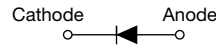


## High Performance Schottky Rectifier, 3 A


**SMA**


### 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
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

Package	SMA
$I_{F(AV)}$	3 A
$V_R$	40 V
$V_F$ at $I_F$	0.43 V
$I_{RM}$	20 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	6.0 mJ

### 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.

### 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
$V_F$	$2 A_{pk}$ , $T_J = 125 \text{ }^\circ\text{C}$	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 $T_L = 105\text{ }^\circ\text{C}$ , rectangular waveform On PC board 9 mm <sup>2</sup> 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 $\mu\text{s}$ sine or 3 $\mu\text{s}$ 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	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 1\text{ A}$ , $L = 12\text{ mH}$		6.0	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ 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	m $\Omega$
Typical junction capacitance	$C_T$	$V_R = 10\text{ V}_{DC}$ , $T_J = 25\text{ }^\circ\text{C}$ , 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	V/ $\mu\text{s}$

**Note**(1) Pulse width < 300  $\mu\text{s}$ , 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	$^\circ\text{C/W}$
Approximate weight				0.07	g
				0.002	oz.
Marking device		Case style SMA (similar D-64)		V3F	

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

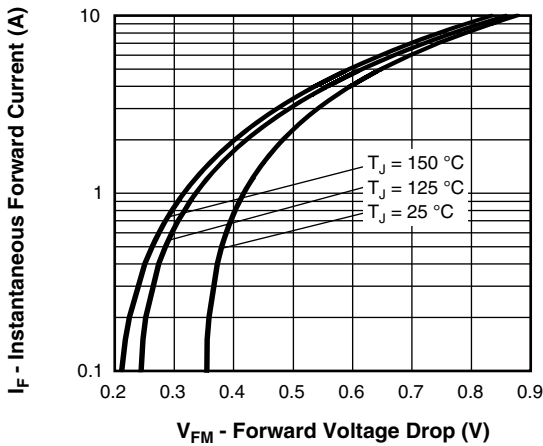


Fig. 1 - Maximum Forward Voltage Drop Characteristics

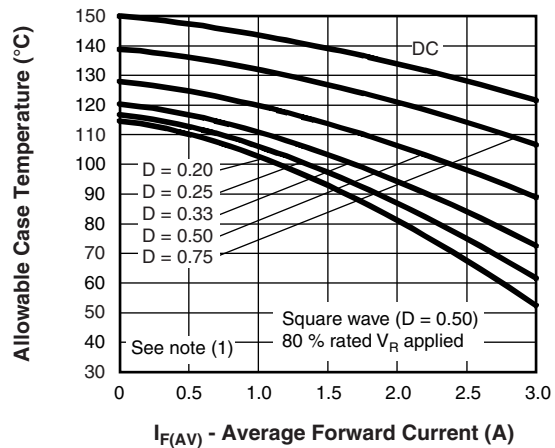


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

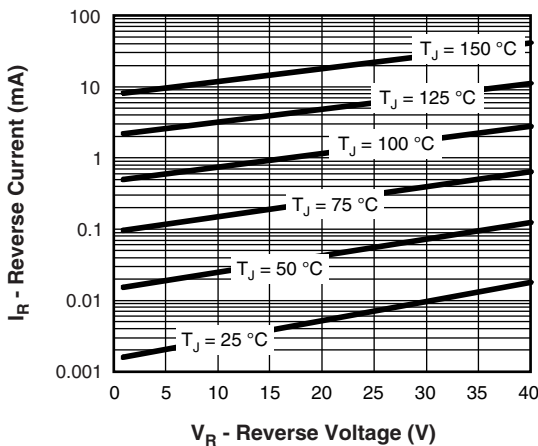


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

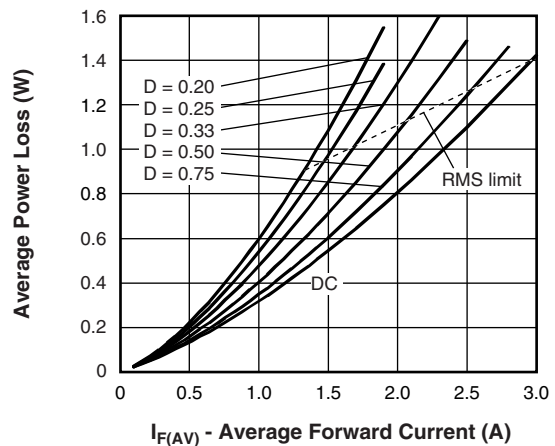


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

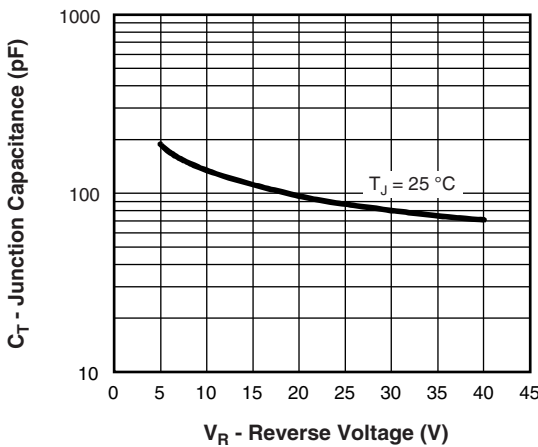


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

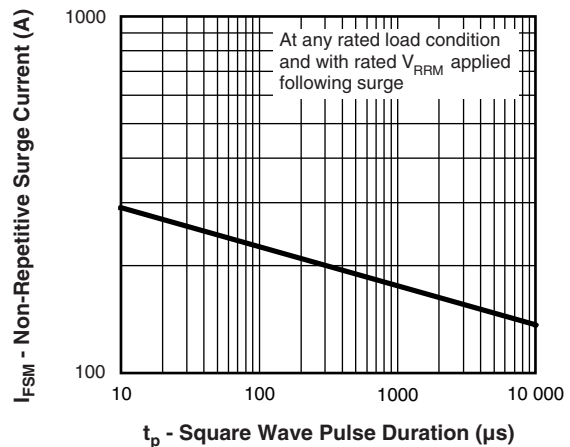


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

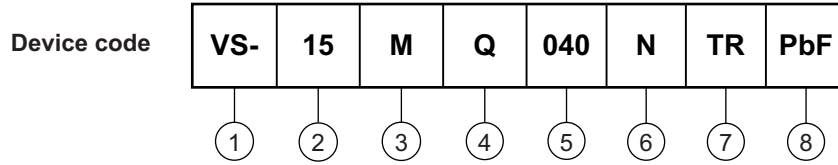
**Note**

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

$P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



ORDERING INFORMATION TABLE



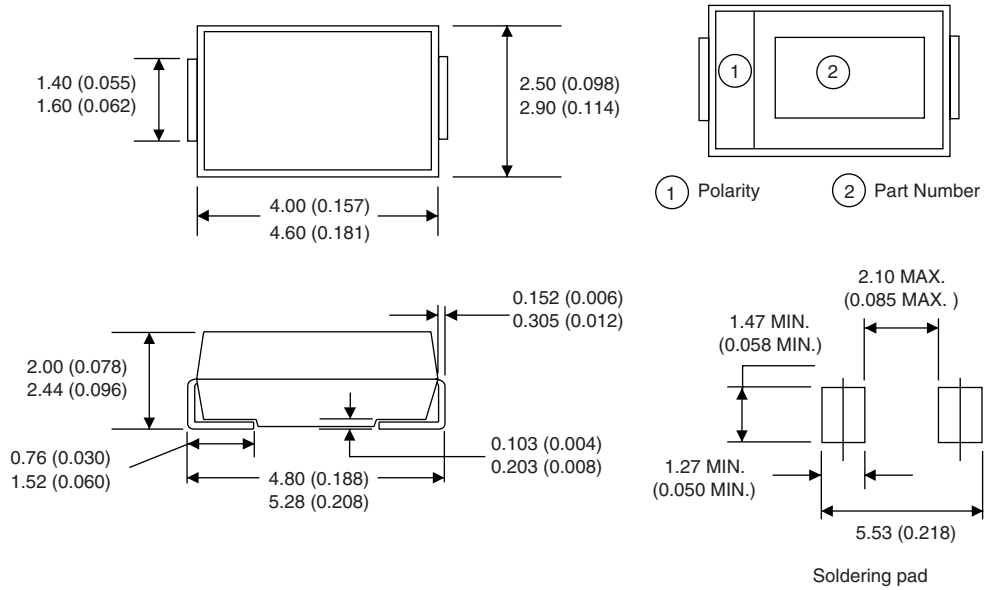
- 1** - Vishay Semiconductors products
- 2** - Current rating
- 3** - M = SMA
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (040 = 40 V)
- 6** - N = New SMA
- 7** -
  - None = box (1000 pieces)
  - TR = tape and reel (7500 pieces)
- 8** - PbF = lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95018">www.vishay.com/doc?95018</a>
Part marking information	<a href="http://www.vishay.com/doc?95029">www.vishay.com/doc?95029</a>
Packaging information	Tape and reel <a href="http://www.vishay.com/doc?95034">www.vishay.com/doc?95034</a>
	Bulk <a href="http://www.vishay.com/doc?95397">www.vishay.com/doc?95397</a>
SPIICE model	<a href="http://www.vishay.com/doc?95273">www.vishay.com/doc?95273</a>



# SMA

**DIMENSIONS** in millimeters (inches)





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