

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, $T_J = 125^\circ C$	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 $T_L = 136^\circ C$, 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}	$T_J = 25^\circ C$, $I_{AS} = 1.0$ A, $L = 8$ 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	$V_{\text{FM}}^{(1)}$	3 A	$T_{\text{J}} = 25\text{ }^{\circ}\text{C}$	0.41	0.45	V
		6 A		0.45	0.53	
		3 A	$T_{\text{J}} = 125\text{ }^{\circ}\text{C}$	0.29	0.36	
		6 A		0.35	0.46	
Maximum reverse leakage current	$I_{\text{RM}}^{(1)}$	$T_{\text{J}} = 25\text{ }^{\circ}\text{C}$	$V_{\text{R}} = \text{Rated } V_{\text{R}}$	0.04	0.5	mA
		$T_{\text{J}} = 100\text{ }^{\circ}\text{C}$		8.0	20	
		$T_{\text{J}} = 125\text{ }^{\circ}\text{C}$		23	35	
Typical junction capacitance	C_{T}	$V_{\text{R}} = 5\text{ }V_{\text{DC}}$ (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	$^{\circ}\text{C/W}$
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

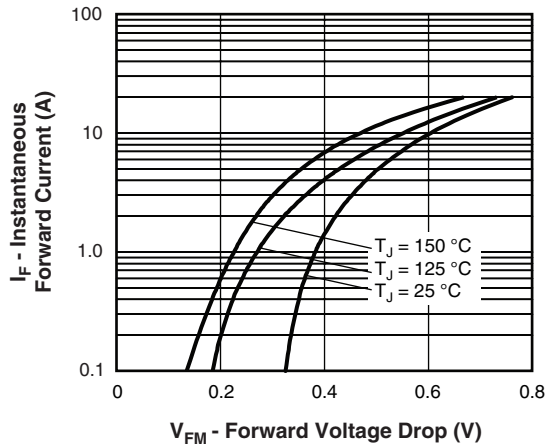


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

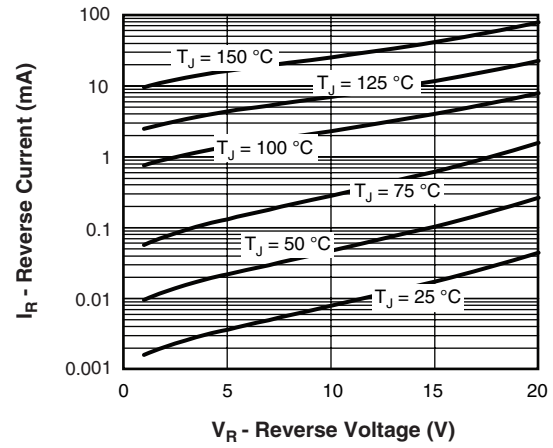


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

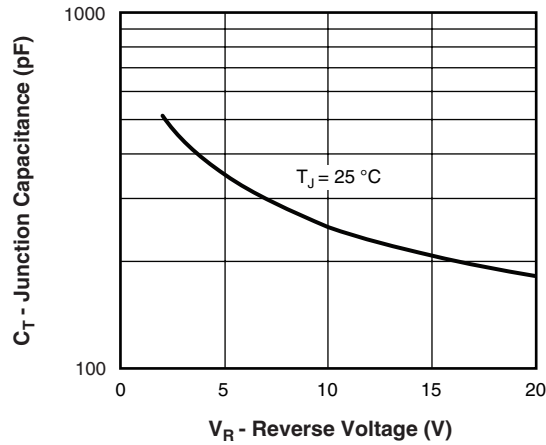


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

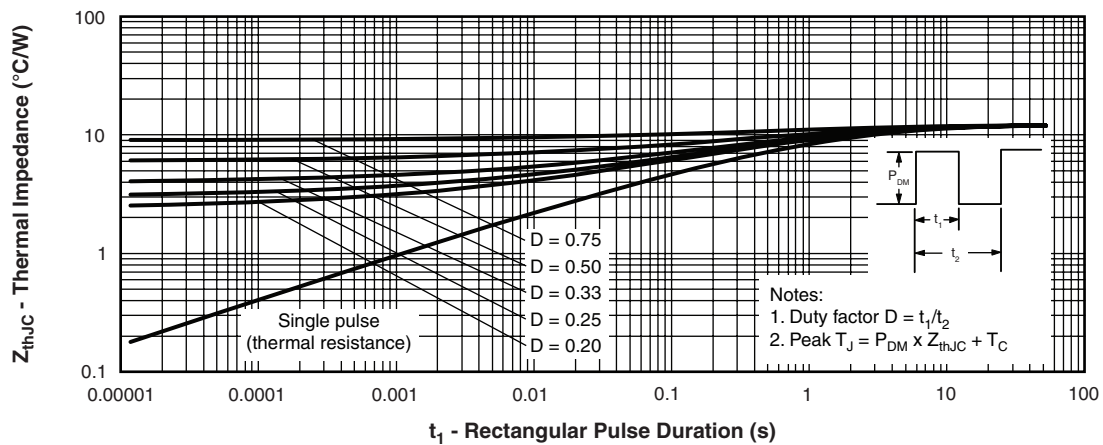


Fig. 4 - - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

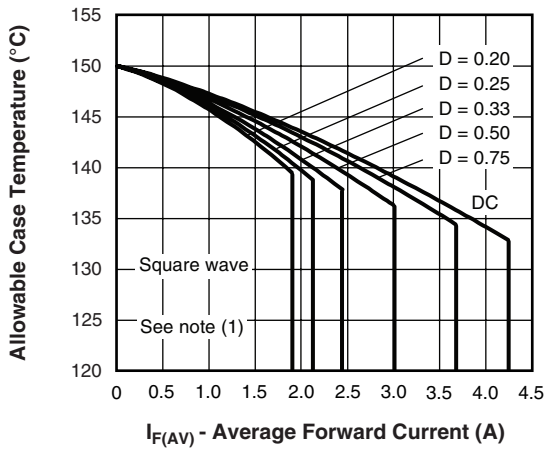


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

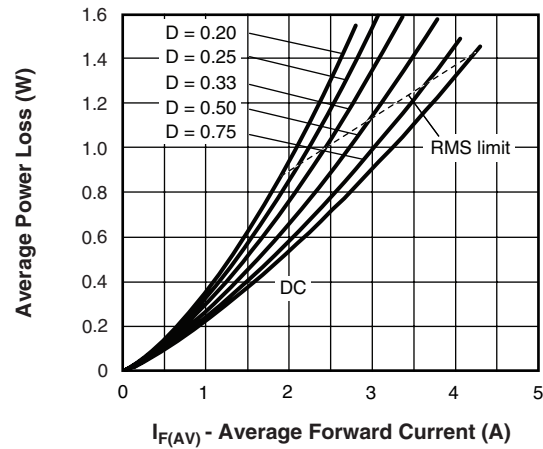


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

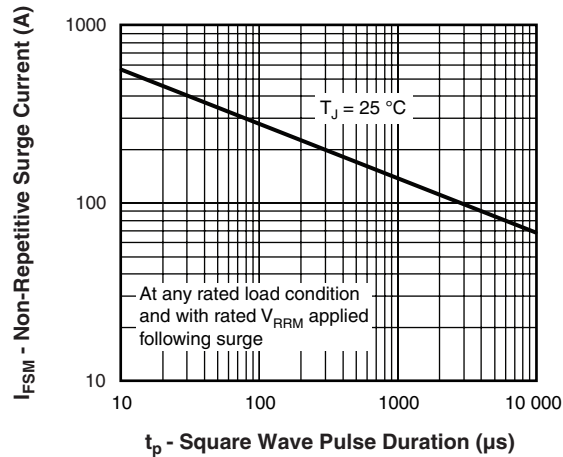


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

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

- 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

www.vishay.com
5



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.