

# MBRAF440, NRVBAF440

## Surface Mount Schottky Power Rectifier

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 protection diodes in surface mount applications where compact size and weight are critical to the system.

### Features

- Low Profile Package for Space Constrained Applications
- Rectangular Package for Automated Handling
- Highly Stable Oxide Passivated Junction
- 150°C Operating Junction Temperature
- Guard-Ring for Stress Protection
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free and Halide-Free Devices

### Mechanical Characteristics

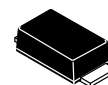
- Case: Epoxy, Molded, Epoxy Meets UL 94, V-0
- Weight: 95 mg (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Cathode Polarity Band
- Device Meets MSL 1 Requirements



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**SCHOTTKY BARRIER  
RECTIFIER  
4.0 AMPERE  
40 VOLTS**



**SMA-FL  
CASE 403AA  
STYLE 6**

### MARKING DIAGRAM



RAF = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping†
MBRAF440T3G	SMA-FL (Pb-Free)	5000 / Tape & Reel
NRVBAF440T3G	SMA-FL (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 Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	40	V
Average Rectified Forward Current (At Rated $V_R$ , $T_L = 107^\circ\text{C}$ )	$I_O$	4.0	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	$I_{FSM}$	100	A
Storage/Operating Case Temperature	$T_{stg}$ , $T_C$	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature (Note 1)	$T_J$	-55 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ , $T_J = 25^\circ\text{C}$ )	dv/dt	10,000	V/ $\mu\text{s}$
ESD Rating	Human Body Model Machine Model	ESD <sub>HBM</sub> ESD <sub>MM</sub>	3B M4 -

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.

1. The heat generated must be less than the thermal conductivity from Junction-to-Ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ .

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance – Junction-to-Lead (Note 2)	$R_{\theta JL}$	25	$^\circ\text{C}/\text{W}$
Thermal Resistance – Junction-to-Ambient (Note 2)	$R_{\theta JA}$	90	

2. 1 inch square pad size (1 × 0.5 inch) for each lead on FR4 board.

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value		Unit
		$T_J = 25^\circ\text{C}$	$T_J = 100^\circ\text{C}$	
Maximum Instantaneous Forward Voltage (Note 3) ( $I_F = 4.0\text{ A}$ )	$V_F$	0.485	0.435	V
Maximum Instantaneous Reverse Current ( $V_R = 40\text{ V}$ )	$I_R$	0.3	15	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.

3. Pulse Test: Pulse Width  $\leq 250\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

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## TYPICAL CHARACTERISTICS

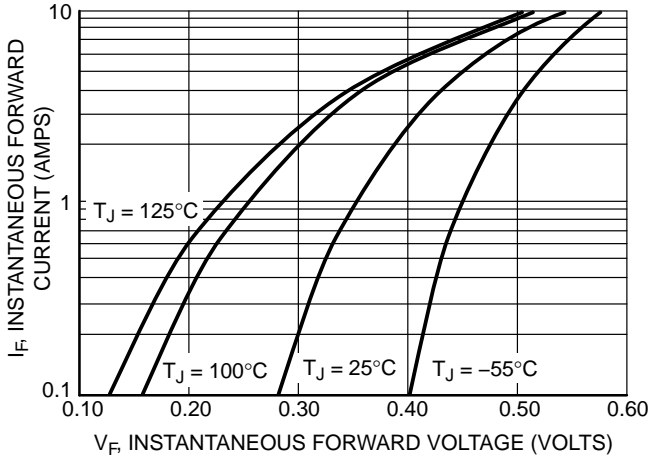


Figure 1. Typical Forward Voltage

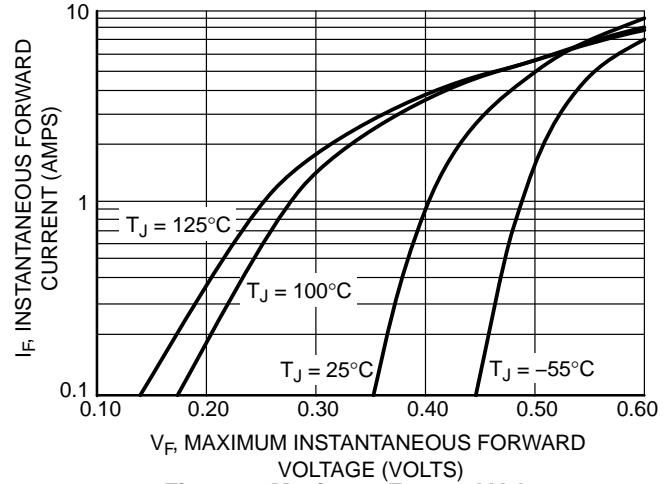


Figure 2. Maximum Forward Voltage

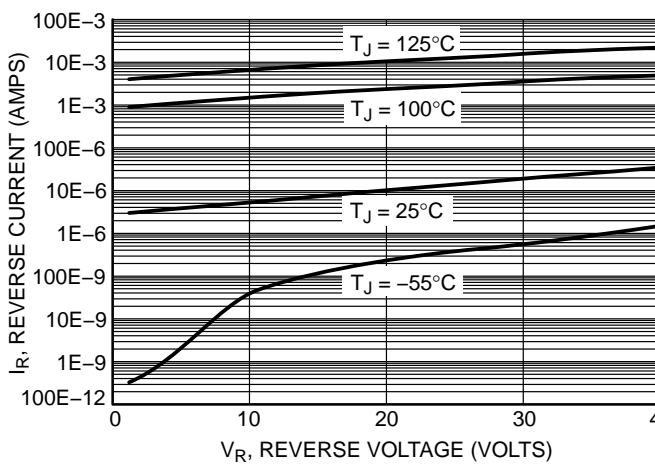


Figure 3. Typical Reverse Current

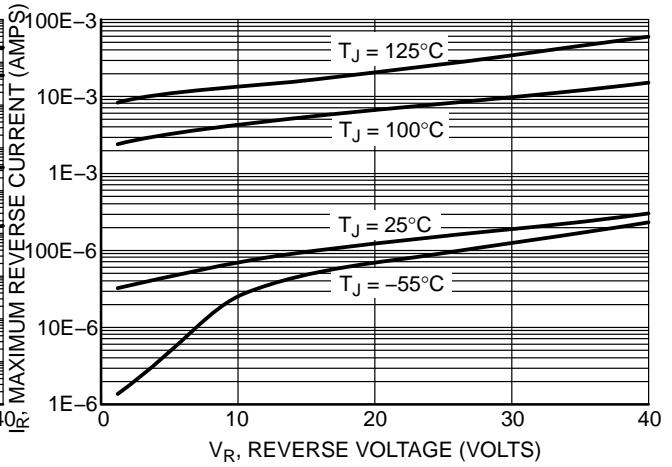


Figure 4. Maximum Reverse Current

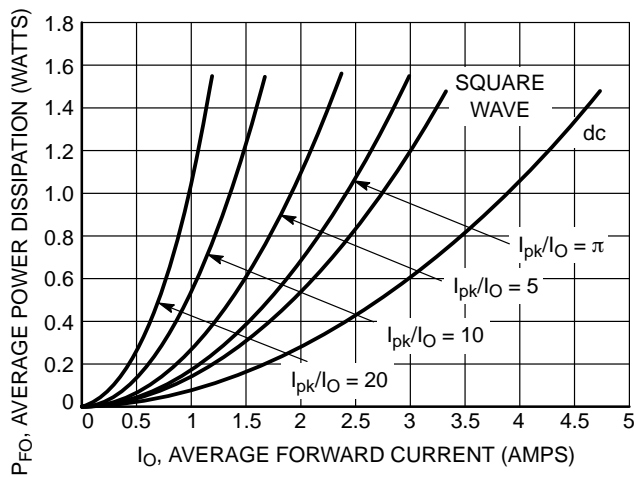


Figure 5. Forward Power Dissipation

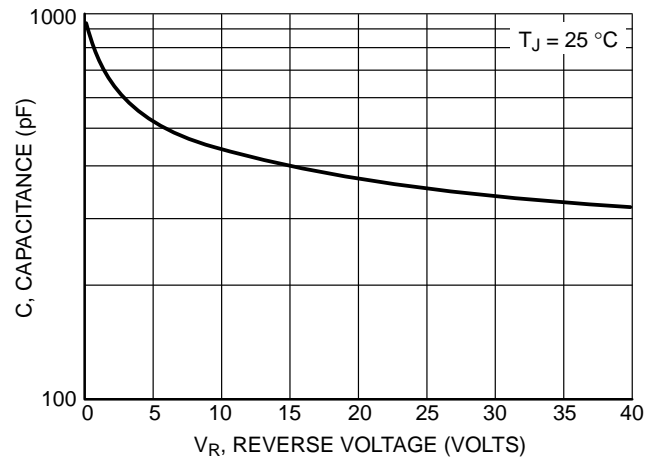


Figure 6. Capacitance

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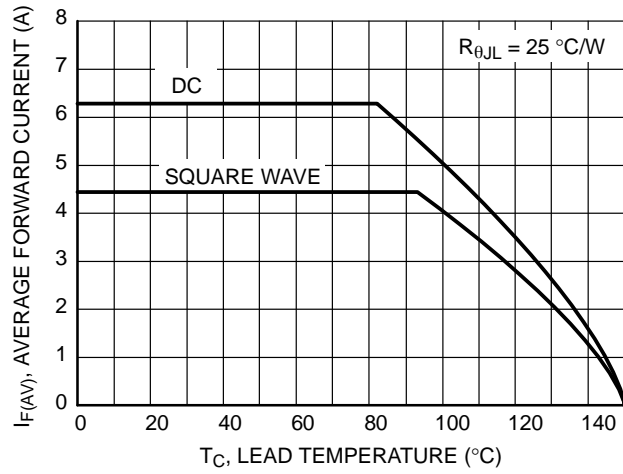


Figure 7. Current Derating

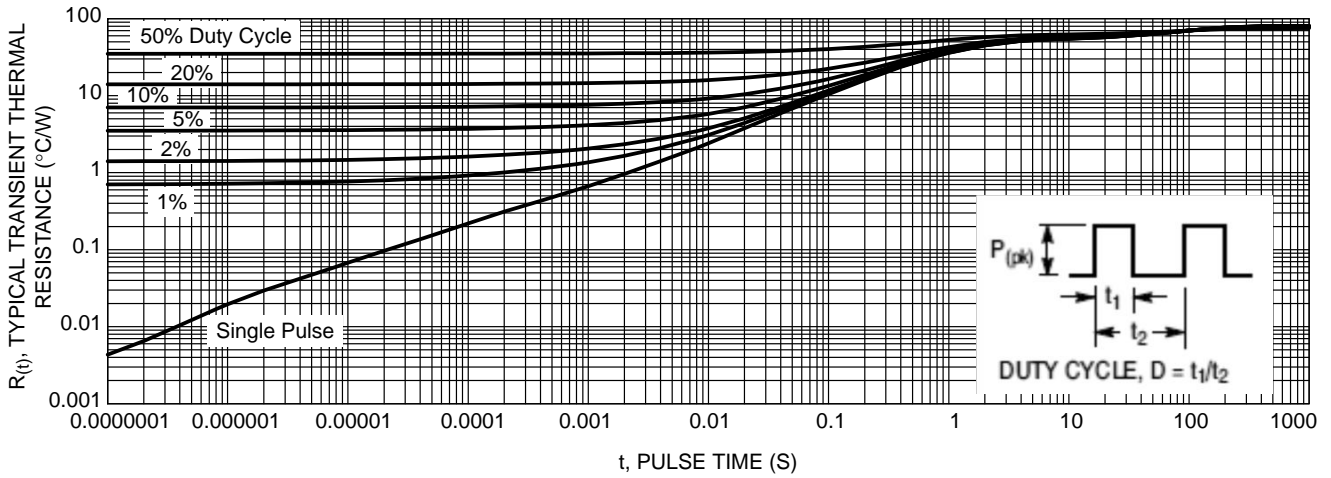
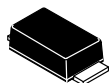


Figure 8. Typical Transient Thermal Response, Junction-to-Ambient

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

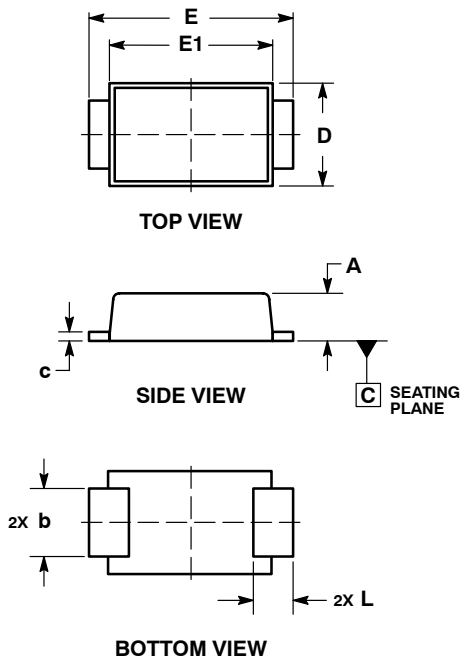
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SCALE 2:1

**SMA-FL**  
CASE 403AA-01  
ISSUE O

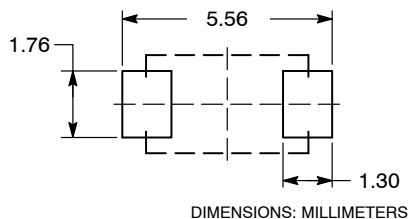
DATE 02 MAR 2011



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.90	1.10
b	1.25	1.65
c	0.15	0.30
D	2.40	2.80
E	4.80	5.40
E1	4.00	4.60
L	0.70	1.10

**RECOMMENDED  
SOLDER 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.

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