

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

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 μs , 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/ μs
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} V_{iso2} V_{iso3}	4500 3500 1500 Volts

THERMAL CHARACTERISTICS

Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.2	$^\circ\text{C}/\text{W}$
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.

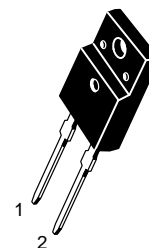
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Preferred devices are Motorola recommended choices for future use and best overall value.

MBRF745

Motorola Preferred Device

**SCHOTTKY BARRIER
RECTIFIER
7.5 AMPERES
45 VOLTS**



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



MBRF745

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 μs , Duty Cycle $\leq 2.0\%$

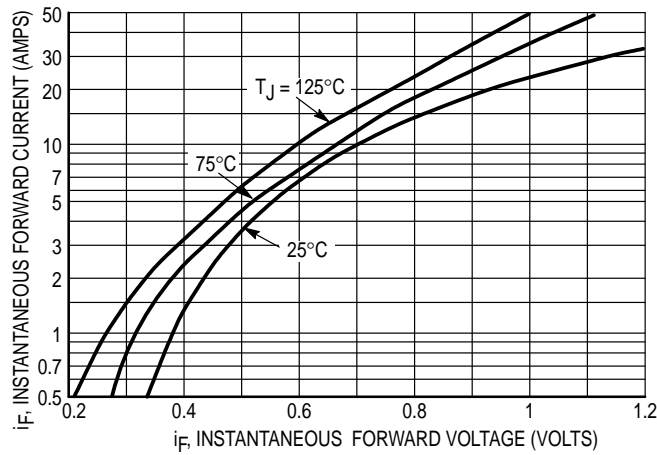


Figure 1. Typical Forward Voltage

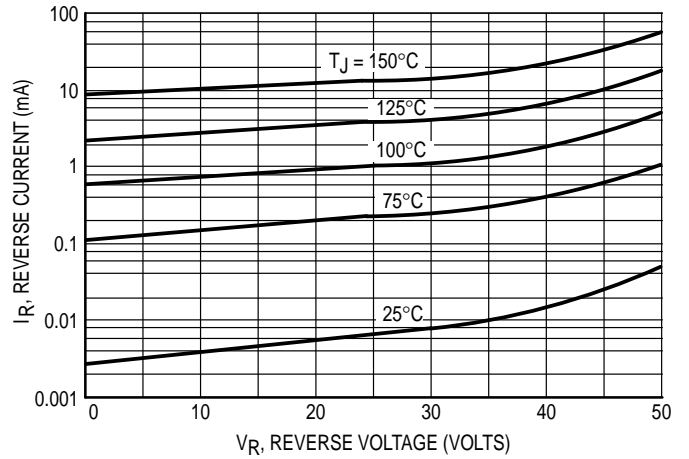


Figure 2. Typical Reverse Current

TEST CONDITIONS FOR ISOLATION TESTS*

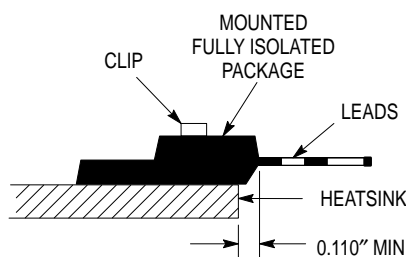


Figure 3. Clip Mounting Position for Isolation Test Number 1

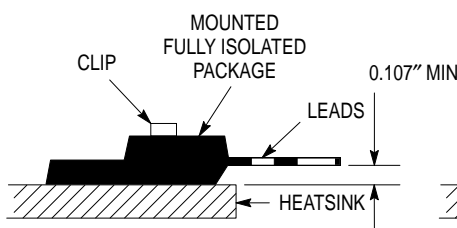


Figure 4. Clip Mounting Position for Isolation Test Number 2

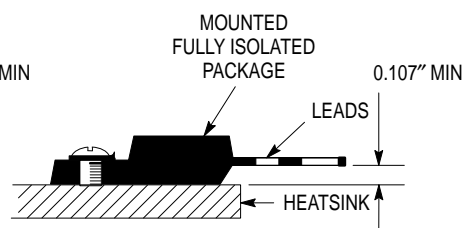
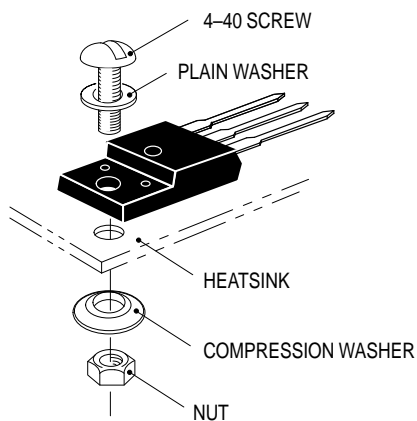


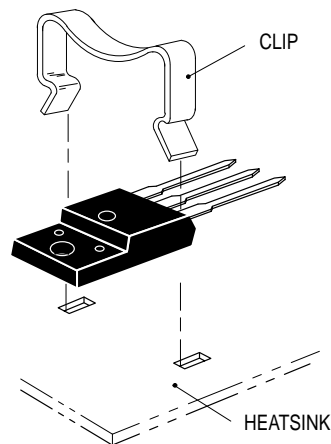
Figure 5. Screw Mounting Position for Isolation Test Number 3

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

MOUNTING INFORMATION**



6a. Screw-Mounted



6b. Clip-Mounted

Figure 6. Typical Mounting Techniques

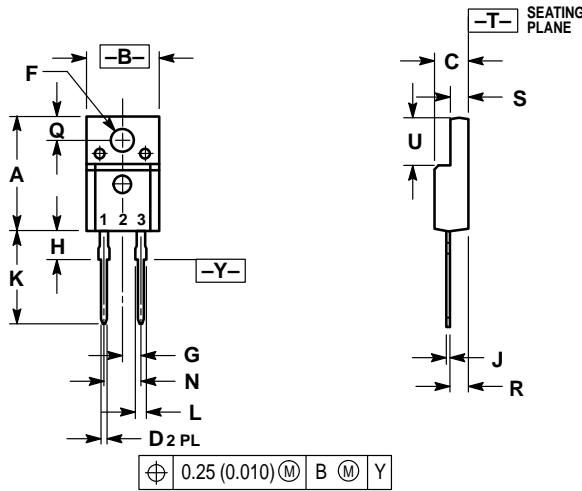
Laboratory tests on a limited number of samples indicate, when using the screw and compression washer mounting technique, a screw torque of 6 to 8 in · lbs is sufficient to provide maximum power dissipation capability. The compression washer helps to maintain a constant pressure on the package over time 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
 2. N/A
 3. ANODE

CASE 221E-01
 ISSUE O

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