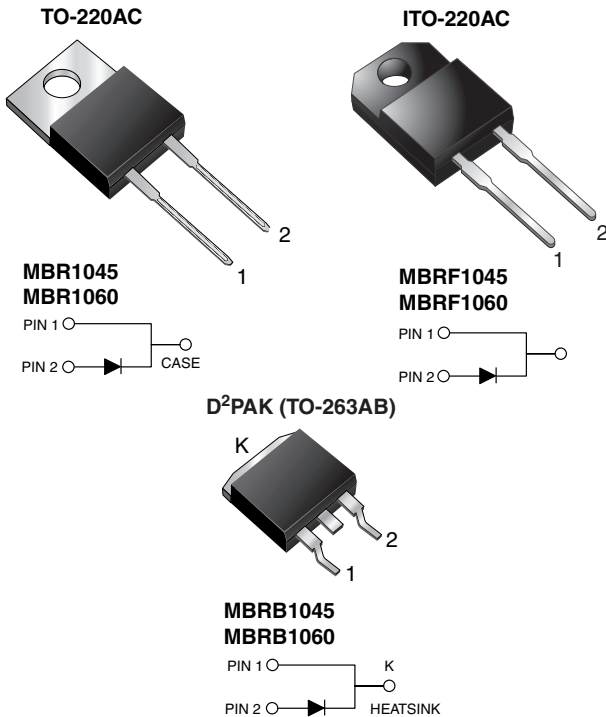


## Schottky Barrier Rectifier



### FEATURES

- Power pack
- Low power loss, high efficiency
- Low forward voltage drop
- High forward surge capability
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for TO-220AC and ITO-220AC package)
- AEC-Q101 qualified available  
 - Automotive ordering code:  
 Base P/NHE3 (for ITO-220AC)  
 Base P/NHM3 (for D²PAK (TO-263AB package))
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### TYPICAL APPLICATIONS

For use in low voltage, high frequency rectifier of switching mode power supplies, freewheeling diodes, DC/DC converters, and polarity protection application.

### MECHANICAL DATA

**Case:** TO-220AC, ITO-220AC, D²PAK (TO-263AB)  
 Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-E3 - RoHS-compliant, commercial grade  
 Base P/NHE3\_X - RoHS-compliant, AEC-Q101 qualified  
 (“\_X” denotes revision code, e.g. A, B, ...)  
 Base P/N-M3 - RoHS-compliant, halogen-free, commercial grade  
 Base P/NHM3 - RoHS-compliant, halogen-free, AEC-Q101 qualified  
**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
 E3 and M3 suffix meets JESD 201 class 1A whisker test, HE3 and HM3 suffix meets JESD 201 class 2 whisker test  
**Polarity:** as marked  
**Mounting Torque:** 10 in-lbs maximum

### LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
$V_{RRM}$	45 V, 60 V
$I_{FSM}$	150 A
$V_F$	0.57 V, 0.70 V
$T_J \text{ max.}$	150 °C
Package	TO-220AC, ITO-220AC, D²PAK (TO-263AB)
Circuit configuration	Single



MAXIMUM RATINGS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	MBR1045 MBRF1045 MBRB1045	MBR1060 MBRF1060 MBRB1060	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	60	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	10		A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	150		A
Peak repetitive reverse current at $t_p = 2.0\text{ }\mu\text{s}$ , 1 kHz	$I_{RRM}$	1.0	0.5	
Voltage rate of change (rated $V_R$ )	$dV/dt$	10 000		V/ $\mu\text{s}$
Operating junction and storage temperature range	$T_J$	-65 to +150		$^\circ\text{C}$
	$T_{STG}$	-65 to +175		
Isolation voltage (ITO-220AC only) from terminal to heatsink $t = 1\text{ min}$	$V_{AC}$	1500		V

ELECTRICAL CHARACTERISTICS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	MBR1045 MBRF1045 MBRB1045	MBR1060 MBRF1060 MBRB1060	UNIT
Maximum instantaneous forward voltage	$V_F$ <sup>(1)</sup>	$I_F = 10\text{ A}$   $T_J = 25\text{ }^\circ\text{C}$	-	0.80	V
		$I_F = 10\text{ A}$   $T_J = 125\text{ }^\circ\text{C}$	0.57	0.70	
		$I_F = 20\text{ A}$   $T_J = 25\text{ }^\circ\text{C}$	0.84	0.95	
		$I_F = 20\text{ A}$   $T_J = 125\text{ }^\circ\text{C}$	0.72	0.85	
Maximum instantaneous reverse current at DC blocking voltage	$I_R$ <sup>(2)</sup>	Rated $V_R$	$T_J = 25\text{ }^\circ\text{C}$	0.10	mA
			$T_J = 125\text{ }^\circ\text{C}$	15	

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: pulse width  $\leq 40\text{ ms}$ 

THERMAL CHARACTERISTICS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	MBR	MBRF	MBRB	UNIT
Typical thermal resistance from junction to case	$R_{\theta JC}$	2.0	4.0	2.0	$^\circ\text{C/W}$

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AC	MBR1045-E3/45	1.80	45	50/tube	Tube
ITO-220AC	MBRF1045-E3/45	1.94	45	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	MBRB1045-M3/I	1.33	I	800/reel	Tape and reel
ITO-220AC	MBRF1045HE3_A/P <sup>(1)</sup>	1.94	P	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	MBRB1045HM3/I <sup>(1)</sup>	1.33	I	800/reel	Tape and reel

**Note**(1) AEC-Q101 qualified, available in ITO-220AC and D<sup>2</sup>PAK (TO-263AB) package



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

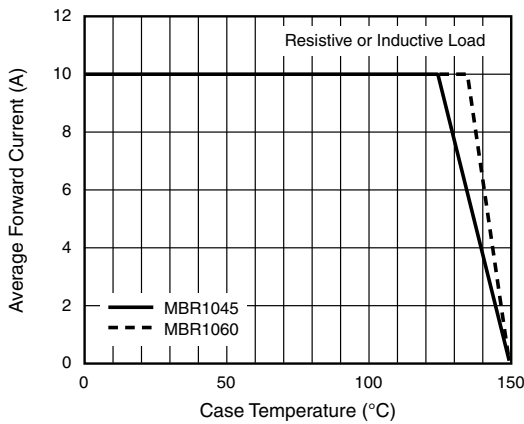


Fig. 1 - Forward Current Derating Curve

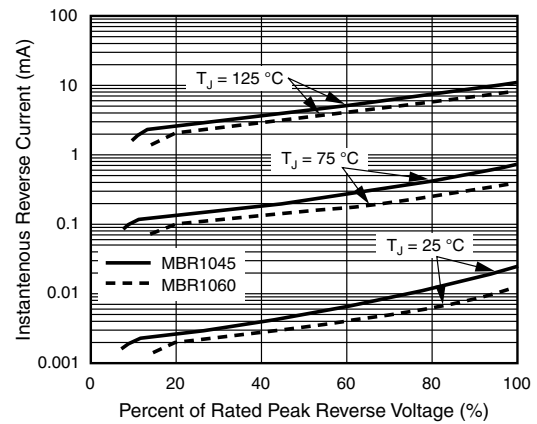


Fig. 4 - Typical Reverse Characteristics

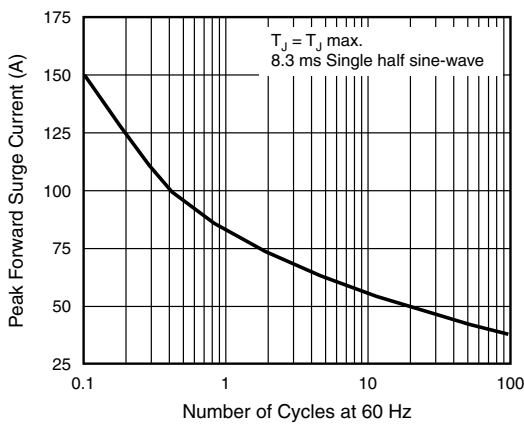


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

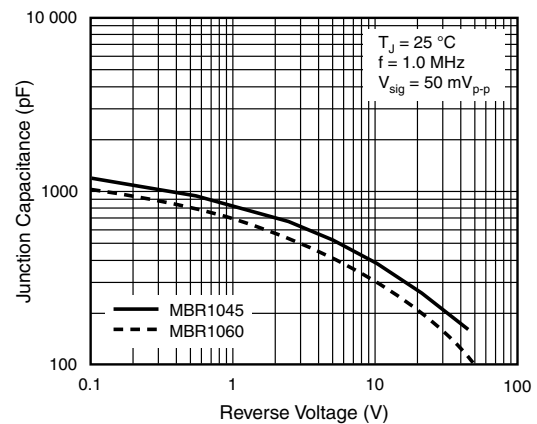


Fig. 5 - Typical Junction Capacitance

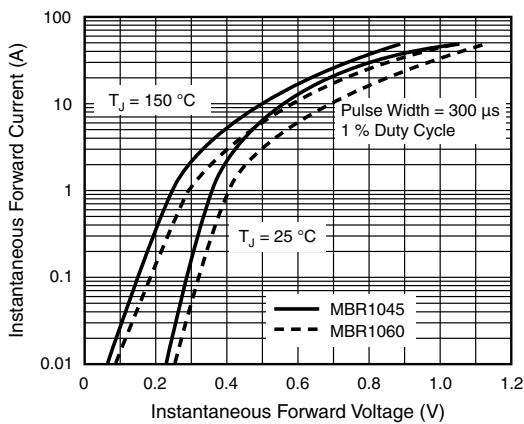


Fig. 3 - Typical Instantaneous Forward Characteristics

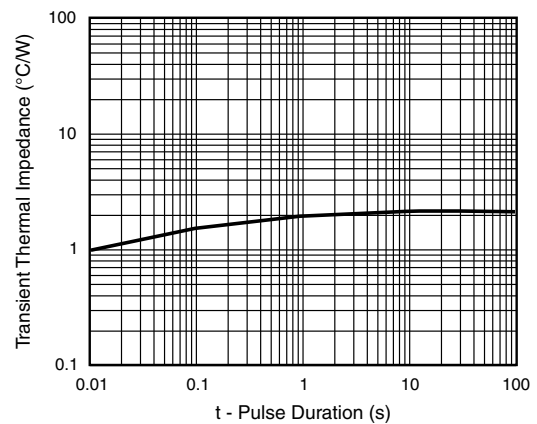
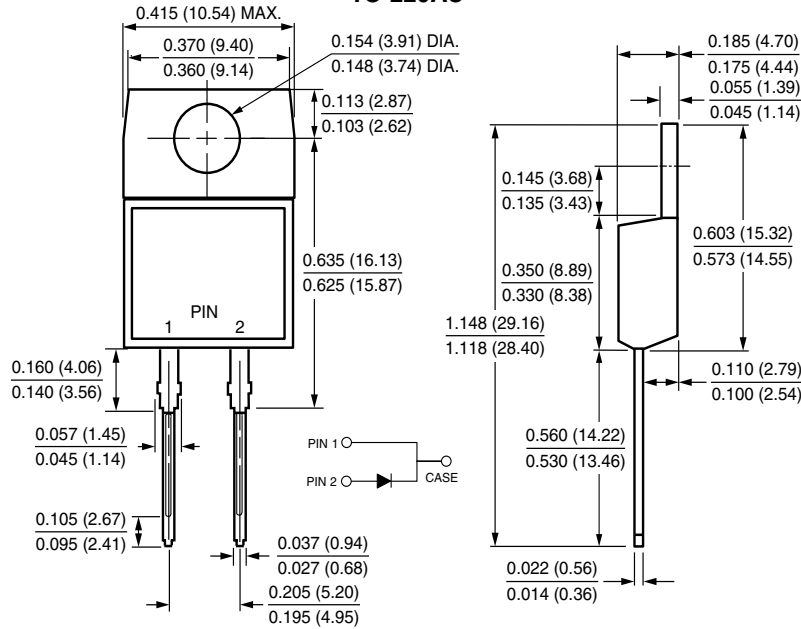


Fig. 6 - Typical Transient Thermal Impedance

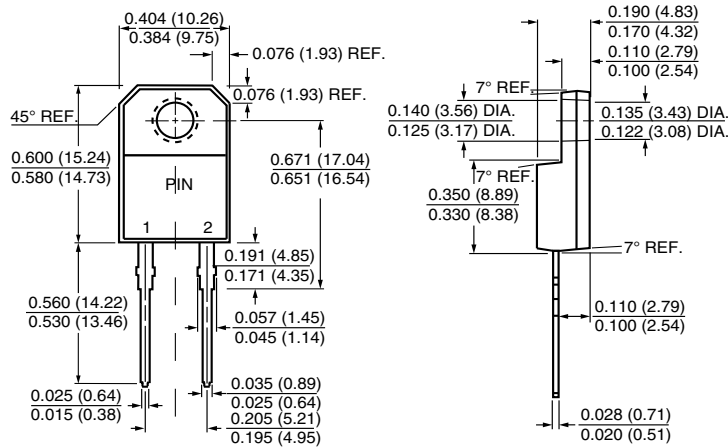


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

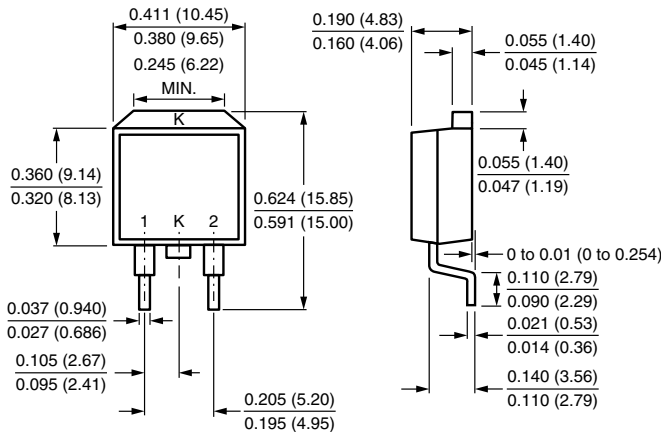
#### TO-220AC



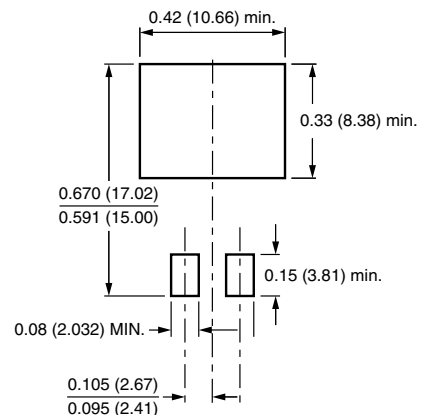
#### ITO-220AC



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



#### Mounting Pad Layout





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