Toohong

MBR120VLSFT1

Surface Mount Schottky Power Rectifier

Plastic SOD−123 Package

SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 20 VOLTS

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
- Pb−Free Packages are Available

Mechanical Characteristics

- Reel Options: MBR120VLSFT1 = 3,000 per 7″ reel/8 mm tape
  MBR120VLSFT3 = 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

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 (Rated V_R) T_L = 119°C	$I_{F(AV)}$	1.0	A
Non−Repetitive Peak Surge Current (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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance − Junction−to−Lead (Note 1)	R_{tjl}	26	°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	

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) (Rated DC Voltage)	I_R	0.60	15	mA

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2%.

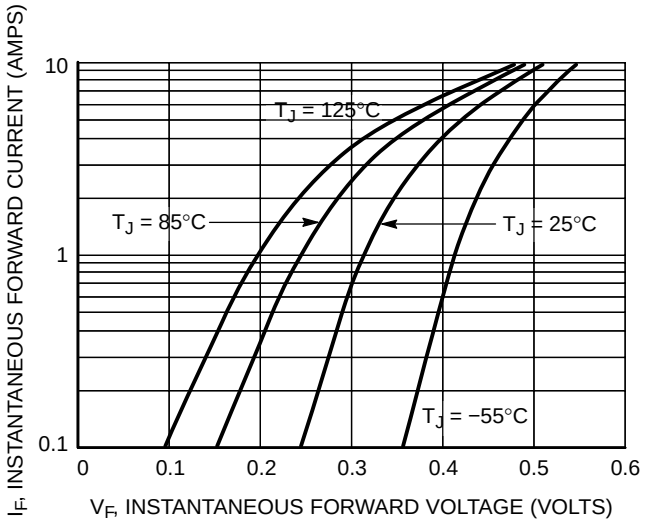

Figure 1. Typical Forward Voltage

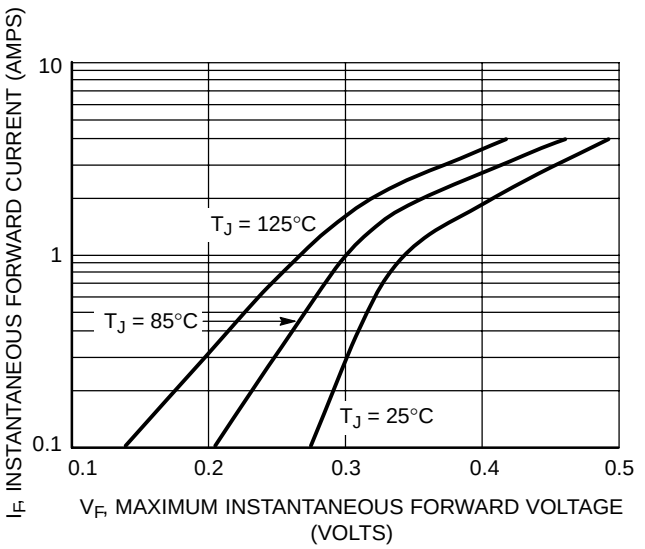

Figure 2. Maximum Forward Voltage

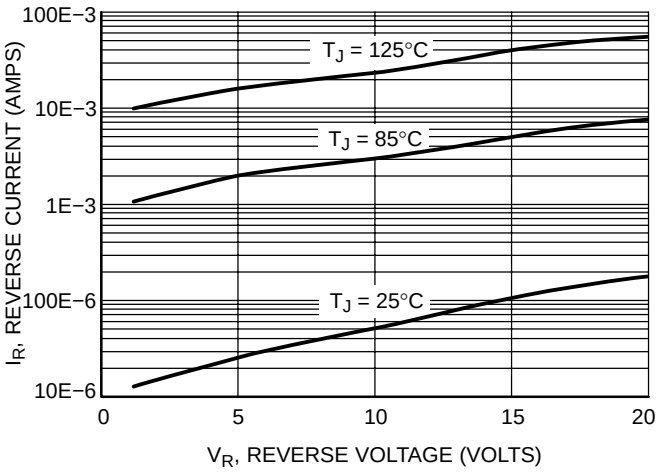

Figure 3. Typical Reverse Current

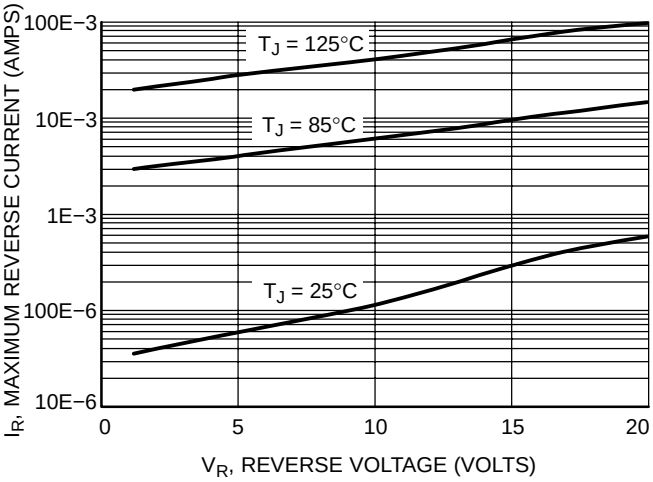

Figure 4. Maximum Reverse Current

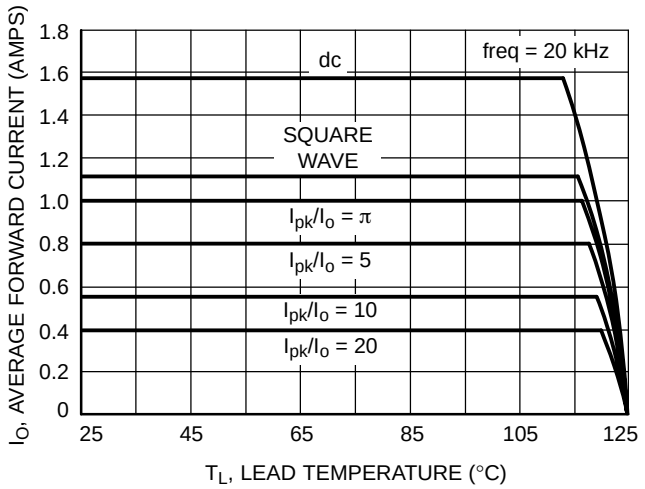

Figure 5. Current Derating

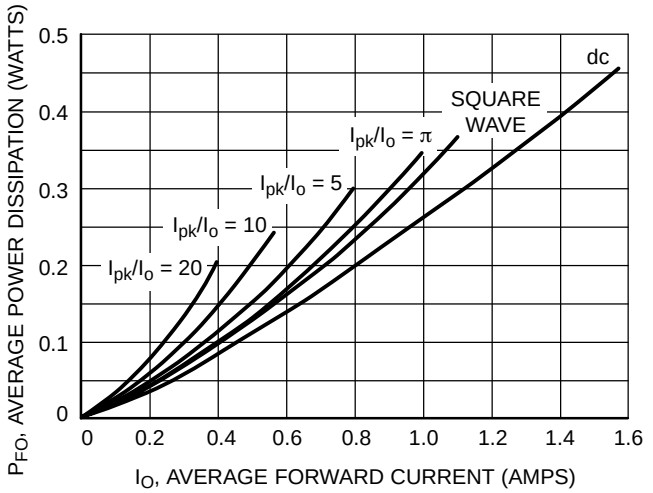

Figure 6. Forward Power Dissipation

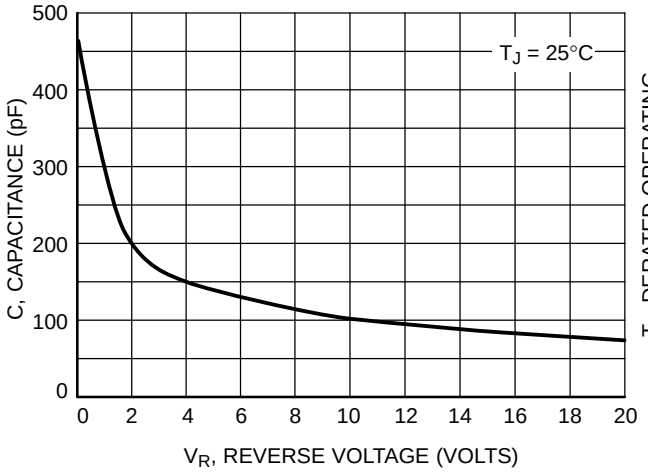

Figure 7. Capacitance

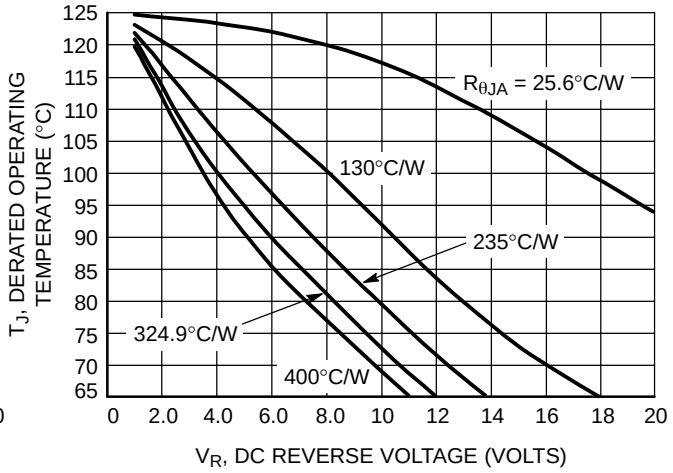

Figure 8. Typical Operating Temperature Derating*

* 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.

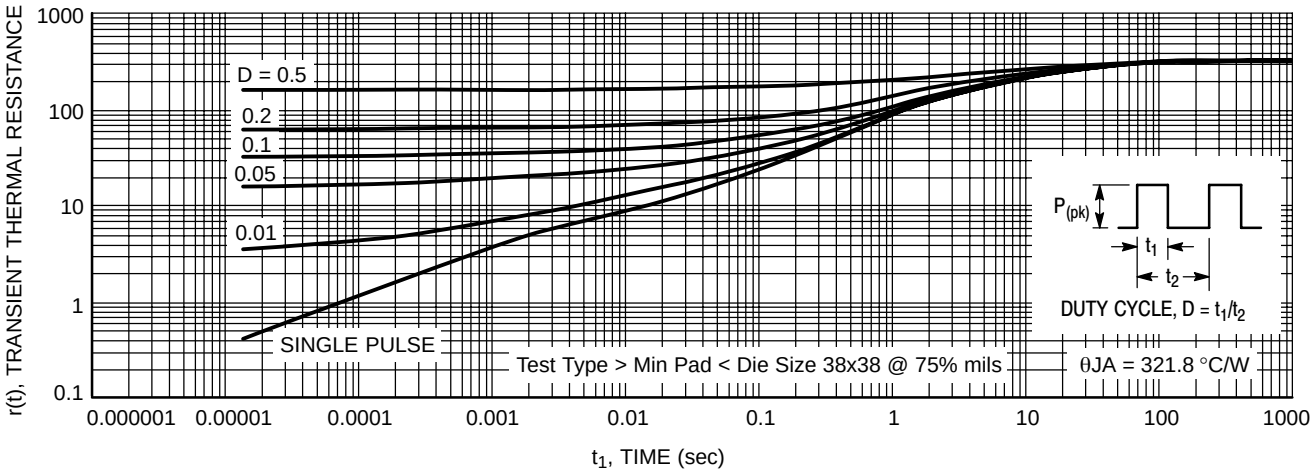

Figure 9. Thermal Response