

# Switch-mode Power Rectifiers

## DPAK-3 Surface Mount Package

### MBRD620CT, NRVBD620VCT, SBRV620CT Series

These state-of-the-art devices are designed for use in switching power supplies, inverters and as free wheeling diodes.

#### Features

- Extremely Fast Switching
- Extremely Low Forward Drop
- Platinum Barrier with Avalanche Guardrings
- NRVBD and SBRV Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

#### Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 0.4 Gram (Approximately)
- 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
- ESD Ratings:
  - ◆ Machine Model = C
  - ◆ Human Body Model = 3B

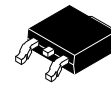


**ON Semiconductor®**

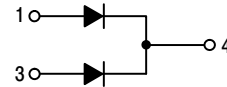
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### SCHOTTKY BARRIER RECTIFIERS

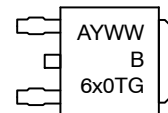
#### 6.0 AMPERES, 20 – 60 VOLTS



**DPAK  
CASE 369C**



#### MARKING DIAGRAM



|       |                      |
|-------|----------------------|
| A     | = Assembly Location* |
| Y     | = Year               |
| WW    | = Work Week          |
| B6x0T | = Device Code        |
| x     | = 2, 3, 4, 5, or 6   |
| G     | = Pb-Free Package    |

\* The Assembly Location Code (A) is front side optional. In cases where the Assembly Location is stamped in the package bottom (molding ejecter pin), the front side assembly code may be blank.

#### ORDERING INFORMATION

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

# MBRD620CT, NRVBD620VCT, SBRV620CT Series

## MAXIMUM RATINGS

| Rating                                                                                                    | Symbol                          | MBRD/NRVBD/SBRV |       |       |       |       | Unit             |
|-----------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|-------|-------|-------|-------|------------------|
|                                                                                                           |                                 | 620CT           | 630CT | 640CT | 650CT | 660CT |                  |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                    | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 20              | 30    | 40    | 50    | 60    | V                |
| Average Rectified Forward Current<br>$T_C = 130^\circ\text{C}$<br>Per Diode<br>Per Device                 | $I_{F(AV)}$                     | 3<br>6          |       |       |       |       | A                |
| Peak Repetitive Forward Current,<br>$T_C = 130^\circ\text{C}$ (Square Wave, Duty = 0.5)<br>Per Diode      | $I_{FRM}$                       | 6               |       |       |       |       | A                |
| Nonrepetitive Peak Surge Current – (Surge applied at rated load conditions halfwave, single phase, 60 Hz) | $I_{FSM}$                       | 75              |       |       |       |       | A                |
| Peak Repetitive Reverse Surge Current (2 $\mu\text{s}$ , 1 kHz)                                           | $I_{RRM}$                       | 1               |       |       |       |       | A                |
| Operating Junction Temperature (Note 1)                                                                   | $T_J$                           | –65 to +175     |       |       |       |       | $^\circ\text{C}$ |
| Storage Temperature                                                                                       | $T_{stg}$                       | –65 to +175     |       |       |       |       | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated $V_R$ )                                                                     | $dv/dt$                         | 10,000          |       |       |       |       | V/ $\mu\text{s}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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 DIODE

| Characteristic                                           | Symbol          | Value | Unit               |
|----------------------------------------------------------|-----------------|-------|--------------------|
| Maximum Thermal Resistance, Junction-to-Case             | $R_{\theta JC}$ | 6     | $^\circ\text{C/W}$ |
| Maximum Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 80    | $^\circ\text{C/W}$ |

2. Rating applies when surface mounted on the minimum pad size recommended.

## ELECTRICAL CHARACTERISTICS PER DIODE

| Characteristic                                                                                                                                                                                                                                                       | Symbol | Value                      | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------|------|
| Maximum Instantaneous Forward Voltage (Note 3)<br>$i_F = 3 \text{ Amps}$ , $T_C = 25^\circ\text{C}$<br>$i_F = 3 \text{ Amps}$ , $T_C = 125^\circ\text{C}$<br>$i_F = 6 \text{ Amps}$ , $T_C = 25^\circ\text{C}$<br>$i_F = 6 \text{ Amps}$ , $T_C = 125^\circ\text{C}$ | $V_F$  | 0.7<br>0.65<br>0.9<br>0.85 | V    |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated dc Voltage, $T_C = 25^\circ\text{C}$ )<br>(Rated dc Voltage, $T_C = 125^\circ\text{C}$ )                                                                                                                    | $i_R$  | 0.1<br>15                  | mA   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

TYPICAL CHARACTERISTICS

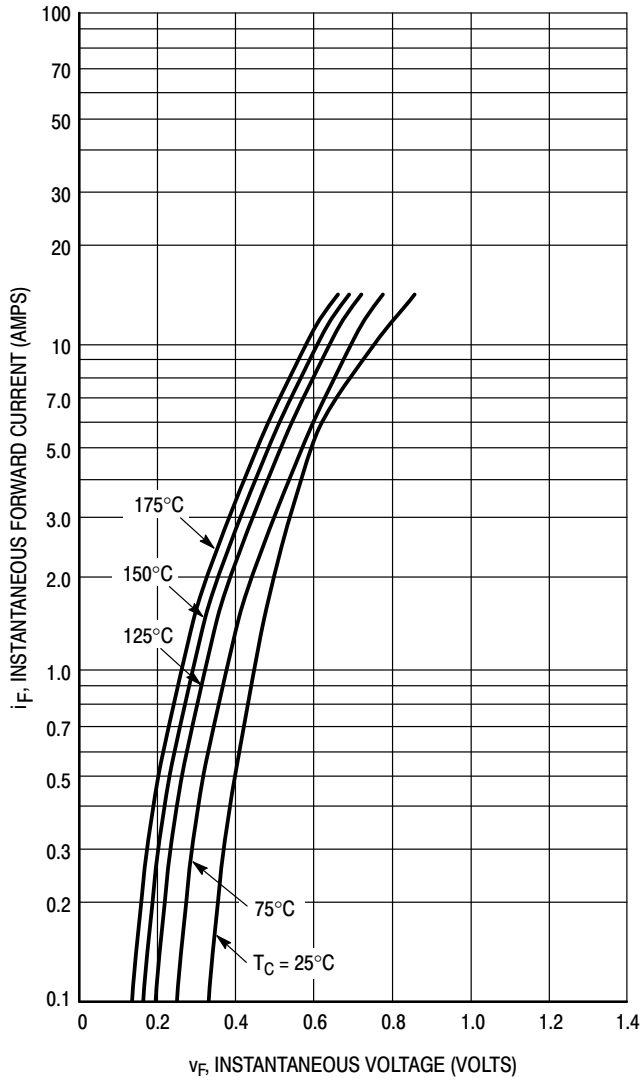
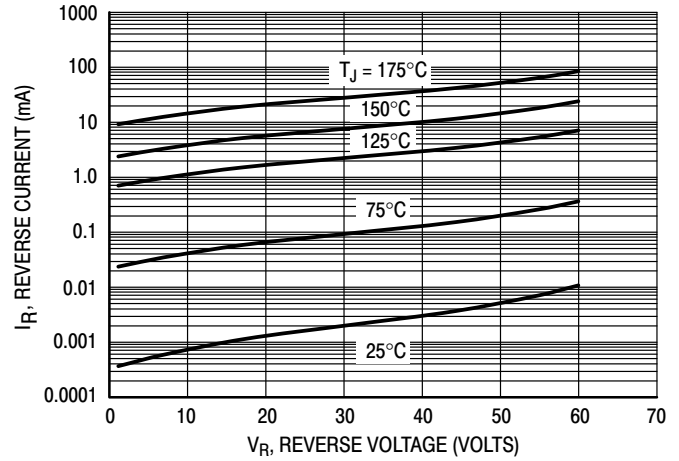


Figure 1. Typical Forward Voltage, Per Leg



\*The curves shown are typical for the highest voltage device in the voltage grouping. Typical reverse current for lower voltage selections can be estimated from these curves if  $V_R$  is sufficient below rated  $V_R$ .

Figure 2. Typical Reverse Current, \* Per Leg

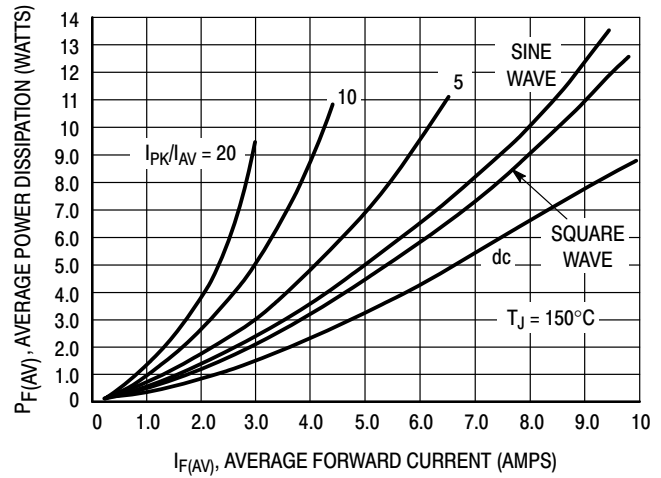


Figure 3. Average Power Dissipation, Per Leg

TYPICAL CHARACTERISTICS

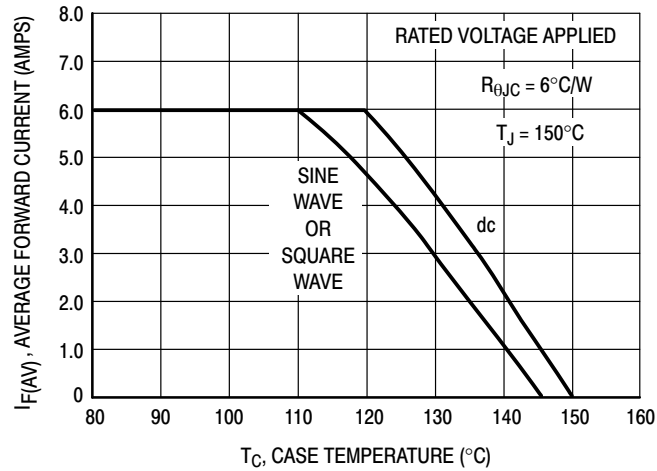


Figure 4. Current Derating, Case, Per Leg

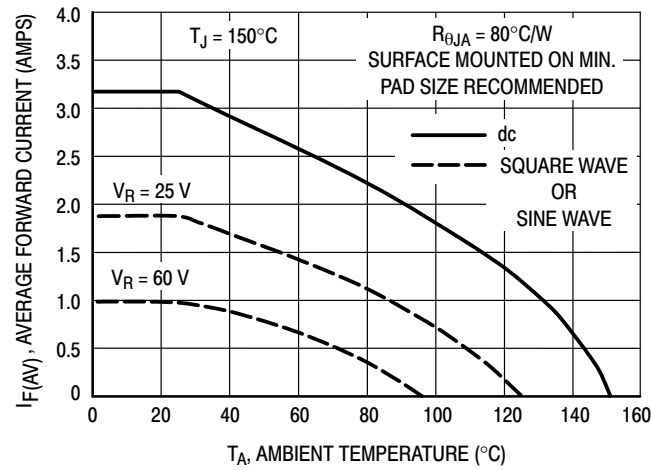


Figure 5. Current Derating, Ambient, Per Leg

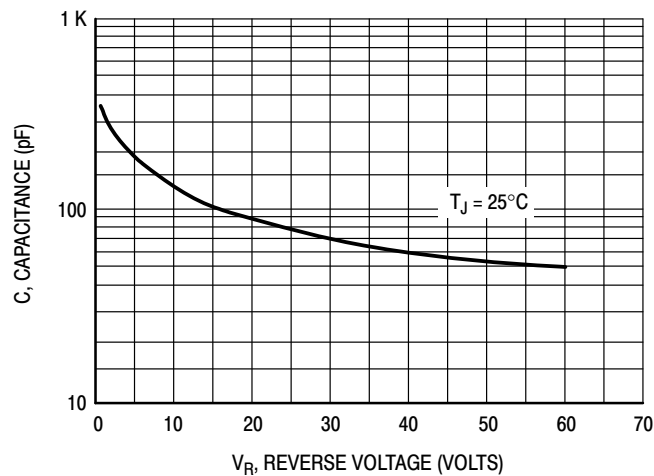


Figure 6. Typical Capacitance, Per Leg

## MBRD620CT, NRVBD620VCT, SBRV620CT Series

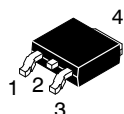
### ORDERING INFORMATION

| Device              | Package           | Shipping†          |
|---------------------|-------------------|--------------------|
| MBRD620CTT4G        | DPAK<br>(Pb-Free) | 2500 / Tape & Reel |
| MBRD630CTT4G        |                   | 2500 / Tape & Reel |
| MBRD640CTG          |                   | 75 Units / Rail    |
| NRVBD640CTG*        |                   | 75 Units / Rail    |
| NRVBD640CTG-VF01*   |                   | 75 Units / Rail    |
| MBRD640CTT4G        |                   | 2500 / Tape & Reel |
| NRVBD640CTT4G*      |                   | 2500 / Tape & Reel |
| NRVBD640VCTT4G*     |                   | 2500 / Tape & Reel |
| SBRV640VCTT4G*      |                   | 2500 / Tape & Reel |
| MBRD650CTG          |                   | 75 Units / Rail    |
| MBRD650CTT4G        |                   | 2500 / Tape & Reel |
| NRVBD650CTG-VF01*   |                   | 2500 / Tape & Reel |
| NRVBD650CTT4G*      |                   | 2500 / Tape & Reel |
| NRVBD650CTT4G-VF01* |                   | 2500 / Tape & Reel |
| MBRD660CTG          |                   | 75 Units / Rail    |
| NRVBD660CTG*        |                   | 75 Units / Rail    |
| NRVBD660CTG-VF01*   |                   | 75 Units / Rail    |
| MBRD660CTRLG        |                   | 1800 / Tape & Reel |
| NRVBD660CTRLG*      |                   | 1800 / Tape & Reel |
| MBRD660CTT4G        |                   | 2500 / Tape & Reel |
| NRVBD660CTT4G*      |                   | 2500 / Tape & Reel |
| SBRV660VCTT4G*      |                   | 2500 / Tape & Reel |
| SNRVBD660CTT4G*     |                   | 2500 / Tape & Reel |

†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.

\*NRVBD and SBRV Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

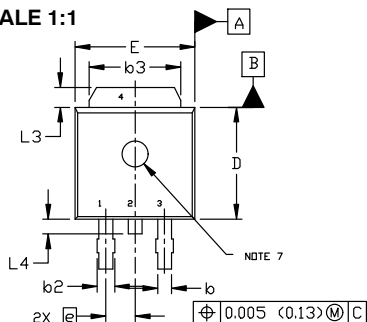
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



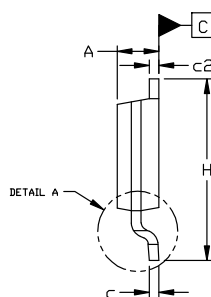
## DPAK (SINGLE GAUGE) CASE 369C ISSUE G

DATE 31 MAY 2023

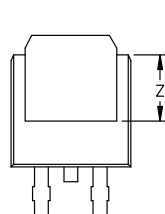
SCALE 1:1



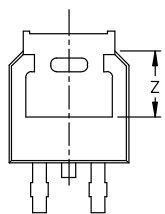
TOP VIEW



SIDE VIEW

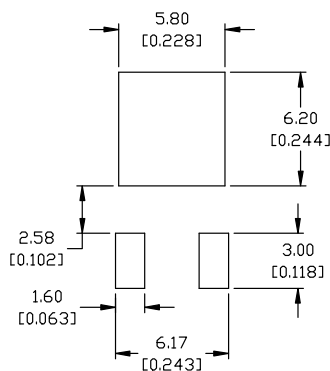


BOTTOM VIEW



BOTTOM VIEW

ALTERNATE  
CONSTRUCTIONS



### RECOMMENDED MOUNTING FOOTPRINT\*

\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

#### STYLE 1:

PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

#### STYLE 2:

PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN

#### STYLE 3:

PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

#### STYLE 4:

PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE

#### STYLE 5:

PIN 1. GATE  
2. ANODE  
3. CATHODE  
4. ANODE

#### STYLE 6:

PIN 1. MT1  
2. MT2  
3. GATE  
4. MT2

#### STYLE 7:

PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

#### STYLE 8:

PIN 1. N/C  
2. CATHODE  
3. ANODE  
4. CATHODE

#### STYLE 9:

PIN 1. ANODE  
2. CATHODE  
3. RESISTOR ADJUST  
4. CATHODE

#### STYLE 10:

PIN 1. CATHODE  
2. ANODE  
3. CATHODE  
4. ANODE

### NOTES:

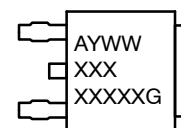
1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN.   | MAX.  | MIN.        | MAX.  |
| A   | 0.086  | 0.094 | 2.18        | 2.38  |
| A1  | 0.000  | 0.005 | 0.00        | 0.13  |
| b   | 0.025  | 0.035 | 0.63        | 0.89  |
| b2  | 0.028  | 0.045 | 0.72        | 1.14  |
| b3  | 0.180  | 0.215 | 4.57        | 5.46  |
| c   | 0.018  | 0.024 | 0.46        | 0.61  |
| c2  | 0.018  | 0.024 | 0.46        | 0.61  |
| D   | 0.235  | 0.245 | 5.97        | 6.22  |
| E   | 0.250  | 0.265 | 6.35        | 6.73  |
| e   | 0.090  | BSC   | 2.29        | BSC   |
| H   | 0.370  | 0.410 | 9.40        | 10.41 |
| L   | 0.055  | 0.070 | 1.40        | 1.78  |
| L1  | 0.114  | REF   | 2.90        | REF   |
| L2  | 0.020  | BSC   | 0.51        | BSC   |
| L3  | 0.035  | 0.050 | 0.89        | 1.27  |
| L4  | ----   | 0.040 | ---         | 1.01  |
| Z   | 0.155  | ----  | 3.93        | ---   |

### GENERIC MARKING DIAGRAM\*



IC



Discrete

XXXXXX = Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

|                  |                     |                                                                                                                                                                                     |
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