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# Is Now



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# Schottky Barrier Rectifier Trench-based, High Performance

# NRVTS3060MFS

This Trench Schottky rectifier is high performance device in SO−8 FL package. The lower forward voltage, less leakage current, and small junction capacitance are suitable to high switching frequency high density DC to DC conversion application. Offering higher avalanche energy capability for Oring or reverse protection application. The SO−8 FL package provides an excellent thermal performance, less land area of board space, and low profile.

### Features

- Lower Forward Voltage Drop
- Less Leakage Current in High Temperature
- Small Junction Capacitance for High Switching Frequency
- Higher Avalanche Energy Capability
- 175°C Operating Junction Temperature
- Good Alternative Solution of SMC and DPAK Package
- Small Footprint − Land Area: 31.2 $mm^2$
- Low Profile − Maximum Height of 1.1 mm
- NRVTS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

### Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 95 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds
- MSL 1

### Applications

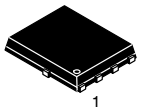
- High Switching Frequency DC/DC Converter
- 2nd Rectifier
- Freewheeling Diode used with Inductive Load
- Oring / Reverse Protection

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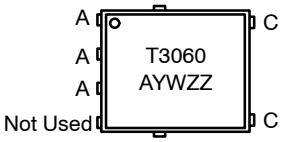
**TRENCH SCHOTTKY RECTIFIER 30 AMPERES 60 VOLTS**




**SO−8 FLAT LEAD CASE 488AA STYLE 2**

**MARKING DIAGRAM**




| | |
|---|---|
| T3060 | = Specific Device Code |
| A | = Assembly Location |
| Y | = Year |
| W | = Work Week |
| ZZ | = Lot Traceability |

**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| NRVTS3060MFST3G | SO−8 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.

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## 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>$V_R$ | 60 | V |
| Continuous Forward Current ($T_C$ = 164°C, DC) | | $I_{F(DC)}$ | 30 | A |
| Peak Repetitive Forward Current ($T_C$ = 162°C, Square Wave, Duty = 0.5) | | $I_{FRM}$ | 60 | A |
| Non−Repetitive Peak Surge Current | Sinusoidal Halfwave, 8.3 ms | $I_{FSM}$ | 350 | A |
| | Square wave, 1 ms | | 600 | |
| | Square wave, 100 μs | | 1200 | |
| Non−Repetitive Avalanche Energy ($T_J$ = 25°C) | | $E_{AS}$ | 800 | mJ |
| Storage Temperature Range | | $T_{stg}$ | −65 to +175 | °C |
| Operating Junction Temperature Range (Note 1) | | $T_J$ | −55 to +175 | °C |
| 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.

1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient $dP_D/dT_J < 1/R_{\theta JA}$

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 56 | °C/W |
| Thermal Resistance, Junction−to−Case Bottom (Note 2) | $R_{\theta JCB}$ | 0.65 | °C/W |
| Thermal Characterization, Junction−to−Case Top (Note 2) | $\psi_{JCT}$ | 3.72 | °C/W |
| Thermal Characterization, Junction−to−Lead of Cathode (Note 2) | $\psi_{JLC}$ | 1.44 | °C/W |

2. Assume 600 $mm^2$, 1 oz. copper bond pad on a FR4 board.

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Typ | Max | Unit |
|---|---|---|---|---|
| Instantaneous Forward Voltage | $V_F$ | | | V |
| ($I_F$ = 15 A, $T_J$ = 25°C) | | 0.48 | – | |
| ($I_F$ = 15 A, $T_J$ = 125°C) | | 0.40 | – | |
| ($I_F$ = 30 A, $T_J$ = 25°C) | | 0.53 | 0.60 | |
| ($I_F$ = 30 A, $T_J$ = 125°C) | | 0.48 | 0.57 | |
| Instantaneous Reverse Current | $I_R$ | | | |
| ($V_R$ = Rated DC Voltage, $T_J$ = 25°C) | | 17 | 100 | μA |
| ($V_R$ = Rated DC Voltage, $T_J$ = 125°C) | | 10 | 30 | mA |
| Junction Capacitance | $C_J$ | | | pF |
| ($V_R$ = 1 V, $T_J$ = 25°C, f = 1 MHz) | | 3140 | – | |

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.

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.



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## TYPICAL CHARACTERISTICS

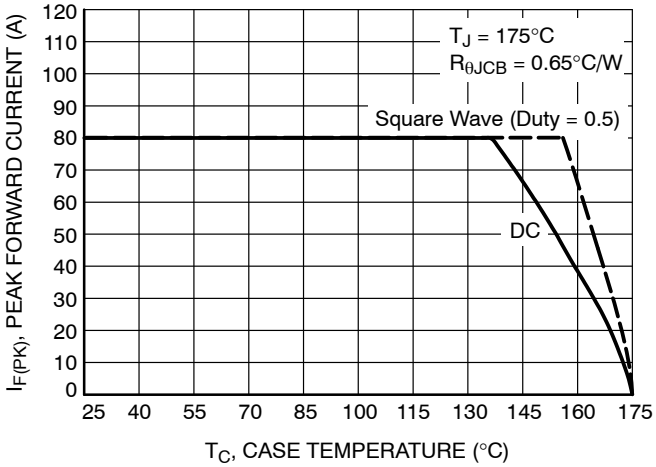



**Figure 1. Forward Current Derating of Case Temperature**

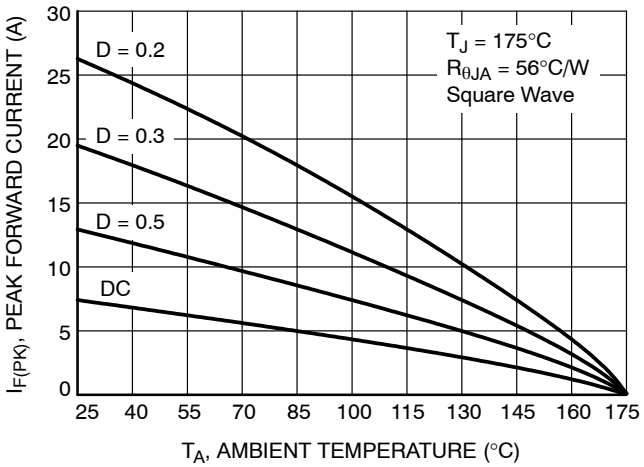



**Figure 2. Forward Current Derating of Ambient Temperature**

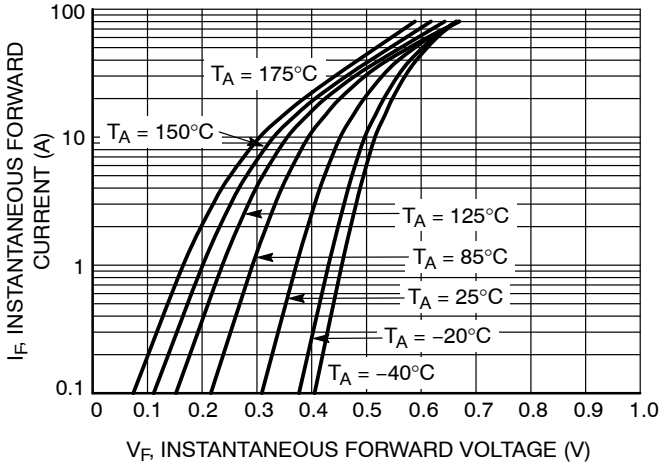



**Figure 3. Typical Forward Characteristics**

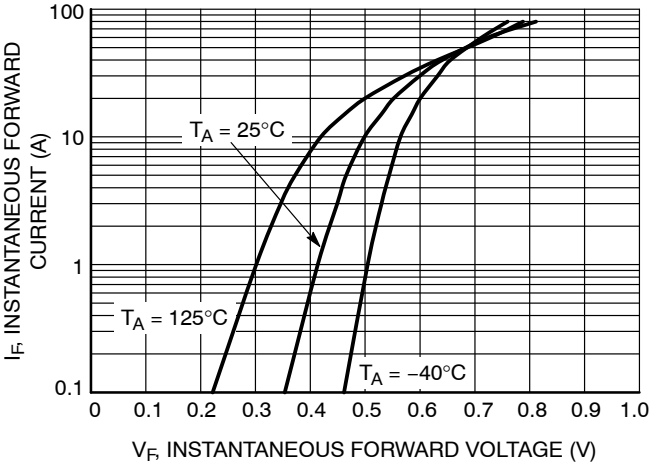



**Figure 4. Maximum Forward Characteristics**

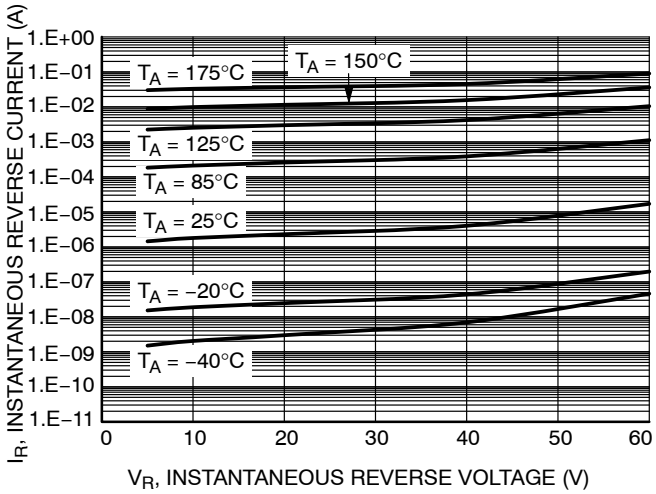



**Figure 5. Typical Reverse Characteristics**

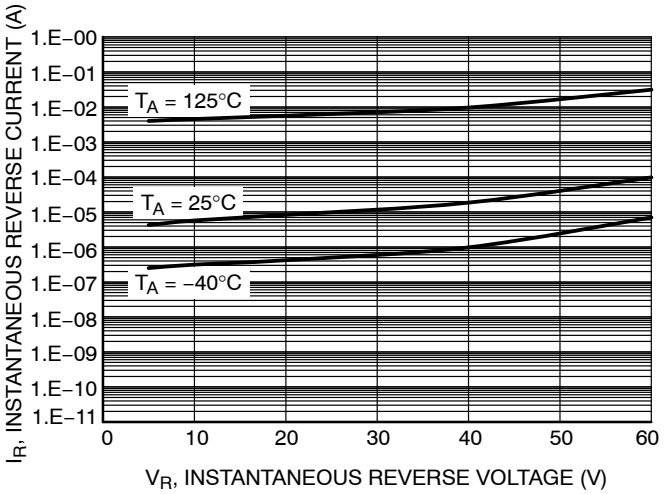



**Figure 6. Maximum Reverse Characteristics**



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## TYPICAL CHARACTERISTICS

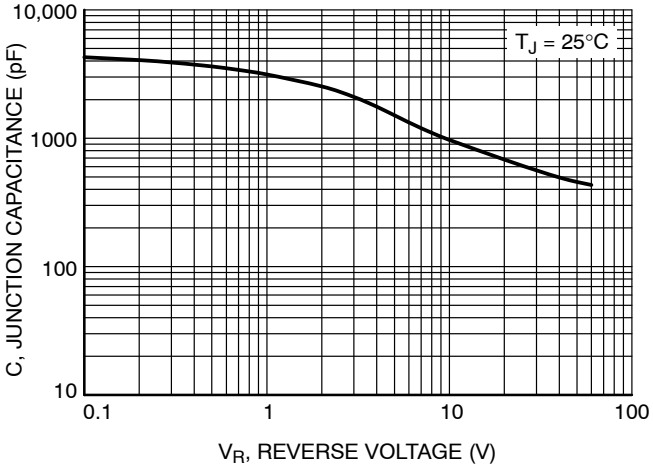



**Figure 7. Typical Junction Capacitance**

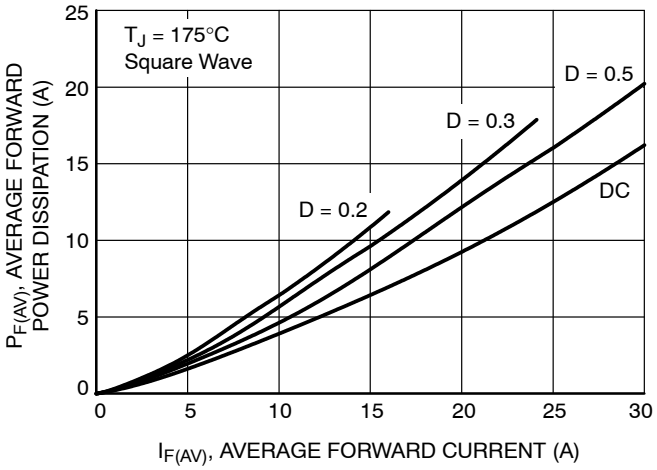



**Figure 8. Average Forward Power Dissipation**

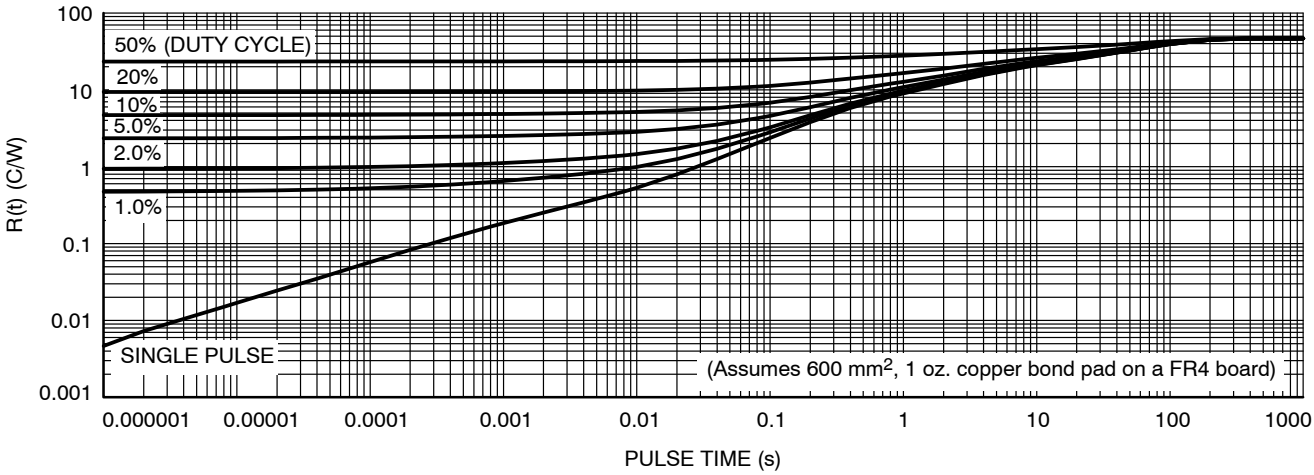



**Figure 9. Typical Thermal Characteristics, Junction−to−Ambient**

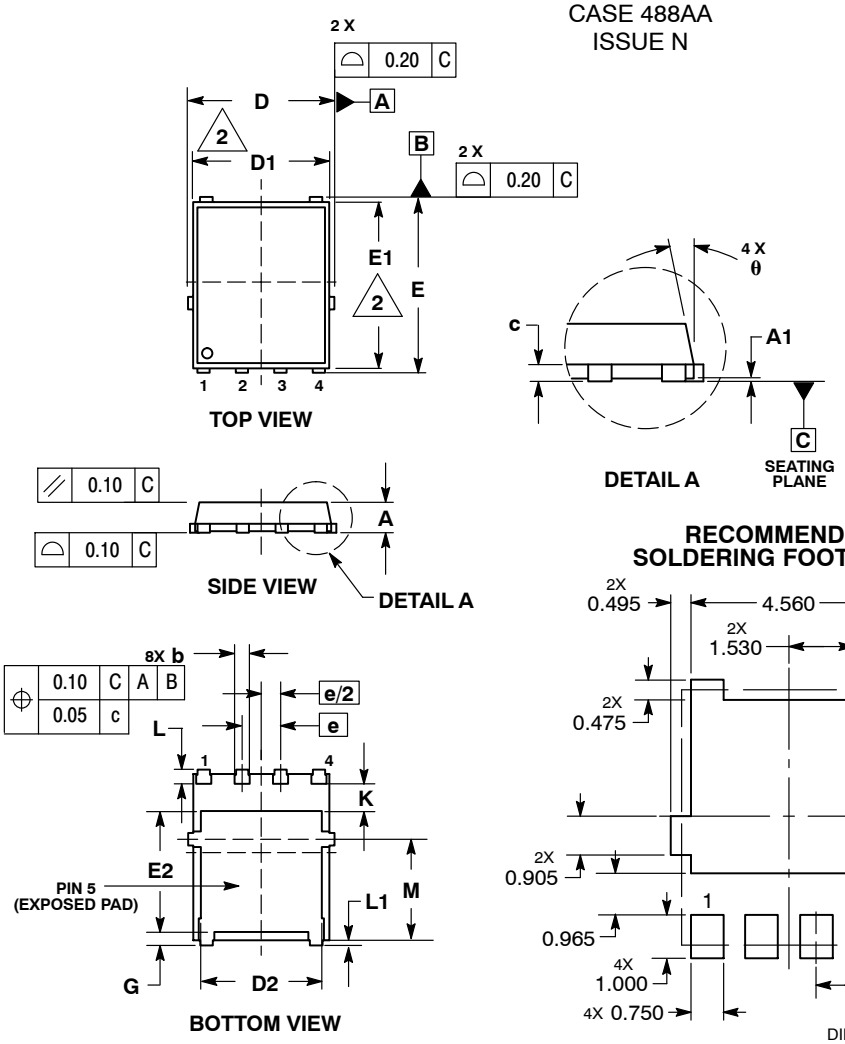


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# NRVTS3060MFS

## PACKAGE DIMENSIONS

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




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.

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

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

**RECOMMENDED SOLDERING 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.


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