# Surface Mount Schottky Power Rectifier

## SMA Power Surface Mount Package

# MBRA140, NRVBA140, NRVBA140N, SBRA140N, SBRA401N

This device employs 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 & SBRA 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

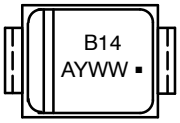
### Mechanical Characteristics

- 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 Either Notch in Plastic Body or Polarity Band

**SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 40 VOLTS**

**SMA**
**CASE 403D**

### MARKING DIAGRAM




| | |
|---|---|
| B14 | = 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† |
|---|---|---|
| MBRA140T3G | SMA (Pb−Free) | 5,000 / Tape & Reel |
| NRVBA140T3G* | SMA (Pb−Free) | 5,000 / Tape & Reel |
| NRVBA140NT3G* | SMA (Pb−Free) | 5,000 / Tape & Reel |
| SBRA140NT3G* | SMA (Pb−Free) | 5,000 / Tape & Reel |
| SBRA401NT3G* | SMA (Pb−Free) | 5,000 / 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.

## 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 $V_R$, $T_C$ = 95°C) | $I_O$ | 1.0 | A |
| Peak Repetitive Forward Current<br>(At Rated $V_R$, Square Wave, 20 kHz, $T_C$ = 100°C) | $I_{FRM}$ | 2.0 | A |
| Non−Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 30 | A |
| Storage Temperature | $T_{stg}$ | −55 to +150 | °C |
| Operating Junction Temperature | $T_J$ | −55 to +125 | °C |
| Voltage Rate of Change<br>(Rated $V_R$, $T_J$ = 25°C) | dv/dt | 10,000 | V/μs |
| ESD Ratings:<br>Machine Model = C<br>Human Body Model = 3B | | <br>> 400<br>> 8000 | V |

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)<br>Thermal Resistance, Junction−to−Ambient (Note 1) | $R_{\theta JL}$<br>$R_{\theta JA}$ | 35<br>86 | °C/W |

1. Mounted on 2″ Square PC Board with 1″ Square Total Pad Size, PC Board FR4.

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Value | | Unit |
|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 2)<br>($I_F$ = 1.0 A)<br>see Figure 2 for other Values ($I_F$ = 2.0 A) | $V_F$ | **$T_J$ = 25°C**<br>0.55<br>0.71 | **$T_J$ = 100°C**<br>0.505<br>0.74 | V |
| Maximum Instantaneous Reverse Current<br>($V_R$ = 40 V)<br>see Figure 4 for other Values ($V_R$ = 20 V) | $I_R$ | **$T_J$ = 25°C**<br>0.5<br>0.1 | **$T_J$ = 100°C**<br>10<br>4.0 | 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.

2. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2.0%.

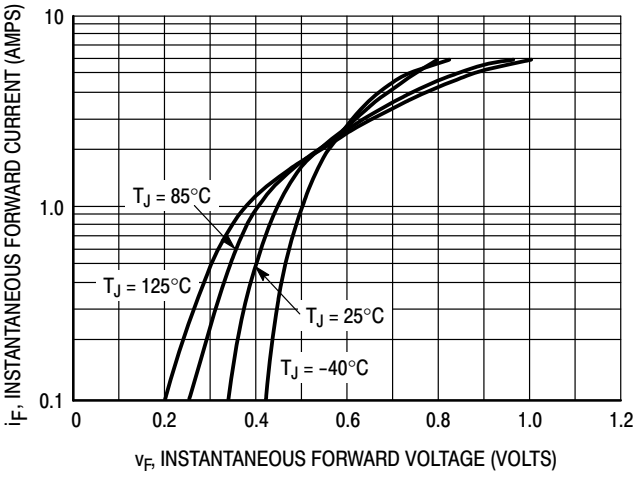



**Figure 1. Typical Forward Voltage**

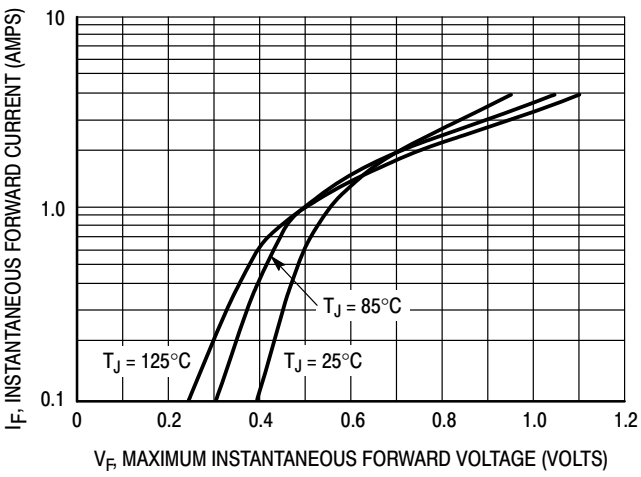



**Figure 2. Maximum Forward Voltage**

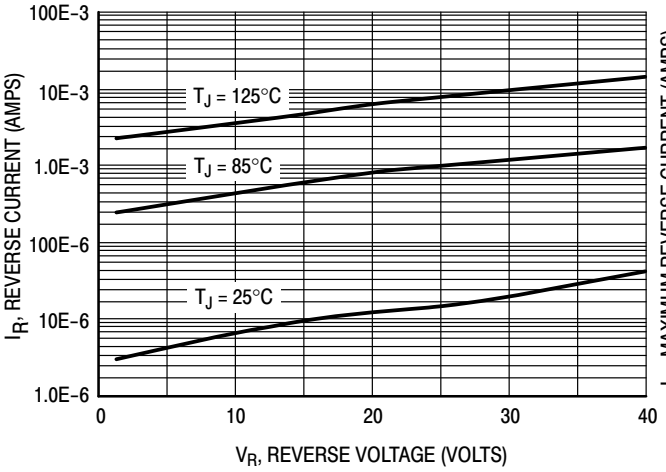



**Figure 3. Typical Reverse Current**

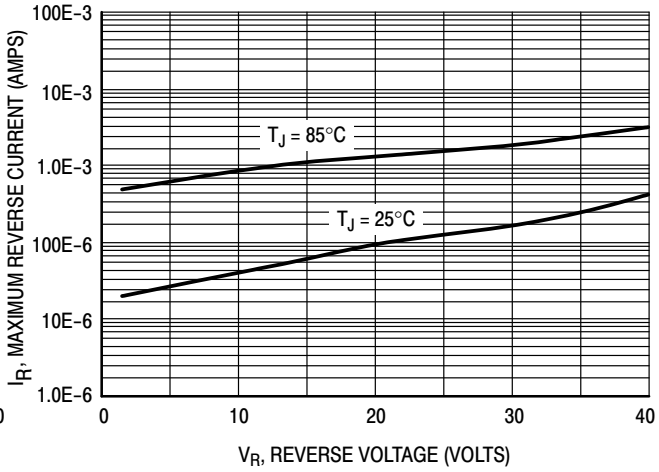



**Figure 4. Maximum Reverse Current**

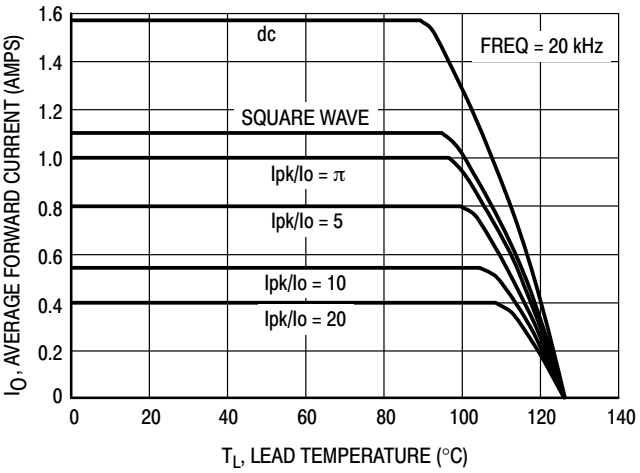



**Figure 5. Current Derating**

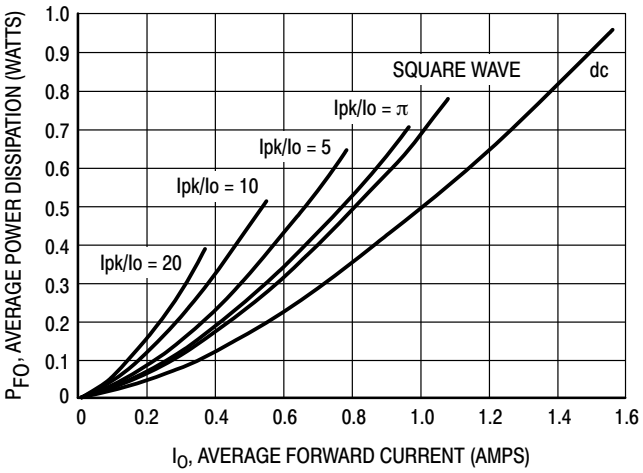



**Figure 6. Forward Power Dissipation**

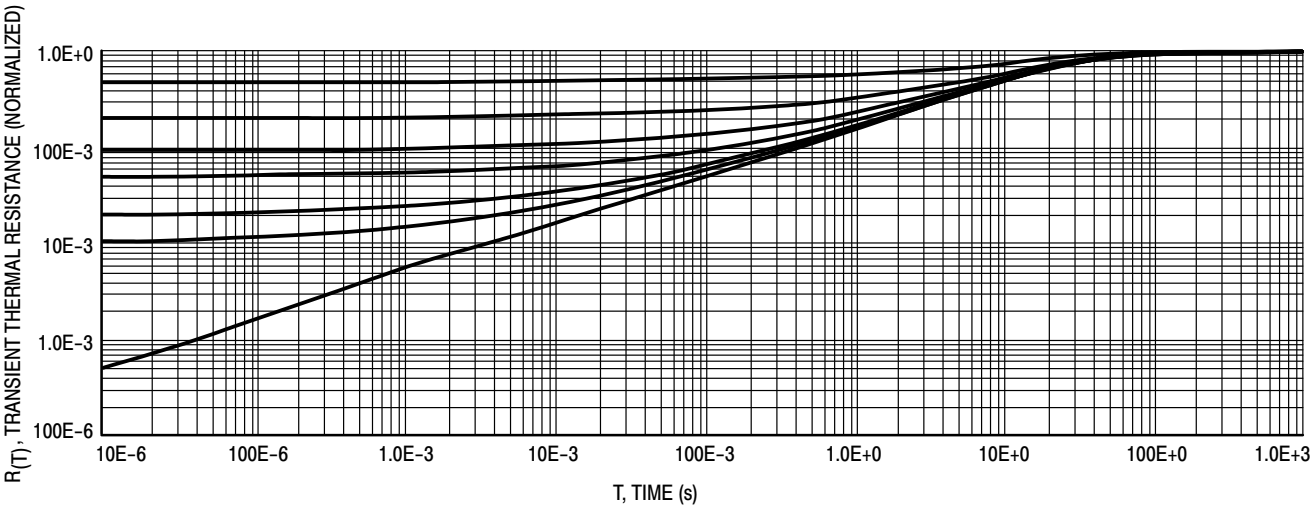



**Figure 7. Thermal Response**

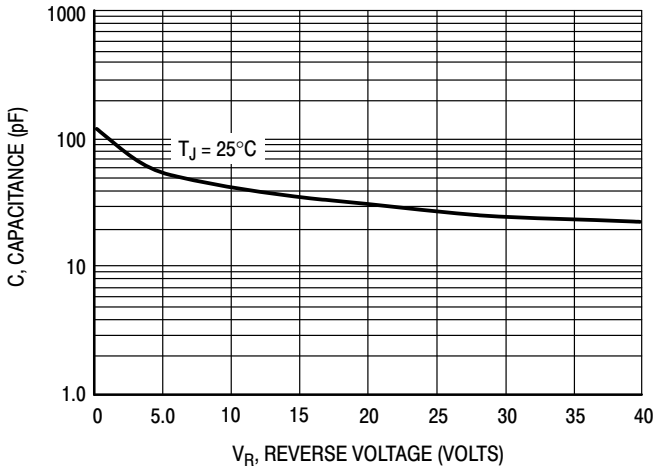



**Figure 8. Capacitance**

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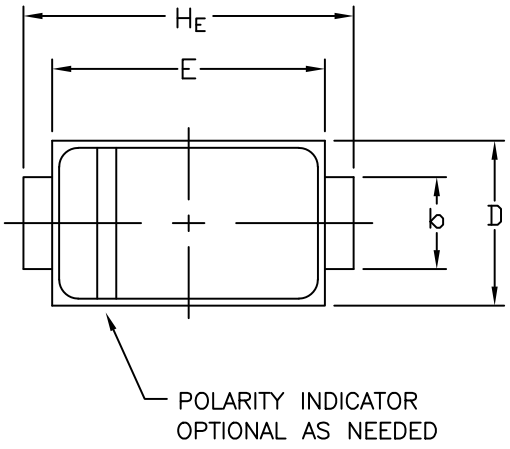
CASE 403D
ISSUE J

DATE 22 OCT 2021

STYLE 1 STYLE 2

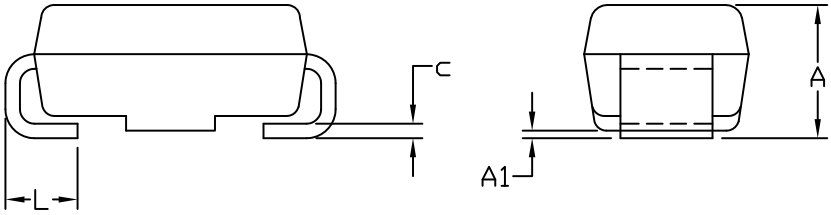
**SCALE 1:1**




NOTES:

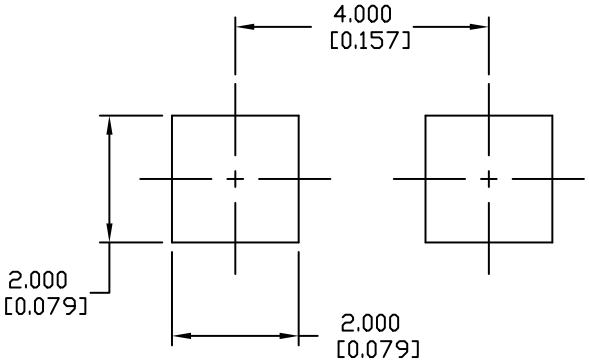
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | 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 |
| b | 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 |
| 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 |



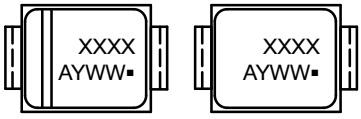

STYLE 1:
PIN 1. CATHODE (POLARITY BAND)
2. ANODE

STYLE 2:
NO POLARITY




RECOMMENDED
MOUNTING FOOTPRINT

**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.

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