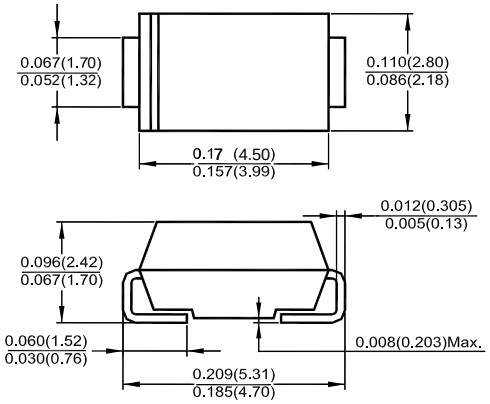
SCHOTTKY RECTIFIER

15MQ040N

Description/ Features

The 15MQ040N Schottky rectifier is designed to be used for low-power applications where a reverse voltage of 40 volts is ancountered and surface mountable is required.



Dimensions in inches and (millimeters)

DO-214AC (SMA)

Applications

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

Features

- Surface mountable
- Extremely low forward voltage
- Improved reverse blocking voltage capability relative to other similar size Schottky
- Compact size

Major Ratings and Characteristics

Characteristics	15MQ040N	Units
I_F DC	3	A
V_{RRM}	40	V
I_{FSM} @tp = 5 µs sine	330	A
V_F @2Apk, T_J=125°C	0.43	V
T_J range	-40 to 150	°C

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Voltage Ratings

Part number		15MQ040N
V_R	Max. DC Reverse Voltage (V)	40
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	15MQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 4	2.1	A	50% duty cycle @ T_L = 105 °C, rectangular wave form. On PC board 9mm² island(.013mm thick copper pad area)	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	330	A	5μs Sine or 3μs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current * See Fig. 6	140		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	6.0	mJ	T_J = 25 °C, I_{AS} = 1A, L = 12mH	
I_{AR}	Repetitive Avalanche Current	1.0	A		

Electrical Specifications

	Parameters	15MQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1) * See Fig. 1	0.42	V	@ 1A	T_J = 25 °C
		0.49	V	@ 2A	
		0.34	V	@ 1A	T_J = 125 °C
		0.43	V	@ 2A	
I_{RM}	Max. Reverse Leakage Current (1) * See Fig. 2	0.5	mA	T_J = 25 °C	V_R = rated V_R
		20	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.26	V	T_J = T_J max.	
r_t	Forward Slope Resistance	64.6	mΩ		
C_T	Typical Junction Capacitance	134	pF	V_R = 10V_{DC}, T_J = 25°C, test signal = 1Mhz	
L_S	Typical Series Inductance	2.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change	10000	V/μs	(Rated V_R)	

(1) Pulse Width < 300μs, Duty Cycle < 2%

Thermal-Mechanical Specifications

	Parameters	15MQ	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-40 to 150	°C	
R_{thJA}	Max. Thermal Resistance Junction to Ambient	80	°C/W	DC operation
wt	Approximate Weight	0.07(0.002)	g (oz.)	
	Case Style	SMA		Similar D-64
	Device Marking	IR3F		

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

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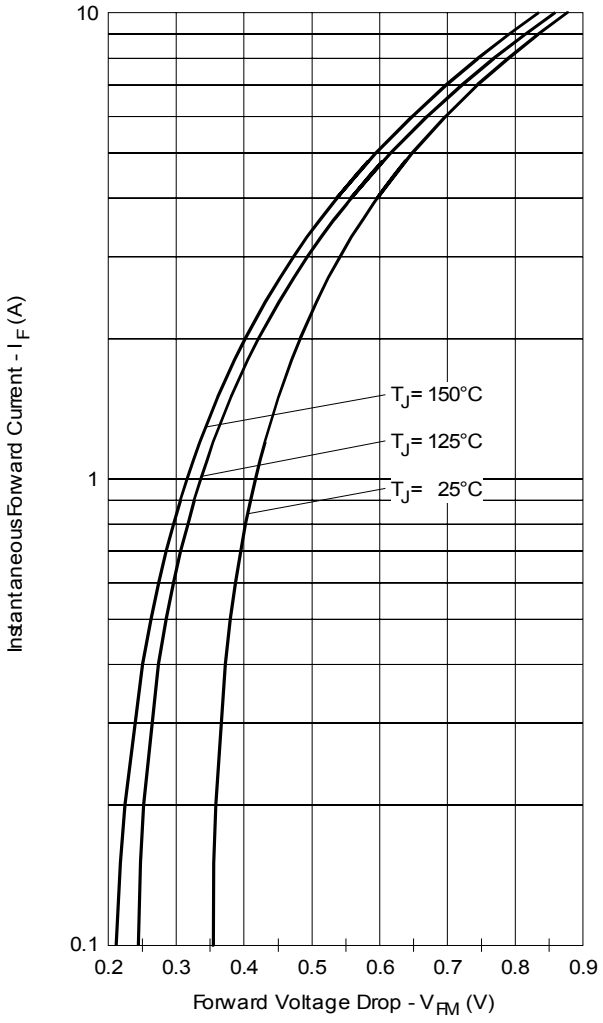

Fig. 1 - Maximum Forward Voltage Drop Characteristics

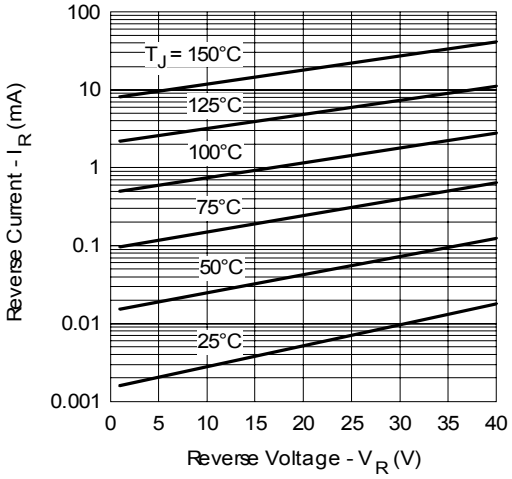

Fig. 2 - Typical Peak Reverse Current
Vs. Reverse Voltage

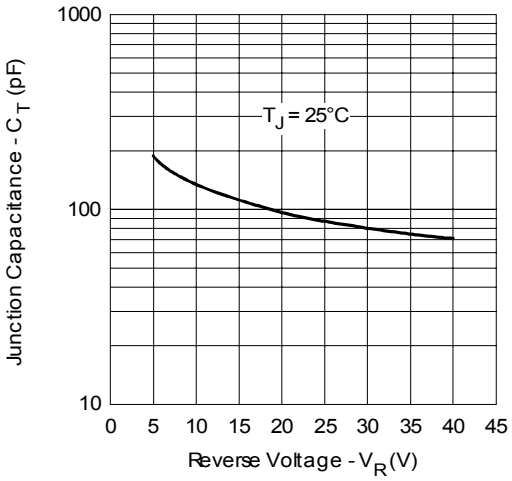

Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage

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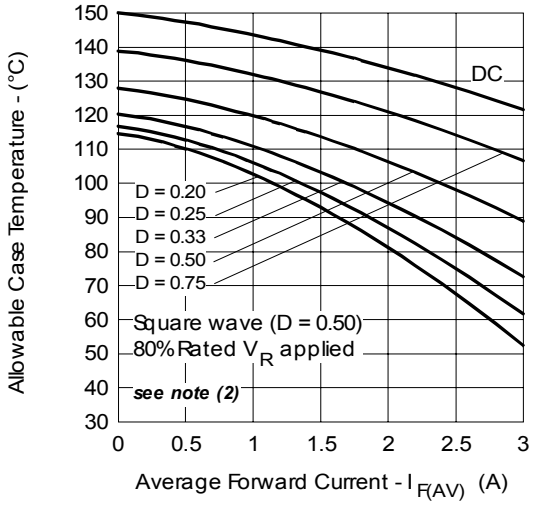

Fig. 4 - Maximum Average Forward Current Vs. Allowable Lead Temperature

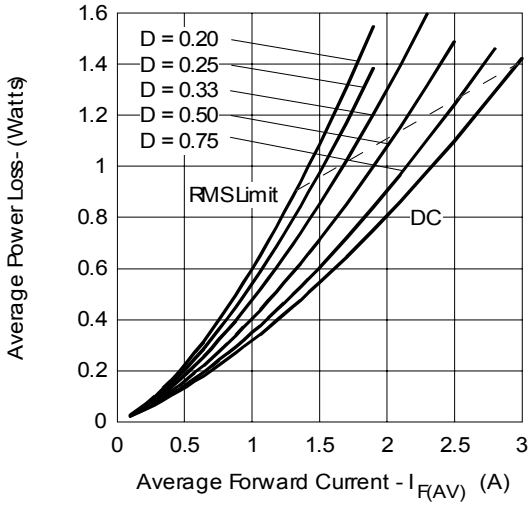

Fig. 5 - Maximum Average Forward Dissipation Vs. Average Forward Current

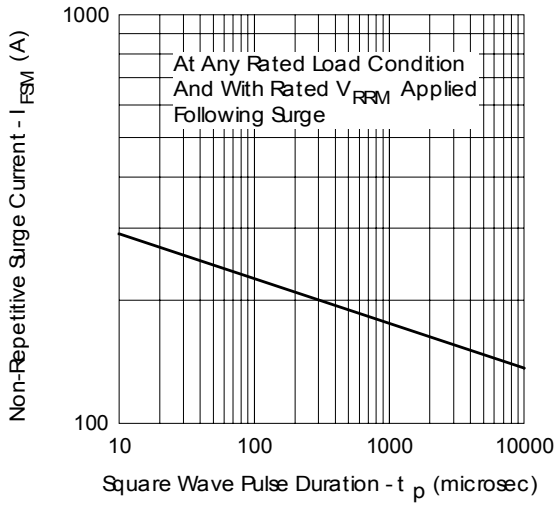

Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

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