

# Surface Mount Schottky Power Rectifier

## SMA Power Surface Mount Package

### MBRA120E, NRVBA120E, NRVBA120EN

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
- Optimized for Low Leakage Current
- NRVBA 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: Molded Epoxy
- Epoxy Meets UL94, V<sub>O</sub> at 1/8"
- Weight: 70 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 Indicates Cathode Lead
- Available in 12 mm Tape, 5000 Units per 13 inch Reel
- Device Meets MSL1 Requirements
- ESD Ratings: Machine Model, C (>400 V)  
Human Body Model, 3B (>8000 V)
- Marking: B1E2



ON Semiconductor®

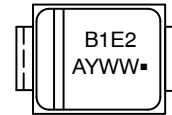
[www.onsemi.com](http://www.onsemi.com)

### SCHOTTKY BARRIER RECTIFIER 1 AMPERE 20 VOLTS



SMA  
CASE 403D

#### MARKING DIAGRAMS



B1E2 = 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 bottom (molding ejecter pin), the front side assembly code may be blank.

#### ORDERING INFORMATION

Device	Package	Shipping†
MBRA120ET3G	SMA (Pb-Free)	5000 / Tape & Reel
NRVBA120ET3G*	SMA (Pb-Free)	5000 / Tape & Reel
NRVBA120ENT3G*	SMA (Pb-Free)	5000 / 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.

# MBRA120E, NRVBA120E, NRVBA120EN

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	20	V
Average Rectified Forward Current (At Rated $V_R$ , $T_C = 125^\circ\text{C}$ )	$I_O$	1.0	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	$I_{FSM}$	40	A
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	-55 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ , $T_J = 25^\circ\text{C}$ )	dv/dt	10,000	V/ $\mu\text{s}$

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

Characteristic	Symbol	5 mm x 5 mm (Note 2)	1 Inch x 1/2 inch (Note 3)	Unit
Thermal Resistance – Junction-to-Lead	$R_{\theta JL}$	34	20	$^\circ\text{C}/\text{W}$
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	138	77	

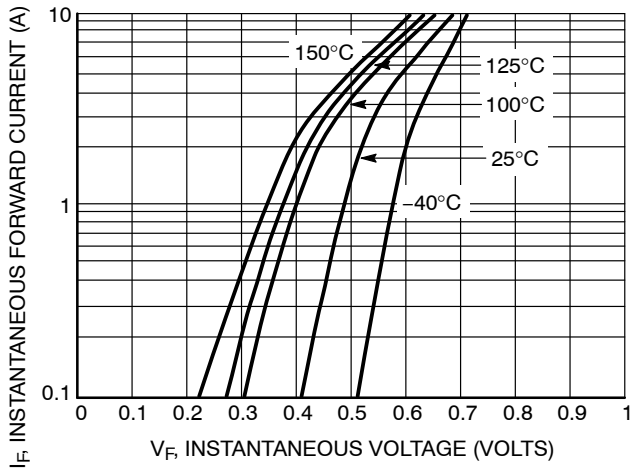
## ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (Note 1), See Figure 2  ( $I_F = 0.1\text{ A}$ ) ( $I_F = 1.0\text{ A}$ ) ( $I_F = 2.0\text{ A}$ )	$V_F$	<b><math>T_J = 25^\circ\text{C}</math></b>	<b><math>T_J = 100^\circ\text{C}</math></b>	V
		0.455	0.360	
		0.530	0.455	
Maximum Instantaneous Reverse Current, See Figure 4  ( $V_R = 20\text{ V}$ ) ( $V_R = 10\text{ V}$ ) ( $V_R = 5.0\text{ V}$ )	$I_R$	<b><math>T_J = 25^\circ\text{C}</math></b>	<b><math>T_J = 100^\circ\text{C}</math></b>	$\mu\text{A}$
		10	1600	
		1.0	500	
		0.5	300	

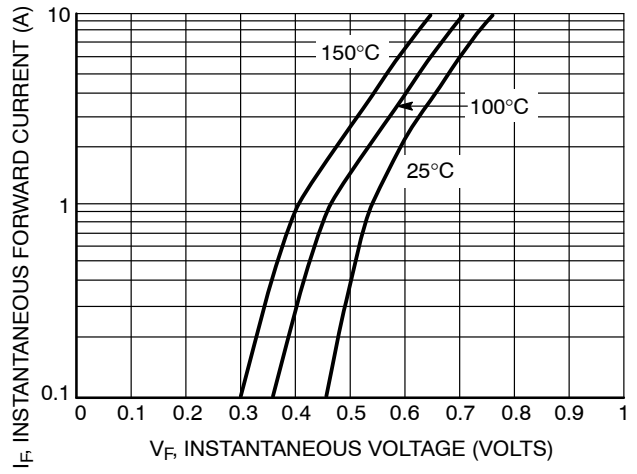
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width  $\leq 250\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2. Mounted on a Pad Size of 5 mm x 5 mm, PC Board FR4 (2 pads).
3. Mounted on a Pad Size of 1 inch x 1/2 inch, PC Board FR4 (2 pads).

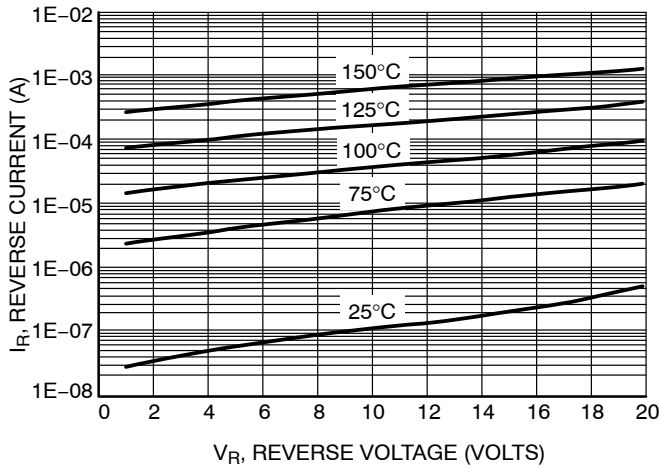
# MBRA120E, NRVBA120E, NRVBA120EN



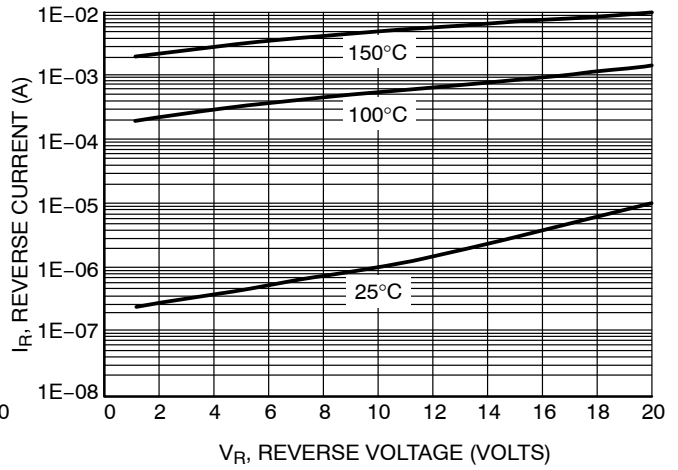
**Figure 1. Typical Forward Voltage**



**Figure 2. Maximum Forward Voltage**

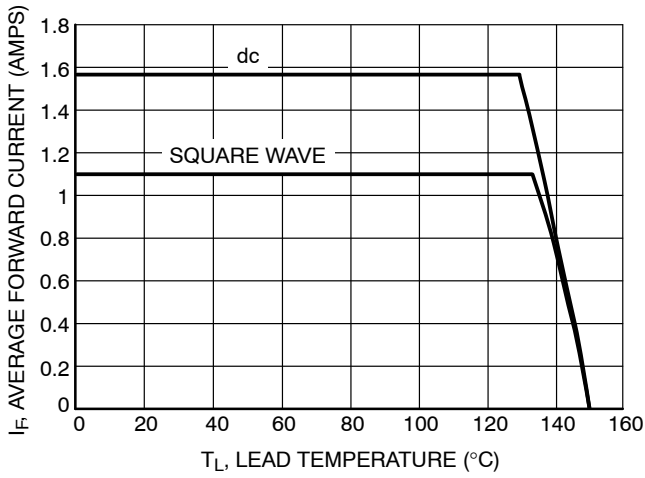


**Figure 3. Typical Reverse Current**

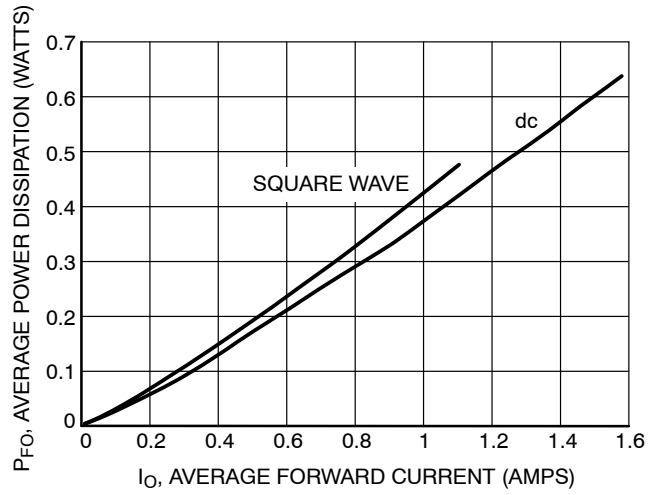


**Figure 4. Maximum Reverse Current**

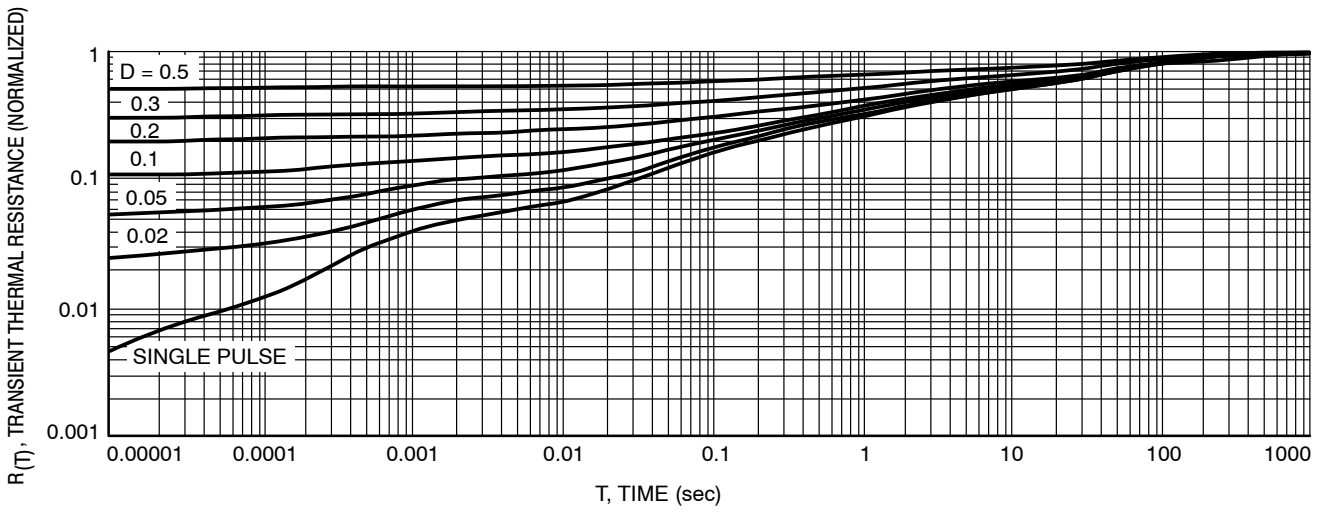
# MBRA120E, NRVBA120E, NRVBA120EN



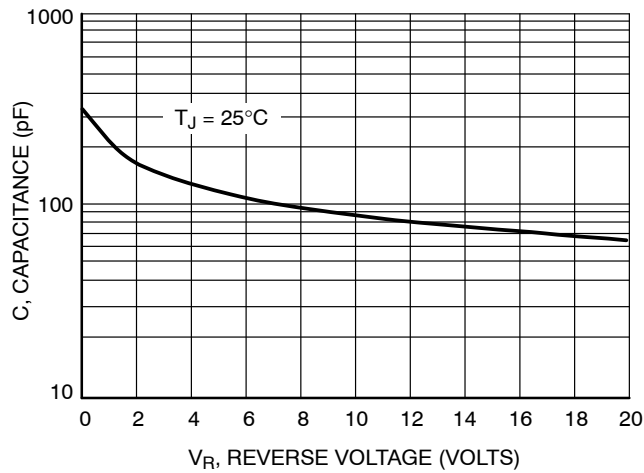
**Figure 5. Current Derating**



**Figure 6. Forward Power Dissipation**



**Figure 7. Thermal Resistance**



**Figure 8. Typical Junction Capacitance**

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



STYLE 1    STYLE 2

SCALE 1:1

**SMA**  
CASE 403D  
ISSUE J

DATE 22 OCT 2021



POLARITY INDICATOR  
OPTIONAL AS NEEDED

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION *b* SHALL BE MEASURED WITHIN DIMENSION *L*.

DIM	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.97	2.10	2.20	0.078	0.083	0.087
A1	0.05	0.10	0.20	0.002	0.004	0.008
<i>b</i>	1.27	1.45	1.63	0.050	0.057	0.064
<i>c</i>	0.15	0.28	0.41	0.006	0.011	0.016
D	2.29	2.60	2.92	0.090	0.103	0.115
E	4.06	4.32	4.57	0.160	0.170	0.180
HE	4.83	5.21	5.59	0.190	0.205	0.220
L	0.76	1.14	1.52	0.030	0.045	0.060



STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

STYLE 2:  
NO POLARITY

**GENERIC  
MARKING DIAGRAM\***



STYLE 1                      STYLE 2

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

\*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.



RECOMMENDED  
MOUNTING FOOTPRINT

<b>DOCUMENT NUMBER:</b>	<b>98AON04079D</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SMA</b>	<b>PAGE 1 OF 1</b>

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**onsemi Website:** [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

**North American Technical Support:**  
Voice Mail: 1 800-282-9855 Toll Free USA/Canada  
Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative