

MBRS2040LT3

Surface Mount Schottky Power Rectifier

SMB Power Surface Mount Package

... employing the Schottky Barrier principle in a metal-to-silicon power rectifier. Features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency switching power supplies; free wheeling diodes and polarity protection diodes.

- Compact Package with J-Bend Leads Ideal for Automated Handling
- Highly Stable Oxide Passivated Junction
- Guardring for Over-Voltage Protection
- Low Forward Voltage Drop
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL94, VO at 1/8"
- Weight: 95 mg (approximately)
- Maximum Temperature of 260°C / 10 Seconds for Soldering
- Cathode Polarity Band
- Available in 12 mm Tape, 2500 Units per 13 inch Reel, Add "T3" Suffix to Part Number
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Marking: BKJL

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 40 | V |
| Average Rectified Forward Current (At Rated V_R , $T_C = 103^\circ\text{C}$) | I_O | 2.0 | A |
| Peak Repetitive Forward Current (At Rated V_R , Square Wave, 20 kHz, $T_C = 104^\circ\text{C}$) | I_{FRM} | 4.0 | A |
| Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | I_{FSM} | 70 | A |
| Storage/Operating Case Temperature | T_{stg}, T_C | -55 to +150 | °C |
| Operating Junction Temperature | T_J | -55 to +125 | °C |
| Voltage Rate of Change (Rated V_R , $T_J = 25^\circ\text{C}$) | dv/dt | 10,000 | V/ μs |



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SCHOTTKY BARRIER RECTIFIER 2.0 AMPERES 40 VOLTS



SMB
CASE 403A
PLASTIC

MARKING DIAGRAM



BKJL = Device Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|------------------|------------------|
| MBRS2040LT3 | SMB | 2500/Tape & Reel |
| MBRS2040LT3G | SMB (Pb-Free) | 2500/Tape & Reel |

†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.

MBRS2040LT3

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------|-----------------------------|
| Thermal Resistance — Junction-to-Lead (Note 1.) | $R_{\theta JL}$ | 22.5 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance — Junction-to-Ambient (Note 2.) | $R_{\theta JA}$ | 78 | |

ELECTRICAL CHARACTERISTICS

| | | | | |
|---|-------|----------------------------|-----------------------------|-------|
| Maximum Instantaneous Forward Voltage (Note 3.) see Figure 2 | V_F | $T_J = 25^{\circ}\text{C}$ | $T_J = 125^{\circ}\text{C}$ | Volts |
| | | 0.43 0.50 | 0.34 0.45 | |
| Maximum Instantaneous Reverse Current (Note 3.) see Figure 4 | I_R | $T_J = 25^{\circ}\text{C}$ | $T_J = 100^{\circ}\text{C}$ | mA |
| | | 0.8 0.1 | 20 6.0 | |

1. Minimum pad size (0.108 X 0.085 inch) for each lead on FR4 board.
2. 1 inch square pad size (1 x 0.5 inch for each lead) on FR4 board.
3. Pulse Test: Pulse Width $\leq 250 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

MBRS2040LT3

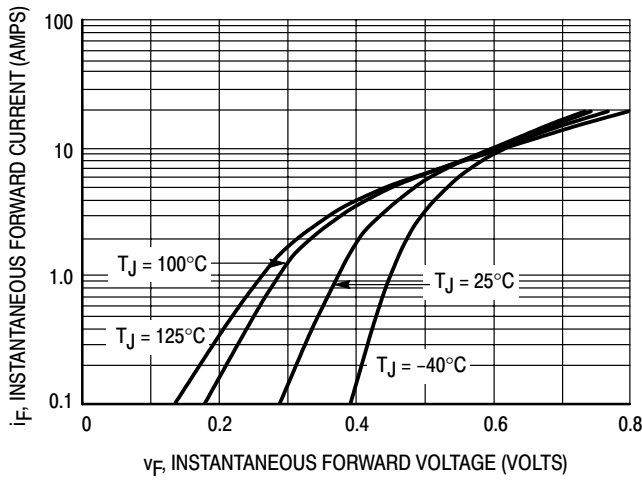


Figure 1. Typical Forward Voltage

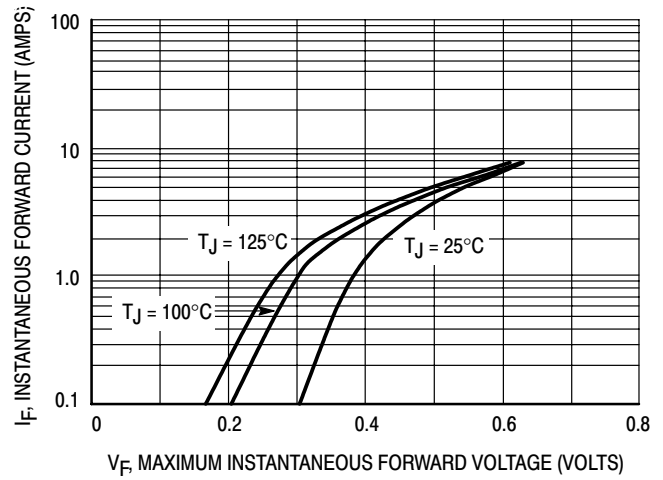


Figure 2. Maximum Forward Voltage

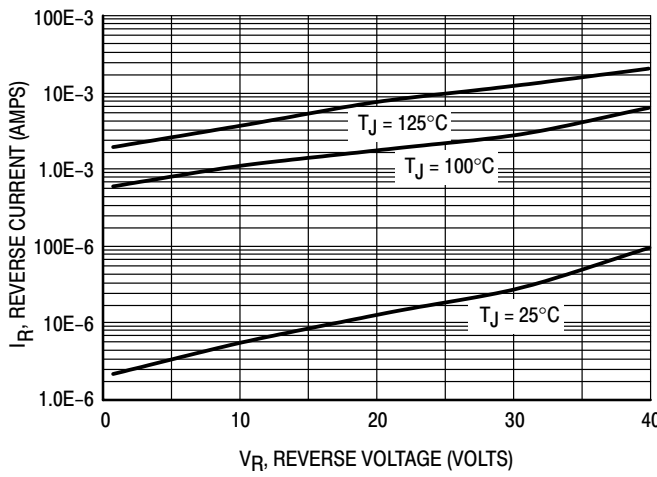


Figure 3. Typical Reverse Current

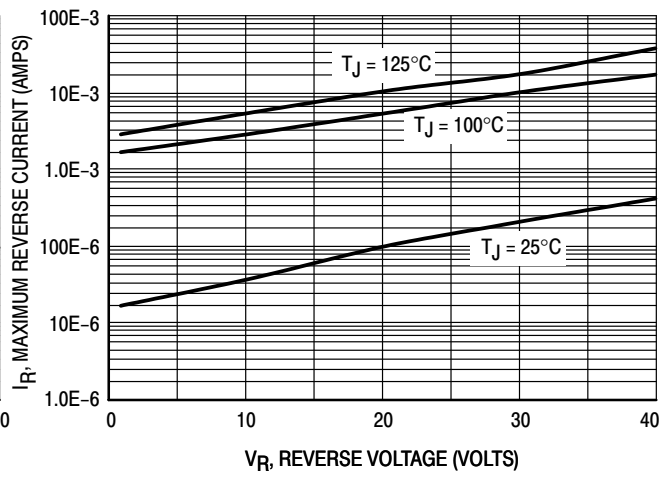


Figure 4. Maximum Reverse Current

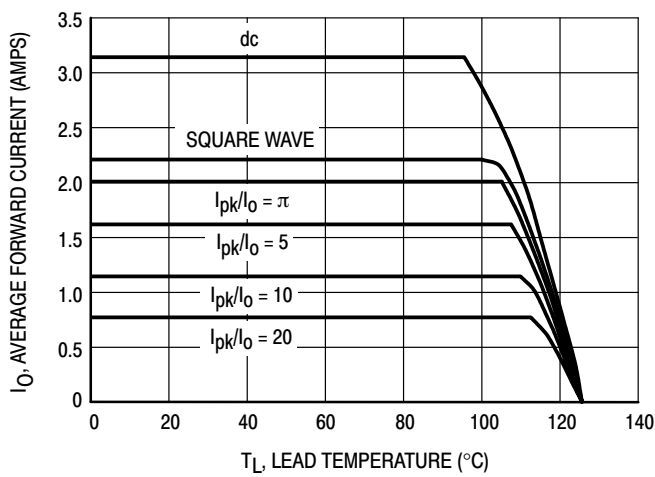


Figure 5. Current Derating

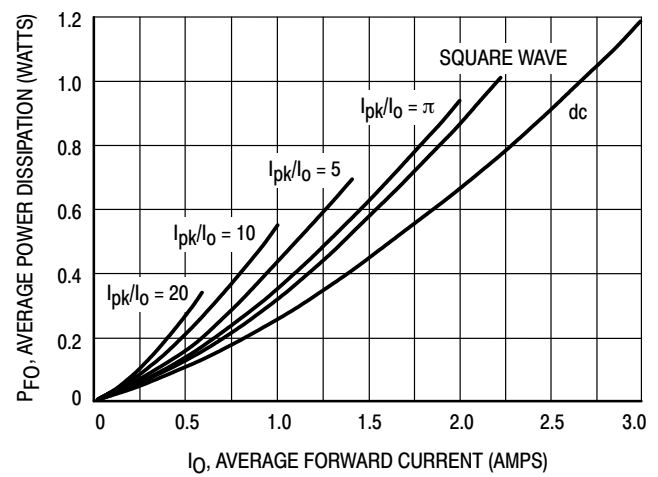


Figure 6. Forward Power Dissipation

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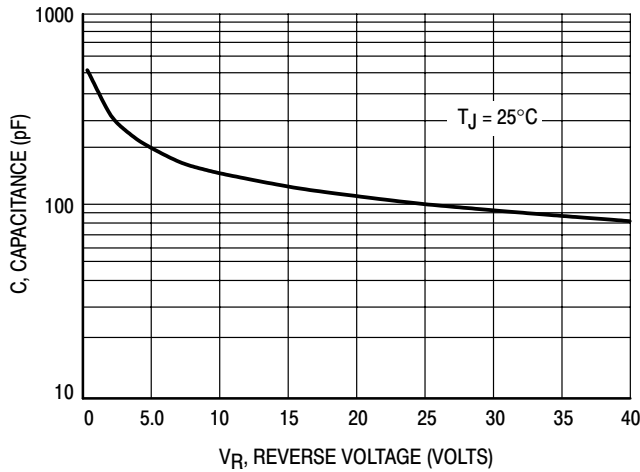


Figure 7. Capacitance

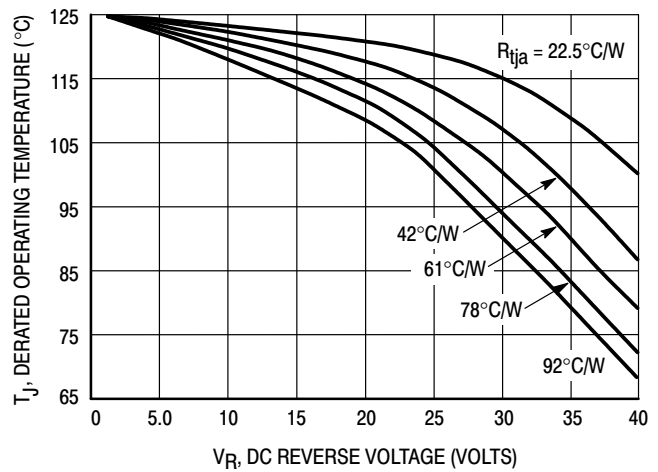


Figure 8. Typical Operating Temperature Derating*

* Reverse power dissipation and the possibility of thermal runaway must be considered when operating this device under any reverse voltage conditions. Calculations of T_J therefore must include forward and reverse power effects. The allowable operating T_J may be calculated from the equation:

$$T_J = T_{Jmax} - r(t)(P_f + P_r) \text{ where}$$

$r(t)$ = thermal impedance under given conditions,
 P_f = forward power dissipation, and
 P_r = reverse power dissipation

This graph displays the derated allowable T_J due to reverse bias under DC conditions only and is calculated as $T_J = T_{Jmax} - r(t)P_r$, where $r(t) = R_{\theta JA}$. For other power applications further calculations must be performed.

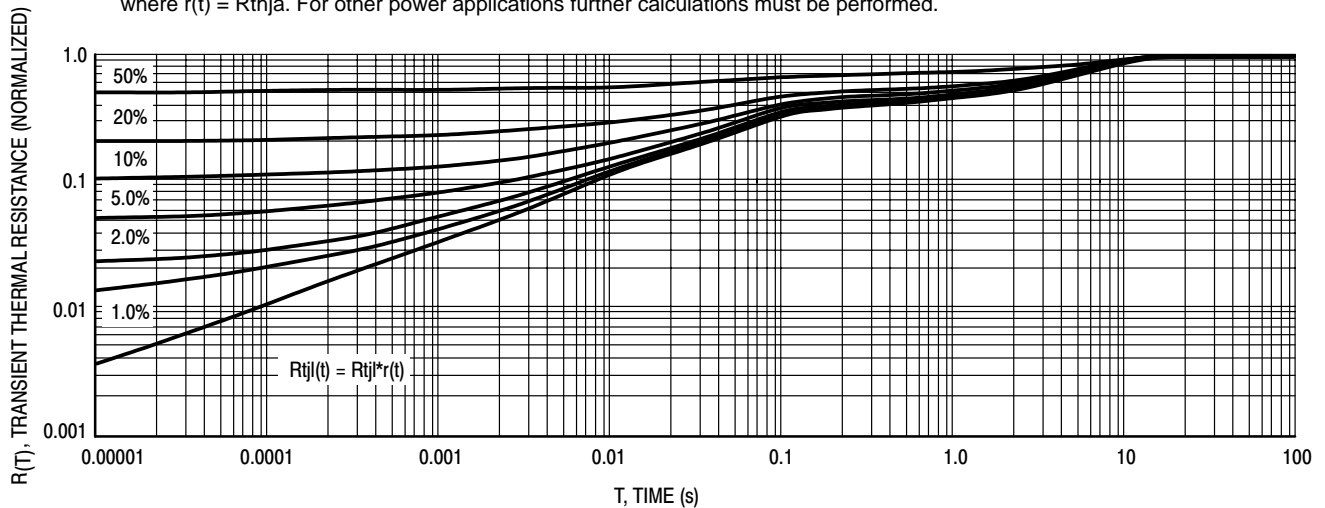


Figure 9. Thermal Response Junction to Lead

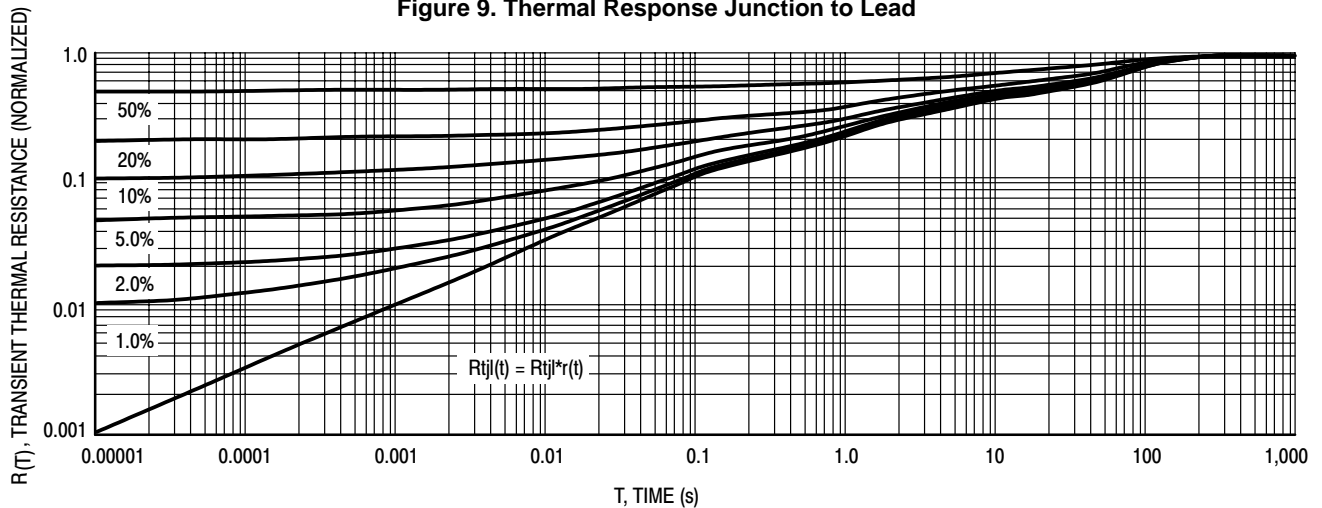
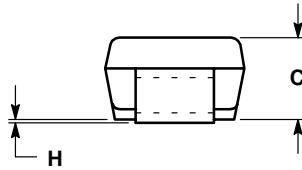
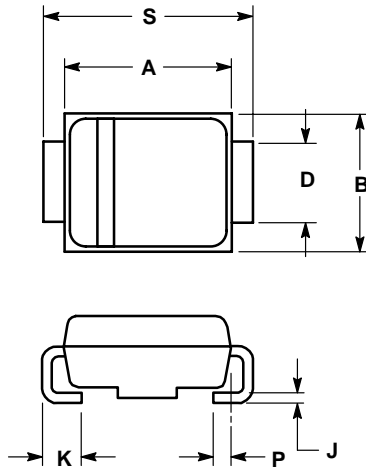


Figure 10. Thermal Response Junction to Ambient

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PACKAGE DIMENSIONS

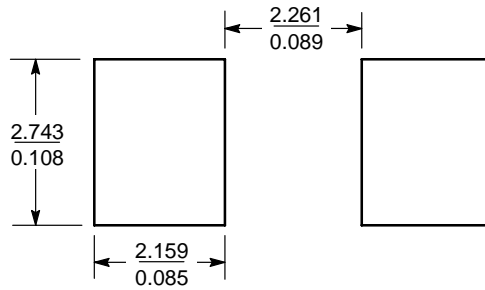
SMB PLASTIC PACKAGE CASE 403A-03 ISSUE D



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|--------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.160 | 0.180 | 4.06 | 4.57 |
| B | 0.130 | 0.150 | 3.30 | 3.81 |
| C | 0.075 | 0.095 | 1.90 | 2.41 |
| D | 0.077 | 0.083 | 1.96 | 2.11 |
| H | 0.0020 | 0.0060 | 0.051 | 0.152 |
| J | 0.006 | 0.012 | 0.15 | 0.30 |
| K | 0.030 | 0.050 | 0.76 | 1.27 |
| P | 0.020 REF | | 0.51 REF | |
| S | 0.205 | 0.220 | 5.21 | 5.59 |

SOLDERING FOOTPRINT*



SCALE 8:1 $\left(\frac{\text{mm}}{\text{inches}} \right)$

SMB

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

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