

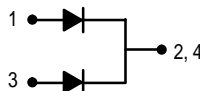
# SWITCHMODE™ Power Rectifiers

... 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
- Guaranteed Reverse Avalanche
- Epoxy Meets UL94, VO at 1/8"

### Mechanical Characteristics:

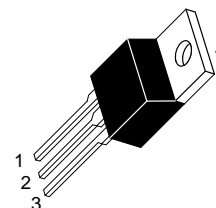
- Case: Epoxy, Molded
- Weight: 1.9 grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped 50 units per plastic tube
- Marking: B2035, B2045



**MBR2035CT**  
**MBR2045CT**

MBR2045CT is a  
Motorola Preferred Device

**SCHOTTKY BARRIER  
RECTIFIERS**  
**20 AMPERES**  
**35 and 45 VOLTS**



**CASE 221A-06**  
**TO-220AB**  
**PLASTIC**

### MAXIMUM RATINGS

Rating	Symbol	MBR2035CT	MBR2045CT	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	35	45	Volts
Average Rectified Forward Current (Rated $V_R$ ) $T_C = 135^\circ\text{C}$	$I_{F(AV)}$	20	20	Amps
Peak Repetitive Forward Current Per Diode Leg (Rated $V_R$ , Square Wave, 20 kHz) $T_C = 135^\circ\text{C}$	$I_{FRM}$	20	20	Amps
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	$I_{FSM}$	150	150	Amps
Peak Repetitive Reverse Surge Current (2.0 $\mu\text{s}$ , 1.0 kHz) See Figure 11	$I_{RRM}$	1.0	1.0	Amp
Operating Junction Temperature	$T_J$	-65 to +150	-65 to +150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +175	-65 to +175	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ )	$dv/dt$	1000	1000	$\text{V}/\mu\text{s}$

### THERMAL CHARACTERISTICS

Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	2.0	$^\circ\text{C}/\text{W}$
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### ELECTRICAL CHARACTERISTICS

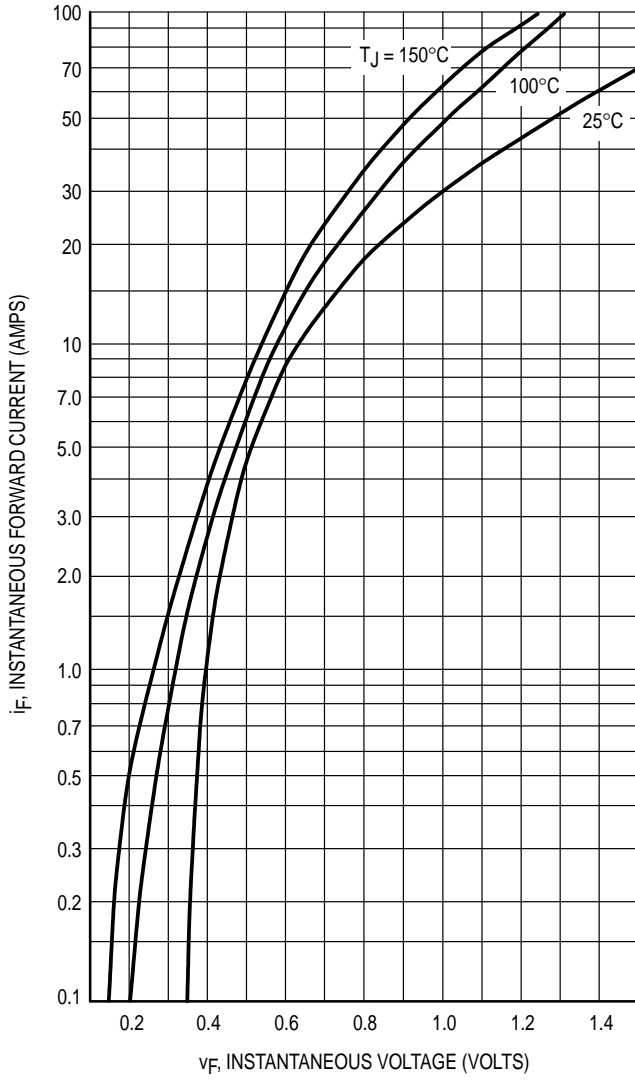
Maximum Instantaneous Forward Voltage (1) ( $i_F = 10$ Amps, $T_C = 125^\circ\text{C}$ ) ( $i_F = 20$ Amps, $T_C = 125^\circ\text{C}$ ) ( $i_F = 20$ Amps, $T_C = 25^\circ\text{C}$ )	$v_F$	0.57 0.72 0.84	0.57 0.72 0.84	Volts
Maximum Instantaneous Reverse Current (1) (Rated dc Voltage, $T_C = 125^\circ\text{C}$ ) (Rated dc Voltage, $T_C = 25^\circ\text{C}$ )	$i_R$	15 0.1	15 0.1	mA

(1) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

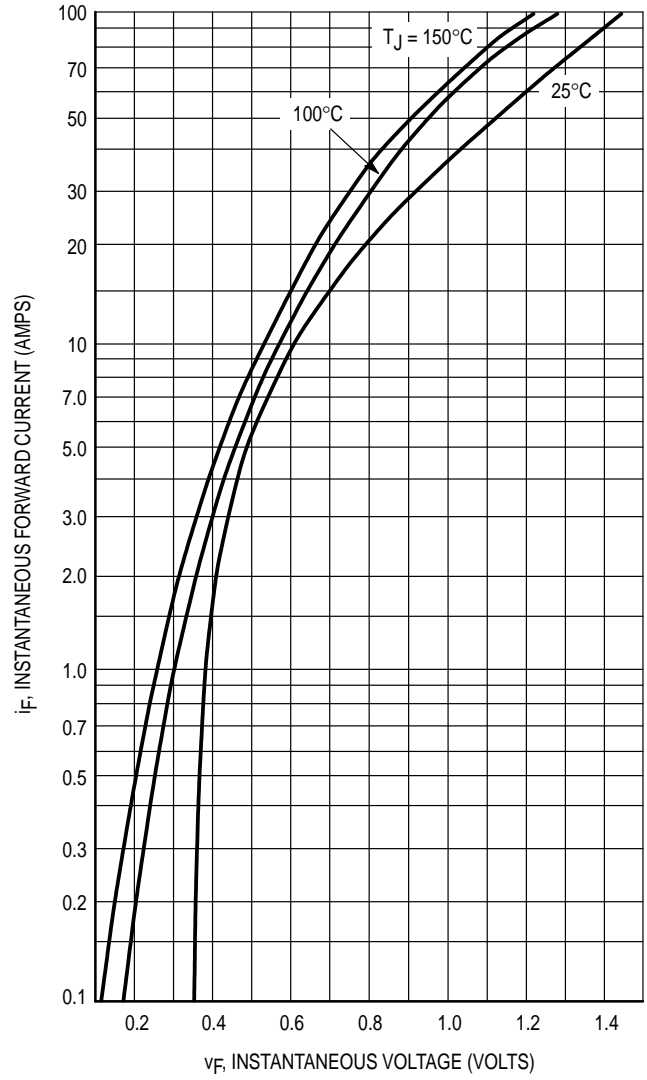
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Preferred devices are Motorola recommended choices for future use and best overall value.

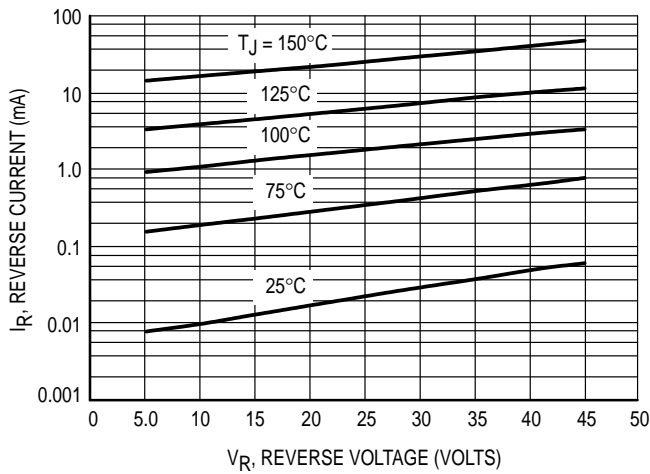
**MBR2035CT MBR2045CT**



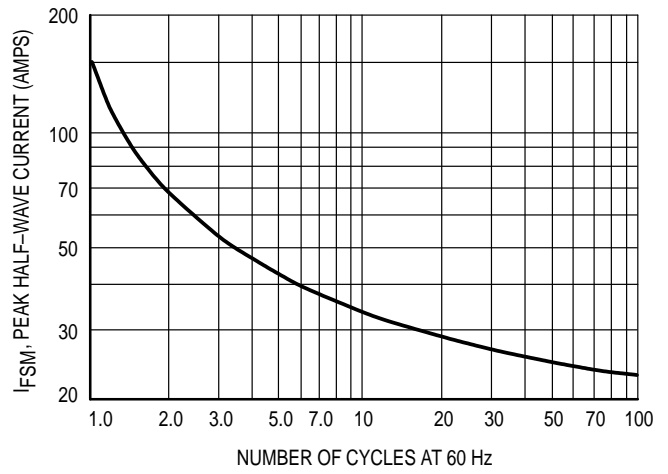
**Figure 1. Maximum Forward Voltage**



**Figure 2. Typical Forward Voltage**



**Figure 3. Maximum Reverse Current**



**Figure 4. Maximum Surge Capability**

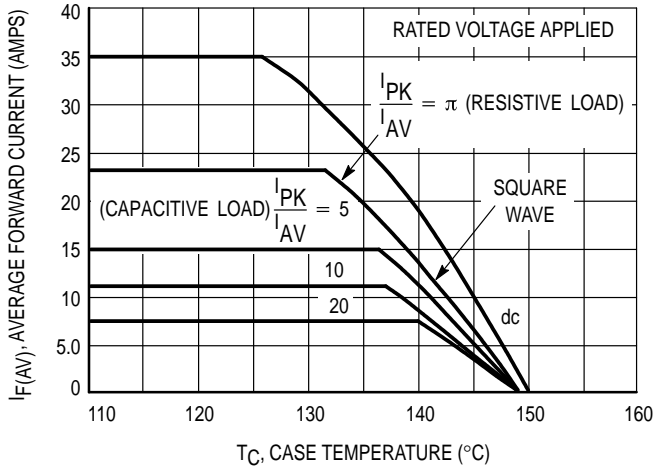


Figure 5. Current Derating, Infinite Heatsink

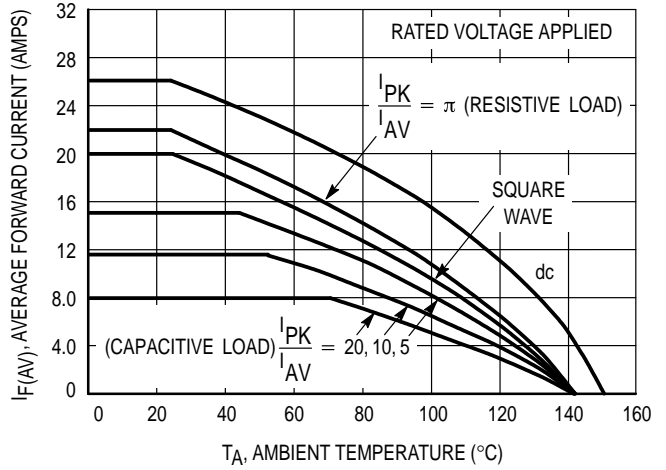


Figure 6. Current Derating,  $R_{\theta JA} = 16^{\circ}\text{C/W}$

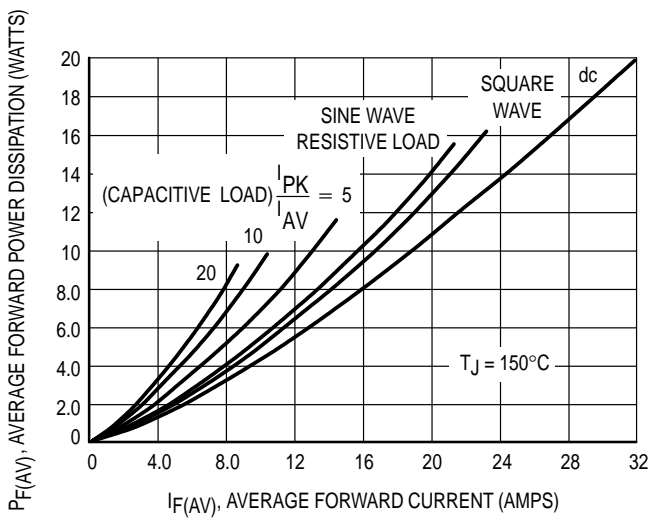


Figure 7. Forward Power Dissipation

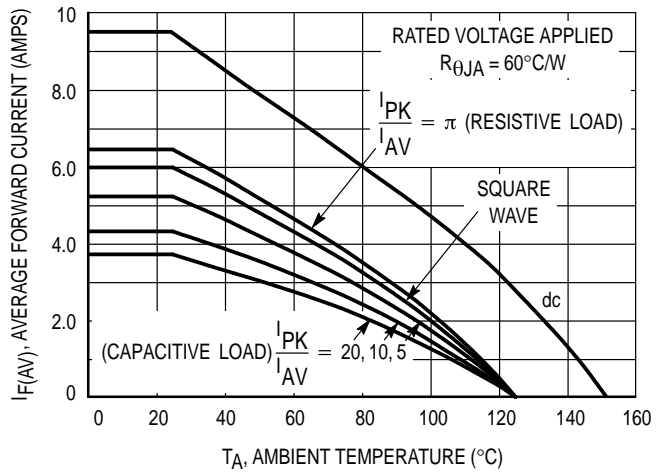


Figure 8. Current Derating, Free Air

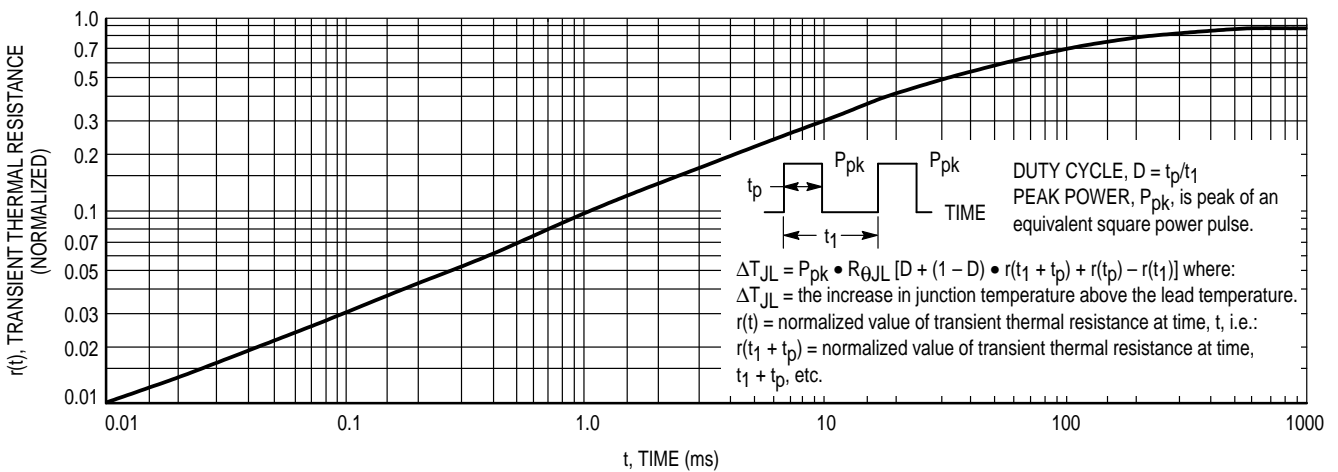


Figure 9. Thermal Response

# MBR2035CT MBR2045CT

## 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.

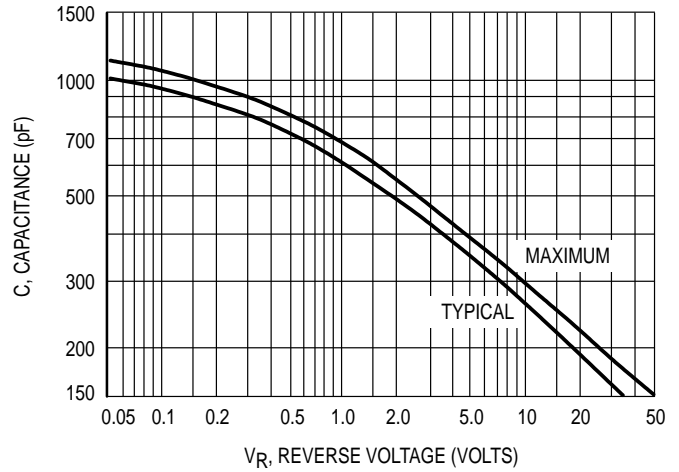


Figure 10. Capacitance

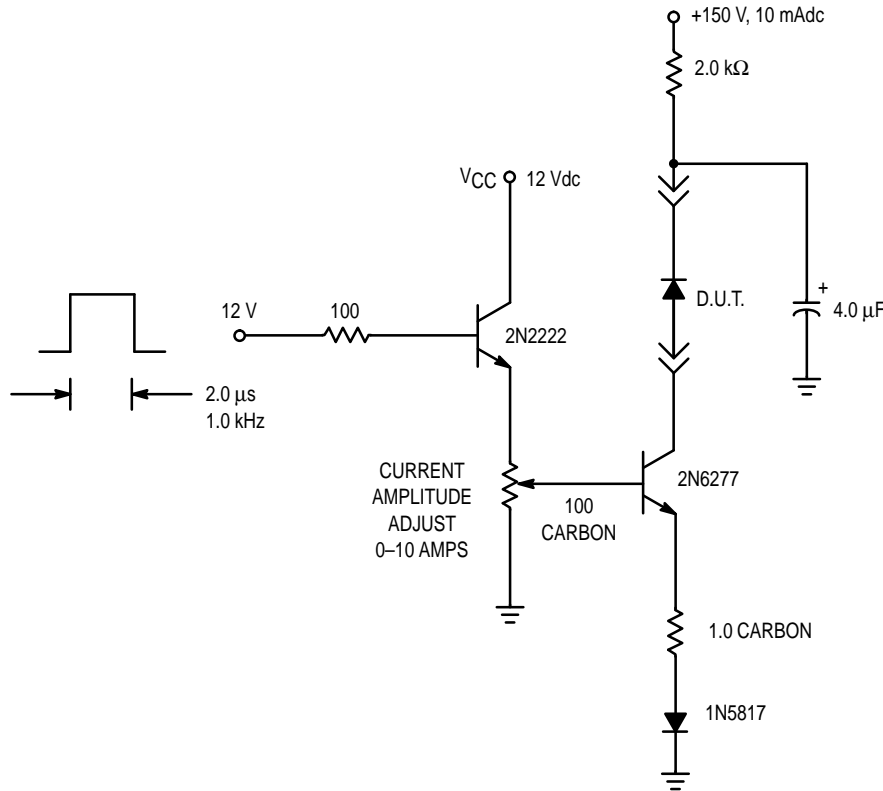
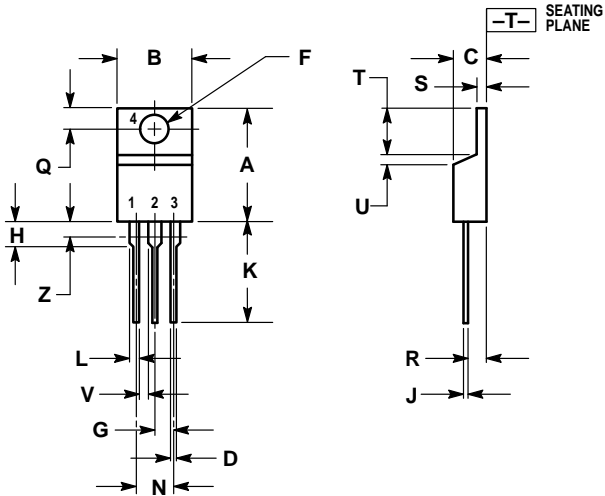


Figure 11. Test Circuit for  $dv/dt$  and Reverse Surge Current

PACKAGE DIMENSIONS



- 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.

DIM	INCHES		MILLIMETERS	
	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

CASE 221A-06  
(TO-220AB)  
ISSUE Y

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