

# MBR120LSFT1

## 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 Forward Voltage
- 125°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

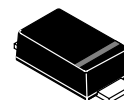
- Reel Options: MBR120LSFT1 = 3,000 per 7" reel/8 mm tape  
MBR120LSFT3 = 10,000 per 13" reel/8 mm tape
- Device Marking: L2L
- Polarity Designator: Cathode Band
- Weight: 11.7 mg (approximately)
- Case: Epoxy, Molded
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



ON Semiconductor®

<http://onsemi.com>

**SCHOTTKY BARRIER  
RECTIFIER  
1.0 AMPERES  
20 VOLTS**



SOD-123FL  
CASE 498  
PLASTIC

#### DEVICE MARKING



L2L = Specific Device Code  
D = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping
MBR120LSFT1	SOD-123FL	3000/Tape & Reel
MBR120LSFT3	SOD-123FL	10,000/Tape & Reel

# MBR120LSFT1

## 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 $V_R$ , $T_L = 115^\circ\text{C}$ )	$I_O$	1.0	A
Peak Repetitive Forward Current (At Rated $V_R$ , Square Wave, 100 kHz, $T_L = 110^\circ\text{C}$ )	$I_{FRM}$	2.0	A
Non-Repetitive Peak Surge Current (Non-Repetitive peak surge current, halfwave, single phase, 60 Hz)	$I_{FSM}$	50	A
Storage Temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	-55 to 125	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ , $T_J = 25^\circ\text{C}$ )	dv/dt	10,000	V/ $\mu\text{s}$

## THERMAL CHARACTERISTICS

Thermal Resistance – Junction-to-Lead (Note 1)	$R_{tjl}$	26	$^\circ\text{C/W}$
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	

- Mounted with minimum recommended pad size, PC Board FR4.
- Mounted with 1 in. copper pad (Cu area 700 mm<sup>2</sup>).

## ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (Note 3), See Figure 2  ( $I_F = 0.1$ A) ( $I_F = 1.0$ A) ( $I_F = 3.0$ A)	$V_F$	$T_J = 25^\circ\text{C}$	$T_J = 85^\circ\text{C}$	V
		0.34	0.26	
		0.45	0.415	
Maximum Instantaneous Reverse Current (Note 3), See Figure 4  ( $V_R = 20$ V) ( $V_R = 10$ V)	$I_R$	$T_J = 25^\circ\text{C}$	$T_J = 85^\circ\text{C}$	mA
		0.40	25	
		0.10	18	

- Pulse Test: Pulse Width  $\leq 250$   $\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

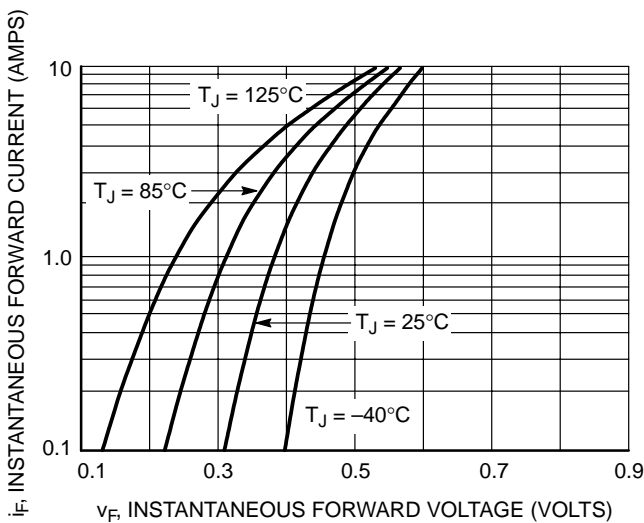


Figure 1. Typical Forward Voltage

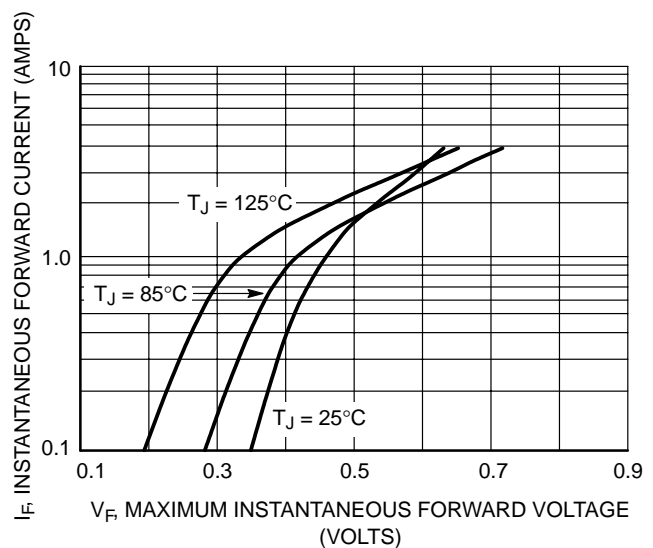
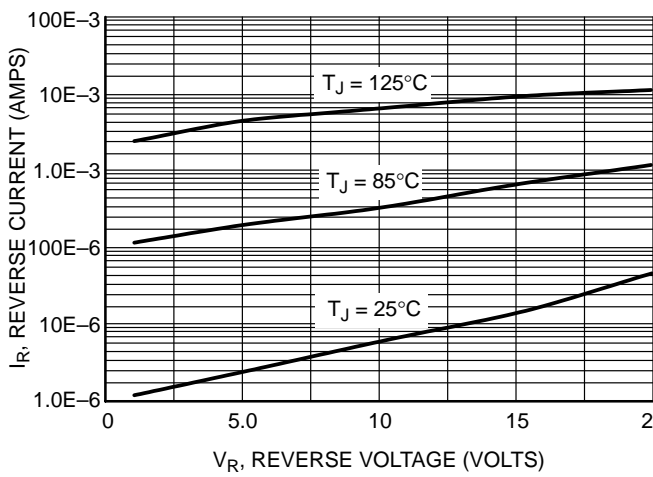
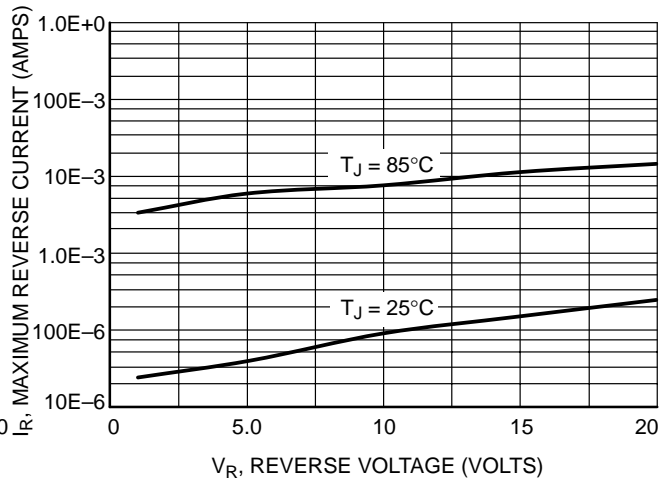


Figure 2. Maximum Forward Voltage

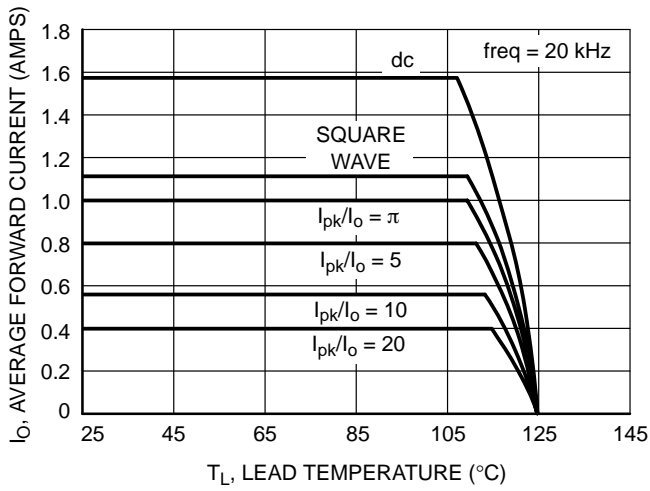
# MBR120LSFT1



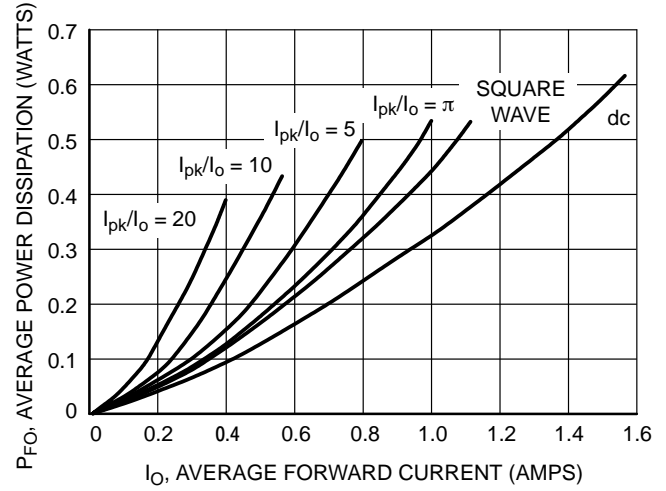
**Figure 3. Typical Reverse Current**



**Figure 4. Maximum Reverse Current**

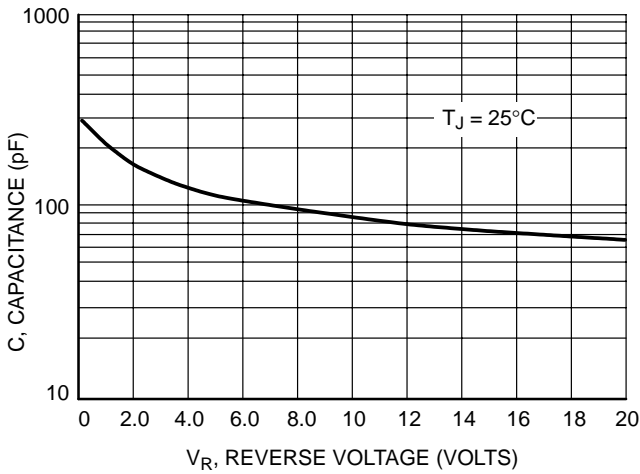


**Figure 5. Current Derating**

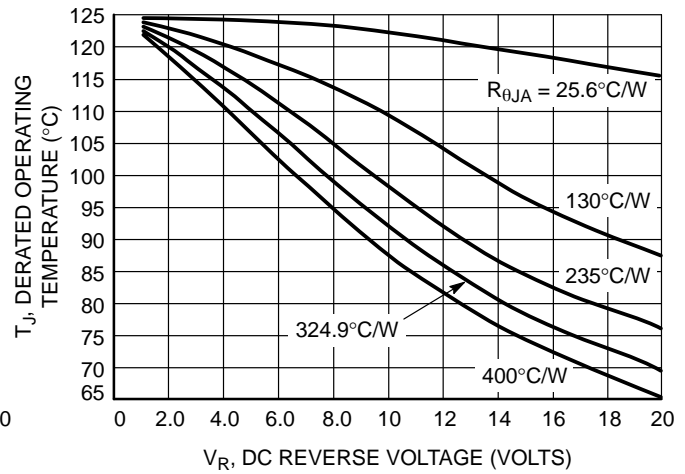


**Figure 6. Forward Power Dissipation**

# MBR120LSFT1



**Figure 7. Capacitance**



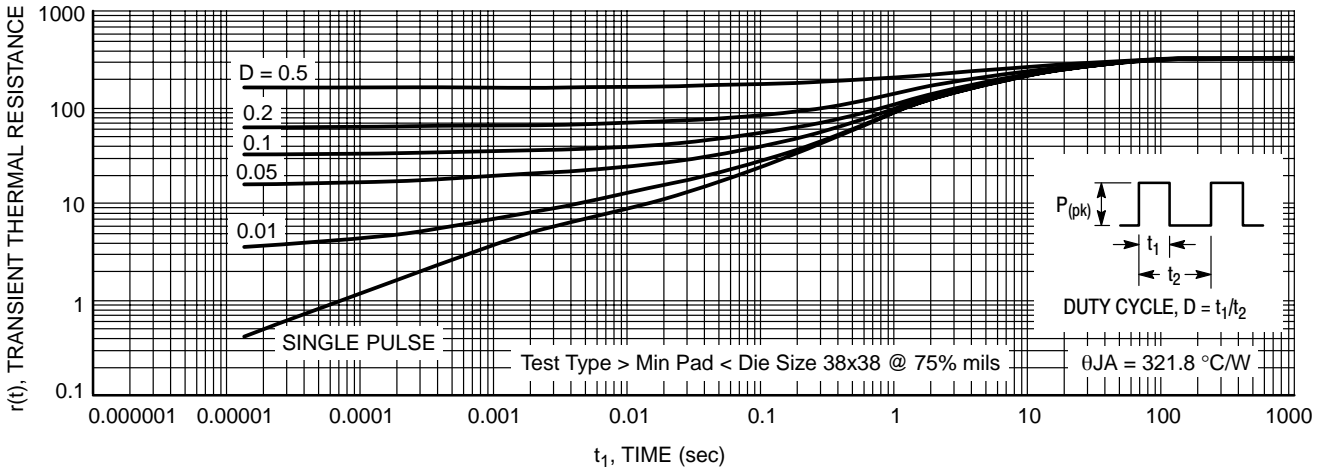
**Figure 8. Typical Operating Temperature Derating\***

\* 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  $r(t) = R_{\theta JA}$ . For other power applications further calculations must be performed.

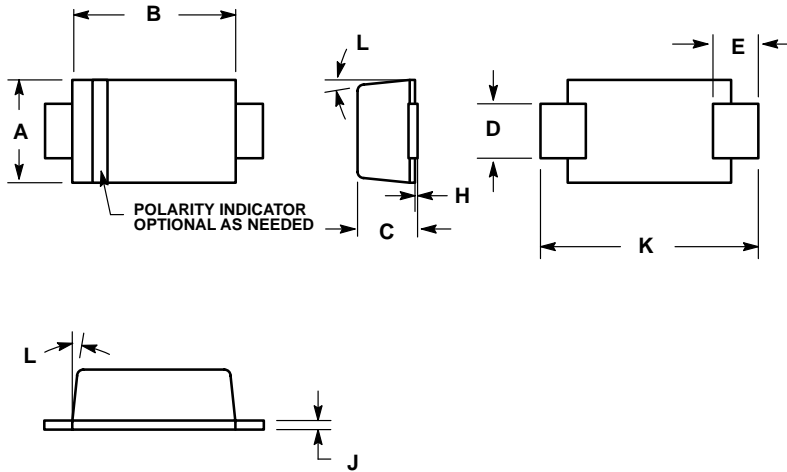


**Figure 9. Thermal Response**

# MBR120LSFT1

## PACKAGE DIMENSIONS

SOD-123LF  
CASE 498-01  
ISSUE O



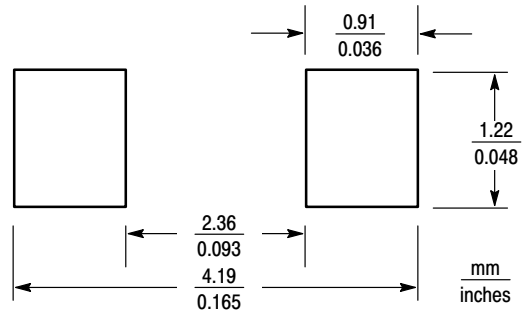
NOTES:

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°

# MBR120LSFT1


## RECOMMENDED FOOTPRINT FOR SOD-123FL



SOD-123

**Notes**

# MBR120LSFT1

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

## PUBLICATION ORDERING INFORMATION

### Literature Fulfillment:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** ONlit@hibbertco.com

**N. American Technical Support:** 800-282-9855 Toll Free USA/Canada

**JAPAN:** ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
**Phone:** 81-3-5773-3850  
**Email:** r14525@onsemi.com

**ON Semiconductor Website:** <http://onsemi.com>

For additional information, please contact your local Sales Representative.