

# NRVTS3100E, NRVTS3100E

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

### 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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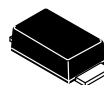
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## SCHOTTKY BARRIER RECTIFIERS 3 AMPERES 100 VOLTS

### MARKING DIAGRAMS



SMA  
CASE 403D  
STYLE 1



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†             |
|---------------|---------------------|-----------------------|
| NRVTS3100ET3G | SMA<br>(Pb-Free)    | 5000 /<br>Tape & Reel |
| NRVTS3100ET3G | SMA-FL<br>(Pb-Free) | 5000 /<br>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.

# NRVTS3100E, NRVTS3100E

## MAXIMUM RATINGS

| Rating                                                                                                      | Symbol                          | Value       | Unit             |
|-------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                      | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 100         | V                |
| Average Rectified Forward Current<br>( $T_L = 134^\circ\text{C}$ )                                          | $I_{F(AV)}$                     | 3.0         | A                |
| Peak Repetitive Forward Current,<br>(Square Wave, 20 kHz, $T_L = 127^\circ\text{C}$ )                       | $I_{FRM}$                       | 6.0         | A                |
| Non-Repetitive Peak Surge Current<br>(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)                                                                               |                                 | 1A          |                  |
| 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          | Typ | Max  | Unit               |
|---------------------------------------------------|-----------------|-----|------|--------------------|
| Maximum Thermal Resistance, Steady State (Note 1) |                 |     |      | $^\circ\text{C/W}$ |
| NRVTS3100E<br>Junction-to-Lead                    | $R_{\theta JL}$ | –   | 22   |                    |
| Junction-to-Ambient                               | $R_{\theta JA}$ | –   | 80   |                    |
| NRVTS3100E<br>Junction-to-Lead                    | $R_{\theta JL}$ | –   | 23.8 |                    |
| Junction-to-Ambient                               | $R_{\theta JA}$ | –   | 82   |                    |

## ELECTRICAL CHARACTERISTICS

|                                                                                                                                                                                                                                                      |       |                                  |                             |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----------------------------|---------------------|
| Instantaneous Forward Voltage (Note 2)<br>( $i_F = 1.0$ Amps, $T_J = 25^\circ\text{C}$ )<br>( $i_F = 3.0$ Amps, $T_J = 25^\circ\text{C}$ )<br><br>( $i_F = 1.0$ Amps, $T_J = 125^\circ\text{C}$ )<br>( $i_F = 3.0$ Amps, $T_J = 125^\circ\text{C}$ ) | $V_F$ | 0.61<br>0.88<br><br>0.53<br>0.66 | –<br>0.995<br><br>–<br>0.70 | V                   |
| Reverse Current (Note 2)<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )                                                                                                                          | $I_R$ | 0.90<br>0.62                     | 5.0<br>2.0                  | $\mu\text{A}$<br>mA |
| Diode Capacitance<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ , $f = 1$ MHz)                                                                                                                                                                      | $C_d$ | 14.3                             |                             | 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.

- Assumes 600 mm<sup>2</sup> 1 oz. copper bond pad, on a FR4 board.
- Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

TYPICAL CHARACTERISTICS

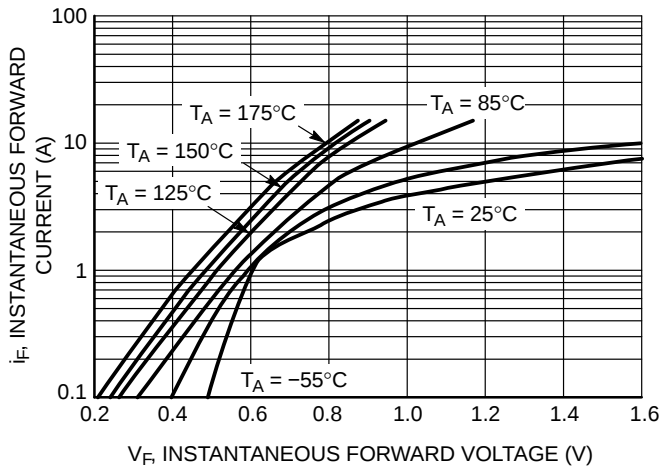


Figure 1. Typical Instantaneous Forward Characteristics

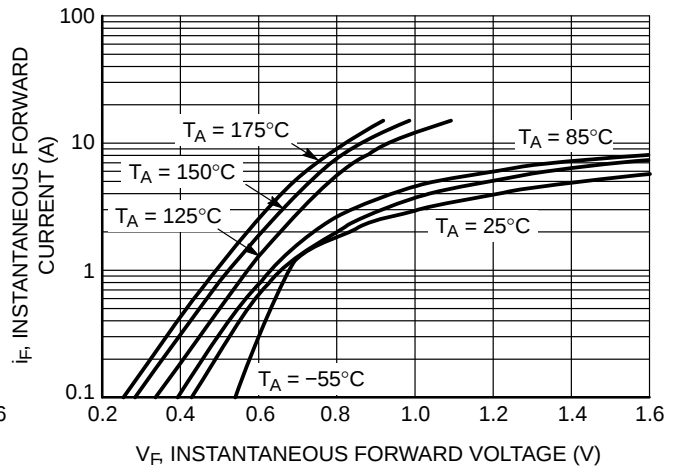


Figure 2. Maximum Instantaneous Forward Characteristics

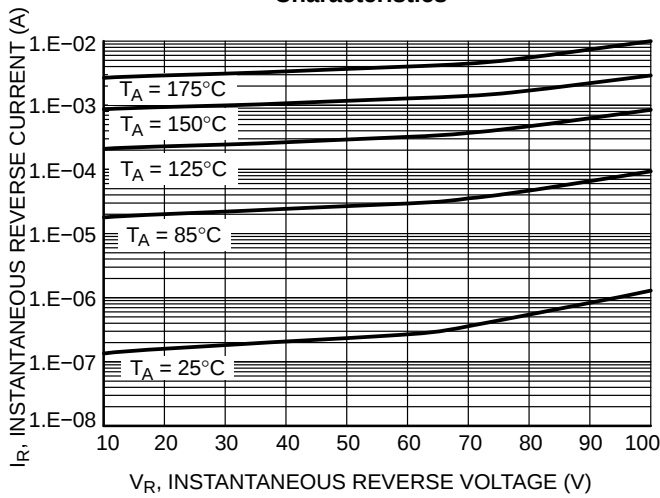


Figure 3. Typical Reverse Characteristics

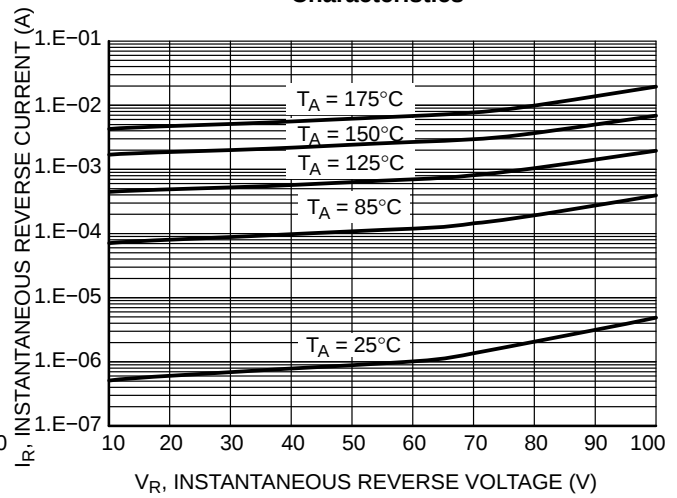


Figure 4. Maximum Reverse Characteristics

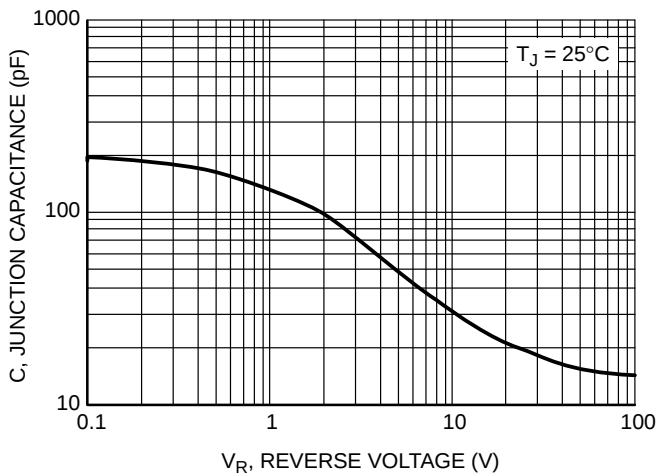


Figure 5. Typical Junction Capacitance

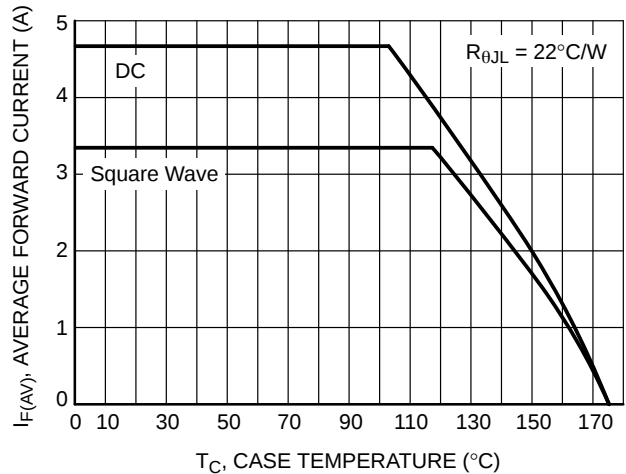


Figure 6. Current Derating for NRVTS3100E

# NRVTS3100E, NRVTS3100E

## TYPICAL CHARACTERISTICS

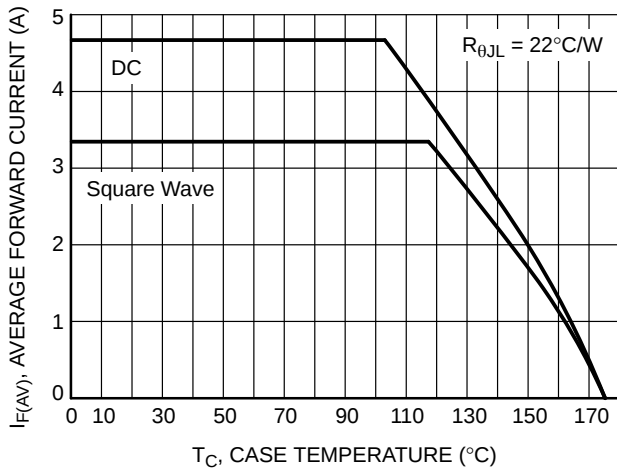


Figure 7. Current Derating for NRVTS3100E

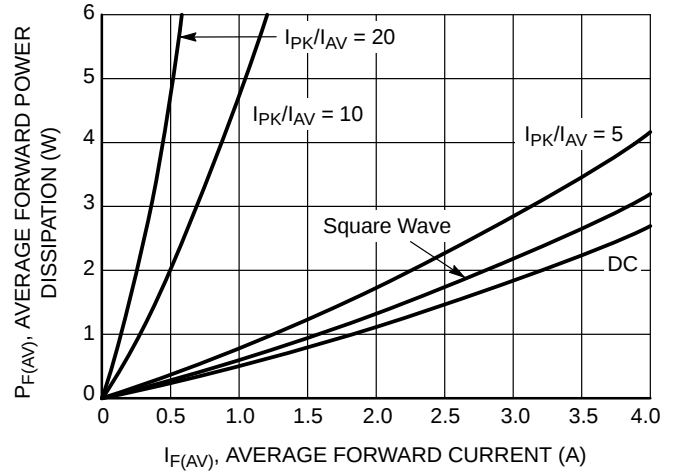


Figure 8. Forward Power Dissipation

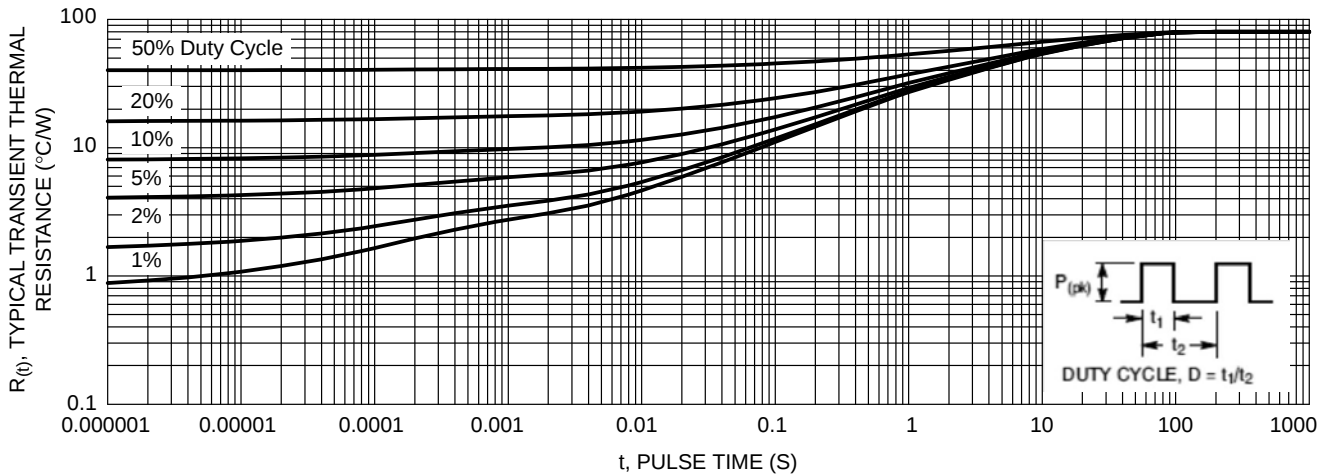


Figure 9. Typical Transient Thermal Response, Junction-to-Ambient for NRVTS3100E

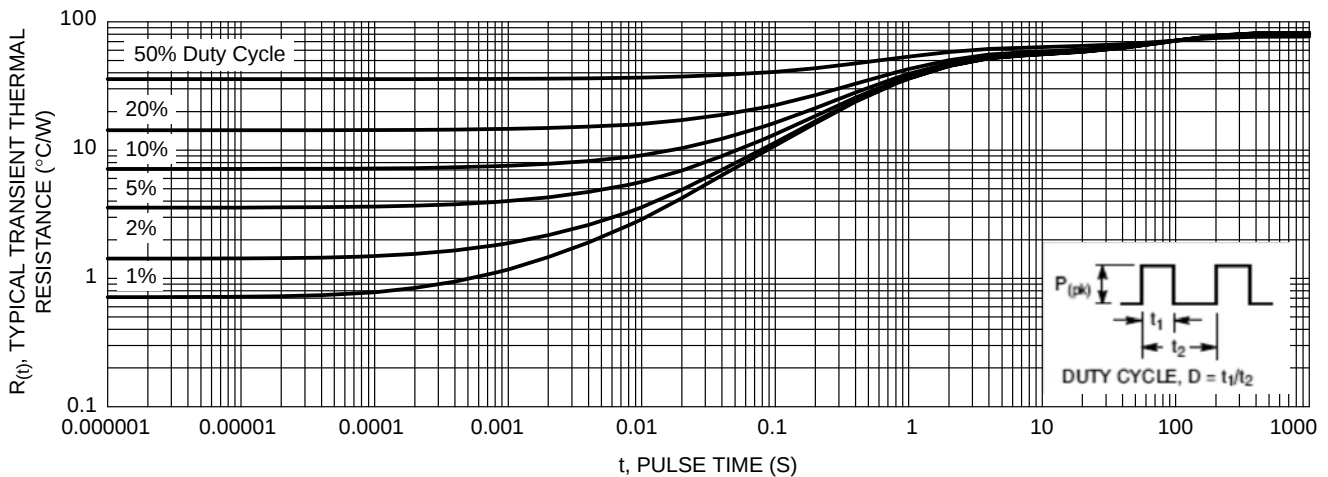
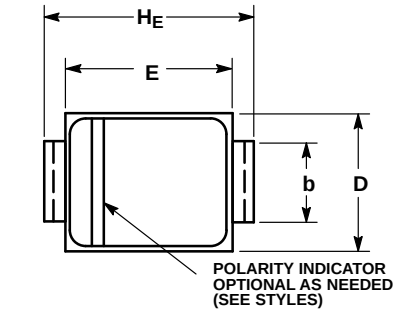


Figure 10. Typical Transient Thermal Response, Junction-to-Ambient for NRVTS3100E

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## PACKAGE DIMENSIONS

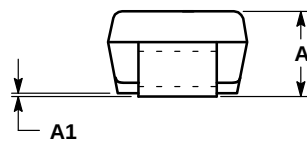
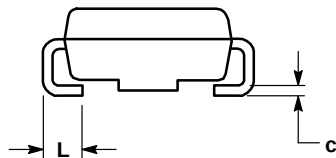
### SMA CASE 403D-02 ISSUE G



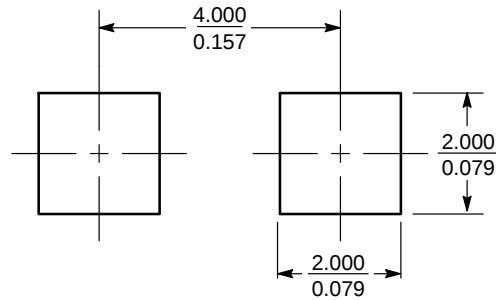
#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
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 |
| b   | 1.27        | 1.45 | 1.63 | 0.050  | 0.057 | 0.064 |
| c   | 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_E | 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 |



#### SOLDERING FOOTPRINT\*



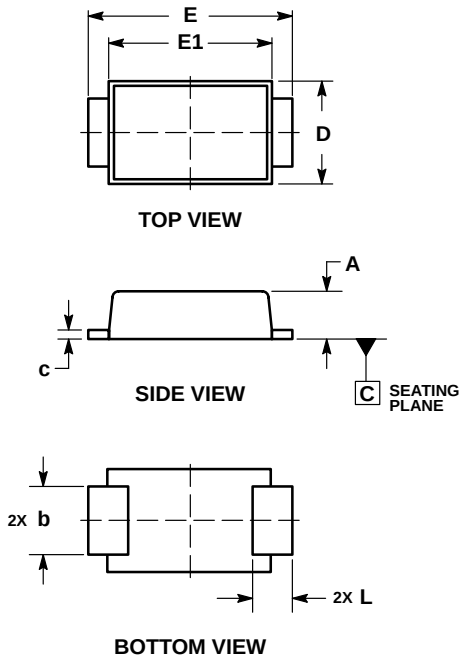
SCALE 8:1  $\left(\frac{\text{mm}}{\text{inches}}\right)$

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

# NRVTS3100E, NRVTS3100E

## PACKAGE DIMENSIONS

### SMA-FL CASE 403AA ISSUE O

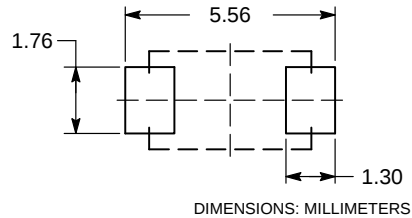


#### NOTES:

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

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | 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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