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[Vishay Semiconductor/Diodes Division](#)  
[VS-15MQ040HM3/5AT](#)

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## VS-15MQ040HM3

Vishay Semiconductors

### High Performance Schottky Rectifier, 1.5 A



DO-214AC (SMA)



#### FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS  
COMPLIANT  
HALOGEN  
FREE

PRODUCT SUMMARY	
Package	DO-214AC (SMA)
$I_{F(AV)}$	1.5 A
$V_R$	40 V
$V_F$ at $I_F$	0.34 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-15MQ040HM3 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
$I_{F(AV)}$	Rectangular waveform	1.5	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-15MQ040HM3	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
		50 % duty cycle at $T_L = 113 \text{ }^\circ\text{C}$ , rectangular waveform On PC board 9 mm <sup>2</sup> island (0.013 mm thick copper pad area)	1.5	
Maximum peak one cycle non-repetitive surge current See fig. 6	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	330
		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 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1.0	A



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	1.5 A	T <sub>J</sub> = 25 °C	0.43	V
		2 A		0.49	
		1.5 A	T <sub>J</sub> = 125 °C	0.34	
		2 A		0.43	
Maximum reverse leakage current See fig. 2	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	0.5	mA
		T <sub>J</sub> = 125 °C		20	
Threshold voltage	V <sub>F(TO)</sub>	T <sub>J</sub> = T <sub>J</sub> maximum		0.26	V
Forward slope resistance	r <sub>t</sub>			64.6	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		134	pF
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		2.0	nH
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/μs

**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 <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub>			-40 to +150	°C
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>	DC operation		80	°C/W
Approximate weight				0.07	g
				0.002	oz.
Marking device		Case style SMA (similar D-64)		XF	

**Note**

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



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**VS-15MQ040HM3**

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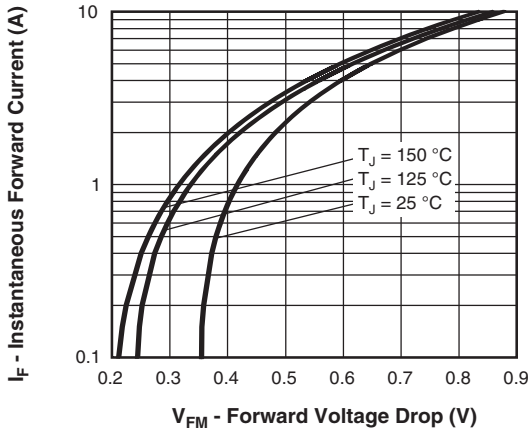


Fig. 1 - Maximum Forward Voltage Drop Characteristics

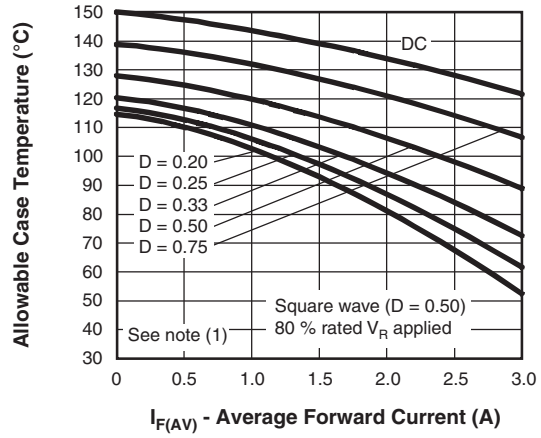


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

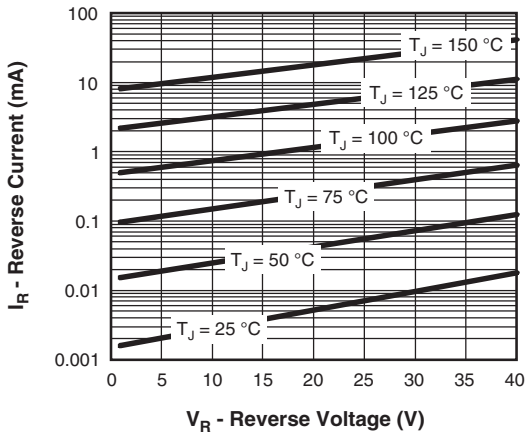


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

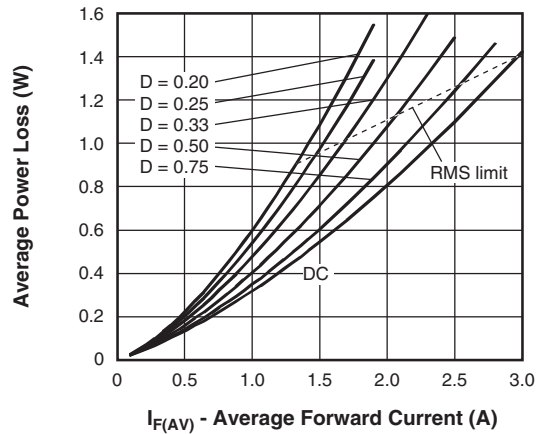


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

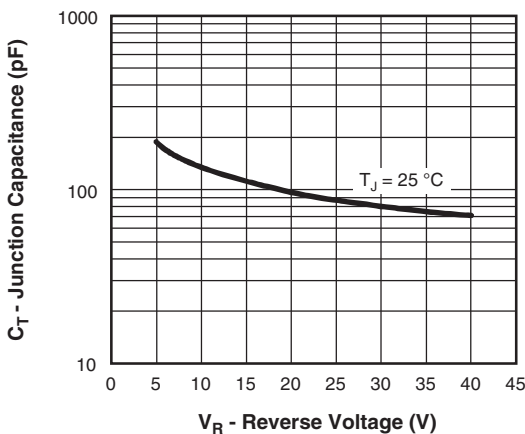


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

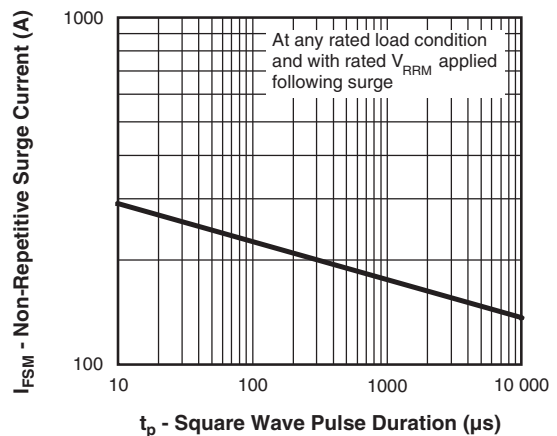


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

**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  $V_R$



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## ORDERING INFORMATION TABLE

Device code	VS-	15	M	Q	040	H	M3
	①	②	③	④	⑤	⑥	⑦

- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - M = SMA
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (040 = 40 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-15MQ040HM3/5AT	5AT	7500	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95400">www.vishay.com/doc?95400</a>
Part marking information	<a href="http://www.vishay.com/doc?95403">www.vishay.com/doc?95403</a>
Packaging information	<a href="http://www.vishay.com/doc?95404">www.vishay.com/doc?95404</a>

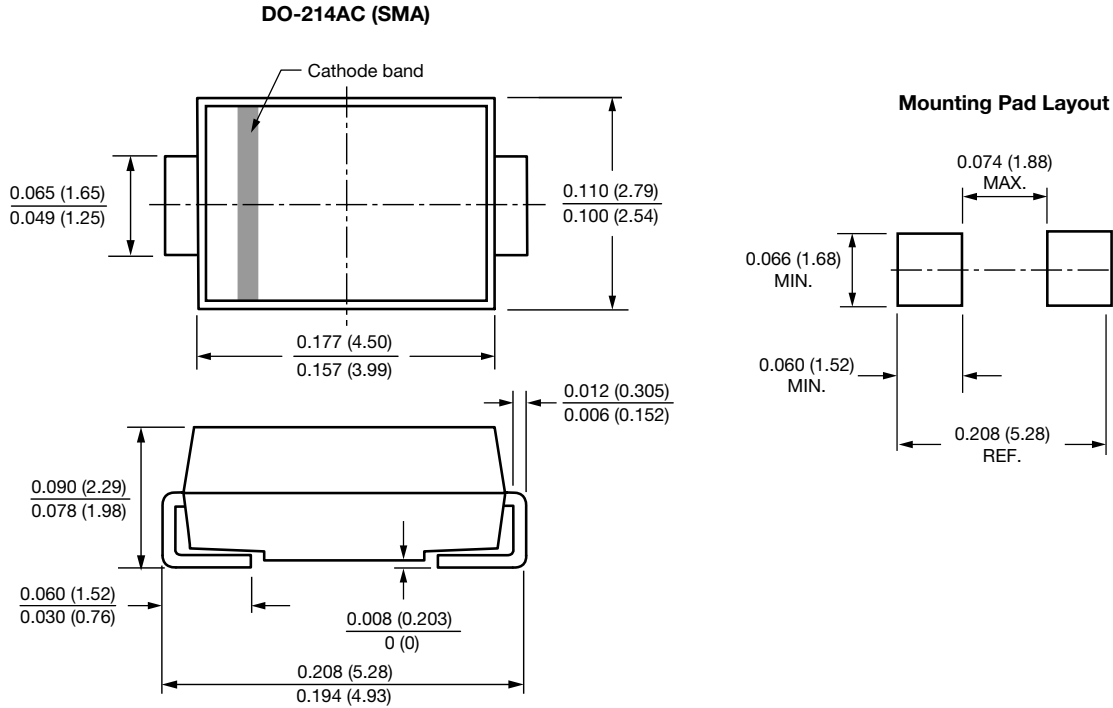


## Outline Dimensions

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### SMA

**DIMENSIONS** in inches (millimeters)





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