MBR2045CT

Preferred Device

SWITCHMODE™ Power Rectifier

These state−of−the−art devices use the Schottky Barrier principle with a platinum barrier metal.

Features

- Guardring for Stress Protection
- Low Forward Voltage
- 150°C Operating Junction Temperature
- Epoxy Meets UL 94, V−0 @ 0.125 in
- Pb−Free Package is Available*

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

MAXIMUM RATINGS

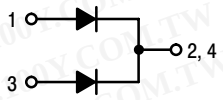
Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	45	V
Average Rectified Forward Current (Rated V_R, T_C = 135°C)	$I_{F(AV)}$	20	A
Peak Repetitive Forward Current per Diode Leg (Rated V_R, Square Wave, 20 kHz, T_C = 135°C)	I_{FRM}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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

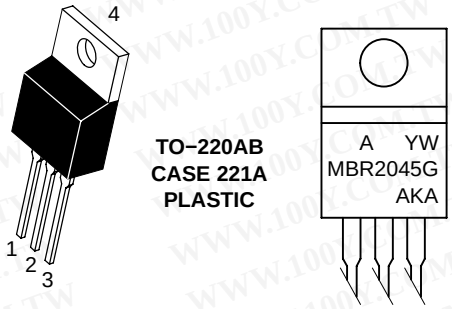
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor®
http://onsemi.com

SCHOTTKY BARRIER RECTIFIER 20 AMPERES, 45 VOLTS



MARKING DIAGRAM



TO−220AB
CASE 221A
PLASTIC

A = Assembly Location
Y = Year
W = Work Week
MBR2045 = Device Code
G = Pb−Free Package
AKA = Diode Polarity

ORDERING INFORMATION

Device	Package	Shipping
MBR2045CT	TO−220	50 Units / Rail
MBR2045CTG	TO−220 (Pb−Free)	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	$R_{\theta JC}$	2.0	°C/W

ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (Note 1) (i_F = 10 Amps, T_C = 125°C) (i_F = 20 Amps, T_C = 125°C) (i_F = 20 Amps, T_C = 25°C)	v_F	 0.57 0.72 0.84	V
Maximum Instantaneous Reverse Current (Note 1) (Rated dc Voltage, T_C = 125°C) (Rated dc Voltage, T_C = 25°C)	i_R	 15 0.1	mA

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

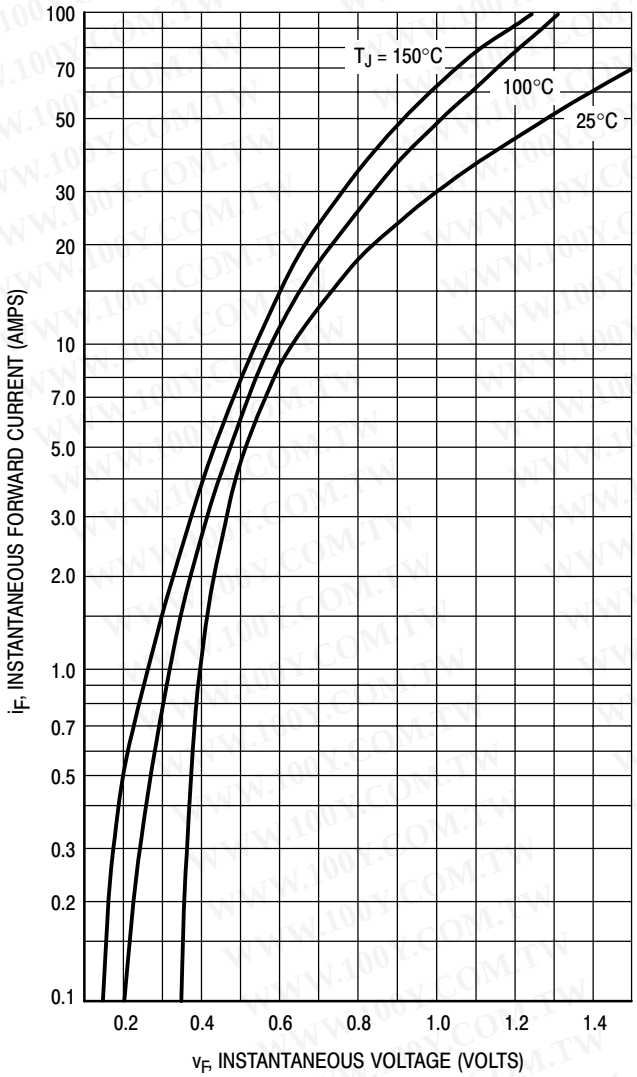


Figure 1. Maximum Forward Voltage

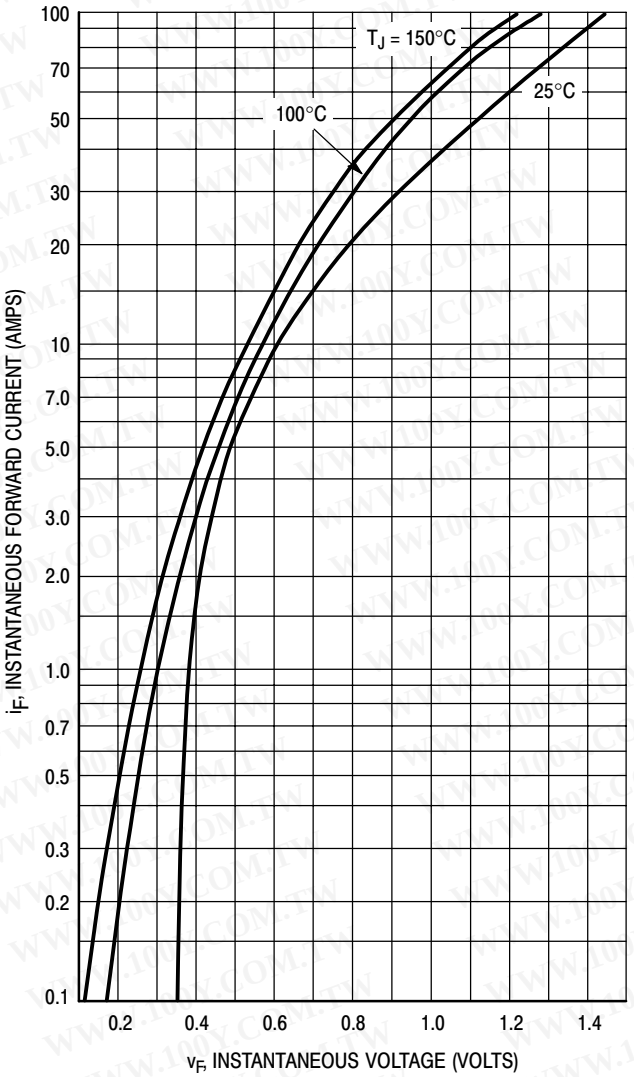


Figure 2. Typical Forward Voltage

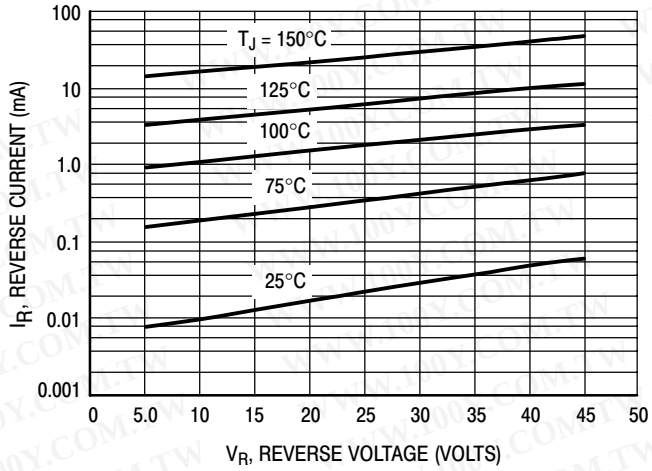


Figure 3. Maximum Reverse Current

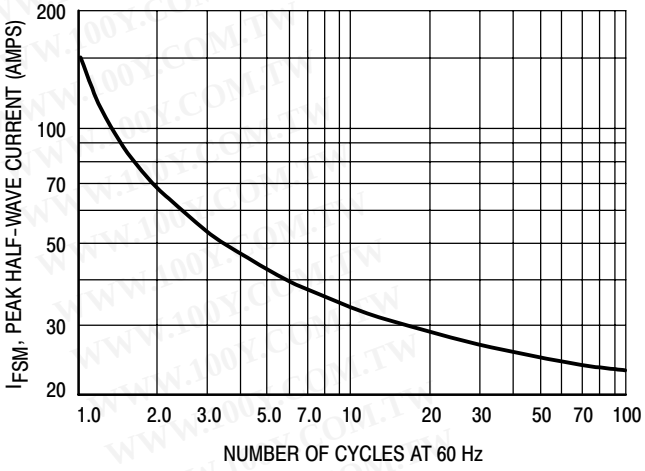


Figure 4. Maximum Surge Capability

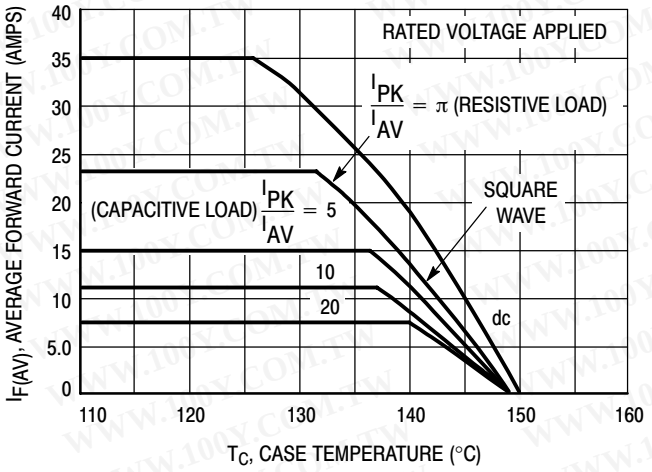


Figure 5. Current Derating, Infinite Heatsink

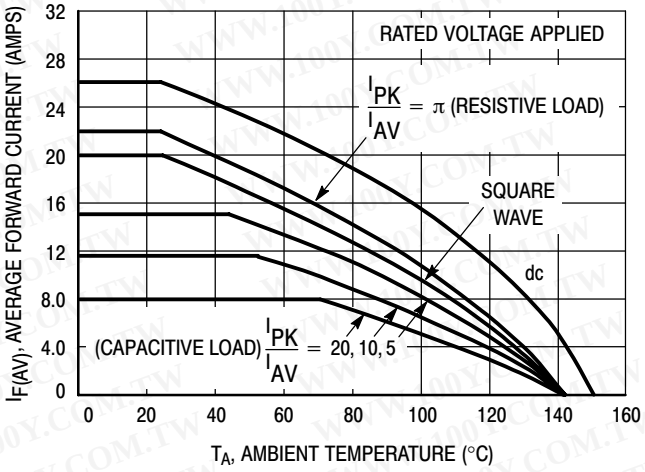


Figure 6. Current Derating, $R_{\theta JA}$ = 16°C/W

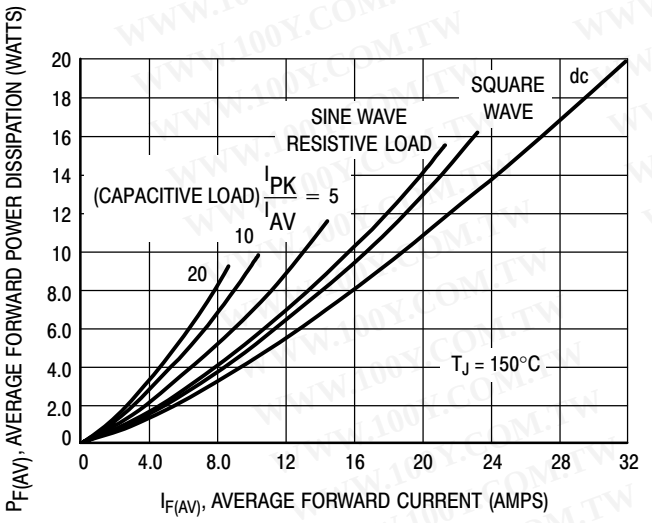


Figure 7. Forward Power Dissipation

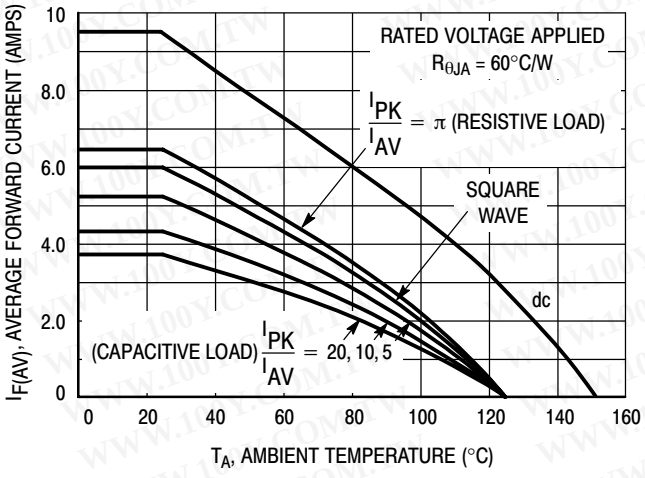


Figure 8. Current Derating, Free Air

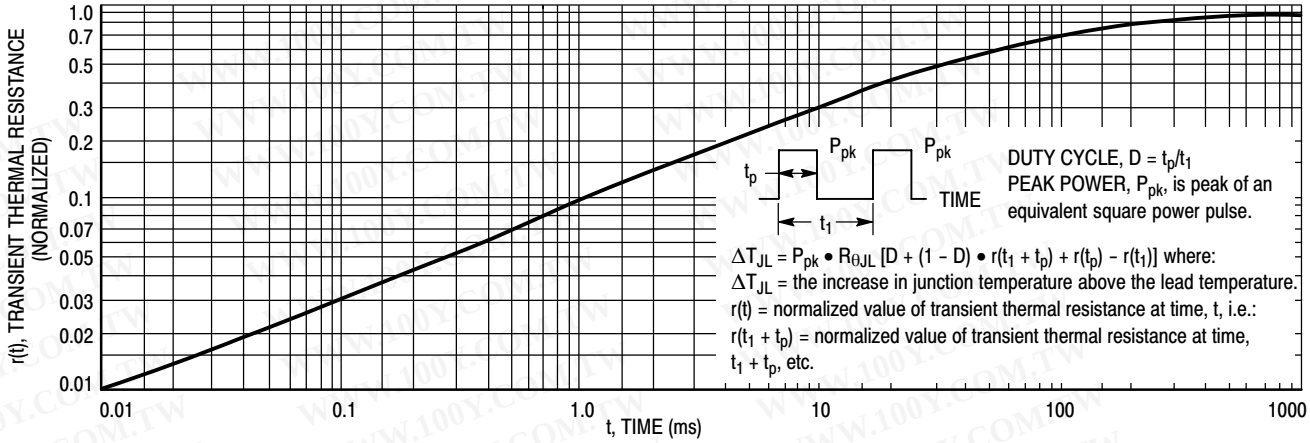


Figure 9. Thermal Response

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.

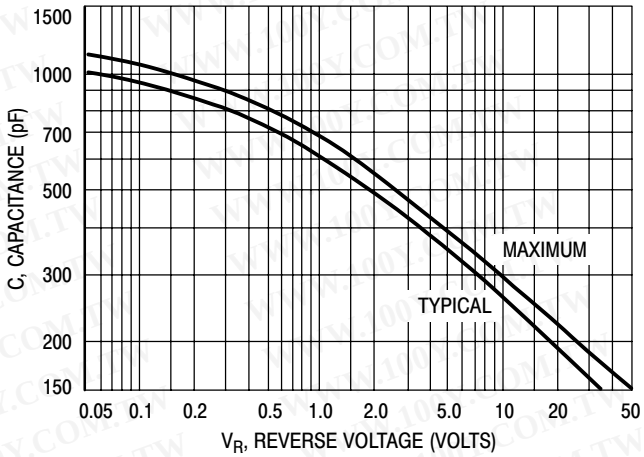


Figure 10. Capacitance

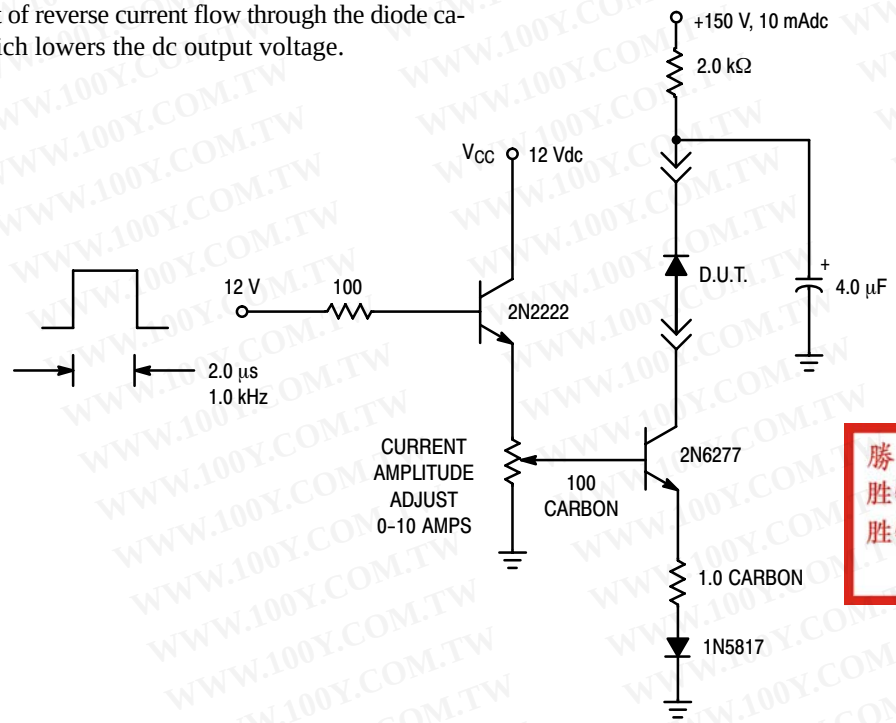
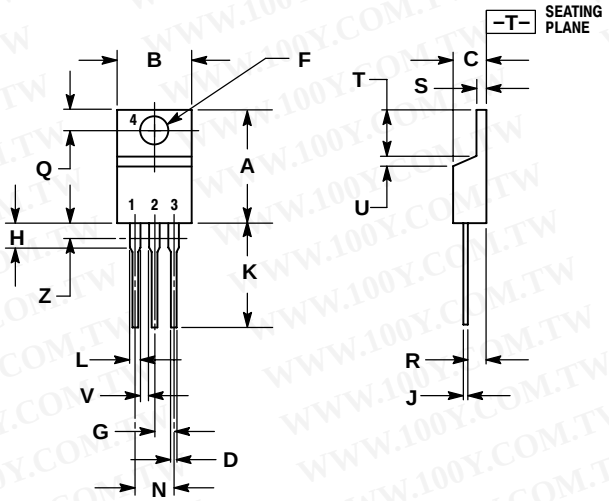


Figure 11. Test Circuit for dv/dt and Reverse Surge Current

MBR2045CT

PACKAGE DIMENSIONS

TO−220
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		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	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
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

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PUBLICATION ORDERING INFORMATION

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