

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

## NRV TSA3100E

### 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

SCHOTTKY BARRIER  
 RECTIFIERS  
 3 AMPERES  
 100 VOLTS



SMA  
 CASE 403D  
 STYLE 1

### MARKING DIAGRAM



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

### ORDERING INFORMATION

| Device               | Package   | Shipping†   |
|----------------------|-----------|-------------|
| NRV TSA3100ET3G      | SMA       | 5000 /      |
| NRV TSA3100ET3G-GA01 | (Pb-Free) | 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

## 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 (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                             | Typ    | Max      | Unit                      |
|--|------------------------------------|--------|----------|---------------------------|
| Maximum Thermal Resistance, Steady State (Note 1)<br>Junction-to-Lead<br>Junction-to-Ambient | $R_{\theta JL}$<br>$R_{\theta JA}$ | -<br>- | 22<br>80 | $^\circ\text{C}/\text{W}$ |

## 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

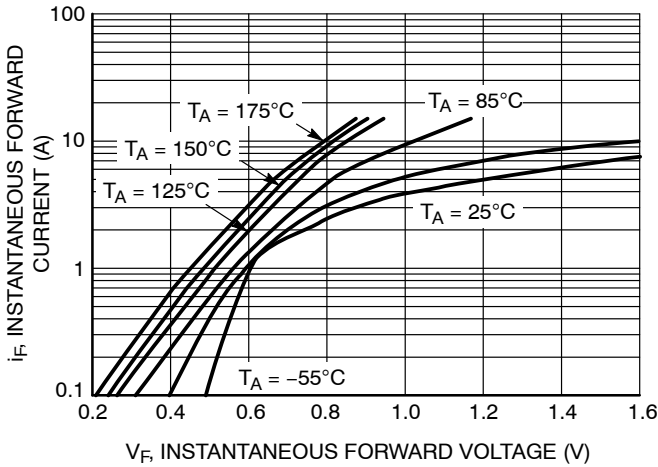


Figure 1. Typical Instantaneous Forward Characteristics

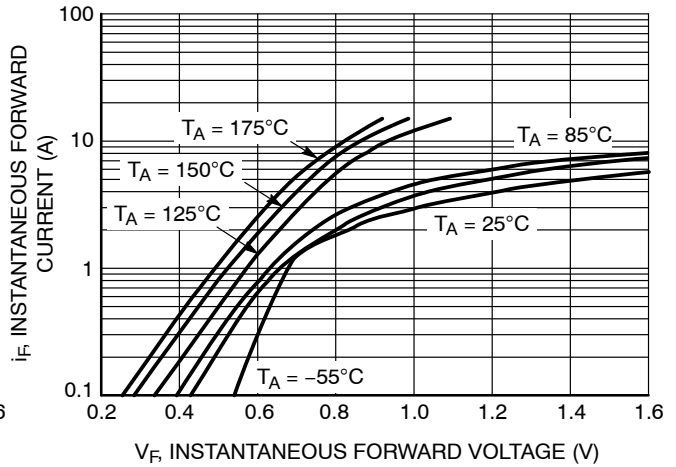


Figure 2. Maximum Instantaneous Forward Characteristics

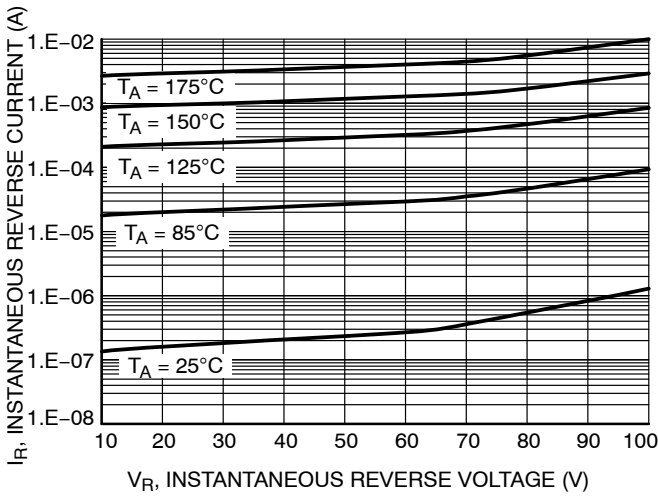


Figure 3. Typical Reverse Characteristics

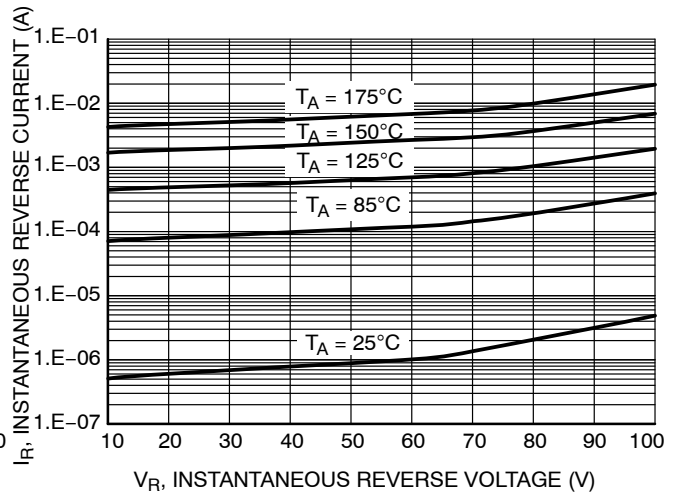


Figure 4. Maximum Reverse Characteristics

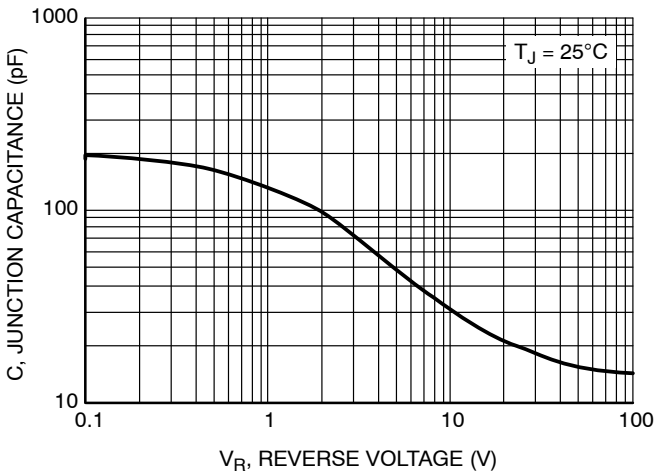


Figure 5. Typical Junction Capacitance

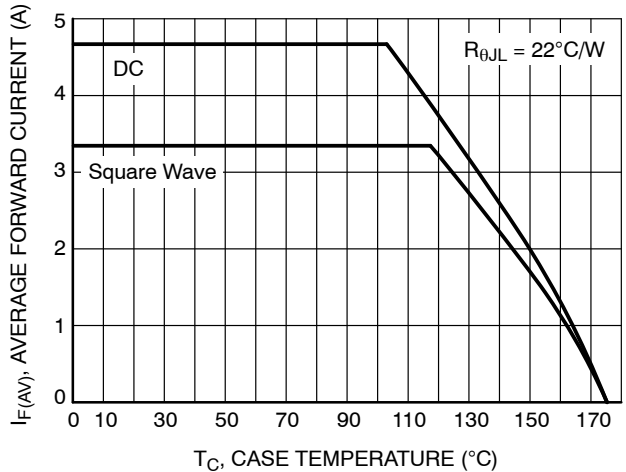


Figure 6. Current Derating

# NRVTS3100E

## TYPICAL CHARACTERISTICS

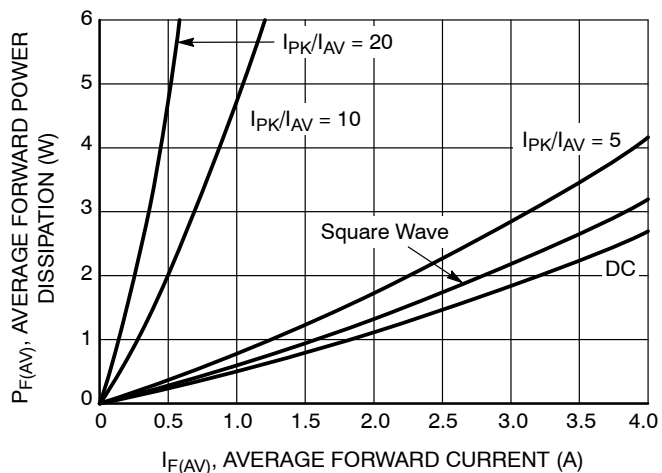


Figure 7. Forward Power Dissipation

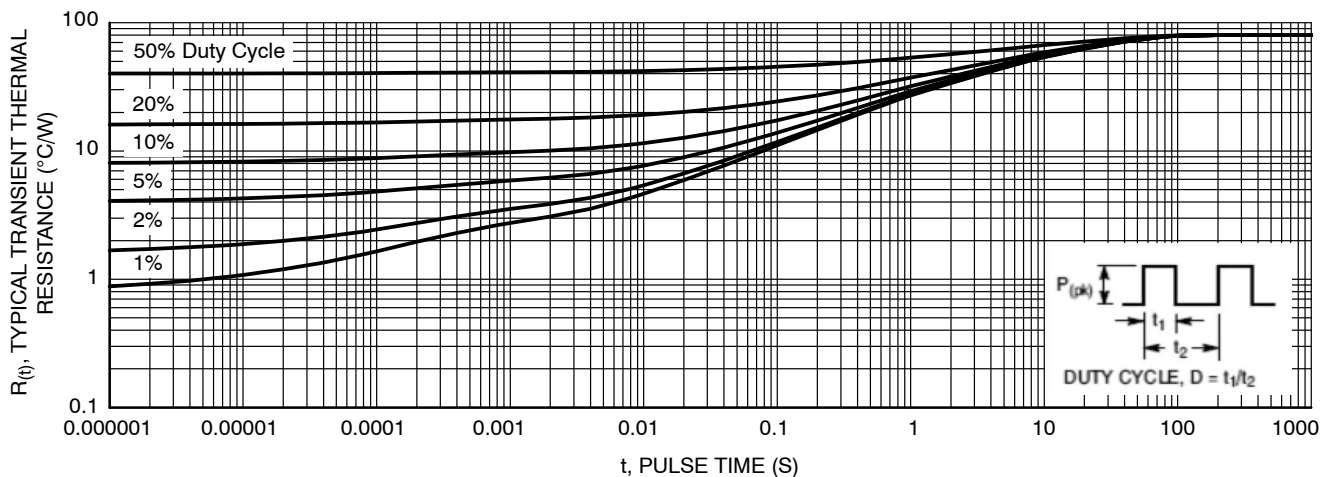


Figure 8. Typical Transient Thermal Response, Junction-to-Ambient

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

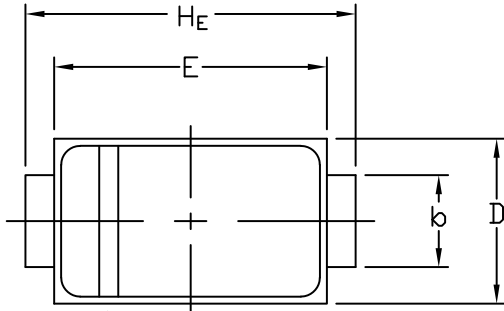


STYLE 1    STYLE 2

SCALE 1:1

**SMA**  
CASE 403D  
ISSUE J

DATE 22 OCT 2021

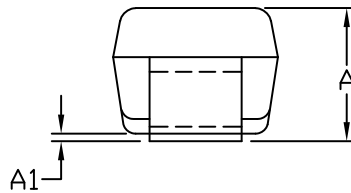
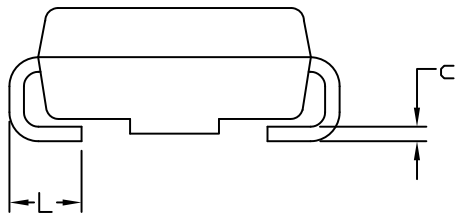


POLARITY INDICATOR  
OPTIONAL AS NEEDED

NOTES:

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

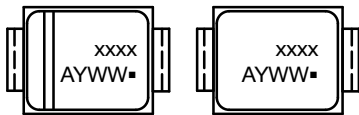
| DIM      | MILLIMETERS |      |      | INCHES |       |       |
|----------|-------------|------|------|--------|-------|-------|
|          | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A        | 1.97        | 2.10 | 2.20 | 0.078  | 0.083 | 0.087 |
| A1       | 0.05        | 0.10 | 0.20 | 0.002  | 0.004 | 0.008 |
| <i>b</i> | 1.27        | 1.45 | 1.63 | 0.050  | 0.057 | 0.064 |
| <i>c</i> | 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 |
| HE       | 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 |



STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

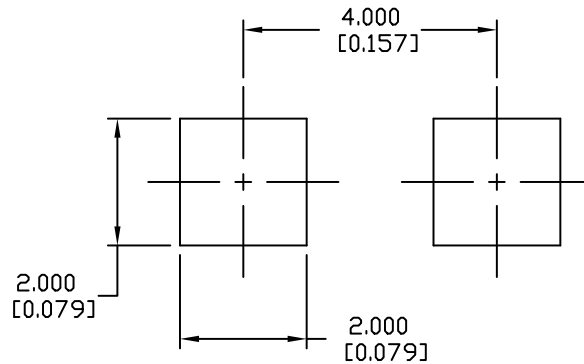
STYLE 2:  
NO POLARITY

**GENERIC MARKING DIAGRAM\***



STYLE 1                  STYLE 2

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



RECOMMENDED MOUNTING FOOTPRINT

\*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. Some products may not follow the Generic Marking.

|                         |                    |  |
|-------------------------|--------------------|--|
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