MBRB30H30CT-1G,
NRVBB30H30CT-1G,
MBR30H30CTG

SWITCHMODE
Power Rectifiers
30 V, 30 A

ON Semiconductor®

http://onsemi.com

Features and Benefits
- Low Forward Voltage
- Low Power Loss/High Efficiency
- High Surge Capacity
- 150°C Operating Junction Temperature
- 30 A Total (15 A Per Diode Leg)
- Guard−Ring for Stress Protection
- AEC−Q101 Qualified and PPAP Capable
- NRVBB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- All Packages are Pb−Free*

Applications
- Power Supply − Output Rectification
- Power Management
- Instrumentation

Mechanical Characteristics:
- Case: Epoxy, Molded
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 1.5 Grams (I²PAK) (Approximately)
          1.9 Grams (TO−220) (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
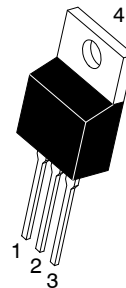- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

SCHOTTKY BARRIER RECTIFIER
30 AMPERES, 30 VOLTS
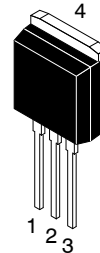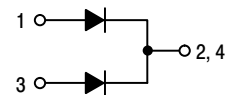
MARKING DIAGRAMS

I²PAK (TO−262)
CASE 418D
PLASTIC

AYWW
B30H30G
AKA

TO−220AB
CASE 221A
PLASTIC

AYWW
B30H30G
AKA

A	= Assembly Location
Y	= Year
WW	= Work Week
B30H30	= Device Code
G	= Pb−Free Package
AKA	= Diode Polarity

ORDERING AND MARKING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

MBRB30H30CT−1G, NRVBB30H30CT−1G, MBR30H30CTG

MAXIMUM RATINGS (Per Diode 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 (Rated V_R) T_C = 138°C	$I_{F(AV)}$	15	A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz)	I_{FRM}	30	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	260	A
Operating Junction Temperature (Note 1)	T_J	−55 to +150	°C
Storage Temperature	T_{stg}	−55 to +150	°C
Voltage Rate of Change (Rated V_R)	dv/dt	10,000	V/μs
Controlled Avalanche Energy (see test conditions in Figures 9 and 10)	W_{AVAL}	250	mJ

ESD Ratings:
    Machine Model = C
    Human Body Model = 3B
		> 400
		> 8000
			V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.
1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit

Maximum Thermal Resistance
    Junction−to−Case
    Junction−to−Ambient
	$R_{\theta JC}$
	$R_{\theta JA}$
		2.0
		70
			°C/W

ELECTRICAL CHARACTERISTICS (Per Diode Leg)

Rating	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 2) (I_F = 15 A, T_C = 25°C) (I_F = 15 A, T_C = 125°C) (I_F = 30 A, T_C = 25°C) (I_F = 30 A, T_C = 125°C)	v_F	 0.48 0.40 0.55 0.53	V
Maximum Instantaneous Reverse Current (Note 2) (Rated DC Voltage, T_C = 25°C) (Rated DC Voltage, T_C = 125°C)	i_R	 0.8 130	mA

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

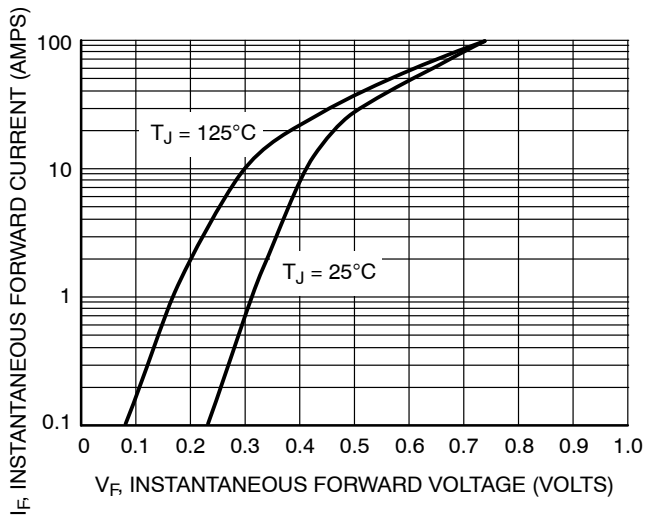# MBRB30H30CT−1G, NRVBB30H30CT−1G, MBR30H30CTG
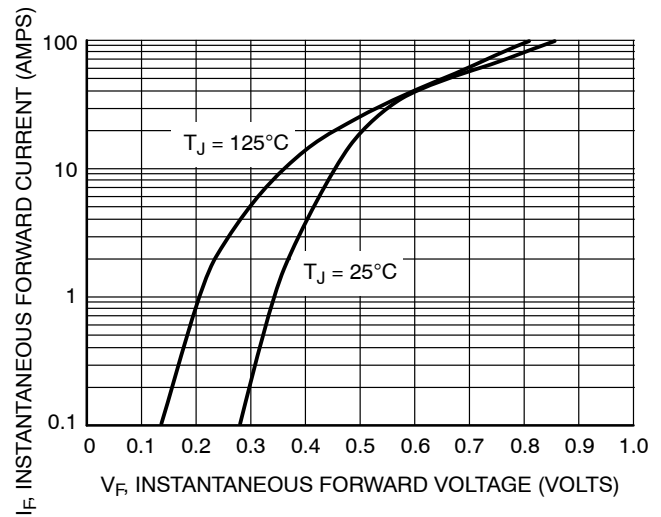

Figure 1. Typical Forward Voltage

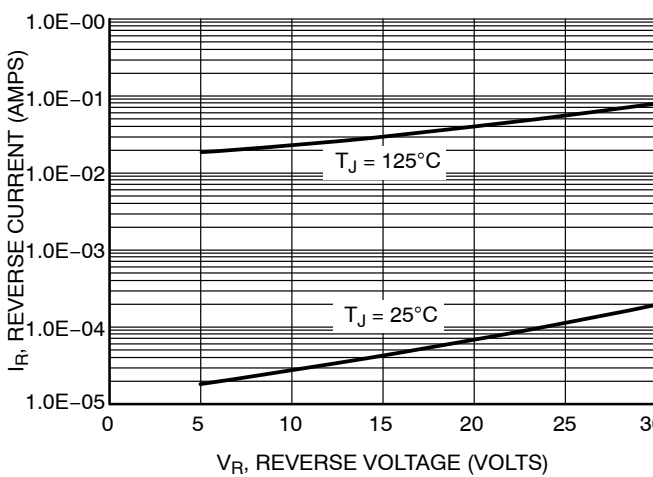Figure 2. Maximum Forward Voltage

Figure 3. Typical Reverse Current
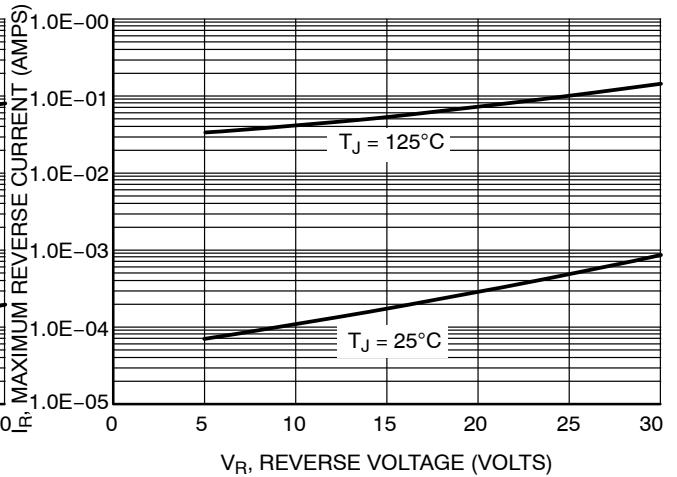
Figure 4. Maximum Reverse Current
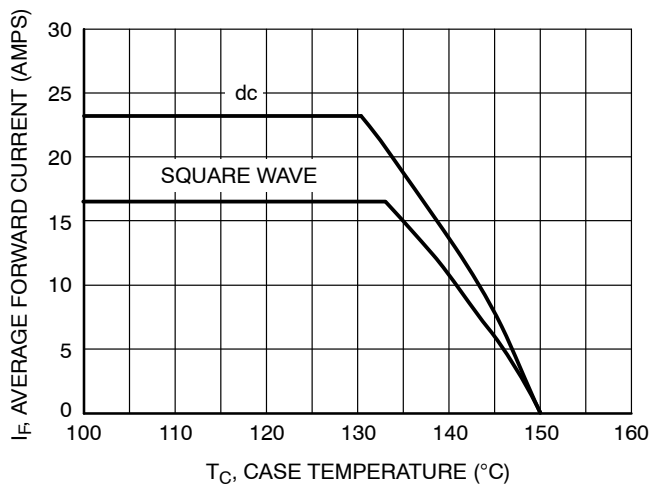
Figure 5. Current Derating
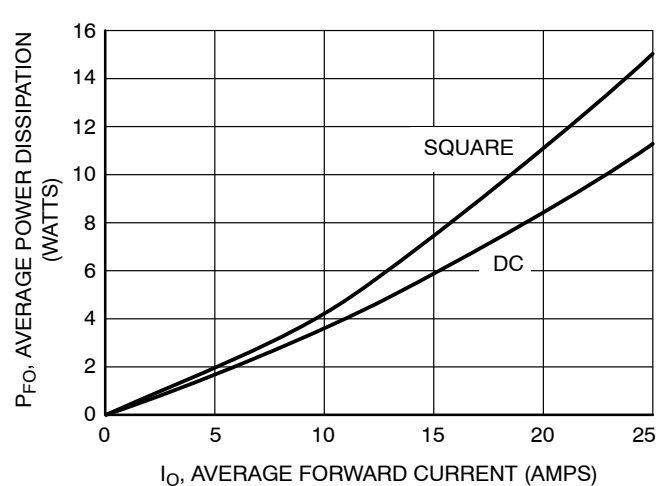
Figure 6. Forward Power Dissipation
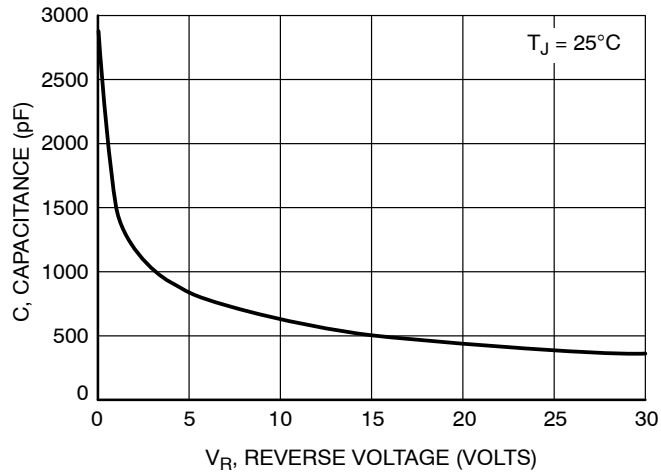
Figure 7. Typical Capacitance
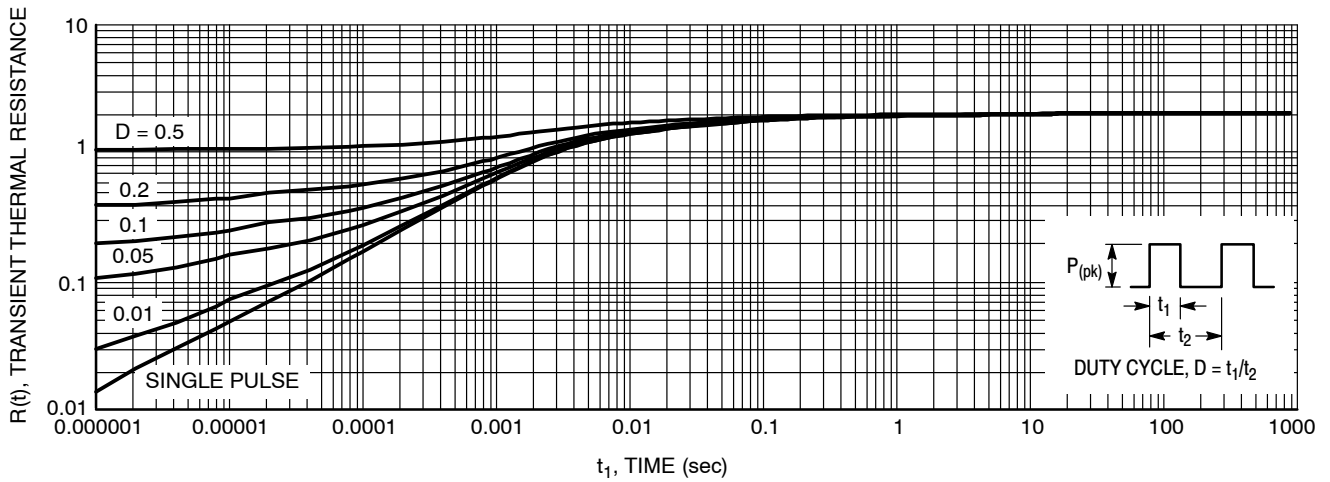
Figure 8. Thermal Response Junction−to−Case

Figure 9. Test Circuit

Figure 10. Current−Voltage Waveforms
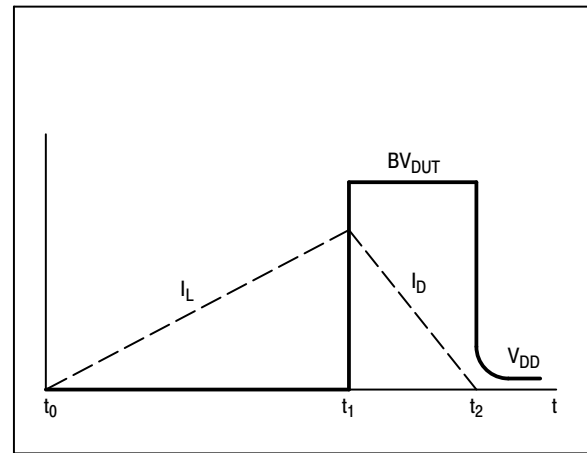
The unclamped inductive switching circuit shown in Figure 9 was used to demonstrate the controlled avalanche capability of this device. A mercury switch was used instead of an electronic switch to simulate a noisy environment when the switch was being opened.

When S_1 is closed at t_0 the current in the inductor I_L ramps up linearly; and energy is stored in the coil. At t_1 the switch is opened and the voltage across the diode under test begins to rise rapidly, due to di/dt effects, when this induced voltage reaches the breakdown voltage of the diode, it is clamped at BV_{DUT} and the diode begins to conduct the full load current which now starts to decay linearly through the diode, and goes to zero at t_2.

By solving the loop equation at the point in time when S_1 is opened; and calculating the energy that is transferred to the diode it can be shown that the total energy transferred is equal to the energy stored in the inductor plus a finite amount of energy from the V_{DD} power supply while the diode is in breakdown (from t_1 to t_2) minus any losses due to finite component resistances. Assuming the component resistive

elements are small Equation (1) approximates the total energy transferred to the diode. It can be seen from this equation that if the V_{DD} voltage is low compared to the breakdown voltage of the device, the amount of energy contributed by the supply during breakdown is small and the total energy can be assumed to be nearly equal to the energy stored in the coil during the time when S_1 was closed, Equation (2).

EQUATION (1):

$$W_{AVAL} \approx \frac{1}{2} LI^2_{LPK} \left(\frac{BV_{DUT}}{BV_{DUT} - V_{DD}} \right)$$

EQUATION (2):

$$W_{AVAL} \approx \frac{1}{2} LI^2_{LPK}$$

ORDERING INFORMATION

Device	Package	Shipping[†]
MBRB30H30CT−1G	TO−262 (Pb−Free)	50 Units / Rail
NRVBB30H30CT−1G	TO−262 (Pb−Free)	50 Units / Rail
MBR30H30CTG	TO−220 (Pb−Free)	50 Units / Rail

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MBRB30H30CT−1G, NRVBB30H30CT−1G, MBR30H30CTG

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AG
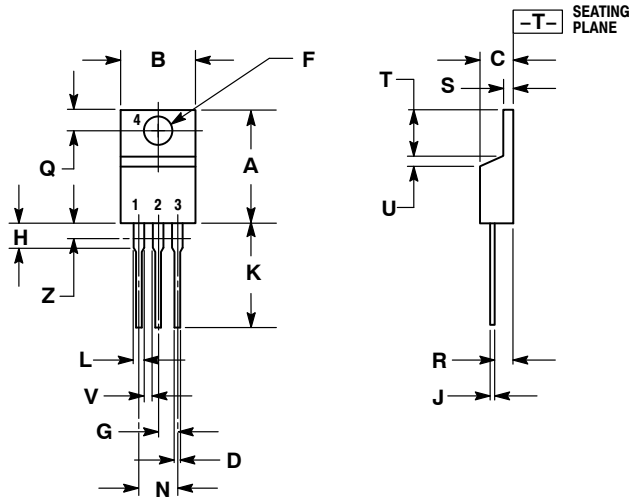
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

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	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.025	0.36	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

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

I²PAK (TO−262)
CASE 418D−01
ISSUE D
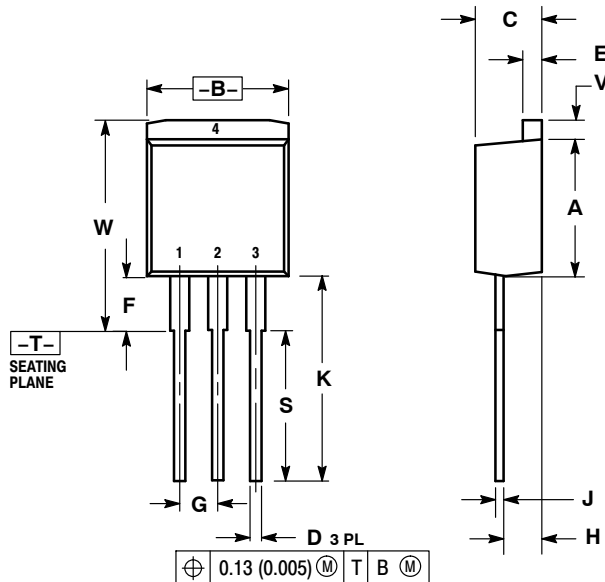
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.335	0.380	8.51	9.65
B	0.380	0.406	9.65	10.31
C	0.160	0.185	4.06	4.70
D	0.026	0.035	0.66	0.89
E	0.045	0.055	1.14	1.40
F	0.122 REF		3.10 REF	
G	0.100 BSC		2.54 BSC	
H	0.094	0.110	2.39	2.79
J	0.013	0.025	0.33	0.64
K	0.500	0.562	12.70	14.27
S	0.390 REF		9.90 REF	
V	0.045	0.070	1.14	1.78
W	0.522	0.551	13.25	14.00

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MBRB30H30CT−1/D