

# Surface Mount Schottky Power Rectifier

## SMB Power Surface Mount Package

### MBRS240LT3G, NRVBS240LT3G, NRVBS240LN

These devices employ the Schottky Barrier principle in a metal-to-silicon power rectifier. Features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency switching power supplies; free wheeling diodes and polarity protection diodes.

#### Features

- Compact Package with J-Bend Leads Ideal for Automated Handling
- Highly Stable Oxide Passivated Junction
- Guard-Ring for Overvoltage Protection
- Low Forward Voltage Drop
- ESD Ratings:
  - ◆ Human Body Model = 3B (> 16000 V)
  - ◆ Machine Model = C (> 400 V)
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable\*
- These are Pb-Free Devices

#### Mechanical Characteristics

- Case: Molded Epoxy
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 95 mg (Approximately)
- Cathode Polarity Band
- Maximum Temperature of 260°C/10 Seconds for Soldering
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable



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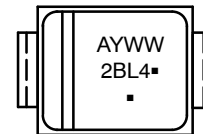
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**SCHOTTKY BARRIER  
RECTIFIER**  
**2.0 AMPERES, 40 VOLTS**



**SMB  
CASE 403A**

#### MARKING DIAGRAM



2BL4 = Specific Device Code  
A = Assembly Location\*\*  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*\*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

| Device         | Package          | Shipping†              |
|----------------|------------------|------------------------|
| MBRS240LT3G    | SMB<br>(Pb-Free) | 2,500 /<br>Tape & Reel |
| NRVBS240LT3G*  | SMB<br>(Pb-Free) | 2,500 /<br>Tape & Reel |
| NRVBS240LNT3G* | SMB<br>(Pb-Free) | 2,500 /<br>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.

# MBRS240LT3G, NRVBS240LT3G, NRVBS240LN

## MAXIMUM RATINGS

| Rating  | Symbol                          | Value       | Unit             |
|---|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                      | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 40          | V                |
| Average Rectified Forward Current<br>(At Rated $V_R$ , $T_C = 100^\circ\text{C}$ )                          | $I_O$                           | 2.0         | A                |
| Peak Repetitive Forward Current<br>(At Rated $V_R$ , Square Wave, 20 kHz, $T_C = 105^\circ\text{C}$ )       | $I_{FRM}$                       | 4.0         | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 25          | A                |
| Storage Temperature   | $T_{stg}$ , $T_C$               | -55 to +150 | $^\circ\text{C}$ |
| Operating Junction Temperature  | $T_J$                           | -55 to +150 | $^\circ\text{C}$ |
| Voltage Rate of Change<br>(Rated $V_R$ , $T_J = 25^\circ\text{C}$ )   | 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.

## THERMAL CHARACTERISTICS

| Characteristic                                   | Symbol          | Value | Unit                      |
|--|-----------------|-------|---------------------------|
| Thermal Resistance, Junction-to-Lead (Note 1)    | $R_{\theta JL}$ | 18    | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 78    | $^\circ\text{C}/\text{W}$ |

1. Mounted with minimum recommended pad size, PC Board FR4.
2. 1 inch square pad size (1 x 0.5 inch for each lead) on FR4 board.

## ELECTRICAL CHARACTERISTICS

| Characteristic   | Symbol | Value                    |                           | Unit |
|--|--------|--------------------------|---------------------------|------|
|  |        | $T_J = 25^\circ\text{C}$ | $T_J = 125^\circ\text{C}$ |      |
| Maximum Instantaneous Forward Voltage (Note 3)<br>see Figure 2<br>( $I_F = 2.0\text{ A}$ )<br>( $I_F = 4.0\text{ A}$ ) | $V_F$  | 0.43                     | 0.375                     | V    |
|  |        | 0.54                     | 0.55                      |      |
| Maximum Instantaneous Reverse Current (Note 3)<br>see Figure 4<br>( $V_R = 40\text{ V}$ )<br>( $V_R = 20\text{ V}$ )   | $I_R$  | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | mA   |
|  |        | 2.0                      | 60                        |      |
|  |        | 0.5                      | 40                        |      |

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  $\leq 250\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MBRS240LT3G, NRVBS240LT3G, NRVBS240LN

## TYPICAL CHARACTERISTICS

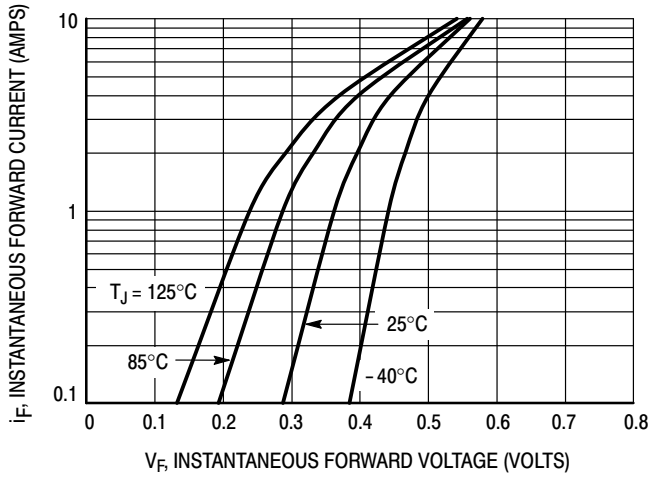


Figure 1. Typical Forward Voltage

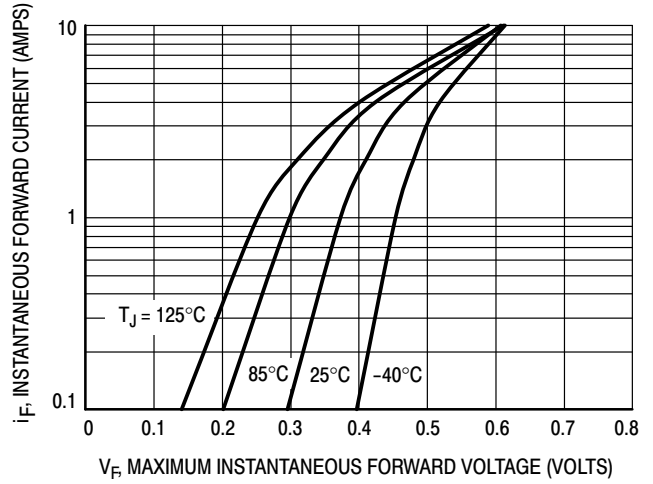


Figure 2. Maximum Forward Voltage

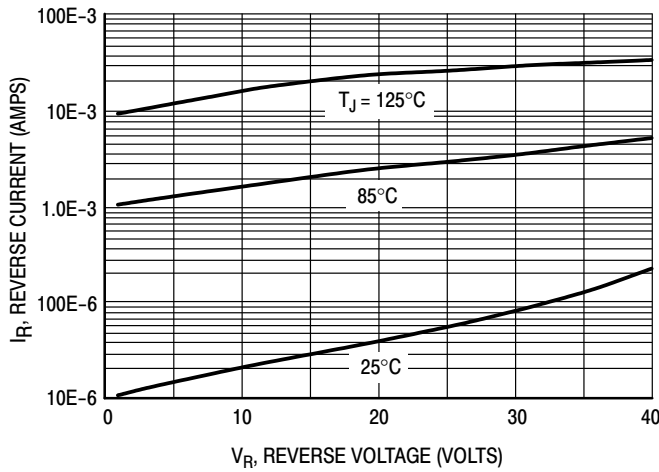


Figure 3. Typical Reverse Current

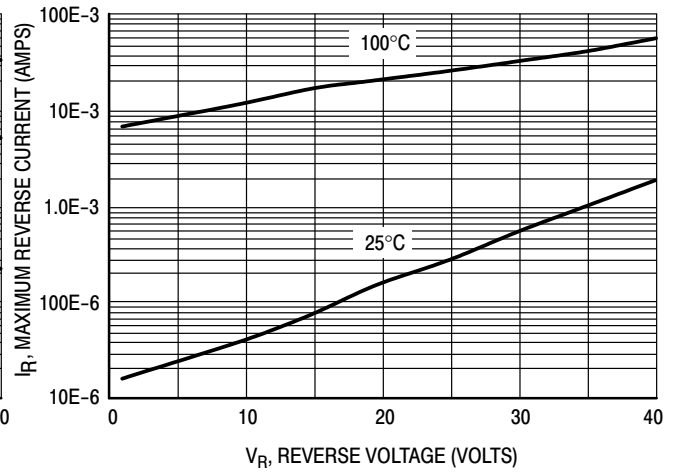


Figure 4. Maximum Reverse Current

# MBRS240LT3G, NRVBS240LT3G, NRVBS240LN

## TYPICAL CHARACTERISTICS

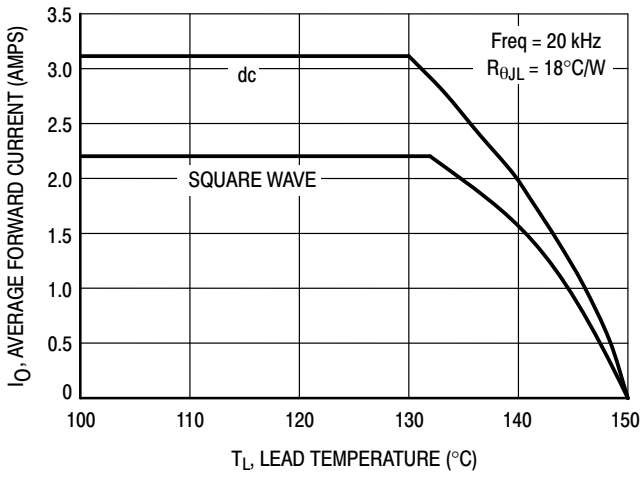


Figure 5. Current Derating

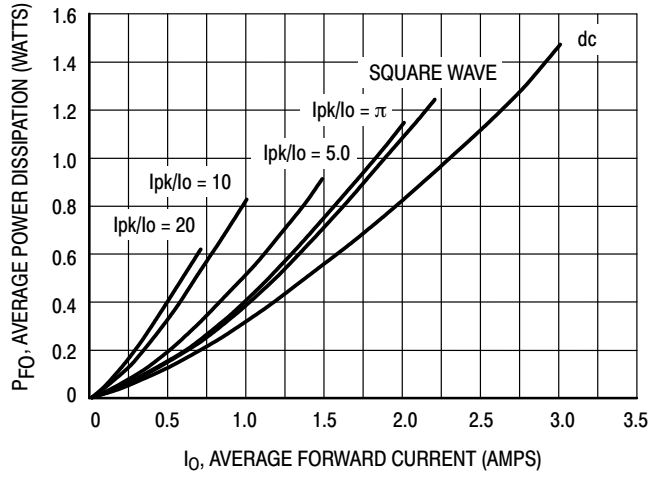


Figure 6. Forward Power Dissipation

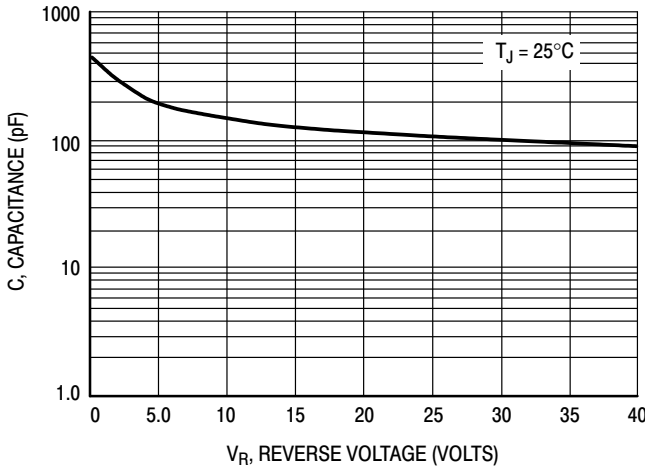


Figure 7. Capacitance

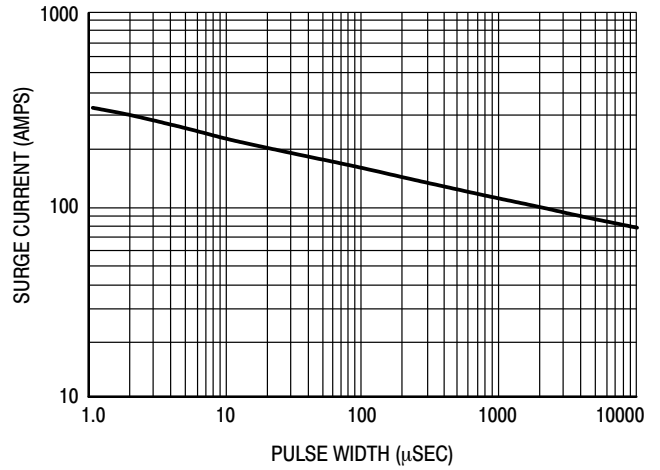


Figure 8. Maximum Non-Repetitive Forward Surge Current

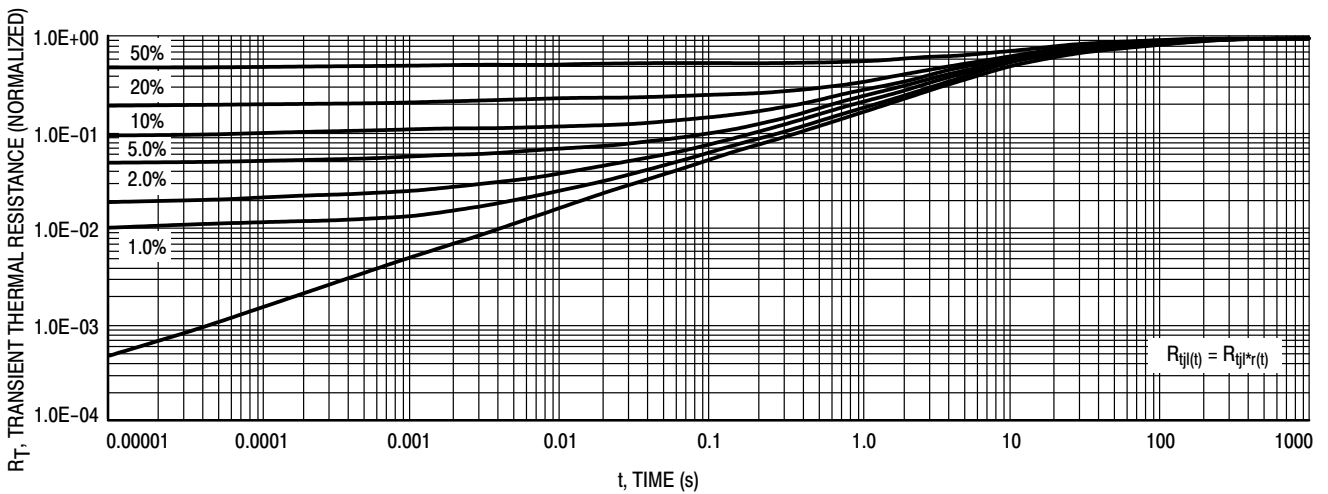


Figure 9. Thermal Response

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

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SCALE 1:1

Polarity Band

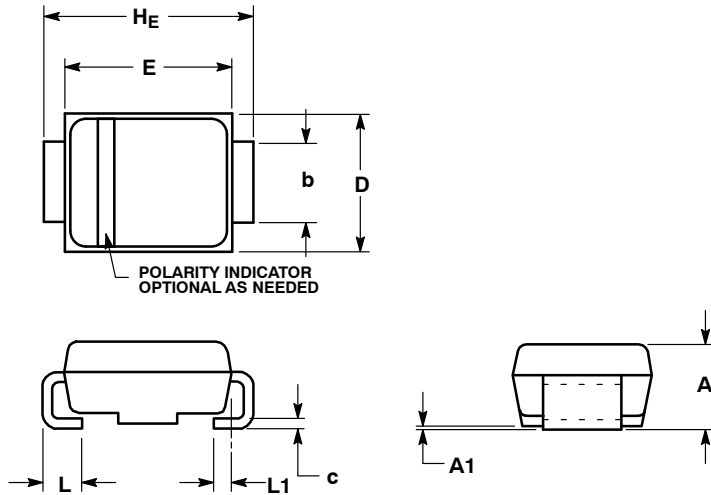


SCALE 1:1

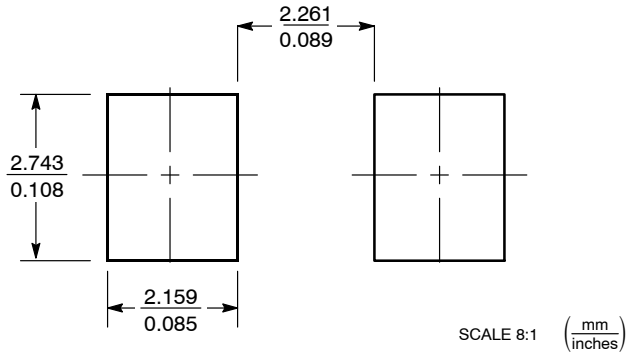
Non-Polarity Band

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CASE 403A-03  
ISSUE J

DATE 19 JUL 2012



### SOLDERING FOOTPRINT\*



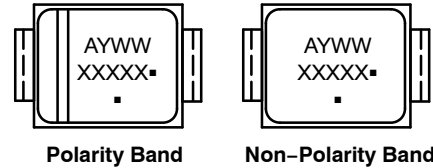
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L1.

| DIM | MILLIMETERS |      |      | INCHES    |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | 1.95        | 2.30 | 2.47 | 0.077     | 0.091 | 0.097 |
| A1  | 0.05        | 0.10 | 0.20 | 0.002     | 0.004 | 0.008 |
| b   | 1.96        | 2.03 | 2.20 | 0.077     | 0.080 | 0.087 |
| c   | 0.15        | 0.23 | 0.31 | 0.006     | 0.009 | 0.012 |
| D   | 3.30        | 3.56 | 3.95 | 0.130     | 0.140 | 0.156 |
| E   | 4.06        | 4.32 | 4.60 | 0.160     | 0.170 | 0.181 |
| HE  | 5.21        | 5.44 | 5.60 | 0.205     | 0.214 | 0.220 |
| L   | 0.76        | 1.02 | 1.60 | 0.030     | 0.040 | 0.063 |
| L1  | 0.51 REF    |      |      | 0.020 REF |       |       |

### GENERIC MARKING DIAGRAM\*



- XXXXX = Specific Device Code
  - A = Assembly Location
  - Y = Year
  - WW = Work Week
  - = Pb-Free Package
- (Note: Microdot may be in either location)

\*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.

|                         |                    |  |
|-------------------------|--------------------|--|
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