MBR120ESF, NRVB120ESF

Surface Mount Schottky Power Rectifier

Plastic SOD−123 Package

This device uses the Schottky Barrier principle with a large area metal−to−silicon power diode. 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. This package also provides an easy to work with alternative to leadless 34 package style. Because of its small size, it is ideal for use in portable and battery powered products such as cellular and cordless phones, chargers, notebook computers, printers, PDAs and PCMCIA cards. 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

- Guardring for Stress Protection
- Low Leakage
- 150°C Operating Junction Temperature
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Package Designed for Optimal Automated Board Assembly
- ESD Rating:
  - Human Body Model = 3B
  - Machine Model = C
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant*

Mechanical Characteristics

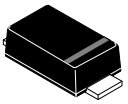
- Device Marking: L2E
- Polarity Designator: Cathode Band
- Weight: 11.7 mg (approximately)
- Case: Epoxy, Molded
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

*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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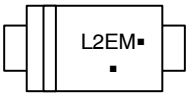
http://onsemi.com

SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 20 VOLTS



SOD−123FL
CASE 498

MARKING DIAGRAM



L2E = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MBR120ESFT1G	SOD−123FL (Pb−Free)	3,000/ Tape & Reel **
NRVB120ESFT1G	SOD−123FL (Pb−Free)	3,000/ Tape & Reel **
MBR120ESFT3G	SOD−123FL (Pb−Free)	10,000 / Tape & Reel ***
NRVB120ESFT3G	SOD−123FL (Pb−Free)	10,000 / Tape & Reel ***

** 8 mm Tape, 7" Reel
*** 8 mm Tape, 13" Reel

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

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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	20	V
Average Rectified Forward Current (At Rated V_R, T_L = 140°C)	I_O	1.0	A
Peak Repetitive Forward Current (At Rated V_R, Square Wave, 20 kHz, T_L = 125°C)	I_{FRM}	2.0	A
Non−Repetitive Peak Surge Current (Non−Repetitive peak surge current, halfwave, single phase, 60 Hz)	I_{FSM}	40	A
Storage Temperature	T_{stg}	−65 to 150	°C
Operating Junction Temperature	T_J	−65 to 150	°C
Voltage Rate of Change (Rated V_R, T_J = 25°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) Thermal Resistance – Junction−to−Lead (Note 2) Thermal Resistance – Junction−to−Ambient (Note 1) Thermal Resistance – Junction−to−Ambient (Note 2)	R_{tjl} R_{tjl} R_{tja} R_{tja}	26 21 325 82	°C/W

1. Mounted with minimum recommended pad size, PC Board FR4.
2. Mounted with 1 in. copper pad (Cu area 700 mm^2).

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value		Unit
Maximum Instantaneous Forward Voltage (Note 3), See Figure 2	V_F	**T_J = 25°C**	**T_J = 100°C**	V
(I_F = 0.1 A) (I_F = 1.0 A) (I_F = 2.0 A)		0.455 0.530 0.595	0.360 0.455 0.540	
Maximum Instantaneous Reverse Current (Note 3), See Figure 4	I_R	**T_J = 25°C**	**T_J = 100°C**	μA
(V_R = 20 V) (V_R = 10 V) (V_R = 5.0 V)		10 1.0 0.5	1600 500 300	

3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.

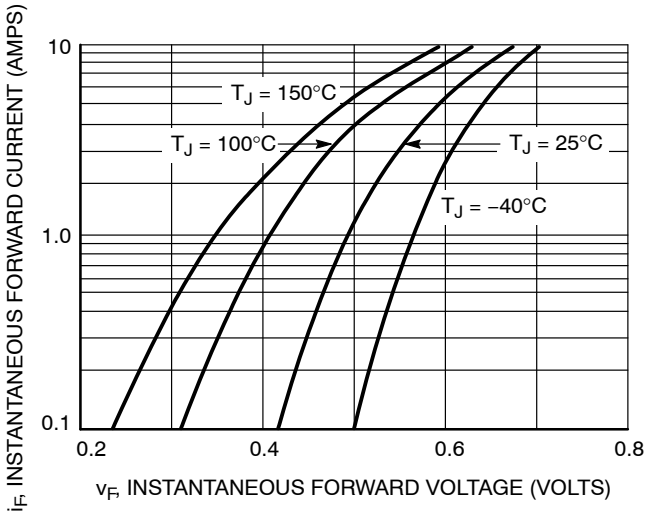


Figure 1. Typical Forward Voltage

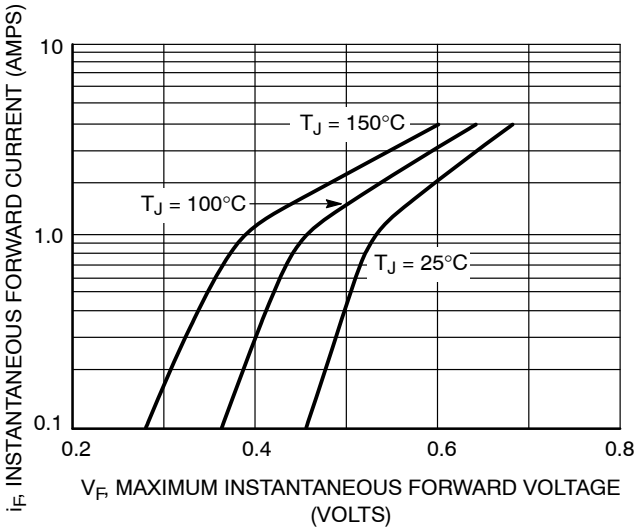


Figure 2. Maximum Forward Voltage

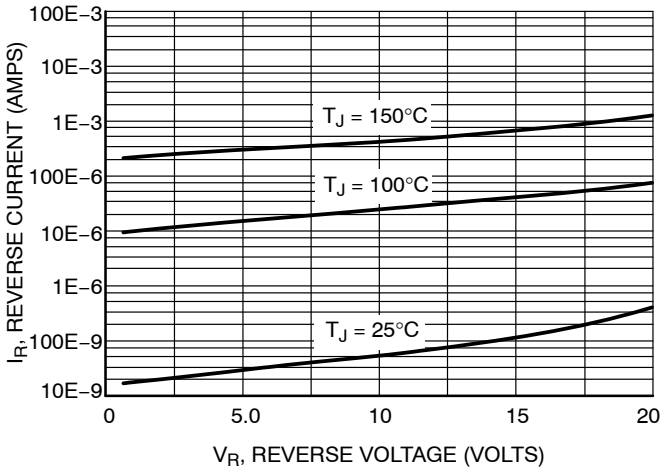


Figure 3. Typical Reverse Current

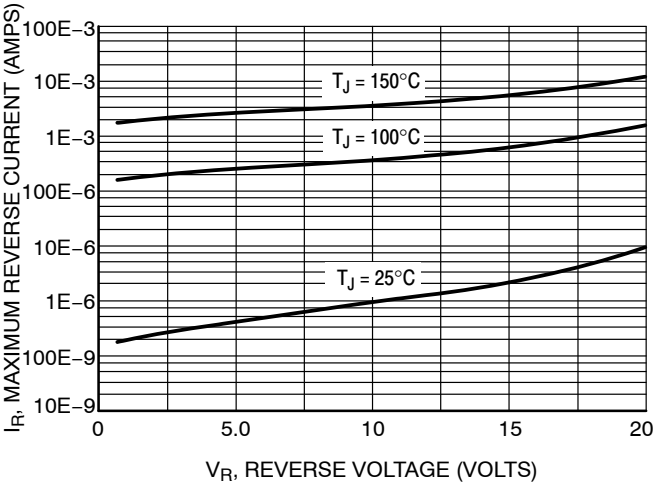


Figure 4. Maximum Reverse Current

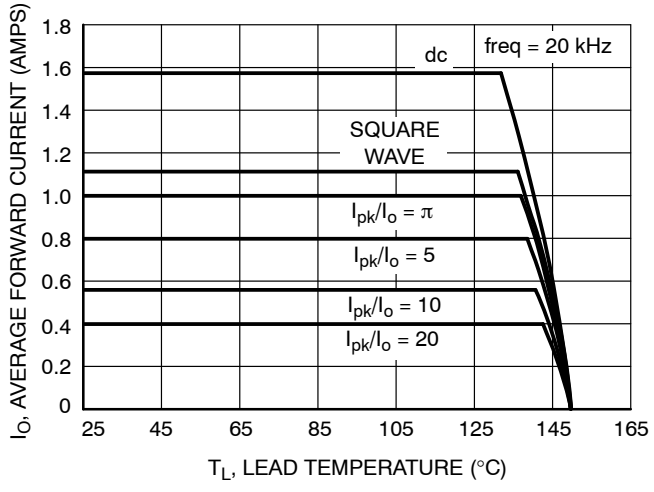


Figure 5. Current Derating

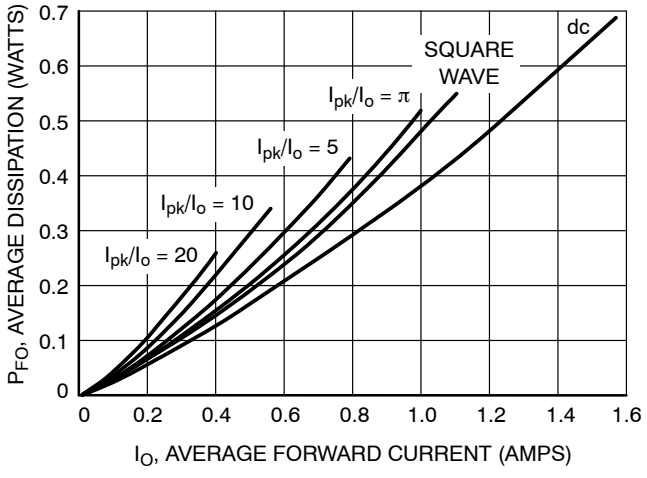


Figure 6. Forward Power Dissipation

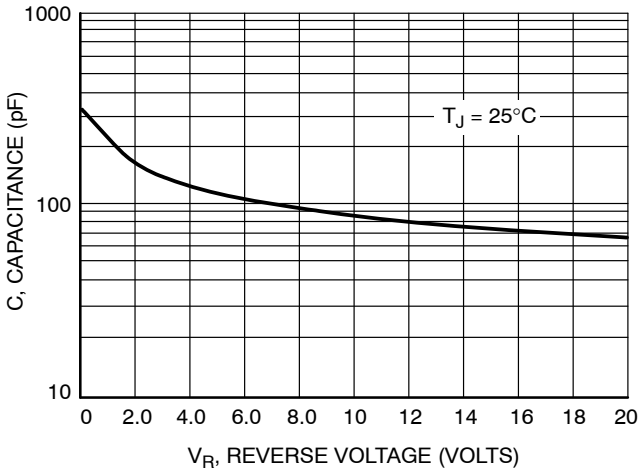


Figure 7. Capacitance

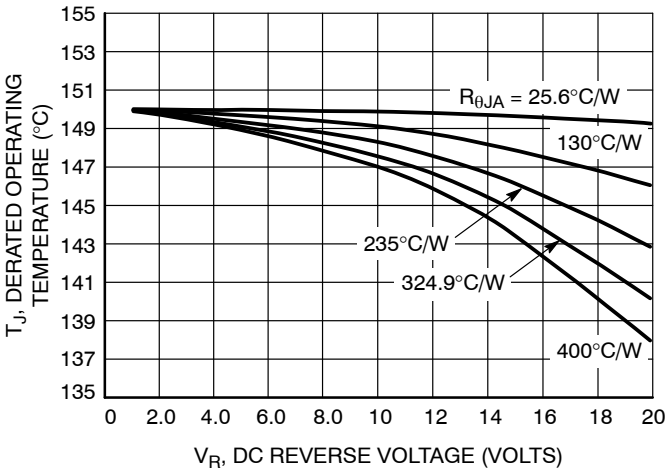


Figure 8. Typical Operating Temperature Derating*

* 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.

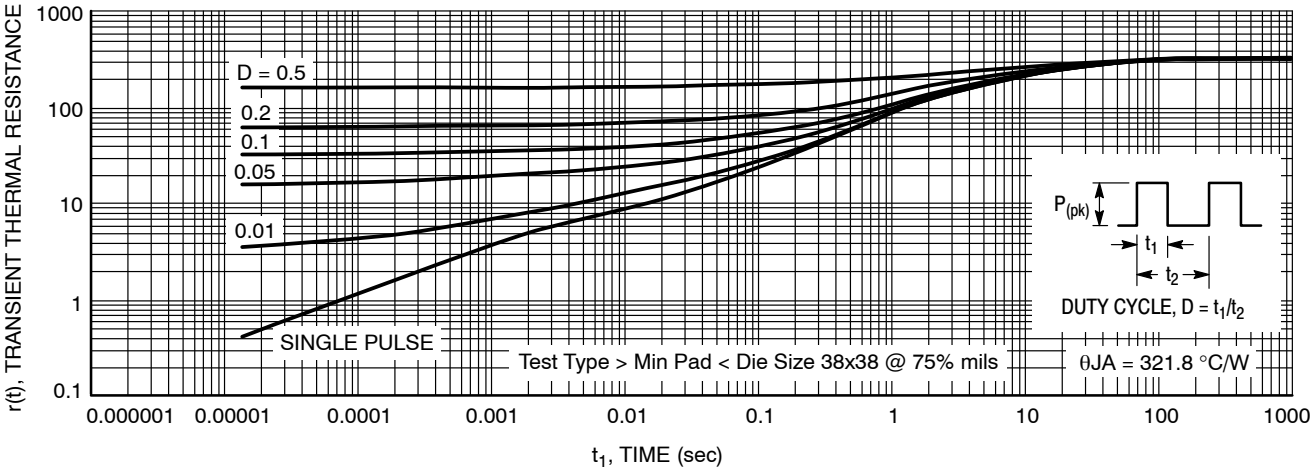
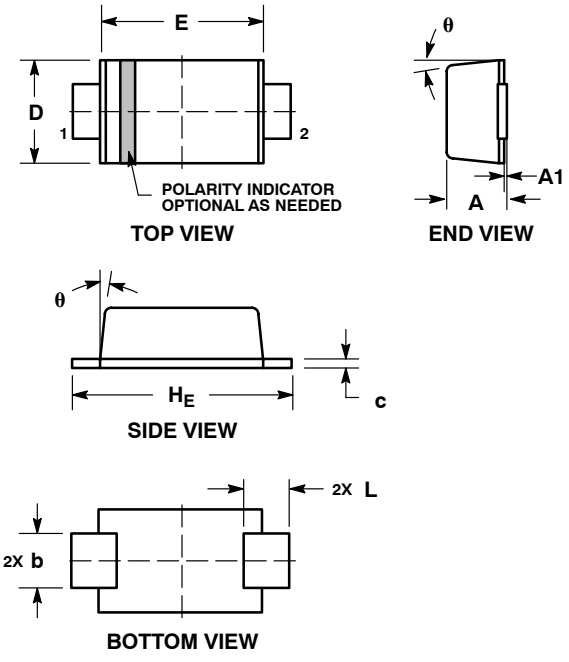


Figure 9. Thermal Response

PACKAGE DIMENSIONS

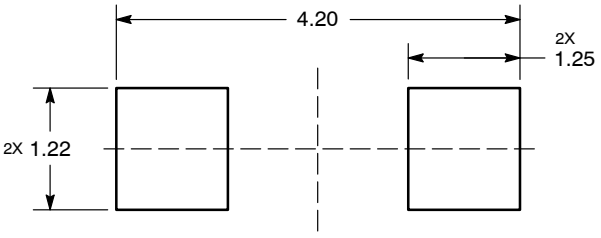
SOD−123FL
CASE 498
ISSUE D



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH.
4. DIMENSIONS D AND J ARE TO BE MEASURED ON FLAT SECTION OF THE LEAD: BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	0.95	0.98	0.035	0.037	0.039
A1	0.00	0.05	0.10	0.000	0.002	0.004
b	0.70	0.90	1.10	0.028	0.035	0.043
c	0.10	0.15	0.20	0.004	0.006	0.008
D	1.50	1.65	1.80	0.059	0.065	0.071
E	2.50	2.70	2.90	0.098	0.106	0.114
L	0.55	0.75	0.95	0.022	0.030	0.037
H_E	3.40	3.60	3.80	0.134	0.142	0.150
θ	0°	–	8°	0°	–	8°

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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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