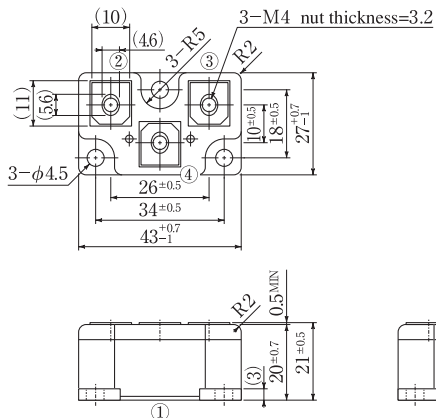


Fig. 79-1

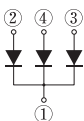


Fig. 79-2

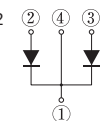


Fig.80 Package: MCP

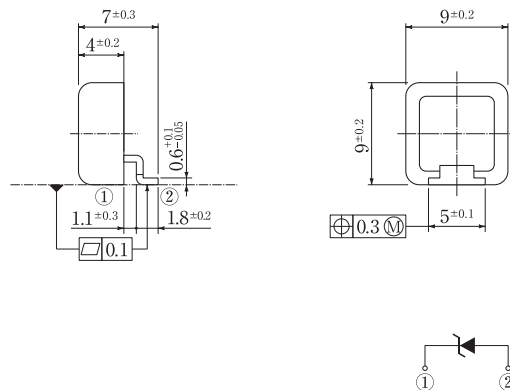
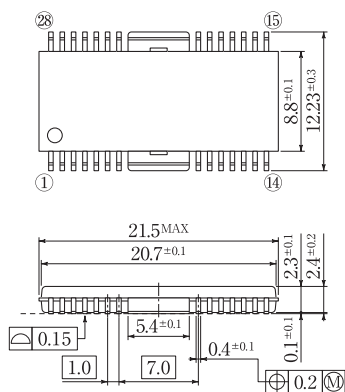


Fig.81 Package: HSOP28



Detail A

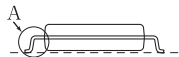
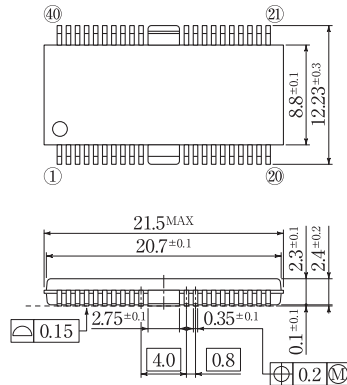
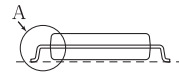


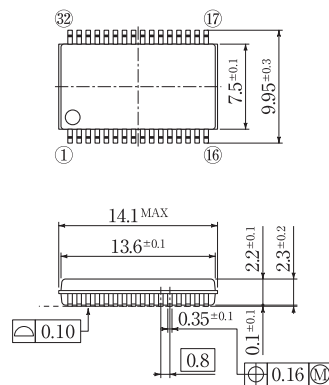
Fig.82 Package: HSOP40



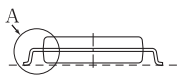
### Detail A



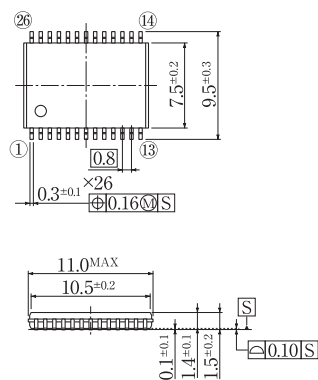
**Fig.83 Package: SSOP32**



### Detail A



**Fig.84 Package: LSSOP26**



### Detail A

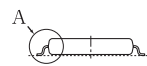


Fig.86 Package: FTO-7P

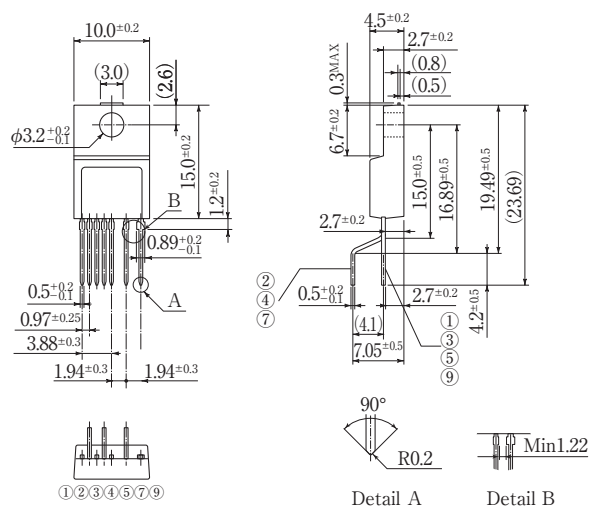


Fig.89 Package: ZIP27

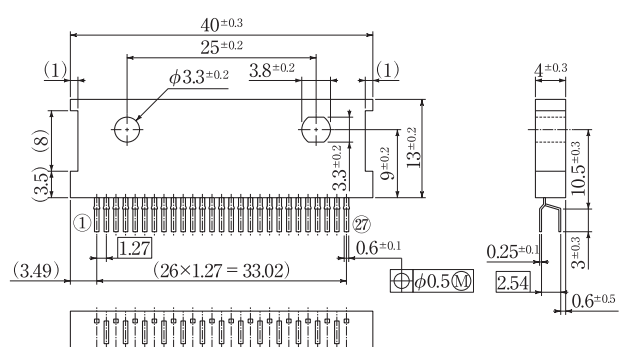


Fig.90 Package: SOP8

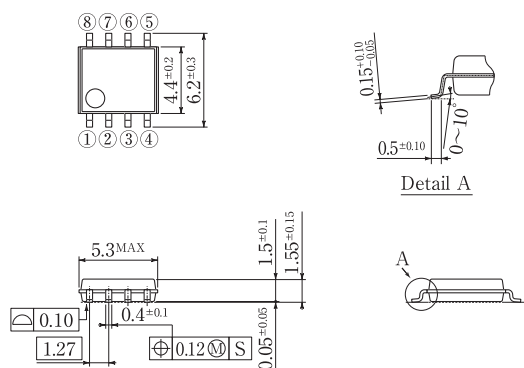


Fig.96 Package: MTO-3PT

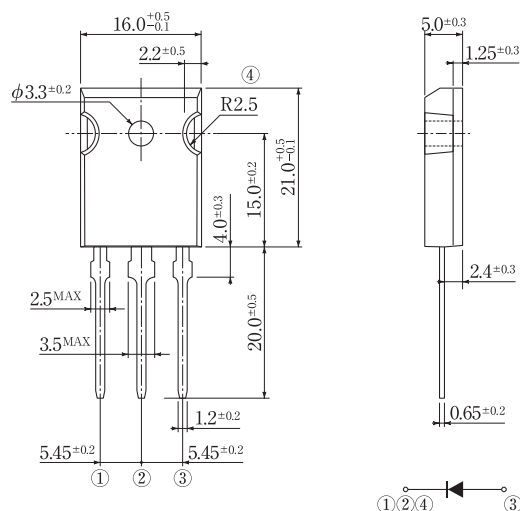
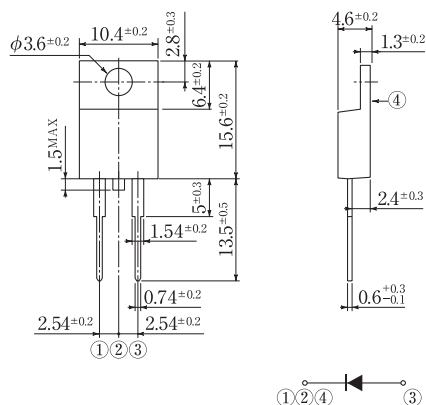


Fig.97 Package: TO-220





**NAMING/OUTLINE OF PACKING FORM**

**ORDERING QUANTITY AND PACKING FORM**

**CODE NO. (TAPING)**

**LEAD FORMING**

# Naming/Outline of Packing Form .....

## 1.Indication of Spec Codes when ordering

Please specify the Spec Code (& the Forming Code) when ordering semiconductors.

- Example 1

Ordering 7001 (short lead) type of S1VB60  
S1VB60-7001
- Example 2

Ordering 7002P5 (5mm pitch, w/kink) type of D2L20U  
D2L20U-7002P5

## 2.Type No.

- Example 1

D 1 N 

Reverse voltage divided by 10
- Example 2

2 S K

2 6 6 3

JEITA No.

JEITA Classification  
2SK: MOSFET

## 3.Spec Code

The code specifies each packing form, lead forming and terminal plate material.

- Example

5 0 0 0

Terminal forming  
0 : Straight terminal  
1 to 9 : Each number shows type of form

In case of surface mounting devices  
6 : Small reel  
7 : Large reel

In case of axial devices  
6 : Lead length 52mm (T52)  
7 : Lead length 26mm (T26)  
8 : Radial taping

Minimum packing unit  
0 : Bulk, tray or taping  
1 : Magazine

Terminal plate material  
3 : Ni/Pd/Au  
4 : Ni or Ag  
5 : Sn-Ag-Cu, Sn, Ag, Sn-Cu  
6 : Sn  
7 : Sn-Bi

#### 4. Minimum packing unit

- **Bulk:** The form in which parts are inserted into plastic bags or cardboard boxes.
- **Tray:** The form in which parts are inserted into containers made of resin.



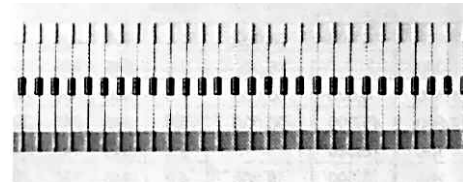
- **Magazine:** The form in which parts are inserted into resin cartridges designated for automatic inserters.



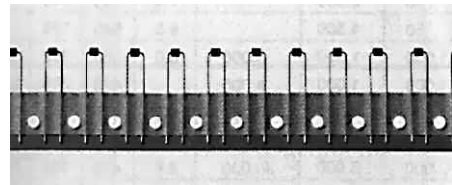
#### ■ Tape & Reel



- **Taping:** Horizontal Taping(T52, T26)



- **Taping:** Radial Taping

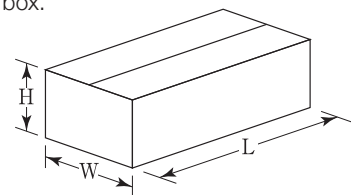


#### 5. Packing Quantities

See the following pages for the quantity and the weight of each standard packing unit.

#### 6. Packing Box Dimensions

See the following pages for the dimensions of each cardboard box.



# Ordering Quantity and Packing Form .....

| Package                                                                     | Terminal Type | Terminal Forming | Spec Code | Ordering Unit (Pcs.) | Minimum Packing Unit |                             | Inner Box Quantity (Pcs./Box) | Standard Packing Unit |             | Packing Box (mm) |     |     |
|-----------------------------------------------------------------------------|---------------|------------------|-----------|----------------------|----------------------|-----------------------------|-------------------------------|-----------------------|-------------|------------------|-----|-----|
|                                                                             |               |                  |           |                      | Quantity             | Packing Method              |                               | Pcs./Box              | Weight (kg) | L                | W   | H   |
| AX057                                                                       | THD           |                  | □060      | 4,000                | 4,000                | Tape, Ammo-Pack 52mm        | 4,000                         | 40,000                | 10.0        | 400              | 270 | 240 |
|                                                                             |               |                  | □070      | 3,000                | 3,000                | Tape, Ammo-Pack 26mm        | 3,000                         | 60,000                | 10.5        | 530              | 270 | 220 |
|                                                                             |               | w/o Kink         | □083      | 3,000                | 3,000                | Tape, Radial                | 3,000                         | 30,000                | 8.6         | 370              | 350 | 245 |
|                                                                             |               | w/ Kink          | □084      | 3,000                | 3,000                | Tape, Radial                | 3,000                         | 30,000                | 8.6         | 370              | 350 | 245 |
| AX06                                                                        | THD           |                  | □000      | 200                  | 200                  | Bulk                        |                               | 5,000                 | 1.5         | 340              | 190 | 115 |
|                                                                             |               |                  | □060      | 4,000                | 4,000                | Tape, Ammo-Pack 52mm        | 4,000                         | 64,000                | 14.0        | 325              | 325 | 420 |
|                                                                             |               |                  | □070      | 3,000                | 3,000                | Tape, Ammo-Pack 26mm        | 3,000                         | 72,000                | 15.7        | 325              | 325 | 420 |
|                                                                             |               |                  | □061      | 4,000                | 4,000                | Tape & Reel, Diameter 300 ϕ | 4,000                         | 20,000                | 4.9         | 325              | 325 | 420 |
| AX078                                                                       | THD           |                  | □081      | 5,000                | 5,000                | Tape, Radial                | 5,000                         | 20,000                | 8.3         | 350              | 200 | 335 |
|                                                                             |               |                  | □000      | 200                  | 200                  | Bulk                        | 2,000                         | 16,000                | 7.9         | 480              | 355 | 230 |
|                                                                             |               |                  | □060      | 2,000                | 2,000                | Tape, Ammo-Pack 52mm        | 2,000                         | 32,000                | 14.7        | 325              | 325 | 420 |
|                                                                             |               |                  | □070      | 1,500                | 1,500                | Tape, Ammo-Pack 26mm        | 1,500                         | 18,000                | 10.0        | 325              | 325 | 260 |
|                                                                             |               |                  | □000      | 200                  | 200                  | Bulk                        | 2,000                         | 12,000                | 8.3         | 336              | 245 | 370 |
| AX10                                                                        | THD           |                  | □060      | 1,200                | 1,200                | Tape, Ammo-Pack 52mm        | 1,200                         | 18,000                | 14.4        | 325              | 325 | 420 |
|                                                                             |               |                  | □061      | 2,500                | 2,500                | Tape & Reel, Diameter 300 ϕ | 2,500                         | 12,500                | 10.8        | 331              | 331 | 432 |
| AX14                                                                        | THD           |                  | □000      | 200                  | 200                  | Bulk                        | 2,000                         | 12,000                | 13.1        | 336              | 245 | 370 |
|                                                                             |               |                  | □060      | 1,200                | 1,200                | Tape, Ammo-Pack 52mm        | 1,200                         | 19,200                | 14.4        | 325              | 325 | 420 |
|                                                                             |               |                  | □061      | 2,500                | 2,500                | Tape & Reel, Diameter 300 ϕ | 2,500                         | 12,500                | 15.0        | 325              | 325 | 420 |
| The initial digit of the Spec Code varies. See the remarks to each product. |               |                  |           |                      |                      |                             |                               |                       |             |                  |     |     |
| M1F                                                                         | SMD           |                  | 5063      | 2,500                | 2,500                | Tape & Reel, Diameter 180 ϕ | 15,000                        | 75,000                | 4.5         | 405              | 210 | 220 |
| 1F                                                                          | SMD           |                  | 5103      | 300                  | 100                  | Magazine                    |                               | 15,000                | 2.3         | 545              | 145 | 110 |
|                                                                             |               |                  | 5053      | 2,000                | 2,000                | Tape & Reel, Diameter 180 ϕ |                               | 40,000                | 4.1         | 340              | 195 | 205 |
|                                                                             |               |                  | 5073      | 7,500                | 7,500                | Tape & Reel, Diameter 330 ϕ | 45,000                        | 90,000                | 10.8        | 395              | 245 | 395 |
| M2F                                                                         | SMD           |                  | 5063      | 1,000                | 1,000                | Tape & Reel, Diameter 180 ϕ | 4,000                         | 20,000                | 3.4         | 340              | 195 | 205 |
|                                                                             |               |                  | 5073      | 4,000                | 4,000                | Tape & Reel, Diameter 330 ϕ | 24,000                        | 48,000                | 8.6         | 395              | 245 | 395 |
| 2F                                                                          | SMD           |                  | 5103      | 120                  | 60                   | Magazine                    |                               | 18,000                | 5.2         | 545              | 145 | 110 |
|                                                                             |               |                  | 5063      | 750                  | 750                  | Tape & Reel, Diameter 180 ϕ | 3,000                         | 15,000                | 4.2         | 340              | 195 | 205 |
|                                                                             |               |                  | 5073      | 3,000                | 3,000                | Tape & Reel, Diameter 330 ϕ | 18,000                        | 36,000                | 9.2         | 395              | 245 | 395 |
| 1Y                                                                          | THD           |                  | 7101      | 100                  | 100                  | Magazine                    |                               | 10,000                | 5.0         | 536              | 141 | 117 |
|                                                                             |               |                  | 7102      | 100                  | 100                  | Magazine                    |                               | 10,000                | 5.0         | 536              | 141 | 117 |
|                                                                             | SMD           |                  | 7062      | 1,000                | 1,000                | Tape & Reel, Diameter 250 ϕ | 4,000                         | 8,000                 | 5.3         | 274              | 219 | 291 |
|                                                                             |               |                  | 7072      | 2,000                | 2,000                | Tape & Reel, Diameter 330 ϕ | 8,000                         | 16,000                | 8.8         | 349              | 244 | 361 |
| 1Z                                                                          | THD           |                  | 7101 *1   | 100                  | 100                  | Magazine                    |                               | 10,000                | 2.1         | 545              | 145 | 110 |
|                                                                             |               |                  | 7102      | 100                  | 100                  | Magazine                    |                               | 15,000                | 3.2         | 545              | 145 | 110 |
|                                                                             | SMD           |                  | 7062      | 750                  | 750                  | Tape & Reel, Diameter 180 ϕ | 3,000                         | 15,000                | 4.0         | 340              | 195 | 205 |
|                                                                             |               |                  | 7072      | 3,000                | 3,000                | Tape & Reel, Diameter 330 ϕ |                               | 15,000                | 4.6         | 340              | 340 | 120 |
| SOPA-4                                                                      | SMD           |                  | 7062      | 1,000                | 1,000                | Tape & Reel, Diameter 180 ϕ | 1,000                         | 20,000                | 3.6         | 340              | 195 | 205 |
| 1N/1NA                                                                      | THD           |                  | 7101      | 70                   | 70                   | Magazine                    |                               | 5,600                 | 4.1         | 545              | 145 | 100 |
|                                                                             |               |                  | 7102      | 70                   | 70                   | Magazine                    |                               | 5,600                 | 4.1         | 545              | 145 | 100 |
|                                                                             |               |                  | 7062      | 1,000                | 1,000                | Tape & Reel, Diameter 250 ϕ | 2,000                         | 10,000                | 5.5         | 275              | 285 | 295 |
| 1W                                                                          | THD           |                  | 7101      | 100                  | 50                   | Magazine                    |                               | 4,000                 | 4.4         | 545              | 145 | 110 |
|                                                                             |               |                  | 7102      | 100                  | 50                   | Magazine                    |                               | 4,000                 | 4.4         | 545              | 145 | 110 |
|                                                                             | SMD           |                  | 7062      | 1,000                | 1,000                | Tape & Reel, Diameter 330 ϕ | 3,000                         | 6,000                 | 5.9         | 395              | 245 | 395 |
|                                                                             |               |                  | 7072      | 2,000                | 2,000                | Tape & Reel, Diameter 380 ϕ |                               | 10,000                | 7.8         | 395              | 245 | 395 |
| E-pack                                                                      | THD           |                  | 7100      | 80                   | 80                   | Magazine                    |                               | 10,000                | 6.9         | 560              | 130 | 109 |
|                                                                             |               |                  | 7101*2    | 80                   | 80                   | Magazine                    |                               | 10,000                | 6.9         | 560              | 130 | 109 |
|                                                                             |               |                  | 7061*2    | 1,500                | 1,500                | Tape & Reel, Diameter 250 ϕ |                               | 6,000                 | 2.9         | 260              | 260 | 99  |
|                                                                             |               |                  | 7071*2    | 3,000                | 3,000                | Tape & Reel, Diameter 330 ϕ |                               | 12,000                | 5.5         | 335              | 335 | 99  |
| STO-220                                                                     | SMD           |                  | 7102      | 50                   | 50                   | Magazine                    |                               | 4,500                 | 9.5         | 555              | 145 | 110 |
|                                                                             |               |                  | 7072      | 1,000                | 1,000                | Tape & Reel, Diameter 330 ϕ | 1,000                         | 3,000                 | 6.0         | 362              | 362 | 160 |
| TO-220                                                                      | THD           |                  | 7100      | 50                   | 50                   | Magazine                    | 2,000                         | 2,000                 | 6.1         | 545              | 145 | 110 |
| TO-221                                                                      | THD           |                  | 7100      | 50                   | 50                   | Magazine                    |                               | 3,000                 | 4.2         | 545              | 145 | 110 |
| ZP                                                                          | SMD           |                  |           |                      |                      |                             |                               |                       | 8.0         | 345              | 345 | 154 |
|                                                                             |               |                  | 7072      | 1,500                | 1,500                | Tape & Reel, Diameter 330 ϕ | 1,500                         | 7,500                 | 8.6         | 363              | 363 | 160 |
| MCP                                                                         | SMD           |                  | 4062      | 300                  | 300                  | Tape & Reel, Diameter 255 ϕ | 1,500                         | 1,500                 | 5.0         | 281              | 281 | 205 |
|                                                                             |               |                  | 4072      | 600                  | 600                  | Tape & Reel, Diameter 330 ϕ | 1,800                         | 1,800                 | 5.5         | 362              | 362 | 150 |

\* 1: Only for S1ZB type  
 \* 2: DE5VE40 Spec Code 5□□□

THD: Through Hole Device  
 SMD: Surface Mount Device

Please make your orders:  
 - more than inner box quantities  
 - a multiple of each ordering unit



| Package                | Terminal Type | Terminal Forming | Spec Code | Ordering Unit (Pcs.) | Minimum Packing Unit |                             | Inner Box Quantity (Pcs./Box) | Standard Packing Unit |             | Packing Box (mm) |     |     |     |
|------------------------|---------------|------------------|-----------|----------------------|----------------------|-----------------------------|-------------------------------|-----------------------|-------------|------------------|-----|-----|-----|
|                        |               |                  |           |                      | Quantity             | Packing Method              |                               | Pcs./Box              | Weight (kg) | L                | W   | H   |     |
| ITO-220                | THD           |                  | 7000      | 50                   | 50                   | Tray                        |                               | 2,000                 | 5.2         | 350              | 205 | 210 |     |
|                        |               | Formed           | 7012      | 50                   | 50                   | Tray                        |                               | 2,000                 | 5.2         | 350              | 205 | 210 |     |
|                        |               |                  | 7100      | 50                   | 50                   | Magazine                    |                               | 2,000                 | 6.7         | 530              | 145 | 110 |     |
| FTO-220                |               |                  | 7600      | 1000                 | 100                  | Bulk                        | 2,000                         | 4,000                 | 8.3         | 422              | 244 | 133 |     |
| FTO-220A               |               | Formed           | 7112      | 300                  | 50                   | Magazine                    |                               | 1,400                 | 4.3         | 526              | 141 | 102 |     |
| FTO-220G               |               |                  | 5600      | 100                  | 2,000                | Bulk                        | 2,000                         | 4,000                 | 8.3         | 422              | 244 | 133 |     |
| MTO-3P                 |               | * 1              | 7100      | 30                   | 30                   | Magazine                    |                               | 900                   | 7.6         | 530              | 145 | 110 |     |
|                        |               | * 2              | 7000      | 100                  | 500                  | Bulk                        | 500                           | 1,000                 | 6.8         | 351              | 176 | 123 |     |
|                        |               | Formed           | 7112      | 35                   | 35                   | Magazine                    |                               | 1,050                 | 9.3         | 635              | 160 | 168 |     |
| MTO-3PT                |               |                  | 5000      | 500                  | 500                  | Bulk                        | 500                           | 1,000                 | 6.8         | 351              | 176 | 123 |     |
| ITO-3P                 |               | * 1              | 7100      | 40                   | 40                   | Magazine                    |                               | 1,200                 | 8.0         | 624              | 151 | 92  |     |
|                        |               | * 2              | 7000      | 100                  | 500                  | Bulk                        | 500                           | 1,000                 | 4.9         | 332              | 188 | 121 |     |
|                        |               |                  |           |                      |                      |                             |                               | 2,000                 | 9.7         | 362              | 332 | 121 |     |
|                        |               | Formed           | 7112      | 40                   | 40                   | Magazine                    |                               | 1,200                 | 7.7         | 635              | 160 | 168 |     |
| 1V                     |               |                  |           | 7000                 | 100                  | 100                         | Bulk                          | 2,000                 | 8,000       | 9.7              | 395 | 350 | 235 |
|                        |               | Formed           |           | 7101                 | 120                  | 30                          | Magazine                      |                       | 3,600       | 5.7              | 508 | 141 | 99  |
| 2S                     |               |                  |           | 7000                 | 100                  | 500                         | Bulk                          | 500                   | 6,000       | 14.4             | 410 | 380 | 170 |
| 3S                     |               |                  |           | 7000                 | 50                   | 250                         | Bulk                          | 250                   | 1,000       | 4.6              | 283 | 155 | 183 |
|                        |               |                  |           |                      |                      |                             | 2,000                         |                       | 9.5         | 305              | 280 | 183 |     |
| 5S                     |               |                  |           | 7000                 | 50                   | 250                         | Bulk                          | 250                   | 2,000       | 14.5             | 330 | 330 | 205 |
|                        |               | Formed           |           | 7101                 | 40                   | 20                          | Magazine                      |                       | 1,000       | 8.2              | 670 | 185 | 95  |
| D3K                    |               |                  |           | 7000                 | 100                  | 500                         | Bulk                          | 500                   | 2,500       | 4.0              | 210 | 188 | 200 |
| TSB(4PIN)              |               |                  |           | 7000                 | 100                  | 100                         | Bulk                          | 100                   | 400         | 9.8              | 351 | 269 | 164 |
| TSB(5PIN)              |               |                  |           |                      |                      |                             |                               |                       |             |                  |     |     |     |
| S2VB                   |               |                  |           | 5000                 | 100                  | 100                         | Tray                          |                       | 1,000       | 3.6              | 265 | 255 | 170 |
| S4VB                   |               |                  |           | 5000                 | 50                   | 100                         | Tray                          |                       | 1,000       | 5.9              | 315 | 285 | 220 |
| S5VB                   |               |                  |           | 5000                 | 50                   | 100                         | Tray                          |                       | 1,000       | 10.4             | 415 | 285 | 300 |
| S10VB                  |               |                  |           | 5000                 | 50                   | 100                         | Tray                          |                       | 1,000       | 9.3              | 375 | 285 | 270 |
| S15VB                  | Faston        |                  | 4000      | 50                   | 100                  | Tray                        |                               | 500                   | 9.0         | 415              | 285 | 180 |     |
| S25VB                  |               |                  | 4000      | 60                   | 60                   | Bulk                        |                               | 300                   | 7.0         | 335              | 205 | 165 |     |
| S50VB                  |               |                  | 4000      | 50                   | 50                   | Tray                        | 200                           | 200                   | 6.2         | 335              | 205 | 165 |     |
| S3WB                   | THD           |                  | 5000      | 50                   | 100                  | Tray                        |                               | 1,000                 | 6.1         | 315              | 285 | 220 |     |
| S10WB                  |               |                  | 5000      | 50                   | 100                  | Tray                        |                               | 1,000                 | 9.3         | 375              | 285 | 270 |     |
| S15WB                  |               |                  | 5000      | 50                   | 100                  | Tray                        |                               | 1,000                 | 15.1        | 415              | 285 | 300 |     |
| S20WB                  |               |                  | 5000      | 50                   | 100                  | Tray                        |                               | 700                   | 15.0        | 415              | 285 | 300 |     |
| D30VC                  | Faston        |                  | 4000      | 50                   | 100                  | Tray                        |                               | 500                   | 7.0         | 375              | 285 | 160 |     |
| SVT                    |               |                  | 4000      | (45)                 | 200                  | Bulk                        | 200                           | 200                   | 6.2         | 335              | 205 | 165 |     |
| SVTA                   | THD           |                  | 5000      | 50                   | 50                   | Tray                        | 250                           | 250                   | 7.6         | 400              | 260 | 255 |     |
| Module                 | M4 nut        |                  | 4000      | (3)                  | 25                   | Bulk                        | 100                           | 200                   | 13.4        | 480              | 330 | 210 |     |
| ZIP27 (MTA·MTD)        | THD           |                  | 7101      | 15                   | 15                   | Magazine                    |                               | 450                   | 5.3         | 640              | 180 | 105 |     |
|                        |               | Formed           | 7102      | 15                   | 15                   | Magazine                    |                               | 450                   | 5.3         | 640              | 180 | 105 |     |
|                        |               | Formed           | 7103      | 15                   | 15                   | Magazine                    |                               | 450                   | 5.3         | 640              | 180 | 105 |     |
| HSOP28 (MD□F·MTD□F)    | SMD           |                  | 3072      | 1,000                | 1,000                | Tape & Reel, Diameter 330 ϕ | 1,000                         | 3,000                 | 7.6         | 362              | 362 | 160 |     |
| HSOP40 (MTD□J)         | SMD           |                  | 3072      | 1,000                | 1,000                | Tape & Reel, Diameter 330 ϕ | 1,000                         | 3,000                 | 7.6         | 362              | 362 | 160 |     |
| SSOP32                 | SMD           |                  | 3072      | 2,000                | 2,000                | Tape & Reel, Diameter 330 ϕ | 2,000                         | 6,000                 | 7.6         | 362              | 362 | 160 |     |
|                        |               |                  | 3062      | 500                  | 500                  | Tape & Reel, Diameter 180 ϕ | 500                           | 2,000                 | 2.9         | 226              | 243 | 260 |     |
| LSSOP26                | SMD           |                  | 3072      | 3,000                | 3,000                | Tape & Reel, Diameter 330 ϕ | 3,000                         | 9,000                 | 5.5         | 363              | 363 | 160 |     |
|                        |               |                  | 3062      | 700                  | 700                  | Tape & Reel, Diameter 180 ϕ | 700                           | 2,800                 | 2.5         | 243              | 226 | 260 |     |
| SOP8                   | SMD           |                  | 7062      | 1,000                | 1,000                | Tape & Reel, Diameter 180 ϕ | 1,000                         | 18,000                | 4.5         | 442              | 202 | 205 |     |
|                        |               | 1,000            |           |                      |                      |                             | 10,000                        | 2.6                   | 260         | 200              | 210 |     |     |
| FTO-5P (MR1000 Series) | THD           | Formed           | 7101      | 50                   | 50                   | Magazine                    |                               | 1,400                 | 4.3         | 526              | 141 | 104 |     |
| FTO-7P (MR4000 Series) | THD           | Formed           | 7101      | 50                   | 50                   | Magazine                    |                               | 1,400                 | 4.3         | 526              | 141 | 104 |     |
| MIH7 (MR2000 Series)   | THD           | Formed           | 7109F12   | 30                   | 30                   | Magazine                    |                               | 960                   | 6.8         | 655              | 170 | 105 |     |
| MZIP7 (MR5000 Series)  | THD           | Formed           | 7101      | 20                   | 20                   | Magazine                    |                               | 560                   | 4.4         | 530              | 150 | 110 |     |
| D6K                    | THD           |                  | 7000      | 50                   | 500                  | Bulk                        | 500                           | 2,000                 | 8.0         | 260              | 220 | 222 |     |

\* 1: MOSFETs

\* 2: Diodes

# Code No. (Taping).....

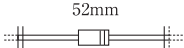
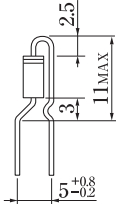
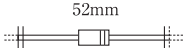
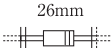
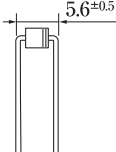
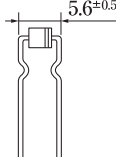
## SMD

| Spec Code | Outline |                                                                                   | Reel diameter (φ) | Quantity | Spec Code | Outline                                                                            |                                                                                     | Reel diameter (φ) | Quantity | Spec Code                                                                           | Outline                                                                               |                                                                                       | Reel diameter (φ)                                                                   | Quantity |
|-----------|---------|-----------------------------------------------------------------------------------|-------------------|----------|-----------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|----------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| 3072      | HSOP28  |  | 330               | 1,000    | 4062      | MCP                                                                                |    | 255               | 300      | 7061                                                                                | E-pack                                                                                |    | 250                                                                                 | 1,500    |
|           | HSOP40  |  | 330               | 1,000    | 4072      |                                                                                    |                                                                                     |                   | 330      | 600                                                                                 |                                                                                       | 1Z                                                                                    |  | 180      |
|           | SSOP32  |  | 330               | 2,000    | 5063      | 1F                                                                                 |    | 180               | 1,500    | 7062                                                                                | 1Y                                                                                    |    | 250                                                                                 | 1,000    |
|           | LSSOP26 |  | 330               | 3,000    |           | 2F                                                                                 |    | 180               | 750      |                                                                                     | 1N                                                                                    |    | 250                                                                                 | 1,000    |
|           |         |                                                                                   |                   | M2F      |           |   | 180                                                                                 | 1,000             | SOPA-4   |                                                                                     |    | 180                                                                                   | 1,000                                                                               |          |
|           |         |                                                                                   |                   |          | 5073      | 1F                                                                                 |    | 330               | 7,500    |                                                                                     | 7062                                                                                  | 1W                                                                                    |  | 330      |
|           |         |                                                                                   |                   | 2F       |           |   | 330                                                                                 | 3,000             | SOP8     |  |                                                                                       | 180                                                                                   | 1,000                                                                               |          |
|           |         |                                                                                   |                   | M2F      |           |  | 330                                                                                 | 4,000             | 7071     | E-pack                                                                              |                                                                                       |   | 330                                                                                 | 3,000    |
|           |         |                                                                                   |                   |          | 6063      | M1F                                                                                |  | 180               | 2,500    | 7072                                                                                | 1Z                                                                                    |  | 330                                                                                 | 3,000    |
|           |         |                                                                                   |                   |          |           |                                                                                    |                                                                                     |                   | 1Y       |                                                                                     |  | 330                                                                                   | 2,000                                                                               |          |
|           |         |                                                                                   |                   |          |           |                                                                                    |                                                                                     |                   | 1W       |                                                                                     |  | 380                                                                                   | 2,000                                                                               |          |
|           |         |                                                                                   |                   |          |           |                                                                                    |                                                                                     |                   | STO-220  |                                                                                     |  | 330                                                                                   | 1,000                                                                               |          |
|           |         |                                                                                   |                   |          |           |                                                                                    |                                                                                     |                   | ZP       |                                                                                     |  | 330                                                                                   | 1,500                                                                               |          |

## AX Ammo-Pack

## AX Radial-Taping

## AX Reel

| Spec Code | Outline |                                                                                   | Quantity | Spec Code | Outline |                                                                                   | Quantity | Spec Code | Outline |                                                                                     | Reel diameter (φ) | Quantity |
|-----------|---------|-----------------------------------------------------------------------------------|----------|-----------|---------|-----------------------------------------------------------------------------------|----------|-----------|---------|-------------------------------------------------------------------------------------|-------------------|----------|
| □060      | AX057   |  | 4,000    | □081      | AX06    |  | 5,000    | □061      | AX06    |  | 300               | 4,000    |
|           | AX06    |                                                                                   | 4,000    |           | AX10    |                                                                                   | 300      |           | 2,500   |                                                                                     |                   |          |
|           | AX078   |                                                                                   | 2,000    |           | AX14    |                                                                                   | 300      |           | 2,500   |                                                                                     |                   |          |
|           | AX10    |                                                                                   | 1,200    |           |         |                                                                                   |          |           |         |                                                                                     |                   |          |
|           | AX14    |                                                                                   | 1,200    |           |         |                                                                                   |          |           |         |                                                                                     |                   |          |
| □070      | AX057   |  | 3,000    | □083      | AX057   |  | 3,000    |           |         |                                                                                     |                   |          |
|           | AX06    |                                                                                   | 3,000    |           |         |                                                                                   |          |           |         |                                                                                     |                   |          |
|           | AX078   |                                                                                   | 1,500    | □084      | AX057   |  | 3,000    |           |         |                                                                                     |                   |          |
|           |         |                                                                                   |          |           |         |                                                                                   |          |           |         |                                                                                     |                   |          |

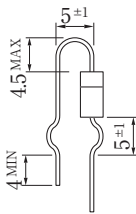
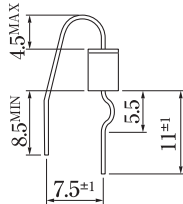
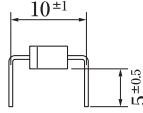
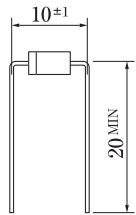
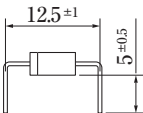
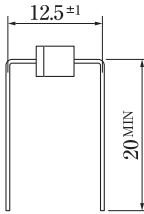
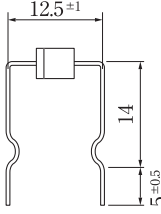
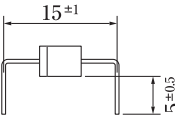
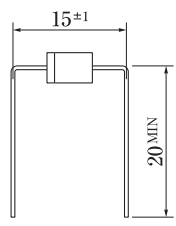
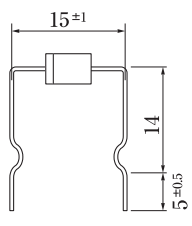
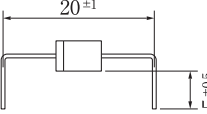
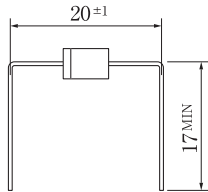
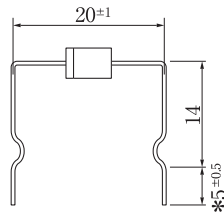
The initial digit of the Spec Code varies. See the remarks to each product.

# Lead Forming

## Axial type diode

Standard forming types are configured using two codes, a spec code first and then the forming code.

Complete code example would be 5002P5. (As for details, please refer to the outline dimensions in each specification sheet.) [Unit: mm]

| Spec Code    |                               | □001                                                                                | □002                                                                              | □003                                                                                 | □004                                                                                  |
|--------------|-------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Forming Code | Package                       |                                                                                     |                                                                                   |                                                                                      |                                                                                       |
| P5           | AX06<br>AX078<br>AX10         |                                                                                     |  |                                                                                      |                                                                                       |
| P7.5         | AX10<br>AX14                  |                                                                                     |  |                                                                                      |                                                                                       |
| P10          | AX06<br>AX078                 |   |                                                                                   |   |                                                                                       |
| P12.5        | AX06<br>AX078<br>AX10         |  |                                                                                   |  |  |
| P15          | AX06<br>AX078<br>AX10<br>AX14 |  |                                                                                   |  |  |
| P20          | AX10<br>AX14                  |  |                                                                                   |  |  |

\* Tolerance is  $5^{+0.5}_{-1.0}$  for AX14 products ( $\phi 1.4\text{mm}$ )

The initial digit of the Spec Code varies. See the remarks to each product.

# SIP Bridge Diodes

(As for details, please refer to the outline dimensions in each specification sheet.) [Unit: mm]

| Spec Code<br>Package | 7001<br>Short Lead | 7002<br>L-Type Lead | 7003<br>Outside Kink | 7004<br>Zig-Zag Lead |
|----------------------|--------------------|---------------------|----------------------|----------------------|
| 1V                   |                    |                     |                      |                      |
| 2S                   |                    |                     |                      |                      |
| 3S                   |                    |                     |                      |                      |
| 5S                   |                    |                     |                      |                      |
| D6K                  |                    |                     |                      |                      |

# Lead Forming

## Three Terminal diodes / MOSFETs

(As for details, please refer to the outline dimensions in each specification sheet.) [Unit: mm]

| Spec Code | 7001 | 7012 | 7015 | 7022 |
|-----------|------|------|------|------|
| Package   |      |      |      |      |
| ITO-220   |      |      |      |      |
| FTO-220   |      |      |      |      |
| FTO-220A  |      |      |      |      |
| MTO-3P    |      |      |      |      |
| ITO-3P    |      |      |      |      |



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