

High Performance Schottky Rectifier, 3.0 A



SMC (DO-214AB)

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			

FEATURES

- Small foot print, surface mountable
- · Very low forward voltage drop

• High frequency operation

ROHS COMPLIANT HALOGEN FREE

- 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 <u>www.vishay.com/doc?99912</u>

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.

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 μs sine	1580	Α	
V _F	3.0 A _{pk} , T _J = 125 °C	0.43	V	
TJ	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}	40	V

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST COND	ITIONS	VALUES	UNITS
Maximum average forward current	,	50 % duty cycle at T _L = 118 °C,	, rectangular waveform	3.0	
Maximum average forward current I _{F(AV)}		50 % duty cycle at T _L = 110 °C, rectangular waveform		4.0	
Maximum peak one cycle .		5 μs sine or 3 μs rect. pulse	Following any rated load	1580	Α
non-repetitive surge current	I _{FSM}	10 ms sine or 6 ms rect. pulse	condition and with rated V _{RRM} applied	80	
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 1.0 \text{A}, L = 12 \text{mH}$		6	mJ
Repetitive avalanche current	I _{AR}	Current decaying linearly to zero in 1 μ s Frequency limited by T _J maximum V _A = 1.5 x V _R typical		1.0	Α



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS VALUES		UNITS	
		3 A	T 05 %	0.525	
Maximum forward voltage drop	V _{FM} ⁽¹⁾	6 A	T _J = 25 °C	0.68	v
Maximum forward voltage drop	V FM (*)	3 A	T _J = 125 °C	0.43	V
		6 A	1J=125 C	0.57	
		T _J = 25 °C		2.0	
Maximum reverse leakage current	reverse leakage current I _{RM} (1)	T _J = 100 °C	V _R = Rated V _R	20	mA
		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 n		nH	
Maximum voltage rate of change	dV/dt	Rated V _R 10 000 V/µs		V/µs	

Note

 $^{(1)}\,$ Pulse width $<300~\mu s,$ 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	°C
Maximum thermal resistance, junction to lead	R _{thJL} ⁽²⁾	DC encyction	12	°C/W
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	46	C/VV
Approximate weight			0.24	g
Approximate weight			0.008	OZ.
Marking device		Case style SMC (DO-214AB)	34	1

Notes

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

(2) Mounted 1" square PCB



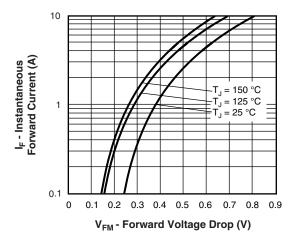


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

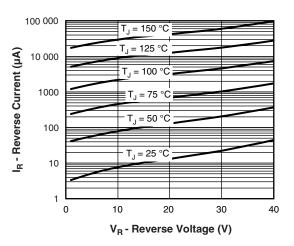


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

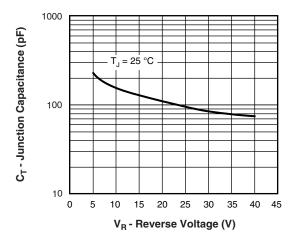


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

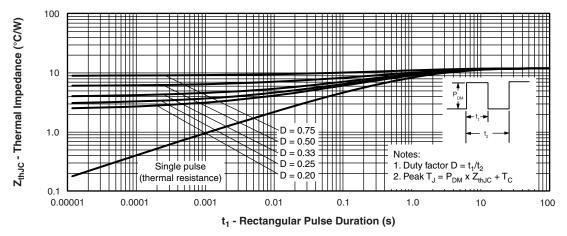


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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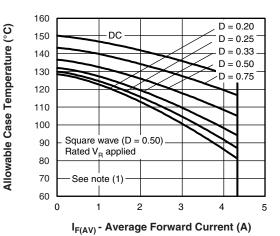


Fig. 5 - Maximum Average Forward Current vs.
Allowable Lead Temperature

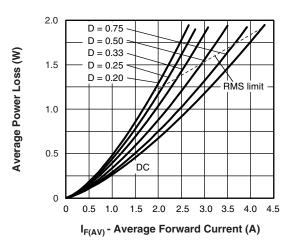


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

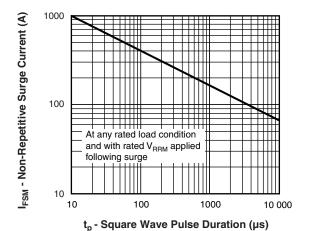


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

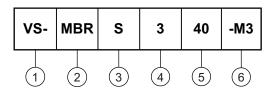
Note

 $\begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{th,JC}; \\ Pd = \text{forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6);} \\ Pd_{REV} = \text{inverse power loss} = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated } V_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated } V_R \text{ (1 - D); } I_R \text{ (2 - D); } I_R \text{ (3 - D); } I_R \text{ (4 - D$



ORDERING INFORMATION TABLE

Device code



- 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)

DO-214AB (SMC)



Mounting Pad Layout





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