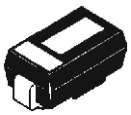
Schottky Rectifier, 2.1 A



SMA

FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Small foot print, surface mountable
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level

RoHS COMPLIANT

DESCRIPTION

The VS-20MQ060NPbF surface mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

PRODUCT SUMMARY	
Package	SMA
$I_{F(AV)}$	2.1 A
V_R	60 V
V_F at I_F	See Electrical table
I_{RM}	7.5 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	2.0 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	2.1	A
V_{RRM}		60	V
I_{FSM}	t_p = 5 µs sine	40	A
V_F	2 Apk, T_J = 125 °C	0.68	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-20MQ060NPbF	UNITS
Maximum DC reverse voltage	V_R	60	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 4	$I_{F(AV)}$	50 % duty cycle at T_C = 107 °C, rectangular waveform On PC board 9 mm² island (0.013 mm thick copper pad area)		2.1	A
Maximum peak one cycle non-repetitive surge current See fig. 6	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	40	A
		10 ms sine or 6 ms rect. pulse		10	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 1 A, L = 4 mH		2.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		1.0	A

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ELECTRICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum forward voltage drop See fig. 1	V_{FM} (1)	2 A	T_J = 25 °C	0.78	V
		1.5 A		0.71	
		1 A		0.63	
		2 A	T_J = 125 °C	0.68	
		1.5 A		0.63	
		1 A		0.57	
Maximum reverse leakage current See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.5	mA
		T_J = 125 °C		7.5	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.45	V
Forward slope resistance	r_t			86.8	mΩ
Typical junction capacitance	C_T	V_R = 10 V_{DC}, T_J = 25 °C, test signal = 1 MHz		31	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		2.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction and storage temperature range	T_J (1), T_{Stg}		- 55 to 150	°C
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation	80	°C/W
Approximate weight			0.07	g
			0.002	oz.
Marking device		Case style SMA (similar D-64)	2H	

Note

(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

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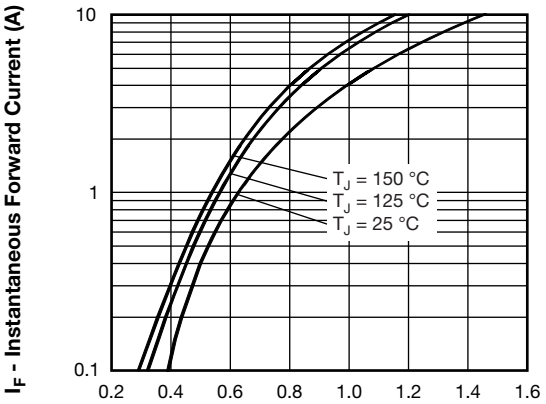

Fig. 1 - Maximum Forward Voltage Drop Characteristics

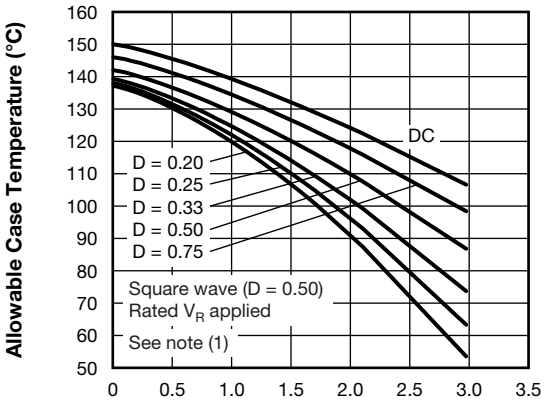

Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

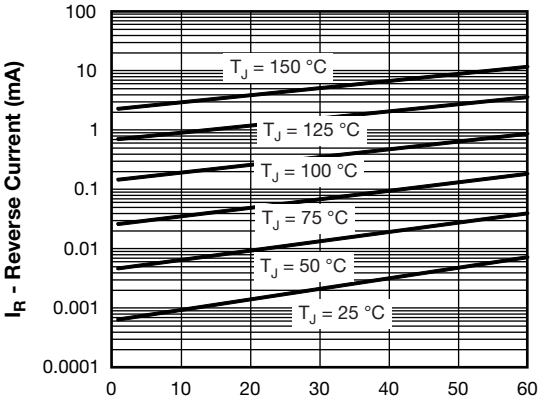

Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

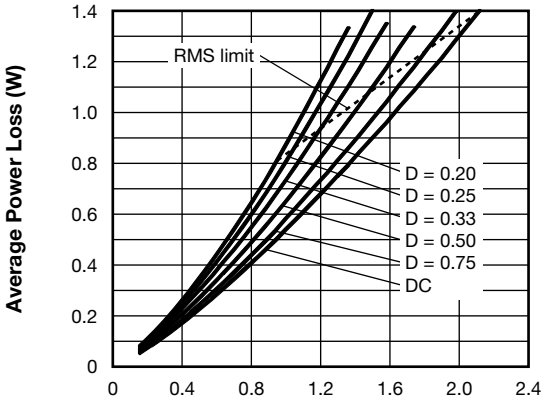

Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

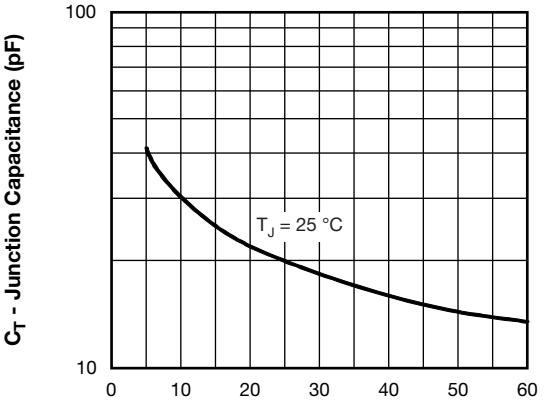

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

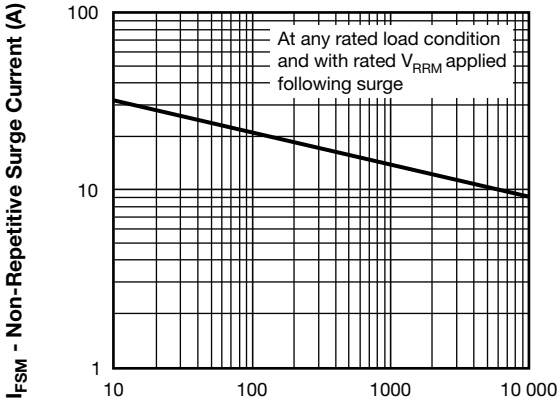

Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6); Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code

VS-	20	M	Q	060	N	TR	PbF
1	2	3	4	5	6	7	8

1 - Vishay Semiconductors product
2 - Current rating
3 - M = SMA
4 - Q = Schottky “Q” series
5 - Voltage rating (060 = 60 V)
6 - N = New SMA
7 - • None = Box (1000 pieces)
• TR = Tape and reel (7500 pieces)
8 - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95018
Part marking information		www.vishay.com/doc?95029
Packaging information	Tape and reel	www.vishay.com/doc?95034
	Bulk	www.vishay.com/doc?95397
SPICE model		www.vishay.com/doc?95396

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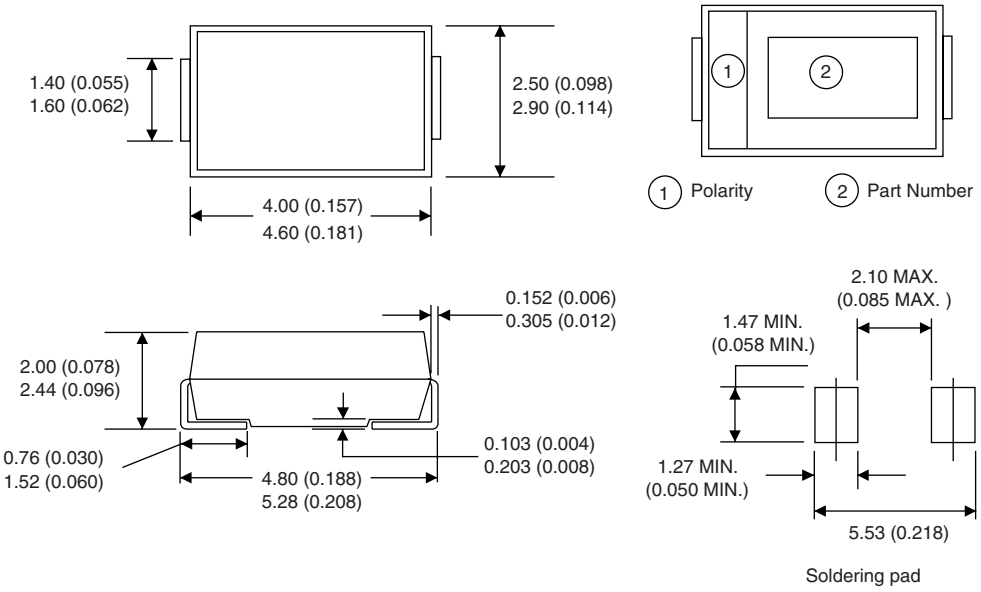
SMA

DIMENSIONS in millimeters (inches)



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