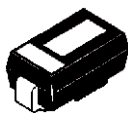


Schottky Rectifier, 1.0 A



SMA



FEATURES

- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- 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

PRODUCT SUMMARY

$I_{F(AV)}$	1.0 A
V_R	40 V
I_{RM}	26 mA at 125 °C

DESCRIPTION

The VS-MBRA140TRPbF 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.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	1.0	A
V_{RRM}		40	V
I_{FSM}	$t_p = 5 \mu s$ sine	120	A
V_F	1.0 Apk, $T_J = 125^\circ C$	0.49	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRA140TRPbF	UNITS
Maximum DC reverse voltage	V_R	40	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 $T_L = 118^\circ C$, rectangular waveform On PC board 9 mm ² island (0.013 mm thick copper pad area)	1.0	A
Maximum peak one cycle non-repetitive surge current See fig. 6	I_{FSM}	5 μs sine or 3 μs rect. pulse	120	
		10 ms sine or 6 ms rect. pulse	30	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25^\circ C$, $I_{AS} = 1 A$, $L = 6 mH$	3.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	1.0	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	1 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.55	V
		2 A		0.71	
		1 A	$T_J = 100\text{ }^{\circ}\text{C}$	0.5	
		2 A		0.65	
		1 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.49	
		2 A		0.63	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA
		$T_J = 100\text{ }^{\circ}\text{C}$		10	
		$T_J = 125\text{ }^{\circ}\text{C}$		26	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.36	V
Forward slope resistance	r_t			104	mΩ
Typical junction capacitance	C_T	$V_R = 10\text{ V}_{DC}$, $T_J = 25\text{ }^{\circ}\text{C}$, test signal = 1 MHz		38	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 μ s, 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	$^{\circ}\text{C}$
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation See fig. 4		35	$^{\circ}\text{C/W}$
Maximum thermal resistance, junction to ambient	R_{thJA}			80	
Approximate weight				0.07	g
				0.002	oz.
Device marking		Case style SMA (similar D-64)		V14	

Notes

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

⁽²⁾ Mounted 1" square PCB, thermal probe connected to lead 2 mm from package

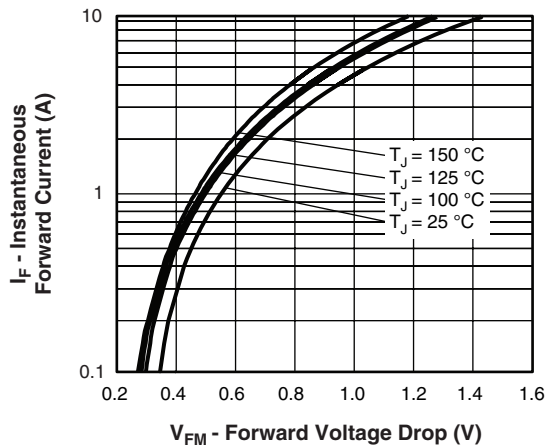


Fig. 1 - Maximum Forward Voltage Drop Characteristics

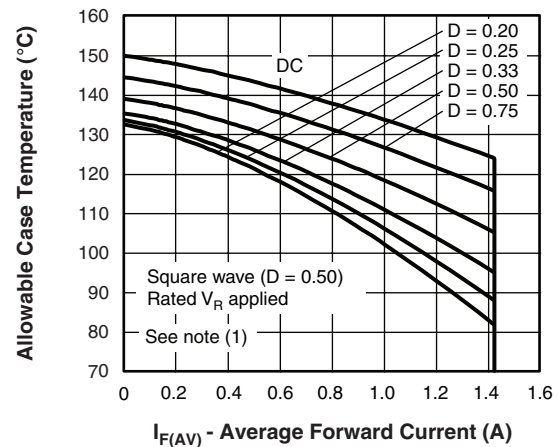


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

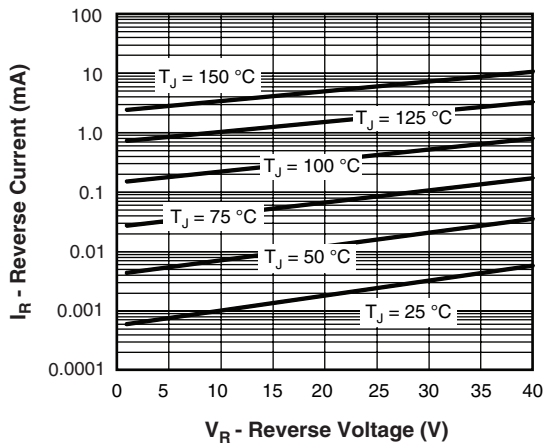


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

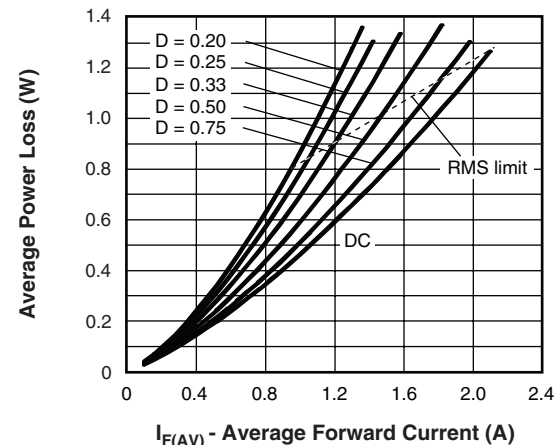


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

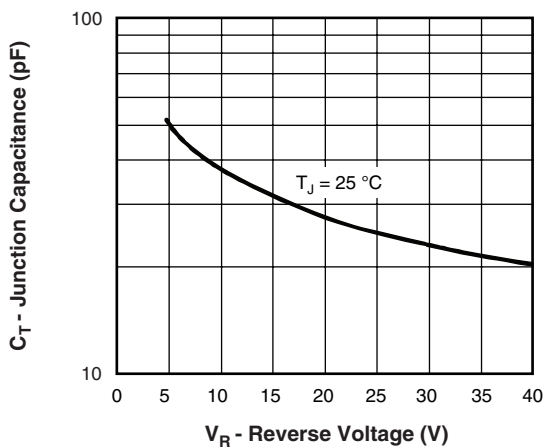


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

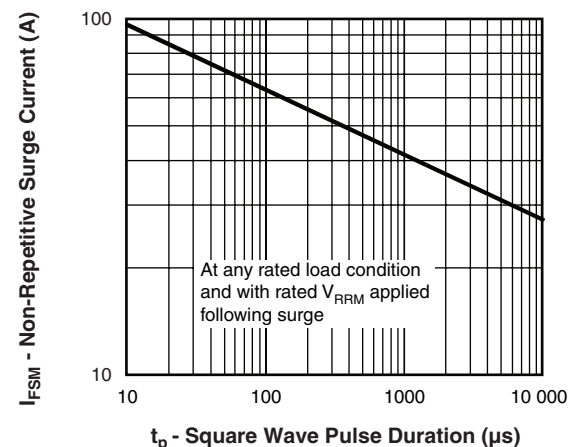


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

(1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6); $P_{d_{REV}}$ = 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-	MBR	A	1	40	TR	PbF
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	-	HPP product suffix				
	2	-	Schottky MBR series				
	3	-	A = SMA				
	4	-	Current rating (1 = 1 A)				
	5	-	Voltage rating (40 = 40 V)				
	6	-	TR = Tape and reel (7500 pieces)				
	7	-	PbF = Lead (Pb)-free				

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95018
Part marking information	www.vishay.com/doc?95029
Packaging information	www.vishay.com/doc?95034



SMA

DIMENSIONS in millimeters (inches)





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