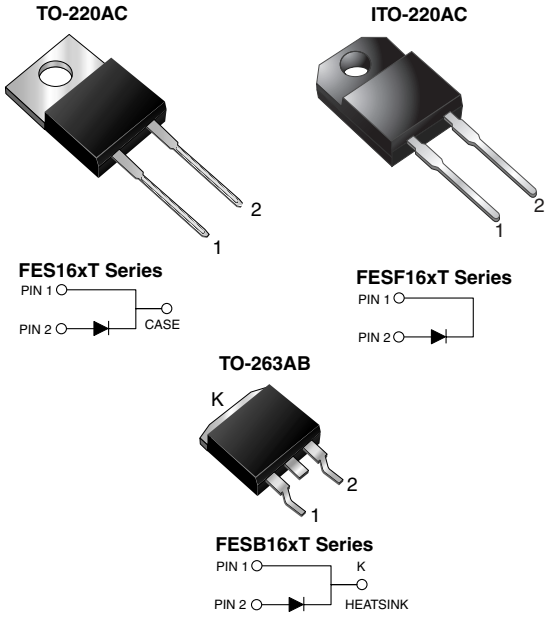
# Ultrafast Plastic Rectifier




## FEATURES

- Glass passivated 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 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 | |
|---|---|
| $I_{F(AV)}$ | 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 |

**MAXIMUM RATINGS** ($T_C$ = 25 °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 °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 min | $V_{AC}$ | 1500 | | | | | | | | V |

| **ELECTRICAL CHARACTERISTICS** ($T_C$ = 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 (1) | 16 A | $V_F$ | 0.975 | | | | 1.30 | | 1.50 | | V |
| Maximum DC reverse current at rated DC blocking voltage | $T_C$ = 25 °C<br>$T_C$ = 100 °C | $I_R$ | 10<br>500 | | | | | | | | µA |
| Maximum reverse recovery time | $I_F$ = 0.5 A,<br>$I_R$ = 1.0 A,<br>$I_{rr}$ = 0.25 A | $t_{rr}$ | 35 | | | | 50 | | | | ns |
| Typical junction capacitance | 4.0 V, 1 MHz | $C_J$ | 175 | | | | | | 145 | | pF |

**Note:**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

| **THERMAL CHARACTERISTICS** ($T_C$ = 25 °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 | °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 |
| TO-220AC | FES16JTHE3/45 (1) | 1.78 | 45 | 50/tube | Tube |
| ITO-220AC | FESF16JTHE3/45 (1) | 1.80 | 45 | 50/tube | Tube |
| TO-263AB | FESB16JTHE3/45 (1) | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | FESB16JTHE3/81 (1) | 1.33 | 81 | 800/reel | Tape and reel |

**Note:**

(1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

($T_A$ = 25 °C unless otherwise noted)

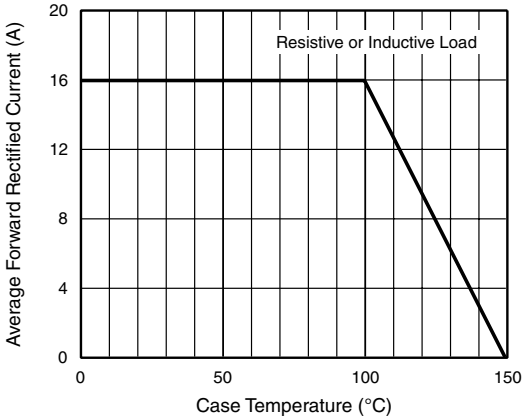



Figure 1. Maximum Forward Current Derating Curve

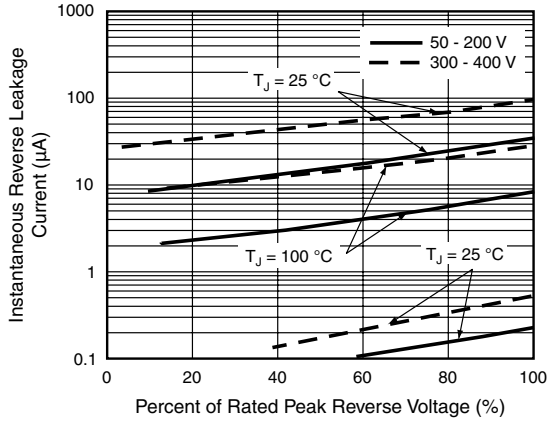



Figure 4. Typical Reverse Leakage Characteristics

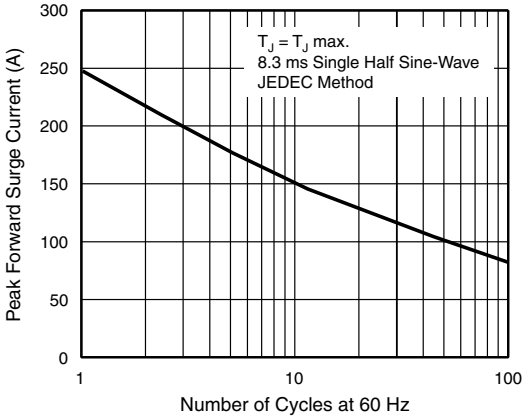



Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

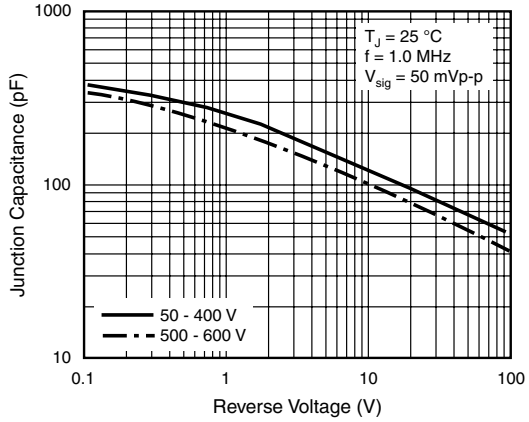



Figure 5. Typical Junction Capacitance

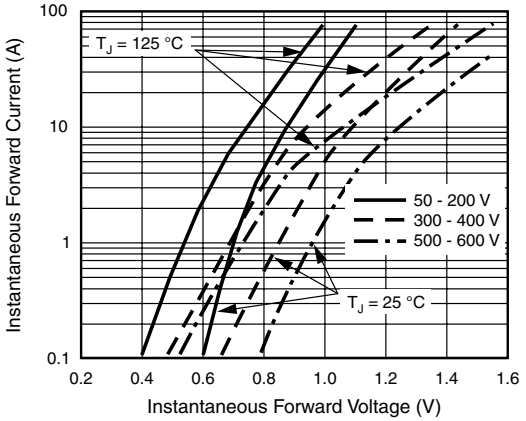
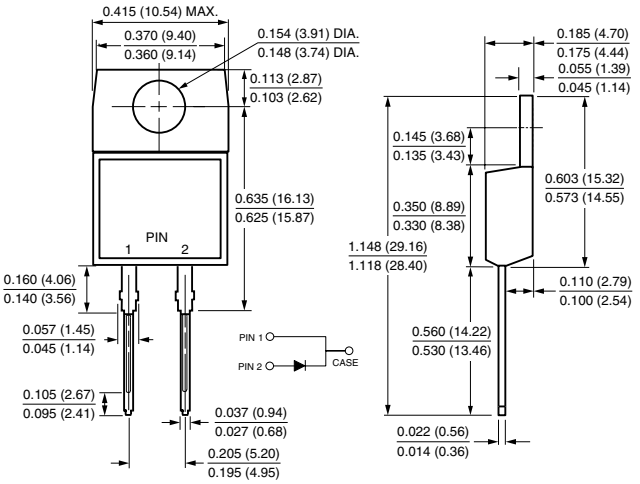


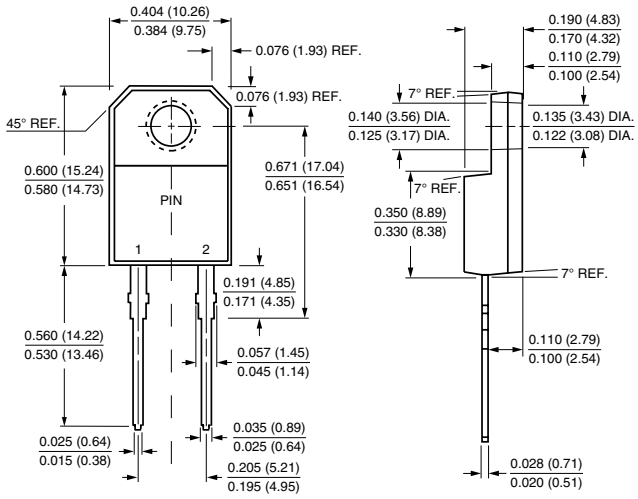

Figure 3. Typical Instantaneous Forward Characteristics

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

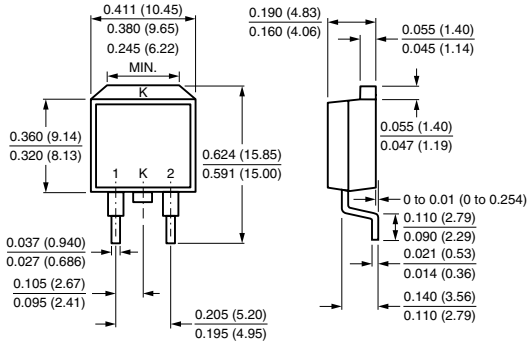
**TO-220AC**

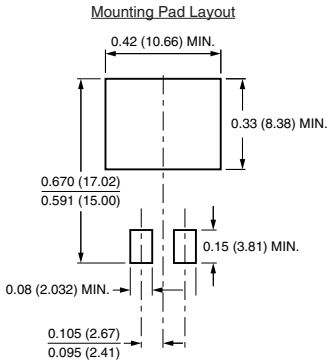



**ITO-220AC**




**TO-263AB**






For technical questions within your region, please contact one of the following:
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