# MBR120VLSF, NRVB120VLSF

# Schottky Power Rectifier, Surface Mount

## 1.0 A, 20 V, 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
- Optimized for Very Low Forward Voltage
- 125°C Operating Junction Temperature
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Package Designed for Optimal Automated Board Assembly
- ESD Ratings: Machine Model, C;
  Human Body Model, 3B
- 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, Halogen Free/BFR Free and are RoHS Compliant

### Mechanical Characteristics

- Reel Options: MBR120VLSFT1G = 3,000 per 7″ reel/8 mm tape
  MBR120VLSFT3G = 10,000 per 13″ reel/8 mm tape
- Device Marking: L2V
- 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
- Device Meets MSL 1 Requirements

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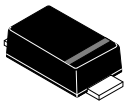
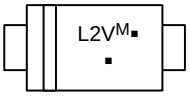
**SCHOTTKY BARRIER RECTIFIER**
**1.0 AMPERES**
**20 VOLTS**



**SOD−123FL**
**CASE 498**

**MARKING DIAGRAM**




L2V = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| MBR120VLSFT1G | SOD−123FL (Pb−Free) | 3000 / Tape & Reel |
| NRVB120VLSFT1G | SOD−123FL (Pb−Free) | 3000 / Tape & Reel |
| MBR120VLSFT3G | SOD−123FL (Pb−Free) | 10000 / Tape & 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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October, 2014 − Rev. 4
Publication Order Number:
MBR120VLSFT1/D

## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 20 | V |
| Average Rectified Forward Current<br>(Rated $V_R$) $T_L$ = 119°C | $I_{F(AV)}$ | 1.0 | A |
| Non−Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions, Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 45 | A |
| Storage Temperature Range | $T_{stg}$ | −65 to +125 | °C |
| Operating Junction Temperature | $T_J$ | −65 to +125 | °C |
| Voltage Rate of Change (Rated $V_R$) | dv/dt | 1000 | 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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance − Junction−to−Lead (Note 1)<br>Thermal Resistance − Junction−to−Lead (Note 2)<br>Thermal Resistance − Junction−to−Ambient (Note 1)<br>Thermal Resistance − Junction−to−Ambient (Note 2) | $R_{tjl}$<br>$R_{tjl}$<br>$R_{tja}$<br>$R_{tja}$ | 26<br>21<br>325<br>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 | $T_J$ = 25°C | $T_J$ = 85°C | Unit |
|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 3) | $V_F$ | | | V |
| ($I_F$ = 0.1 A) | | 0.275 | 0.205 | |
| ($I_F$ = 0.5 A) | | 0.315 | 0.270 | |
| ($I_F$ = 1.0 A) | | 0.340 | 0.300 | |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated DC Voltage) | $I_R$ | 0.60 | 15 | mA |

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 = 300 μs, Duty Cycle ≤ 2%.

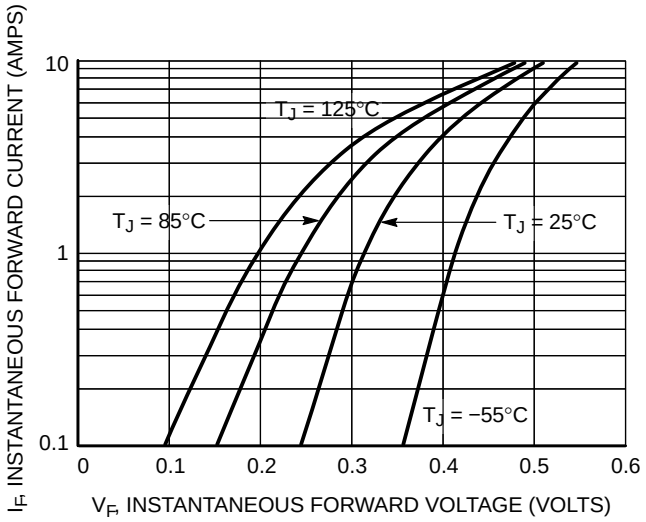



**Figure 1. Typical Forward Voltage**

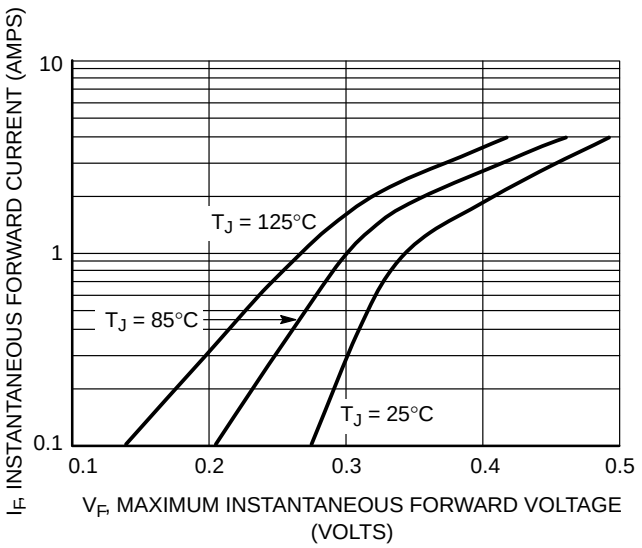



**Figure 2. Maximum Forward Voltage**

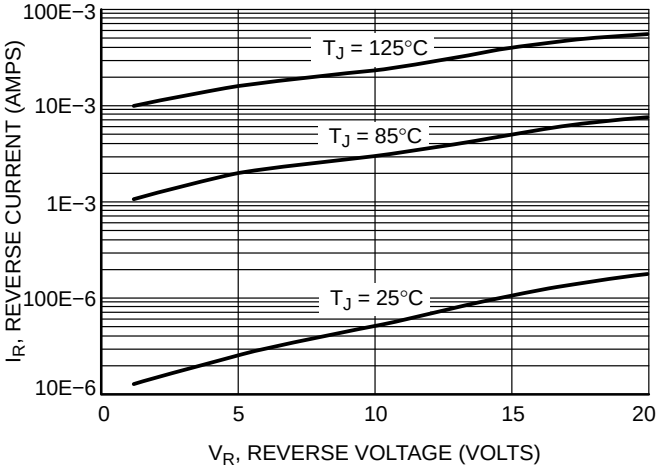



**Figure 3. Typical Reverse Current**

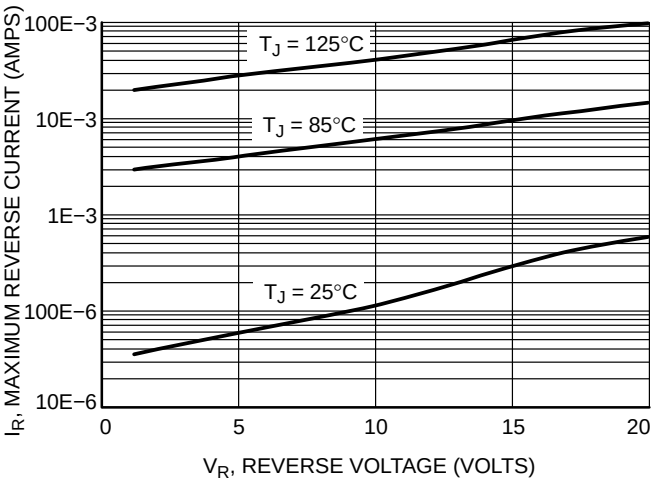



**Figure 4. Maximum Reverse Current**

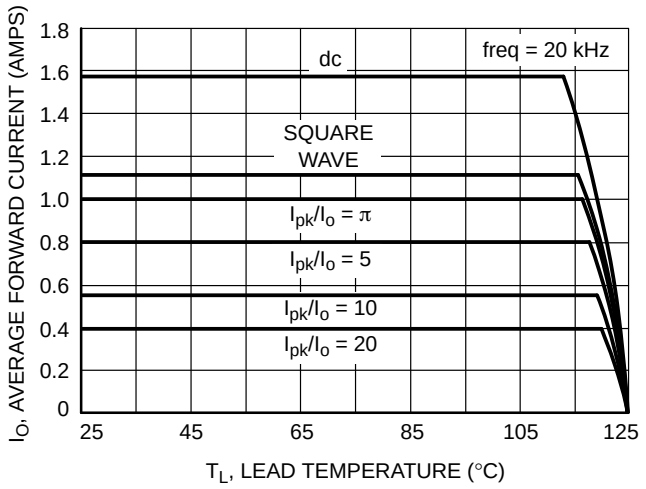



**Figure 5. Current Derating**

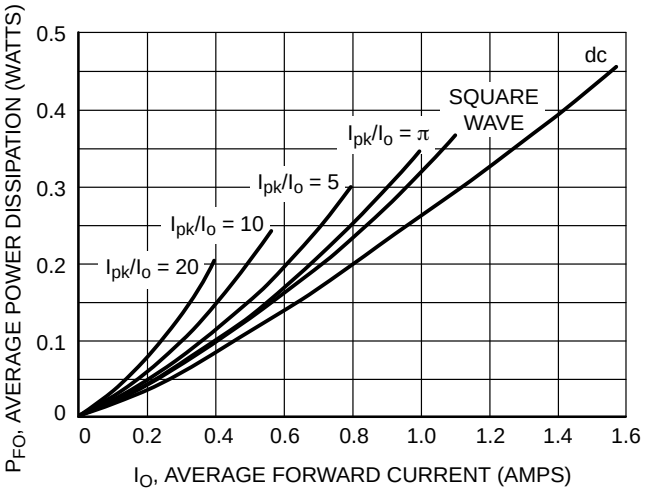



**Figure 6. Forward Power Dissipation**

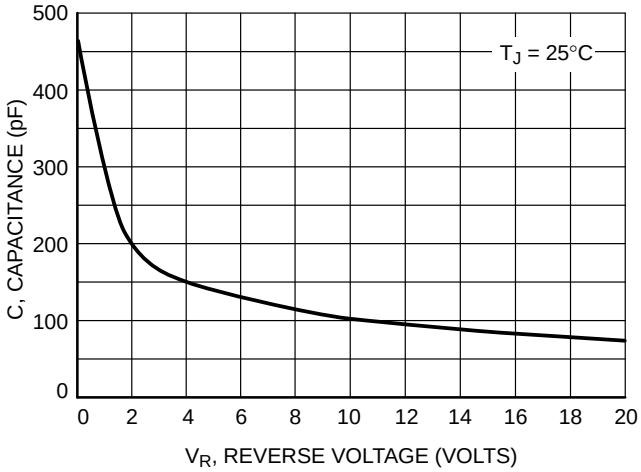



**Figure 7. Capacitance**

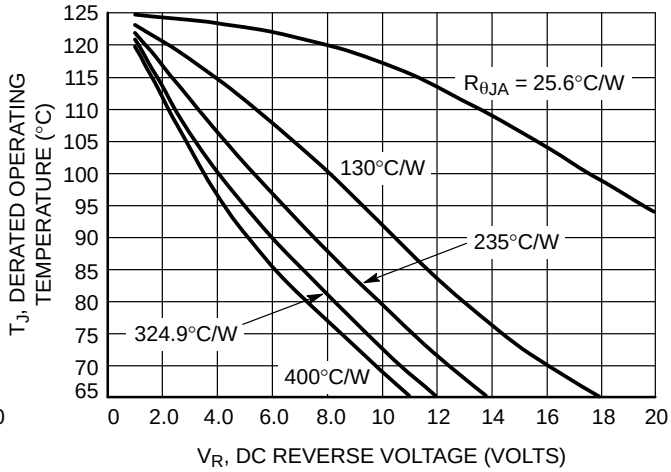



**Figure 8. Typical Operating Temperature Derating***

* 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.

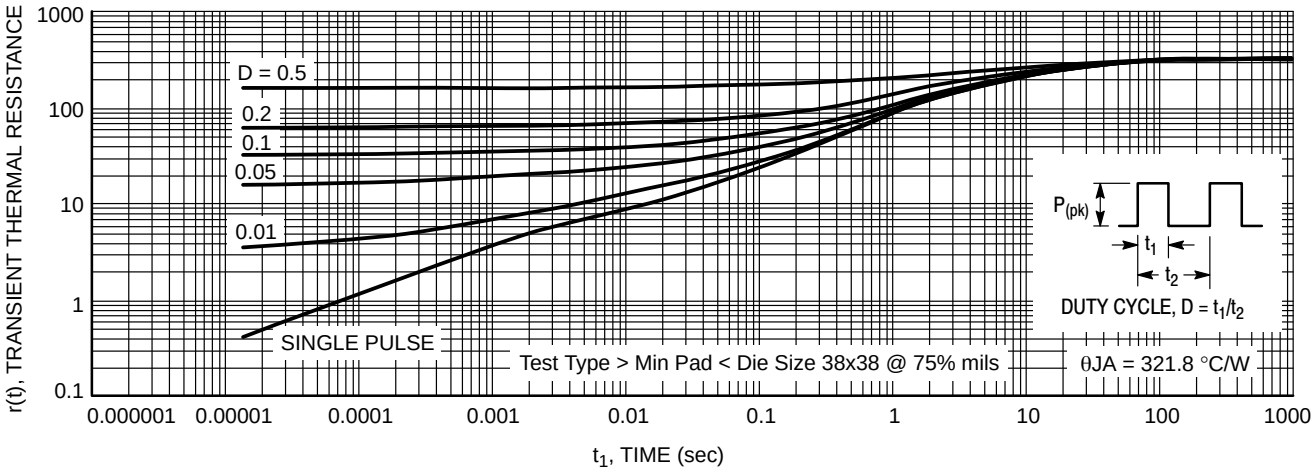
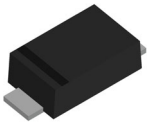
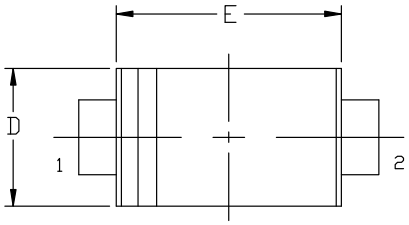



**Figure 9. Thermal Response**

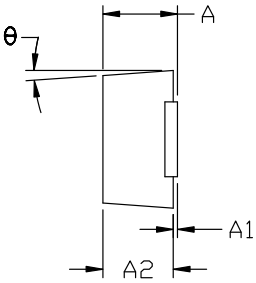


**SOD−123−2 1.65x2.70x0.90**
CASE 498
ISSUE E

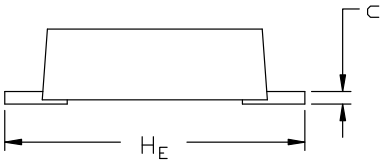
DATE 22 AUG 2023




TOP VIEW



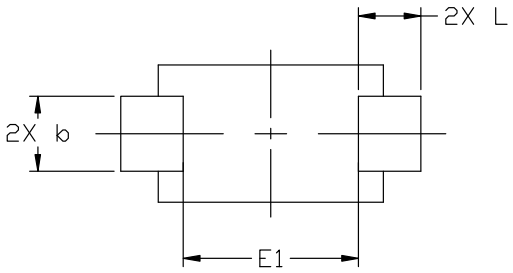

END VIEW



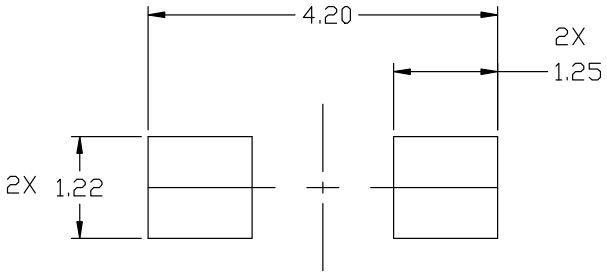

SIDE VIEW

| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 0.95 | 0.98 |
| A1 | 0.00 | 0.05 | 0.10 |
| A2 | 0.85 | 0.90 | 0.95 |
| b | 0.70 | 0.90 | 1.10 |
| c | 0.10 | 0.15 | 0.20 |
| D | 1.50 | 1.65 | 1.80 |
| E | 2.50 | 2.70 | 2.90 |
| E1 | 1.70 | 2.10 | 2.50 |
| $H_E$ | 3.40 | 3.60 | 3.80 |
| L | 0.55 | 0.75 | 0.95 |
| θ | 0° | --- | 8° |

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS b AND L ARE TO BE MEASURED ON A FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 FROM THE LEAD TIP.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH PROTRUSIONS, OR GATE BURRS.
5. FLAT LEAD.



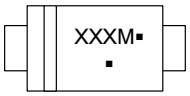

BOTTOM VIEW




RECOMMENDED
MOUNTING 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.

**GENERIC**
**MARKING DIAGRAM***




XXX = Specific Device Code
M = Date Code
▪ = 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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|---|---|---|
| DESCRIPTION: | SOD−123−2 1.65x2.70x0.90 | PAGE 1 OF 1 |

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