Trench Schottky Rectifier, Very Low Leakage

NRVTSS5100E, NRVTSAF5100E

SCHOTTKY BARRIER RECTIFIERS 5 AMPERES 100 VOLTS

SMB CASE 403A

SMA−FL CASE 403AA STYLE 6

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

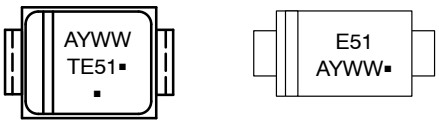
Typical Applications

- 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

MARKING DIAGRAMS



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 package dimensions section on page 5 of this data sheet.

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°C)	$I_{F(AV)}$	5.0	A
Peak Repetitive Forward Current, (Square Wave, 20 kHz, T_L = 83°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	°C
Operating Junction Temperature	T_J	−55 to +175	°C
ESD Rating (Human Body Model)		1B	
ESD Rating (Charged Device Model)		> 1000	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	Max	Unit
Maximum Thermal Resistance, Steady State (Note 1)				°C/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^2 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 A, T_J = 25°C) (i_F = 5.0 A, T_J = 25°C) (i_F = 3.0 A, T_J = 125°C) (i_F = 5.0 A, T_J = 125°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°C) (Rated dc Voltage, T_J = 125°C)	i_R	 2.6 2.2	 29 5	 μA mA
Diode Capacitance (Rated dc Voltage, T_J = 25°C, f = 1 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 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

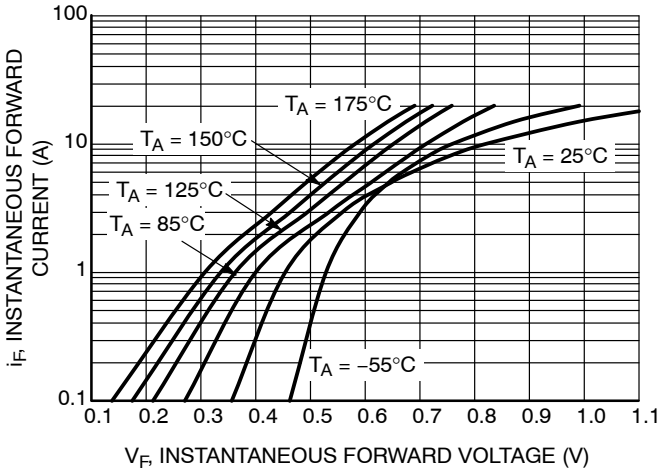


Figure 1. Typical Instantaneous Forward Characteristics

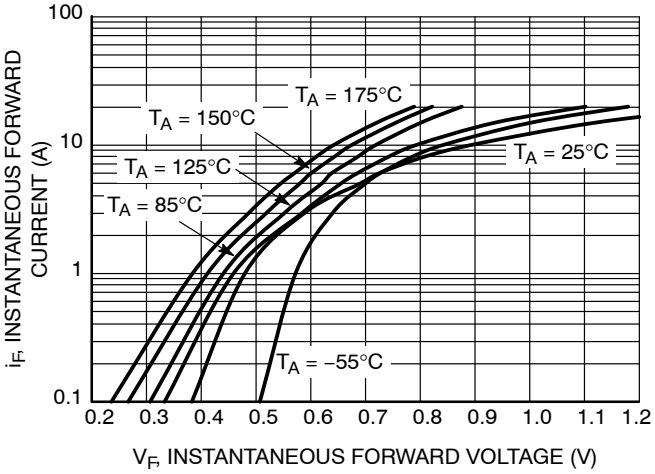


Figure 2. Maximum Instantaneous Forward Characteristics

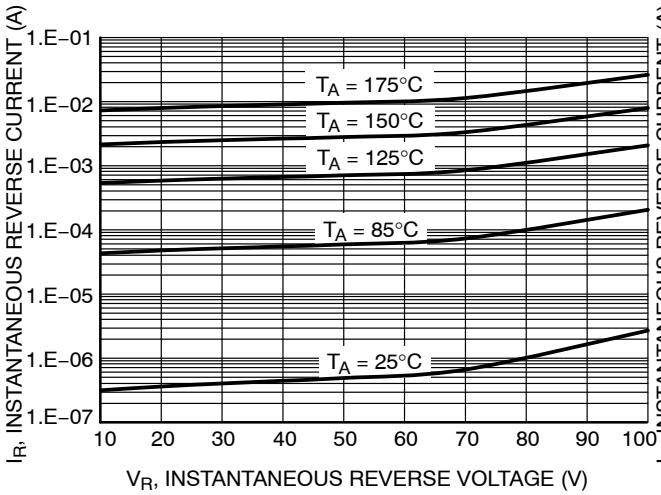


Figure 3. Typical Reverse Characteristics

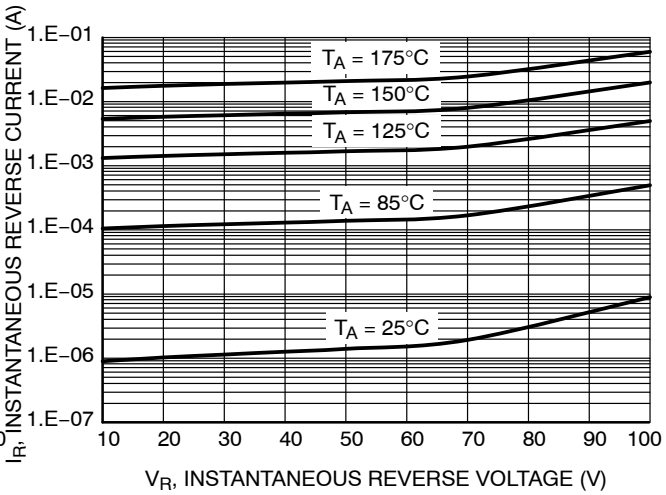


Figure 4. Maximum Reverse Characteristics

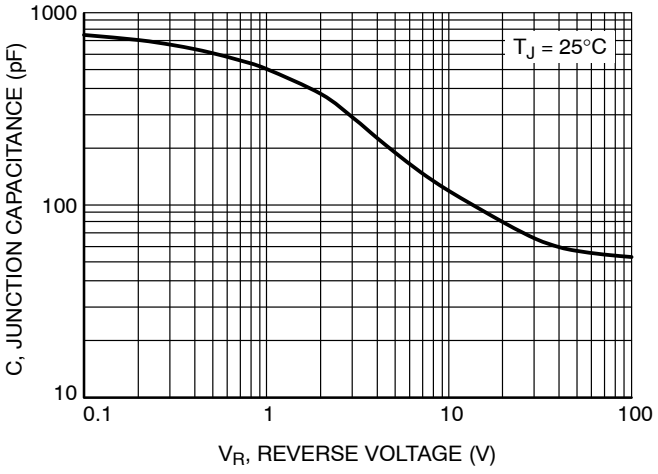


Figure 5. Typical Junction Capacitance

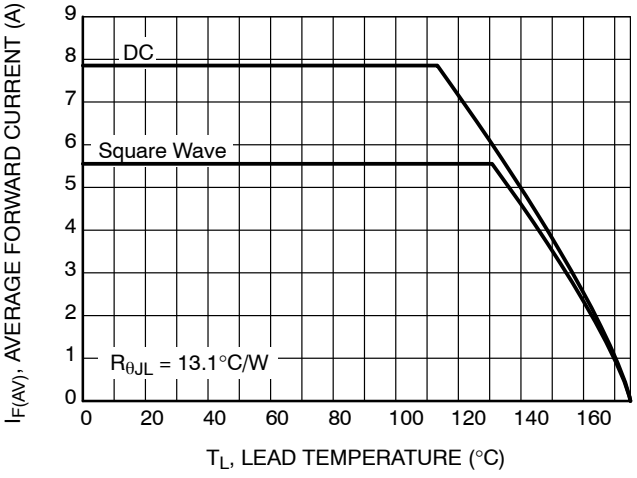


Figure 6. Current Derating per Diode for NRVTSS5100E

TYPICAL CHARACTERISTICS

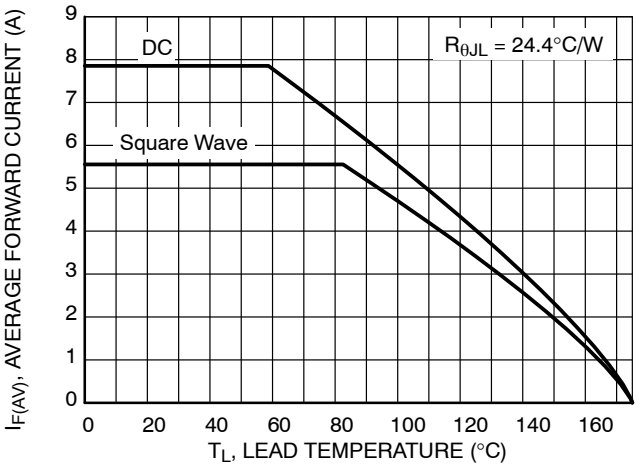


Figure 7. Current Derating per Diode for NRVTSAF5100E

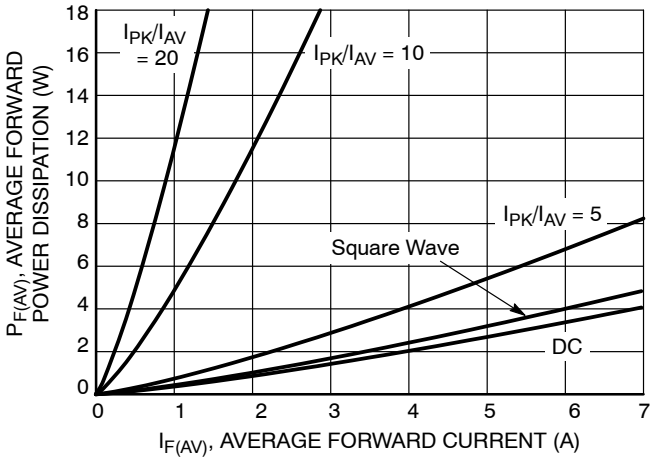


Figure 8. Forward Power Dissipation

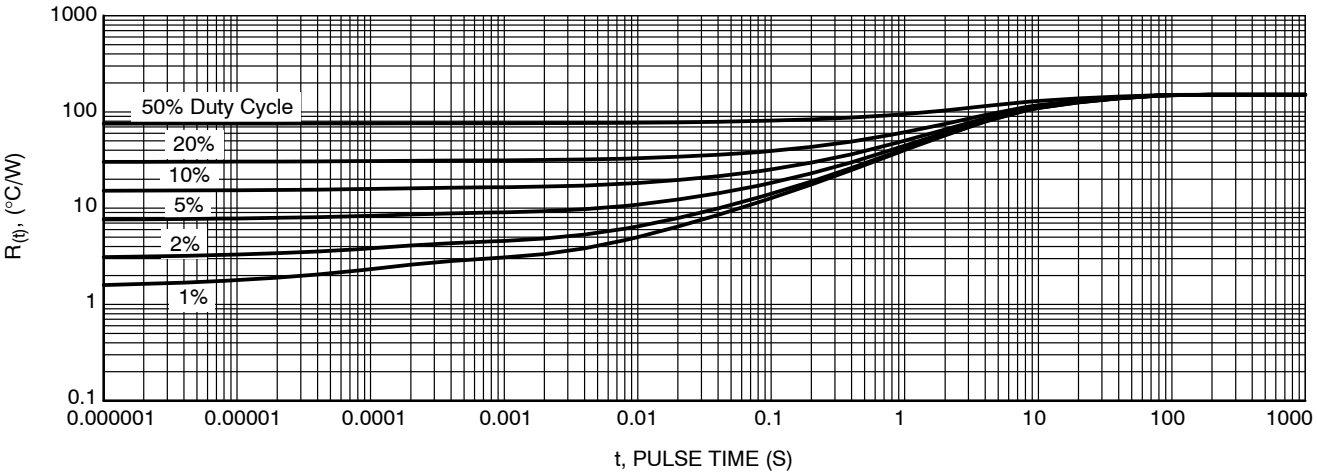


Figure 9. Transient Thermal Response, Junction−to−Ambient, for NRVTSS5100E

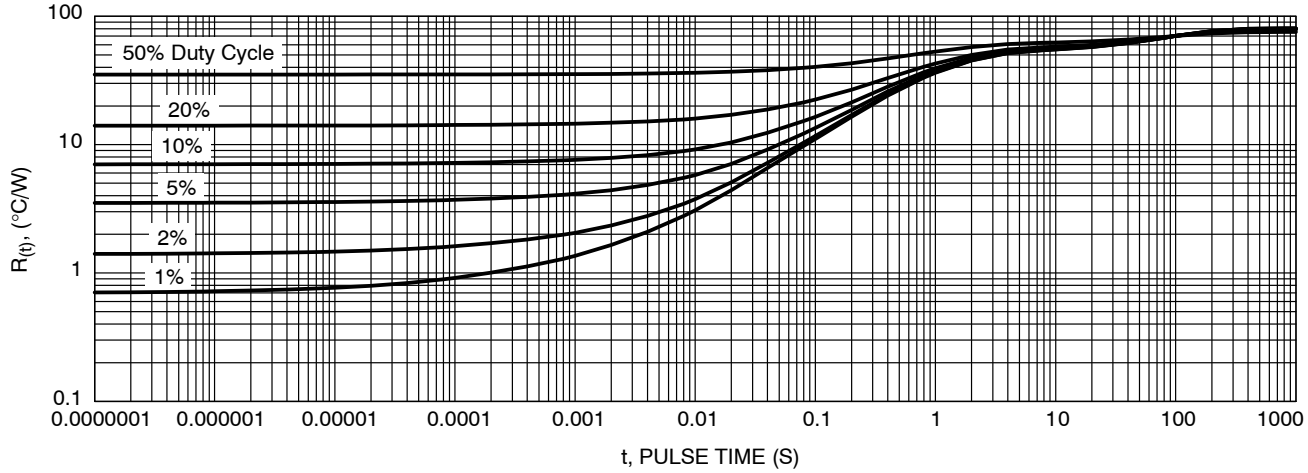


Figure 10. Transient Thermal Response, Junction−to−Ambient, for NRVTSAF5100E

ORDERING INFORMATION

Device	Package	Shipping†
NRVTSAF5100ET3G	SMA−FL (Pb−Free)	5000 / Tape & Reel
NRVTSS5100ET3G	SMB (Pb−Free)	2500 / Tape & Reel
NRVTSS5100ET3G−GA01	SMB (Pb−Free)	2500 / Tape & Reel

†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.

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

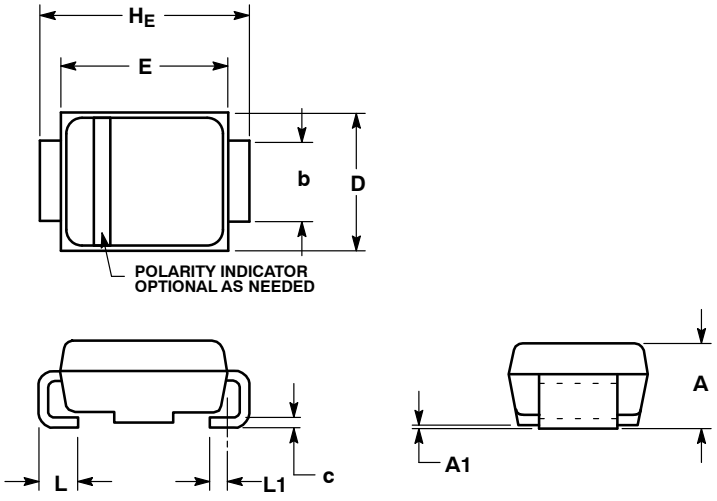
ON Semiconductor®

SMB
CASE 403A−03
ISSUE J

DATE 19 JUL 2012

SCALE 1:1
Polarity Band

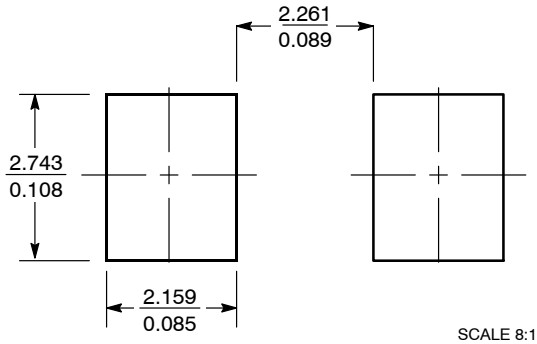
SCALE 1:1
Non−Polarity Band



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

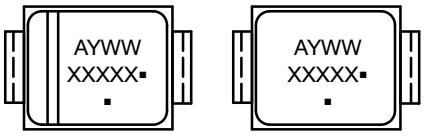
	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.95	2.30	2.47	0.077	0.091	0.097
A1	0.05	0.10	0.20	0.002	0.004	0.008
b	1.96	2.03	2.20	0.077	0.080	0.087
c	0.15	0.23	0.31	0.006	0.009	0.012
D	3.30	3.56	3.95	0.130	0.140	0.156
E	4.06	4.32	4.60	0.160	0.170	0.181
H_E	5.21	5.44	5.60	0.205	0.214	0.220
L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

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.

GENERIC MARKING DIAGRAM*



Polarity Band **Non−Polarity Band**

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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DESCRIPTION:	SMB	PAGE 1 OF 1

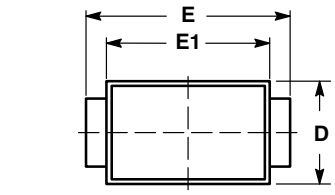
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

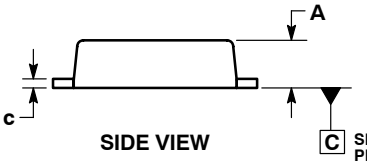
SMA−FL
CASE 403AA−01
ISSUE O

DATE 02 MAR 2011

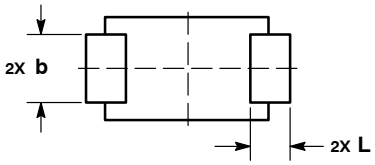
SCALE 2:1



TOP VIEW

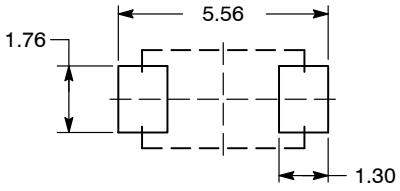


SIDE VIEW



BOTTOM VIEW

RECOMMENDED
SOLDER FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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 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

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DESCRIPTION:	**SMA−FL**		**PAGE 1 OF 1**

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Email Requests to: orderlit@onsemi.com

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TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800−282−9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

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