# 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

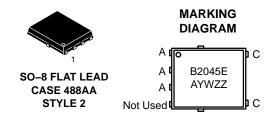


## ON Semiconductor®

http://onsemi.com

## SCHOTTKY BARRIER RECTIFIERS 20 AMPERES 45 VOLTS





B2045E = Specific Device Code A = Assembly Location

Y = Year
W = Work Week
ZZ = Lot Traceability

### **ORDERING INFORMATION**

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

## **MAXIMUM RATINGS**

Rating	Symbol	Value	Unit	
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	45	V	
Average Rectified Forward Current (Rated $V_R$ , $T_C = 130^{\circ}C$ )	I <sub>F(AV)</sub>	20	А	
Peak Repetitive Forward Current, (Rated V <sub>R</sub> , Square Wave, 20 kHz, T <sub>C</sub> = 120°C)	I <sub>FRM</sub>	40	А	
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I <sub>FSM</sub>	400	А	
Storage Temperature Range	T <sub>stg</sub>	-65 to +175	°C	
Operating Junction Temperature	TJ	-55 to +150	°C	
Unclamped Inductive Switching Energy (10 mH Inductor, Non-repetitive)	E <sub>AS</sub>	E <sub>AS</sub> 150		
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/dTJ < 1/RJA

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Тур	Max	Unit
Thermal Resistance, Junction-to-Case, Steady State (Assumes 600 mm <sup>2</sup> 1 oz. copper bond pad, on a FR4 board)	$R_{ heta JC}$	-	1.6	°C/W

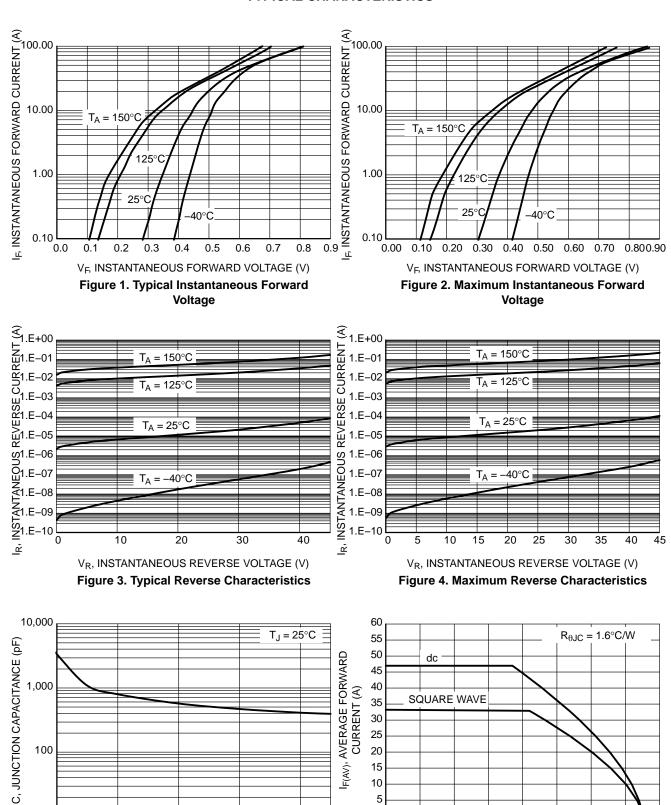
## **ELECTRICAL CHARACTERISTICS**

Instantaneous Forward Voltage (Note 1)	VF			V
$(i_F = 10 \text{ A}, T_J = 125^{\circ}\text{C})$		0.35	0.47	
$(i_F = 10 \text{ A}, T_J = 25^{\circ}\text{C})$		0.45	0.56	
$(i_F = 20 \text{ A}, T_J = 125^{\circ}\text{C})$		0.43	0.58	
$(i_F = 20 \text{ A}, T_J = 25^{\circ}\text{C})$		0.51	0.64	
Instantaneous Reverse Current (Note 1)	i <sub>R</sub>			mA
(Rated dc Voltage, T <sub>J</sub> = 125°C)		48	100	
(Rated dc Voltage, T <sub>J</sub> = 25°C)		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.

<sup>1.</sup> Pulse Test: Pulse Width = 300  $\mu$ s, Duty Cycle  $\leq$  2.0%.

#### TYPICAL CHARACTERISTICS

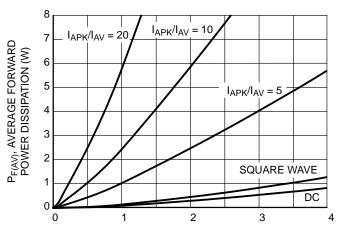


V<sub>R</sub>, REVERSE VOLTAGE (V) **Figure 5. Typical Junction Capacitance** 

T<sub>C</sub>, CASE TEMPERATURE (°C) Figure 6. Current Derating

140 160

## TYPICAL CHARACTERISTICS



 $I_{F(AV)}$ , AVERAGE FORWARD CURRENT (A)

Figure 7. Forward Power Dissipation

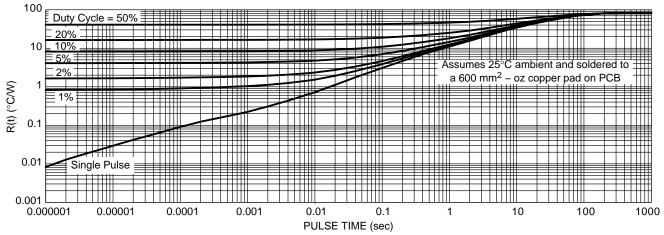
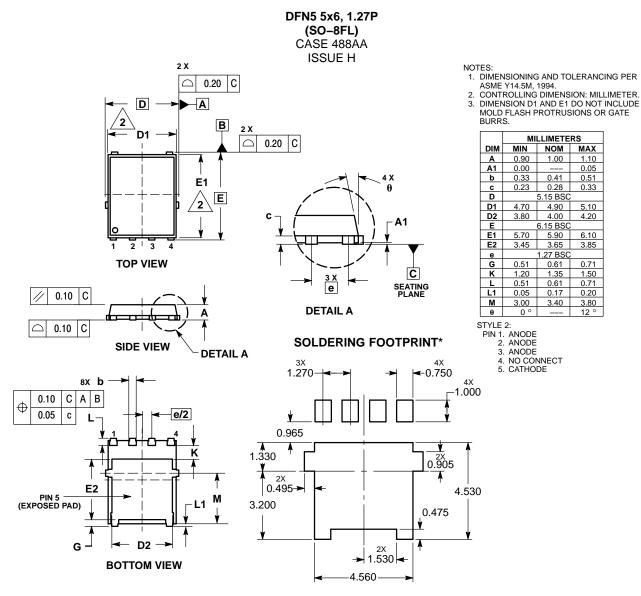


Figure 8. Thermal Response

#### PACKAGE DIMENSIONS



\*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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