Vishay Semiconductors

High Performance Schottky Rectifier, 3.0 A



Cathode		Anode
o—	-	

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		

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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 <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	CHARACTERISTICS VALUES U			
I _{F(AV)}	Rectangular waveform	3.0	A		
V _{RRM}		40	V		
I _{FSM}	t _p = 5 μs sine	1580	А		
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 ourrent		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	А	
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 °C, I _{AS} = 1.0 A, L = 12 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	А

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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CO	NDITIONS	VALUES	UNITS
		3 A	T.I = 25 °C	0.525	
Maximum forward voltage drop	V _{FM} ⁽¹⁾	6 A	IJ=25 C	0.68	v
Maximum forward voltage drop	VFM ()	3 A	T 105 %O	0.43	
		6 A	− T _J = 125 °C	0.57	
		T _J = 25 °C		2.0	
Maximum 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	CT	$V_R = 5 V_{DC}$ (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.		3.0	nH
Maximum voltage rate of change	dV/dt	Rated V _R 10 000 V/		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⁾		12	°C/W	
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	46		
Approvimeto weight			0.24	g	
Approximate weight			0.008	oz.	
Marking device		Case style SMC (DO-214AB)	34	ļ	

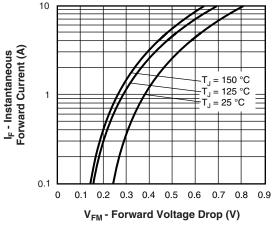
Notes

(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

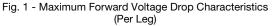
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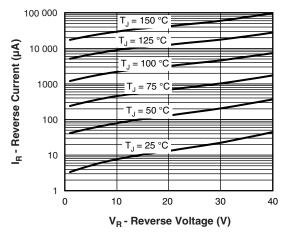


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

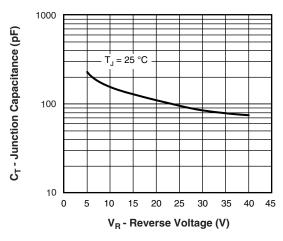
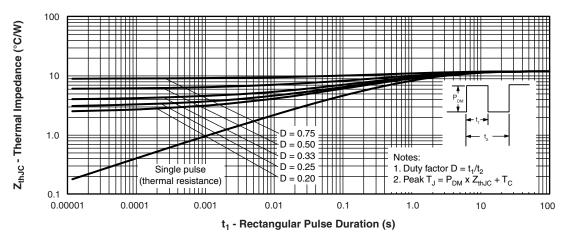
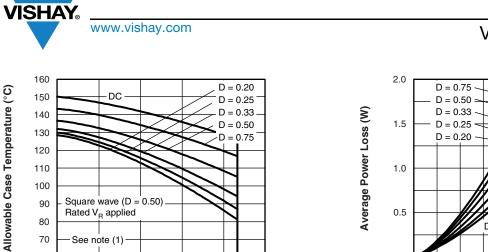


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)





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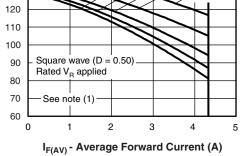


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

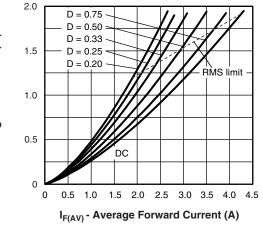


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

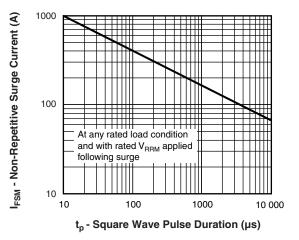


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

 $\begin{array}{l} \mbox{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \mbox{forward power loss} = I_{F(AV)} \times V_{FM} \mbox{ at } (I_{F(AV)}/D) \mbox{ (see fig. 6); } \\ Pd_{REV} = \mbox{inverse power loss} = V_{R1} \times I_R \mbox{ (1 - D); } I_R \mbox{ at } V_{R1} = 80 \ \% \mbox{ rated } V_R \end{array}$ (1)

VS-MBRS340-M3



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ORDERING INFORMATION TABLE

Device code	vs-	MBR	S	3	40	-M3	
	1	2	3	4	5	6	•
	1 · 2 · 3 ·	Sch	,	niconduo BR serie		oduct	
	4	- Cur	rent rati	ng (3 =	3 A)		
	5	- Volt	tage rati	ng (40 =	= 40 V)		
	6	-M3	s = halog	gen-free	, RoHS	-complia	ant, ar

-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)						
PREFERRED P/N	REFERRED 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		

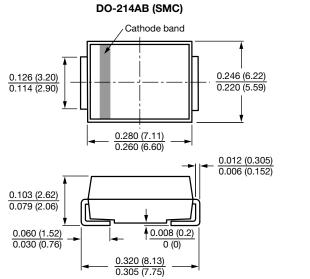


Outline Dimensions

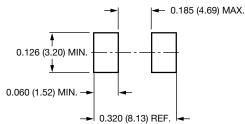
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SMC

DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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