

## High Performance Schottky Rectifier, 3.0 A



Cathode — Anode

DO-214AB (SMC)



**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](http://www.vishay.com/doc?99912)

### DESCRIPTION

The VS-MBRS360-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.

PRODUCT SUMMARY	
Package	SMC
$I_{F(AV)}$	3.0 A
$V_R$	60 V
$V_F$ at $I_F$	0.61 V
$I_{RM}$ max.	30 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	5.0 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	3.0	A
$V_{RRM}$		60	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	790	A
$V_F$	3.0 A <sub>pk</sub> , $T_J = 125$ °C	0.61	V
$T_J$	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-MBRS360-M3	UNITS
Maximum DC reverse voltage	$V_R$	60	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 $T_L = 118$ °C, rectangular waveform		3.0	A	
		50 % duty cycle at $T_L = 105$ °C, rectangular waveform		4.0		
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	790		
		10 ms sine or 6 ms rect. pulse		80		
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 1.0$ A, $L = 10$ mH		5.0	mJ	
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ 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 <sub>FM</sub> <sup>(1)</sup>	3 A	T <sub>J</sub> = 25 °C	0.57	0.74	V	
		6 A		0.72	0.9		
		3 A	T <sub>J</sub> = 125 °C	0.51	0.61		
		6 A		0.62	0.77		
Maximum reverse leakage current	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	-	0.5	mA	
		T <sub>J</sub> = 100 °C		-	20		
		T <sub>J</sub> = 125 °C		-	30		
Maximum junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		-	180	pF	
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		-	3.0	nH	
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		-	10 000	V/μs	

**Note**

<sup>(1)</sup> Pulse width < 300 μs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub>		-55 to +150	°C
Maximum thermal resistance, junction to lead	R <sub>thJL</sub> <sup>(2)</sup>	DC operation	12	°C/W
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>		46	
Approximate weight		Case style SMC (similar to DO-214AB)	0.24	g
Marking device			0.008	oz.

**Notes**

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

<sup>(2)</sup> Mounted 1" square PCB

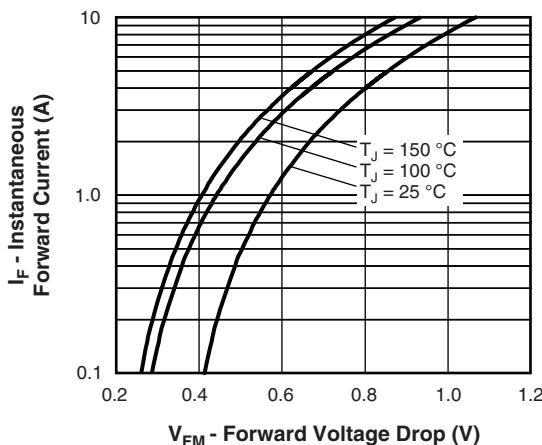


Fig. 1 - Maximum Forward Voltage Drop Characteristics  
(Per Leg)

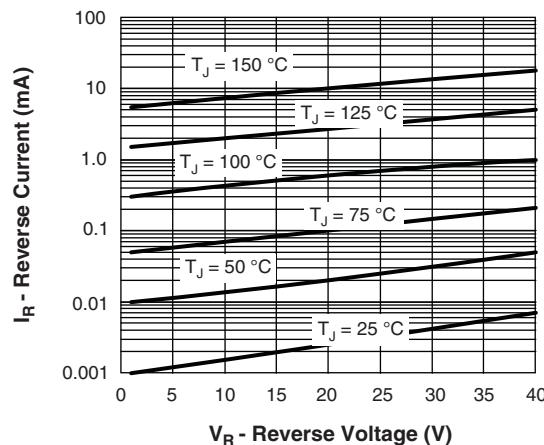


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage  
(Per Leg)

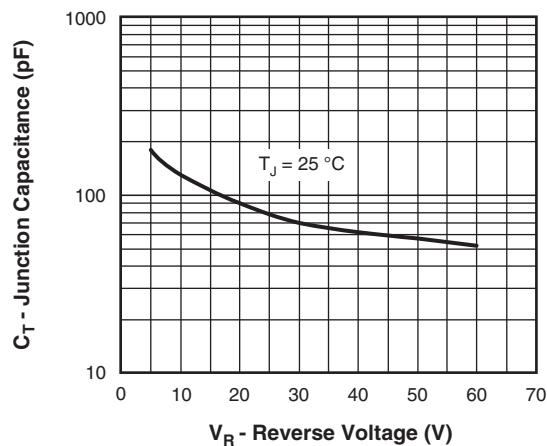


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

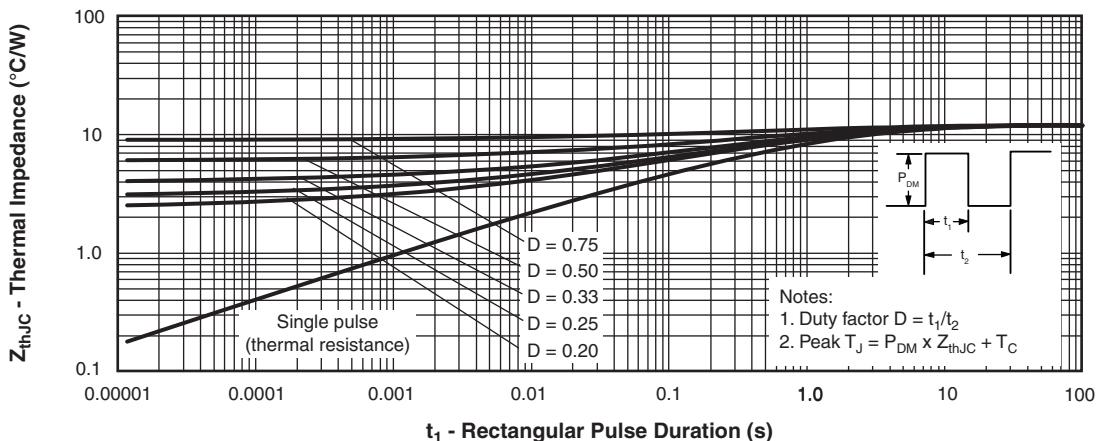


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

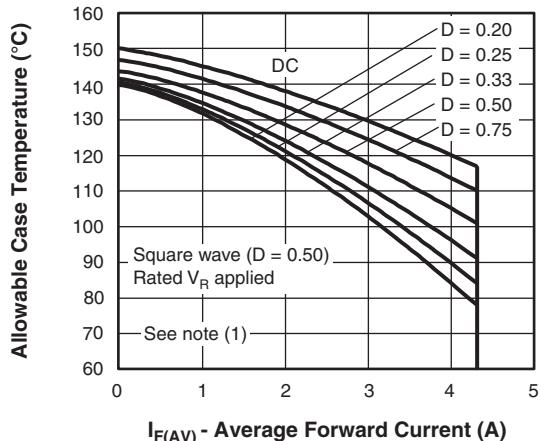


Fig. 5 - Maximum Average Forward Current vs.  
Allowable Lead Temperature

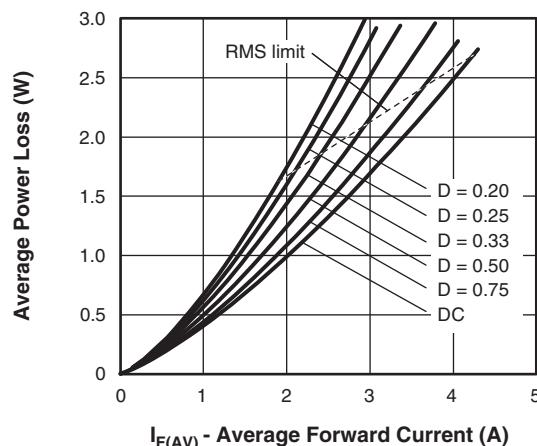


Fig. 6 - Maximum Average Forward Dissipation vs.  
Average Forward Current

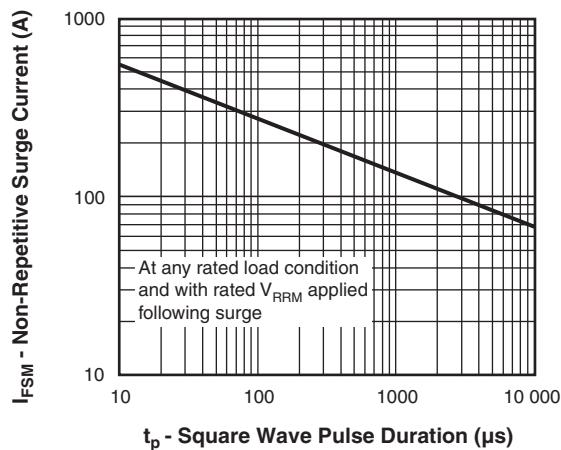


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

#### Note

(1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

**ORDERING INFORMATION TABLE**

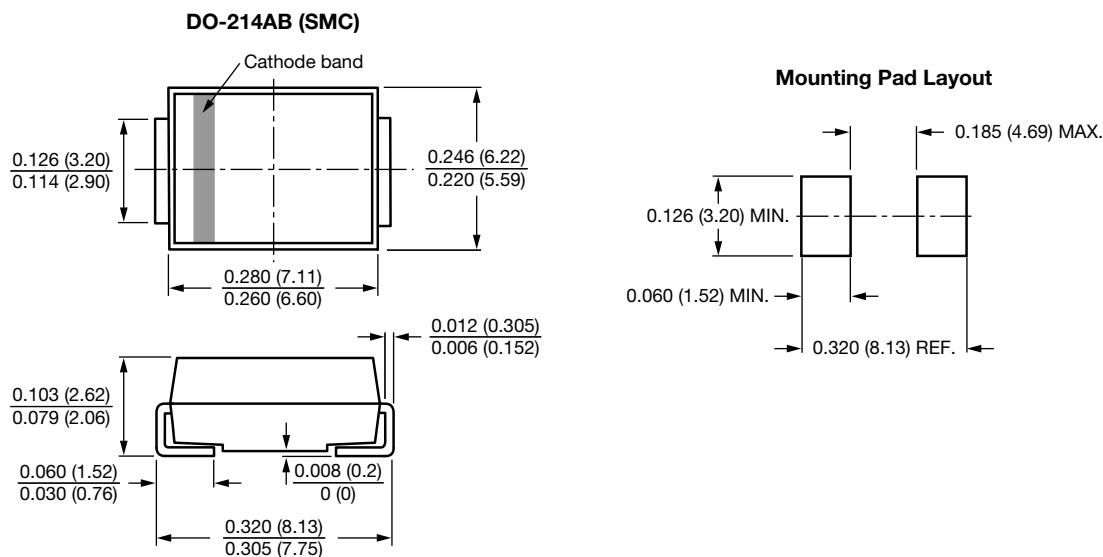
Device code	VS-	MBR	S	3	60	-M3
	1	2	3	4	5	6
<b>1</b>		- Vishay Semiconductors products				
<b>2</b>		- Schottky MBR series				
<b>3</b>		- S = SMC				
<b>4</b>		- Current rating (3 = 3 A)				
<b>5</b>		- Voltage rating (60 = 60 V)				
<b>6</b>		- M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free				

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBRS360-M3/9AT	9AT	3500	13" diameter plastic tape and reel

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95402">www.vishay.com/doc?95402</a>
Part marking information	<a href="http://www.vishay.com/doc?95403">www.vishay.com/doc?95403</a>
Packaging information	<a href="http://www.vishay.com/doc?95404">www.vishay.com/doc?95404</a>

### SMC

#### DIMENSIONS in inches (millimeters)



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