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### Vishay Semiconductors

# **High Performance Schottky Rectifier, 1 A**

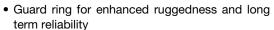


CRAA	/DA	04	4 4 0
SMA	IDO-	-214	HAL

PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	1 A			
$V_R$	100 V			
V <sub>F</sub> at I <sub>F</sub>	0.63 V			
I <sub>RM</sub>	1 mA at 125 °C			
T <sub>J</sub> max.	150 °C			
E <sub>AS</sub>	1.0 mJ			
Package	SMA (DO-214AC)			
Circuit configuration	Single			

#### **FEATURES**

Low forward voltage drop





- Small footprint, surface mountable
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

### **DESCRIPTION / APPLICATIONS**

The VS-10MQ100HM3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and very 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 <sub>F(AV)</sub>	Rectangular waveform	1	Α		
V <sub>RRM</sub>		100	V		
I <sub>FSM</sub>	$t_p = 5 \mu s sine$	120	Α		
$V_{F}$	1.5 A <sub>pk</sub> , T <sub>J</sub> = 125 °C	0.68	V		
T <sub>J</sub>	Range	-55 to +150	°C		

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10MQ100HM3	UNITS
Maximum DC reverse voltage	$V_R$	100	V
Maximum working peak reverse voltage	$V_{RWM}$	100	V

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current		$50~\%$ duty cycle at $T_L = 126~^{\circ}$ C, rectangular waveform On PC board 9 mm $^2$ island (0.013 mm thick copper pad area)		1.5	
See fig. 4	I <sub>F(AV)</sub>	50 % duty cycle at $T_L$ = 135 °C, rectangular waveform On PC board 9 mm <sup>2</sup> island (0.013 mm thick copper pad area)		1	А
Maximum peak one cycle		5 μs sine or 3 μs rect. pulse Following any rated		120	
non-repetitive surge current, $T_J = 25$ °C See fig. 6	I <sub>FSM</sub>	10 ms sine or 6 ms rect. pulse	load condition and with rated V <sub>RRM</sub> applied	30	
Non-repetitive avalanche energy	E <sub>AS</sub>	$T_J = 25  ^{\circ}\text{C},  I_{AS} = 0.5  \text{A},  L = 8  \text{mH}$		1.0	mJ
Repetitive avalanche current	I <sub>AR</sub>	Current decaying linearly to zero in 1 $\mu$ s Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical  0.5		Α	



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1		1 A	T <sub>J</sub> = 25 °C	0.78	V
	V (1)	1.5 A		0.85	
	V <sub>FM</sub> <sup>(1)</sup>	1 A	T <sub>J</sub> = 125 °C	0.63	
		1.5 A		0.68	
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	0.1	mA
See fig. 2		T <sub>J</sub> = 125 °C		1	
Threshold voltage	V <sub>F(TO)</sub>	$T_{J} = T_{J}$ maximum		0.52	V
Forward slope resistance	r <sub>t</sub>			78.4	mΩ
Typical junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 10 V <sub>DC</sub> , T <sub>J</sub> = 25 °C, test signal = 1 MHz		38	pF
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body 2.0		2.0	nH
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub> 10 000		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 <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub>			-55 to +150	°C
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>	DC operation		80	°C/W
Approximate weight				0.07	g
Approximate weight				0.002	OZ.
Marking device		Case style SMA (DO-214AC)		1,	J

### Note

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

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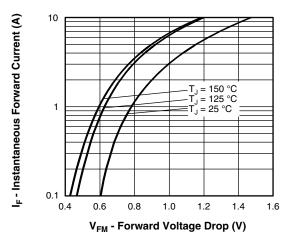


Fig. 1 - Maximum Forward Voltage Drop Characteristics

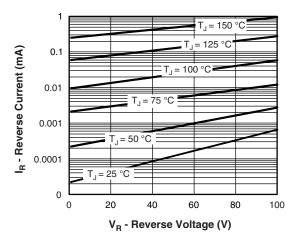


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

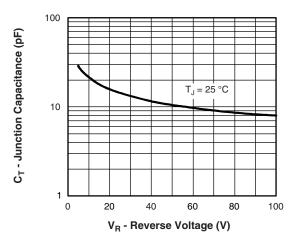
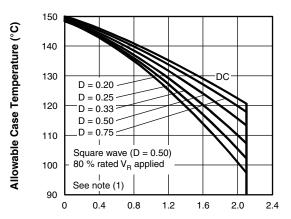


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



I<sub>F(AV)</sub> - Average Forward Current (A)

Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

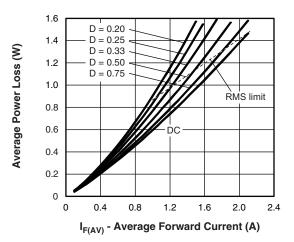


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

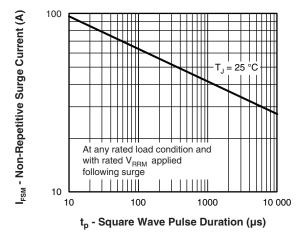


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

#### Note

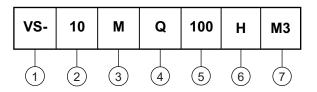
 $^{1)}$  Formula used: T<sub>C</sub> = T<sub>J</sub> - (Pd + Pd<sub>REV</sub>) x R<sub>th,JC</sub>; Pd = Forward power loss = I<sub>F(AV)</sub> x V<sub>FM</sub> at (I<sub>F(AV)</sub>/D) (see fig. 6); Pd<sub>REV</sub> = Inverse power loss = V<sub>R1</sub> x I<sub>R</sub> (1 - D); I<sub>R</sub> at V<sub>R1</sub> = 80 % rated V<sub>R</sub>



## Vishay Semiconductors

### **ORDERING INFORMATION TABLE**

Device code



- 1 Vishay Semiconductors product
- 2 Current rating
- 3 M = SMA
- 4 Q = Schottky "Q" series
- 5 Voltage rating (100 = 100 V)
- 6 H = AEC-Q101 qualified
- 7 Environmental digit:

M3 = Halogen-free, RoHS-compliant and terminations lead (Pb)-free

ORDERING INFORMATION (Example)					
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION		
VS-10MQ100HM3/5AT	5AT	7500	13" diameter plastic tape and reel		

LINKS TO RELATED DOCUMENTS			
Dimensions	www.vishay.com/doc?95400		
Part marking information	www.vishay.com/doc?95403		
Packaging information	www.vishay.com/doc?95404		

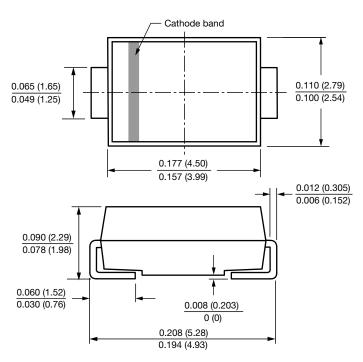


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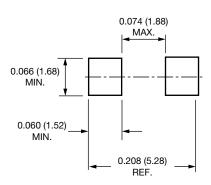
## **SMA**

### **DIMENSIONS** in inches (millimeters)

### **DO-214AC (SMA)**



### **Mounting Pad Layout**





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