

High Performance Schottky Rectifier, 1 A



ADDITIONAL RESOURCES

SMA (DO-214AC)



PRIMARY CHARACTERISTICS				
I _{F(AV)}	1 A			
V _R	60 V			
V _F at I _F	0.63			
I _{RM}	7.5 mA at 125 °C			
T _J max.	150 °C			
E _{AS}	2.0 mJ			
Package	SMA (DO-214AC)			
Circuit configuration	Single			

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-10MQ060NTRPbF 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	SYMBOL CHARACTERISTICS VALUES UNITS				
I _{F(AV)}	Rectangular waveform	1	Α		
V _{RRM}		60	V		
I _{FSM}	$t_p = 5 \mu s sine$	40	Α		
V _F	1.5 A _{pk} , T _J = 125 °C	0.63	V		
T _J	Range	-55 to +150	°C		

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10MQ060NTRPbF	UNITS
Maximum DC reverse voltage	V_R	60	V
Maximum working peak reverse voltage	V_{RWM}	80	V

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current		50 % duty cycle at $T_L = 120$ °C, On PC board 9 mm ² island (0.013)		1.5	۸
See fig. 4		$50~\%$ duty cycle at $T_L = 129~^{\circ}$ C, rectangular waveform On PC board $9~\text{mm}^2$ island (0.013 mm thick copper pad area)		1	- A
Maximum peak one cycle		5 μs sine or 3 μs rect. pulse	Following any rated load	40	
non-repetitive surge current See fig. 6	I _{FSM}	10 ms sine or 6 ms rect. pulse	condition and with rated V _{RRM} applied	10	Α
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 1 \text{A}, L = 4 \text{mH}$		2.0	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		Α	



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
		1 A	T _{.1} = 25 °C	0.63	V
Maximum forward voltage drop	V _{FM} ⁽¹⁾	1.5 A	- IJ=25 C	0.71	
See fig. 1	V FM ('')	1 A	T _J = 125 °C	0.57	
		1.5 A		0.63	
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	0.5	A
See fig. 2	IRM ('')	T _J = 125 °C		7.5	mA mA
Threshold voltage	V _{F(TO)}	$T_J = T_J$ maximum		0.45	V
Forward slope resistance	r _t			86.8	mΩ
Typical junction capacitance	C _T	V _R = 10 V _{DC} , T _J = 25 °C, test signal = 1 MHz		31	pF
Typical series inductance	L _S	Measured lead to lead 5 mm from package body 2.0		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)	11	Н

Note

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Vishay Semiconductors

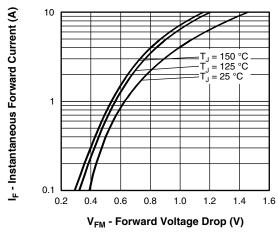


Fig. 1 - Maximum Forward Voltage Drop Characteristics

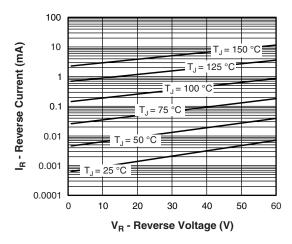


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

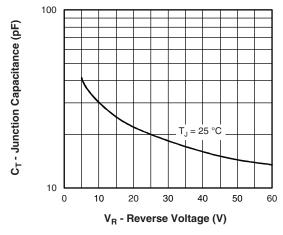
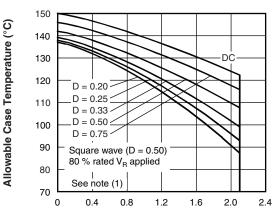


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



I_{F(AV)} - Average Forward Current (A)

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

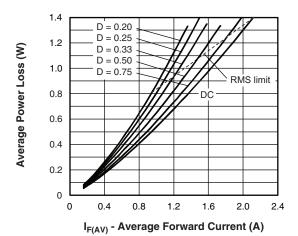


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

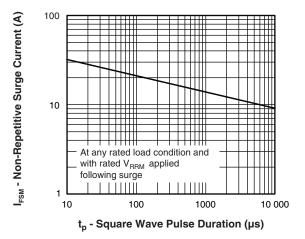


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

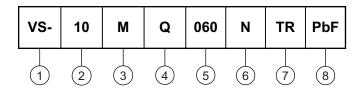
Note

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



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (10 = 1 A)

3 - M = SMA

4 - Q = Schottky "Q" series

5 - Voltage rating (060 = 60 V)

6 - N = new SMA

7 - TR = tape and reel

PbF = lead (Pb)-free

ORDERING INFORMATION (Example)					
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION		
VS-10MQ060NTRPbF	5AT	7500	13" diameter plastic tape and reel		

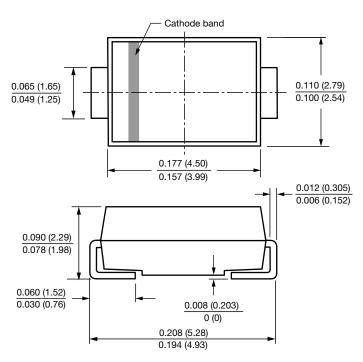
LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?95400</u>				
Part marking information	www.vishay.com/doc?95403			
Packaging information	www.vishay.com/doc?95404			
SPICE model	www.vishay.com/doc?97185			



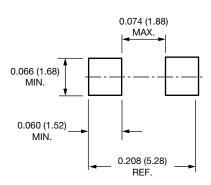
SMA

DIMENSIONS in inches (millimeters)

DO-214AC (SMA)



Mounting Pad Layout





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