

ON Semiconductor

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MBRS410L, NRVBS410L

Surface Mount Schottky Power Rectifier

This device employs the Schottky Barrier principle in a large area metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency rectification, or as free wheeling and polarity protection diodes, in surface mount applications where compact size and weight are critical to the system. Typical applications are AC-DC and DC-DC converters, reverse battery protection, and “ORing” of multiple supply voltages and any other application where performance and size are critical.

Features

- Ultra Low V_F
- 1st in the Market Place with a 10 V_R Schottky Rectifier
- Small Compact Surface Mountable Package with J-Bend Leads
- Rectangular Package for Automated Handling
- Highly Stable Oxide Passivated Junction
- Very Low Forward Voltage Drop
- Excellent Ability to Withstand Reverse Avalanche Energy Transients
- Guard-Ring for Stress Protection
- NRVBS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable*
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Mechanical Characteristics

- Case: Epoxy, Molded
- Weight: 217 mg (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Polarity: Polarity Band on Plastic Body Indicates Cathode Lead
- ESD Ratings: Machine Model = C
Human Body Model = 3B

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	10	V
Average Rectified Forward Current (@ $T_L = 110^\circ\text{C}$)	I_O	4.0	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	150	A
Operating Junction Temperature	T_J	-65 to +125	°C

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.



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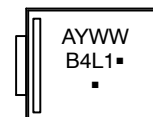
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SCHOTTKY BARRIER RECTIFIERS 4.0 AMPERES, 10 VOLTS



SMC 2-LEAD
CASE 403AC

MARKING DIAGRAM



B4L1 = Specific Device Code
A = Assembly Location**
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

**The Assembly Location code (A) is front side optional. In cases where the Assembly Location is stamped in the package, the front side assembly code may be blank.

ORDERING INFORMATION

Device	Package	Shipping†
MBRS410LT3G	SMC (Pb-Free)	2500 / Tape & Reel
NRVBS410LT3G*	SMC (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 Specification Brochure, BRD8011/D.

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Min Pad (Note 2)	1 Inch Pad	Unit
Thermal Resistance, Junction-to-Lead	$R_{\theta JL}$	12	7.0	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	109	59	

ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (Note 1)	V_F	$T_J = 25^{\circ}\text{C}$	$T_J = 100^{\circ}\text{C}$	V
($I_F = 2.0\text{ A}$)		0.31	0.200	
($I_F = 4.0\text{ A}$)		0.33	0.225	
($I_F = 8.0\text{ A}$)		0.35	0.250	
Maximum Instantaneous Reverse Current (Note 1)	I_R	$T_J = 25^{\circ}\text{C}$	$T_J = 100^{\circ}\text{C}$	mA
(Rated dc Voltage, $V_R = 5.0\text{ V}$)		2.0	100	
(Rated dc Voltage, $V_R = 10\text{ V}$)		5.0	200	

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.

1. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.
2. Mounted with Minimum Recommended Pad Size, PC Board FR4.

TYPICAL ELECTRICAL CHARACTERISTICS

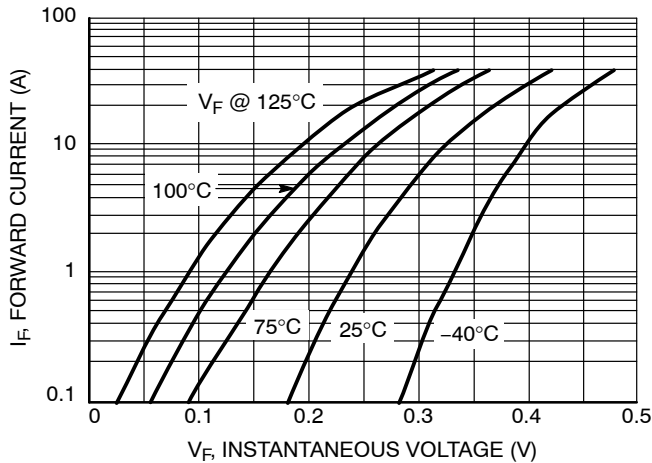


Figure 1. Typical Forward Voltage

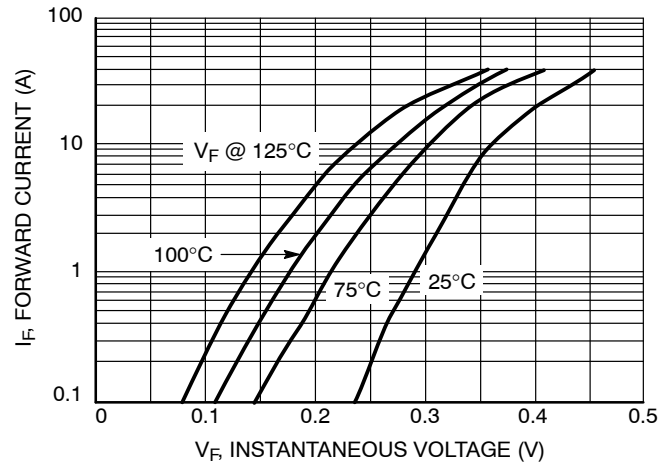


Figure 2. Maximum Forward Voltage

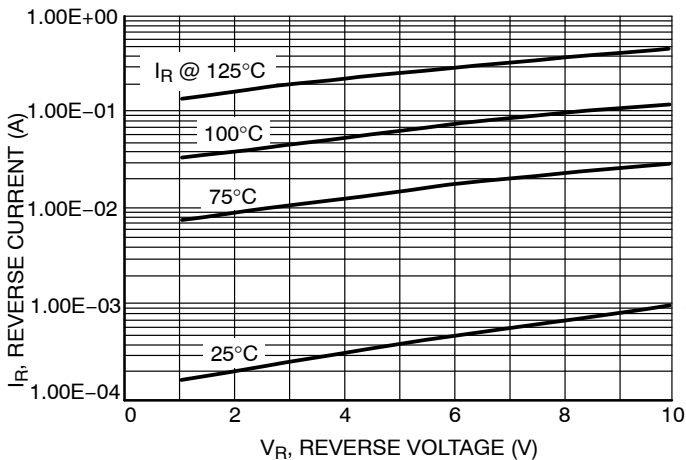


Figure 3. Typical Reverse Current

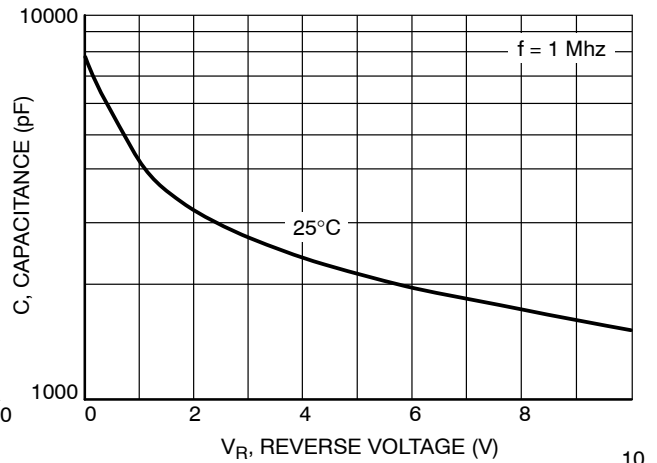


Figure 4. Typical Capacitance

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TYPICAL ELECTRICAL CHARACTERISTICS (continued)

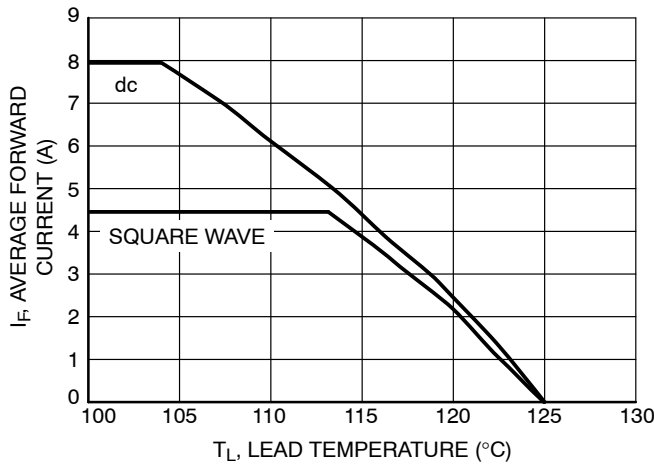


Figure 5. Current Derating (Junction-to-Lead)

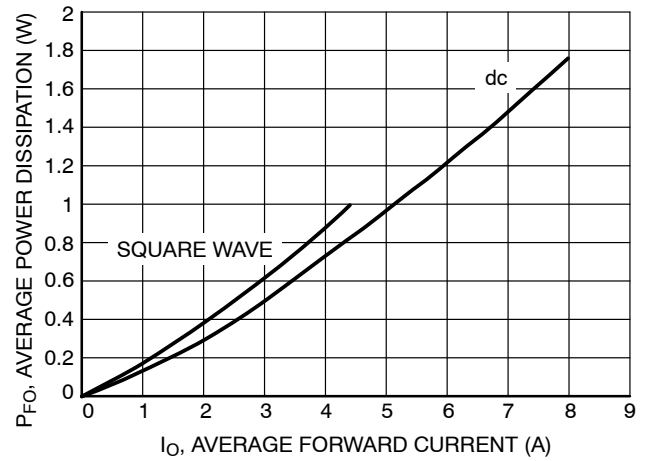


Figure 6. Forward Power Dissipation

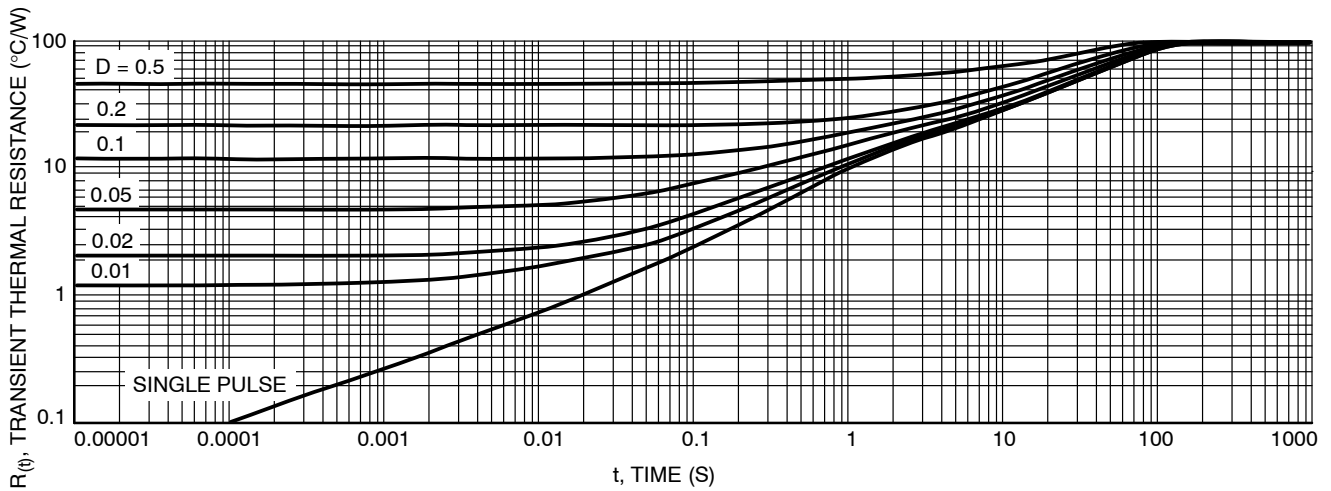


Figure 7. Thermal Response, Junction-to-Ambient (min pad)

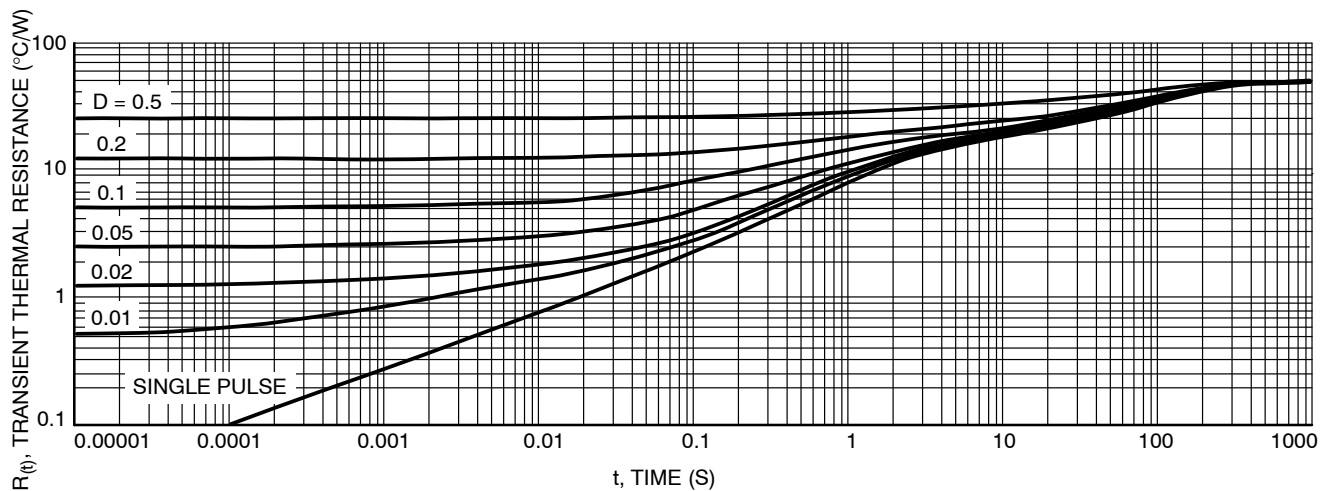
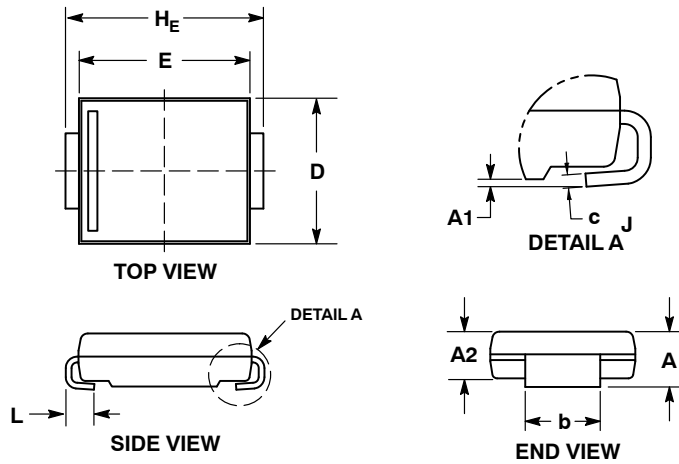


Figure 8. Thermal Response, Junction-to-Ambient (1 inch pad)

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PACKAGE DIMENSIONS

SMC 2-LEAD CASE 403AC ISSUE B

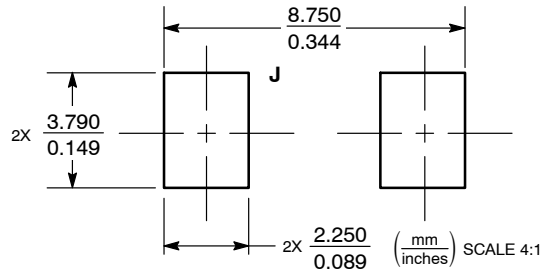


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.254mm PER SIDE.
4. DIMENSIONS D AND E TO BE DETERMINED AT DATUM H.
5. DIMENSION b SHALL BE MEASURED WITHIN THE AREA DETERMINED BY DIMENSION L.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.95	2.61	0.077	0.103
A1	0.05	0.20	0.002	0.008
A2	1.90	2.41	0.075	0.095
b	2.90	3.20	0.114	0.126
c	0.15	0.41	0.006	0.016
D	5.55	6.25	0.219	0.246
E	6.60	7.15	0.260	0.281
HE	7.75	8.15	0.305	0.321
L	0.75	1.60	0.030	0.063

RECOMMENDED 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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