

# Switch Mode Power Rectifiers

## MBR2045MFS, NRVB2045MFS

**SCHOTTKY BARRIER  
RECTIFIERS  
20 AMPERES  
45 VOLTS**

These state-of-the-art devices have the following features:

### Features

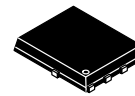
- Low Power Loss / High Efficiency
- New Package Provides Capability of Inspection and Probe After Board Mounting
- Guardring for Stress Protection
- Low Forward Voltage Drop
- 150°C Operating Junction Temperature
- Wettable Flacks Option Available
- NRVB Prefix for Automotive and Other Applications 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: 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

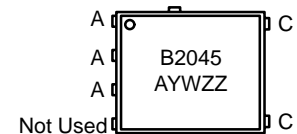
### Applications

- Output Rectification in Compact Portable Consumer Applications
- Freewheeling Diode used with Inductive Loads



SO-8 FLAT LEAD  
CASE 488AA  
STYLE 2

### MARKING DIAGRAM



B2045 = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
ZZ = Lot Traceability

### ORDERING INFORMATION

| Device          | Package              | Shipping†             |
|-----------------|----------------------|-----------------------|
| MBR2045MFST1G   | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |
| NRVB2045MFST1G* | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |

### DISCONTINUED (Note 1)

|                 |                      |                       |
|-----------------|----------------------|-----------------------|
| MBR2045MFST3G   | SO-8 FL<br>(Pb-Free) | 5000 /<br>Tape & Reel |
| NRVB2045MFST3G* | 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.

1. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

# MBR2045MFS, NRVB2045MFS

## 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 $V_R$ , $T_C = 130^\circ\text{C}$ )                             | $I_{F(AV)}$                     | 20          | A                |
| Peak Repetitive Forward Current,<br>(Rated $V_R$ , Square Wave, 20 kHz, $T_C = 135^\circ\text{C}$ )         | $I_{FRM}$                       | 40          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 400         | A                |
| Storage Temperature Range   | $T_{stg}$                       | -65 to +175 | $^\circ\text{C}$ |
| Operating Junction Temperature  | $T_J$                           | -55 to +150 | $^\circ\text{C}$ |
| Unclamped Inductive Switching Energy (10 mH Inductor, Non-repetitive)                                       | $E_{AS}$                        | 150         | 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.

NOTE: The heat generated must be less than the thermal conductivity from Junction-to-Ambient:  $dPD/dT_J < 1/R_{JA}$

## 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) | $R_{\theta JC}$ | -   | 1.6 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient, Steady State<br>(Assumes 600 mm <sup>2</sup> , 2-oz, 2 layer on a FR4 board)     | $R_{\theta JA}$ | -   | 45  | $^\circ\text{C/W}$ |

## ELECTRICAL CHARACTERISTICS

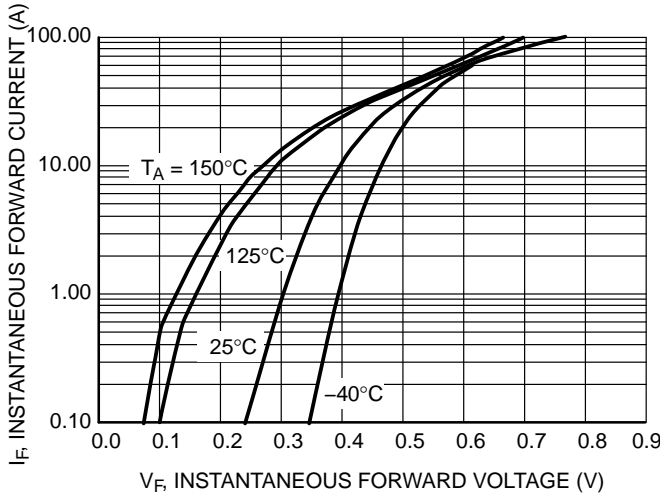
| Characteristic   | Symbol | Typ                          | Max                          | Unit |
|--|--------|------------------------------|------------------------------|------|
| Instantaneous Forward Voltage (Note 1)<br>( $i_F = 15\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $i_F = 15\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $i_F = 30\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $i_F = 30\text{ A}$ , $T_J = 25^\circ\text{C}$ ) | $V_F$  | 0.35<br>0.44<br>0.46<br>0.51 | 0.41<br>0.49<br>0.58<br>0.61 | V    |
| Instantaneous Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )  | $i_R$  | 200<br>0.3                   | 300<br>0.6                   | mA   |

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.

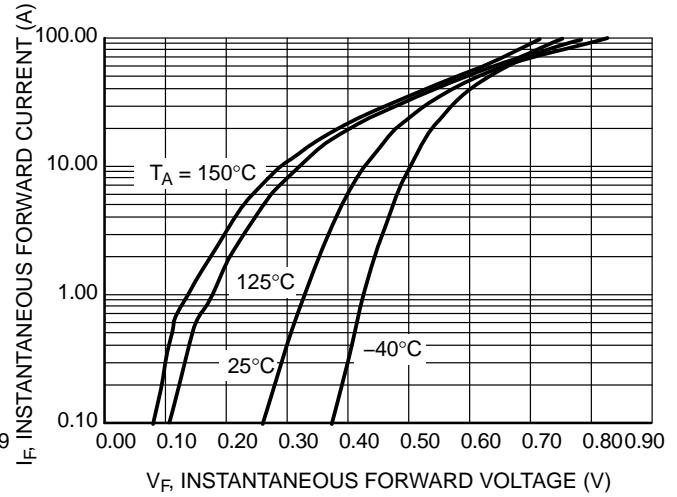
1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MBR2045MFS, NRVB2045MFS

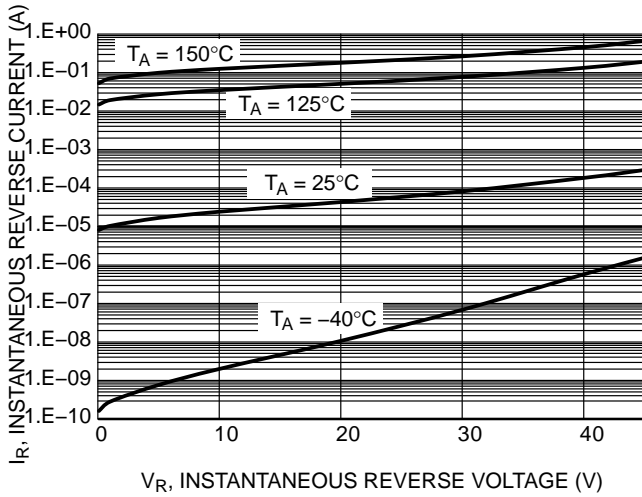
## TYPICAL CHARACTERISTICS



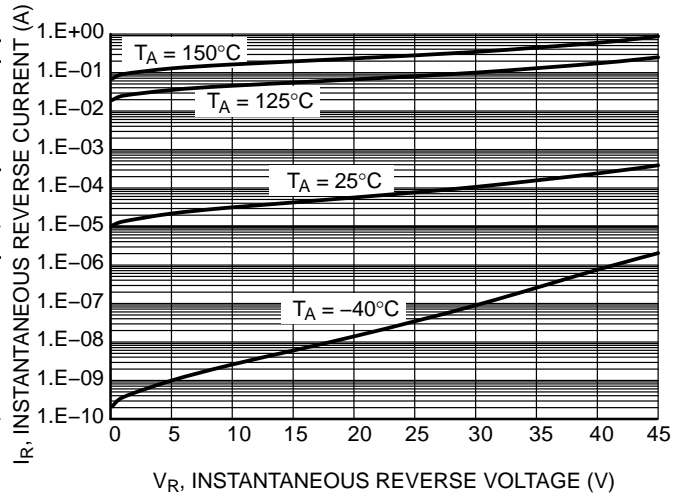
**Figure 1. Typical Instantaneous Forward Voltage**



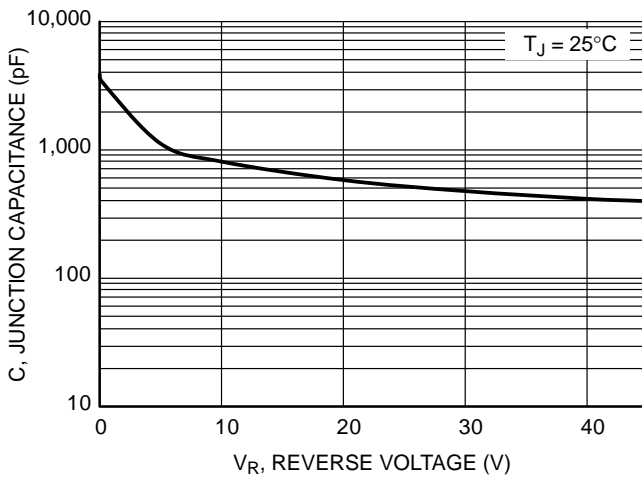
**Figure 2. Maximum Instantaneous Forward Voltage**



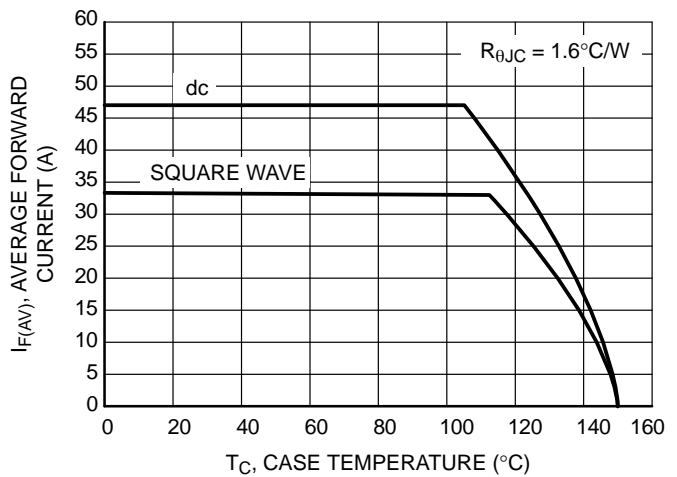
**Figure 3. Typical Reverse Characteristics**



**Figure 4. Maximum Reverse Characteristics**



**Figure 5. Typical Junction Capacitance**



**Figure 6. Current Derating TO-220AB**

# MBR2045MFS, NRVB2045MFS

## TYPICAL CHARACTERISTICS

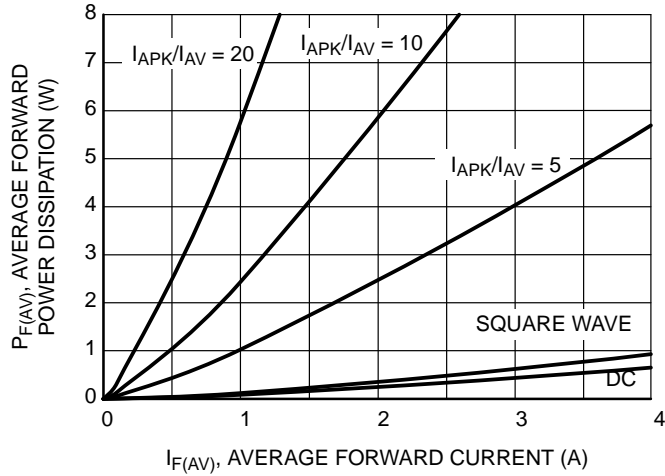


Figure 7. Forward Power Dissipation

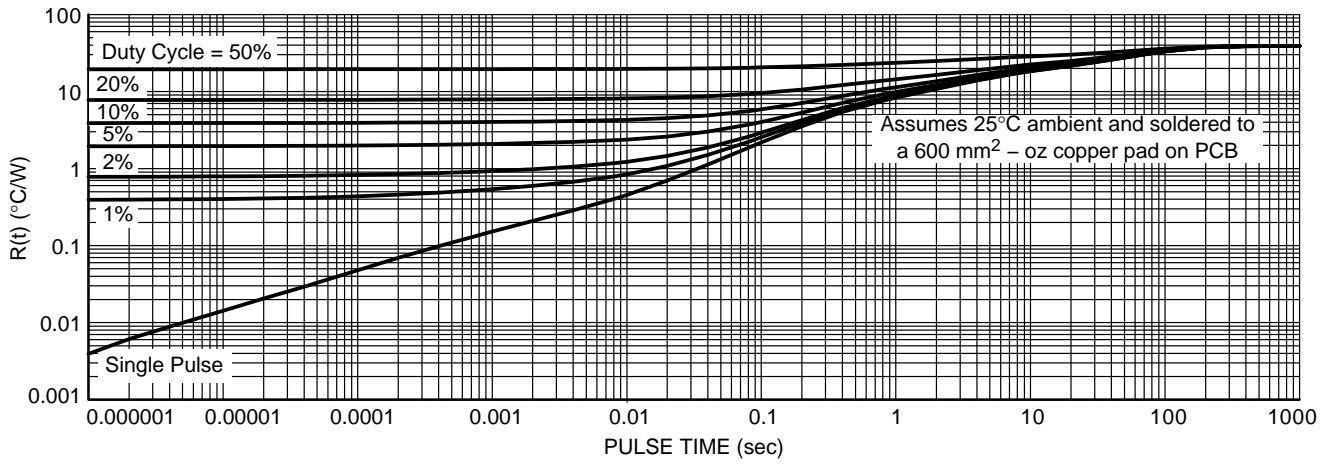
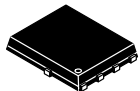


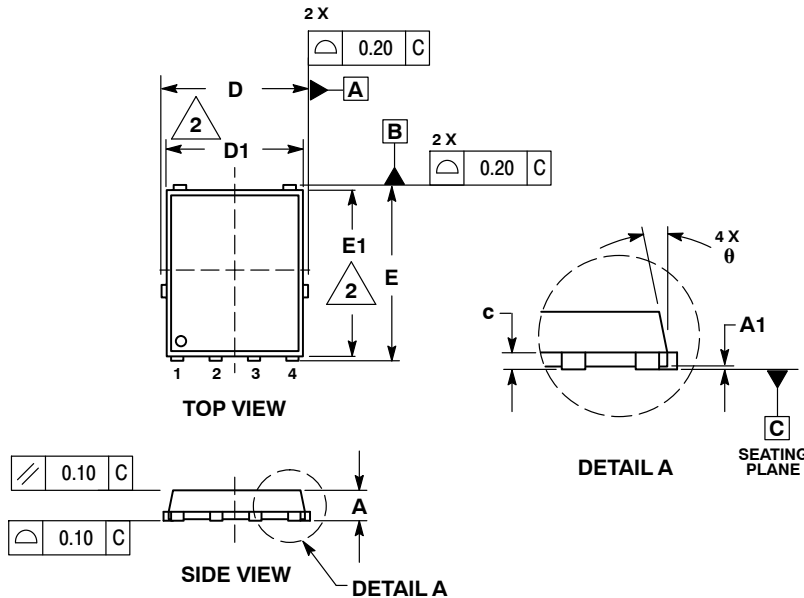
Figure 8. Thermal Response



1  
SCALE 2:1

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

DATE 25 JUN 2018

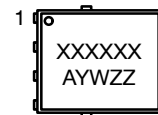


NOTES:

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.

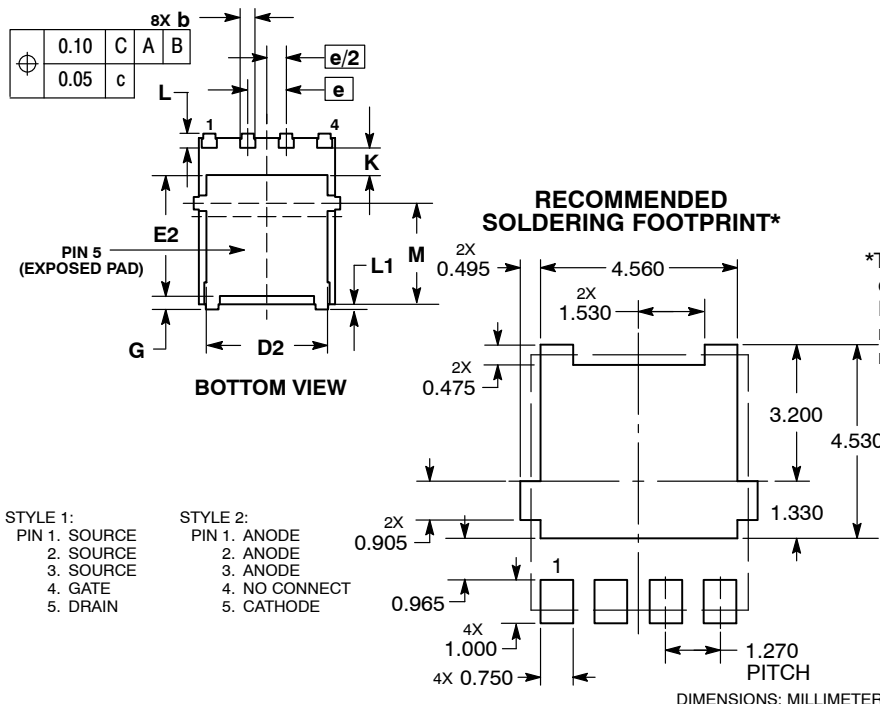
| DIM | MILLIMETERS |       |      |
|-----|-------------|-------|------|
|     | MIN         | NOM   | MAX  |
| A   | 0.90        | 1.00  | 1.10 |
| A1  | 0.00        | ---   | 0.05 |
| b   | 0.33        | 0.41  | 0.51 |
| c   | 0.23        | 0.28  | 0.33 |
| D   | 5.00        | 5.15  | 5.30 |
| D1  | 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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| DESCRIPTION:     | DFN5 5x6, 1.27P (SO-8FL) | PAGE 1 OF 1  |

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