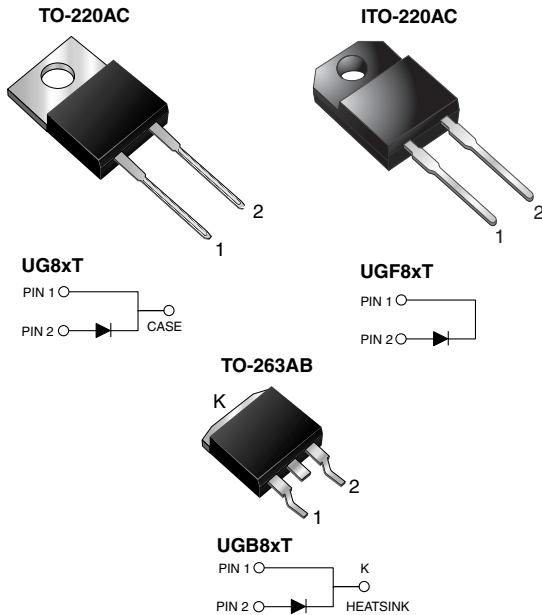


## Ultrafast Rectifier



### 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

|                    |               |
|--------------------|---------------|
| $I_{F(AV)}$        | 8.0 A         |
| $V_{RRM}$          | 50 V to 200 V |
| $I_{FSM}$          | 150 A         |
| $t_{rr}$           | 20 ns         |
| $V_F$              | 0.95 V        |
| $T_J \text{ max.}$ | 150 °C        |

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

| PARAMETER                                                                          | SYMBOL         | UG8AT         | UG8BT | UG8CT | UG8DT | UNIT |
|------------------------------------------------------------------------------------|----------------|---------------|-------|-------|-------|------|
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 50            | 100   | 150   | 200   | V    |
| Maximum RMS voltage                                                                | $V_{RMS}$      | 35            | 70    | 105   | 140   | V    |
| Maximum DC blocking voltage                                                        | $V_{DC}$       | 50            | 100   | 150   | 200   | 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 | $I_{FSM}$      | 150           |       |       |       | A    |
| Operating junction and storage temperature range                                   | $T_J, T_{STG}$ | - 55 to + 150 |       |       |       | °C   |
| Isolation voltage (ITO-220AC only) from terminals to heatsink $t = 1$ min          | $V_{AC}$       | 1500          |       |       |       | V    |

| ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted) |                                                                                                        |                                                   |                 |                    |       |       |       |      |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------|--------------------|-------|-------|-------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                                                        |                                                   | SYMBOL          | UG8AT              | UG8BT | UG8CT | UG8DT | UNIT |
| Maximum instantaneous forward voltage <sup>(1)</sup>                       | 8.0 A<br>20.0 A<br>5.0 A                                                                               | T <sub>J</sub> = 150 °C                           | V <sub>F</sub>  | 1.0<br>1.2<br>0.95 |       |       |       | V    |
| Maximum DC reverse current at rated DC blocking voltage                    |                                                                                                        | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 100 °C | I <sub>R</sub>  | 10<br>300          |       |       |       | μA   |
| 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> | 20                 |       |       |       | ns   |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 8.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub> | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 100 °C | t <sub>rr</sub> | 30<br>50           |       |       |       | ns   |
| Maximum recovered stored charged                                           | I <sub>F</sub> = 8.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs                                         | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 100 °C | Q <sub>rr</sub> | 20<br>45           |       |       |       | nC   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                                                           |                                                   | C <sub>J</sub>  | 45                 |       |       |       | pF   |

| <b>THERMAL CHARACTERISTICS</b> ( $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                 |       |        |        |                             |
|---------------------------------------------------------------------------------------------|-----------------|-------|--------|--------|-----------------------------|
| PARAMETER                                                                                   | SYMBOL          | UG8AT | UGF8AT | UGB8AT | UNIT                        |
| Typical thermal resistance from junction to case                                            | $R_{\theta JC}$ | 4.0   | 5.0    | 4.0    | $^{\circ}\text{C}/\text{W}$ |

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

| <b>ORDERING INFORMATION</b> (Example) |                             |                 |              |               |               |
|---------------------------------------|-----------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE                               | PREFERRED P/N               | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC                              | UG8DT-E3/45                 | 1.80            | 45           | 50/tube       | Tube          |
| ITO-220AC                             | UGF8DT-E3/45                | 1.95            | 45           | 50/tube       | Tube          |
| TO-263AB                              | UGB8DT-E3/45                | 1.33            | 45           | 50/tube       | Tube          |
| TO-263AB                              | UGB8DT-E3/81                | 1.33            | 81           | 800/reel      | Tape reel     |
| TO-220AC                              | UG8DTHE3/45 <sup>(1)</sup>  | 1.80            | 45           | 50/tube       | Tube          |
| ITO-220AC                             | UGF8DTHE3/45 <sup>(1)</sup> | 1.95            | 45           | 50/tube       | Tube          |
| TO-263AB                              | UGB8DTHE3/45 <sup>(1)</sup> | 1.33            | 45           | 50/tube       | Tube          |
| TO-263AB                              | UGB8DTHE3/81 <sup>(1)</sup> | 1.33            | 81           | 800/reel      | Tape reel     |

**Note:**

(1) Automotive grade AEC Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES

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

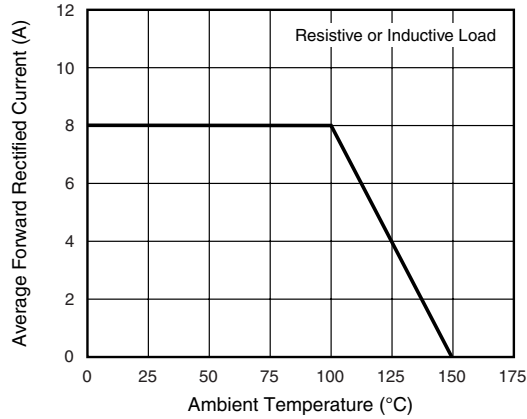


Figure 1. Maximum Forward Current Derating Curve

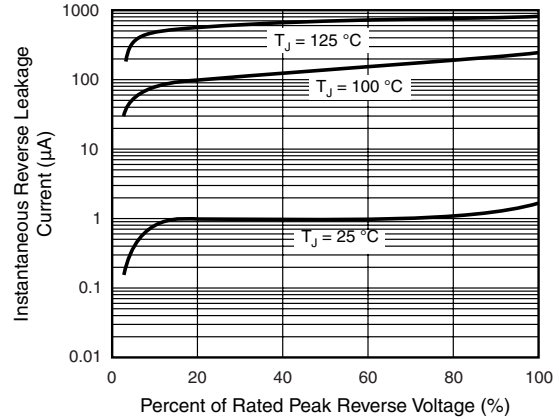


Figure 4. Typical Reverse Characteristics

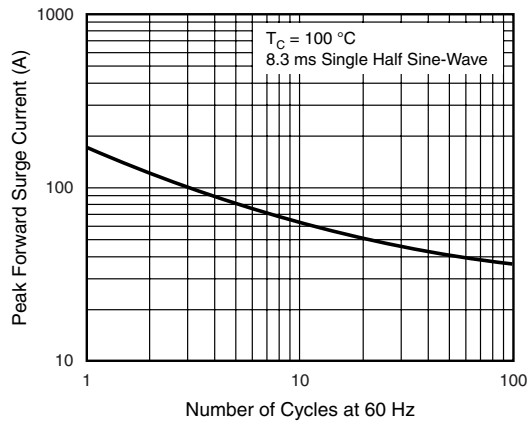


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

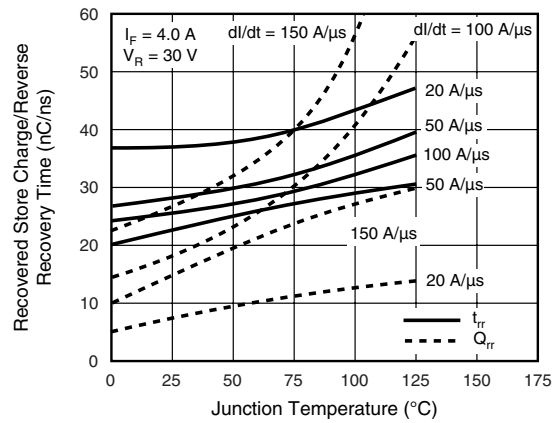


Figure 5. Reverse Switching Characteristics

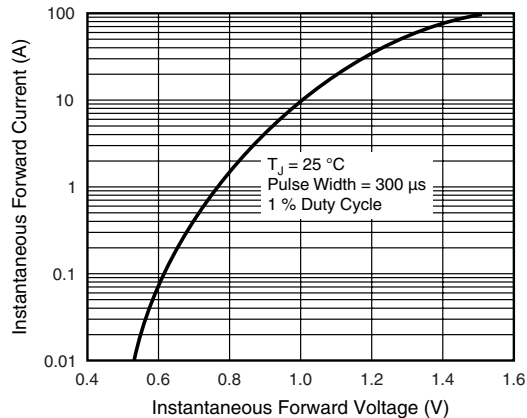


Figure 3. Typical Instantaneous Forward Characteristics

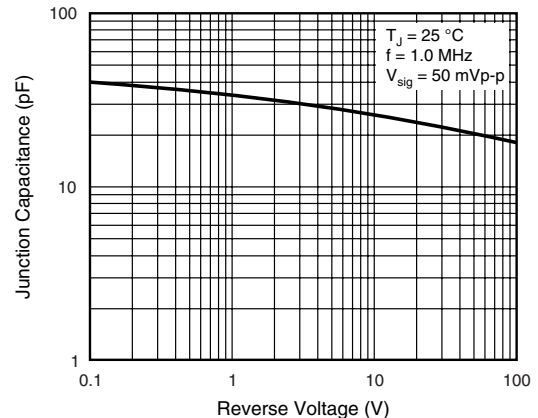


Figure 6. Typical Junction Capacitance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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