

# Surface Mount Schottky Power Rectifier SMA Power Surface Mount Package

## MBRA120E, NRVBA120E, NRVBA120EN

Employing 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
- Guardring for Over-Voltage Protection
- Optimized for Low Leakage Current
- 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:

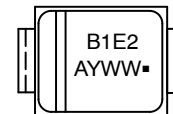
- Case: Molded Epoxy
- Epoxy Meets UL94, V<sub>O</sub> at 1/8"
- Weight: 70 mg (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Polarity: Polarity Band Indicates Cathode Lead
- Available in 12 mm Tape, 5000 Units per 13 inch Reel
- Device Meets MSL1 Requirements
- ESD Ratings: Machine Model, C (>400 V)  
Human Body Model, 3B (>8000 V)
- Marking: B1E2

## SCHOTTKY BARRIER RECTIFIER 1 AMPERE 20 VOLTS



SMA  
CASE 403D

### MARKING DIAGRAMS



B1E2 = 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 ejector pin), the front side assembly code may be blank.

### ORDERING INFORMATION

| Device         | Package          | Shipping†             |
|----------------|------------------|-----------------------|
| MBRA120ET3G    | SMA<br>(Pb-Free) | 5000 /<br>Tape & Reel |
| NRVBA120ET3G*  | SMA<br>(Pb-Free) | 5000 /<br>Tape & Reel |
| NRVBA120ENT3G* | SMA<br>(Pb-Free) | 5000 /<br>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.

# MBRA120E, NRVBA120E, NRVBA120EN

## 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 $V_R$ , $T_C = 125^\circ\text{C}$ )                          | $I_O$                           | 1.0         | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 40          | A                |
| Storage Temperature                                                                                         | $T_{stg}$                       | -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          | 5 mm x 5 mm<br>(Note 2) | 1 Inch x 1/2 inch<br>(Note 3) | Unit                      |
|------------------------------------------|-----------------|-------------------------|-------------------------------|---------------------------|
| Thermal Resistance – Junction-to-Lead    | $R_{\theta JL}$ | 34                      | 20                            | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance – Junction-to-Ambient | $R_{\theta JA}$ | 138                     | 77                            |                           |

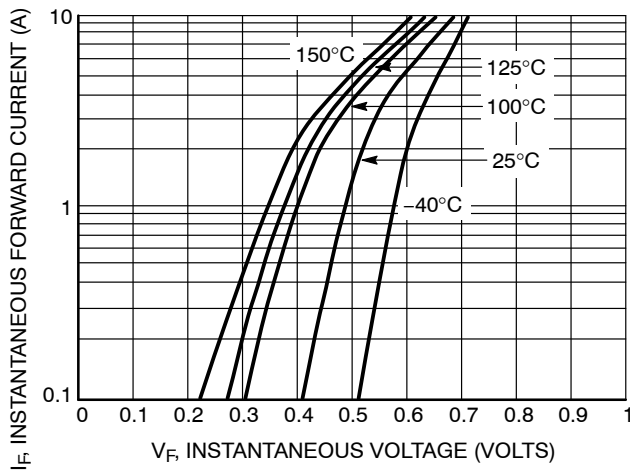
## ELECTRICAL CHARACTERISTICS

|                                                                                                                                                      |       |                          |                           |               |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------|---------------------------|---------------|
| Maximum Instantaneous Forward Voltage (Note 1), See Figure 2<br><br>( $I_F = 0.1\text{ A}$ )<br>( $I_F = 1.0\text{ A}$ )<br>( $I_F = 2.0\text{ A}$ ) | $V_F$ | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | V             |
|                                                                                                                                                      |       | 0.455                    | 0.360                     |               |
|                                                                                                                                                      |       | 0.530                    | 0.455                     |               |
| Maximum Instantaneous Reverse Current, See Figure 4<br><br>( $V_R = 20\text{ V}$ )<br>( $V_R = 10\text{ V}$ )<br>( $V_R = 5.0\text{ V}$ )            | $I_R$ | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | $\mu\text{A}$ |
|                                                                                                                                                      |       | 10                       | 1600                      |               |
|                                                                                                                                                      |       | 1.0                      | 500                       |               |
|                                                                                                                                                      |       | 0.5                      | 300                       |               |

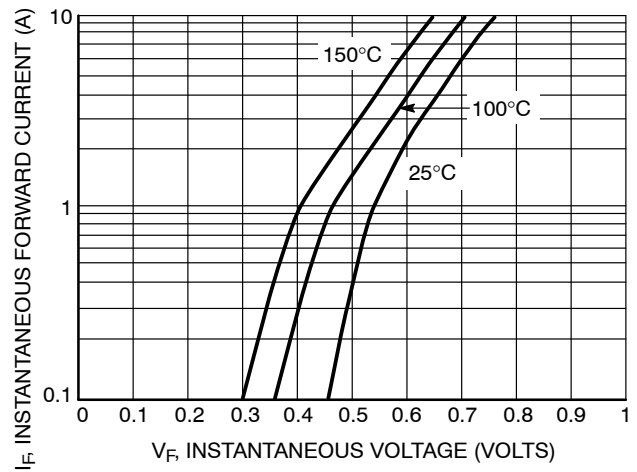
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2. Mounted on a Pad Size of 5 mm x 5 mm, PC Board FR4 (2 pads).
3. Mounted on a Pad Size of 1 inch x 1/2 inch, PC Board FR4 (2 pads).

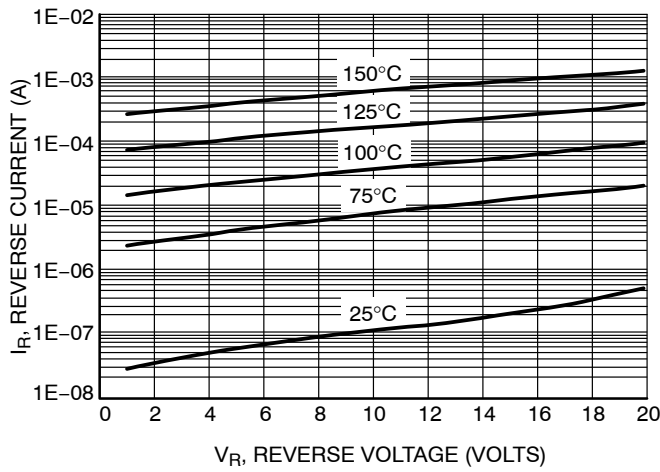
# MBRA120E, NRVBA120E, NRVBA120EN



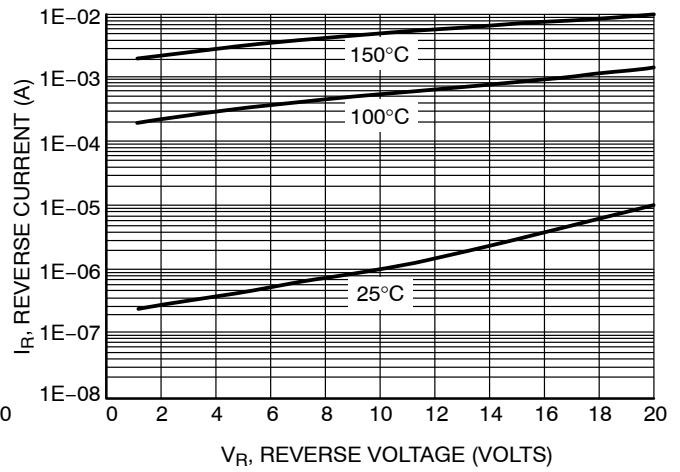
**Figure 1. Typical Forward Voltage**



**Figure 2. Maximum Forward Voltage**



**Figure 3. Typical Reverse Current**



**Figure 4. Maximum Reverse Current**

# MBRA120E, NRVBA120E, NRVBA120EN

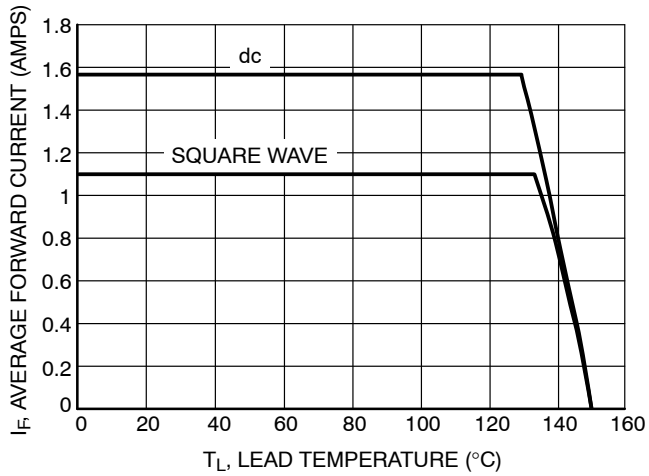


Figure 5. Current Derating

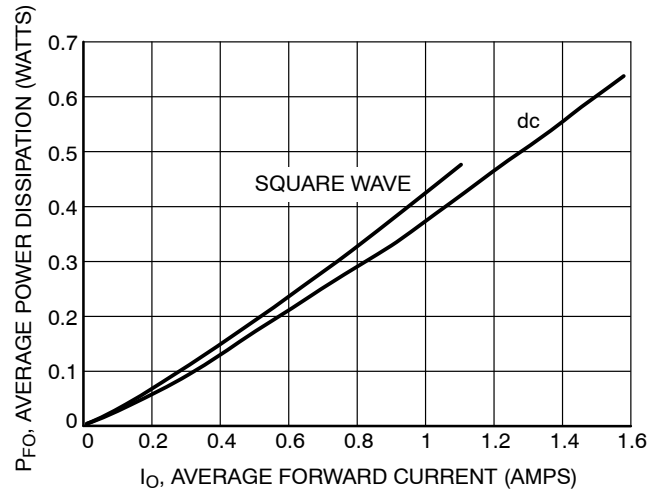


Figure 6. Forward Power Dissipation

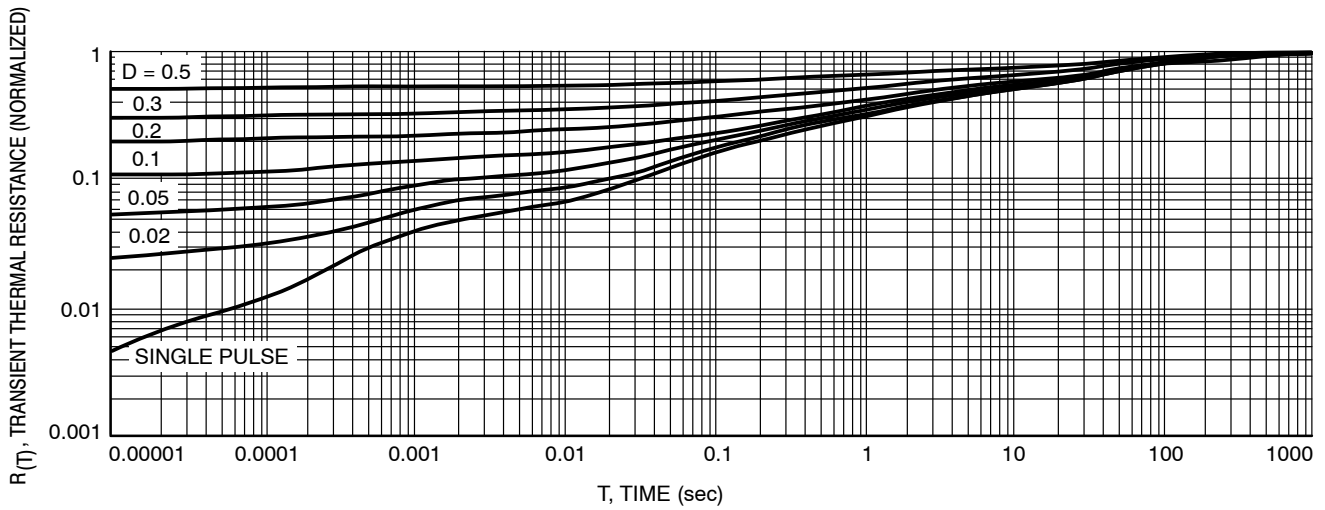


Figure 7. Thermal Resistance

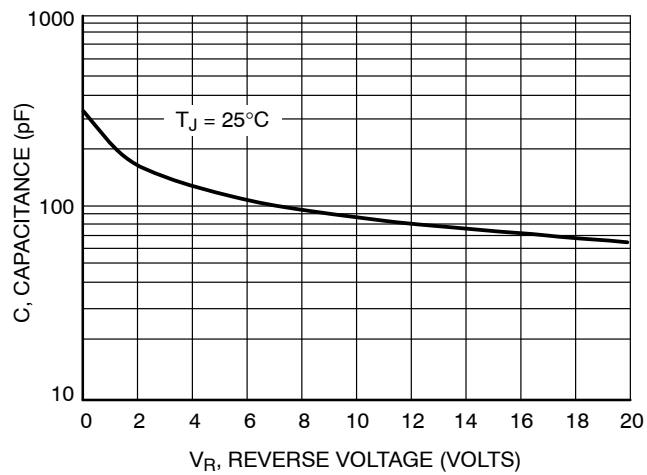


Figure 8. Typical Junction Capacitance

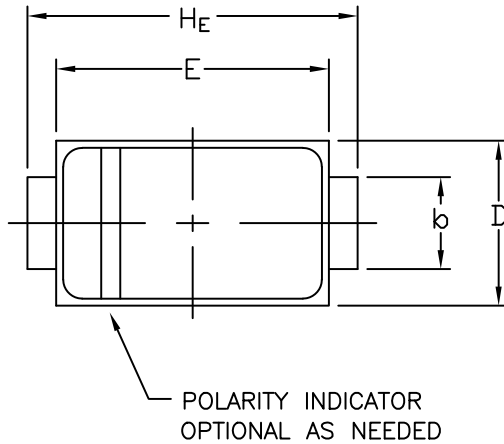


STYLE 1    STYLE 2

SCALE 1:1

**SMA**  
**CASE 403D**  
**ISSUE J**

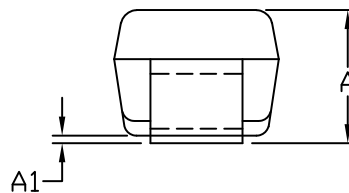
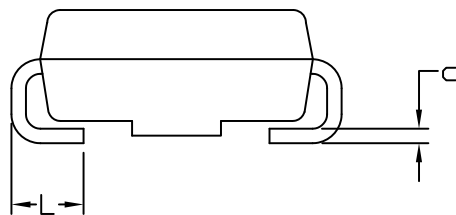
DATE 22 OCT 2021



NOTES:

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

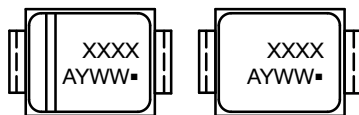
| DIM            | MILLIMETERS |      |      | INCHES |       |       |
|----------------|-------------|------|------|--------|-------|-------|
|                | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A              | 1.97        | 2.10 | 2.20 | 0.078  | 0.083 | 0.087 |
| A1             | 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 |
| c              | 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 |
| H <sub>E</sub> | 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\***

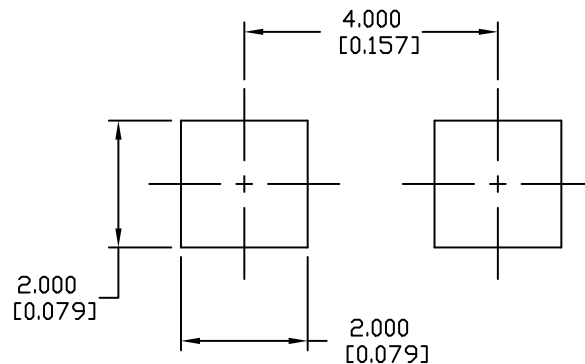


STYLE 1

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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