

MBR120ESFT1

Surface Mount Schottky Power Rectifier

Plastic SOD-123 Package

... using 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. These state-of-the-art devices have the following features:

- Guardring for Stress Protection
- Low Leakage
- 150°C Operating Junction Temperature
- Epoxy Meets UL94, V0 at 1/8”
- Package Designed for Optimal Automated Board Assembly
- ESD Ratings: Machine Model, C
Human Body Model, 3B

Mechanical Characteristics

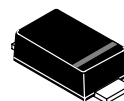
- Reel Options: MBR120ESFT1 = 3,000 per 7” reel/8 mm tape
MBR120ESFT3 = 10,000 per 13” reel/8 mm tape
- Device Marking: L2E
- Polarity Designator: Cathode Band
- Weight: 11.7 mg (approximately)
- Case: Epoxy, Molded
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



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SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 20 VOLTS



**SOD-123FL
CASE 498
PLASTIC**

DEVICE MARKING



L2E = Specific Device Code
D = Date Code

ORDERING INFORMATION

| Device | Package | Shipping |
|-------------|-----------|--------------------|
| MBR120ESFT1 | SOD-123FL | 3000/Tape & Reel |
| MBR120ESFT3 | SOD-123FL | 10,000/Tape & Reel |

MBR120ESFT1

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 , $T_L = 140^\circ\text{C}$) | I_O | 1.0 | A |
| Peak Repetitive Forward Current (At Rated V_R , Square Wave, 20 kHz, $T_L = 125^\circ\text{C}$) | 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 | $^\circ\text{C}$ |
| Operating Junction Temperature | T_J | -65 to 150 | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated V_R , $T_J = 25^\circ\text{C}$) | dv/dt | 10,000 | $\text{V}/\mu\text{s}$ |

THERMAL CHARACTERISTICS

| | | | |
|---|-----------|-----|---------------------------|
| Thermal Resistance – Junction-to-Lead (Note 1) | R_{tjl} | 26 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance – Junction-to-Lead (Note 2) | R_{tjl} | 21 | |
| Thermal Resistance – Junction-to-Ambient (Note 1) | R_{tja} | 325 | |
| Thermal Resistance – Junction-to-Ambient (Note 2) | R_{tja} | 82 | |

1. Mounted with minimum recommended pad size, PC Board FR4.
2. Mounted with 1 in. copper pad (Cu area 700 mm²).

ELECTRICAL CHARACTERISTICS

| | | | | |
|--|-------|--------------------------|---------------------------|---------------|
| Maximum Instantaneous Forward Voltage (Note 3), See Figure 2 ($I_F = 0.1$ A) ($I_F = 1.0$ A) ($I_F = 2.0$ A) | V_F | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | V |
| | | 0.455 | 0.360 | |
| | | 0.530 | 0.455 | |
| Maximum Instantaneous Reverse Current (Note 3), See Figure 4 ($V_R = 20$ V) ($V_R = 10$ V) ($V_R = 5.0$ V) | I_R | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | μA |
| | | 10 | 1600 | |
| | | 1.0 | 500 | |
| | | 0.5 | 300 | |

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

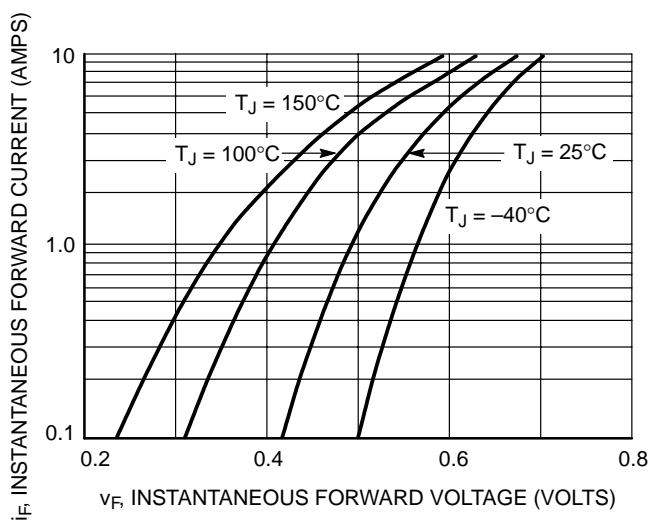


Figure 1. Typical Forward Voltage

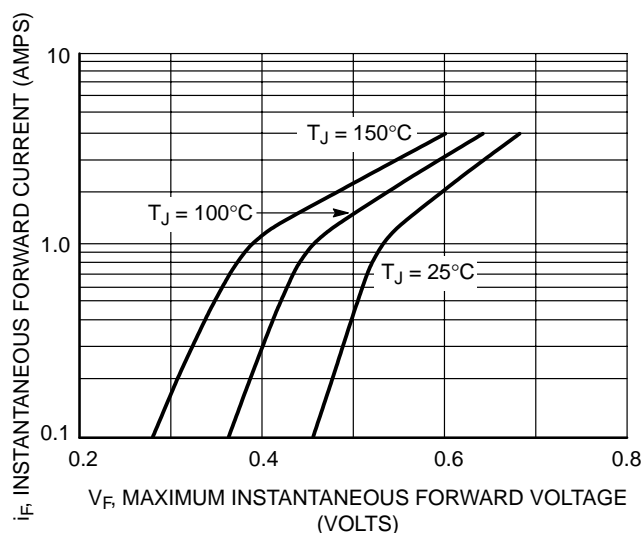


Figure 2. Maximum Forward Voltage

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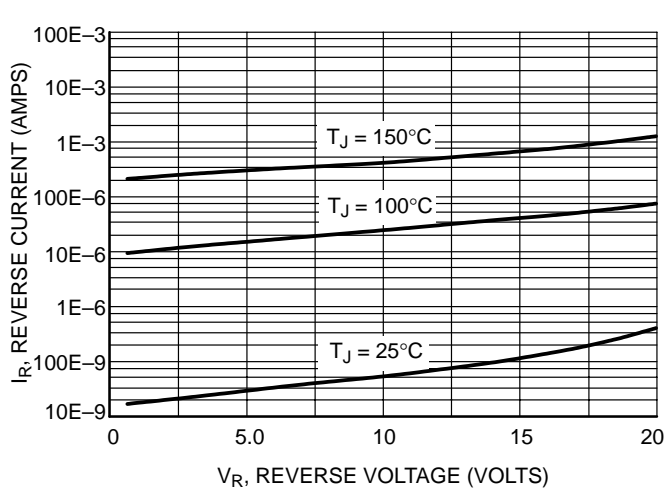


Figure 3. Typical Reverse Current

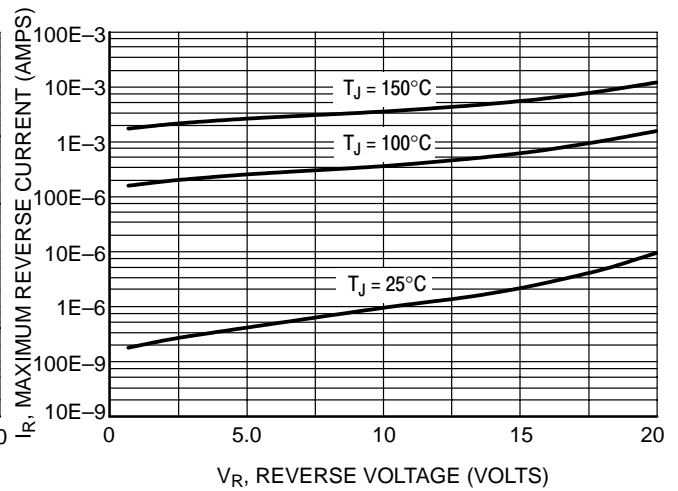


Figure 4. Maximum Reverse Current

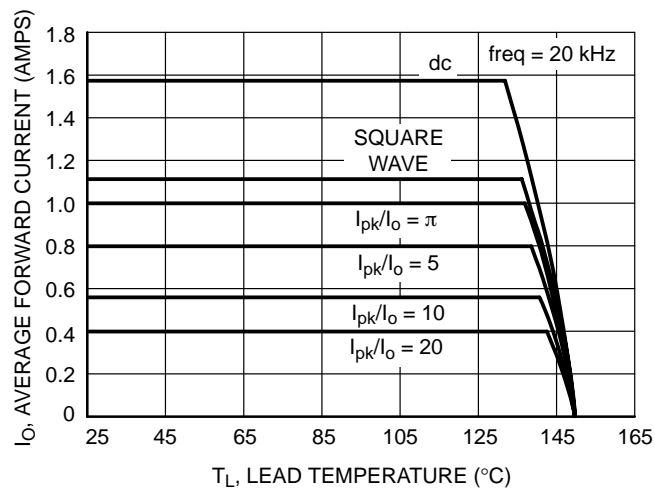


Figure 5. Current Derating

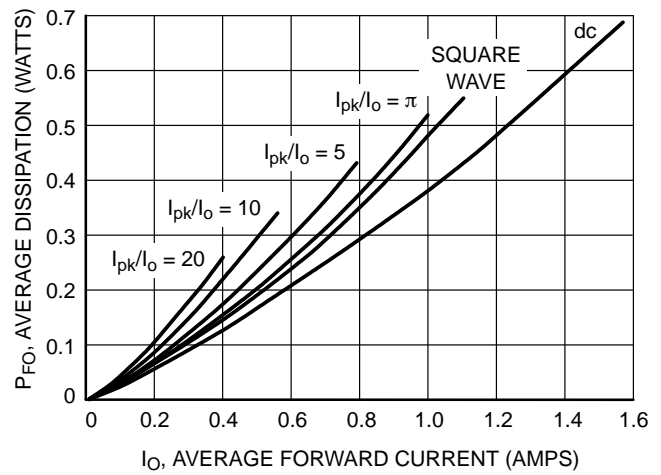


Figure 6. Forward Power Dissipation

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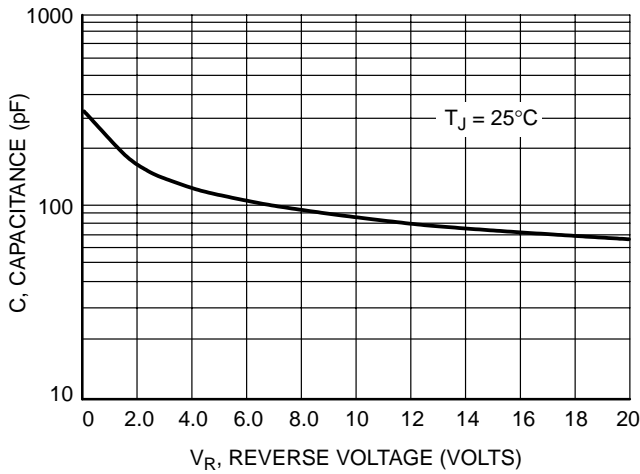


Figure 7. Capacitance

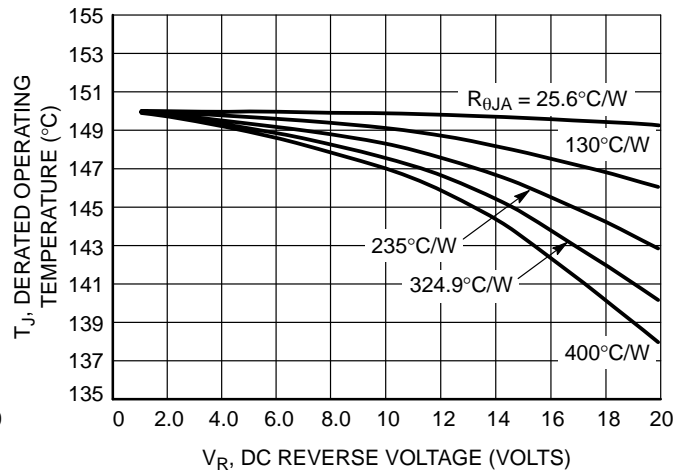


Figure 8. Typical Operating Temperature Derating*

* 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:

$$T_J = T_{Jmax} - r(t)(P_f + P_r) \text{ where}$$

$r(t)$ = thermal impedance under given conditions,
 P_f = forward power dissipation, and
 P_r = reverse power dissipation

This graph displays the derated allowable T_J due to reverse bias under DC conditions only and is calculated as $T_J = T_{Jmax} - r(t)P_r$, where $r(t) = R_{thja}$. For other power applications further calculations must be performed.

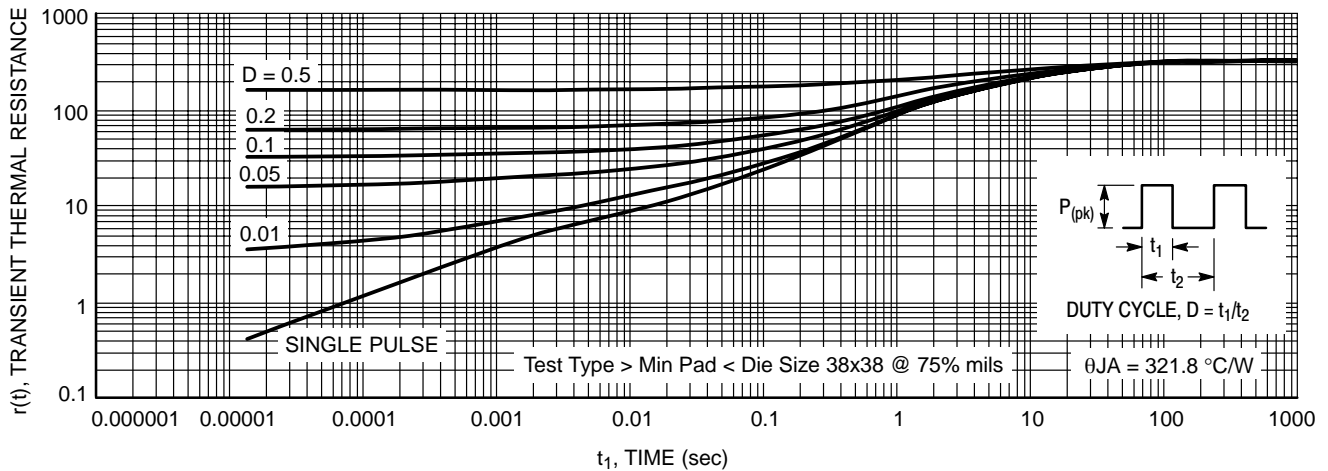
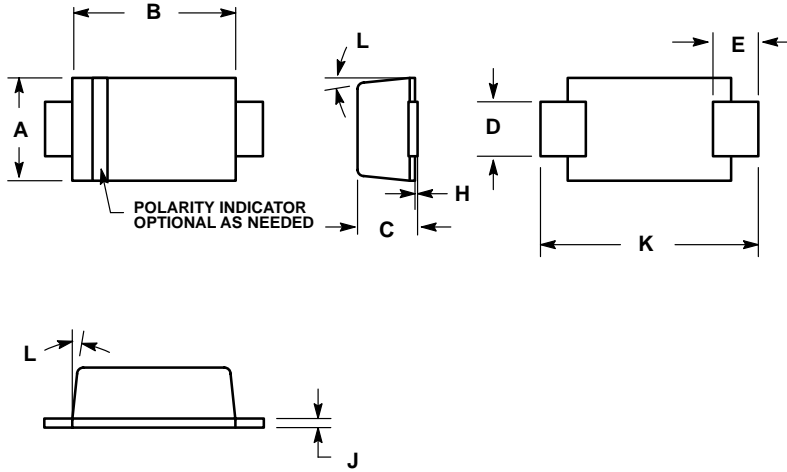


Figure 9. Thermal Response

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PACKAGE DIMENSIONS

SOD-123LF
CASE 498-01
ISSUE O



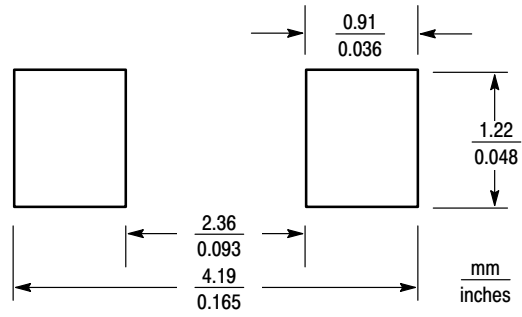
NOTES:

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.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.50 | 1.80 | 0.059 | 0.071 |
| B | 2.50 | 2.90 | 0.098 | 0.114 |
| C | 0.90 | 1.00 | 0.035 | 0.039 |
| D | 0.70 | 1.10 | 0.028 | 0.043 |
| E | 0.55 | 0.95 | 0.022 | 0.037 |
| H | 0.00 | 0.10 | 0.000 | 0.004 |
| J | 0.10 | 0.20 | 0.004 | 0.008 |
| K | 3.40 | 3.80 | 0.134 | 0.150 |
| L | 0° | 8° | 0° | 8° |


MBR120ESFT1

RECOMMENDED FOOTPRINT FOR SOD-123FL



SOD-123

Notes

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