# **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
- Matched Dual Die Construction
- 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<sup>(1)</sup>

#### **Mechanical Characteristics**

- Case: Epoxy, Molded
- Weight: 1.9 grams (approximately)
- Leads are Readily Solderable

   Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

   Shipped 50 units per plastic tube

   Marking: B1545 • Finish: All External Surfaces Corrosion Resistant and Terminal



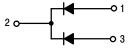
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## SCHOTTKY BARRIER RECTIFIER 15 AMPERES, 45 VOLTS



CASE 221D-02 ISOLATED TO-220



#### **MAXIMUM RATINGS, PER LEG**

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	45	Volts
Average Rectified Forward Current (Rated V <sub>R</sub> ), T <sub>C</sub> = 105°C			7.5 15	Amps
Peak Repetitive Forward Current, T <sub>C</sub> = 105°C (Rated V <sub>R</sub> , Square Wave, 20 kHz) Per Diode		I <sub>FRM</sub>	15	Amps
Non-repetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		I <sub>FSM</sub>	150	Amps
Peak Repetitive Reverse Surge Current (2.0 μs, 1.0 kHz)		I <sub>RRM</sub>	1.0	Amp
Operating Junction and Storage Temperature		T <sub>J</sub> , T <sub>stg</sub>	– 65 to +150	°C
Voltage Rate of Change (Rated V <sub>R</sub> )		dv/dt	10000	V/μs
RMS Isolation Voltage (t = 1 second, R.H. ≤ 30%, T <sub>A</sub> = 25°C) <sup>(2)</sup>	Per Figure 3 Per Figure 4 <sup>(1)</sup> Per Figure 5	V <sub>iso1</sub> V <sub>iso2</sub> V <sub>iso3</sub>	4500 3500 1500	Volts

#### THERMAL CHARACTERISTICS, PER LEG

Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$ 4.1	°C/W
Lead Temperature for Soldering Purposes: 1/8" from Case for 5 seconds	T <sub>L</sub> 260	°C

<sup>(1)</sup> UL Recognized mounting method is per Figure 4.

#### **ELECTRICAL CHARACTERISTICS, PER LEG**

Characterist	tic	Symbol	Max	Unit
Maximum Instantaneous Forward Voltage (3) ( $i_F$ = 15 Amp, $T_C$ = 25°C) ( $i_F$ = 15 Amp, $T_C$ = 125°C) ( $i_F$ = 7.5 Amp, $T_C$ = 125°C)	LIS ON IN	V̄F	0.84 0.72 0.57	Volts
Maximum Instantaneous Reverse Current (3) (Rated DC Voltage, T <sub>C</sub> = 25°C) (Rated DC Voltage, T <sub>C</sub> = 125°C)	EALCOOK FOR	i <sub>R</sub>	0.1 15	mA

<sup>(3)</sup> Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤ 2.0%

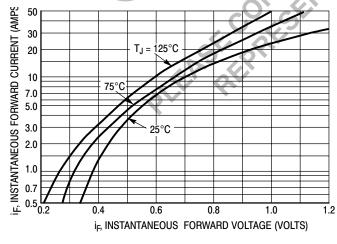


Figure 1. Typical Forward Voltage

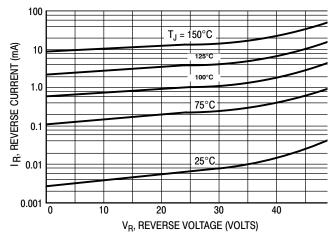
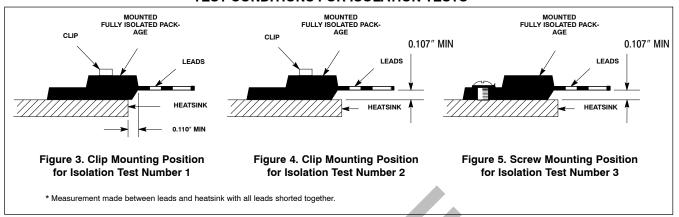


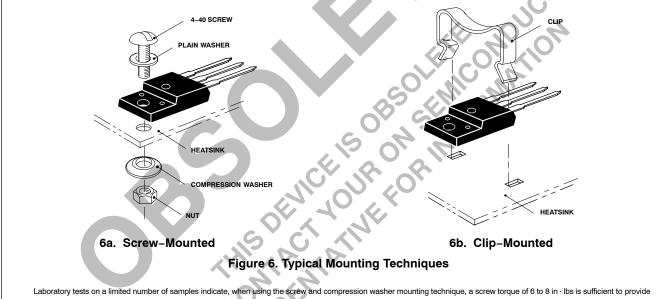
Figure 2. Typical Reverse Current

<sup>(2)</sup> Proper strike and creepage distance must be provided.

#### **TEST CONDITIONS FOR ISOLATION TESTS\***



### **MOUNTING INFORMATION\*\***



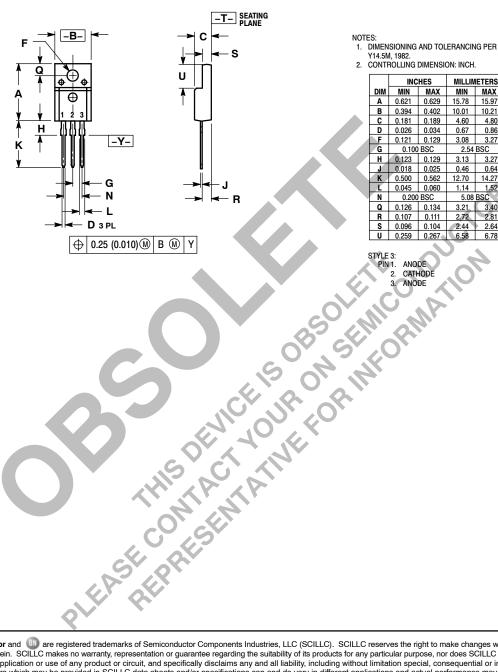
Laboratory tests on a limited number of samples indicate, when using the screw and compression washer mounting technique, a screw torque of 6 to 8 in · lbs is sufficient to provide maximum power dissipation capability. The compression washer helps to maintain a constant pressure on the package over time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

<sup>\*\*</sup>For more information about mounting power semiconductors see Application Note AN1040.

#### PACKAGE DIMENSIONS

#### **CASE 221D-02** (ISOLATED TO-220) **ISSUE D**



#### NOTES

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

ı		INCHES		MILLIMETEDS		
		INCHES		MILLIMETERS		
	DIM	MIN	MAX	MIN	MAX	
	Α	0.621	0.629	15.78	15.97	
	В	0.394	0.402	10.01	10.21	
	С	0.181	0.189	4.60	4.80	
	D	0.026	0.034	0.67	0.86	
4	<b></b> F	0.121 0.129		3.08	3.27	
ı	G	0.100 BSC		2.54 BSC		
1	н	0.123	0.129	3.13	3.27	
	J	0.018	0.025	0.46	0.64	
J	K	0.500	0.562	12.70	14.27	
ı	L	0.045	0.060	1.14	1.52	
Ų	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	

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