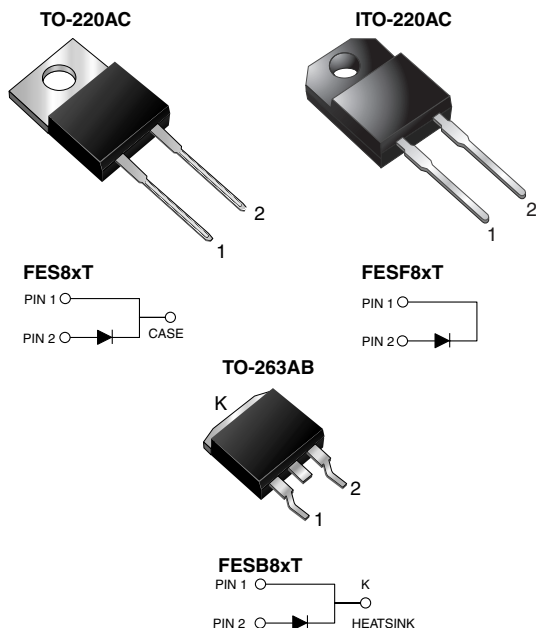


## Ultrafast Plastic Rectifier



### FEATURES

- Glass passivated chip junction
- Ultrafast recovery time
- Low switching losses, high efficiency
- Low leakage current
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder dip 260 °C, 40 s (for TO-220AC and ITO-220AC package)
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

**Case:** TO-220AC, ITO-220AC, TO-263AB

Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

E3 suffix for consumer grade, meets JESD 201 class 1A whisker test, HE3 suffix for high reliability grade (AEC Q101 qualified), meets JESD 201 class 2 whisker test

**Polarity:** As marked

**Mounting Torque:** 10 in-lbs maximum

### PRIMARY CHARACTERISTICS

|                    |                        |
|--------------------|------------------------|
| $I_{F(AV)}$        | 8.0 A                  |
| $V_{RRM}$          | 50 V to 600 V          |
| $I_{FSM}$          | 125 A                  |
| $t_{rr}$           | 35 ns, 50 ns           |
| $V_F$              | 0.95 V, 1.30 V, 1.50 V |
| $T_J \text{ max.}$ | 150 °C                 |

### MAXIMUM RATINGS ( $T_C = 25$ °C unless otherwise noted)

| PARAMETER                                                                          | SYMBOL         | FES 8AT       | FES 8BT | FES 8CT | FES 8DT | FES 8FT | FES 8GT | FES 8HT | FES 8JT | 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 $T_C = 100$ °C                        | $I_{F(AV)}$    | 8.0           |         |         |         |         |         |         |         | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 125           |         |         |         |         |         |         |         | A    |
| Operating storage and temperature range                                            | $T_J, T_{STG}$ | - 55 to + 150 |         |         |         |         |         |         |         | °C   |
| Isolation voltage (ITO-220AC only) from terminal to heatsink $t = 1$ min           | $V_{AC}$       | 1500          |         |         |         |         |         |         |         | V    |

| ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted) |                                                                             |                                                   |                 |           |         |         |         |         |         |         |         |      |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------|-----------------|-----------|---------|---------|---------|---------|---------|---------|---------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                             |                                                   | SYMBOL          | FES 8AT   | FES 8BT | FES 8CT | FES 8DT | FES 8FT | FES 8GT | FES 8HT | FES 8JT | UNIT |
| Maximum instantaneous forward voltage <sup>(1)</sup>                       | 8.0 A                                                                       |                                                   | V <sub>F</sub>  | 0.95      |         |         |         | 1.3     |         | 1.5     |         | V    |
| Maximum DC reverse current at rated DC blocking voltage                    |                                                                             | T <sub>C</sub> = 25 °C<br>T <sub>C</sub> = 100 °C | I <sub>R</sub>  | 10<br>500 |         |         |         |         |         |         |         | μA   |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A,<br>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>  | 85        |         |         |         |         |         | 50      |         | pF   |

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

| <b>THERMAL CHARACTERISTICS</b> ( $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                 |     |      |      |                      |
|---------------------------------------------------------------------------------------------|-----------------|-----|------|------|----------------------|
| PARAMETER                                                                                   | SYMBOL          | FES | FESF | FESB | UNIT                 |
| Typical thermal resistance from junction to case                                            | $R_{\theta JC}$ | 2.2 | 5.0  | 2.2  | $^{\circ}\text{C/W}$ |

| <b>ORDERING INFORMATION</b> (Example) |                              |                 |              |               |               |
|---------------------------------------|------------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE                               | PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC                              | FES8JT-E3/45                 | 1.80            | 45           | 50/tube       | Tube          |
| ITO-220AC                             | FESF8JT-E3/45                | 1.85            | 45           | 50/tube       | Tube          |
| TO-263AB                              | FESB8JT-E3/45                | 1.33            | 45           | 50/tube       | Tube          |
| TO-263AB                              | FESB8JT-E3/81                | 1.33            | 81           | 800/reel      | Tape and reel |
| TO-220AC                              | FES8JT-E3/45 <sup>(1)</sup>  | 1.80            | 45           | 50/tube       | Tube          |
| ITO-220AC                             | FESF8JT-E3/45 <sup>(1)</sup> | 1.85            | 45           | 50/tube       | Tube          |
| TO-263AB                              | FESB8JT-E3/45 <sup>(1)</sup> | 1.33            | 45           | 50/tube       | Tube          |
| TO-263AB                              | FESB8JT-E3/81 <sup>(1)</sup> | 1.33            | 81           | 800/reel      | Tape and reel |

**Note:**

(1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

( $T_A = 25^\circ\text{C}$  unless otherwise noted)



Figure 1. Maximum Forward Current Derating Curve



Figure 4. Typical Reverse Leakage Characteristics



Figure 2. Maximum Non-Repetitive Peak Forward Surge Current



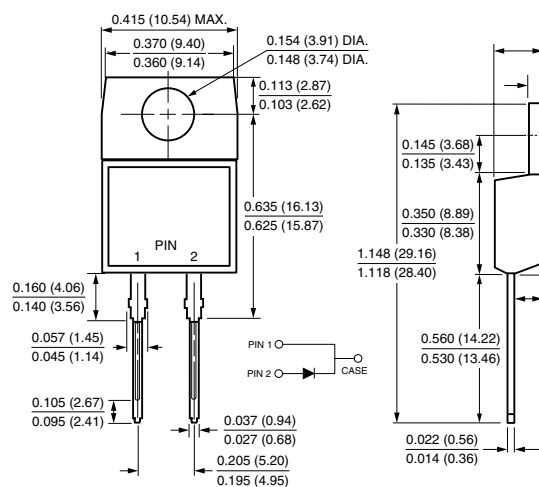
Figure 5. Typical Junction Capacitance



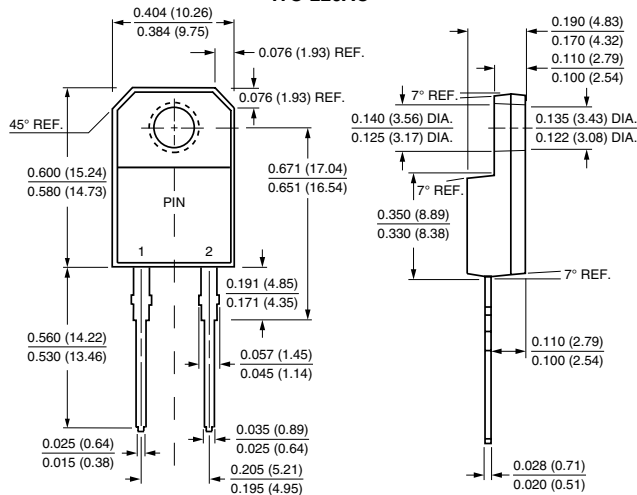
Figure 3. Typical Instantaneous Forward Characteristics

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

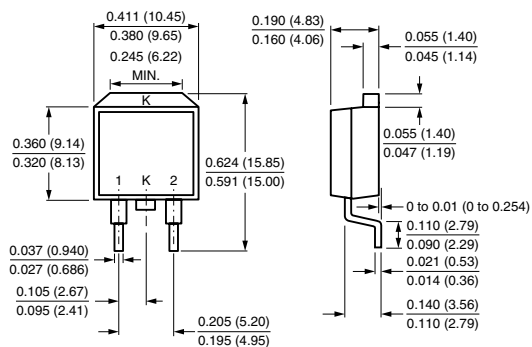
## TO-220AC



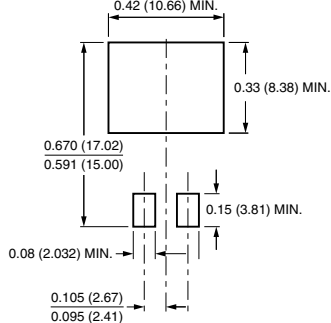
ITO-220AC



**TO-263AB**



### Mounting Pad Layout





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