

# Exceptionally Low Leakage Trench-based Schottky Rectifier

## NTS1045EMFS, NRVTS1045EMFS

**SCHOTTKY BARRIER  
RECTIFIERS  
10 AMPERES  
45 VOLTS**

1,2,3  5,6

### Features

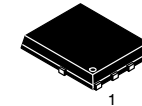
- Fine Lithography Trench-based Schottky Technology for Very Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- NRV Prefix for Automotive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

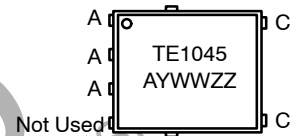
### Mechanical Characteristics:

- 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



**SO-8 FLAT LEAD  
CASE 488AA  
STYLE 2**

### MARKING DIAGRAM



TE1045 = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
ZZ = Lot Traceability

### ORDERING INFORMATION

| Device           | Package              | Shipping†             |
|------------------|----------------------|-----------------------|
| NTS1045EMFST1G   | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |
| NTS1045EMFST3G   | SO-8 FL<br>(Pb-Free) | 5000 /<br>Tape & Reel |
| NRVTS1045EMFST1G | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |
| NRVTS1045EMFST3G | SO-8 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.

# NTS1045EMFS, NRVTS1045EMFS

## 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>$V_R$ | 45          | V                |
| Average Rectified Forward Current<br>(Rated $V_R$ , $T_C = 166^\circ\text{C}$ )                             | $I_{F(AV)}$                     | 10          | A                |
| Peak Repetitive Forward Current,<br>(Rated $V_R$ , Square Wave, 20 kHz, $T_C = 162^\circ\text{C}$ )         | $I_{FRM}$                       | 20          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 210         | A                |
| Storage Temperature Range                                                                                   | $T_{stg}$                       | -65 to +175 | $^\circ\text{C}$ |
| Operating Junction Temperature                                                                              | $T_J$                           | -55 to +175 | $^\circ\text{C}$ |
| Unclamped Inductive Switching Energy (10 mH Inductor, Non-repetitive)                                       | $E_{AS}$                        | 100         | mJ               |
| ESD Rating (Human Body Model)                                                                               |                                 | 3B          |                  |
| ESD Rating (Machine Model)                                                                                  |                                 | M4          |                  |

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               |
|---------------------------------------------------------------------------------------------------------------------------|-----------------|-----|-----|--------------------|
| Thermal Resistance, Junction-to-Case, Steady State<br>(Assumes 600 mm <sup>2</sup> 1 oz. copper bond pad, on a FR4 board) | $R_{\theta JC}$ | -   | 2.0 | $^\circ\text{C/W}$ |

## ELECTRICAL CHARACTERISTICS

|                                                                                                                                                                                                                                                    |       |                                  |                            |                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|----------------------------|---------------------|
| Instantaneous Forward Voltage (Note 1)<br>( $i_F = 5.0$ Amps, $T_J = 25^\circ\text{C}$ )<br>( $i_F = 10$ Amps, $T_J = 25^\circ\text{C}$ )<br><br>( $i_F = 5.0$ Amps, $T_J = 125^\circ\text{C}$ )<br>( $i_F = 10$ Amps, $T_J = 125^\circ\text{C}$ ) | $V_F$ | 0.42<br>0.48<br><br>0.34<br>0.41 | -<br>0.60<br><br>-<br>0.53 | V                   |
| Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )                                                                                                                        | $i_R$ | 20<br>7.0                        | 50<br>20                   | $\mu\text{A}$<br>mA |
| Diode Capacitance<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ , $f = 1$ MHz)                                                                                                                                                                    | $C_d$ | 300                              |                            | 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.

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

TYPICAL CHARACTERISTICS

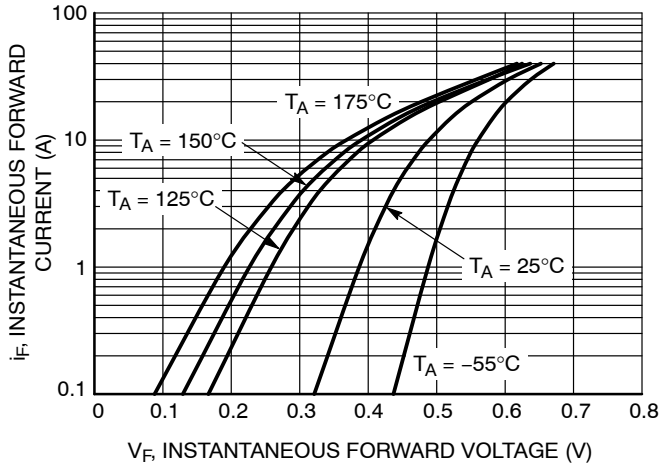


Figure 1. Typical Instantaneous Forward Characteristics

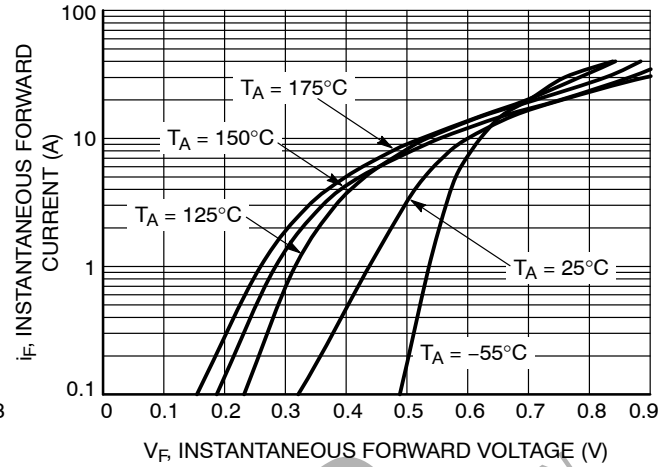


Figure 2. Maximum Instantaneous Forward Characteristics

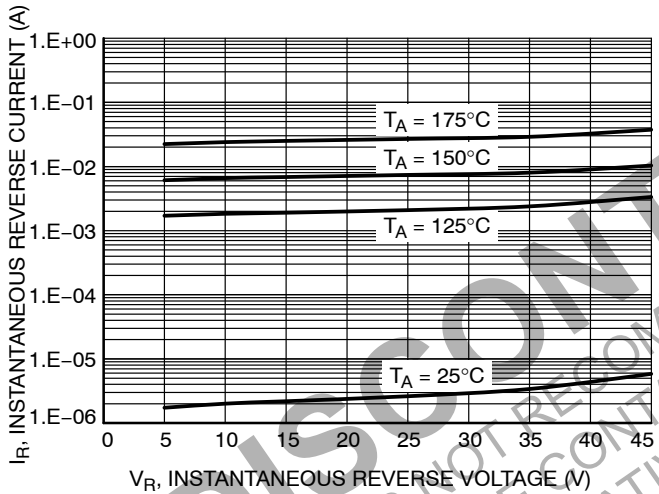


Figure 3. Typical Reverse Characteristics

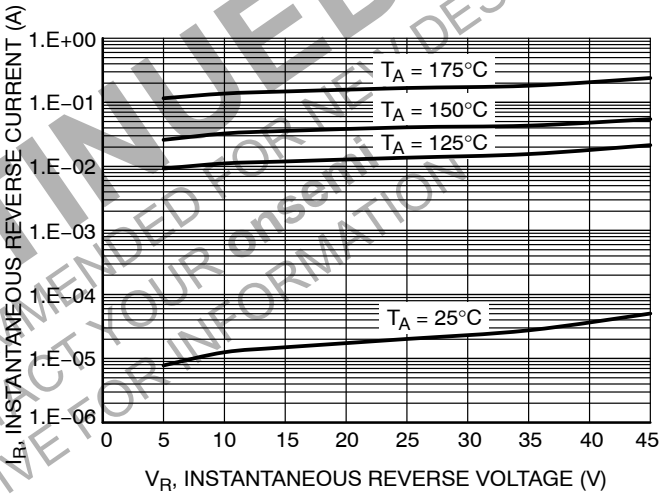


Figure 4. Maximum Reverse Characteristics

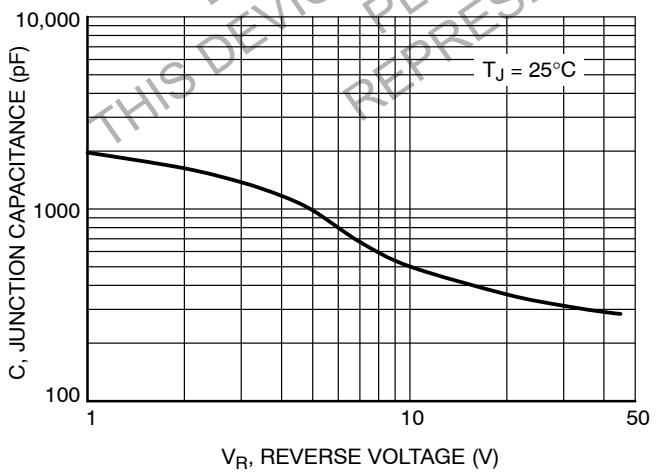


Figure 5. Typical Junction Capacitance

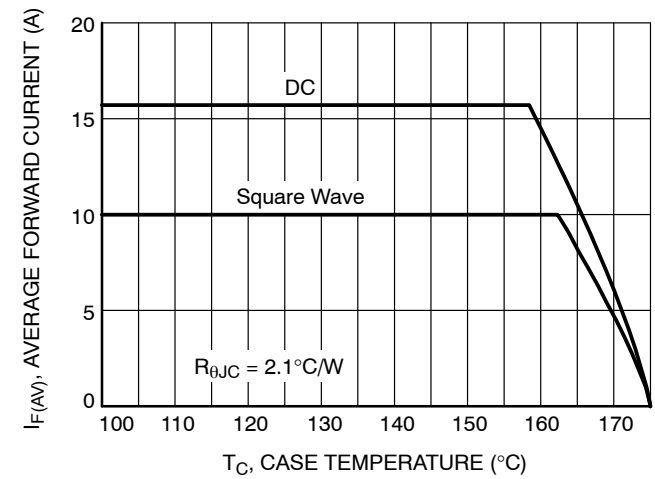


Figure 6. Current Derating

TYPICAL CHARACTERISTICS

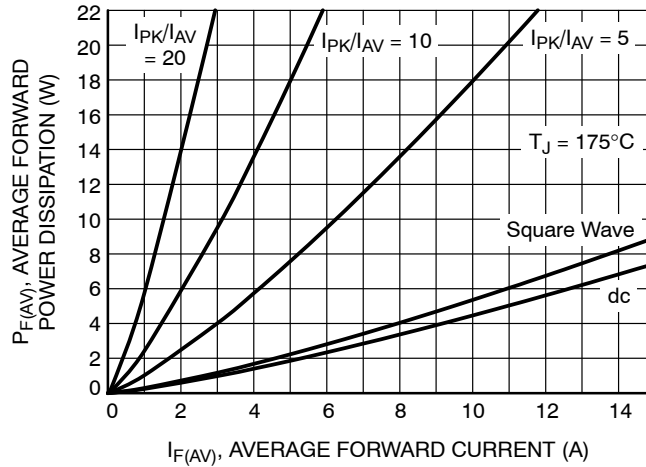


Figure 7. Forward Power Dissipation

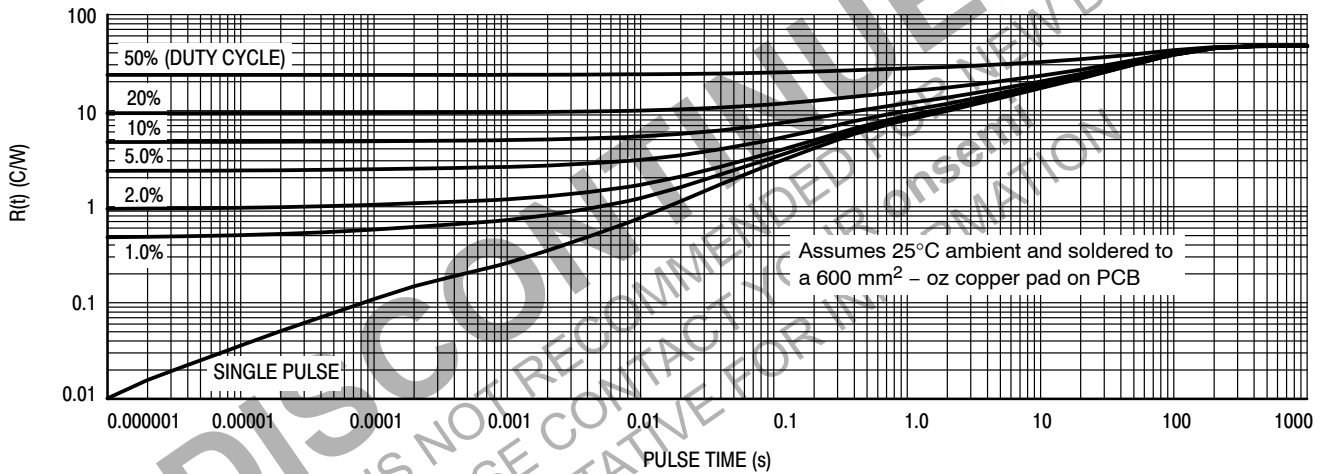


Figure 8. Typical Thermal Characteristics

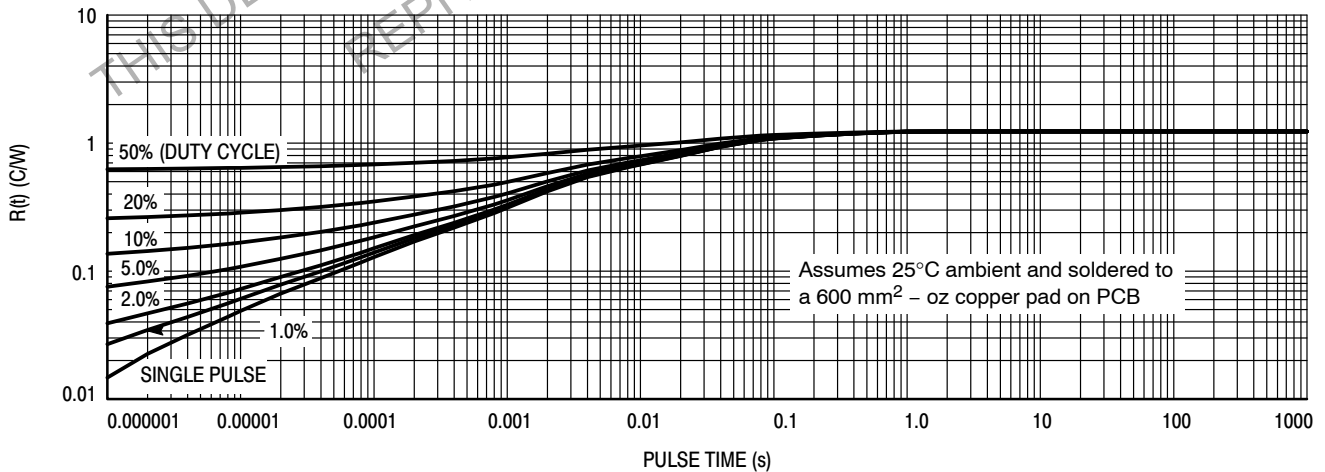
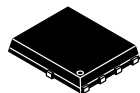


Figure 9. Typical Transient Thermal Response Characteristics, Junction-to-Case



SCALE 2:1

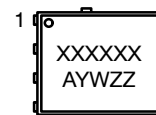
**DFN5 5x6, 1.27P**  
**(SO-8FL)**  
**CASE 488AA**  
**ISSUE N**

DATE 25 JUN 2018

## NOTES:

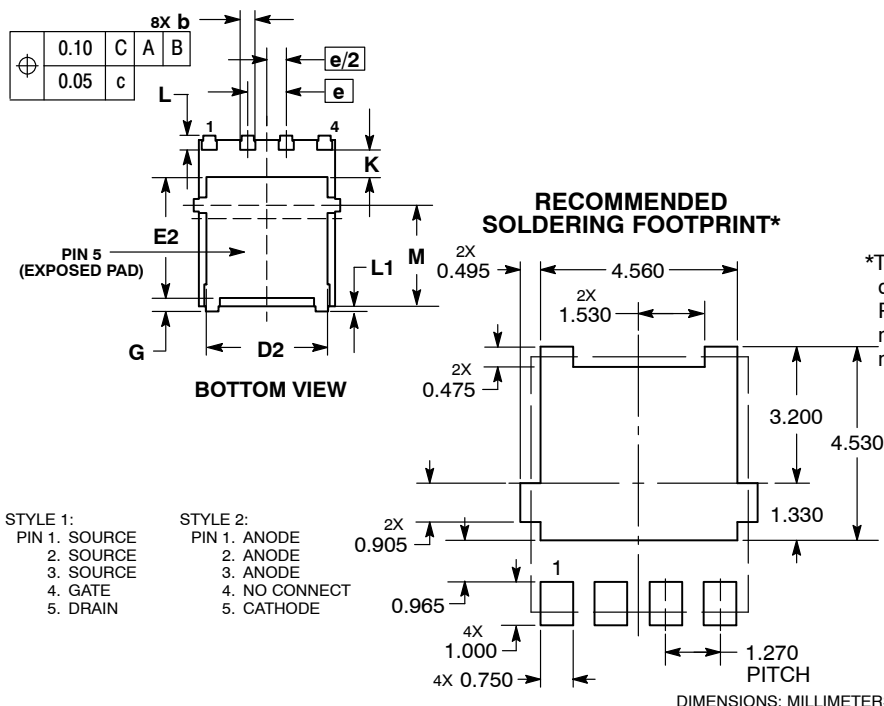
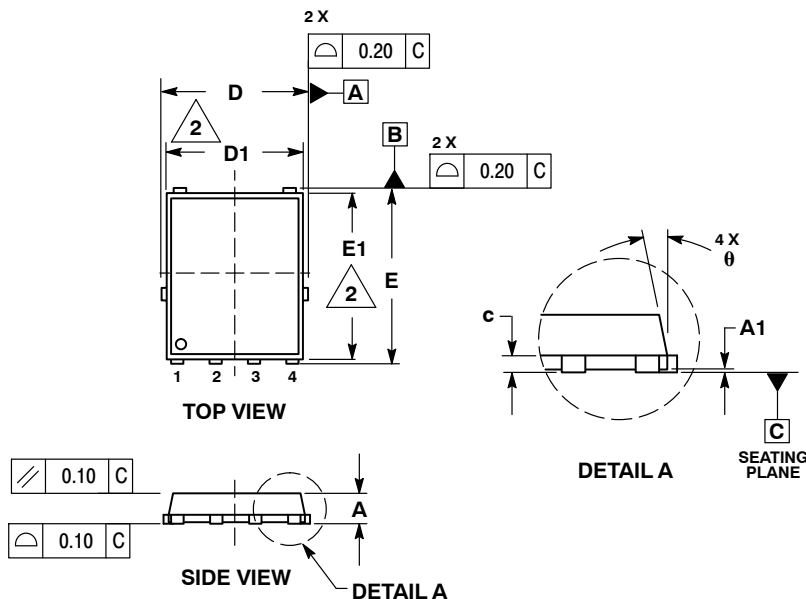
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| DIM | MILLIMETERS |       |      |
|-----|-------------|-------|------|
|     | MIN         | NOM   | MAX  |
| A   | 0.90        | 1.00  | 1.10 |
| A1  | 0.00        | ---   | 0.05 |
| b   | 0.33        | 0.41  | 0.51 |
| c   | 0.23        | 0.28  | 0.33 |
| D   | 5.00        | 5.15  | 5.30 |
| D1  | 4.70        | 4.90  | 5.10 |
| D2  | 3.80        | 4.00  | 4.20 |
| E   | 6.00        | 6.15  | 6.30 |
| E1  | 5.70        | 5.90  | 6.10 |
| E2  | 3.45        | 3.65  | 3.85 |
| e   | 1.27 BSC    |       |      |
| G   | 0.51        | 0.575 | 0.71 |
| K   | 1.20        | 1.35  | 1.50 |
| L   | 0.51        | 0.575 | 0.71 |
| L1  | 0.125 REF   |       |      |
| M   | 3.00        | 3.40  | 3.80 |
| θ   | 0°          | ---   | 12°  |

**GENERIC**  
**MARKING DIAGRAM\***


XXXXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
ZZ = Lot Traceability

\*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.



STYLE 1:  
PIN 1. SOURCE  
2. SOURCE  
3. SOURCE  
4. GATE  
5. DRAIN

STYLE 2:  
PIN 1. ANODE  
2. ANODE  
3. ANODE  
4. NO CONNECT  
5. CATHODE

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

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