

# Trench-based Schottky Rectifier, Low Forward Voltage, Low Leakage

## NRVTSS5100E, NRVTSAF5100E

### Features

- Fine Lithography Trench-based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- High Surge Capability
- 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

### Typical Applications

- Switching Power Supplies including Wireless, Smartphone and Notebook Adapters
- High Frequency and DC-DC Converters
- Freewheeling and OR-ing diodes
- Reverse Battery Protection
- Instrumentation
- LED Lighting

### Mechanical Characteristics:

- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in.
- Lead Finish: 100% Matte Sn (Tin)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL 1 Requirements



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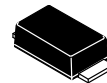
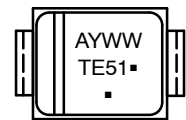
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## SCHOTTKY BARRIER RECTIFIERS 5 AMPERES 100 VOLTS

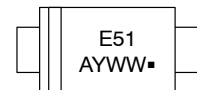
### MARKING DIAGRAMS



SMB  
CASE 403A



SMA-FL  
CASE 403AA  
STYLE 6



- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
NRVTSS5100ET3G	SMB (Pb-Free)	2500 / Tape & Reel
NRVTSAF5100ET3G	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.

# NRVTSS5100E, NRVTSAF5100E

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	100	V
Average Rectified Forward Current ( $T_L = 100^\circ\text{C}$ )	$I_{F(AV)}$	5.0	A
Peak Repetitive Forward Current, (Square Wave, 20 kHz, $T_L = 83^\circ\text{C}$ )	$I_{FRM}$	10	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	$I_{FSM}$	50	A
Storage Temperature Range	$T_{stg}$	-65 to +175	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	-55 to +175	$^\circ\text{C}$
ESD Rating (Human Body Model)		1B	
ESD Rating (Machine Model)		M3	

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	Max	Unit
Maximum Thermal Resistance, Steady State (Note 1)			$^\circ\text{C}/\text{W}$
(NRVTSAF5100E) Junction-to-Lead	$R_{\theta JL}$	25	
Junction-to-Ambient	$R_{\theta JA}$	90	
(NRVTSS5100E) Junction-to-Lead	$R_{\theta JL}$	13.1	
Junction-to-Ambient	$R_{\theta JA}$	71.1	

1. Assumes 600 mm<sup>2</sup> 1 oz. copper bond pad, on a FR4 board

## ELECTRICAL CHARACTERISTICS

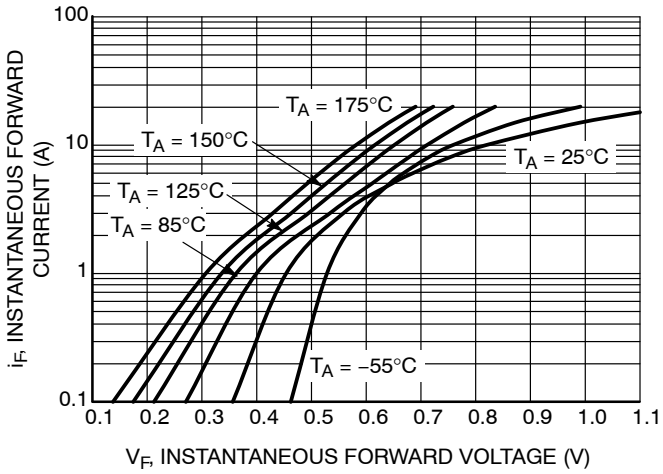
Characteristic	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage (Note 2) ( $i_F = 3.0\text{ A}$ , $T_J = 25^\circ\text{C}$ ) ( $i_F = 5.0\text{ A}$ , $T_J = 25^\circ\text{C}$ )  ( $i_F = 3.0\text{ A}$ , $T_J = 125^\circ\text{C}$ ) ( $i_F = 5.0\text{ A}$ , $T_J = 125^\circ\text{C}$ )	$V_F$	0.56 0.65  0.50 0.56	- 0.69  - 0.62	V
Reverse Current (Note 2) (Rated dc Voltage, $T_J = 25^\circ\text{C}$ ) (Rated dc Voltage, $T_J = 125^\circ\text{C}$ )	$i_R$	2.6 2.2	29 5	$\mu\text{A}$ mA
Diode Capacitance (Rated dc Voltage, $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ )	$C_d$	54.4		pF

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.

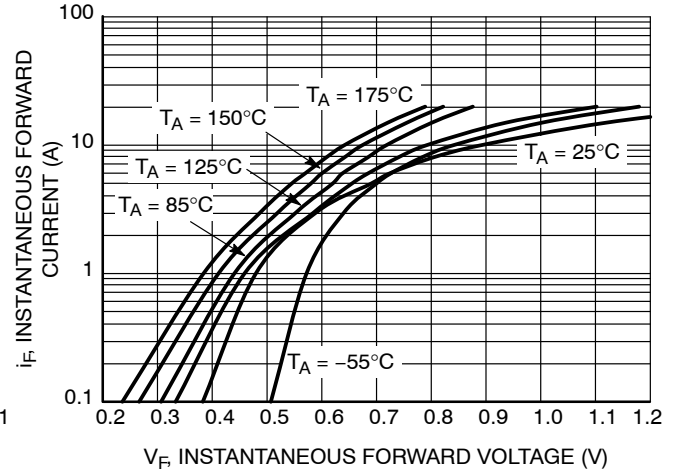
2. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# NRVTSS5100E, NRVTSAF5100E

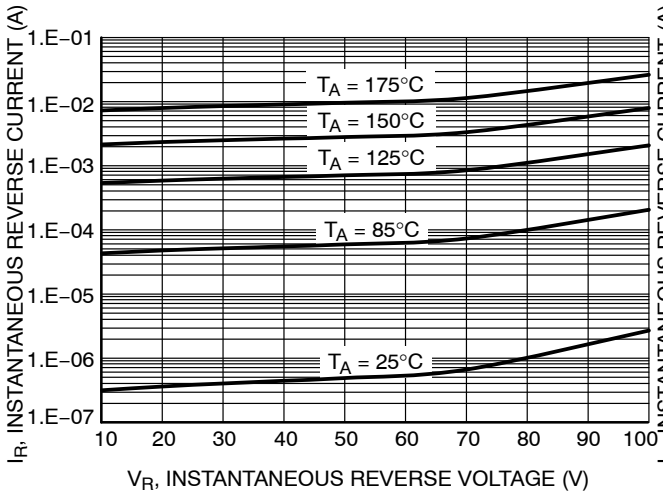
## TYPICAL CHARACTERISTICS



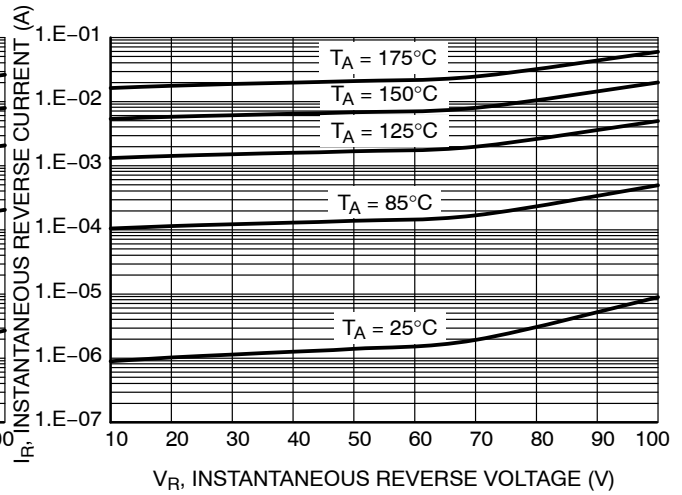
**Figure 1. Typical Instantaneous Forward Characteristics**



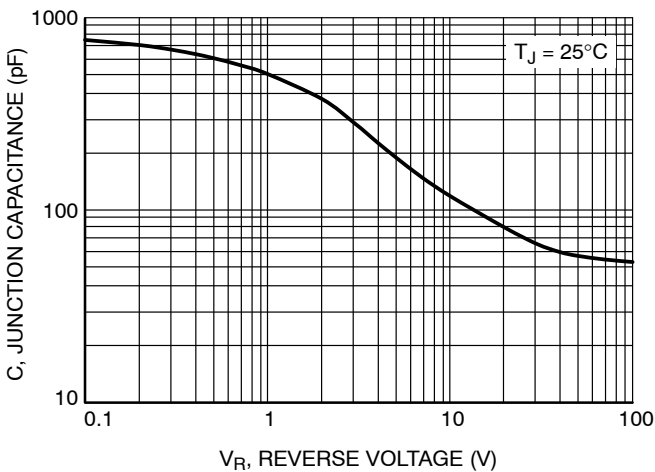
**Figure 2. Maximum Instantaneous Forward Characteristics**



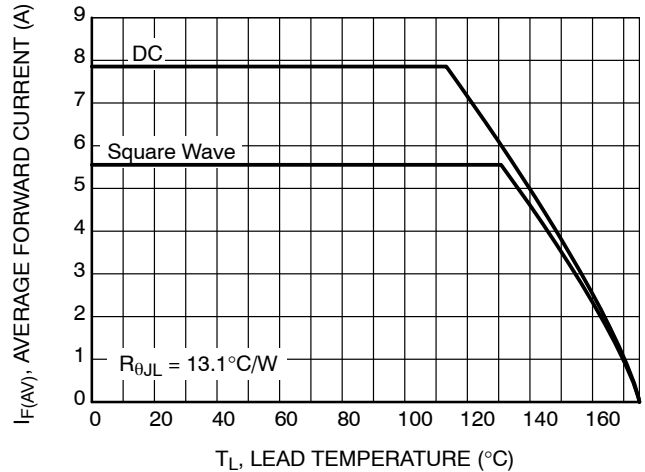
**Figure 3. Typical Reverse Characteristics**



**Figure 4. Maximum Reverse Characteristics**



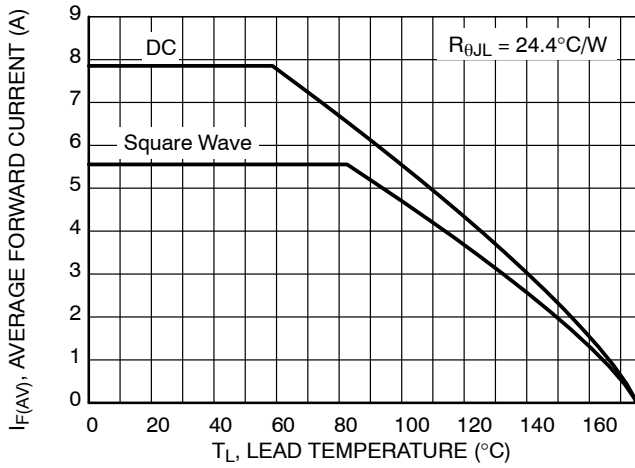
**Figure 5. Typical Junction Capacitance**



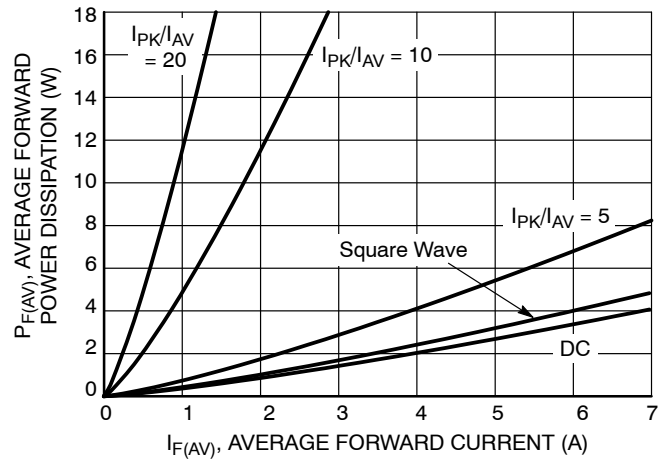
**Figure 6. Current Derating per Diode for NRVTSS5100E**

# NRVTSS5100E, NRVTSAF5100E

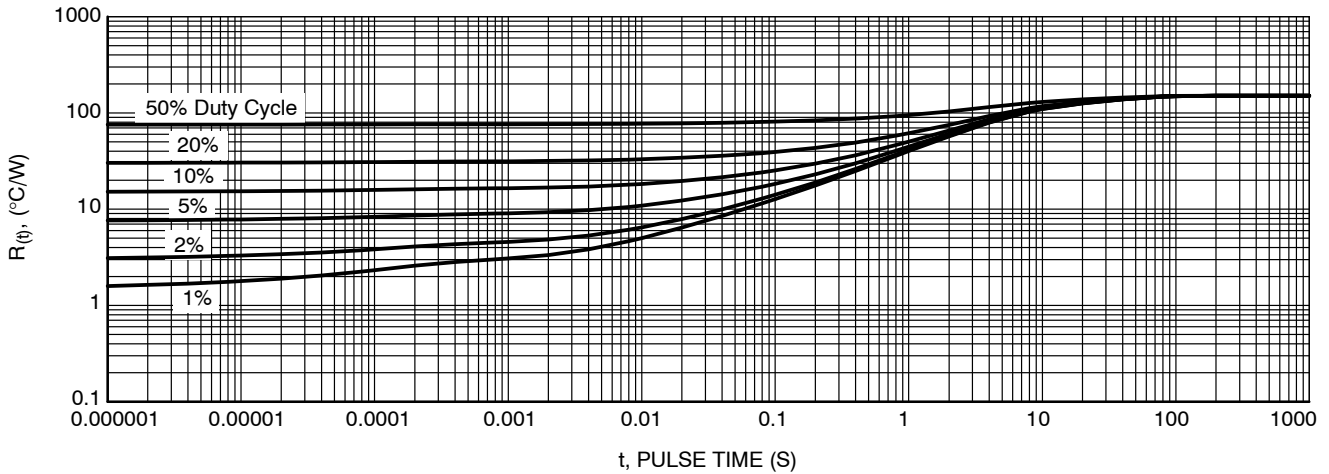
## TYPICAL CHARACTERISTICS



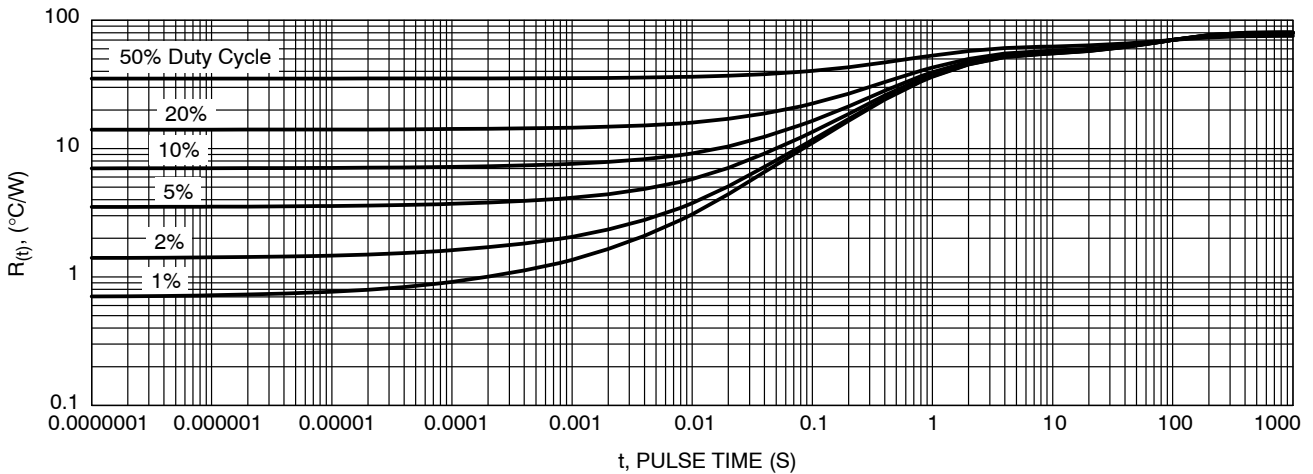
**Figure 7. Current Derating per Diode for NRVTSAF5100E**



**Figure 8. Forward Power Dissipation**



**Figure 9. Transient Thermal Response, Junction-to-Ambient, for NRVTS5100E**



**Figure 10. Transient Thermal Response, Junction-to-Ambient, for NRVTSAF5100E**

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

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SCALE 1:1

Polarity Band

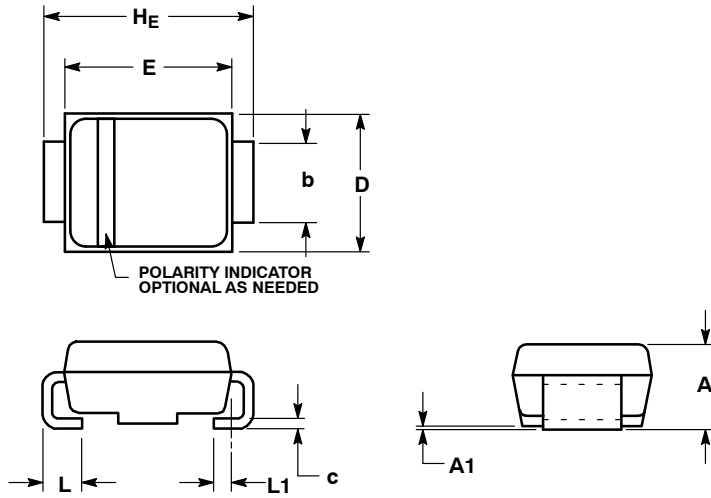


SCALE 1:1

Non-Polarity Band

**SMB**  
CASE 403A-03  
ISSUE J

DATE 19 JUL 2012



**SOLDERING 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.

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L1.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.95	2.30	2.47	0.077	0.091	0.097
A1	0.05	0.10	0.20	0.002	0.004	0.008
b	1.96	2.03	2.20	0.077	0.080	0.087
c	0.15	0.23	0.31	0.006	0.009	0.012
D	3.30	3.56	3.95	0.130	0.140	0.156
E	4.06	4.32	4.60	0.160	0.170	0.181
HE	5.21	5.44	5.60	0.205	0.214	0.220
L	0.76	1.02	1.60	0.030	0.040	0.063
L1	0.51 REF			0.020 REF		

**GENERIC MARKING DIAGRAM\***



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

\*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.

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

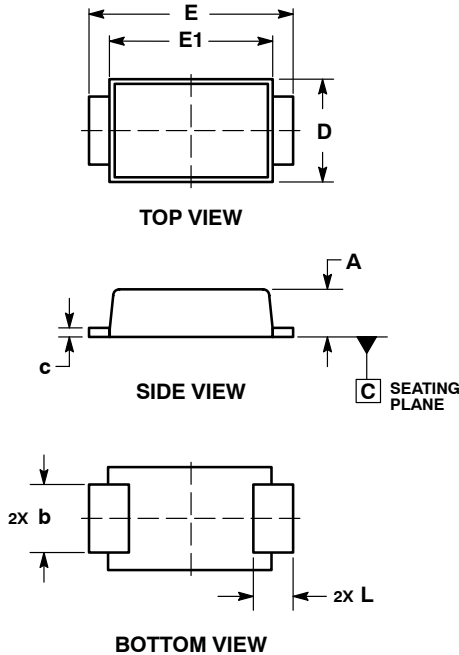
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SCALE 2:1

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

DATE 02 MAR 2011

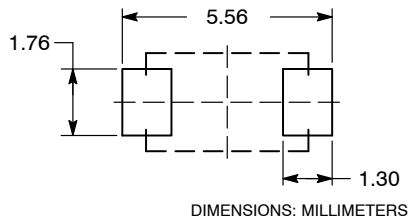


**NOTES:**

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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