MBR2030CTL

Preferred Device

SWITCHMODE™ Dual Schottky Power Rectifier

The MBR2030CTL 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.

Features

- Pb−Free Package is Available*
- Highly Stable Oxide Passivated Junction
- Very Low Forward Voltage Drop (0.4 Max @ 10 A, T_C = 150°C)
- 150°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 UL 94, V−0 @ 0.125 in

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

*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®

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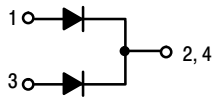
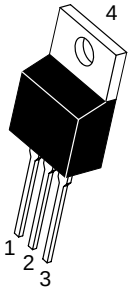
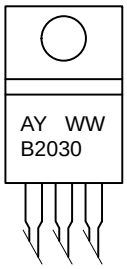
SCHOTTKY BARRIER RECTIFIER 20 AMPERES 30 VOLTS



MARKING DIAGRAM



TO−220AB CASE 221A PLASTIC



A = Assembly Location
Y = Year
WW = Work Week
B2030 = Device Code

ORDERING INFORMATION

Device	Package	Shipping
MBR2030CTL	TO−220	50 Units/Tube
MBR2030CTLG	TO−220 (Pb−Free)	50 Units/Tube

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

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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	V
Average Rectified Forward Current	$I_{F(AV)}$	10	A
Nonrepetitive 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)	I_{RRM}	1.0	A
Operating Junction Temperature	T_J	−65 to +150	°C
Storage Temperature	T_{stg}	−65 to +175	°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.

THERMAL CHARACTERISTICS (Per Leg)

Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	2.0	°C/W

ELECTRICAL CHARACTERISTICS (Per Leg)

Maximum Instantaneous Forward Voltage (Note 1) (i_F = 10 Amps, T_C = 25°C) (i_F = 10 Amps, T_C = 150°C) (i_F = 20 Amps, T_C = 25°C) (i_F = 20 Amps, T_C = 150°C)	v_F	 0.52 0.40 0.58 0.48	V
Maximum Instantaneous Reverse Current (Note 1) (Rated DC Voltage, T_C = 25°C) (Rated DC Voltage, T_C = 100°C) (Rated DC Voltage, T_C = 125°C)	i_R	 5.0 40 75	mA

1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 10%.

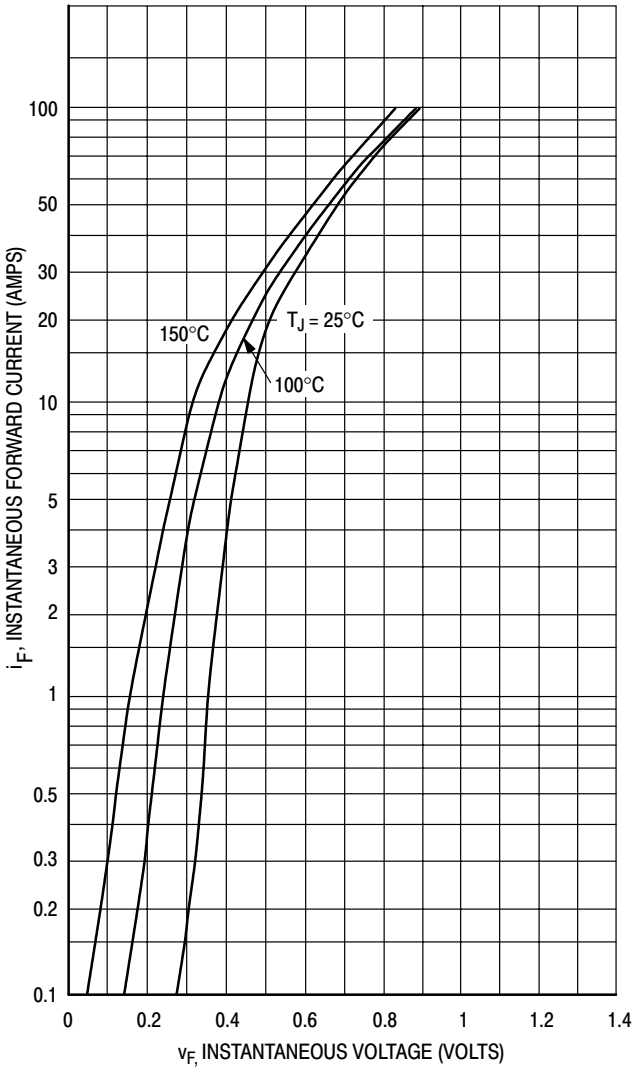


Figure 1. Typical Forward Voltage (Per Leg)

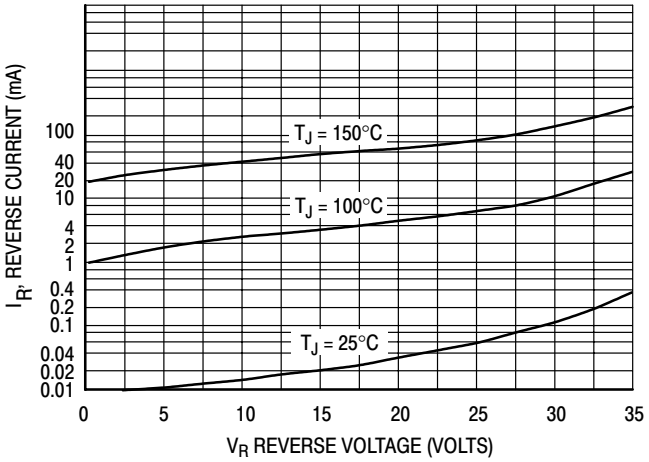


Figure 2. Typical Reverse Current (Per Leg)

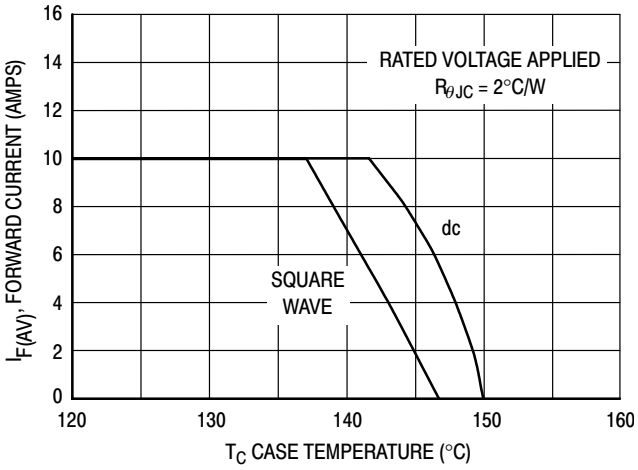


Figure 3. Current Derating, Case

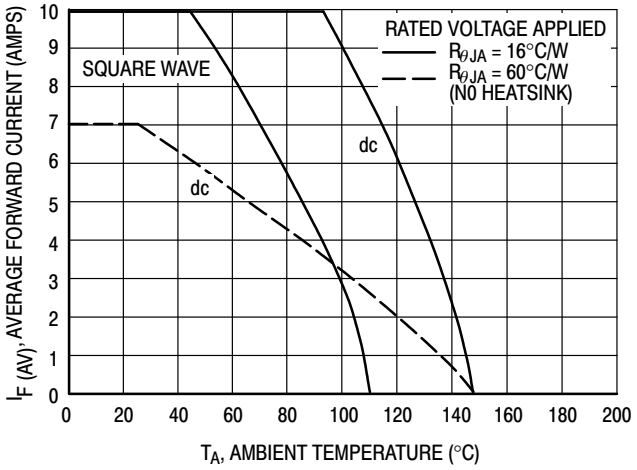


Figure 4. Current Derating, Ambient

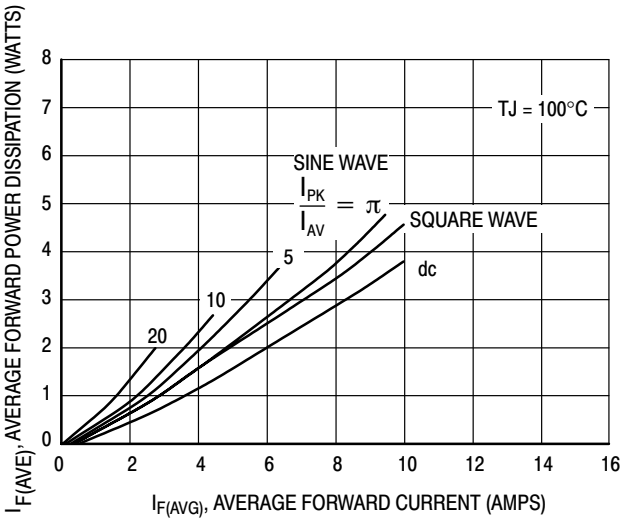


Figure 5. Forward Power Dissipation

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.

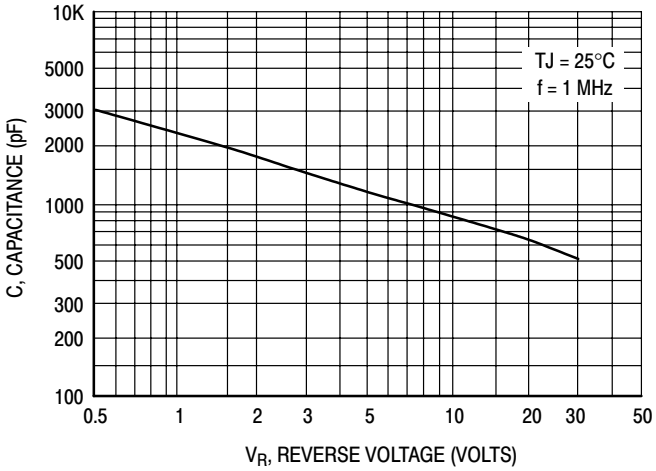


Figure 6. Typical Capacitance

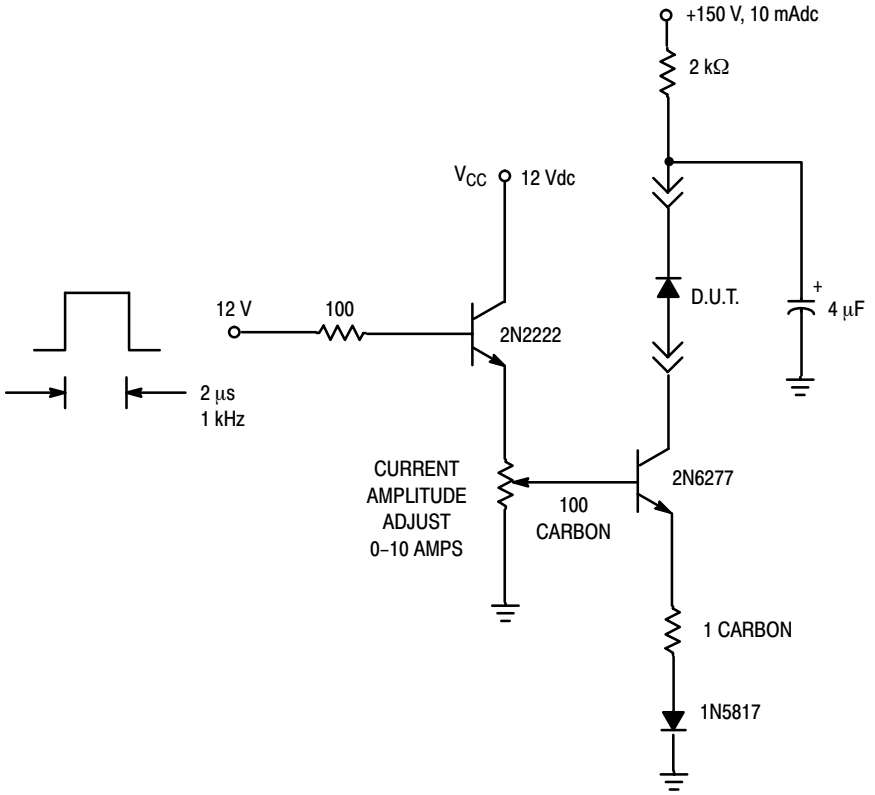
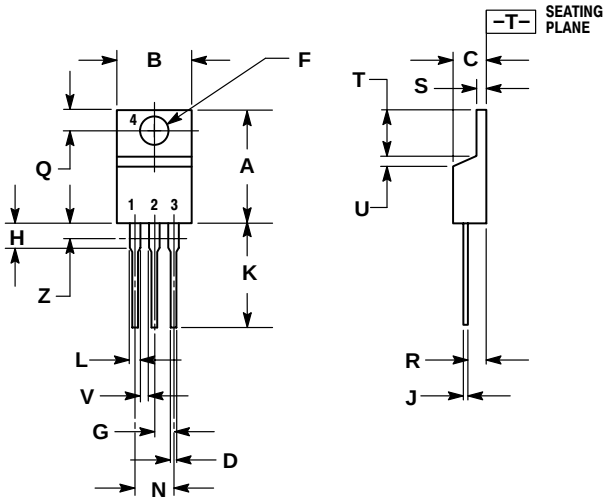


Figure 7. Test Circuit for dv/dt and Reverse Surge Current

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.

	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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