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(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: B2045

MAXIMUM RATINGS, PER LEG

Rating			Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		VRRM VRWM VR	45	Volts
Average Rectified Forward Current (Rated V_R), $T_C = 135$ °C	Total Device	lF(AV)	10 20	Amps
Peak Repetitive Forward Current Per Diode Leg (Rated V _R , Square Wave, 20 kHz), T _C = 135°C		IFRM	20	Amps
Non-repetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		IFSM	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	°C
Voltage Rate of Change (Rated V _R)		dv/dt	10000	V/μs
RMS Isolation Voltage (t = 1 second, R.H. ≤ 30%, T _A = 25°C) ⁽²⁾	Per Figure 5 Per Figure 6(1) Per Figure 7	Viso1 Viso2 Viso3	4500 3500 1500	Volts

THERMAL CHARACTERISTICS, PER LEG

Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.0	°C/W
Lead Temperature for Soldering Purposes: 1/8" from Case for 5 seconds		260	°C

- (1) UL Recognized mounting method is per Figure 6.
- (2) Proper strike and creepage distance must be provided.

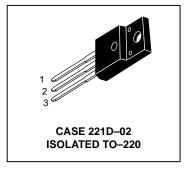
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Preferred devices are Motorola recommended choices for future use and best overall value.

MBRF2045CT

Motorola Preferred Device

SCHOTTKY BARRIER RECTIFIER 20 AMPERES 45 VOLTS





ELECTRICAL CHARACTERISTICS, PER LEG

Characteristic		Max	Unit
Maximum Instantaneous Forward Voltage (3) (iF = 20 Amp, $T_C = 25^{\circ}C$) (iF = 20 Amp, $T_C = 125^{\circ}C$) (iF = 10 Amp, $T_C = 125^{\circ}C$)	٧F	0.84 0.72 0.57	Volts
Maximum Instantaneous Reverse Current (3) (Rated DC Voltage, T _C = 25°C) (Rated DC Voltage, T _C = 125°C)	iR	0.1 15	mA

⁽³⁾ Pulse Test: Pulse Width = 300 μ s, Duty Cycle \leq 2.0%

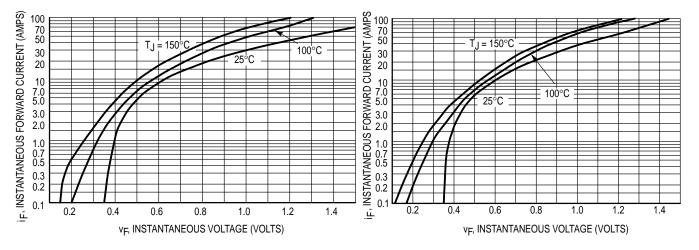


Figure 1. Maximum Forward Voltage

Figure 2. Typical Forward Voltage

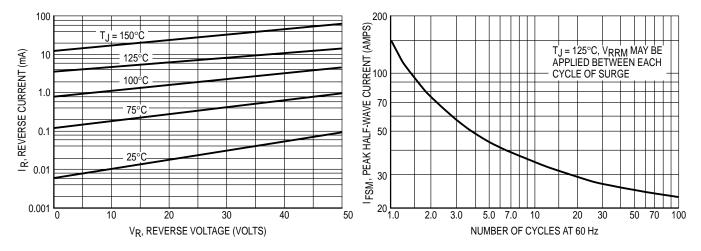
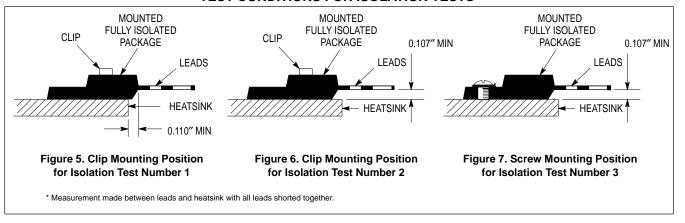


Figure 3. Maximum Reverse Current

Figure 4. Maximum Surge Capability

2 Rectifier Device Data

TEST CONDITIONS FOR ISOLATION TESTS*



MOUNTING INFORMATION**

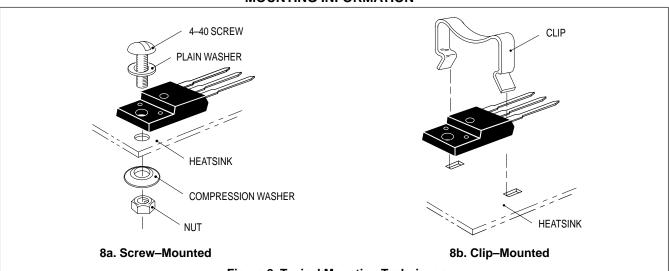


Figure 8. Typical Mounting Techniques

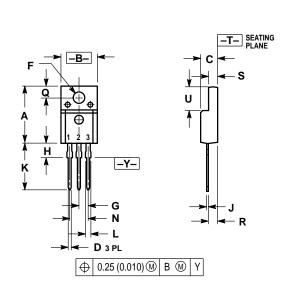
Laboratory tests on a limited number of samples indicate, when using the screw and compression washer mounting technique, a screw torque of 6 to 8 in · lbs is sufficient to provide maximum power dissipation capability. The compression washer helps to maintain a constant pressure on the package over time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

Rectifier Device Data 3

^{**}For more information about mounting power semiconductors see Application Note AN1040.

PACKAGE DIMENSIONS



NOTES

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

	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	
F	0.121	0.129	3.08	3.27	
G	0.100 BSC		2.54 BSC		
Н	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 3:

PIN 1. ANODE

2. CATHODE

3. ANODE

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

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How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution; P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609 INTERNET: http://Design–NET.com

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JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, 6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 81–3–3521–8315

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298



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