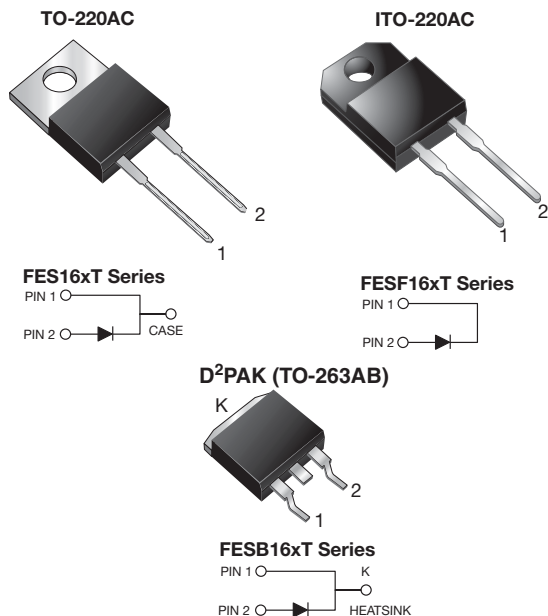


## Ultrafast Plastic Rectifier



**RoHS**  
COMPLIANT

### FEATURES

- Power pack
- Glass passivated pellet chip junction
- Ultrafast recovery time
- Low switching losses, high efficiency
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for D<sup>2</sup>PAK (TO-263AB) package)
- Solder dip 275 °C max. 10 s, per JESD 22-B106 (for TO-220AC and ITO-220AC package)
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 (for ITO-220AC and D<sup>2</sup>PAK (TO-263AB) package)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### TYPICAL APPLICATIONS

For use in high frequency rectifier of switching mode power supplies, inverters, freewheeling diodes, DC/DC converters, and other power switching application.

### DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS |                                                    |
|-------------------------|----------------------------------------------------|
| $I_{F(AV)}$             | 16 A                                               |
| $V_{RRM}$               | 50 V to 600 V                                      |
| $I_{FSM}$               | 250 A                                              |
| $t_{rr}$                | 35 ns, 50 ns                                       |
| $V_F$                   | 0.975 V, 1.30 V, 1.50 V                            |
| $T_J$ max.              | 150 °C                                             |
| Package                 | TO-220AC, ITO-220AC, D <sup>2</sup> PAK (TO-263AB) |
| Circuit configurations  | Single                                             |

### MECHANICAL DATA

**Case:** TO-220AC, ITO-220AC, D<sup>2</sup>PAK (TO-263AB)  
Molding compound meets UL 94 V-0 flammability rating  
Base P/N-E3 - RoHS-compliant, commercial grade  
Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified ("\_X" denotes revision code e.g. A, B,...)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

**Mounting Torque:** 10 in-lbs max.

| MAXIMUM RATINGS ( $T_C = 25\text{ °C}$ unless otherwise noted)                     |                |             |          |          |          |          |          |          |          |      |
|------------------------------------------------------------------------------------|----------------|-------------|----------|----------|----------|----------|----------|----------|----------|------|
| PARAMETER                                                                          | SYMBOL         | FES 16AT    | FES 16BT | FES 16CT | FES 16DT | FES 16FT | FES 16GT | FES 16HT | FES 16JT | UNIT |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 50          | 100      | 150      | 200      | 300      | 400      | 500      | 600      | V    |
| Maximum RMS voltage                                                                | $V_{RMS}$      | 35          | 70       | 105      | 140      | 210      | 280      | 350      | 420      | V    |
| Maximum DC blocking voltage                                                        | $V_{DC}$       | 50          | 100      | 150      | 200      | 300      | 400      | 500      | 600      | V    |
| Maximum average forward rectified current at $T_C = 100\text{ °C}$                 | $I_{F(AV)}$    | 16          |          |          |          |          |          |          |          | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 250         |          |          |          |          |          |          |          | A    |
| Operating storage and temperature range                                            | $T_J, T_{STG}$ | -65 to +150 |          |          |          |          |          |          |          | °C   |
| Isolation voltage (ITO-220AC only) from terminal to heatsink $t = 1\text{ min}$    | $V_{AC}$       | 1500        |          |          |          |          |          |          |          | V    |



| ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted) |                                                                          |                               |          |          |          |          |          |          |          |          |      |    |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|------|----|
| PARAMETER                                                                  | TEST CONDITIONS                                                          | SYMBOL                        | FES 16AT | FES 16BT | FES 16CT | FES 16DT | FES 16FT | FES 16GT | FES 16HT | FES 16JT | UNIT |    |
| Maximum instantaneous forward voltage                                      | 16 A                                                                     | V <sub>F</sub> <sup>(1)</sup> | 0.975    |          |          |          | 1.30     |          | 1.50     |          | V    |    |
| Maximum DC reverse current at rated DC blocking voltage                    | T <sub>C</sub> = 25 °C                                                   | I <sub>R</sub>                | 10       |          |          |          |          |          |          |          |      | μA |
|                                                                            | T <sub>C</sub> = 100 °C                                                  |                               | 500      |          |          |          |          |          |          |          |      |    |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A | t <sub>rr</sub>               | 35       |          |          |          | 50       |          |          |          | ns   |    |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             | C <sub>J</sub>                | 175      |          |          |          |          |          | 145      |          | pF   |    |

**Note**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

| THERMAL CHARACTERISTICS ( $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                 |     |      |      |                      |
|--------------------------------------------------------------------------------------|-----------------|-----|------|------|----------------------|
| PARAMETER                                                                            | SYMBOL          | FES | FESF | FESB | UNIT                 |
| Typical thermal resistance, junction to case                                         | $R_{\theta JC}$ | 1.2 | 1.7  | 1.2  | $^{\circ}\text{C/W}$ |

| ORDERING INFORMATION (Example) |                                |                 |              |               |               |
|--------------------------------|--------------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE                        | PREFERRED P/N                  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC                       | FES16JT-E3/45                  | 1.78            | 45           | 50/tube       | Tube          |
| ITO-220AC                      | FESF16JT-E3/45                 | 1.80            | 45           | 50/tube       | Tube          |
| TO-263AB                       | FESB16JT-E3/45                 | 1.33            | 45           | 50/tube       | Tube          |
| TO-263AB                       | FESB16JT-E3/81                 | 1.33            | 81           | 800/reel      | Tape and reel |
| ITO-220AC                      | FESF16JT-E3_A/P <sup>(1)</sup> | 1.80            | P            | 50/tube       | Tube          |
| TO-263AB                       | FESB16JT-E3_A/P <sup>(1)</sup> | 1.33            | P            | 50/tube       | Tube          |
| TO-263AB                       | FESB16JT-E3_A/I <sup>(1)</sup> | 1.33            | I            | 800/reel      | Tape and reel |

**Note**

(1) AEC-Q101 qualified, available in ITO-220AC and TO-263AB package



## RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

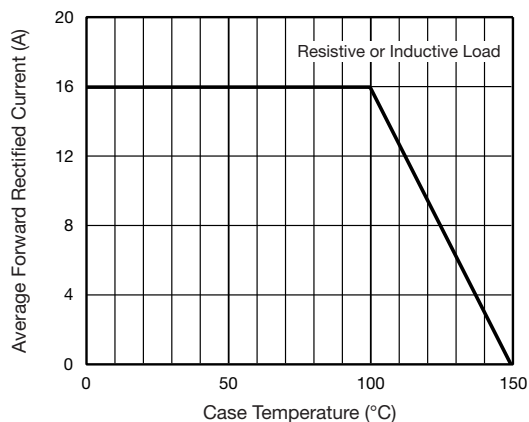


Fig. 1 - Maximum Forward Current Derating Curve

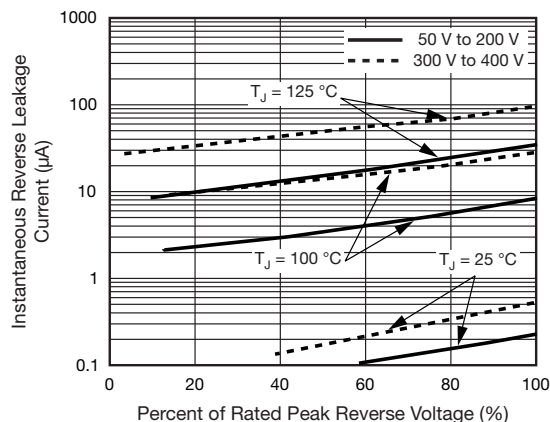


Fig. 4 - Typical Reverse Leakage Characteristics

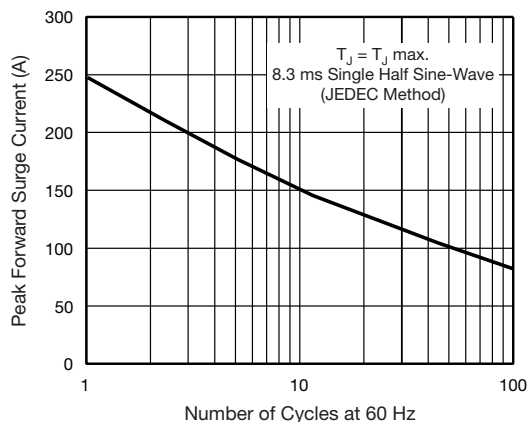


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

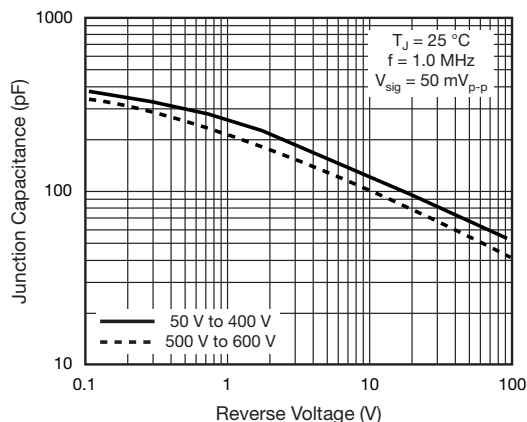


Fig. 5 - Typical Junction Capacitance

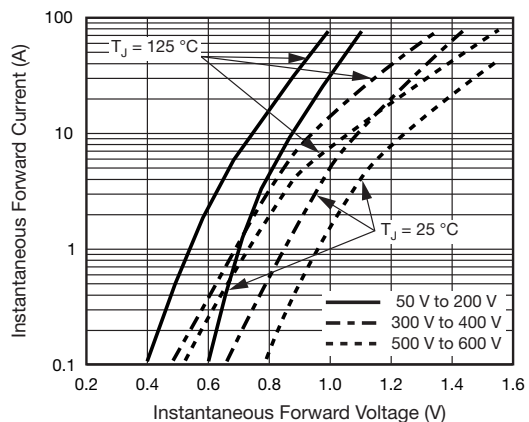
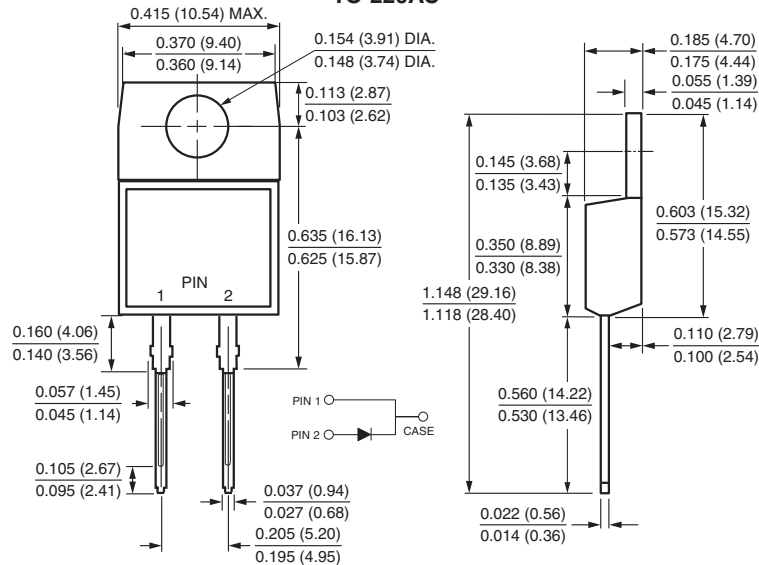


Fig. 3 - Typical Instantaneous Forward Characteristics

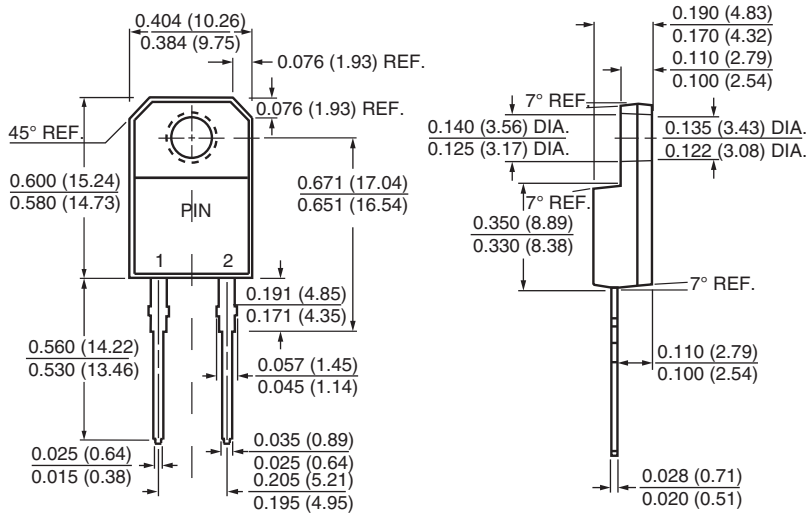


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

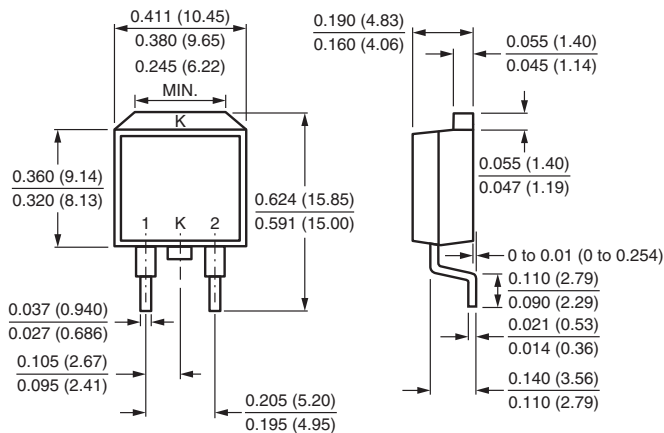
TO-220AC



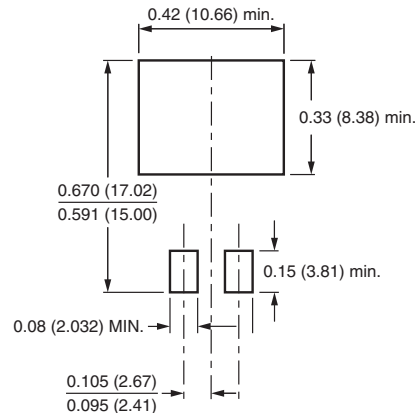
ITO-220AC



D<sup>2</sup>PAK (TO-263AB)



Mounting Pad Layout





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