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RoHS COMPLIANT

High Performance Schottky Rectifier, 1 A

FEATURES

- Small foot print, surface mountable
- 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
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The VS-10MQ100NTRPbF 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 _{F(AV)}	Rectangular waveform	1	А		
V _{RRM}		100	V		
I _{FSM}	t _p = 5 μs sine	120	А		
V _F	1.5 A _{pk} , T _J = 125 °C	0.68	V		
TJ	Range	-55 to +150	°C		

VOLTAGE RATINGS					
PARAMETER	SYMBOL	VS-10MQ100NTRPbF	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 °C, rectangular waveform On PC board 9 mm ² island (0.013 mm thick copper pad area)		1.5	А	
See fig. 4	IF(AV)	50 % duty cycle at T_L = 135 °C, rectangular waveform On PC board 9 mm ² island (0.013 mm thick copper pad area)		1		
Maximum peak one cycle	I _{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load	120	А	
non-repetitive surge current, $T_J = 25 \text{ °C}$ See fig. 6		10 ms sine or 6 ms rect. pulse	condition and with rated V _{RRM} applied	30		
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 \text{ °C}, I_{AS} = 0.5 \text{ A}, L = 8 \text{ mH}$		1.0	mJ	
Repetitive avalanche current	I _{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		0.5	А	

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SMA (DO-214AC)

PRODUCT SUMMARY				
Package	SMA (DO-214AC)			
I _{F(AV)}	1 A			
V _R	100 V			
V _F at I _F	0.78 V			
I _{RM}	1 mA at 125 °C			
T _J max.	150 °C			
Diode variation	Single			
E _{AS}	1.0 mJ			

Cathode

Anode

-0



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CC	ONDITIONS	VALUES	UNITS
		1 A	– T _J = 25 °C	0.78	V
Maximum forward voltage drop	V _{FM} ⁽¹⁾	1.5 A	1j=25 C	0.85	
See fig. 1	V FM (")	1 A	T = 125 °C	0.63	
		1.5 A	T _J = 125 °C	0.68	
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	0.1	mA
See fig. 2	IRM (17	T _J = 125 °C		1	
Threshold voltage	V _{F(TO)}	$T_{\rm J} = T_{\rm J} \text{ maximum} \qquad \qquad$		0.52	V
Forward slope resistance	r _t			mΩ	
Typical junction capacitance	CT	$V_R = 10 V_{DC}$, $T_J = 25 \text{ °C}$, test signal = 1 MHz		38	pF
Typical series inductance	L _S	Measured lead to lead 5 mm from package body 2.0		nH	
Maximum voltage rate of change	dV/dt	Rated V _R 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 _J ⁽¹⁾ , T _{Stg}		-55 to +150	°C	
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	80	°C/W	
Approximate weight			0.07	g	
Approximate weight			0.002	oz.	
Marking device		Case style SMA (DO-214AC)(similar D-64)	1J		

Note

(1)

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





Fig. 1 - Maximum Forward Voltage Drop Characteristics



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



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

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

Note

⁽¹⁾ Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6); Pd_{REV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = 80 % rated V_R

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3

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ORDERING INFORMATION TABLE

Device code	vs-	10	М	Q	100	N	TR	PbF
		2	3	4	5	6	7	8
	1 2 3	- Cur	nay Serr rent rati : SMA		•	oduct		
	4		Schottk	ky "Q" se	eries			
	5	- Vol	tage rati	ng (100	= 100 \	/)		
	6	• N =	new SN	ΛA				
	7.	. TR	= tape a	nd reel				
	8	- PbF	= lead	(Pb)-fre	е			

ORDERING INFORMATION (Example)						
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION			
VS-10MQ100NTRPbF	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			
SPICE model	www.vishay.com/doc?95371			



Outline Dimensions

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SMA

DIMENSIONS in inches (millimeters)

DO-214AC (SMA)





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1