

# Surface Mount Schottky Power Rectifier

## SMA Power Surface Mount Package

### MBRA320, NRVBA320, NRVBA320N

Employing the Schottky Barrier principle in a large area metal-to-silicon power diode. State of the art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency rectification, or as free wheeling and polarity diodes in surface mount applications where compact size and weight are critical to the system.

#### Features

- Small Compact Surface Mountable Package with J-Bent Leads
- Rectangular Package for Automated Handling
- Highly Stable Oxide Passivated Junction
- Very Low Forward Voltage Drop
- Guardring for Stress Protection
- NRVBA Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable\*
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### Mechanical Characteristics:

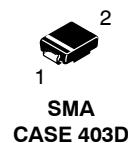
- Case: Epoxy, Molded
- Weight: 70 mg (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped in 12 mm tape, 5000 units per 13 inch reel
- Polarity: Cathode Lead Indicated by Polarity Band
- ESD Ratings: Machine Model = C  
Human Body Model = 3B
- Device Meets MSL 1 Requirements



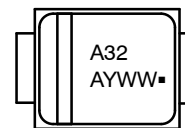
ON Semiconductor®

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### SCHOTTKY BARRIER RECTIFIER 3.0 AMPERES 20 VOLTS



#### MARKING DIAGRAM



A32 = 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†          |
|---------------|---------------|--------------------|
| MBRA320T3G    | SMA (Pb-Free) | 5000 / Tape & Reel |
| NRVBA320T3G*  | SMA (Pb-Free) | 5000 / Tape & Reel |
| NRVBA320NT3G* | SMA (Pb-Free) | 5000 / Tape & Reel |

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

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## 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>$V_R$ | 20          | V                      |
| Average Rectified Forward Current<br>(At Rated $V_R$ , $T_L = 100^\circ\text{C}$ )                          | $I_O$                           | 3.0         | A                      |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 80          | A                      |
| Storage Temperature   | $T_{stg}$                       | -65 to +150 | $^\circ\text{C}$       |
| Operating Junction Temperature  | $T_J$                           | -65 to +125 | $^\circ\text{C}$       |
| Voltage Rate of Change<br>(Rated $V_R$ , $T_J = 25^\circ\text{C}$ )   | $dv/dt$                         | 10,000      | $\text{V}/\mu\text{s}$ |

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)    | $R_{\theta JL}$ | 15    | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance – Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 80    | $^\circ\text{C}/\text{W}$ |

## ELECTRICAL CHARACTERISTICS

|   |       |                           |       |
|---|-------|---------------------------|-------|
| Maximum Instantaneous Forward Voltage (Note 2) ( $I_F = 3.0 \text{ A}$ , $T_J = 25^\circ\text{C}$ ) | $V_F$ | 0.50                      | Volts |
| Maximum Instantaneous Reverse Current (Note 2) ( $V_R = 20 \text{ V}$ )                             | $I_R$ | $T_J = 25^\circ\text{C}$  | mA    |
|   |       | 2.0                       |       |
|   |       | $T_J = 100^\circ\text{C}$ | 20    |

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.

- Mounted on 2" Square PC Board with 1" Square Total Pad Size, PC Board FR4.
- Pulse Test: Pulse Width = 300 s, Duty Cycle  $\leq 2.0\%$ .

## TYPICAL CHARACTERISTICS

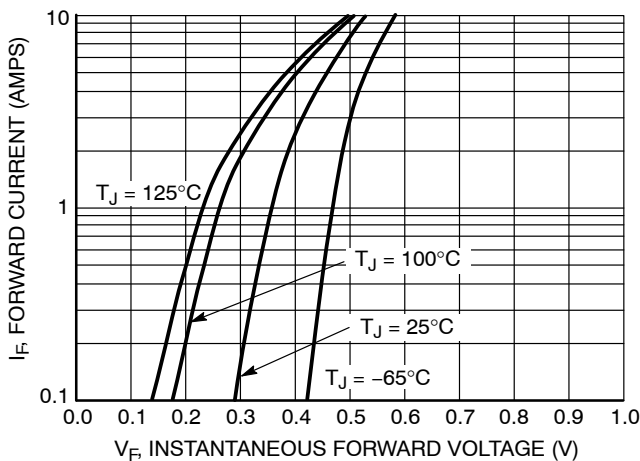


Figure 1. Typical Forward Voltage

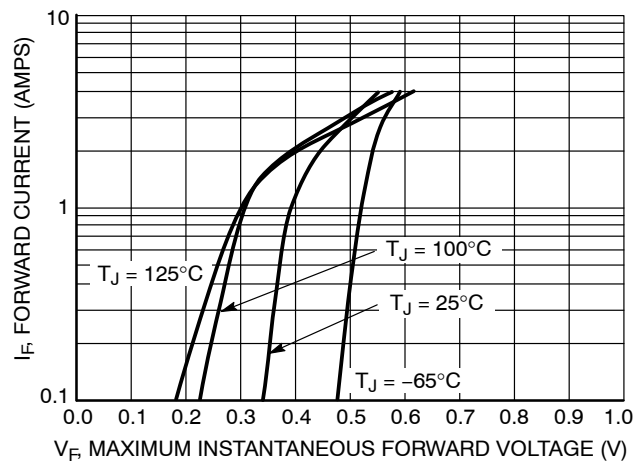


Figure 2. Maximum Forward Voltage

# MBRA320, NRVBA320, NRVBA320N

## TYPICAL CHARACTERISTICS

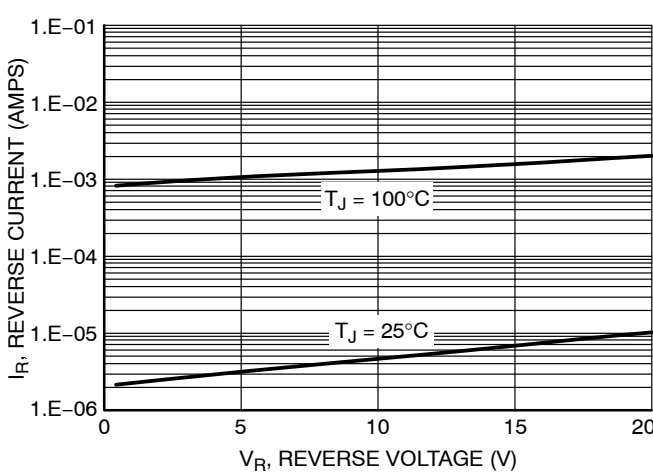


Figure 3. Typical Reverse Current

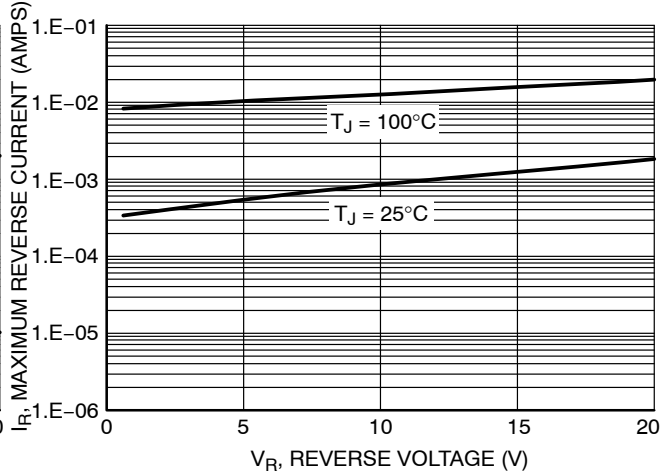


Figure 4. Maximum Reverse Current

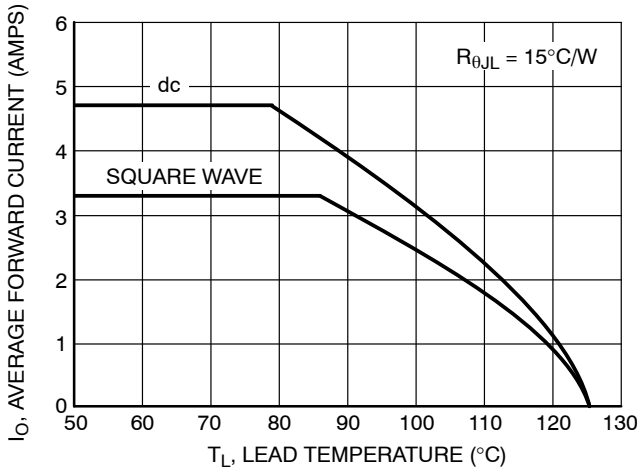


Figure 5. Current Derating

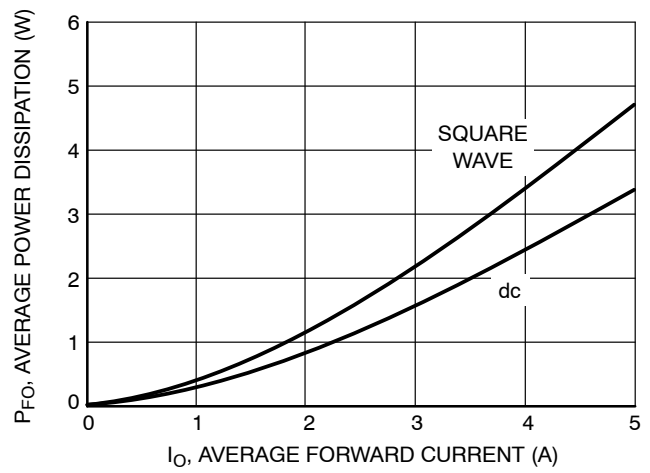


Figure 6. Forward Power Dissipation

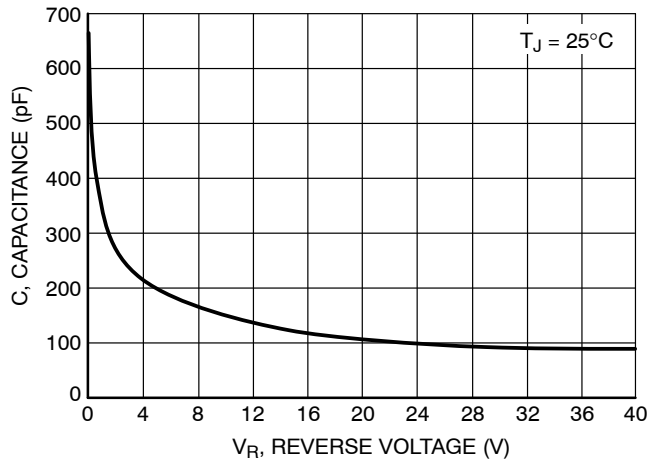


Figure 7. Typical Capacitance

# MBRA320, NRVBA320, NRVBA320N

## TYPICAL CHARACTERISTICS

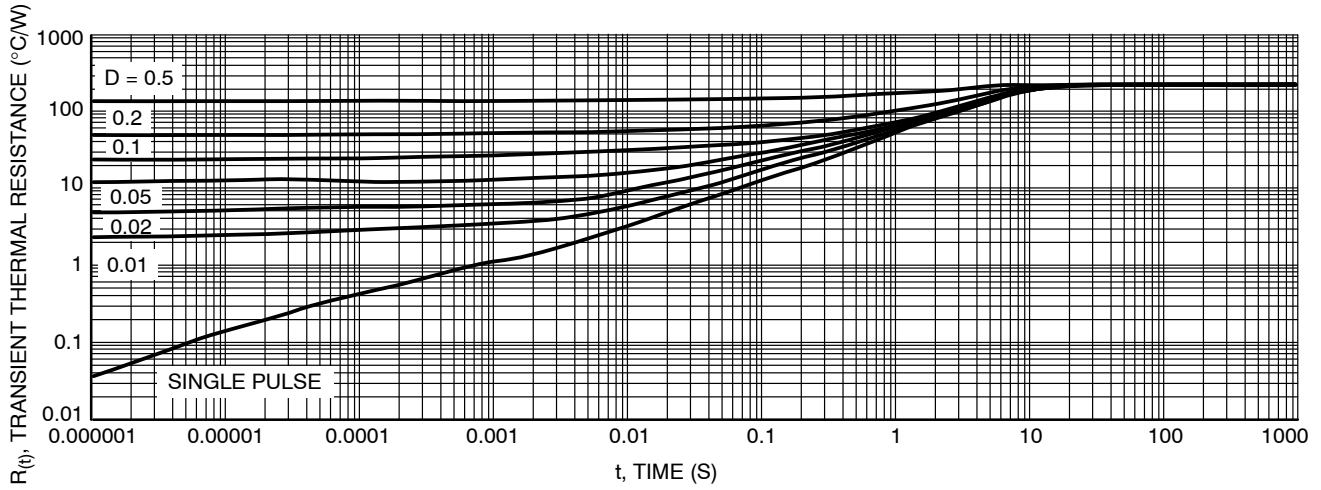


Figure 8. Thermal Response, Junction-to-Ambient (min pad)

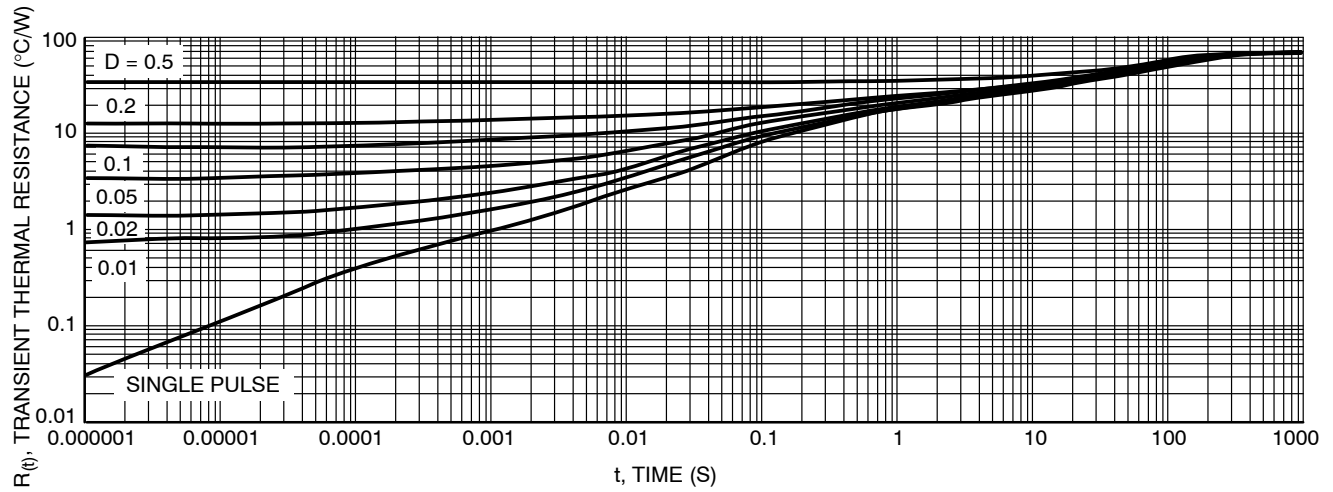


Figure 9. Thermal Response, Junction to Ambient (1 inch pad)

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS



STYLE 1    STYLE 2

SCALE 1:1

**SMA**  
CASE 403D  
ISSUE J

DATE 22 OCT 2021



POLARITY INDICATOR  
OPTIONAL AS NEEDED

NOTES:

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

| DIM      | MILLIMETERS |      |      | INCHES |       |       |
|----------|-------------|------|------|--------|-------|-------|
|          | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A        | 1.97        | 2.10 | 2.20 | 0.078  | 0.083 | 0.087 |
| A1       | 0.05        | 0.10 | 0.20 | 0.002  | 0.004 | 0.008 |
| <i>b</i> | 1.27        | 1.45 | 1.63 | 0.050  | 0.057 | 0.064 |
| <i>c</i> | 0.15        | 0.28 | 0.41 | 0.006  | 0.011 | 0.016 |
| D        | 2.29        | 2.60 | 2.92 | 0.090  | 0.103 | 0.115 |
| E        | 4.06        | 4.32 | 4.57 | 0.160  | 0.170 | 0.180 |
| HE       | 4.83        | 5.21 | 5.59 | 0.190  | 0.205 | 0.220 |
| L        | 0.76        | 1.14 | 1.52 | 0.030  | 0.045 | 0.060 |



STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

STYLE 2:  
NO POLARITY

**GENERIC MARKING DIAGRAM\***



STYLE 1                  STYLE 2

- xxxx = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- = 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.



RECOMMENDED MOUNTING FOOTPRINT

|                         |                    |  |
|-------------------------|--------------------|--|
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| <b>DESCRIPTION:</b>     | <b>SMA</b>         | <b>PAGE 1 OF 1</b>   |

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