Surface Mount Schottky Power Rectifier

SMB Power Surface Mount Package

MBRS2040LT3G, NRVBS2040LT3G, NRVBS2040LN

. . . 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.

Features

- 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)
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable*
- These are Pb−Free Devices

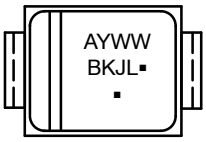
Mechanical Characteristics

- 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

SCHOTTKY BARRIER RECTIFIER 2.0 AMPERES 40 VOLTS

SMB
CASE 403A

MARKING DIAGRAM



BKJL	= Specific Device Code
A	= Assembly Location**
Y	= Year
WW	= Work Week
▪	= Pb−Free Package

(Note: Microdot may be in either location)

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

Device	Package	Shipping†
MBRS2040LT3G	SMB (Pb−Free)	2,500 / Tape & Reel
NRVBS2040LNT3G*	SMB (Pb−Free)	2,500 / Tape & Reel

DISCONTINUED (Note 1)

NRVBS2040LT3G*	SMB (Pb−Free)	2,500 / Tape & Reel

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

1. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

MAXIMUM RATINGS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Symbol	Characteristic	Value	Unit
$R_{\theta JL}$ $R_{\theta JA}$	Thermal Resistance — Junction−to−Lead (Note 1) Thermal Resistance — Junction−to−Ambient (Note 2)	22.5 78	°C/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

Symbol	Characteristic	Value		Unit
V_F	Maximum Instantaneous Forward Voltage (Note 3) see Figure 2	**T_J = 25°C**	**T_J = 125°C**	Volts
	(I_F = 2.0 A) (I_F = 4.0 A)	0.43 0.50	0.34 0.45	
I_R	Maximum Instantaneous Reverse Current (Note 3) see Figure 4	**T_J = 25°C**	**T_J = 100°C**	mA
	(V_R = 40 V) (V_R = 20 V)	0.8 0.1	20 6.0	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

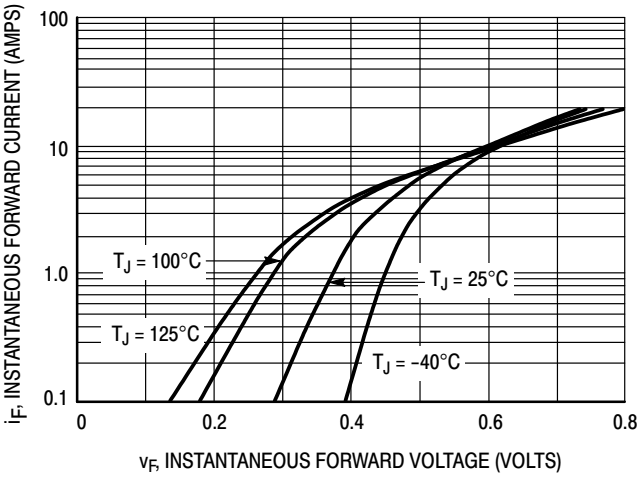


Figure 1. Typical Forward Voltage

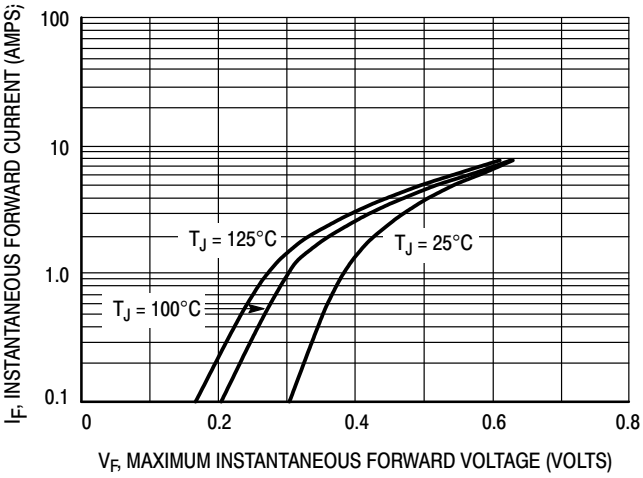


Figure 2. Maximum Forward Voltage

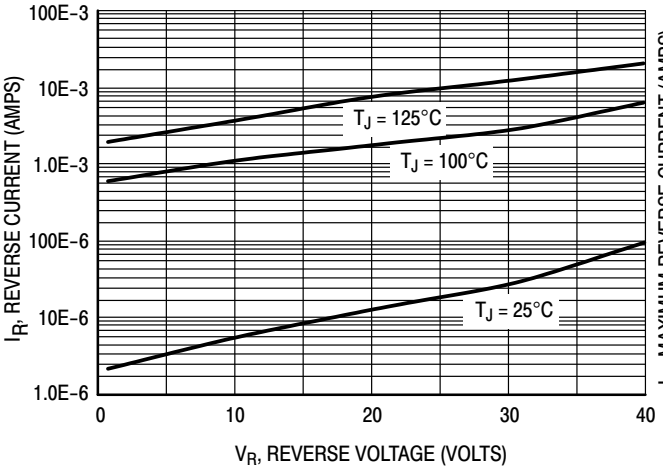


Figure 3. Typical Reverse Current

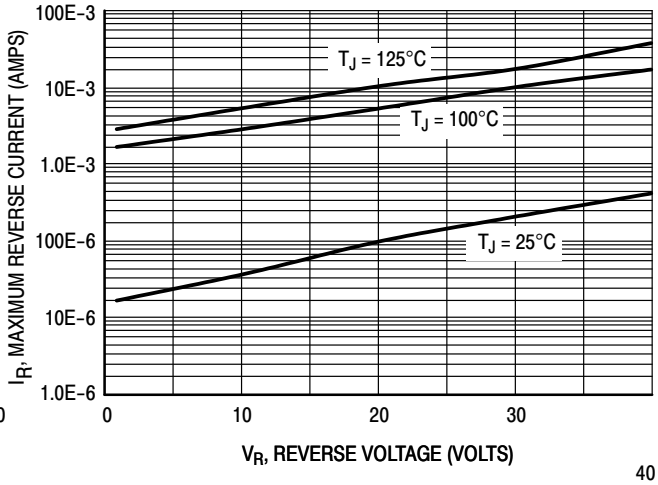


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Figure 4. Maximum Reverse Current

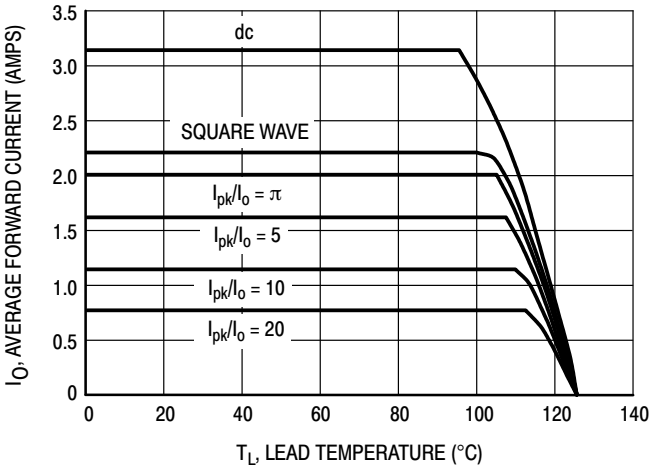


Figure 5. Current Derating

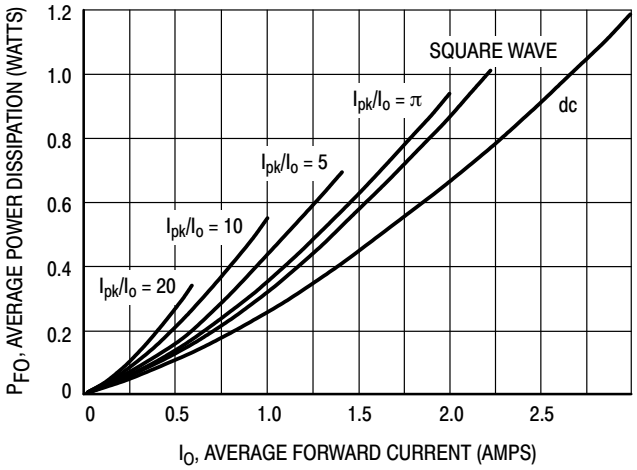


Figure 6. Forward Power Dissipation

3.0

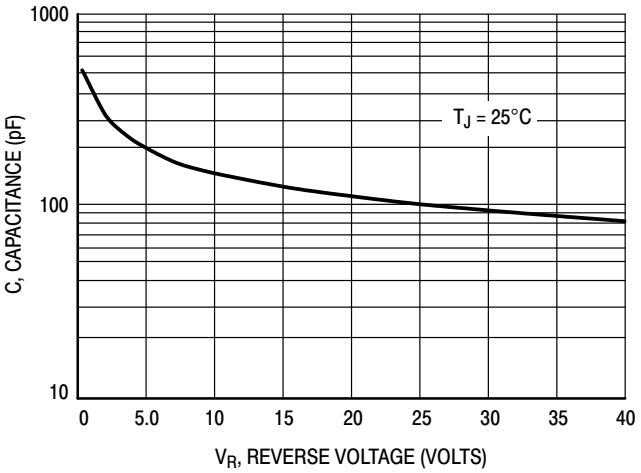


Figure 7. Capacitance

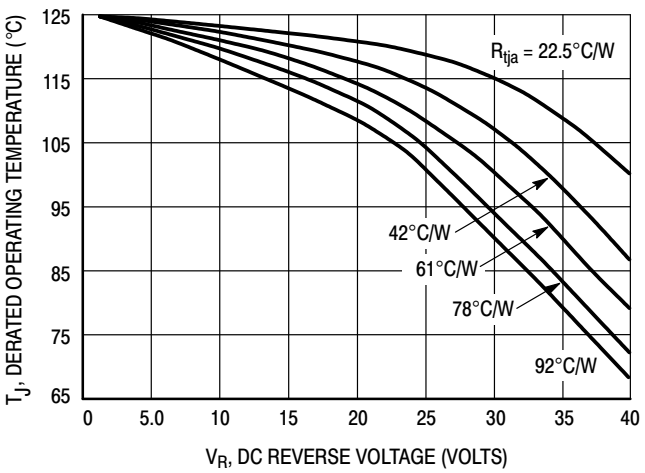


Figure 8. Typical Operating Temperature Derating*

* 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.

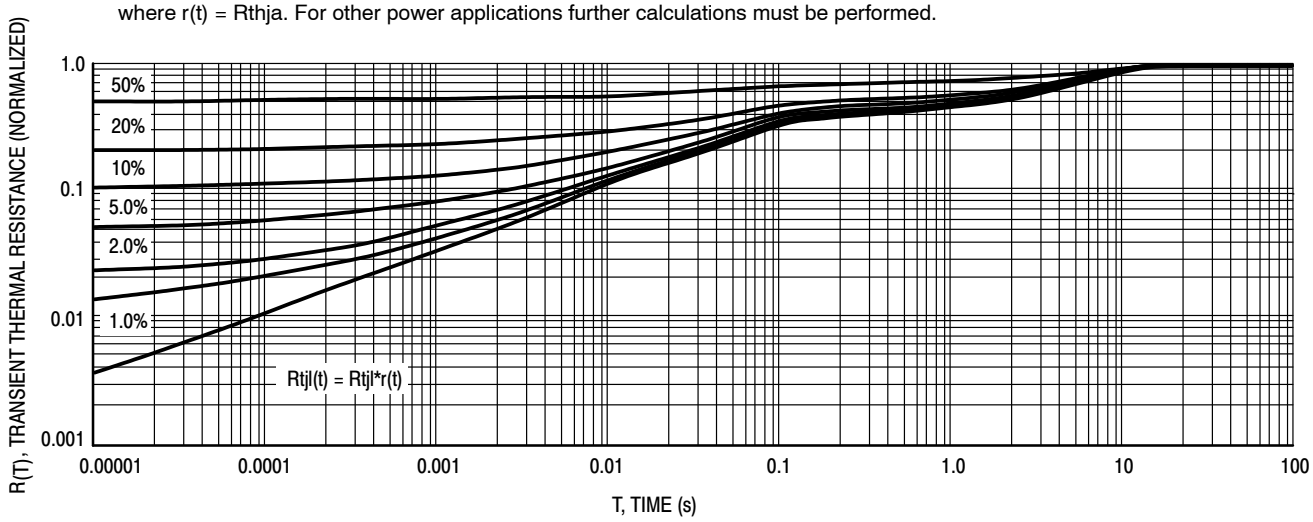


Figure 9. Thermal Response Junction to Lead

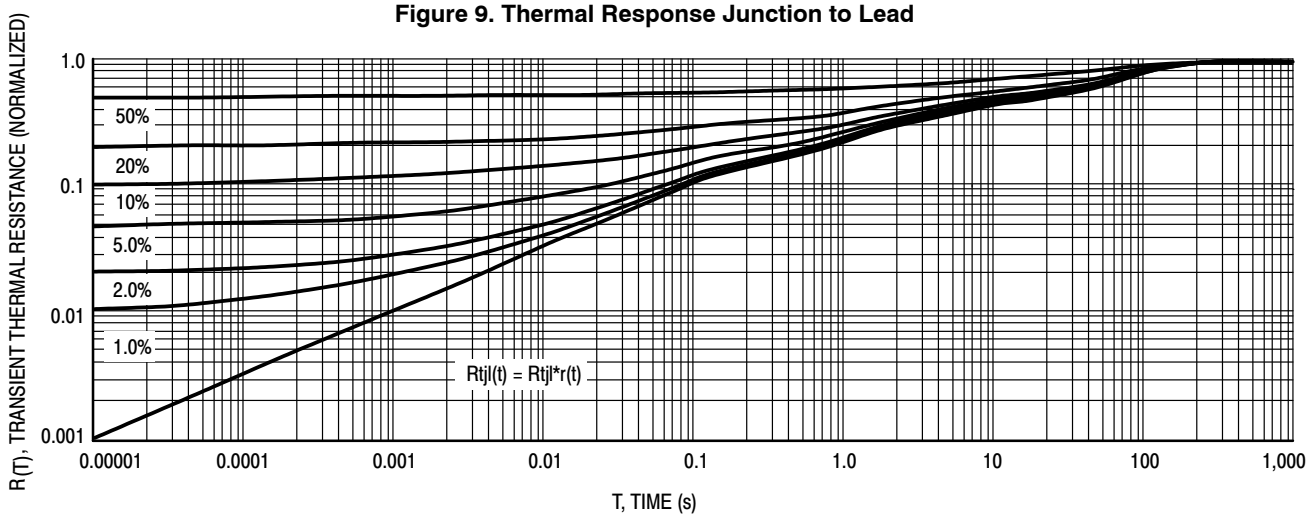


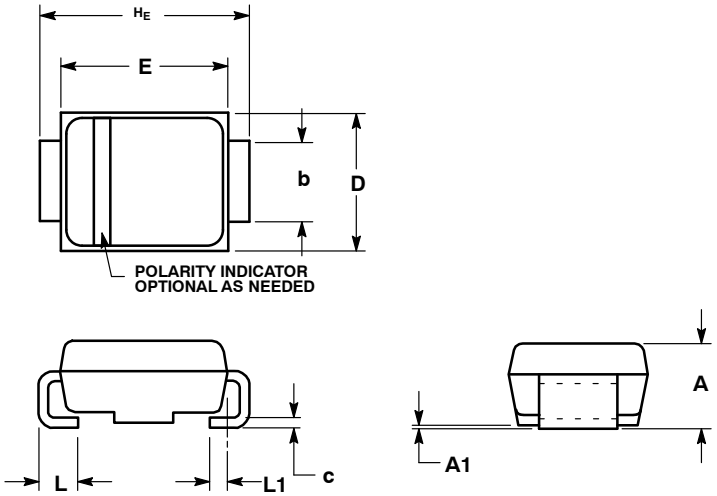
Figure 10. Thermal Response Junction to Ambient

SMB
CASE 403A−03
ISSUE J

DATE 19 JUL 2012

SCALE 1:1
Polarity Band

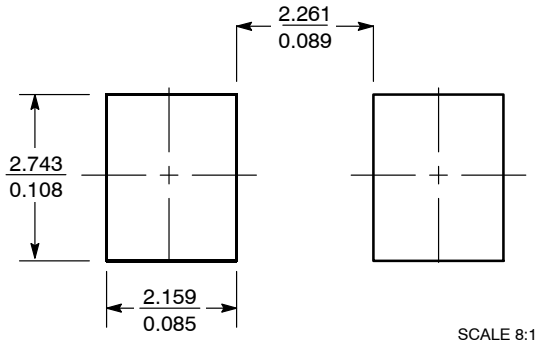
SCALE 1:1
Non−Polarity Band



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L1.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.95	2.30	2.47	0.077	0.091	0.097
A1	0.05	0.10	0.20	0.002	0.004	0.008
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		

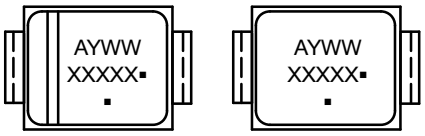
SOLDERING FOOTPRINT*



SCALE 8:1 (mm / inches)

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

GENERIC MARKING DIAGRAM*



Polarity Band **Non−Polarity Band**

XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*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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