

Schottky Rectifier, 3.0 A



SMC



FEATURES

- Small foot print, surface mountable
- Very 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

$I_{F(AV)}$	3.0 A
V_R	20 V
I_{RM}	35 mA at 125 °C

DESCRIPTION

The VS-MBRS320TRPbF surface mount Schottky rectifier has been designed for applications requiring low forward drop and 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	3.0	A
V_{RRM}		20	V
I_{FSM}	$t_p = 5 \mu s$ sine	820	A
V_F	3.0 Apk, $T_J = 125 \text{ °C}$	0.36	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRS320TRPbF	UNITS
Maximum DC reverse voltage	V_R	20	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_L = 136 \text{ °C}$, rectangular waveform	3.0	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	820	
		10 ms sine or 6 ms rect. pulse	80	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25 \text{ °C}$, $I_{AS} = 1.0 \text{ A}$, $L = 8 \text{ mH}$	4	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		TYP.	MAX.	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^\circ\text{C}$	0.41	0.45	V
		6 A		0.45	0.53	
		3 A	$T_J = 125\text{ }^\circ\text{C}$	0.29	0.36	
		6 A		0.35	0.46	
Maximum reverse leakage current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.04	0.5	mA
		$T_J = 100\text{ }^\circ\text{C}$		8.0	20	
		$T_J = 125\text{ }^\circ\text{C}$		23	35	
Typical junction capacitance	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		360	-	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		3.0	-	nH
Maximum voltage rate of change	dV/dt	Rated V_R		-	10 000	V/ μ s

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	$T_J^{(1)}, T_{Stg}$		- 65 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation	12	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient	R_{thJA}		46	
Approximate weight			0.24	g
			0.008	oz.
Marking device		Case style SMC (similar to DO-214AB)	V32	

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

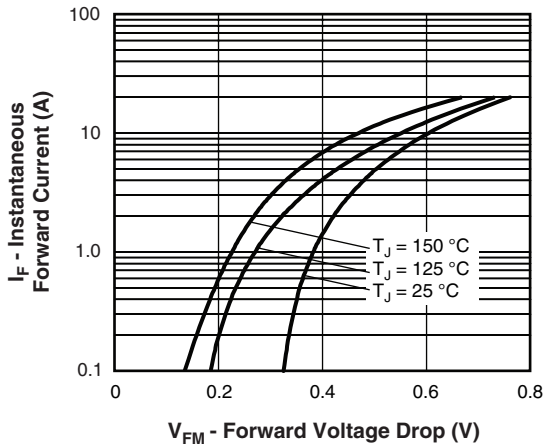


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

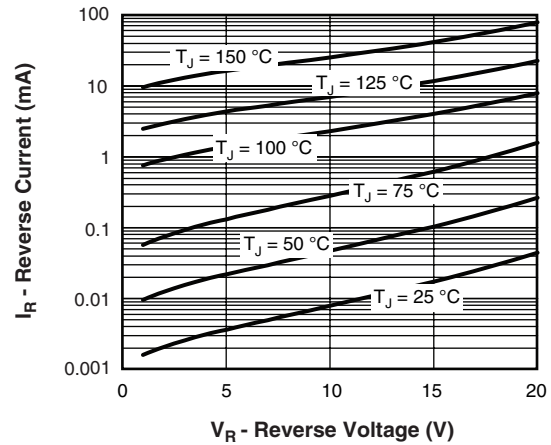


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

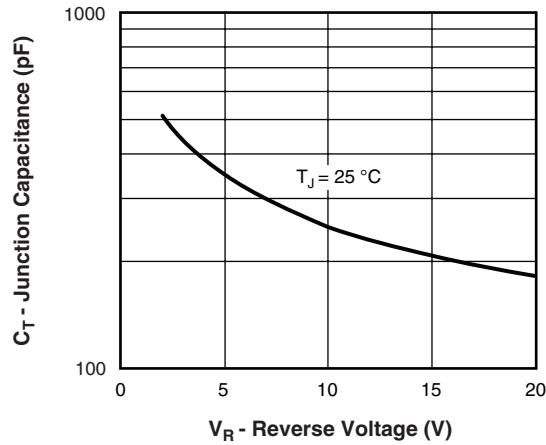


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

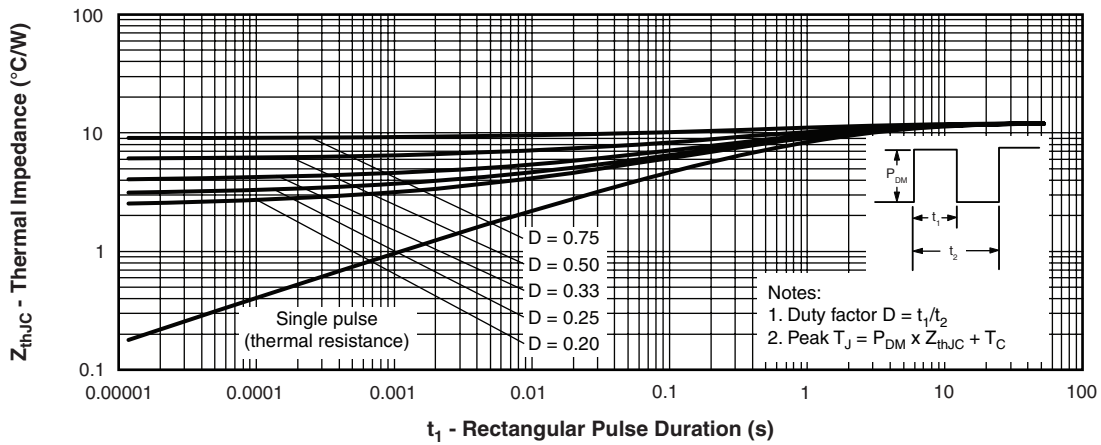


Fig. 4 - - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

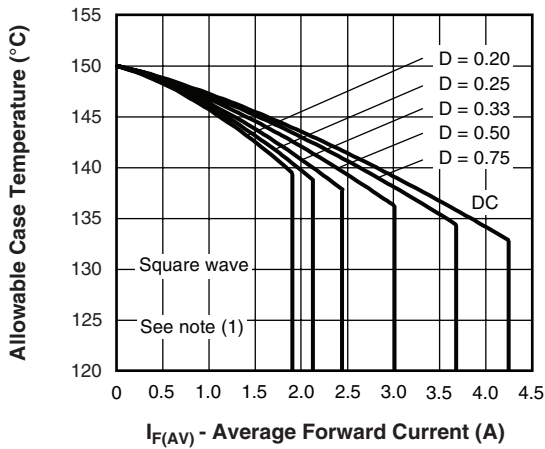


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

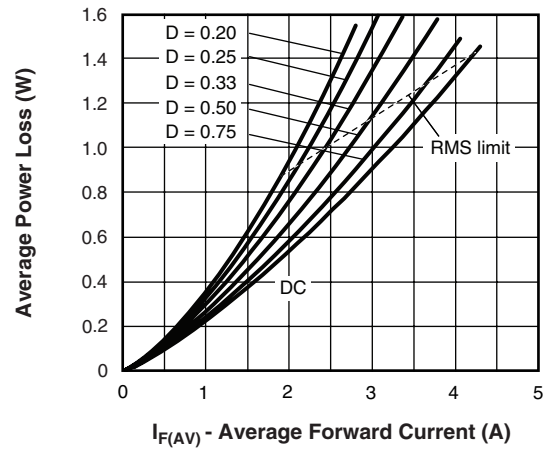


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

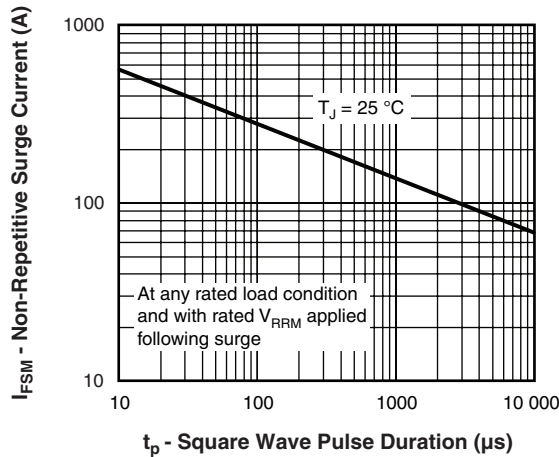


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

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 = $V_{R1} \times I_R (1 - D)$



ORDERING INFORMATION TABLE

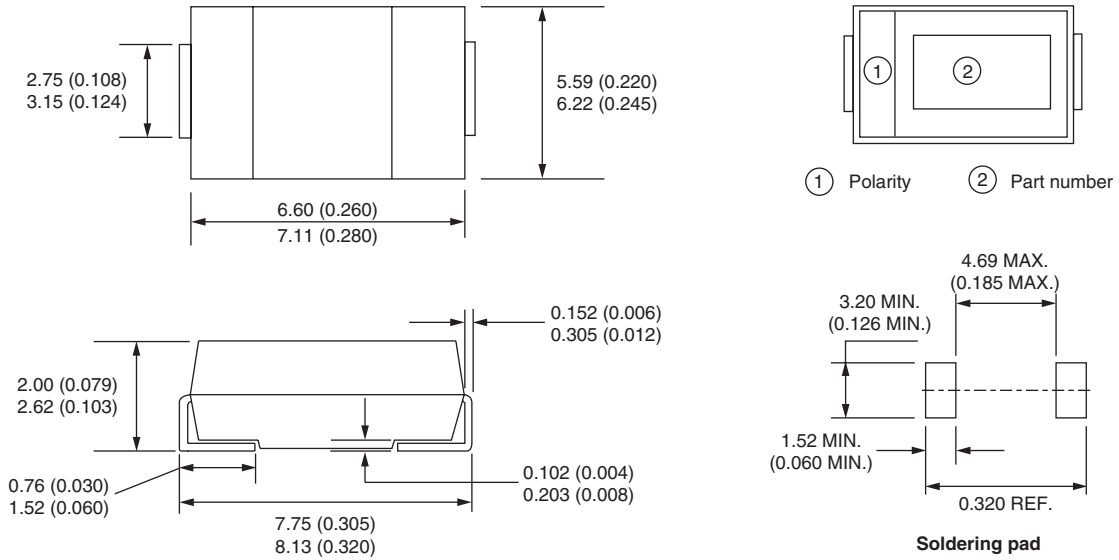
Device code	VS-	MBR	S	3	20	TR	PbF
	①	②	③	④	⑤	⑥	⑦

- 1** - HPP product suffix
- 2** - Schottky MBR series
- 3** - S = SMC
- 4** - Current rating (3 = 3 A)
- 5** - Voltage rating (20 = 20 V)
- 6** - TR = Tape and reel (3000 pieces)
- 7** - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95023
Part marking information	www.vishay.com/doc?95029
Packaging information	www.vishay.com/doc?95034

SMC

DIMENSIONS in millimeters (inches)





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