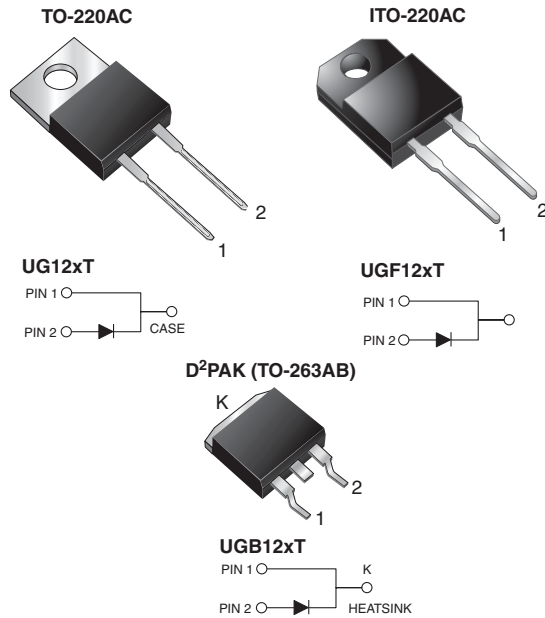




**THE DATASHEET OF
UGF12JT-E3/45**



High Voltage Ultrafast Rectifier



FEATURES

- Power pack
- Glass passivated pellet chip junction
- Ultrafast recovery time
- Soft recovery characteristics
- 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 275 °C max., 10 s per JESD 22-B106 (for TO-220AC and ITO-220AC package)
- AEC-Q101 qualified (for ITO-220AC and TO-263AB package)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

TYPICAL APPLICATIONS

For use in high voltage and high frequency power factor correction, freewheeling diodes and secondary DC/DC rectification application.

DESIGN SUPPORT TOOLS

[click logo to get started](#)

3D
Models
Available

| PRIMARY CHARACTERISTICS | |
|-------------------------|---------------------------------------|
| $I_{F(AV)}$ | 12 A |
| V_{RRM} | 500 V to 600 V |
| I_{FSM} | 135 A |
| t_{rr} | 30 ns |
| V_F at $I_F = 12$ A | 1.5 V |
| T_J max. | 150 °C |
| Package | TO-220AC, ITO-220AC, D²PAK (TO-263AB) |
| Circuit configuration | Single |

MECHANICAL DATA

Case: TO-220AC, ITO-220AC, D²PAK (TO-263AB)

Molding compound meets UL 94V-0 flammability rating
Base P/N-E3 - RoHS-compliant, commercial grade
Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD22-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 ($T_C = 25$ °C unless otherwise noted) | | | | |
|--|----------------|-------------|--------|------|
| PARAMETER | SYMBOL | UG12HT | UG12JT | UNIT |
| Max. repetitive peak reverse voltage | V_{RRM} | 500 | 600 | V |
| Max. working reverse voltage | V_{RWM} | 400 | 480 | V |
| Max. RMS voltage | V_{RMS} | 350 | 420 | V |
| Max. DC blocking voltage | V_{DC} | 500 | 600 | V |
| Max. average forward rectified current (fig. 1) | $I_{F(AV)}$ | 12 | | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 135 | | 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 ($T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|---|-----------------------------------|----------|--------|--------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | UG12HT | UG12JT | UNIT |
| Max. instantaneous forward voltage ⁽¹⁾ | $I_F = 12\text{ A}$ | $T_J = 25\text{ }^\circ\text{C}$ | V_F | 1.75 | | V |
| | $I_F = 12\text{ A}$ | $T_J = 125\text{ }^\circ\text{C}$ | | 1.50 | | |
| Max. reverse current | $T_J = 25\text{ }^\circ\text{C}$ | | I_R | 30 | | μA |
| | $T_J = 125\text{ }^\circ\text{C}$ | | | 4.0 | | mA |
| Max. reverse recovery time | $I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $I_{rr} = 0.25\text{ A}$ | | t_{rr} | 30 | | ns |
| | $I_F = 1.0\text{ A}$, $dI/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$, $I_{rr} = 0.1 I_{RM}$ | | t_{rr} | 50 | | ns |
| Typical softness factor (t_b/t_a) | $I_F = 12\text{ A}$, $dI/dt = 240\text{ A}/\mu\text{s}$, $V_R = 400\text{ V}$, $I_{rr} = 0.1 I_{RM}$ | | S | 0.9 | | - |
| Max. reverse recovery current | $I_F = 12\text{ A}$, $dI/dt = 96\text{ A}/\mu\text{s}$, $V_R = 400\text{ V}$, $T_C = 125\text{ }^\circ\text{C}$ | | I_{RM} | 7.5 | | A |
| Peak forward recovery time | $I_F = 12\text{ A}$, $dI/dt = 96\text{ A}/\mu\text{s}$, $V_F = 1.1\text{ V} \times V_F\text{ max.}$ | | t_{fr} | 500 | | ns |

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

| THERMAL CHARACTERISTICS ($T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | |
|---|-----------------|------|-------|-------|---------------------------|
| PARAMETER | SYMBOL | UG12 | UGF12 | UGB12 | UNIT |
| Typical thermal resistance from junction to case | $R_{\theta JC}$ | 1.73 | 3.04 | 1.73 | $^\circ\text{C}/\text{W}$ |

| ORDERING INFORMATION (Example) | | | | | |
|---------------------------------------|------------------------------|-----------------|--------------|---------------|---------------|
| PACKAGE | PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| TO-220AC | UG12JT-E3/45 | 1.80 | 45 | 50/tube | Tube |
| ITO-220AC | UGF12JT-E3/45 | 1.95 | 45 | 50/tube | Tube |
| TO-263AB | UGB12JT-E3/45 | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | UGB12JT-E3/81 | 1.33 | 81 | 800/reel | Tape and reel |
| ITO-220AC | UGF12JT E3/45 ⁽¹⁾ | 1.95 | 45 | 50/tube | Tube |
| TO-263AB | UGB12JT E3/45 ⁽¹⁾ | 1.33 | 45 | 50/tube | Tube |
| TO-263AB | UGB12JT E3/81 ⁽¹⁾ | 1.33 | 81 | 800/reel | Tape and reel |

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



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

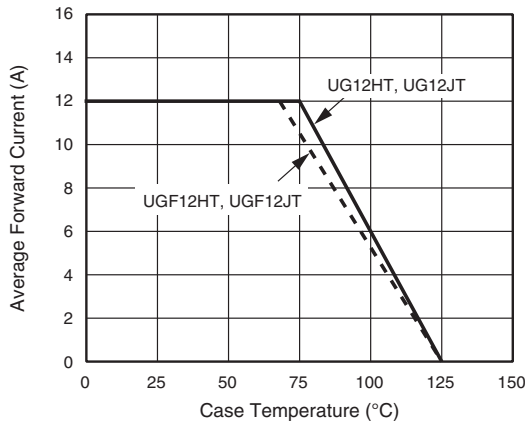


Fig. 1 - Forward Current Derating Curve

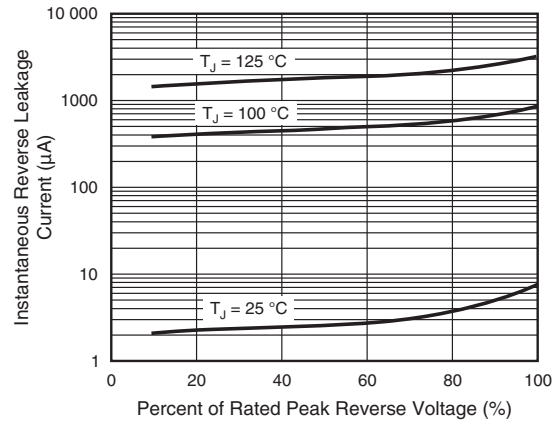


Fig. 4 - Typical Reverse Leakage Characteristics Per Leg

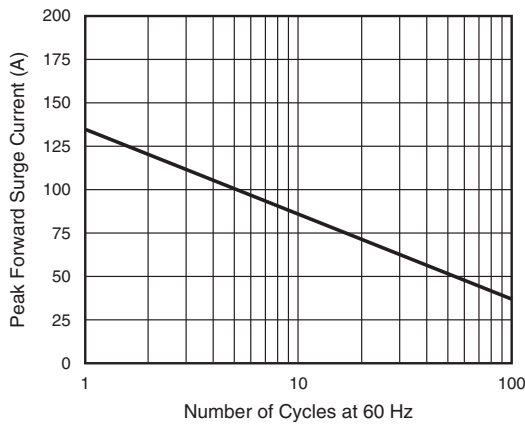


Fig. 2 - Max. Non-Repetitive Peak Forward Surge Current

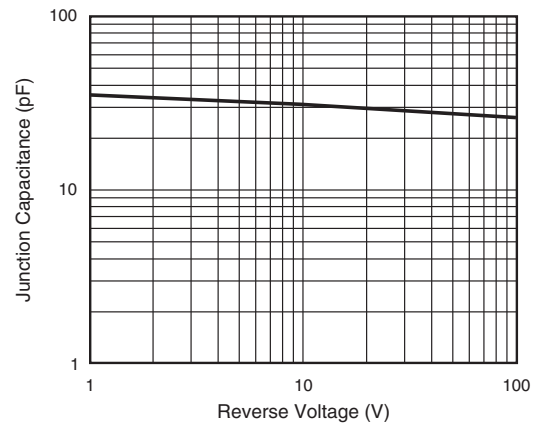


Fig. 5 - Typical Junction Capacitance Per Leg

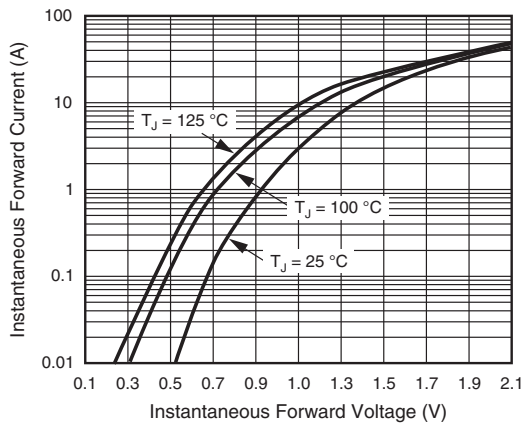


Fig. 3 - Typical Instantaneous Forward Characteristics Per Leg

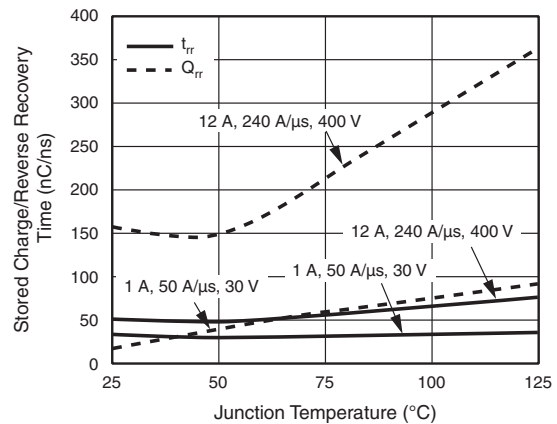
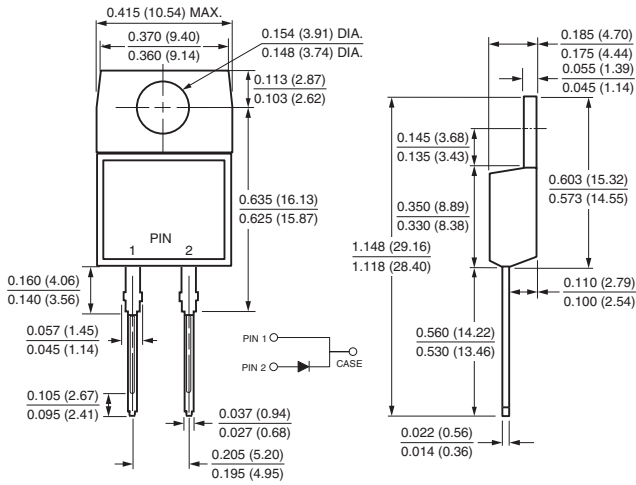


Fig. 6 - Reverse Switching Characteristics Per Leg

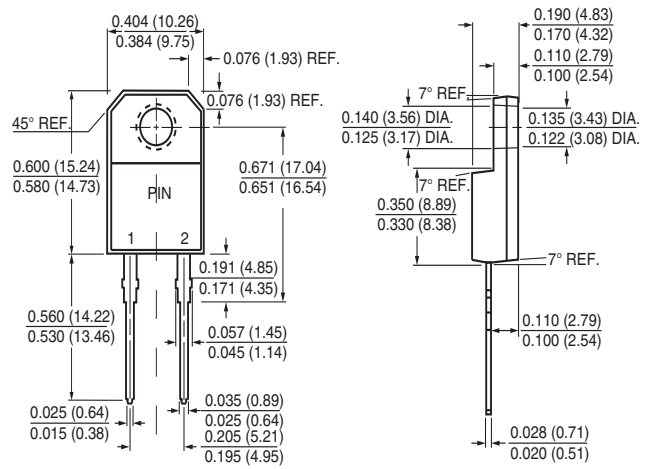


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

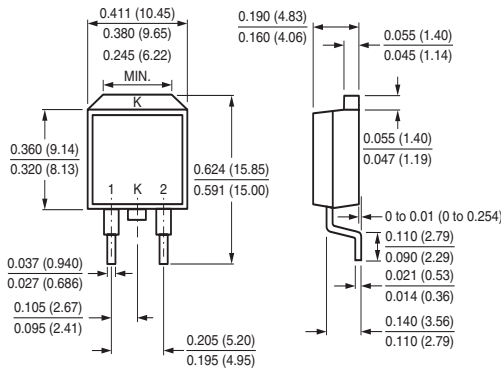
TO-220AC



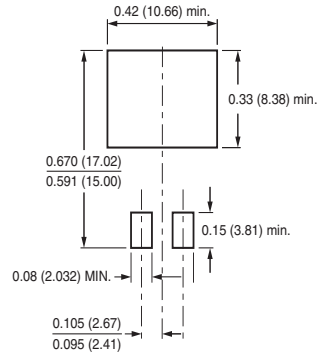
ITO-220AC



D²PAK (TO-263AB)



Mounting Pad Layout





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