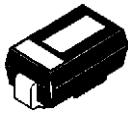


Schottky Rectifier, 3 A



Cathode → Anode

SMA



RoHS
COMPLIANT

FEATURES

- Surface mountable
- Extremely low forward voltage
- Compact size
- Improved reverse blocking voltage capability relative to other similar size Schottky
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

APPLICATIONS

- Switching power supplies
- Meter protection
- Reverse protection for power input to PC board circuits
- Battery isolation and charging
- Low threshold voltage diode
- Freewheeling or by-pass diode
- Low voltage clamp

DESCRIPTION

The VS-15MQ040NPbF Schottky rectifier is designed to be used for low power applications where a reverse voltage of 40 V is encountered and surface mountable is required.

PRODUCT SUMMARY	
$I_{F(AV)}$	3 A
V_R	40 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	DC	3	A
V_{RRM}		40	V
I_{FSM}	$t_p = 5 \mu s$ sine	330	A
V_F	2 Apk, $T_J = 125^\circ C$	0.43	V
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-15MQ040NPbF	UNITS
Maximum DC reverse voltage	V_R	40	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average forward current See fig. 4	$I_{F(AV)}$	50 % duty cycle at $T_L = 105^\circ C$, rectangular waveform On PC board 9 mm ² island (0.013 mm thick copper pad area)		2.1	A	
Maximum peak one cycle non-repetitive surge current See fig. 6	I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	330	A	
		10 ms sine or 6 ms rect. pulse		140		
Non-repetitive avalanche energy	E_{AS}	$T_J = 25^\circ C$, $I_{AS} = 1 A$, $L = 12 mH$		6.0	mJ	
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		1.0	A	

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	1 A	$T_J = 25 \text{ }^\circ\text{C}$	0.42	V	
		2 A		0.49		
		1 A	$T_J = 125 \text{ }^\circ\text{C}$	0.34		
		2 A		0.43		
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA	
		$T_J = 125 \text{ }^\circ\text{C}$		20		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.26	V	
Forward slope resistance	r_t			64.6	$\text{m}\Omega$	
Typical junction capacitance	C_T	$V_R = 10 \text{ V}_{\text{DC}}, T_J = 25 \text{ }^\circ\text{C}$, test signal = 1 MHz		134	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	$\text{V}/\mu\text{s}$	

Note(1) Pulse width < 300 μs , duty cycle < 2 %
THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J^{(1)}, T_{Stg}$			- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation		80	$^\circ\text{C}/\text{W}$
Approximate weight				0.07	g
				0.002	oz.
Marking device		Case style SMA (similar D-64)		V3F	

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

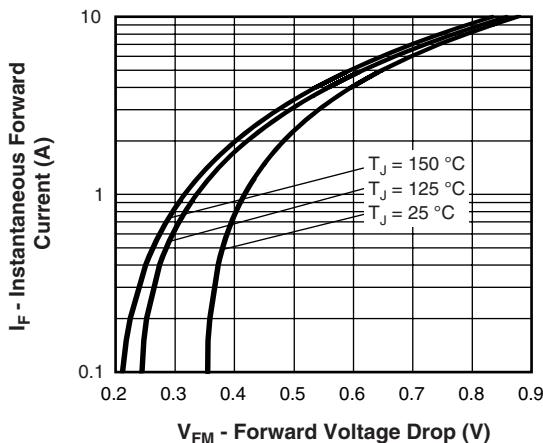


Fig. 1 - Maximum Forward Voltage Drop Characteristics

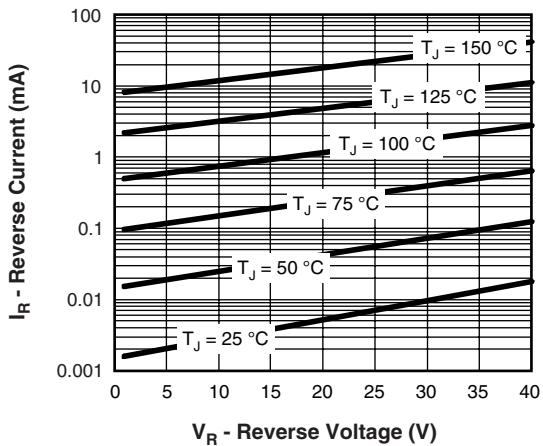


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

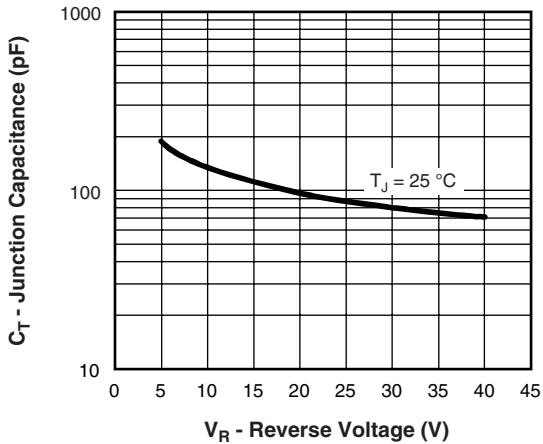


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

Note

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

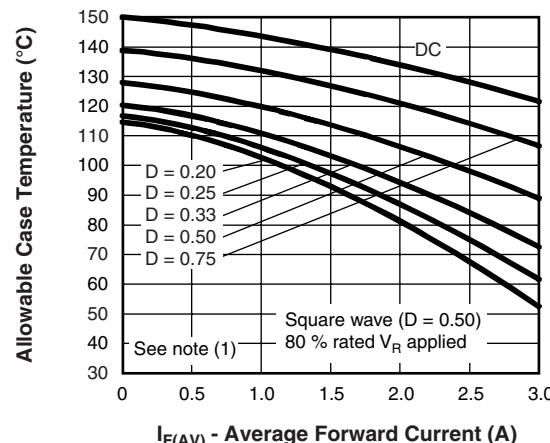


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

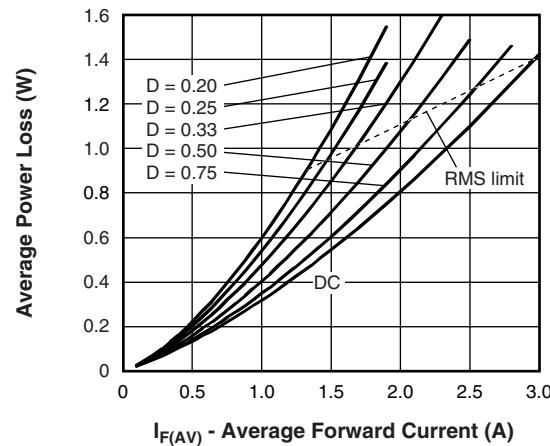


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

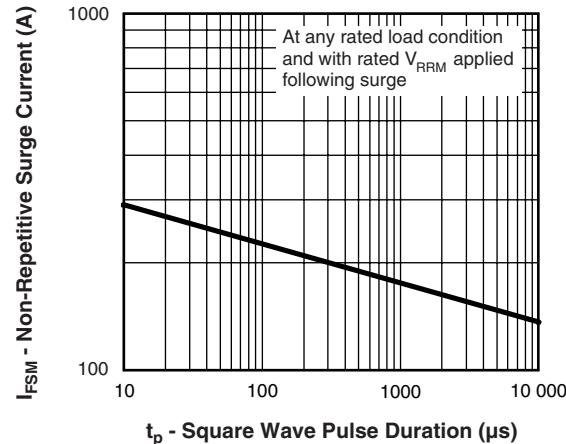


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

ORDERING INFORMATION TABLE

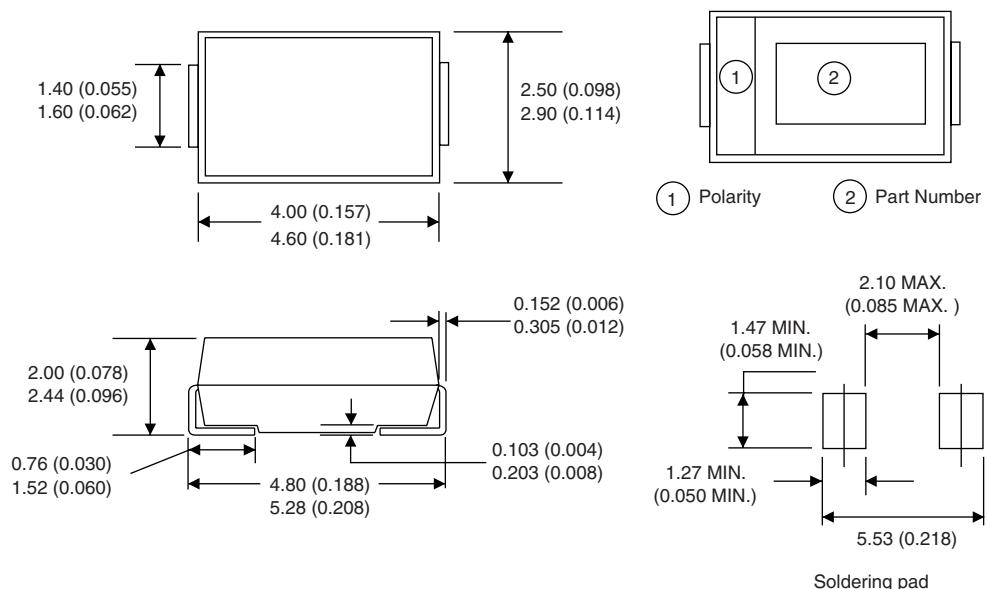
Device code	VS-	15	M	Q	040	N	TR	PbF
	1	2	3	4	5	6	7	8

- 1** - HPP product suffix
- 2** - Current rating
- 3** - M = SMA
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (040 = 40 V)
- 6** - N = New SMA
- 7** - • None = Box (1000 pieces)
• TR = Tape and reel (7500 pieces)
- 8** - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95018
Part marking information	www.vishay.com/doc?95029
Packaging information	www.vishay.com/doc?95034 www.vishay.com/doc?95397
SPICE model	www.vishay.com/doc?95273

SMA

DIMENSIONS in millimeters (inches)



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