MBRS140LT3

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

Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL94, VO at 1/8″
- Weight: 95 mg (approximately)
- Cathode Polarity Band
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Available in 12 mm Tape, 2500 Units per 13″ Reel, Add “T3” Suffix to Part Number
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Marking: B14L

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 = 110°C)	I_O	1.0	A
Peak Repetitive Forward Current (At Rated V_R, Square Wave, 100 kHz, T_C = 110°C)	I_{FRM}	2.0	A
Non–Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	40	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°C)	dv/dt	10,000	V/μs

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SCHOTTKY BARRIER RECTIFIER 1.0 AMPERE 40 VOLTS

SMB
CASE 403A
PLASTIC

MARKING DIAGRAM

B14L = Device Code

ORDERING INFORMATION

Device	Package	Shipping
MBRS140LT3	SMB	2500/Tape & Reel

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance — Junction–to–Lead (Note 1.)	$R_{\theta JL}$	24	°C/W
Thermal Resistance — Junction–to–Ambient (Note 2.)	$R_{\theta JA}$	80	

ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (Note 3.)		v_F	**T_J = 25°C**	**T_J = 125°C**	Volts
	(i_F = 1.0 A)		0.5	0.425	
see Figure 2	(i_F = 2.0 A)		0.6	0.58	
Maximum Instantaneous Reverse Current (Note 3.)		I_R	**T_J = 25°C**	**T_J = 100°C**	mA
	(V_R = 40 V)		0.4	10	
see Figure 4	(V_R = 20 V)		0.02	5.0	

1. Mounted with minimum recommended pad size, PC Board FR4.
2. 1 inch square pad size (1 x 0.5 inch for each lead) on FR4 board.
3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2.0%.

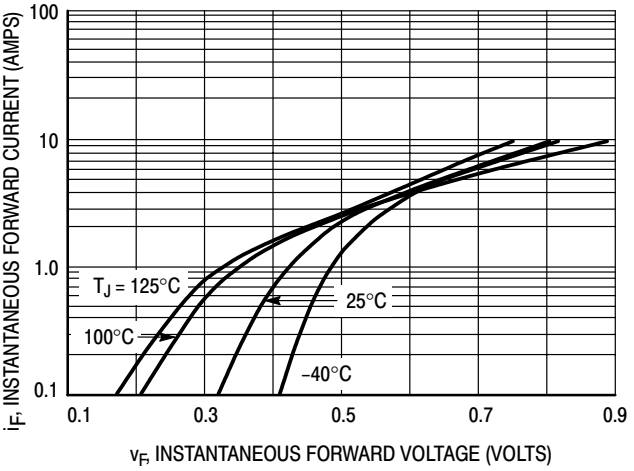


Figure 1. Typical Forward Voltage

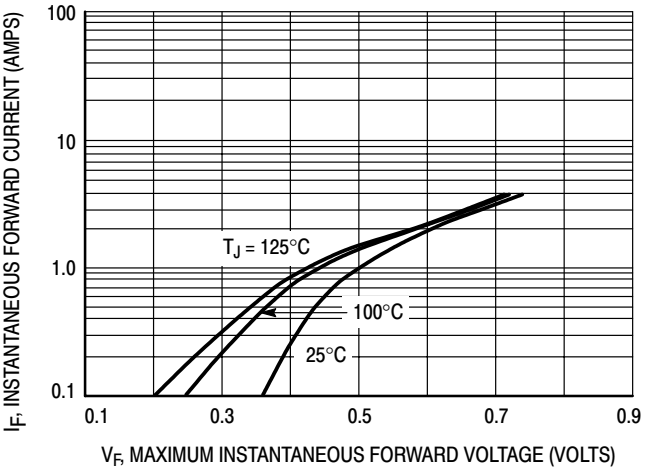


Figure 2. Maximum Forward Voltage

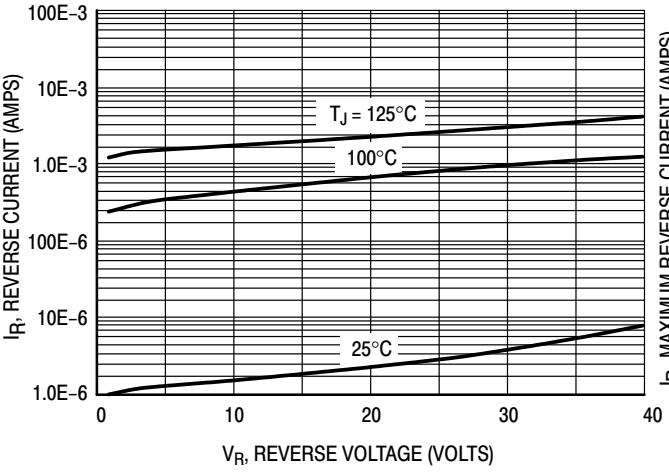


Figure 3. Typical Reverse Current

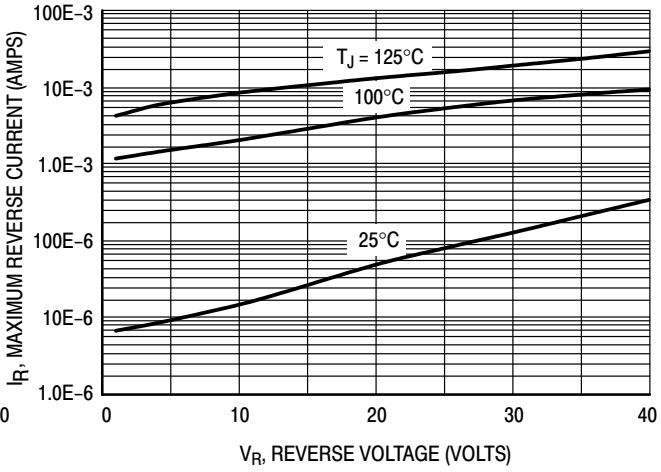


Figure 4. Maximum Reverse Current

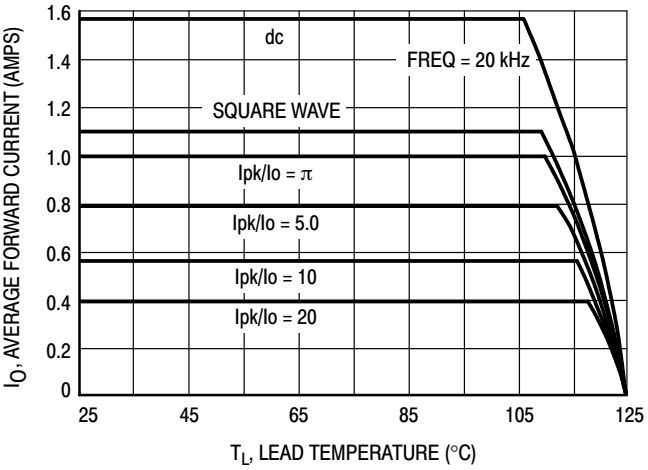


Figure 5. Current Derating

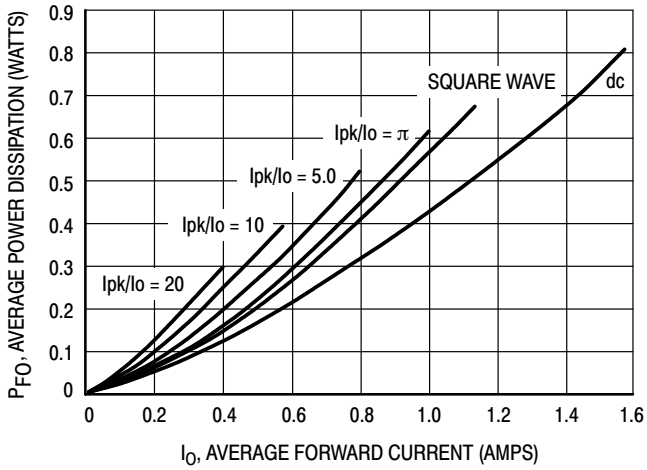


Figure 6. Forward Power Dissipation

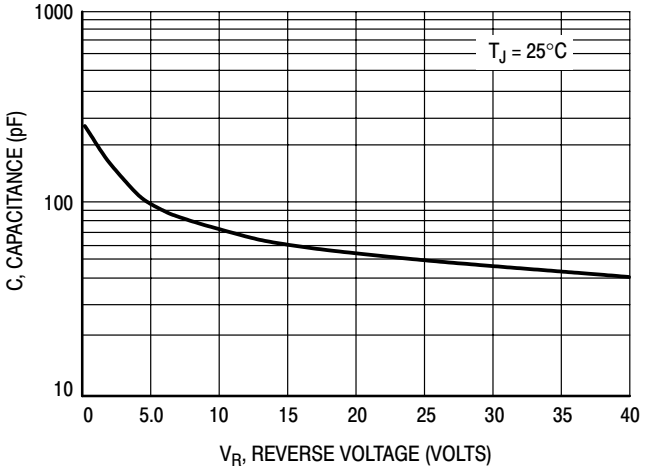


Figure 7. Capacitance

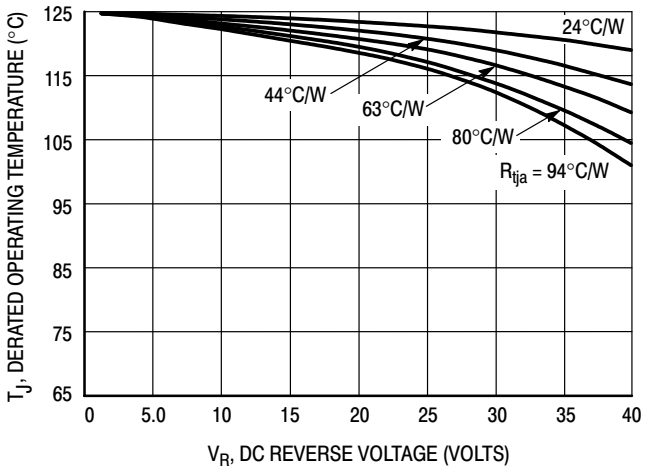


Figure 8. Typical Operating Temperature Derating*

* 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: $T_J = T_{Jmax} – r(t)(Pf + Pr)$ where

r(t) = thermal impedance under given conditions,
Pf = forward power dissipation, and
Pr = reverse power dissipation

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

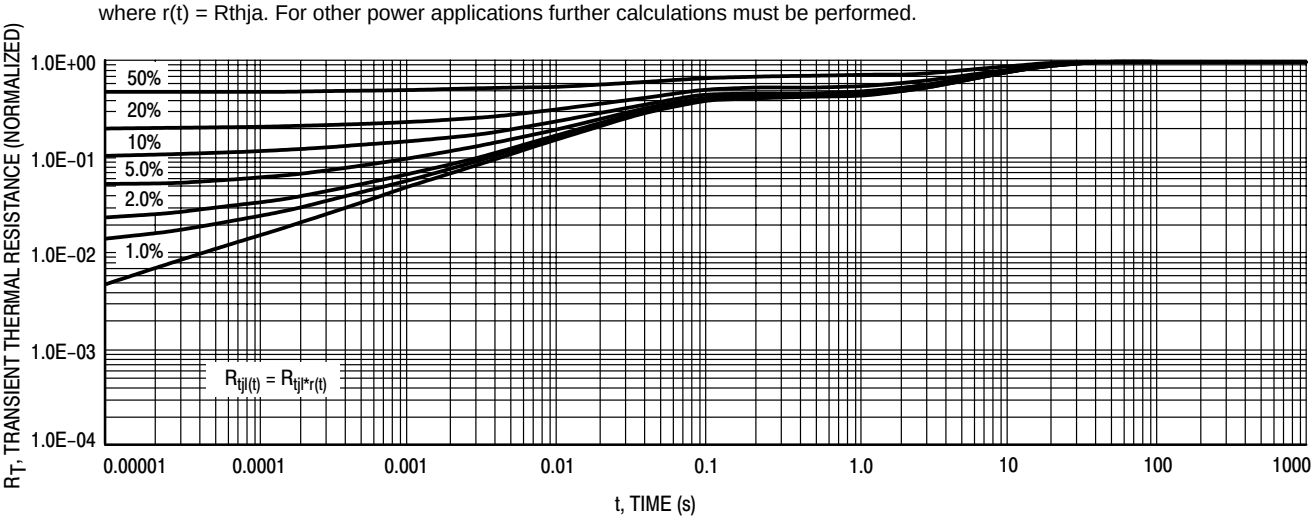


Figure 9. Thermal Response — Junction to Lead

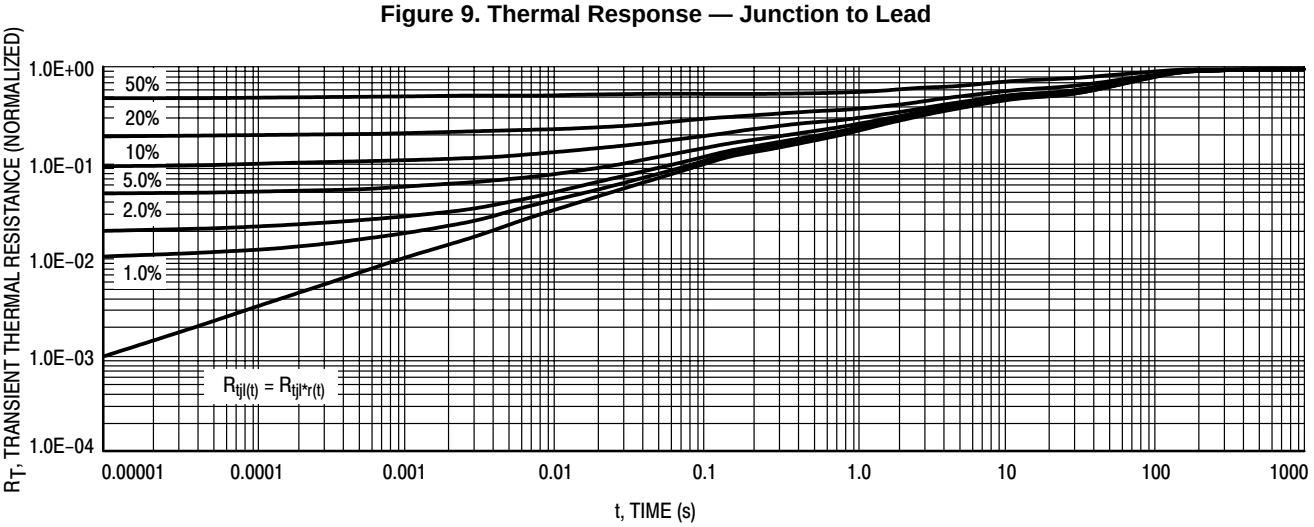
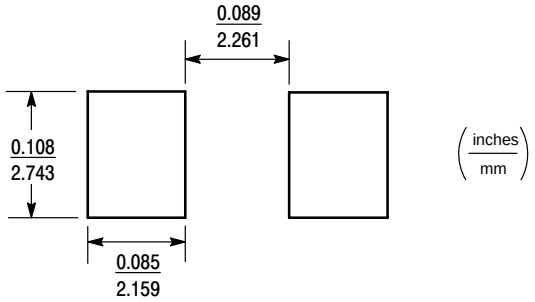


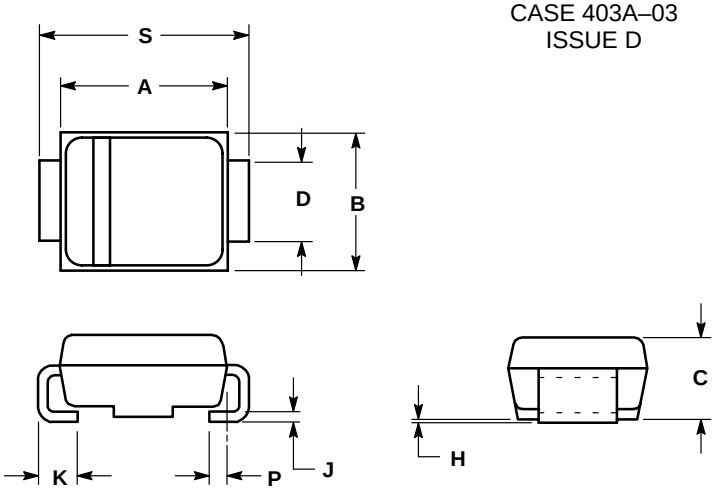
Figure 10. Thermal Response — Junction to Ambient

MINIMUM SOLDER PAD SIZES



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.

	INCHES		MILLIMETERS	
DIM	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

Notes

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