

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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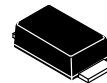
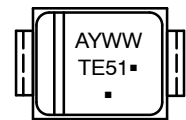
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SCHOTTKY BARRIER RECTIFIERS 5 AMPERES 100 VOLTS

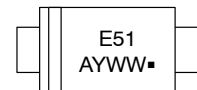
MARKING DIAGRAMS



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, NRVTSF5100E

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) | | | $^\circ\text{C}/\text{W}$ |
| (NRVTSF5100E) 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 mm² 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 | μA 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 μs , Duty Cycle $\leq 2.0\%$.

NRVTSS5100E, NRVTSAF5100E

TYPICAL CHARACTERISTICS

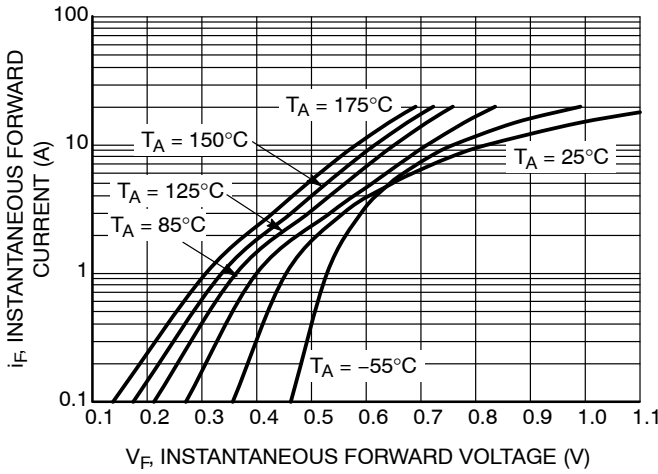


Figure 1. Typical Instantaneous Forward Characteristics

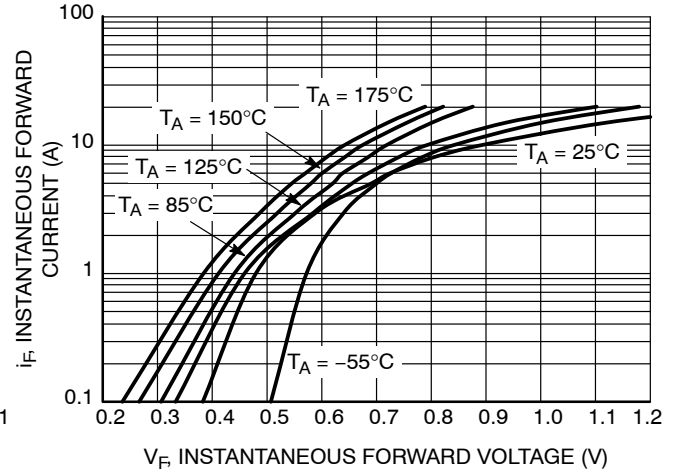


Figure 2. Maximum Instantaneous Forward Characteristics

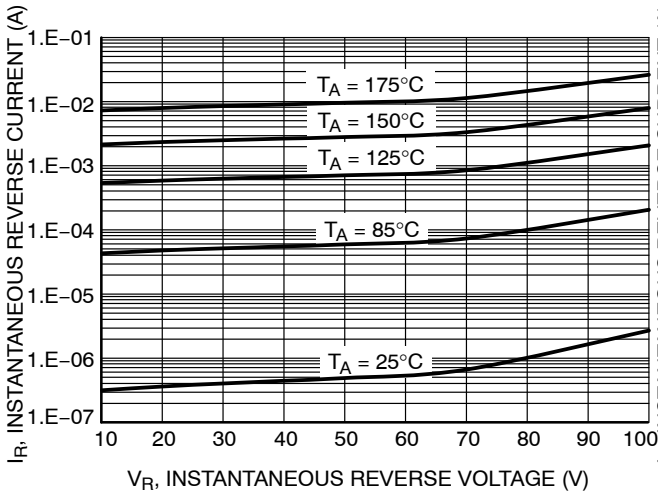


Figure 3. Typical Reverse Characteristics

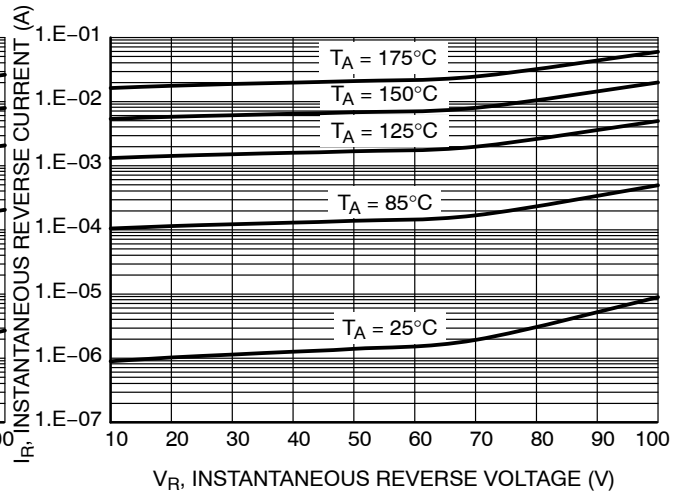


Figure 4. Maximum Reverse Characteristics

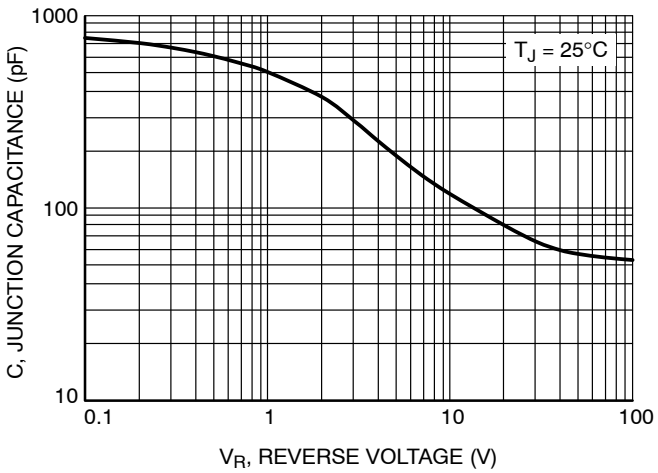


Figure 5. Typical Junction Capacitance

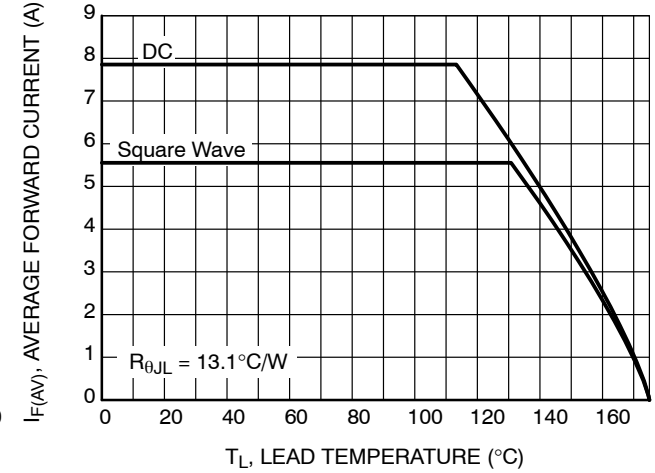


Figure 6. Current Derating per Diode for NRVTSS5100E

NRVTSS5100E, NRVTSAF5100E

TYPICAL CHARACTERISTICS

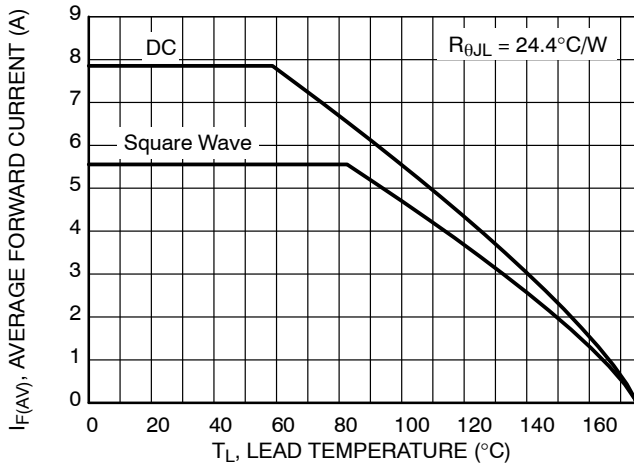


Figure 7. Current Derating per Diode for NRVTSAF5100E

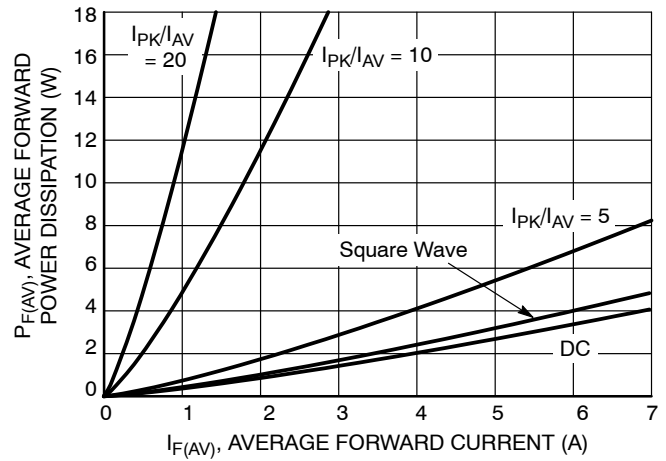


Figure 8. Forward Power Dissipation

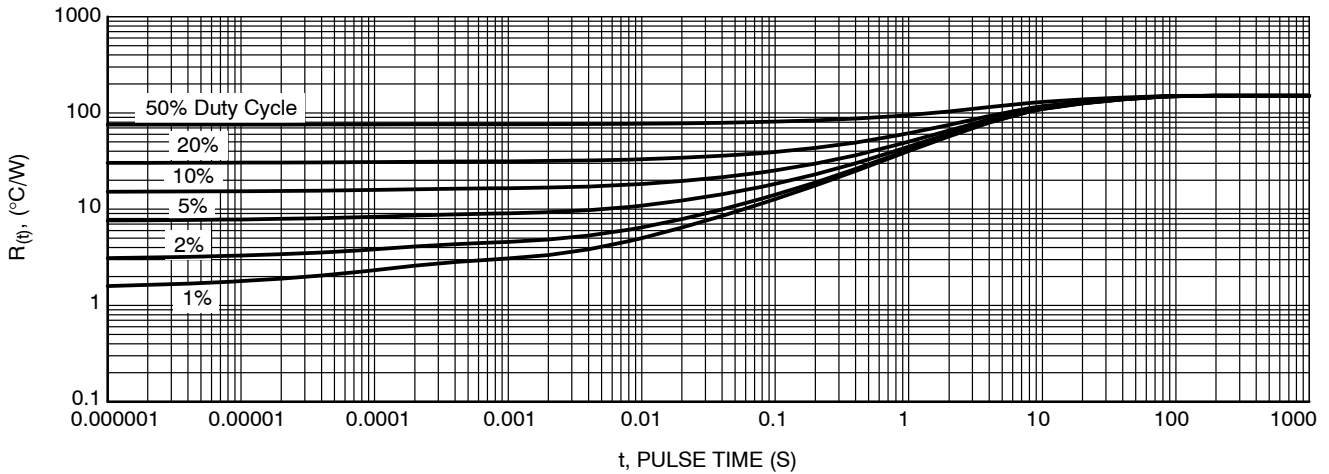


Figure 9. Transient Thermal Response, Junction-to-Ambient, for NRVTS5100E

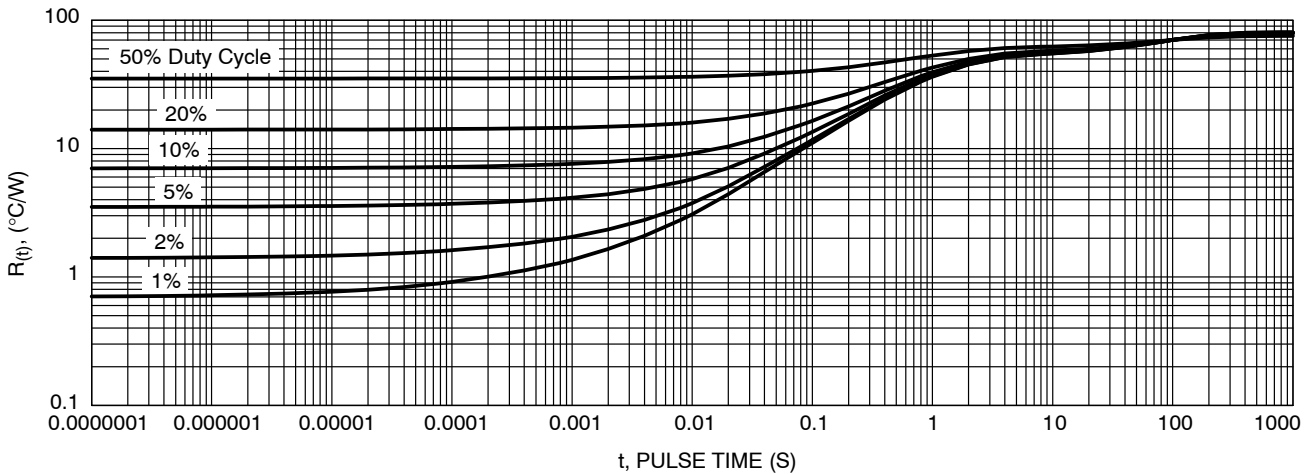


Figure 10. Transient Thermal Response, Junction-to-Ambient, for NRVTSAF5100E

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 1:1

Polarity Band



SCALE 1:1

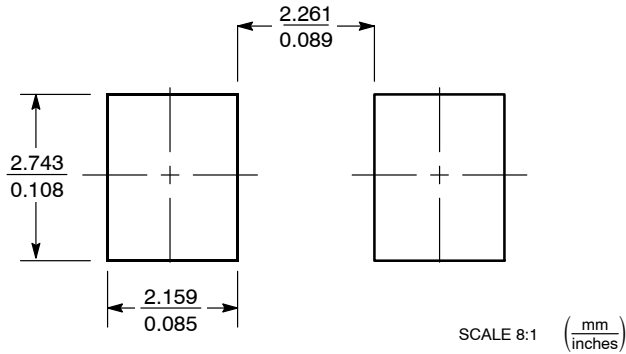
Non-Polarity Band

SMB
CASE 403A-03
ISSUE J

DATE 19 JUL 2012



SOLDERING FOOTPRINT*



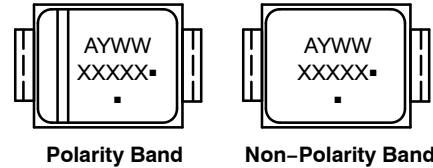
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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.

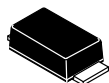
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MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

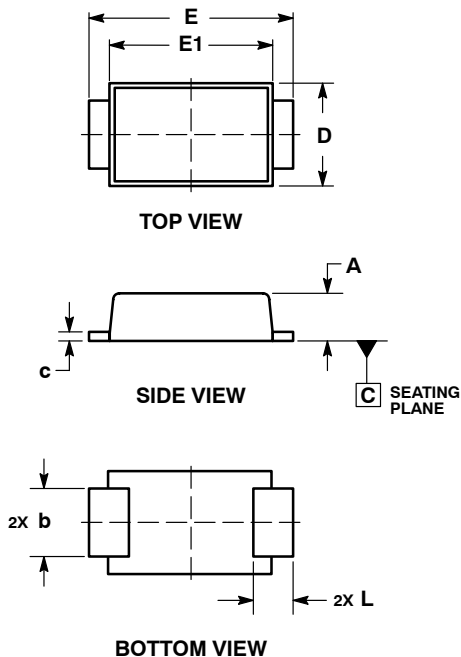
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SCALE 2:1

SMA-FL
CASE 403AA-01
ISSUE O

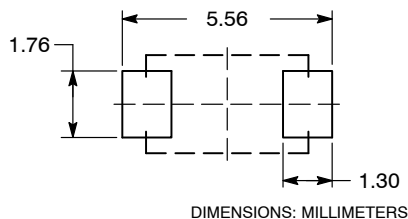
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- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.

| 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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