**Preferred Device** 

## **SWITCHMODE™ Power Rectifier**

... using the Schottky Barrier principle with a platinum barrier metal. These state-of-the-art devices have the following features:

- Guardring for Stress Protection
- Low Forward Voltage
- 150°C Operating Junction Temperature
- Epoxy Meets UL94, VO at 1/8"

#### **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**

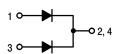
Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	45	V
Average Rectified Forward Current (Rated $V_R$ , $T_C = 135$ °C)	I <sub>F(AV)</sub>	20	Α
Peak Repetitive Forward Current per Diode Leg (Rated V <sub>R</sub> , Square Wave, 20 kHz, T <sub>C</sub> = 135°C)	I <sub>FRM</sub>	20	А
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I <sub>FSM</sub>	150	А
Peak Repetitive Reverse Surge Current (2.0 μs, 1.0 kHz) See Figure 11	I <sub>RRM</sub>	1.0	A
Storage Temperature Range	T <sub>stg</sub>	-65 to +175	°C
Operating Junction Temperature	TJ	-65 to +150	°C
Voltage Rate of Change (Rated V <sub>R</sub> )	dv/dt	1000	V/μs



#### ON Semiconductor™

http://onsemi.com

# SCHOTTKY BARRIER RECTIFIER 20 AMPERES 45 VOLTS





TO-220AB CASE 221A PLASTIC

#### MARKING DIAGRAM



YY = Year WW = Work Week B2045 = Device Code AKA = Diode Polarity

#### **ORDERING INFORMATION**

Device	Package	Shipping
MBR2045CT	TO-220	50 Units/Rail

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

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Maximum Thermal Resistance, Junction to Case	R <sub>θJC</sub>	2.0	°C/W
ELECTRICAL CHARACTERISTICS			
Maximum Instantaneous Forward Voltage (Note 1.) ( $i_F = 10 \text{ Amps}$ , $T_C = 125^{\circ}\text{C}$ ) ( $i_F = 20 \text{ Amps}$ , $T_C = 125^{\circ}\text{C}$ ) ( $i_F = 20 \text{ Amps}$ , $T_C = 25^{\circ}\text{C}$ )	VF	0.57 0.72 0.84	Volts
Maximum Instantaneous Reverse Current (Note 1.) (Rated dc Voltage, $T_C = 125^{\circ}C$ ) (Rated dc Voltage, $T_C = 25^{\circ}C$ )	i <sub>R</sub>	15 0.1	mA

<sup>1.</sup> Pulse Test: Pulse Width = 300  $\mu$ s, Duty Cycle  $\leq$  2.0%.

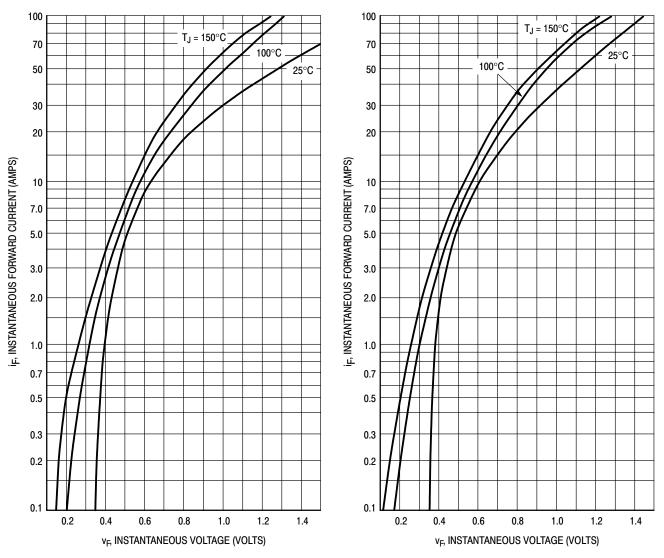


Figure 1. Maximum Forward Voltage

Figure 2. Typical Forward Voltage

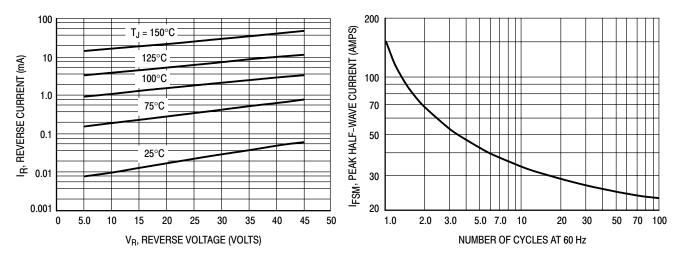
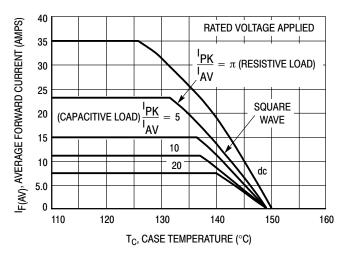


Figure 3. Maximum Reverse Current

Figure 4. Maximum Surge Capability



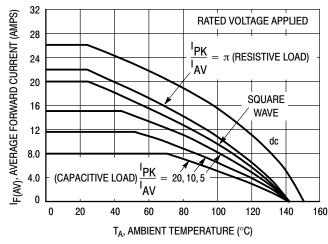
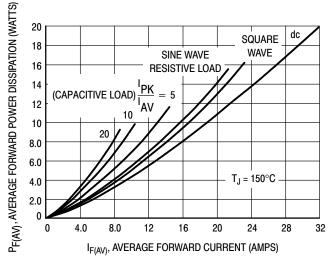


Figure 5. Current Derating, Infinite Heatsink

Figure 6. Current Derating,  $R_{\theta JA} = 16^{\circ}C/W$ 



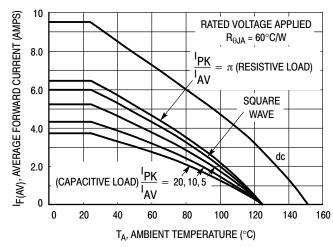


Figure 7. Forward Power Dissipation

Figure 8. Current Derating, Free Air

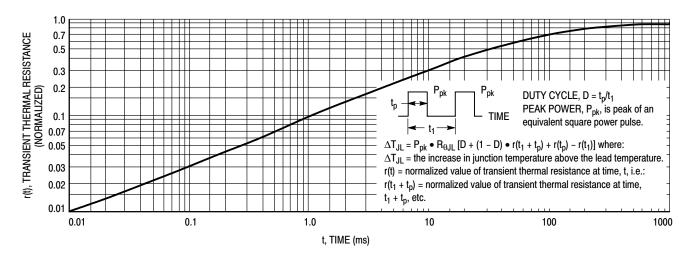


Figure 9. Thermal Response

#### HIGH FREQUENCY OPERATION

Since current flow in a Schottky rectifier is the result of majority carrier conduction, it is not subject to junction diode forward and reverse recovery transients due to minority carrier injection and stored charge. Satisfactory circuit analysis work may be performed by using a model consisting of an ideal diode in parallel with a variable capacitance. (See Figure 10.)

Rectification efficiency measurements show that operation will be satisfactory up to several megahertz. For example, relative waveform rectification efficiency is approximately 70 percent at 2.0 MHz, e.g., the ratio of dc power to RMS power in the load is 0.28 at this frequency, whereas perfect rectification would yield 0.406 for sine wave inputs. However, in contrast to ordinary junction diodes, the loss in waveform efficiency is not indicative of power loss; it is simply a result of reverse current flow through the diode capacitance, which lowers the dc output voltage.

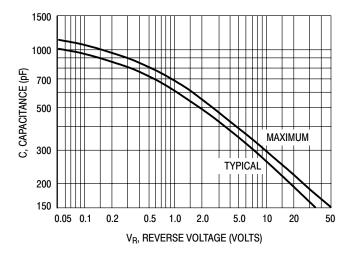


Figure 10. Capacitance

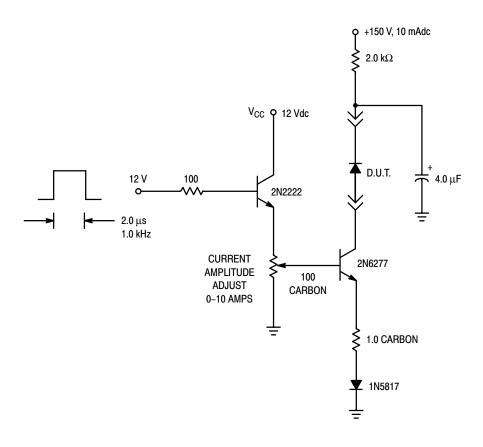
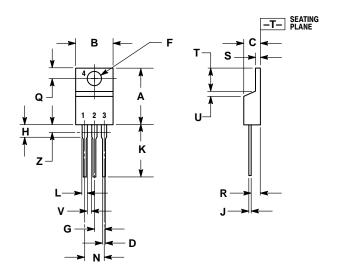


Figure 11. Test Circuit for dv/dt and Reverse Surge Current

#### **PACKAGE DIMENSIONS**

TO-220 **PLASTIC** CASE 221A-09 **ISSUE AA** 



- NOTES:
  1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.570	0.620	14.48	15.75
В	0.380	0.405	9.66	10.28
С	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
Ŧ	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
Н	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
Κ	0.500	0.562	12.70	14.27
Г	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Ø	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
Т	0.235	0.255	5.97	6.47
C	0.000	0.050	0.00	1.27
٧	0.045		1.15	
Z		0.080		2.04



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Liliali. Olviit-asia@filibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center 4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–0031

**Phone**: 81–3–5740–2700 **Email**: r14525@onsemi.com

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