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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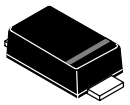
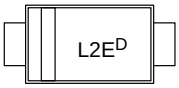
SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 20 VOLTS



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

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

THERMAL CHARACTERISTICS

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

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%.

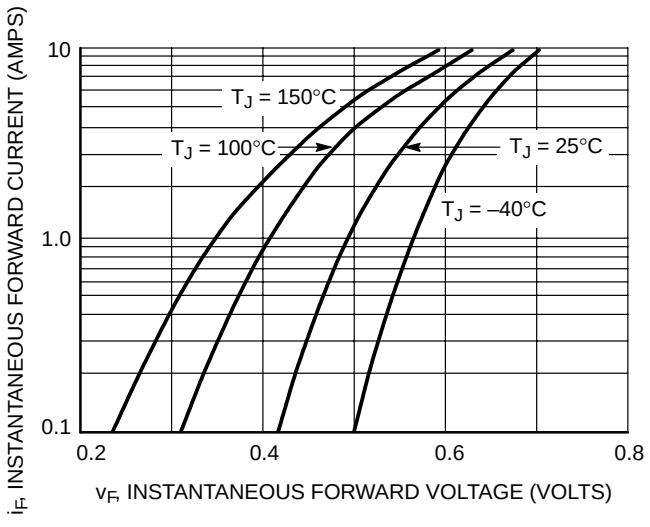


Figure 1. Typical Forward Voltage

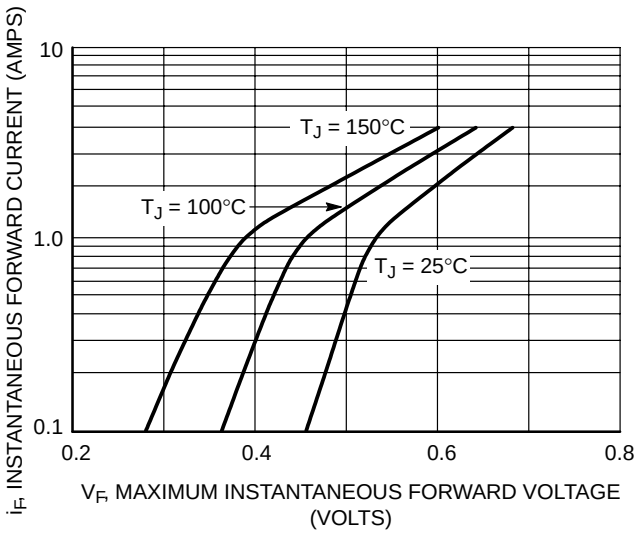


Figure 2. Maximum Forward Voltage

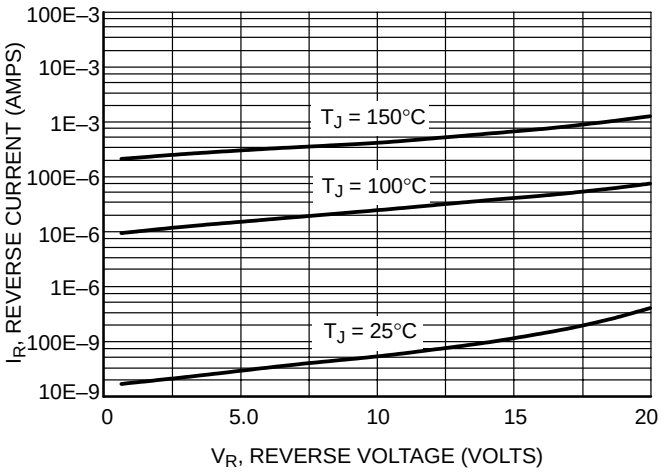


Figure 3. Typical Reverse Current

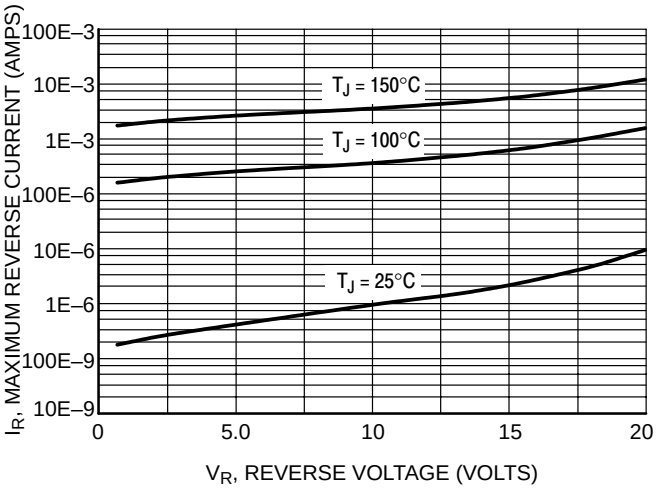


Figure 4. Maximum Reverse Current

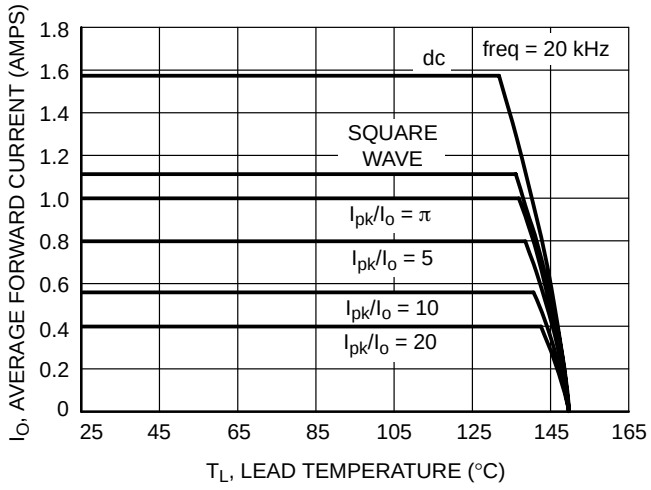


Figure 5. Current Derating

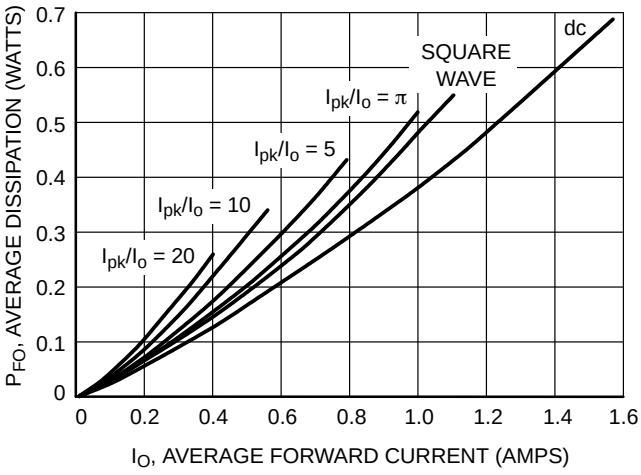


Figure 6. Forward Power Dissipation

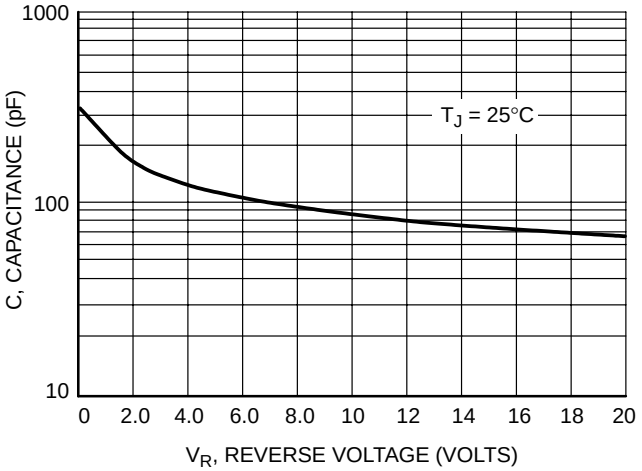


Figure 7. Capacitance

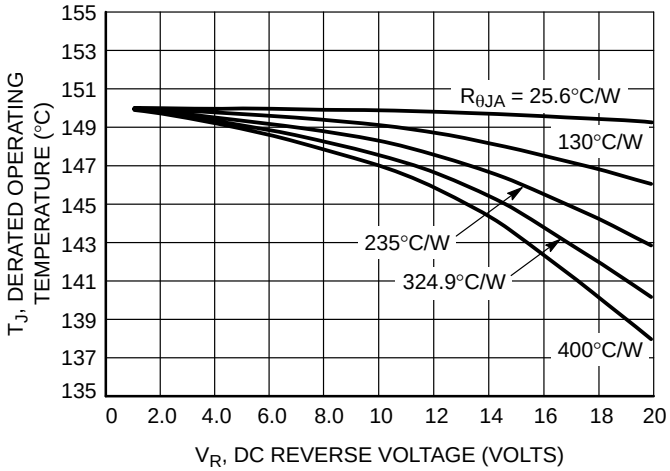


Figure 8. Typical Operating Temperature Derating*

* 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.

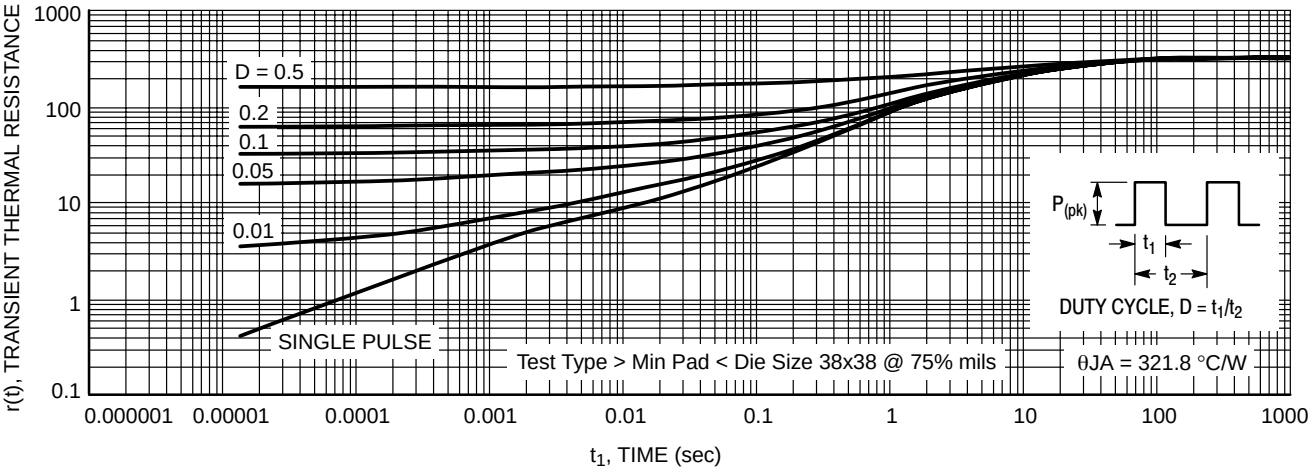
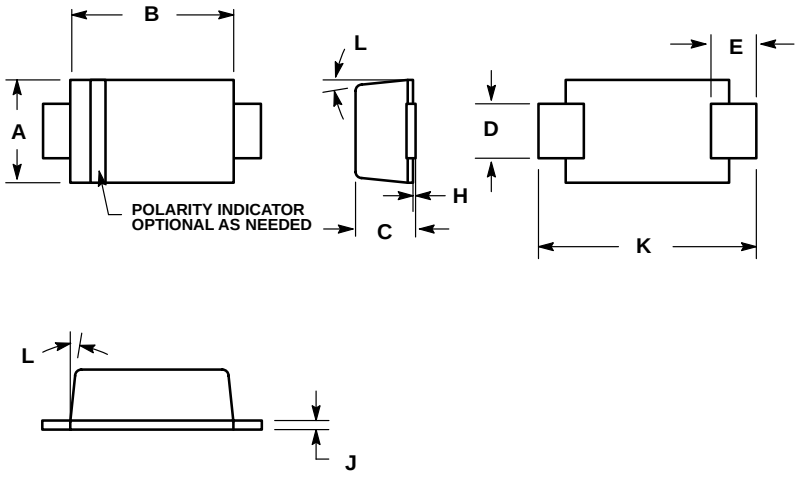


Figure 9. Thermal Response

PACKAGE DIMENSIONS

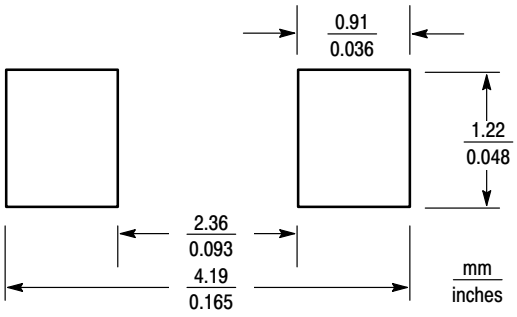
SOD–123LF
CASE 498–01
ISSUE O



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.

	MILLIMETERS		INCHES	
DIM	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 °

RECOMMENDED FOOTPRINT FOR SOD−123FL



SOD−123

Notes

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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MBR120ESFT1/D