

# MBR2030CTL

Preferred Device

## SWITCHMODE™ Dual Schottky Power Rectifier

...employing 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 (0.4 Max @ 10 A,  $T_C = 150^\circ\text{C}$ )
- $150^\circ\text{C}$  Operating Junction Temperature
- Matched Dual Die Construction (10 A per Leg or 20 A per Package)
- 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"

### 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:  $260^\circ\text{C}$  Max. for 10 Seconds
- Shipped 50 units per plastic tube
- Marking: B2030

### MAXIMUM RATINGS

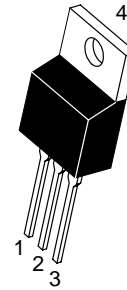
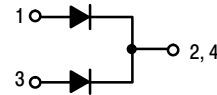
Please See the Table on the Following Page



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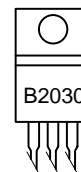
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**SCHOTTKY BARRIER  
RECTIFIER  
20 AMPERES  
30 VOLTS**



TO-220AB  
CASE 221A  
PLASTIC

### MARKING DIAGRAM



B2030 = Device Code

### ORDERING INFORMATION

Device	Package	Shipping
MBR2030CTL	TO-220	50 Units/Tube

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

# MBR2030CTL

## MAXIMUM RATINGS (Per Leg)

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	30	Volts
Average Rectified Forward Current	$I_{F(AV)}$	10	Amps
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	$I_{FSM}$	150	Amps
Peak Repetitive Reverse Surge Current (2.0 $\mu$ s, 1.0 kHz)	$I_{RRM}$	1.0	Amp
Operating Junction Temperature	$T_J$	-65 to +150	$^{\circ}$ C
Storage Temperature	$T_{stg}$	-65 to +175	$^{\circ}$ C
Voltage Rate of Change (Rated $V_R$ )	dv/dt	1000	V/ $\mu$ s

## THERMAL CHARACTERISTICS (Per Leg)

Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	$^{\circ}$ C/W
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## ELECTRICAL CHARACTERISTICS (Per Leg)

Maximum Instantaneous Forward Voltage (Note 1.) ( $i_F = 10$ Amps, $T_C = 25^{\circ}$ C) ( $i_F = 10$ Amps, $T_C = 150^{\circ}$ C) ( $i_F = 20$ Amps, $T_C = 25^{\circ}$ C) ( $i_F = 20$ Amps, $T_C = 150^{\circ}$ C)	$v_F$	0.52 0.40 0.58 0.48	Volts
Maximum Instantaneous Reverse Current (Note 1.) (Rated DC Voltage, $T_C = 25^{\circ}$ C) (Rated DC Voltage, $T_C = 100^{\circ}$ C) (Rated DC Voltage, $T_C = 125^{\circ}$ C)	$i_R$	5.0 40 75	mA

1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle  $\leq$  10%.

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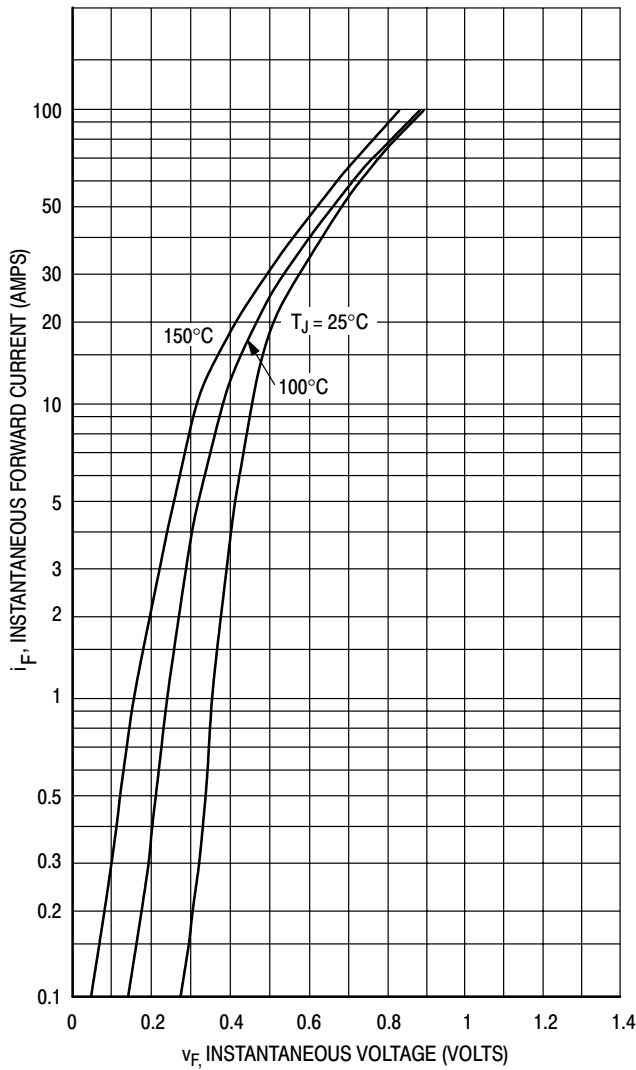


Figure 1. Typical Forward Voltage (Per Leg)

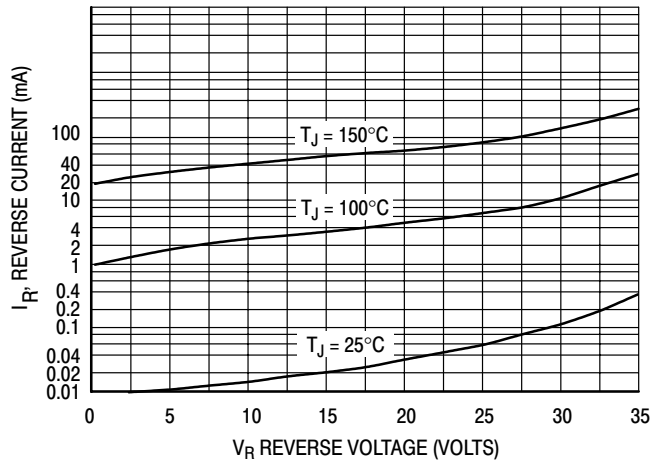


Figure 2. Typical Reverse Current (Per Leg)

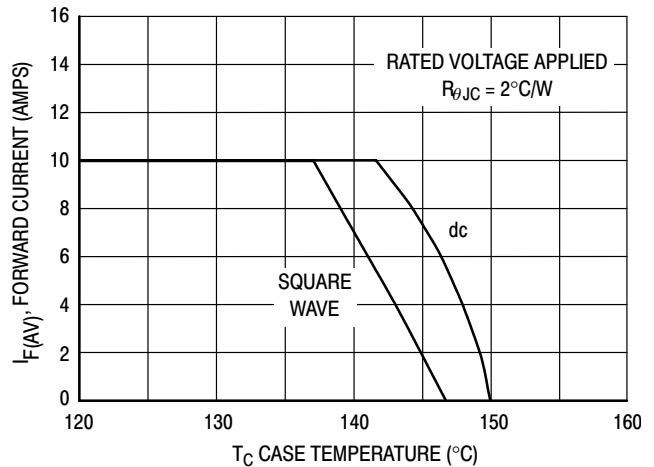


Figure 3. Current Derating, Case

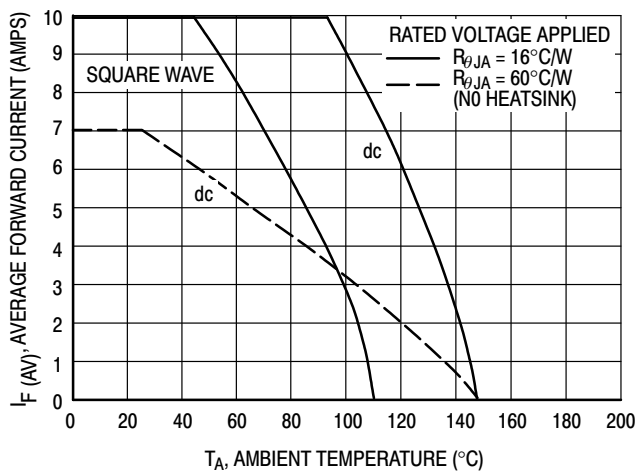


Figure 4. Current Derating, Ambient

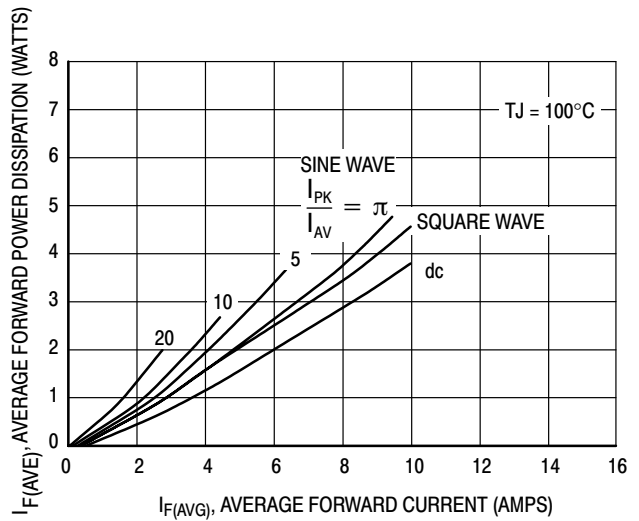


Figure 5. Forward Power Dissipation

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## 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 6.)

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.

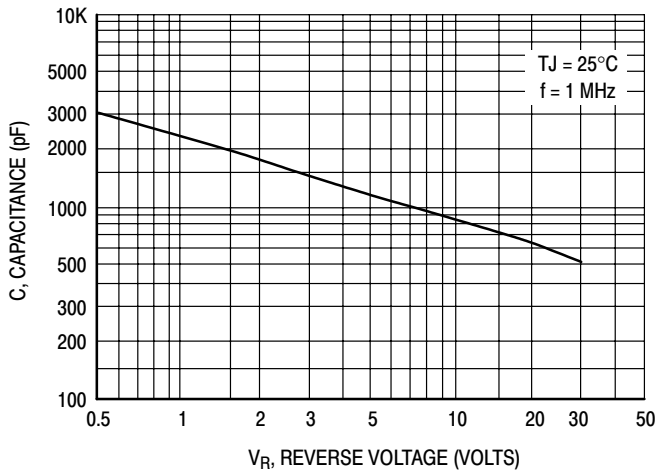


Figure 6. Typical Capacitance

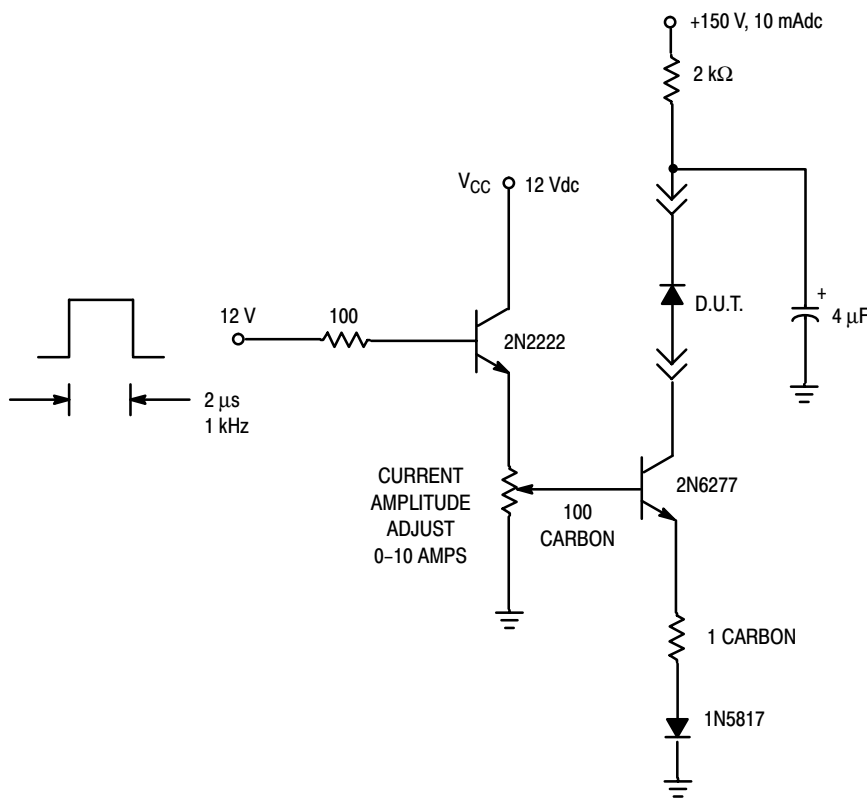
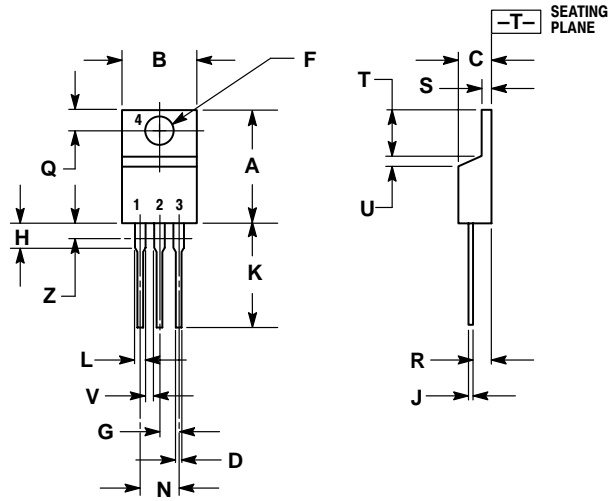


Figure 7. Test Circuit for dv/dt and Reverse Surge Current

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## PACKAGE DIMENSIONS

TO-220AB  
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.

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

**Notes**

**Notes**

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