

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 ($I_F = 2.0\text{ A}$) ($I_F = 4.0\text{ A}$)	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 ($V_R = 40\text{ V}$) ($V_R = 20\text{ V}$)	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 $\leq 250\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

MBRS2040LT3

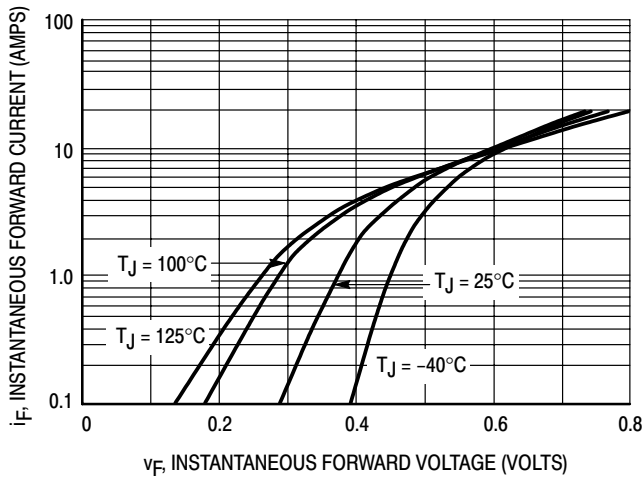


Figure 1. Typical Forward Voltage

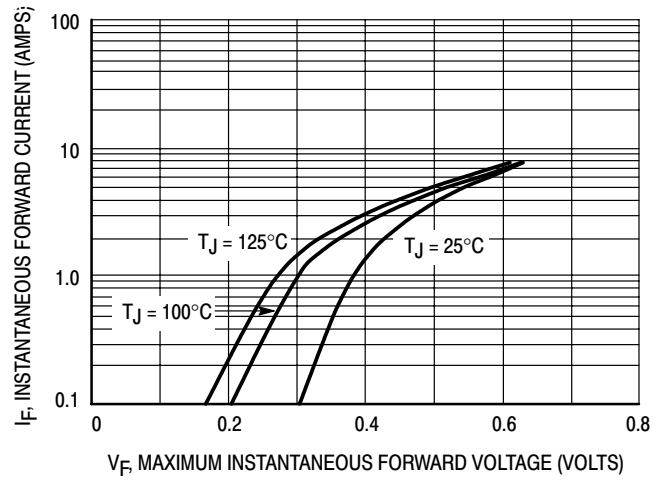


Figure 2. Maximum Forward Voltage

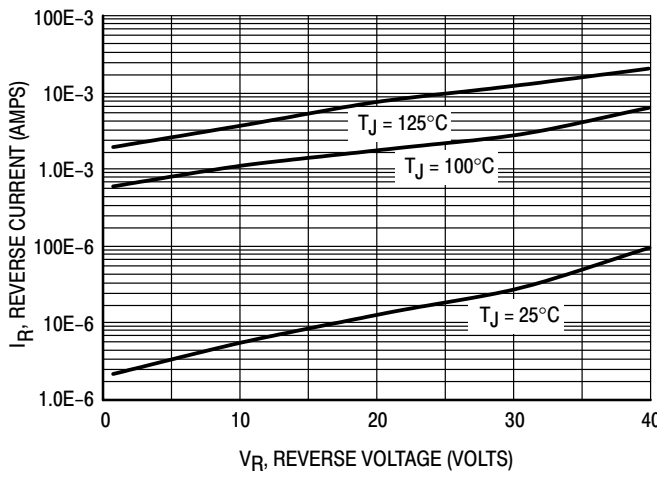


Figure 3. Typical Reverse Current

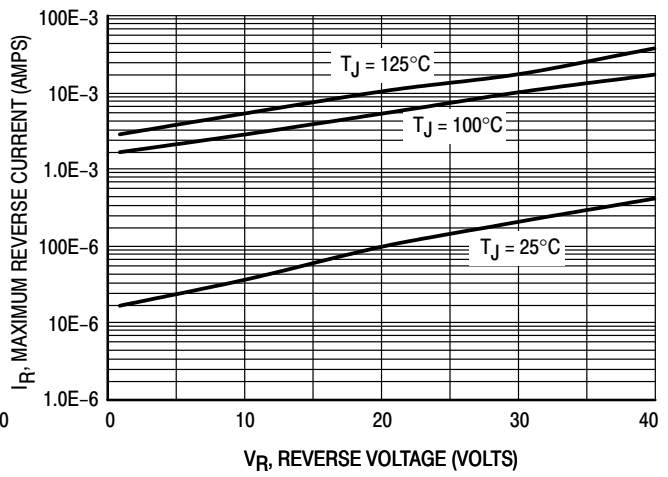


Figure 4. Maximum Reverse Current

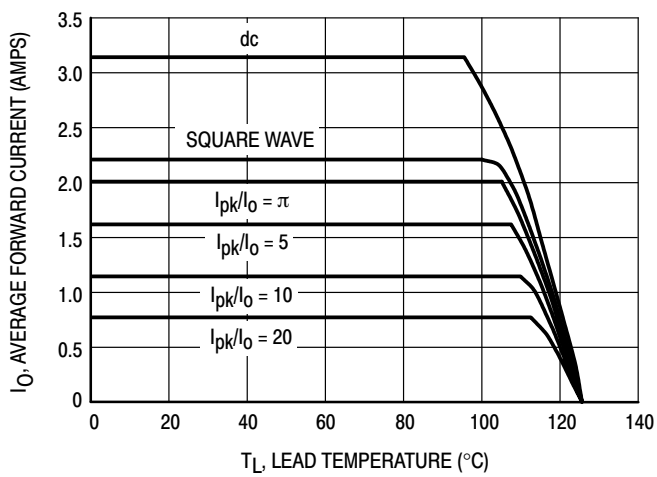


Figure 5. Current Derating

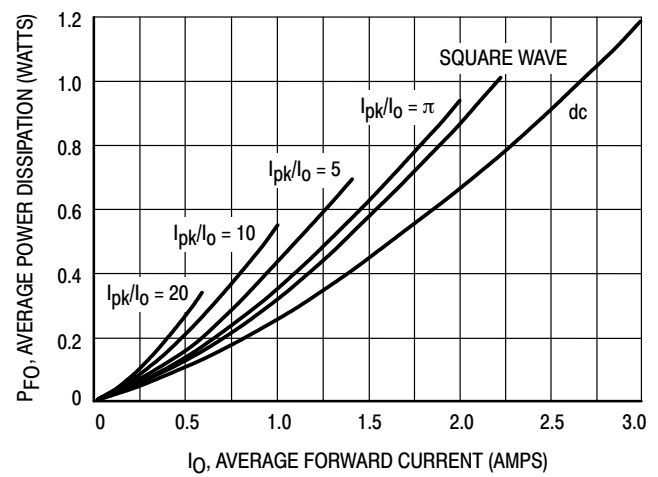


Figure 6. Forward Power Dissipation

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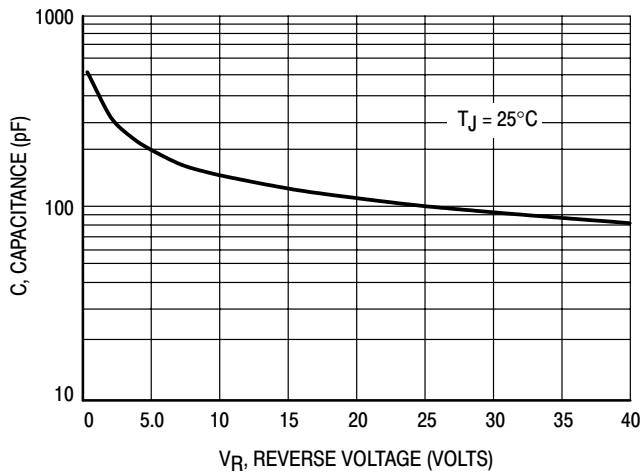


Figure 7. Capacitance

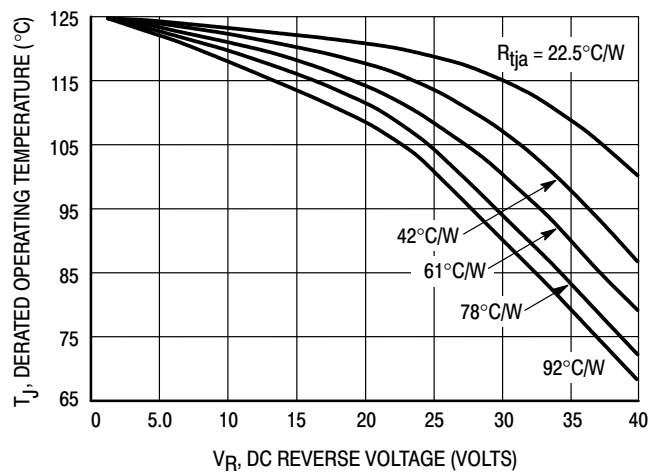


Figure 8. Typical Operating Temperature Derating*

* 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:

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

$$r(t) = \text{thermal impedance under given conditions,}$$

$$P_f = \text{forward power dissipation, and}$$

$$P_r = \text{reverse power dissipation}$$

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.

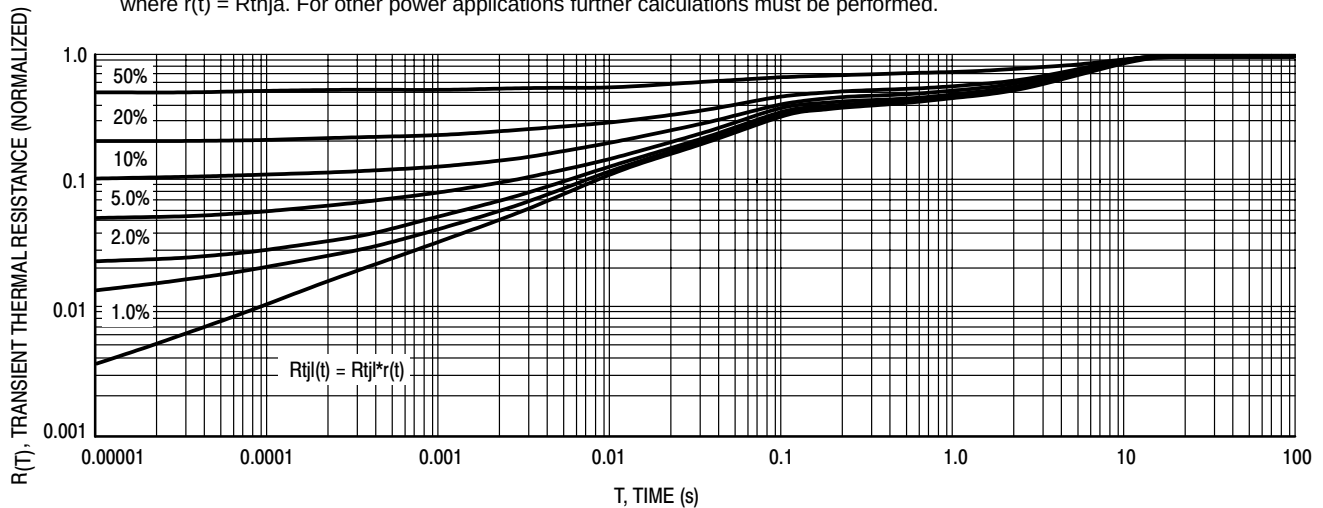


Figure 9. Thermal Response Junction to Lead

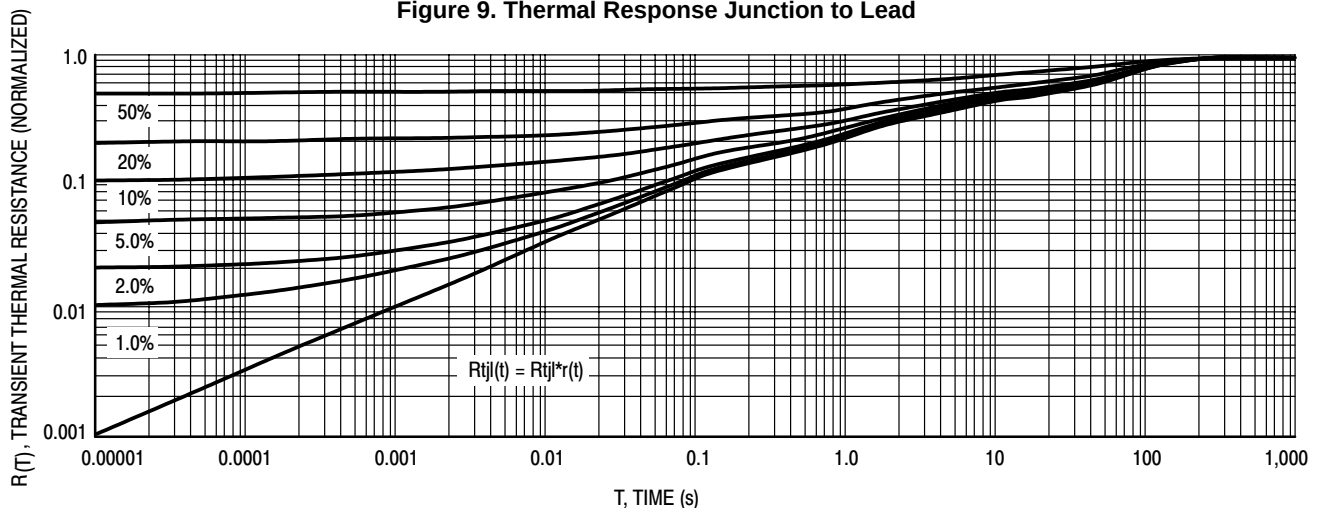
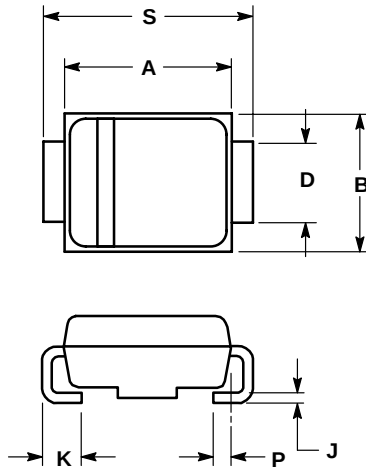


Figure 10. Thermal Response Junction to Ambient

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PACKAGE DIMENSIONS

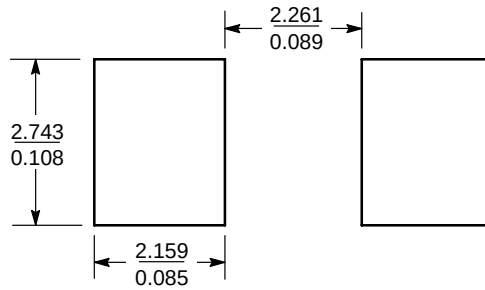
SMB PLASTIC PACKAGE CASE 403A-03 ISSUE D



- 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, SOLDERRM/D.

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