

# SWITCHMODE™ Schottky Power Rectifier

The SWITCHMODE Power Rectifier employs the Schottky Barrier principle in a large area metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for use as rectifiers in very low-voltage, high-frequency switching power supplies, free wheeling diodes and polarity protection diodes.

- Highly Stable Oxide Passivated Junction
- Very Low Forward Voltage Drop
- High Junction Temperature Capability
- High dv/dt Capability
- Excellent Ability to Withstand Reverse Avalanche Energy Transients
- Guardring for Stress Protection
- Epoxy Meets UL94, VO at 1/8"
- Electrically Isolated. No Isolation Hardware Required.
- UL Recognized File #E69369(1)

## Mechanical Characteristics

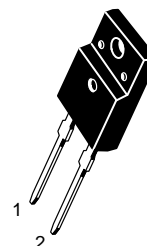
- Case: Epoxy, Molded
- Weight: 1.9 grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped 50 units per plastic tube
- Marking: B745



**MBRF745**

Motorola Preferred Device

**SCHOTTKY BARRIER  
RECTIFIER  
7.5 AMPERES  
45 VOLTS**



**CASE 221E-01  
ISOLATED TO-220**

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	45	Volts
Average Rectified Forward Current (Rated $V_R$ ), $T_C = 105^\circ\text{C}$	$I_F(AV)$	7.5	Amps
Peak Repetitive Forward Current (Rated $V_R$ , Square Wave, 20 kHz), $T_C = 105^\circ\text{C}$	$I_{FRM}$	15	Amps
Non-repetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	$I_{FSM}$	150	Amps
Peak Repetitive Reverse Surge Current (2.0 $\mu\text{s}$ , 1.0 kHz)	$I_{RRM}$	1.0	Amp
Operating Junction and Storage Temperature	$T_J, T_{stg}$	- 65 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ )	dv/dt	10000	V/ $\mu\text{s}$
RMS Isolation Voltage (t = 1 second, R.H. $\leq 30\%$ , $T_A = 25^\circ\text{C}$ )(2)	Per Figure 3 Per Figure 4(1) Per Figure 5	$V_{iso1}$ 4500 $V_{iso2}$ 3500 $V_{iso3}$ 1500	Volts

## THERMAL CHARACTERISTICS

Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$
Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	260	$^\circ\text{C}$

(1) UL Recognized mounting method is per Figure 4.

(2) Proper strike and creepage distance must be provided.

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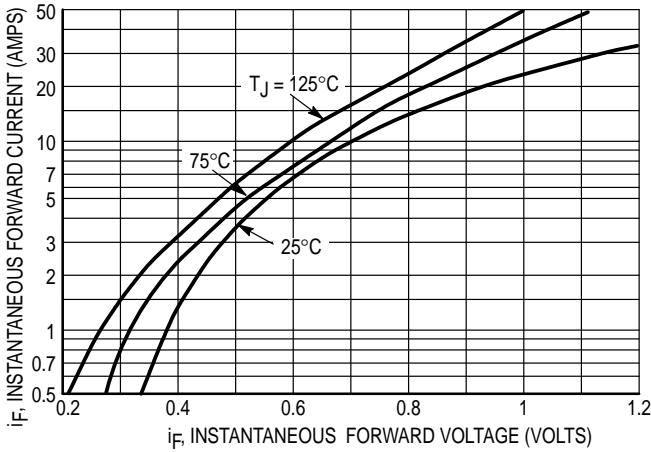
**Preferred** devices are Motorola recommended choices for future use and best overall value.



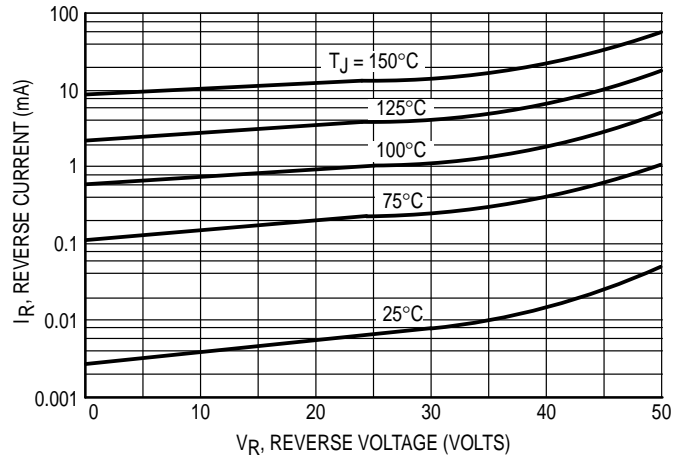
**ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Maximum Instantaneous Forward Voltage (3) ( $i_F = 15$ Amp, $T_C = 25^\circ\text{C}$ ) ( $i_F = 15$ Amp, $T_C = 125^\circ\text{C}$ ) ( $i_F = 7.5$ Amp, $T_C = 125^\circ\text{C}$ )	$v_F$	0.84 0.72 0.57	Volts
Maximum Instantaneous Reverse Current (3) (Rated DC Voltage, $T_C = 25^\circ\text{C}$ ) (Rated DC Voltage, $T_C = 125^\circ\text{C}$ )	$i_R$	0.1 15	mA

(3) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

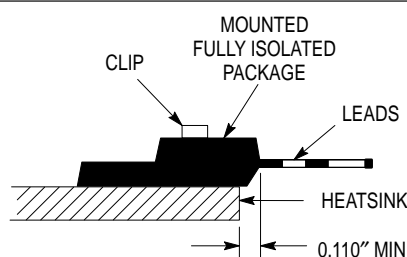


**Figure 1. Typical Forward Voltage**

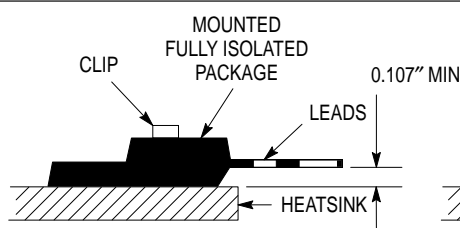


**Figure 2. Typical Reverse Current**

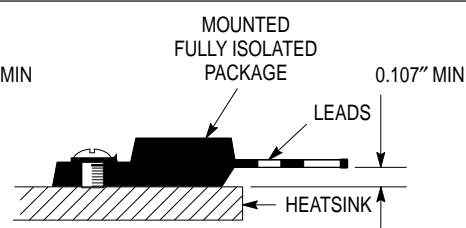
## TEST CONDITIONS FOR ISOLATION TESTS\*



**Figure 3. Clip Mounting Position  
for Isolation Test Number 1**



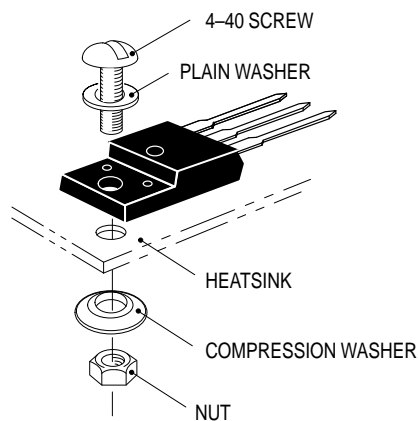
**Figure 4. Clip Mounting Position  
for Isolation Test Number 2**



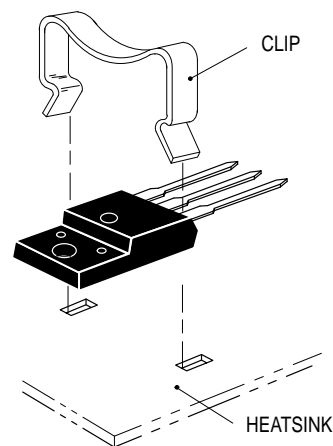
**Figure 5. Screw Mounting Position  
for Isolation Test Number 3**

\* Measurement made between leads and heatsink with all leads shorted together.

## MOUNTING INFORMATION\*\*



**6a. Screw-Mounted**



**6b. Clip-Mounted**

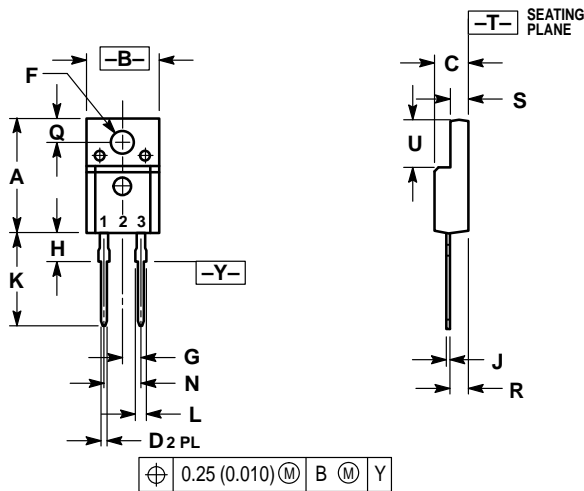
**Figure 6. Typical Mounting Techniques**

Laboratory tests on a limited number of samples indicate, when using the screw and compression washer mounting technique, a screw torque of 6 to 8 in · lbs is sufficient to provide maximum power dissipation capability. The compression washer helps to maintain a constant pressure on the package over time and during large temperature excursions. Destructive laboratory tests show that using a hex head 4-40 screw, without washers, and applying a torque in excess of 20 in · lbs will cause the plastic to crack around the mounting hole, resulting in a loss of isolation capability.

Additional tests on slotted 4-40 screws indicate that the screw slot fails between 15 to 20 in · lbs without adversely affecting the package. However, in order to positively ensure the package integrity of the fully isolated device, Motorola does not recommend exceeding 10 in · lbs of mounting torque under any mounting conditions.

\*\*For more information about mounting power semiconductors see Application Note AN1040.

## PACKAGE DIMENSIONS



## NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.621	0.629	15.78	15.97
B	0.394	0.402	10.01	10.21
C	0.181	0.189	4.60	4.80
D	0.026	0.034	0.67	0.86
F	0.121	0.129	3.08	3.27
G	0.100 BSC		2.54 BSC	
H	0.123	0.129	3.13	3.27
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.14	1.52
N	0.200 BSC		5.08 BSC	
Q	0.126	0.134	3.21	3.40
R	0.107	0.111	2.72	2.81
S	0.096	0.104	2.44	2.64
U	0.259	0.267	6.58	6.78

## STYLE 1:

- PIN 1. CATHODE
- N/A
- ANODE

CASE 221E-01  
ISSUE O

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