

MBRS2040LT3G, NRVBS2040LT3G

Surface Mount Schottky Power Rectifier

SMB Power Surface Mount Package

... employing the Schottky Barrier principle in a metal

Compact Package with J Bend Leads Ideal for Automated Handling

- Highly Stable Oxide Passivated Junction
- Guardring for Over Voltage Protection
- Low Forward Voltage Drop
- ESD Ratings:
 - ◆ Human Body Model = 3B (> 16000 V)
 - ◆ Machine Model = C (> 400 V)
- AEC Q101 Qualified and PPAP Capable
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- All Packages are Pb Free*

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
-

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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 Temperature	T_{stg} , T_C	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature	T_J	-55 to +125	$^\circ\text{C}$
Voltage Rate of Change (Rated V_R , $T_J = 25^\circ\text{C}$)	dv/dt	10,000	V/ μs

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.

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	$^\circ\text{C}/\text{W}$

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.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value		Unit
		$T_J = 25^\circ\text{C}$	$T_J = 125^\circ\text{C}$	
Maximum Instantaneous Forward Voltage (Note 3) see Figure 2 ($I_F = 2.0\text{ A}$) ($I_F = 4.0\text{ A}$)	V_F	0.43	0.34	Volts
		0.50	0.45	
Maximum Instantaneous Reverse Current (Note 3) see Figure 4 ($V_R = 40\text{ V}$) ($V_R = 20\text{ V}$)	I_R	0.8	20	mA
		0.1	6.0	

3. Pulse Test: Pulse Width $\leq 250\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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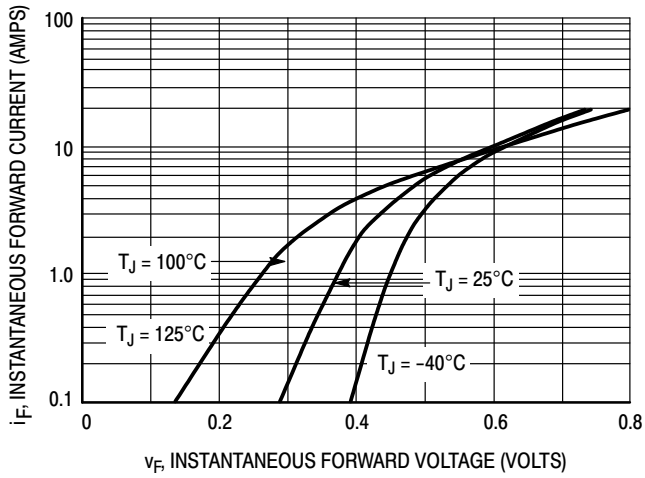


Figure 1. Typical Forward Voltage

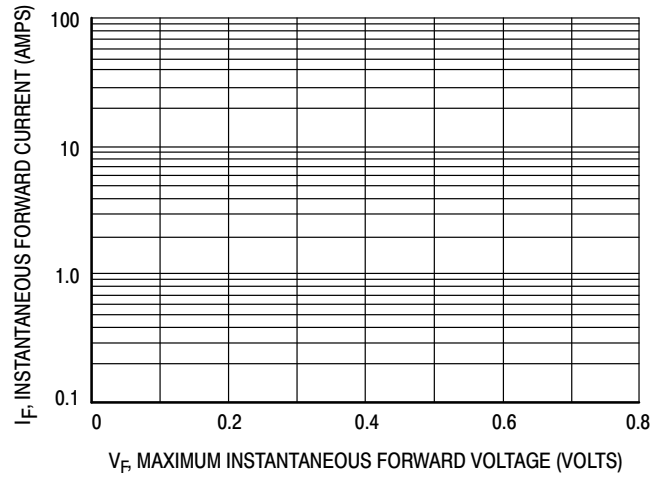


Figure 2. Maximum Forward Voltage

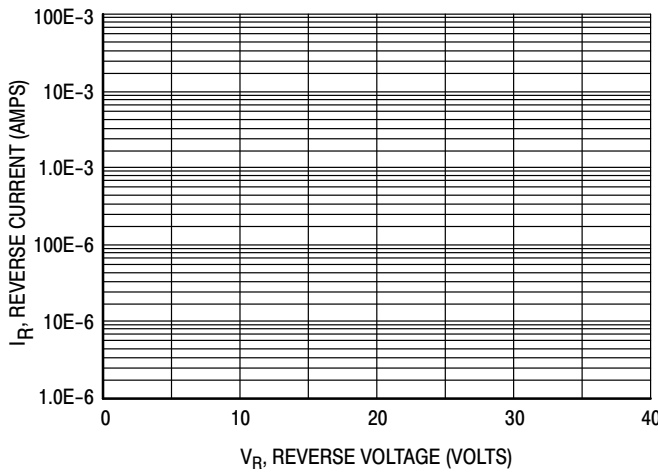


Figure 3. Typical Reverse Current

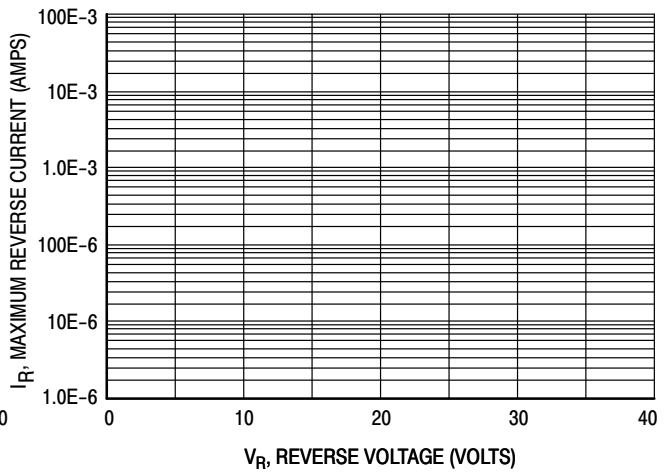


Figure 4. Maximum Reverse Current

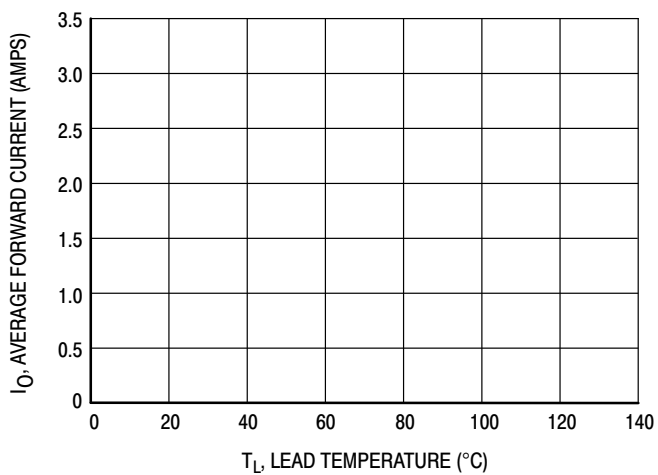


Figure 5. Current Derating

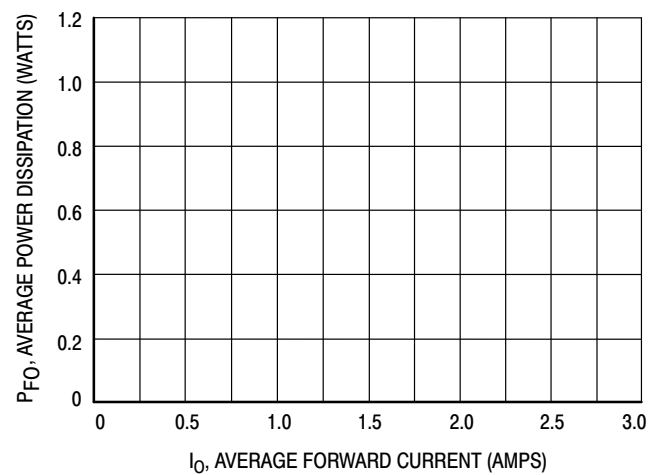


Figure 6. Forward Power Dissipation

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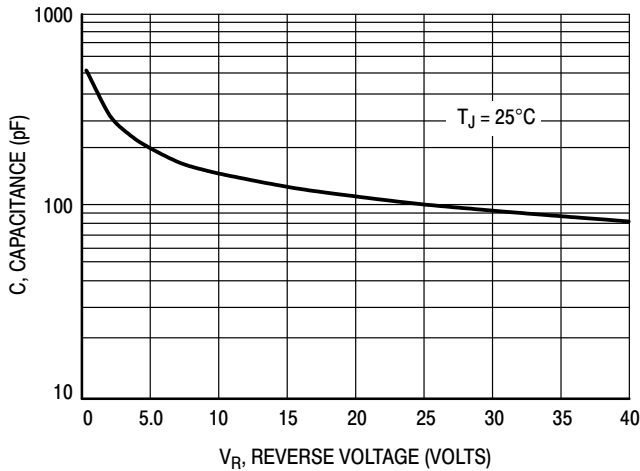


Figure 7. Capacitance

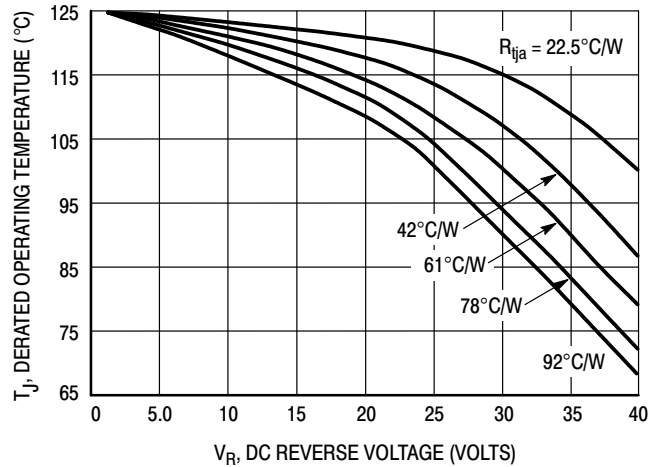


Figure 8. Typical Operating Temperature Derating*

* 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 $r(t) = R_{thja}$. For other power applications further calculations must be performed.

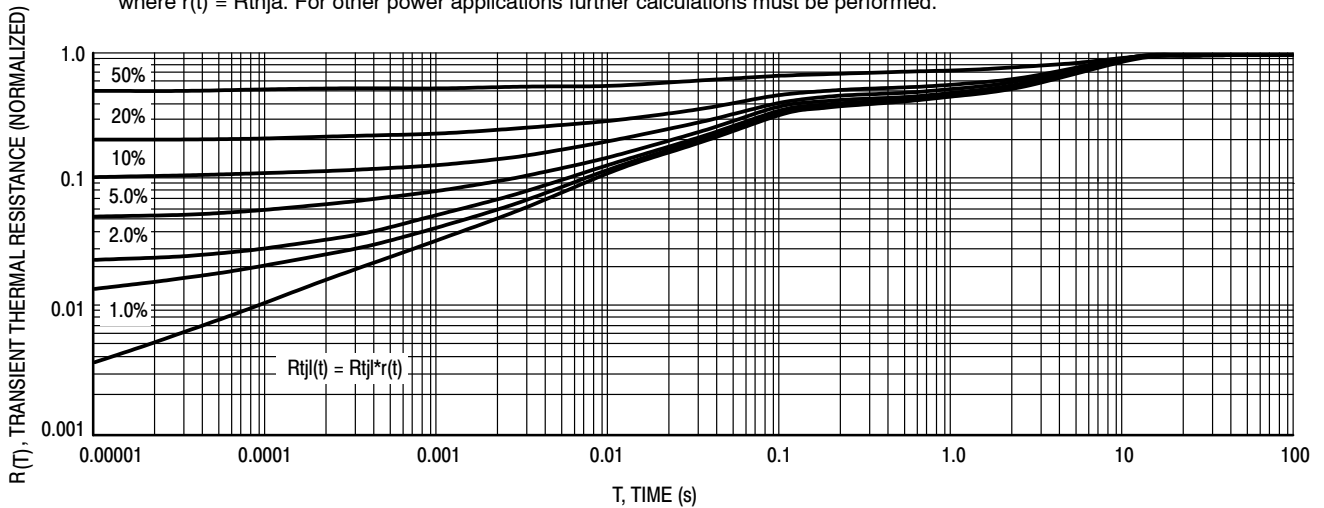


Figure 9. Thermal Response Junction to Lead

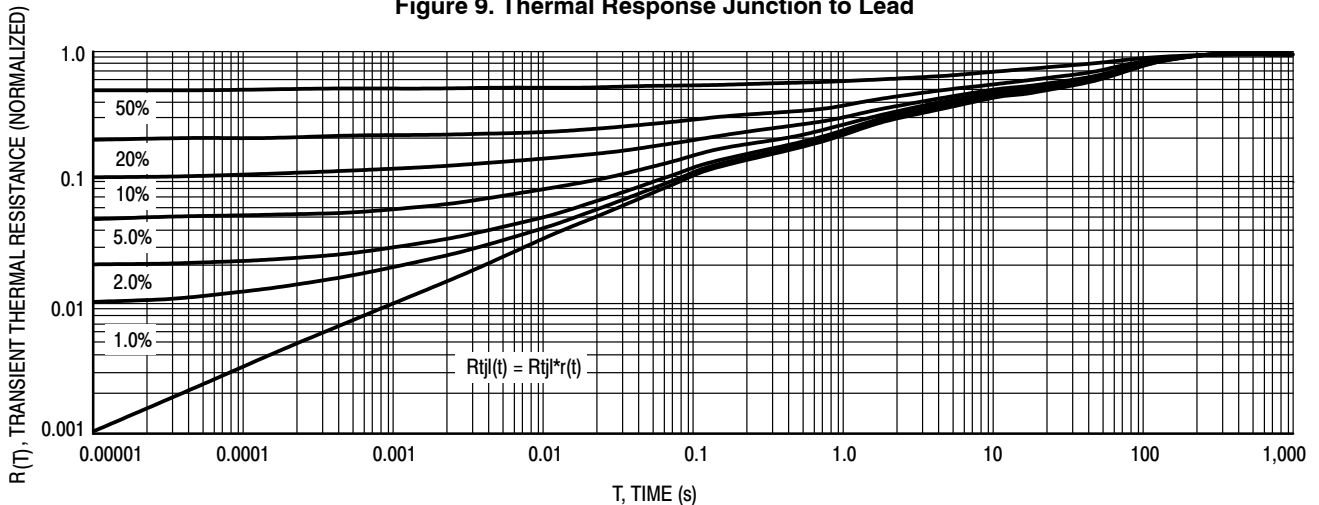
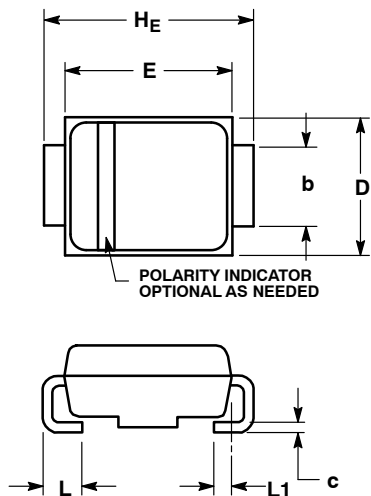


Figure 10. Thermal Response Junction to Ambient

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PACKAGE DIMENSIONS

SMB
CASE 403A-03
ISSUE H

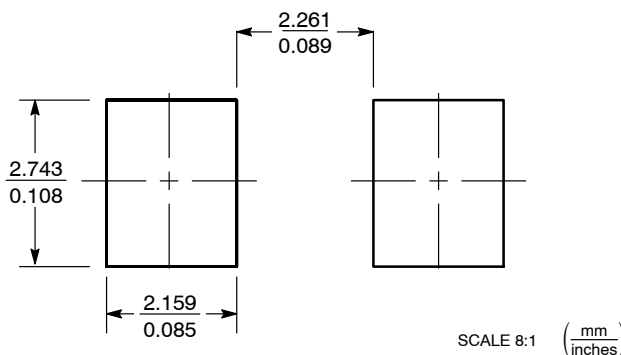


NOTES:

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

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.90	2.20	2.28	0.075	0.087	0.090
A1	0.05	0.10	0.19	0.002	0.004	0.007
b	1.96	2.03	2.20	0.077	0.080	0.087
c	0.15	0.23	0.31	0.006	0.009	0.012
D	3.30	3.56	3.95	0.130	0.140	0.156
E	4.06	4.32	4.60	0.160	0.170	0.181
H _E	5.21	5.44	5.60	0.205	0.214	0.220
L	0.76	1.02	1.60	0.030	0.040	0.063
L1	0.51 REF			0.020 REF		

SOLDERING FOOTPRINT*



*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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