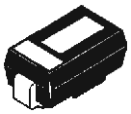
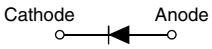
Schottky Rectifier, 3 A





SMA

FEATURES

- Surface mountable
- Extremely low forward voltage
- Compact size
- Improved reverse blocking voltage capability relative to other similar size Schottky
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level

Pb Available

RoHS* COMPLIANT

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 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 µs sine	330	A
V_F	2 Apk, T_J = 125 °C	0.43	V
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	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 °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 °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 x V_R typical		1.0	A

* Pb containing terminations are not RoHS compliant, exemptions may apply

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V_{FM} (1)	1 A	T_J = 25 °C	0.42	V
		2 A		0.49	
		1 A	T_J = 125 °C	0.34	
		2 A		0.43	
Maximum reverse leakage current See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.5	mA
		T_J = 125 °C		20	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.26	V
Forward slope resistance	r_t			64.6	mΩ
Typical junction capacitance	C_T	V_R = 10 V_{DC}, T_J = 25 °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/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_J (1), T_{Stg}		- 40 to 150	°C
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation	80	°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

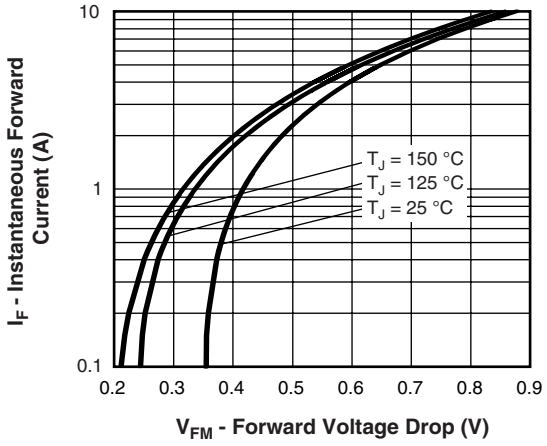


Fig. 1 - Maximum Forward Voltage Drop Characteristics

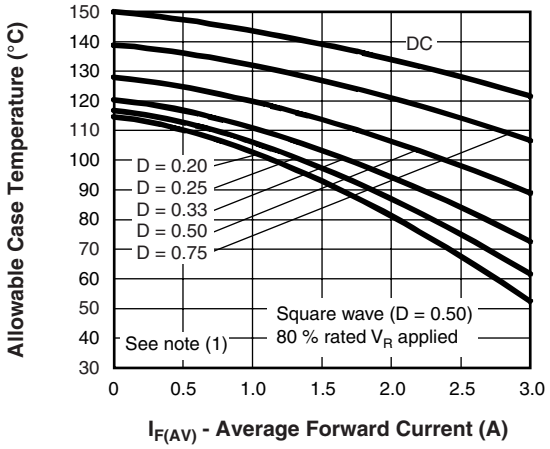


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

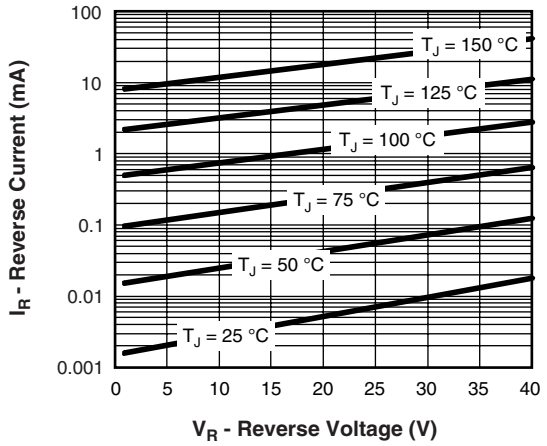


Fig. 2Typical Peak Reverse Current vs. Reverse Voltage

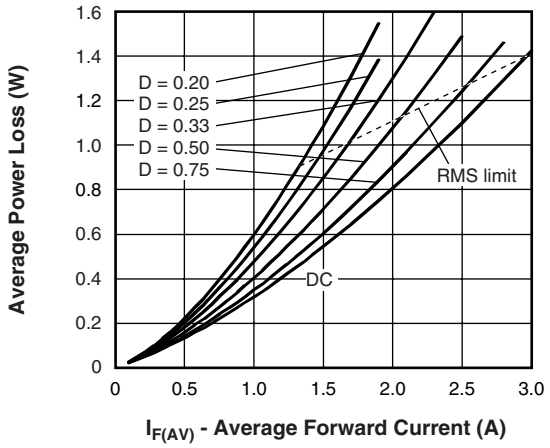


Fig. 5Maximum Average Forward Dissipation vs. Average Forward Current

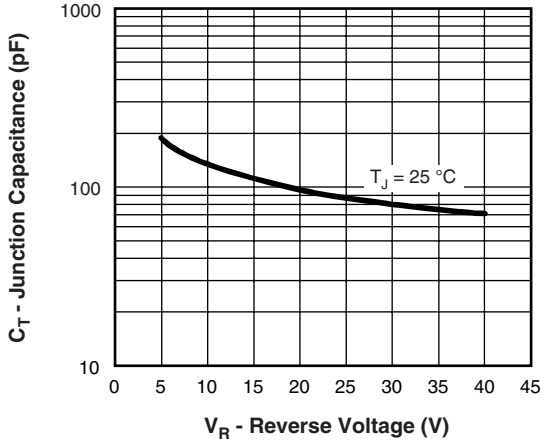


Fig. 3Typical Junction Capacitance vs. Reverse Voltage

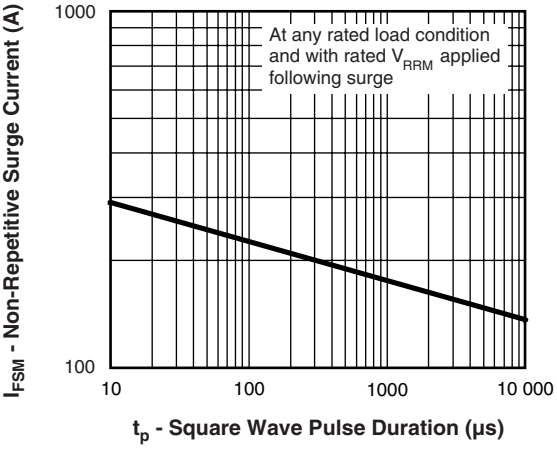


Fig. 6Maximum Peak Surge Forward Current vs. Pulse Duration

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

ORDERING INFORMATION TABLE

Device code

15	M	Q	040	N	TR	PbF
1	2	3	4	5	6	7

- 1 - Current rating
- 2 - M = SMA
- 3 - Q = Schottky “Q” series
- 4 - Voltage rating (040 = 40 V)
- 5 - N = New SMA
- 6 - • None = Box (1000 pieces)
  • TR = Tape and reel (7500 pieces)
- 7 - • None = Standard production
  • PbF = Lead (Pb)-free

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

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