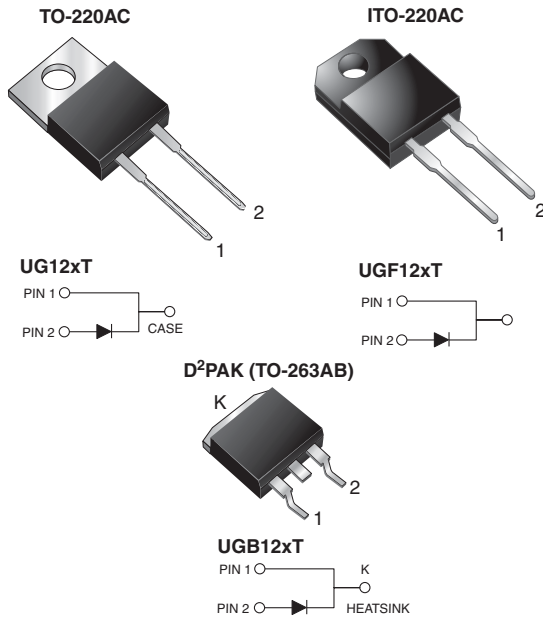


## High Voltage Ultrafast Rectifier



### 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](http://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

### MECHANICAL DATA

**Case:** TO-220AC, ITO-220AC, D<sup>2</sup>PAK (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.

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, D <sup>2</sup> PAK (TO-263AB)
Circuit configuration	Single

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



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	UG12HT	UG12JT	UNIT
Max. instantaneous forward voltage <sup>(1)</sup>	$I_F = 12\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	$V_F$	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		$\mu\text{A}$
	$T_J = 125\text{ }^\circ\text{C}$			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
	$I_F = 1.0\text{ A}$ , $dI/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$		$t_{rr}$	50		ns
Typical softness factor ( $t_b/t_a$ )	$I_F = 12\text{ A}$ , $dI/dt = 240\text{ A}/\mu\text{s}$ , $V_R = 400\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$		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**<sup>(1)</sup> 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	UG12	UGF12	UGB12	UNIT
Typical thermal resistance from junction to case	$R_{\theta JC}$	1.73	3.04	1.73	$^\circ\text{C}/\text{W}$

<b>ORDERING INFORMATION</b> (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 <sup>(1)</sup>	1.95	45	50/tube	Tube
TO-263AB	UGB12JT E3/45 <sup>(1)</sup>	1.33	45	50/tube	Tube
TO-263AB	UGB12JT E3/81 <sup>(1)</sup>	1.33	81	800/reel	Tape and reel

**Note**<sup>(1)</sup> 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)

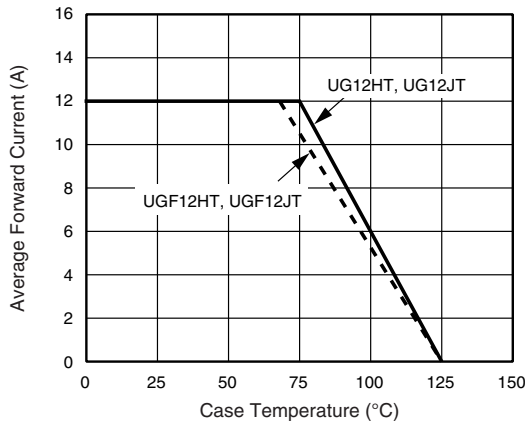


Fig. 1 - Forward Current Derating Curve

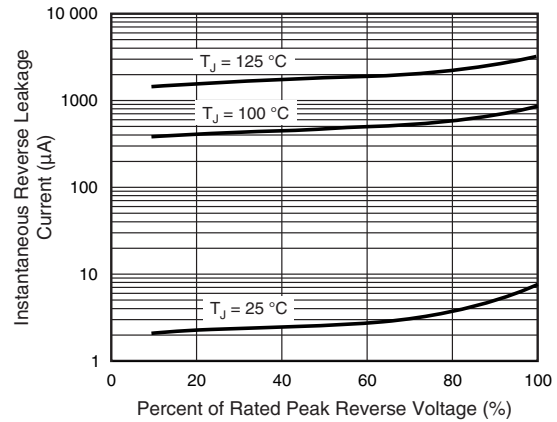


Fig. 4 - Typical Reverse Leakage Characteristics Per Leg

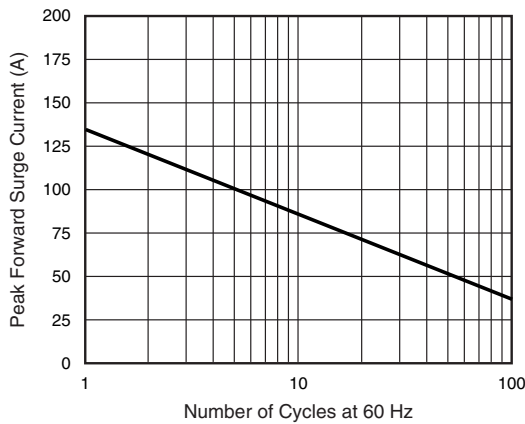


Fig. 2 - Max. Non-Repetitive Peak Forward Surge Current

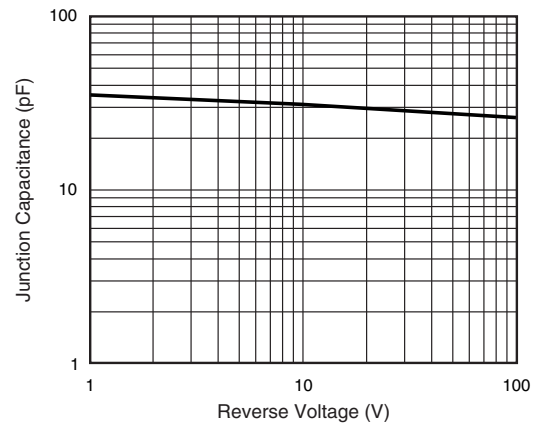


Fig. 5 - Typical Junction Capacitance Per Leg

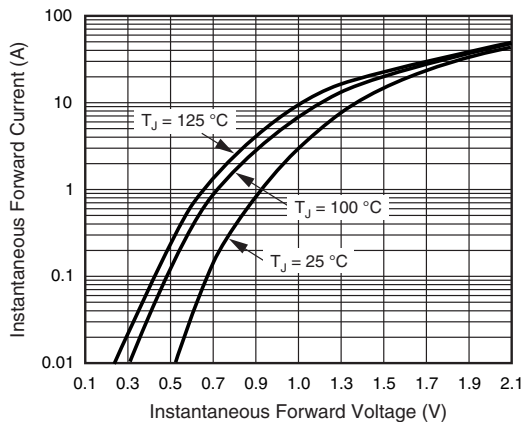


Fig. 3 - Typical Instantaneous Forward Characteristics Per Leg

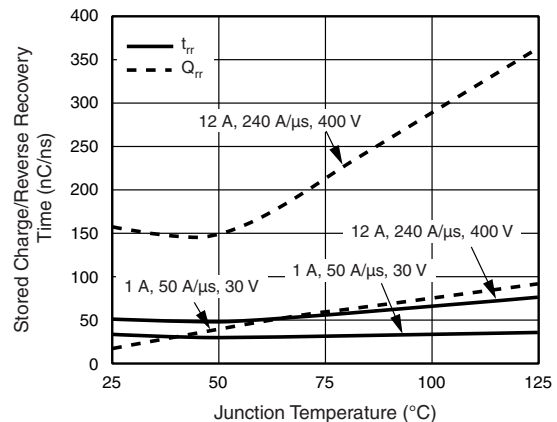
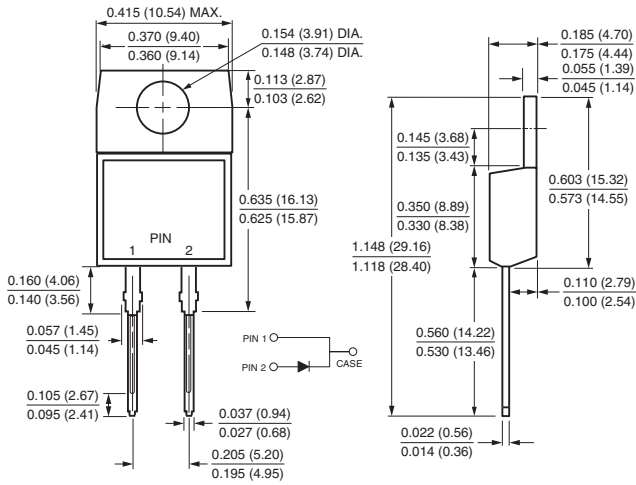


Fig. 6 - Reverse Switching Characteristics Per Leg

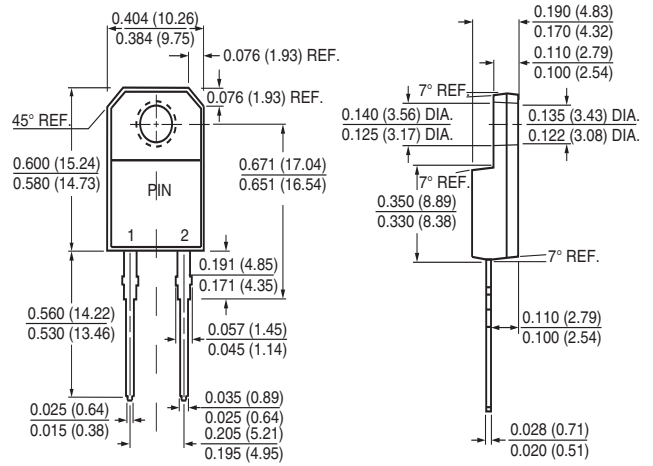


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

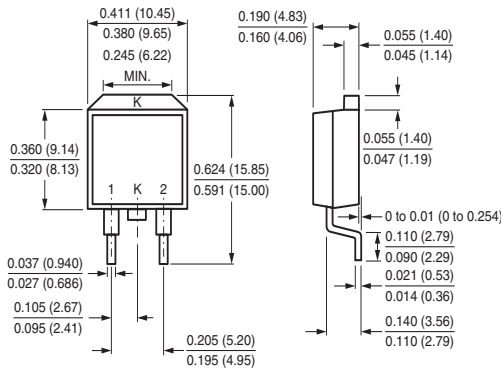
#### TO-220AC



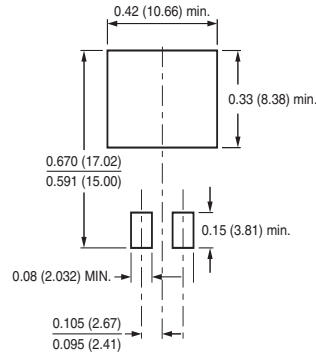
#### ITO-220AC



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



#### Mounting Pad Layout





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