

High Performance Schottky Rectifier, 3.0 A



Cathode — Anode

SMC (DO-214AB)



RoHS
COMPLIANT
HALOGEN
FREE

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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION

The VS-MBRS340-M3 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
V_R	40 V
V_F at I_F	0.43 V
I_{RM} max.	35 mA at 125 °C
T_J max.	150 °C
E_{AS}	6.0 mJ
Package	SMC (DO-214AB)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	3.0	A
V_{RRM}		40	V
I_{FSM}	$t_p = 5 \mu s$ sine	1580	A
V_F	$3.0 \text{ A}_{pk}, T_J = 125 \text{ }^\circ\text{C}$	0.43	V
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-MBRS340-M3	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	$I_{F(AV)}$	50 % duty cycle at $T_L = 118 \text{ }^\circ\text{C}$, rectangular waveform	3.0	A
		50 % duty cycle at $T_L = 110 \text{ }^\circ\text{C}$, rectangular waveform	4.0	
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	1580	
		10 ms sine or 6 ms rect. pulse	80	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25 \text{ }^\circ\text{C}$, $I_{AS} = 1.0 \text{ A}$, $L = 12 \text{ mH}$	6	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	V _{FM} ⁽¹⁾	3 A	T _J = 25 °C	0.525	V	
		6 A		0.68		
		3 A	T _J = 125 °C	0.43		
		6 A		0.57		
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	2.0	mA	
		T _J = 100 °C		20		
		T _J = 125 °C		35		
Maximum junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		230	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/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 lead	R _{thJL} ⁽²⁾	DC operation	12	°C/W
Maximum thermal resistance, junction to ambient	R _{thJA}		46	
Approximate weight			0.24	g
Marking device		Case style SMC (DO-214AB)	0.008	oz.
			34	

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

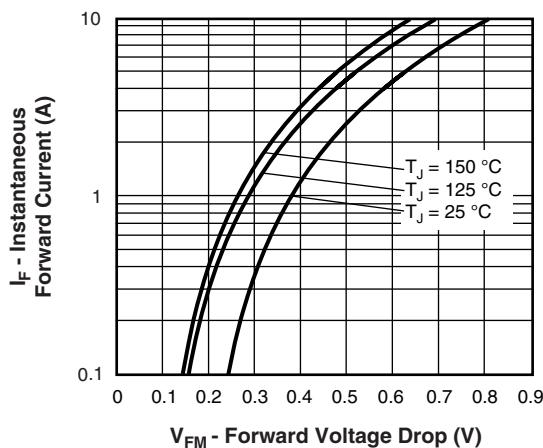


Fig. 1 - Maximum Forward Voltage Drop Characteristics
(Per Leg)

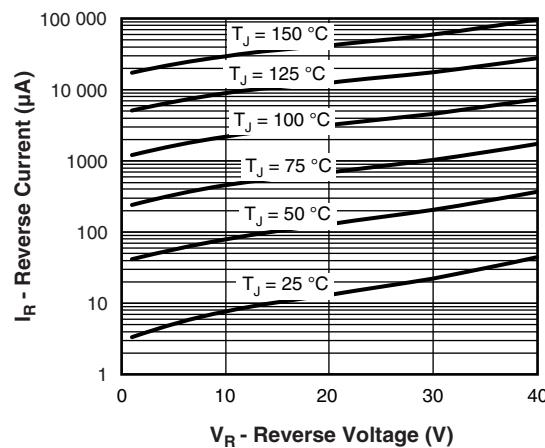


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage
(Per Leg)

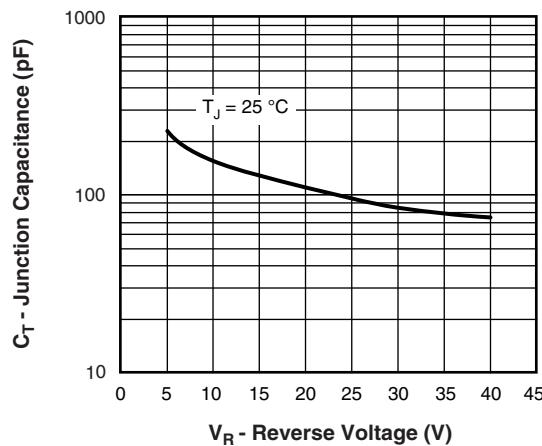


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

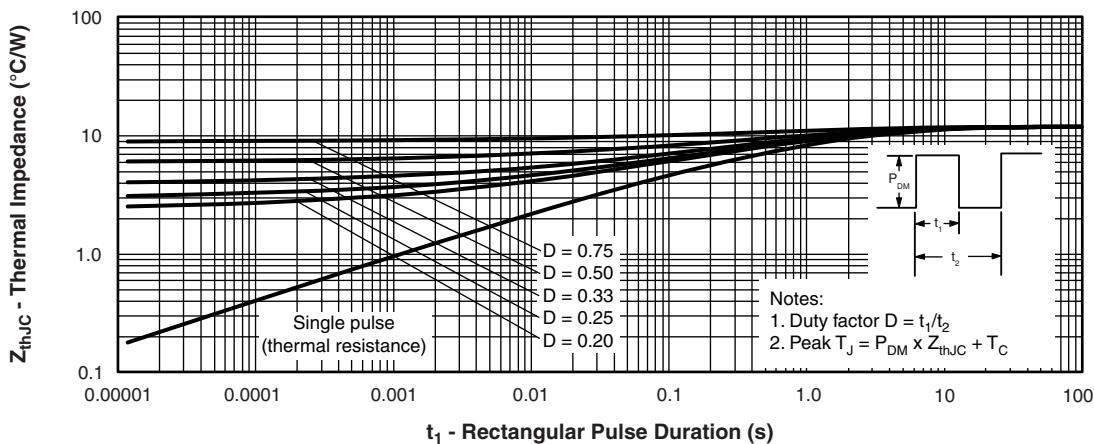
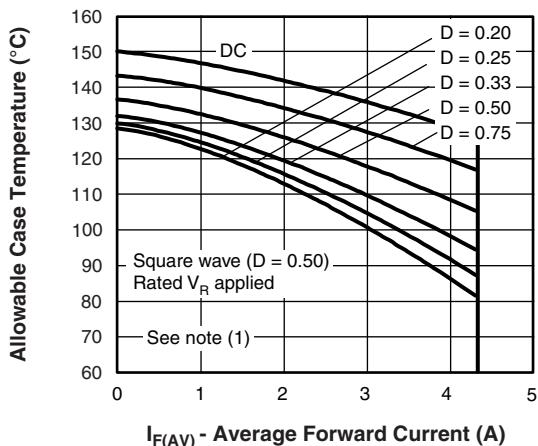
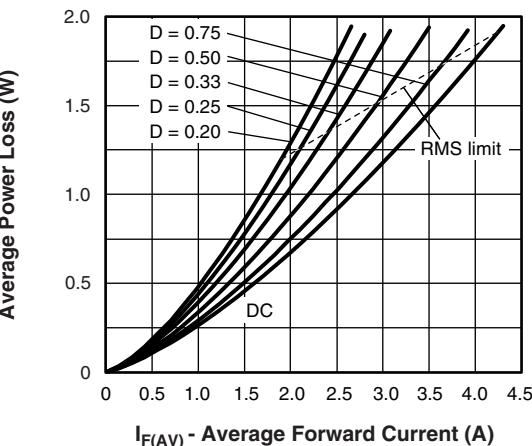


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)



$I_{F(AV)}$ - Average Forward Current (A)

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



$I_{F(AV)}$ - Average Forward Current (A)

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

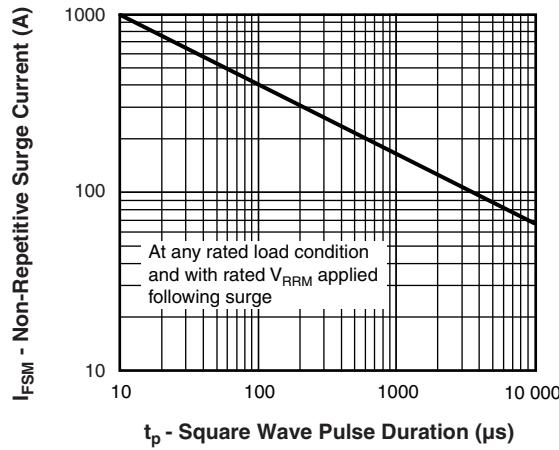


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = 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	S	3	40	-M3
	(1)	(2)	(3)	(4)	(5)	(6)
1		- Vishay Semiconductors product				
2		- Schottky MBR series				
3		- S = SMC				
4		- Current rating (3 = 3 A)				
5		- Voltage rating (40 = 40 V)				
6		- M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free				

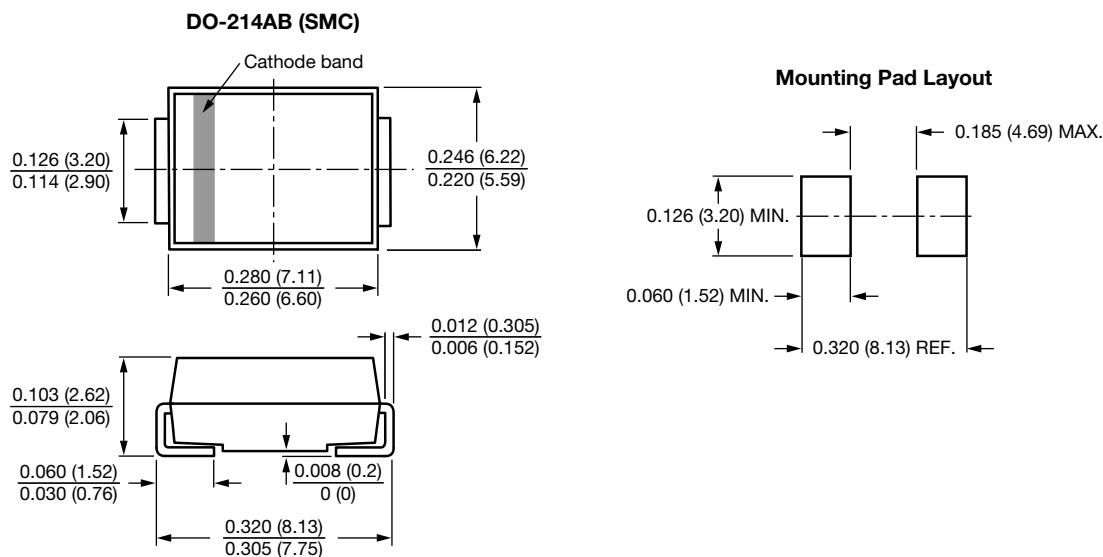
ORDERING INFORMATION (Example)

PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBRS340-M3/9AT	9AT	3500	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95402
Part marking information	www.vishay.com/doc?95403
Packaging information	www.vishay.com/doc?95404
SPICE model	www.vishay.com/doc?95366

SMC

DIMENSIONS in inches (millimeters)



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