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# MBR2045EMFS, NRVB2045EMFS

## Switch-mode Power Rectifiers

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
- 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

### 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

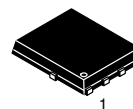
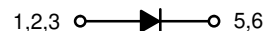
- Excellent Alternative to DPAK in Space-Constrained Automotive Applications
- Output Rectification in Compact Portable Consumer Applications
- Freewheeling Diode used with Inductive Loads



**ON Semiconductor®**

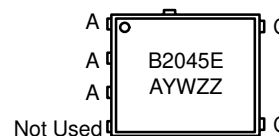
<http://onsemi.com>

## SCHOTTKY BARRIER RECTIFIERS 20 AMPERES 45 VOLTS



SO-8 FLAT LEAD  
CASE 488AA  
STYLE 2

### MARKING DIAGRAM



B2045E = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
ZZ = Lot Traceability

### ORDERING INFORMATION

| Device          | Package              | Shipping†             |
|-----------------|----------------------|-----------------------|
| MBR2045EMFST1G  | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |
| MBR2045EMFST3G  | SO-8 FL<br>(Pb-Free) | 5000 /<br>Tape & Reel |
| NRVB2045EMFST1G | SO-8 FL<br>(Pb-Free) | 1500 /<br>Tape & Reel |
| NRVB2045EMFST3G | 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.

# MBR2045EMFS, NRVB2045EMFS

## 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, $T_C = 120^\circ\text{C}$ )         | $I_{FRM}$                       | 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 | $^\circ\text{C}/\text{W}$ |

## ELECTRICAL CHARACTERISTICS

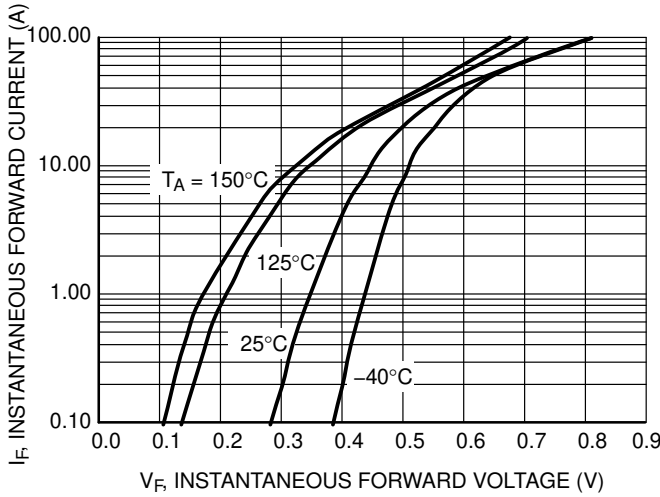
|  |       |      |      |    |
|--|-------|------|------|----|
| Instantaneous Forward Voltage (Note 1)<br>( $i_F = 10\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $i_F = 10\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $i_F = 20\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $i_F = 20\text{ A}$ , $T_J = 25^\circ\text{C}$ ) | $V_F$ | 0.35 | 0.47 | V  |
|  |       | 0.45 | 0.56 |    |
|  |       | 0.43 | 0.58 |    |
|  |       | 0.51 | 0.64 |    |
| Instantaneous Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )  | $i_R$ | 48   | 100  | mA |
|  |       | 0.09 | 0.40 |    |

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.

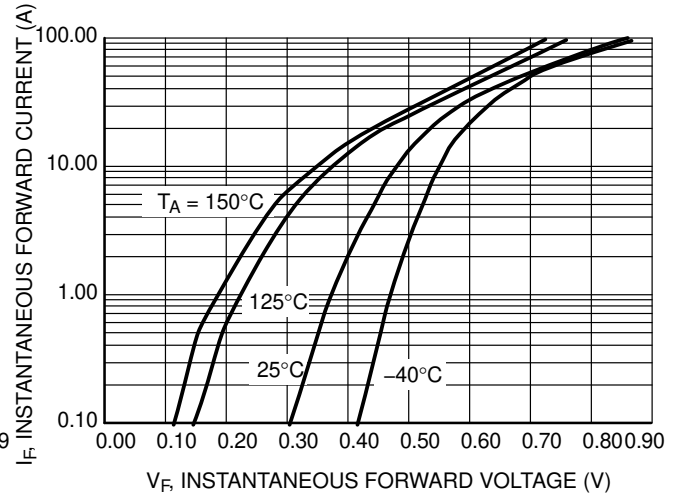
1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MBR2045EMFS, NRVB2045EMFS

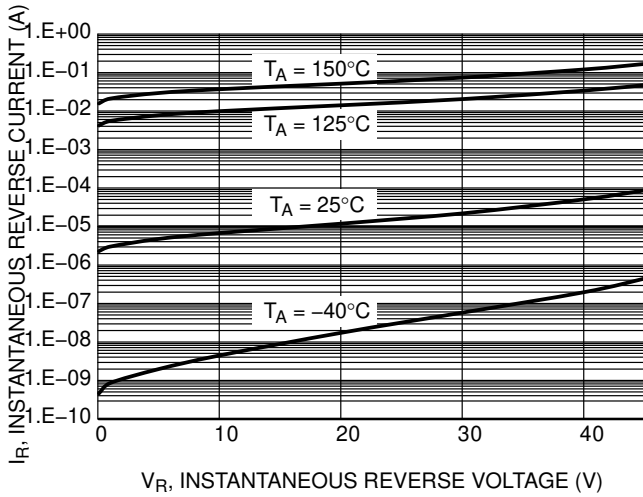
## TYPICAL CHARACTERISTICS



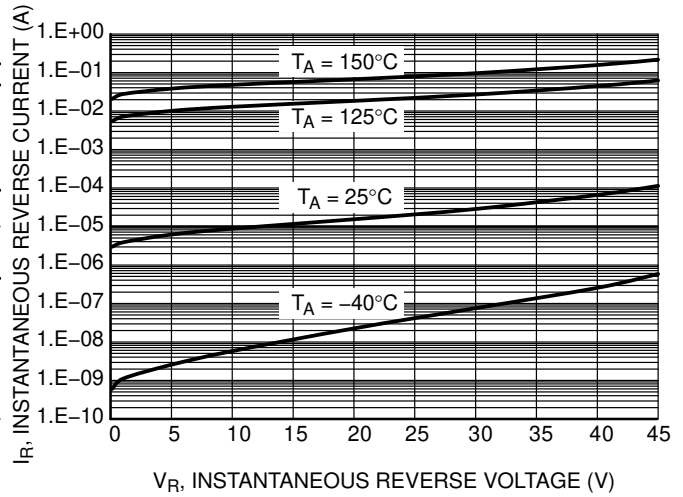
**Figure 1. Typical Instantaneous Forward Voltage**



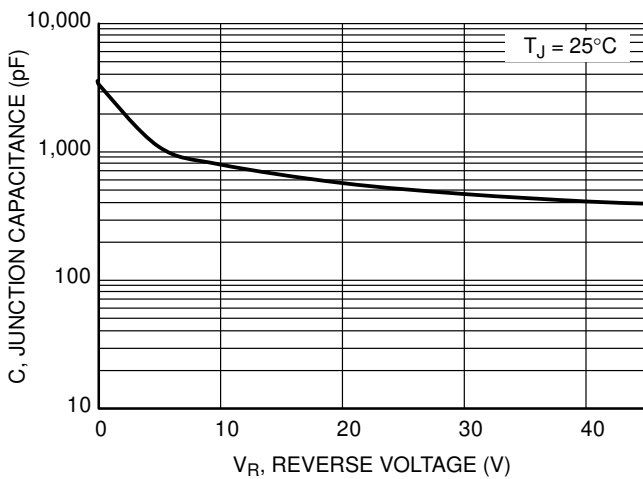
**Figure 2. Maximum Instantaneous Forward Voltage**



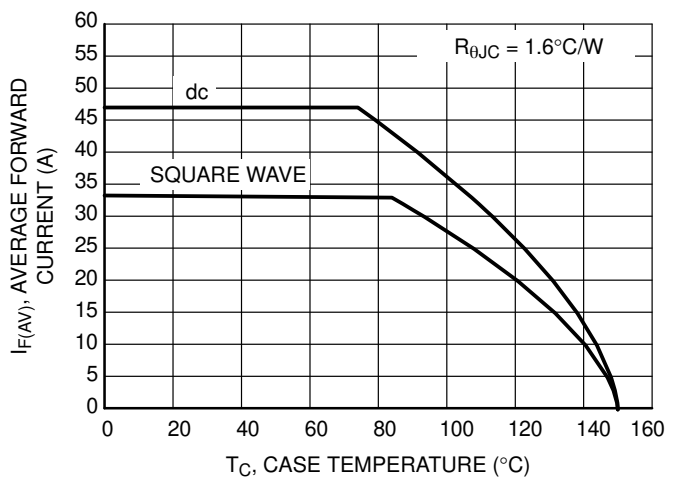
**Figure 3. Typical Reverse Characteristics**



**Figure 4. Maximum Reverse Characteristics**



**Figure 5. Typical Junction Capacitance**



**Figure 6. Current Derating**

# MBR2045EMFS, NRVB2045EMFS

## TYPICAL CHARACTERISTICS

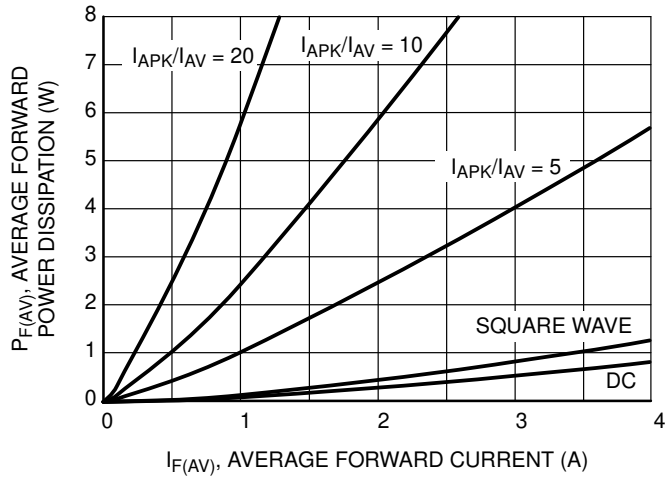


Figure 7. Forward Power Dissipation

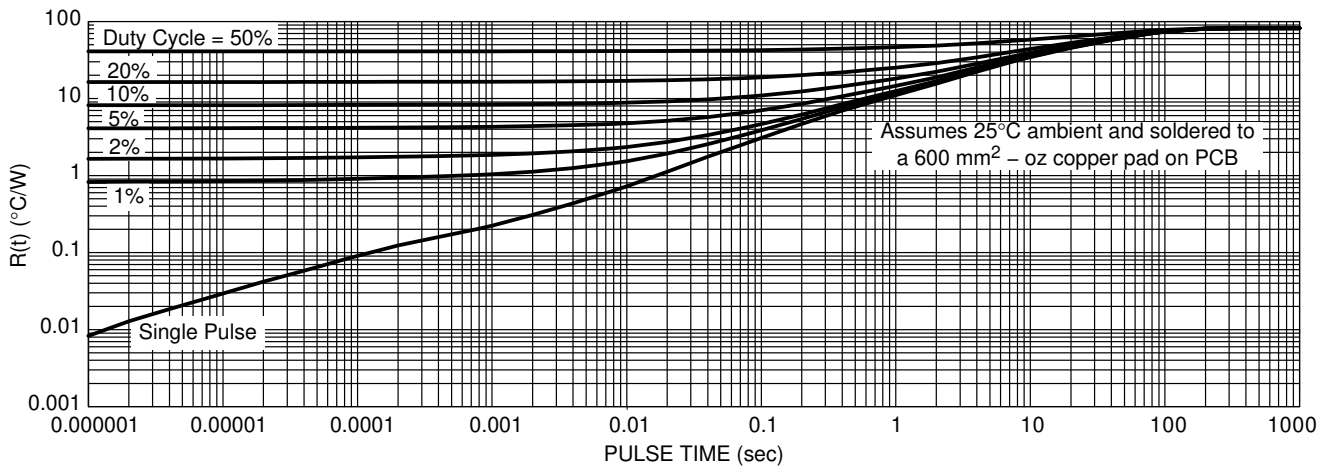
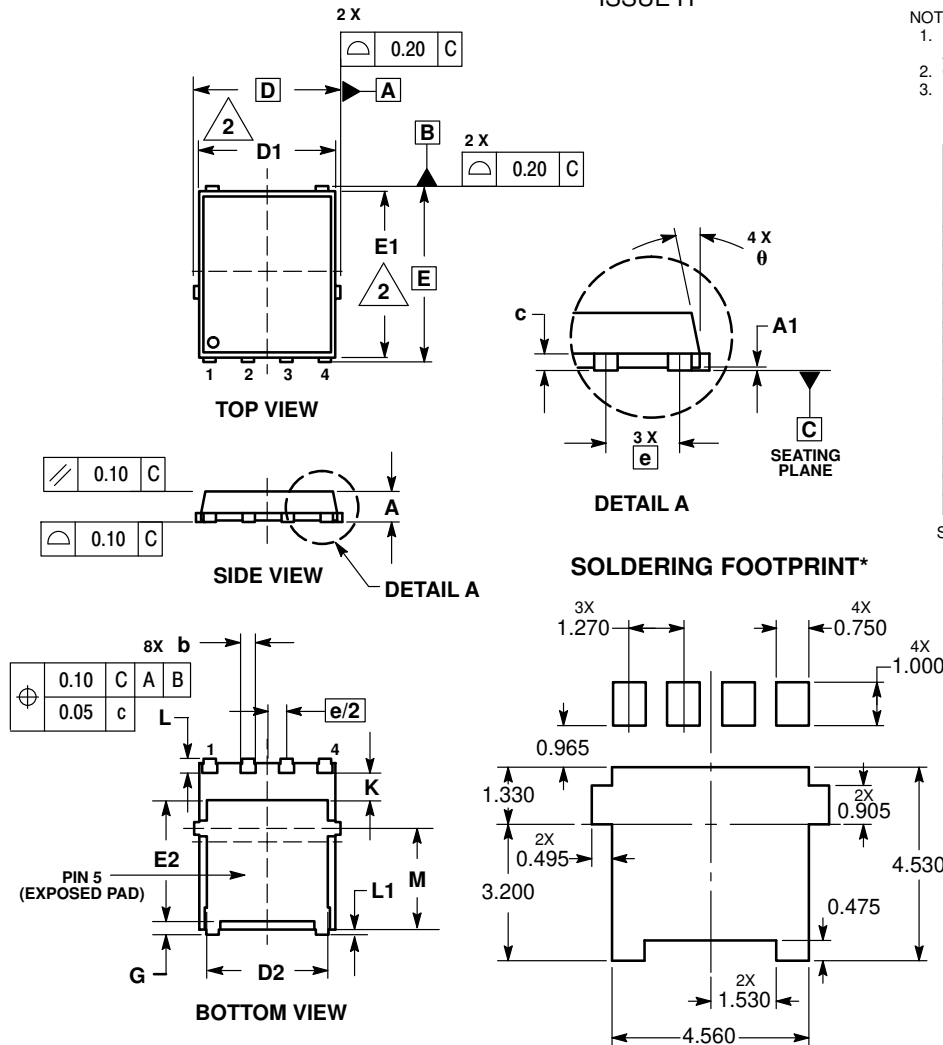


Figure 8. Thermal Response

# MBR2045EMFS, NRVB2045EMFS

## PACKAGE DIMENSIONS

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



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   | 5.15 BSC    |      |      |
| D1  | 4.70        | 4.90 | 5.10 |
| D2  | 3.80        | 4.00 | 4.20 |
| E   | 6.15 BSC    |      |      |
| E1  | 5.70        | 5.90 | 6.10 |
| E2  | 3.45        | 3.65 | 3.85 |
| e   | 1.27 BSC    |      |      |
| G   | 0.51        | 0.61 | 0.71 |
| K   | 1.20        | 1.35 | 1.50 |
| L   | 0.51        | 0.61 | 0.71 |
| L1  | 0.05        | 0.17 | 0.20 |
| M   | 3.00        | 3.40 | 3.80 |
| θ   | 0°          | ---  | 12°  |

STYLE 2:

- PIN 1. ANODE
- ANODE
- ANODE
- NO CONNECT
- CATHODE

\*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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