# MBRD620CTG Series, NRVBD640CTG Series

# SWITCHMODE Power Rectifiers

## DPAK−3 Surface Mount Package

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 Prefix 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

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

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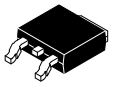
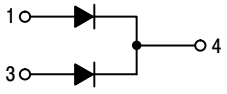
http://onsemi.com

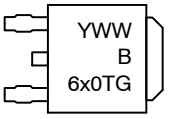
**SCHOTTKY BARRIER RECTIFIERS 6.0 AMPERES, 20 − 60 VOLTS**



**DPAK**
**CASE 369C**




### MARKING DIAGRAM




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

### ORDERING INFORMATION

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

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## MAXIMUM RATINGS

| Rating | Symbol | MBRD/NRVBD/SBR | | | | | 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°C (Rated $V_R$)<br>Per Diode<br>Per Device | $I_{F(AV)}$ | | | 3<br>6 | | | A |
| Peak Repetitive Forward Current,<br>$T_C$ = 130°C (Rated $V_R$, Square Wave, 20 kHz)<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 μs, 1 kHz) | $I_{RRM}$ | | | 1 | | | A |
| Operating Junction Temperature (Note 1) | $T_J$ | | | –65 to +175 | | | °C |
| Storage Temperature | $T_{stg}$ | | | –65 to +175 | | | °C |
| Voltage Rate of Change (Rated $V_R$) | dv/dt | | | 10,000 | | | V/μs |

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 DIODE

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Maximum Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 6 | °C/W |
| Maximum Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 80 | °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 Amps, $T_C$ = 25°C<br>$i_F$ = 3 Amps, $T_C$ = 125°C<br>$i_F$ = 6 Amps, $T_C$ = 25°C<br>$i_F$ = 6 Amps, $T_C$ = 125°C | $V_F$ | <br>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°C)<br>(Rated dc Voltage, $T_C$ = 125°C) | $i_R$ | <br>0.1<br>15 | mA |

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



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## TYPICAL CHARACTERISTICS

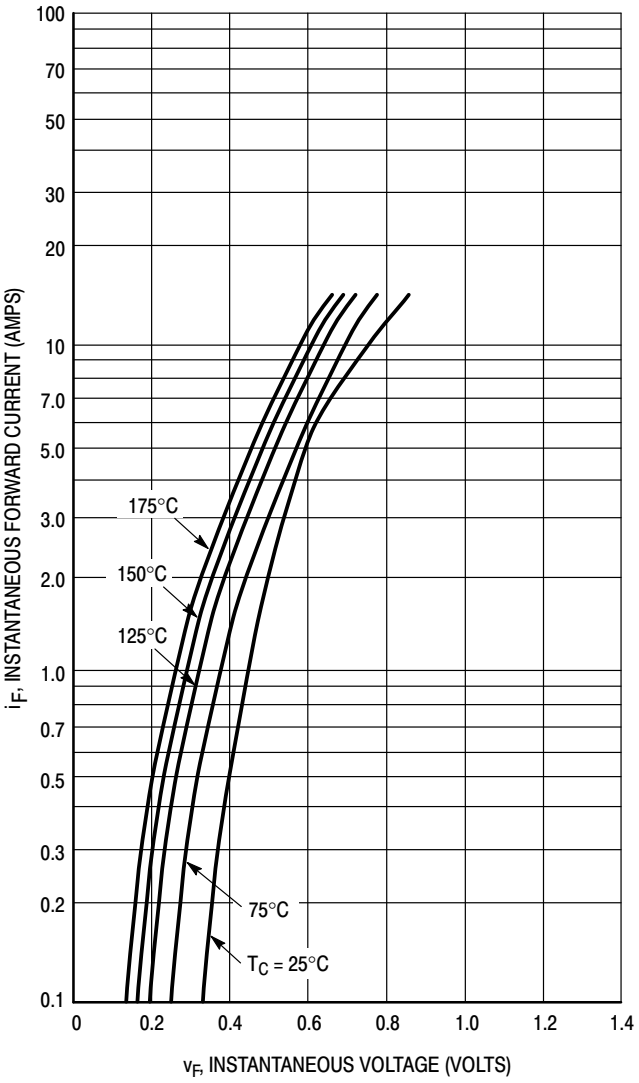
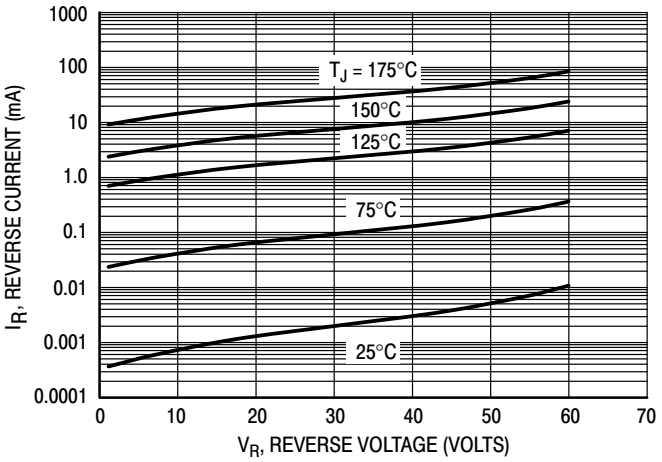



**Figure 1. Typical Forward Voltage, Per Leg**




*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**

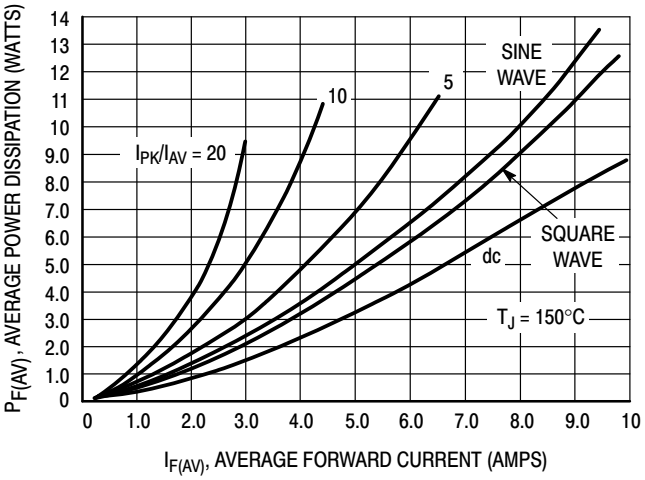



**Figure 3. Average Power Dissipation, Per Leg**



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## TYPICAL CHARACTERISTICS

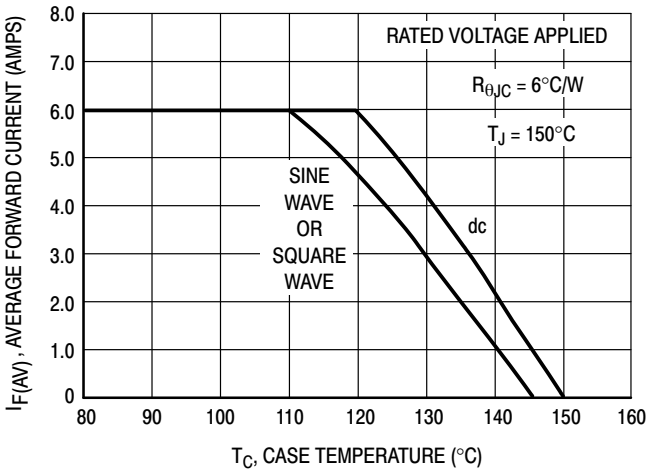


**Figure 4. Current Derating, Case, Per Leg**

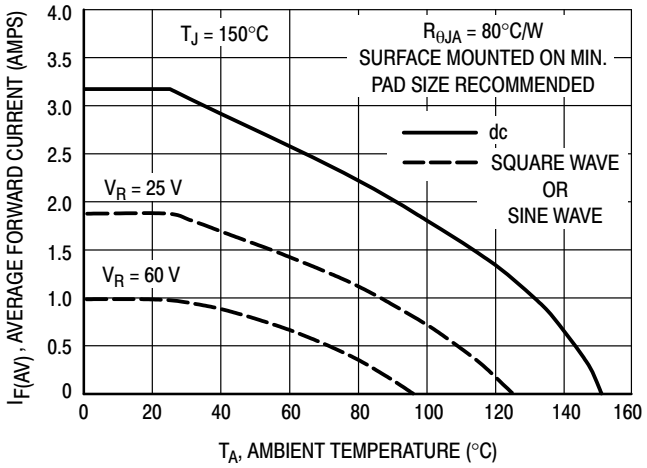


**Figure 5. Current Derating, Ambient, Per Leg**

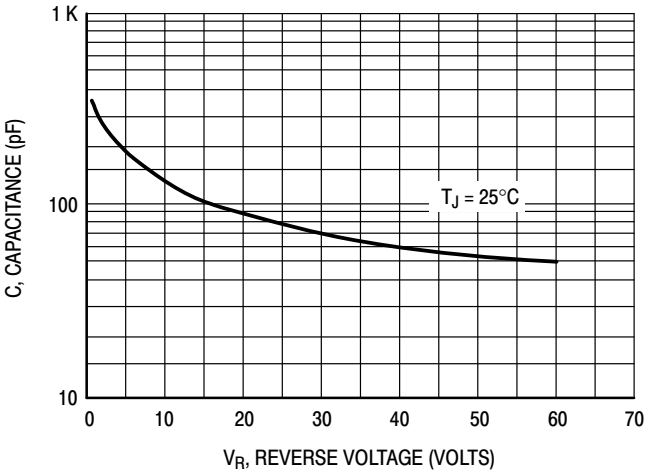


**Figure 6. Typical Capacitance, Per Leg**



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**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| MBRD620CTT4G | DPAK (Pb−Free) | 2500 / Tape & Reel |
| MBRD630CTT4G | | 2500 / Tape & Reel |
| MBRD640CTG | | 75 Units / Rail |
| NRVBD640CTG | | 75 Units / Rail |
| MBRD640CTT4G | | 2500 / Tape & Reel |
| NRVBD640CTT4G | | 2500 / Tape & Reel |
| MBRD650CTG | | 75 Units / Rail |
| MBRD650CTT4G | | 2500 / Tape & Reel |
| NRVBD650CTT4G | | 2500 / Tape & Reel |
| MBRD660CTG | | 75 Units / Rail |
| NRVBD660CTG | | 75 Units / Rail |
| MBRD660CTRLG | | 1800 / Tape & Reel |
| MBRD660CTT4G | | 2500 / Tape & Reel |
| NRVBD660CTT4G | | 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.



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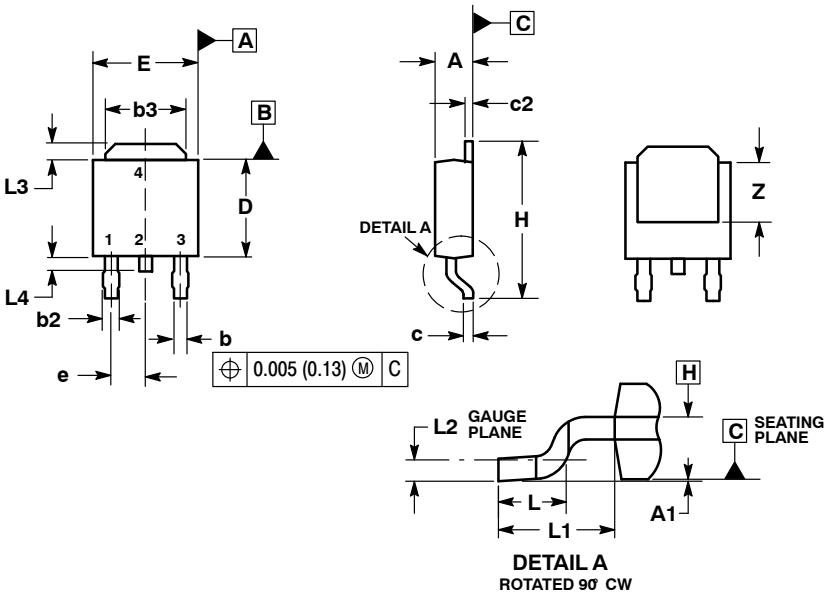
## PACKAGE DIMENSIONS

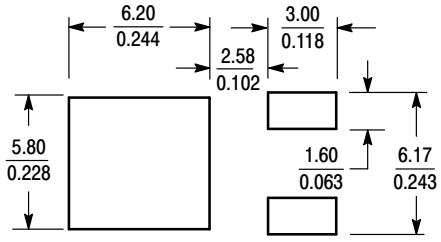
**DPAK (SINGLE GAUGE)**
CASE 369C
ISSUE D




NOTES:
1. DIMENSIONING AND TOLERANCING PER 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.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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 | 0.030 | 0.045 | 0.76 | 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 | 0.108 REF | | 2.74 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 | --- |

## SOLDERING FOOTPRINT*




SCALE 3:1 (mm / inches)

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

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