

# MBR4045PT

## SWITCHMODE™ Power Rectifier

### Features and Benefits

- Low Forward Voltage
- Low Power Loss/High Efficiency
- High Surge Capacity
- 175°C Operating Junction Temperature
- 40 A Total (20 A Per Diode Leg)
- Pb-Free Package is Available\*

### Applications

- Power Supply – Output Rectification
- Power Management
- Instrumentation

### Mechanical Characteristics

- Case: Epoxy, Molded
- Epoxy Meets UL 94, V-0 @ 0.125 in
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperatures for Soldering Purposes: 260°C Max. for 10 Seconds
- ESD Rating: Human Body Model 3B  
Machine Model C

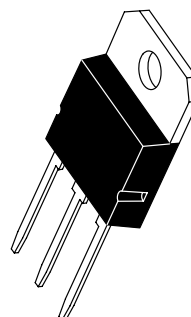
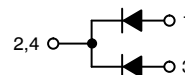
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



**ON Semiconductor®**

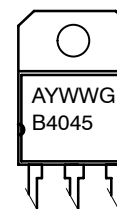
<http://onsemi.com>

## SCHOTTKY BARRIER RECTIFIER 40 AMPERES 45 VOLTS



**SOT-93  
CASE 340D  
STYLE 2**

### MARKING DIAGRAM



B4045 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

| Device     | Package             | Shipping†     |
|------------|---------------------|---------------|
| MBR4045PT  | SOT-93              | 30 Units/Rail |
| MBR4045PTG | SOT-93<br>(Pb-Free) | 30 Units/Rail |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MBR4045PT

## MAXIMUM RATINGS

| Rating                                                                                                           | Symbol                          | Max         | 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 $V_R$ , $T_C = 125^\circ\text{C}$ ) Per Diode<br>Per Device          | $I_{F(AV)}$                     | 20<br>40    | A                |
| Peak Repetitive Forward Current,<br>(Rated $V_R$ , Square Wave, 20 kHz<br>@ $T_C = 90^\circ\text{C}$ ) Per Diode | $I_{FRM}$                       | 40          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase,<br>60 Hz)   | $I_{FSM}$                       | 400         | A                |
| Peak Repetitive Reverse Current,<br>(2.0 $\mu\text{s}$ , 1.0 kHz)                                                | $I_{RRM}$                       | 2.0         | A                |
| Storage Temperature Range                                                                                        | $T_{stg}$                       | -65 to +175 | $^\circ\text{C}$ |
| Operating Junction Temperature (Note 1)                                                                          | $T_J$                           | -65 to +175 | $^\circ\text{C}$ |
| Peak Surge Junction Temperature<br>(Forward Current Applied)                                                     | $T_{J(pk)}$                     | 175         | $^\circ\text{C}$ |
| Voltage Rate of Change                                                                                           | $dv/dt$                         | 10,000      | V/ $\mu\text{s}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 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                                  | Conditions  | Symbol          | Max | Unit               |
|-------------------------------------------------|-------------|-----------------|-----|--------------------|
| Maximum Thermal Resistance, Junction-to-Case    | Minimum Pad | $R_{\theta JC}$ | 1.4 | $^\circ\text{C/W}$ |
| Maximum Thermal Resistance, Junction-to-Ambient | Minimum Pad | $R_{\theta JA}$ | 55  |                    |

## ELECTRICAL CHARACTERISTICS

| Characteristic                                                                                                                                                                                                                                                   | Symbol | Min              | Typ                          | Max                          | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|------------------------------|------------------------------|------|
| Instantaneous Forward Voltage (Note 2)<br>( $i_F = 20\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $i_F = 20\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $i_F = 40\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $i_F = 40\text{ A}$ , $T_J = 125^\circ\text{C}$ ) | $V_F$  | –<br>–<br>–<br>– | 0.53<br>0.46<br>0.64<br>0.62 | 0.70<br>0.60<br>0.80<br>0.75 | V    |
| Instantaneous Reverse Current (Note 2)<br>(Rated DC Voltage, $T_J = 25^\circ\text{C}$ )<br>(Rated DC Voltage, $T_J = 125^\circ\text{C}$ )                                                                                                                        | $i_R$  | –<br>–           | 0.09<br>30                   | 1.0<br>50                    | mA   |

# MBR4045PT

## TYPICAL ELECTRICAL CHARACTERISTICS

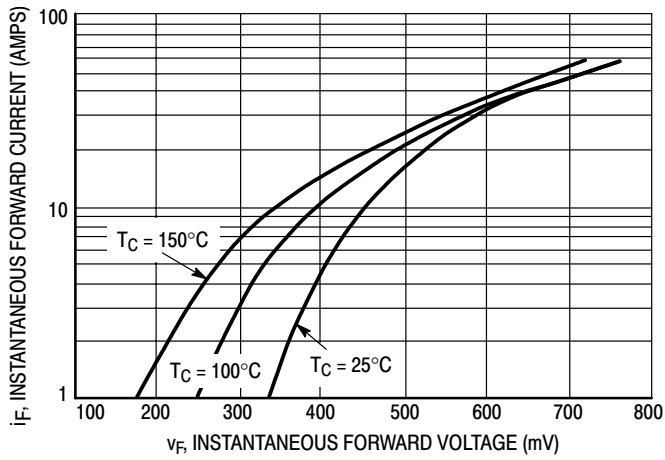


Figure 1. Typical Forward Voltage

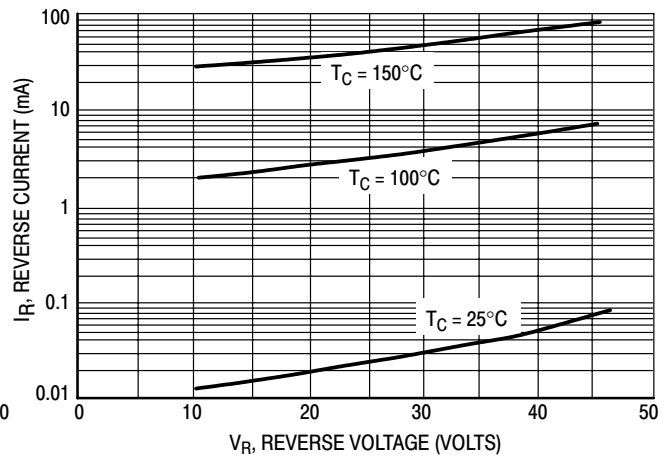


Figure 2. Typical Reverse Current

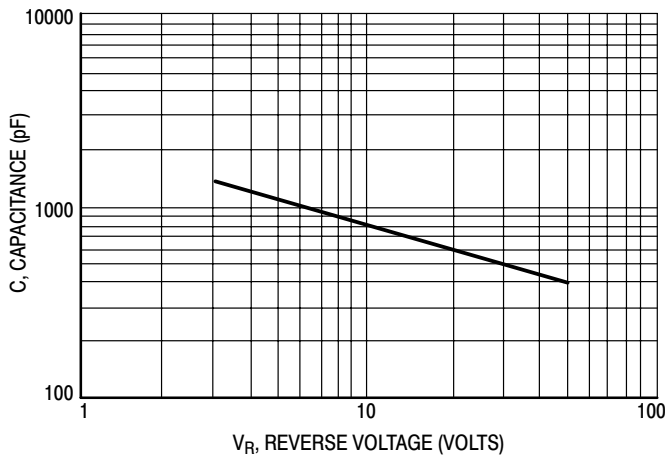


Figure 3. Typical Capacitance Per Leg

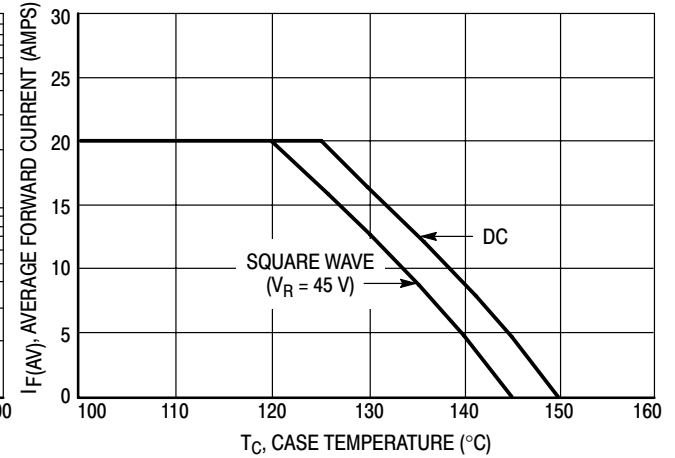
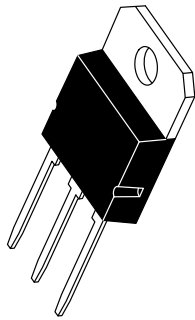


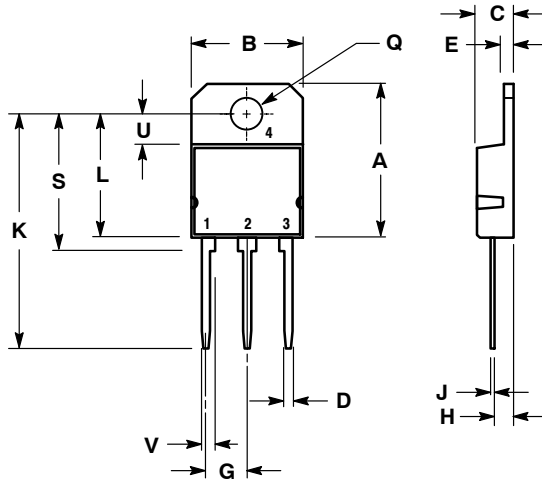
Figure 4. Current Derating Per Leg



SCALE 1:1

SOT-93 (TO-218)  
CASE 340D-02  
ISSUE E

DATE 03 JAN 2002



STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: MILLIMETER.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | ---         | 20.35 | ---       | 0.801 |
| B   | 14.70       | 15.20 | 0.579     | 0.598 |
| C   | 4.70        | 4.90  | 0.185     | 0.193 |
| D   | 1.10        | 1.30  | 0.043     | 0.051 |
| E   | 1.17        | 1.37  | 0.046     | 0.054 |
| G   | 5.40        | 5.55  | 0.213     | 0.219 |
| H   | 2.00        | 3.00  | 0.079     | 0.118 |
| J   | 0.50        | 0.78  | 0.020     | 0.031 |
| K   | 31.00 REF   |       | 1.220 REF |       |
| L   | ---         | 16.20 | ---       | 0.638 |
| Q   | 4.00        | 4.10  | 0.158     | 0.161 |
| S   | 17.80       | 18.20 | 0.701     | 0.717 |
| U   | 4.00 REF    |       | 0.157 REF |       |
| V   | 1.75 REF    |       | 0.069     |       |

GENERIC  
MARKING DIAGRAM\*



A = Assembly Location  
Y = Year  
WW = Work Week  
XXXXX = Device Code

\*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.

|                  |                 |                                                                                                                                                                                     |
|------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SOT-93 (TO-218) | PAGE 1 OF 1                                                                                                                                                                         |

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