

# Surface Mount Standard Recovery Power Rectifier

## SMA Power Surface Mount Package

### MRA4003T3G Series, NRVA4003T3G Series

Features construction with glass passivation. Ideally suited for surface mounted automotive applications.

#### Features

- Compact Package with J-Bend Leads Ideal for Automated Handling
- Stable, High Temperature, Glass Passivated Junction
- NRVA 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: Molded Epoxy  
Epoxy meets UL 94 V-0 @ 0.125 in
- Weight: 70 mg (Approximately)
- Finish: All External Surfaces are Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 seconds in Solder Bath
- Polarity: Band in Plastic Body Indicates Cathode Lead
- Marking: MRA4003T3G = R13  
MRA4004T3G = R14  
MRA4005T1G = R15  
MRA4005T3G = R15  
MRA4006T3G = R16  
MRA4007T3G = R17  
NRVA4003T3G = R13  
NRVA4004T3G = R14  
NRVA4005T3G = R15  
NRVA4006T3G = R16  
NRVA4007T3G = R17
- ESD Rating:
  - ◆ Human Body Model 3A
  - ◆ Machine Model C

## STANDARD RECOVERY RECTIFIERS 1.0 AMPERES 300–1000 VOLTS



SMA  
CASE 403D

#### MARKING DIAGRAM



R1x = Specific Device Code  
F = Wafer Source  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the ordering information section on page 4 of this data sheet.

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

# MRA4003T3G Series, NRVA4003T3G Series

## MAXIMUM RATINGS

| Rating                                                                                                             | Symbol                          | Value      |                      |                      |                      |                      | Unit             |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------|------------|----------------------|----------------------|----------------------|----------------------|------------------|
|                                                                                                                    |                                 | MRA4003    | MRA4004/<br>NRVA4004 | MRA4005/<br>NRVA4005 | MRA4006/<br>NRVA4006 | MRA4007/<br>NRVA4007 |                  |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                             | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 300        | 400                  | 600                  | 800                  | 1000                 | Volts            |
| Avg. Rectified Forward Current<br>(At Rated $V_R$ , $T_L = 150^\circ\text{C}$ )                                    | $I_O$                           | 1          |                      |                      |                      |                      | Amp              |
| Peak Repetitive Forward Current<br>(At Rated $V_R$ , Square Wave,<br>20 kHz, $T_L = 150^\circ\text{C}$ )           | $I_{FRM}$                       | 2          |                      |                      |                      |                      | Amps             |
| Non-Repetitive Peak Surge Current<br>(Surge applied at rated load<br>conditions, halfwave, single phase,<br>60 Hz) | $I_{FSM}$                       | 30         |                      |                      |                      |                      | Amps             |
| Junction Operating Temperature Range                                                                               | $T_J$                           | -55 to 150 |                      |                      |                      |                      | $^\circ\text{C}$ |
| Storage Temperature Range                                                                                          | $T_{stg}$                       | -55 to 175 |                      |                      |                      |                      | $^\circ\text{C}$ |

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)    | $R_{\theta JL}$ | 16.2  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 88.3  | $^\circ\text{C}/\text{W}$ |

## ELECTRICAL CHARACTERISTICS

| Characteristic                                                                                     | Symbol | Value                    |                           | Unit          |
|----------------------------------------------------------------------------------------------------|--------|--------------------------|---------------------------|---------------|
|                                                                                                    |        | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ |               |
| Maximum Instantaneous Forward Voltage (Note 3)<br>( $I_F = 1\text{ A}$ )<br>( $I_F = 2\text{ A}$ ) | $V_F$  | 1.1<br>1.18              | 1.04<br>1.12              | Volts         |
| Maximum Instantaneous Reverse Current (at rated DC voltage)                                        | $I_R$  | 10                       | 50                        | $\mu\text{A}$ |

1. Minimum Pad Size
2. 1 inch Pad Size
3. Pulse Test: Pulse Width  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

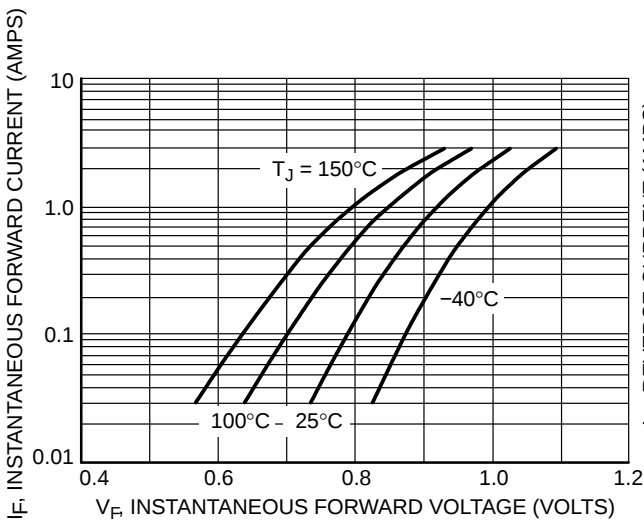


Figure 1. Typical Forward Voltage

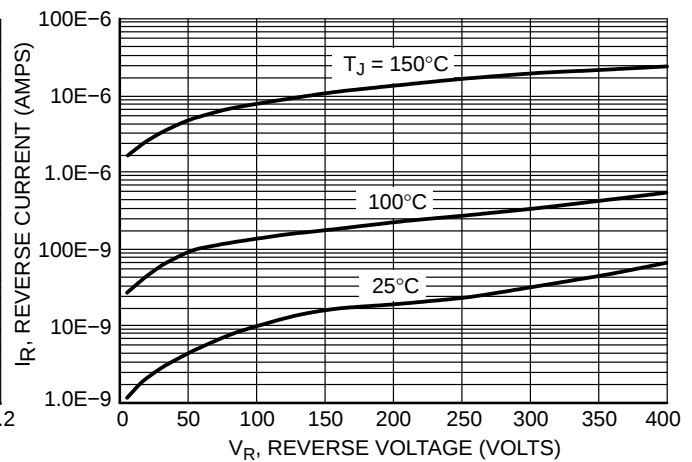


Figure 2. Typical Reverse Current

## MRA4003T3G Series, NRVA4003T3G Series

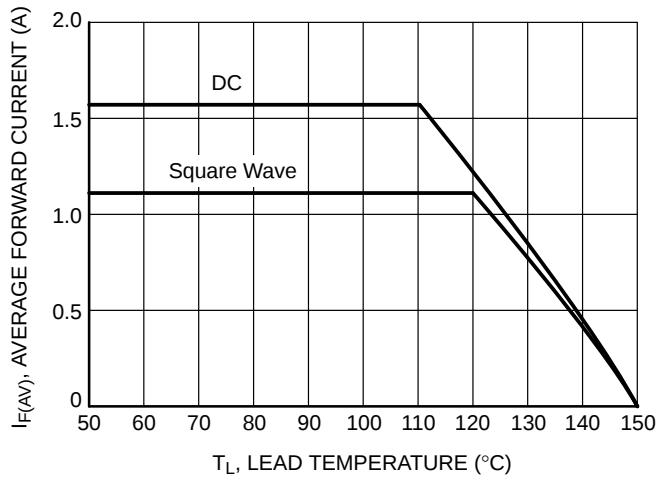


Figure 3. Current Derating

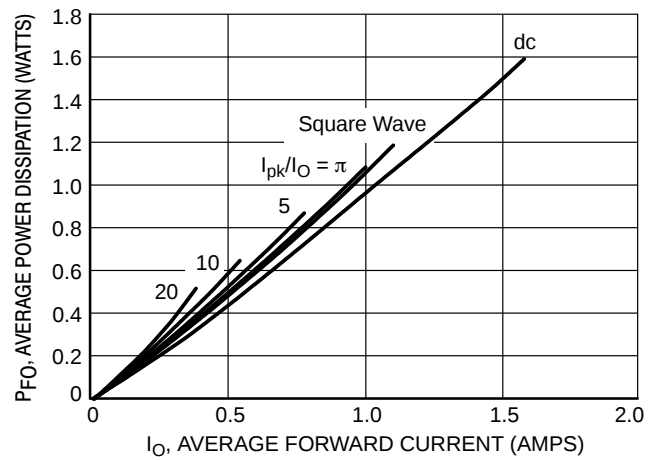


Figure 4. Forward Power Dissipation per Leg

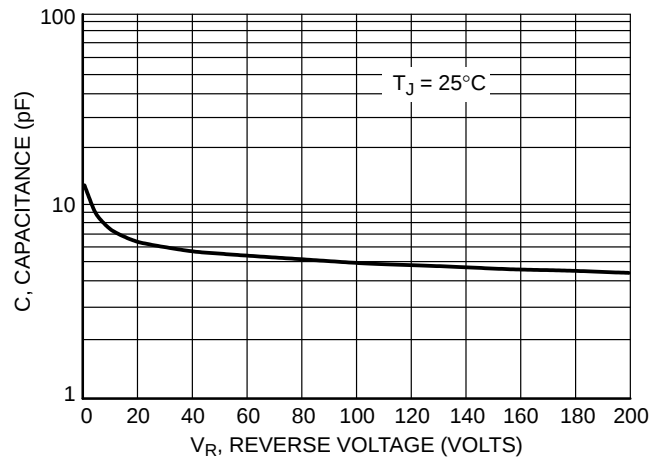


Figure 5. Capacitance

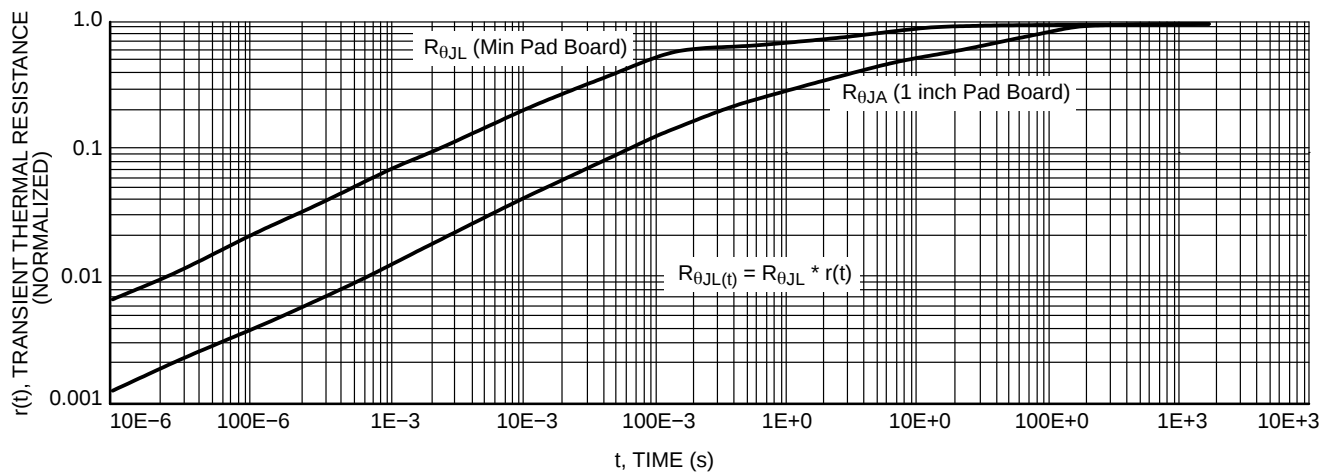


Figure 6. Thermal Response

## MRA4003T3G Series, NRVA4003T3G Series

### ORDERING INFORMATION

| Device       | Package          | Shipping†           |
|--------------|------------------|---------------------|
| MRA4003T3G   | SMA<br>(Pb-Free) | 5,000 / Tape & Reel |
| MRA4004T3G   |                  |                     |
| MRA4005T1G   |                  | 1,500 / Tape & Reel |
| MRA4005T3G   |                  |                     |
| MRA4006T3G   |                  | 5,000 / Tape & Reel |
| MRA4007T3G   |                  |                     |
| NRVA4003T3G* |                  | 5,000 / Tape & Reel |
| NRVA4004T3G* |                  |                     |
| NRVA4005T3G* |                  |                     |
| NRVA4006T3G* |                  |                     |
| NRVA4007T3G* |                  |                     |

†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.

\*NRVA Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

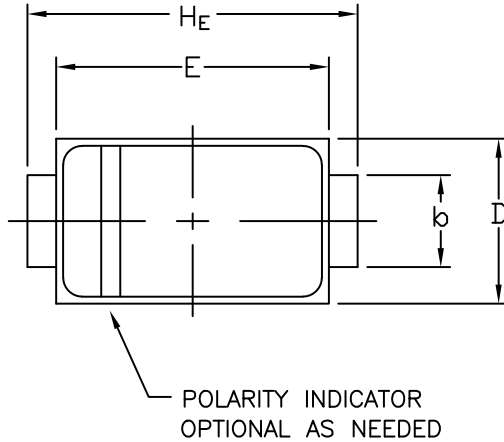


STYLE 1    STYLE 2

SCALE 1:1

### SMA CASE 403D ISSUE J

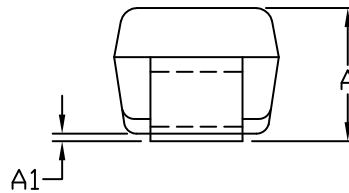
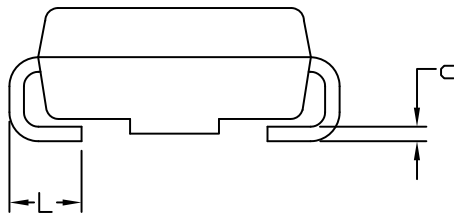
DATE 22 OCT 2021



#### NOTES:

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

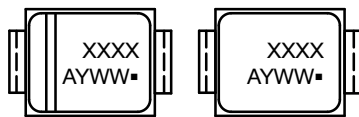
| DIM            | MILLIMETERS |      |      | INCHES |       |       |
|----------------|-------------|------|------|--------|-------|-------|
|                | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A              | 1.97        | 2.10 | 2.20 | 0.078  | 0.083 | 0.087 |
| A1             | 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 |
| <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 |
| 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\*

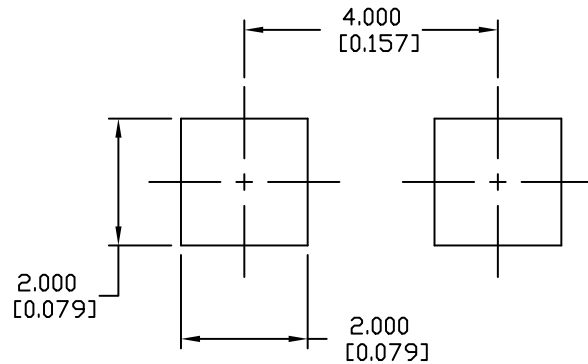


STYLE 1

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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