

# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## SWITCHMODE Power Rectifiers

### TO-220/D<sup>2</sup>PAK Surface Mount Power Package

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

#### Features

- Package Designed for Power Surface Mount Applications (D<sup>2</sup>PAK)
- Center-Tap Configuration (D<sup>2</sup>PAK)
- Guardring for Stress Protection
- Low Forward Voltage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Short Heat Sink Tab Manufactured – Not Sheared (D<sup>2</sup>PAK)
- Similar in Size to Industry Standard TO-220 Package
- 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\*

#### Mechanical Characteristics:

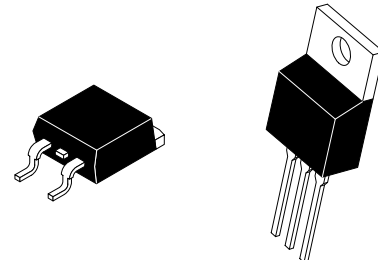
- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0
- Weight: 1.7 Grams (Approximately) – D<sup>2</sup>PAK,  
1.9 Grams (Approximately) – TO-220
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds (D<sup>2</sup>PAK)
- Device Meets MSL1 Requirements (D<sup>2</sup>PAK)
- ESD Ratings:
  - ◆ Machine Model = C (> 400 V)
  - ◆ Human Body Model = 3B (> 8000 V)



ON Semiconductor®

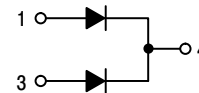
<http://onsemi.com>

### SCHOTTKY BARRIER RECTIFIERS 20 AMPERES, 60 VOLTS

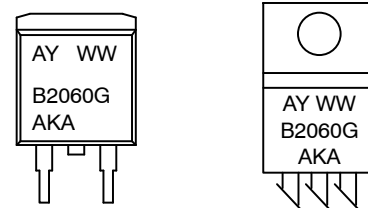


D<sup>2</sup>PAK  
CASE 418B  
STYLE 3

TO-220AB  
CASE 221A  
STYLE 6



#### MARKING DIAGRAMS



A = Assembly Location  
Y = Year  
WW = Work Week  
B2060 = Device Code  
G = Pb-Free Package  
AKA = Diode Polarity

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 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.

# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## MAXIMUM RATINGS (Per Leg)

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	60	V
Average Rectified Forward Current (Rated $V_R$ , $T_C = 110^\circ\text{C}$ ) Total Device	$I_{F(AV)}$	10 20	A
Peak Repetitive Forward Current (Rated $V_R$ , Square Wave, 20 kHz, $T_C = 100^\circ\text{C}$ )	$I_{FRM}$	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 $\mu\text{s}$ , 1.0 kHz)	$I_{RRM}$	0.5	A
Storage Temperature Range	$T_{stg}$	-65 to +175	$^\circ\text{C}$
Operating Junction Temperature (Note 1)	$T_J$	-65 to +175	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ )	dv/dt	10,000	V/ $\mu\text{s}$

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 (Per Leg)

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.0	$^\circ\text{C}/\text{W}$
Junction-to-Ambient (Note 2) MBRB2060CTG	$R_{\theta JA}$	50	
Junction-to-Ambient (Note 2) MBR2060CTG	$R_{\theta JA}$	60	

2. When mounted using minimum recommended pad size on FR-4 board.

## ELECTRICAL CHARACTERISTICS (Per Leg)

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 3) ( $I_F = 20$ Amps, $T_J = 125^\circ\text{C}$ ) ( $I_F = 20$ Amps, $T_J = 25^\circ\text{C}$ )	$V_F$	0.85 0.95	V
Maximum Instantaneous Reverse Current (Note 3) (Rated dc Voltage, $T_J = 125^\circ\text{C}$ ) (Rated dc Voltage, $T_J = 25^\circ\text{C}$ )	$i_R$	35 0.15	mA

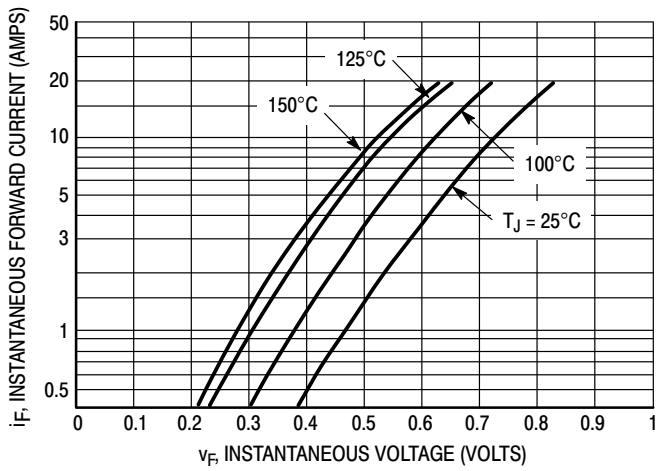
3. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## ORDERING INFORMATION

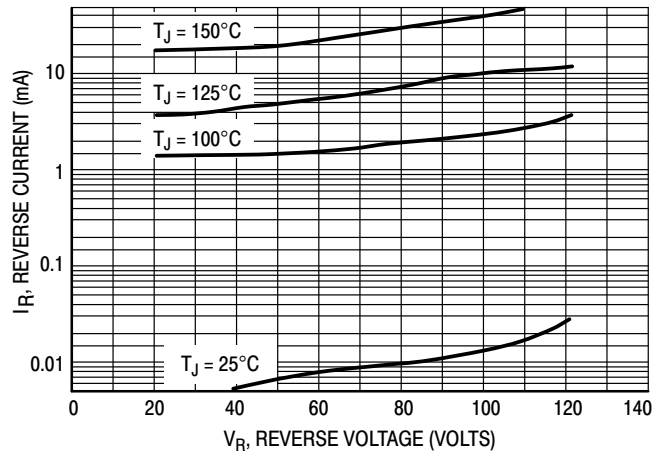
Device	Package	Shipping <sup>†</sup>
MBRB2060CTG	D <sup>2</sup> PAK (Pb-Free)	50 Units / Rail
MBRB2060CTT4G	D <sup>2</sup> PAK (Pb-Free)	800 Units / Tape & Reel
NRVBB2060CTT4G	D <sup>2</sup> PAK (Pb-Free)	800 Units / Tape & Reel
MBR2060CTG	TO-220 (Pb-Free)	50 Units / Rail

<sup>†</sup>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.

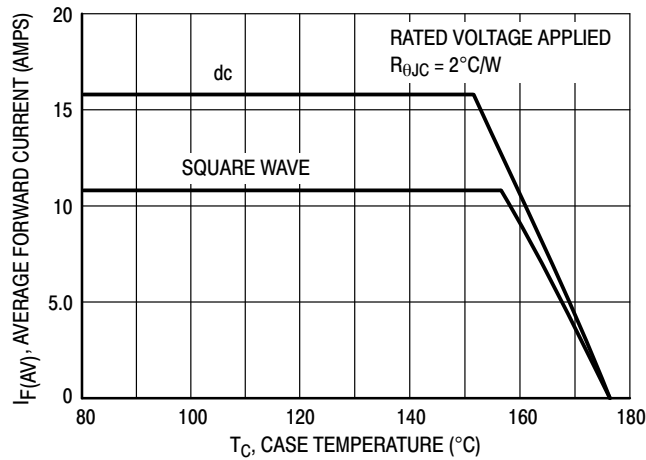
**MRB2060CTG, MBR2060CTG, NRVBB2060CTT4G**



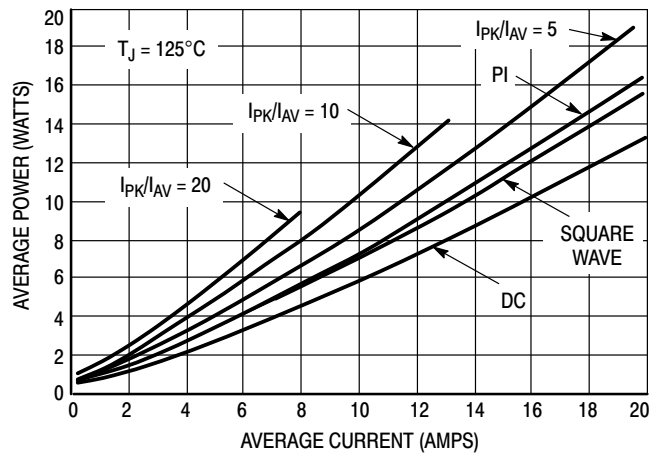
**Figure 1. Typical Forward Voltage Per Diode**



**Figure 2. Typical Reverse Current Per Diode**



**Figure 3. Typical Current Derating, Case, Per Leg**

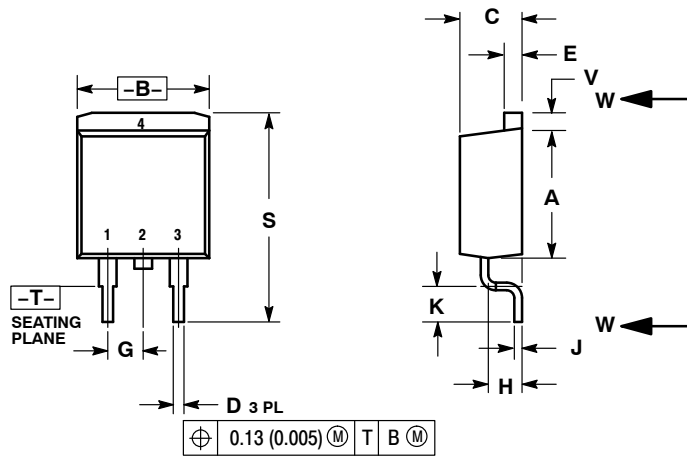


**Figure 4. Average Power Dissipation and Average Current**

# MRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

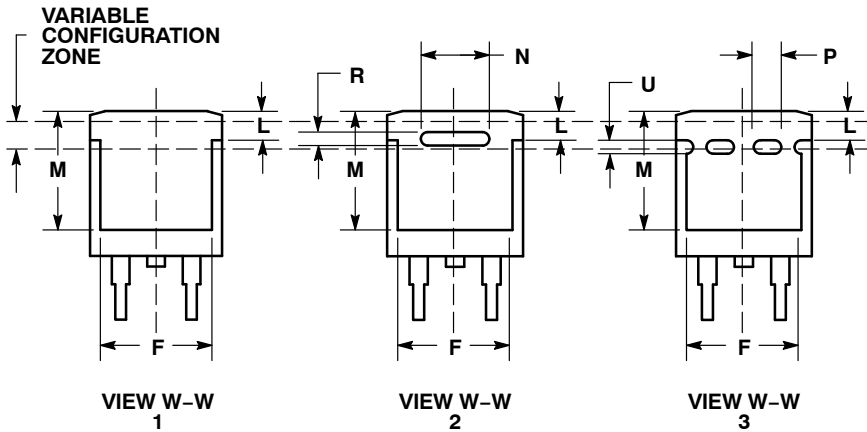
## PACKAGE DIMENSIONS

**D<sup>2</sup>PAK 3**  
CASE 418B-04  
ISSUE K



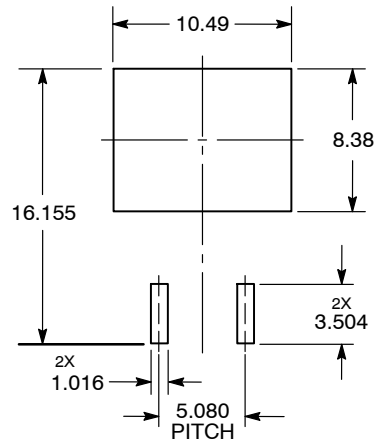
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40



- STYLE 3:
1. ANODE
  2. CATHODE
  3. ANODE
  4. CATHODE

### SOLDERING FOOTPRINT\*



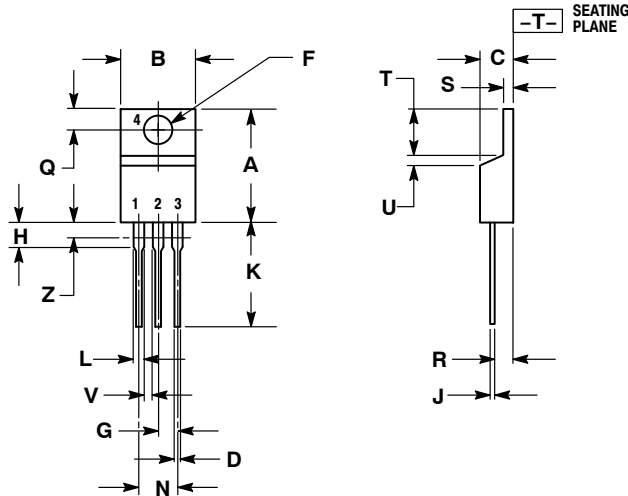
DIMENSIONS: MILLIMETERS

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# MBRB2060CTG, MBR2060CTG, NRVBB2060CTT4G

## 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

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