

# Standard Rectifier

$$V_{RRM} = 800 \text{ V}$$

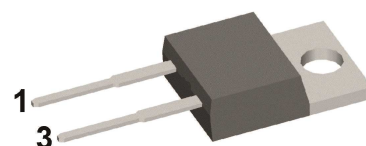
$$I_{FAV} = 30 \text{ A}$$

$$V_F = 1.25 \text{ V}$$

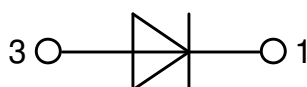
## Single Diode

**Part number**

**DSI30-08A**



Backside: cathode



### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

### Applications:

- Diode for main rectification
- For single and three phase bridge configurations

### Package: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

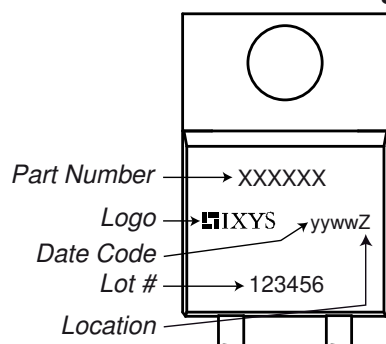
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| Rectifier  |                                              |                                                      |                                | Ratings                        |      |      |                  |
|------------|----------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------------|------|------|------------------|
| Symbol     | Definition                                   | Conditions                                           |                                | min.                           | typ. | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                        |                                |                                |      | 900  | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                        |                                |                                |      | 800  | V                |
| $I_R$      | reverse current                              | $V_R = 800\text{ V}$                                 | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 40   | $\mu\text{A}$    |
|            |                                              | $V_R = 800\text{ V}$                                 | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 1.5  | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 30\text{ A}$                                  | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 1.29 | V                |
|            |                                              | $I_F = 60\text{ A}$                                  |                                |                                |      | 1.60 | V                |
|            |                                              | $I_F = 30\text{ A}$                                  | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 1.25 | V                |
|            |                                              | $I_F = 60\text{ A}$                                  |                                |                                |      | 1.66 | V                |
| $I_{FAV}$  | average forward current                      | $T_C = 130^{\circ}\text{C}$<br>rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}\text{C}$ |                                |      | 30   | A                |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only                    |                                | $T_{VJ} = 175^{\circ}\text{C}$ |      | 0.82 | V                |
| $r_F$      | slope resistance                             |                                                      |                                |                                |      | 14.1 | m $\Omega$       |
| $R_{thJC}$ | thermal resistance junction to case          |                                                      |                                |                                |      | 0.9  | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                      |                                |                                | 0.5  |      | K/W              |
| $P_{tot}$  | total power dissipation                      | $T_C = 25^{\circ}\text{C}$                           |                                |                                |      | 160  | W                |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 45^{\circ}\text{C}$  |                                |      | 300  | A                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 325  | A                |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 255  | A                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 275  | A                |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 45^{\circ}\text{C}$  |                                |      | 450  | A <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 440  | A <sup>2</sup> s |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 325  | A <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 315  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$               |                                |                                | 10   |      | pF               |

| Package TO-220 |                              |              | Ratings |      |      |      |
|----------------|------------------------------|--------------|---------|------|------|------|
| Symbol         | Definition                   | Conditions   | min.    | typ. | max. | Unit |
| $I_{RMS}$      | RMS current                  | per terminal |         |      | 35   | A    |
| $T_{VJ}$       | virtual junction temperature |              | -40     |      | 175  | °C   |
| $T_{op}$       | operation temperature        |              | -40     |      | 150  | °C   |
| $T_{stg}$      | storage temperature          |              | -40     |      | 150  | °C   |
| Weight         |                              |              |         | 2    |      | g    |
| $M_D$          | mounting torque              |              | 0.4     |      | 0.6  | Nm   |
| $F_C$          | mounting force with clip     |              | 20      |      | 60   | N    |

### Product Marking



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSI30-08A       | DSI30-08A          | Tube          | 50       | 476382   |

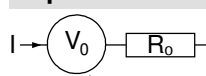
| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DSI30-08AS   | TO-263AB (D2Pak) (2) | 800           |
| DSI30-08AC   | ISOPLUS220AC (2)     | 800           |
| DSI30-12A    | TO-220AC (2)         | 1200          |
| DSI30-12AS   | TO-263AB (D2Pak) (2) | 1200          |

|            |                      |      |
|------------|----------------------|------|
| DSI30-12AC | ISOPLUS220AC (2)     | 1200 |
| DSI30-16A  | TO-220AC (2)         | 1600 |
| DSI30-16AS | TO-263AB (D2Pak) (2) | 1600 |

### Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 175^{\circ}\text{C}$



Rectifier

$V_{0\max}$  threshold voltage

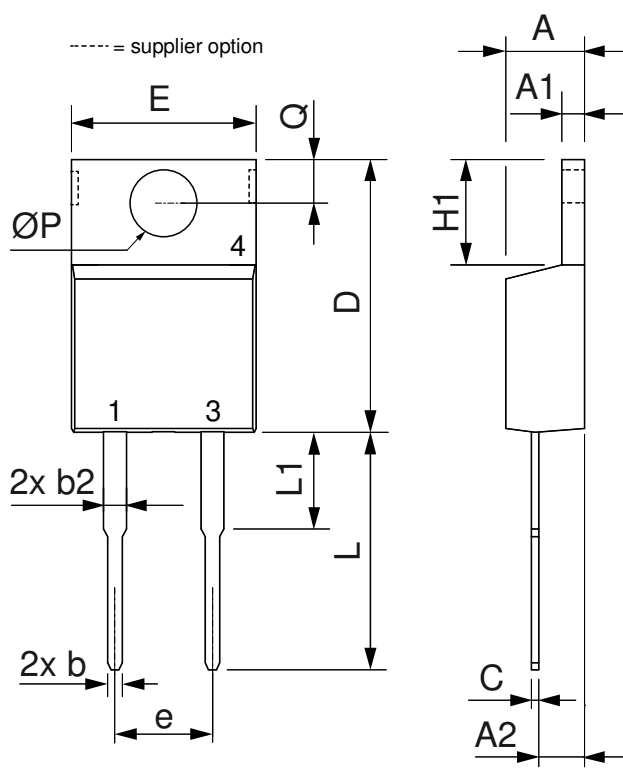
0.82

V

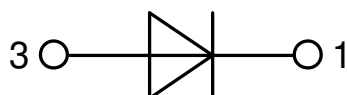
$R_{0\max}$  slope resistance \*

11

mΩ

**Outlines TO-220**


| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 4.32       | 4.82  | 0.170  | 0.190 |
| A1   | 1.14       | 1.39  | 0.045  | 0.055 |
| A2   | 2.29       | 2.79  | 0.090  | 0.110 |
| b    | 0.64       | 1.01  | 0.025  | 0.040 |
| b2   | 1.15       | 1.65  | 0.045  | 0.065 |
| C    | 0.35       | 0.56  | 0.014  | 0.022 |
| D    | 14.73      | 16.00 | 0.580  | 0.630 |
| E    | 9.91       | 10.66 | 0.390  | 0.420 |
| e    | 5.08       | BSC   | 0.200  | BSC   |
| H1   | 5.85       | 6.85  | 0.230  | 0.270 |
| L    | 12.70      | 13.97 | 0.500  | 0.550 |
| L1   | 2.79       | 5.84  | 0.110  | 0.230 |
| ØP   | 3.54       | 4.08  | 0.139  | 0.161 |
| Q    | 2.54       | 3.18  | 0.100  | 0.125 |



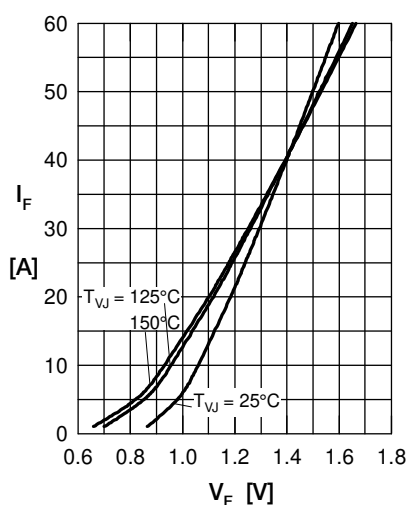
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

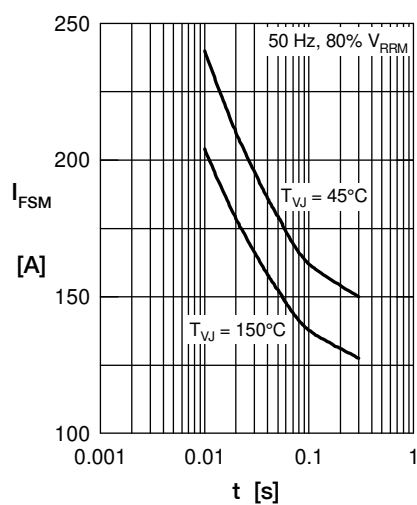


Fig. 2 Surge overload current

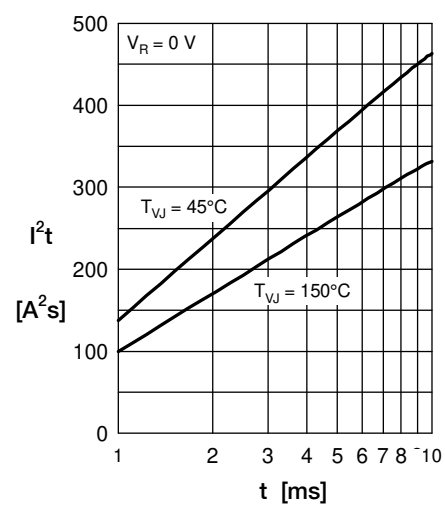
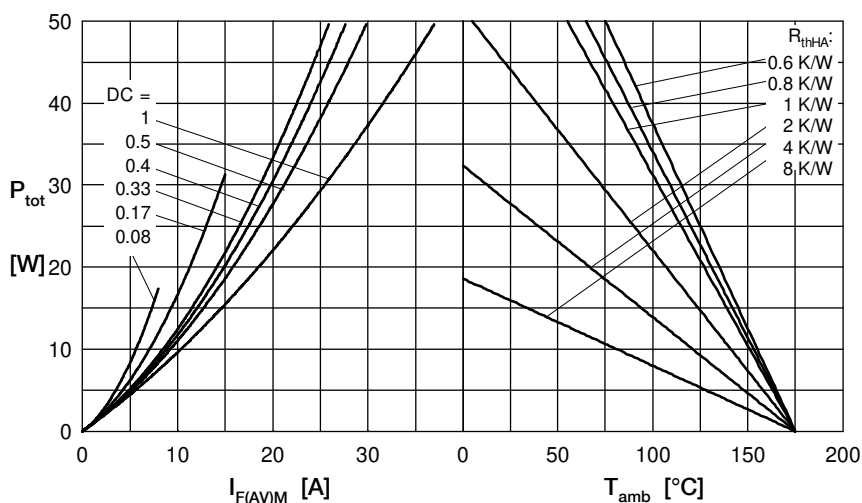

 Fig. 3  $I^2t$  versus time per diode


Fig. 4 Power dissipation vs. direct output current and ambient temperature

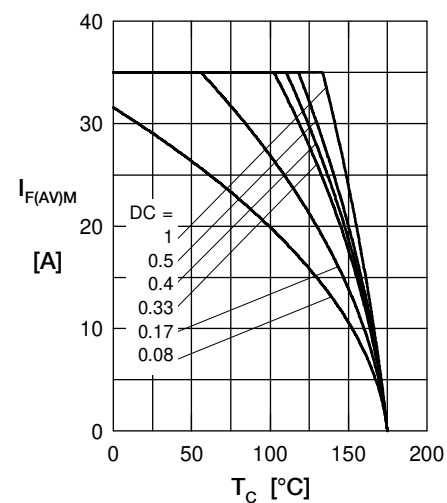


Fig. 5 Max. forward current vs. case temperature

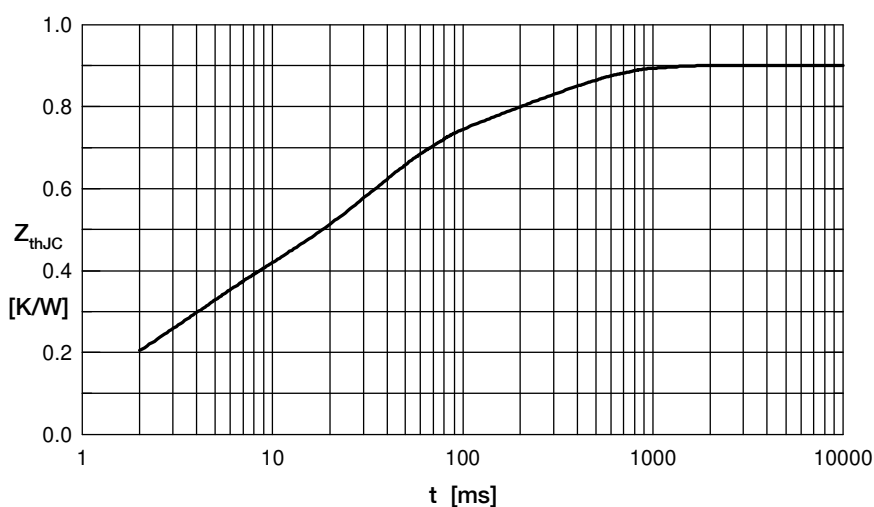


Fig. 6 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.03            | 0.0004    |
| 2 | 0.08            | 0.002     |
| 3 | 0.2             | 0.003     |
| 4 | 0.39            | 0.03      |
| 5 | 0.2             | 0.29      |