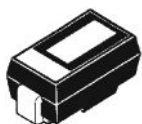


Schottky Rectifier, 1.0 A


SMB


FEATURES

- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- 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


RoHS
COMPLIANT

PRODUCT SUMMARY

$I_{F(AV)}$	1.0 A
V_R	40 V

DESCRIPTION

The VS-10BQ040PbF surface mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	1.0	A
V_{RRM}		40	V
I_{FSM}	$t_p = 5 \mu s$ sine	430	A
V_F	1.0 Apk, $T_J = 125^\circ C$	0.49	V
T_J	Range	- 55 to 150	$^\circ C$

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-10BQ040PbF	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	$I_{F(AV)}$	50 % duty cycle at $T_L = 112^\circ C$, rectangular waveform	1.0	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	430	A
		10 ms sine or 6 ms rect. pulse	45	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25^\circ C$, $I_{AS} = 1$ A, $L = 6$ mH	3.0	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	$T_J = 25\text{ }^{\circ}\text{C}$	0.53	V
		2 A		0.70	
		1 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.49	
		2 A		0.64	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	0.1	mA
		$T_J = 125\text{ }^{\circ}\text{C}$		4	
Typical junction capacitance	C_T	$V_R = 5\text{ V}_{DC}$, (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		80	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		2.0	nH
Maximum voltage rate of charge	dV/dt	Rated V_R		10 000	V/ μ s

Note

⁽¹⁾ Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J^{(1)}, T_{Stg}$		- 55 to 150	°C
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation	36	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		80	
Approximate weight			0.10	g
			0.003	oz.
Marking device		Case style SMB (similar DO-214AA)	V1F	

Notes

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

⁽²⁾ Mounted 1" square PCB

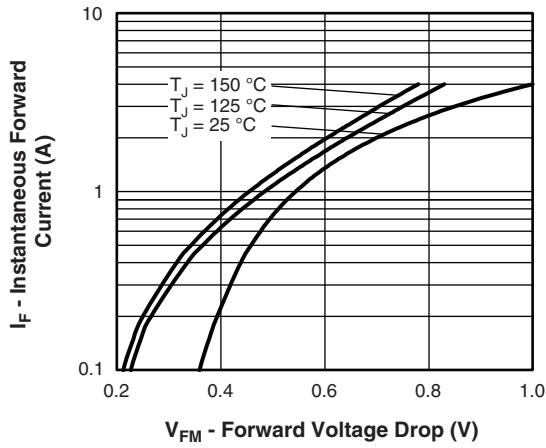


Fig. 1 - Maximum Forward Voltage Drop Characteristics

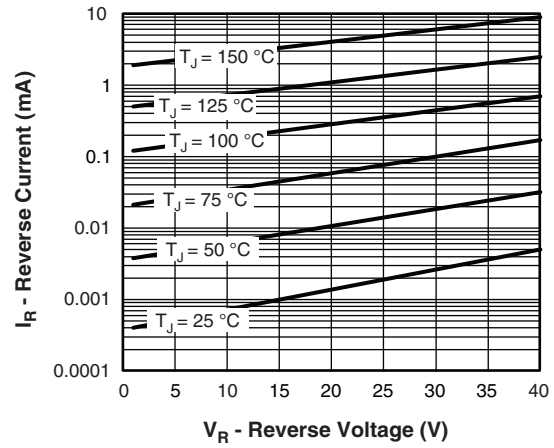


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

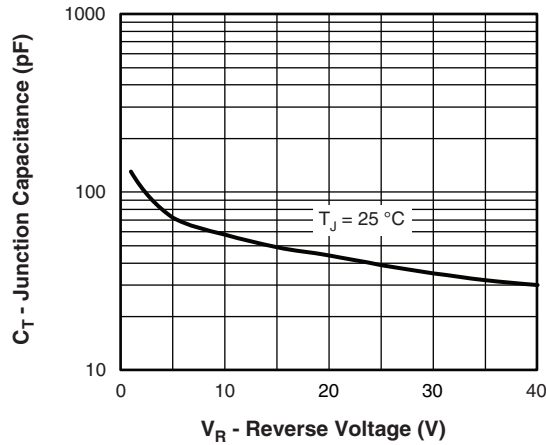
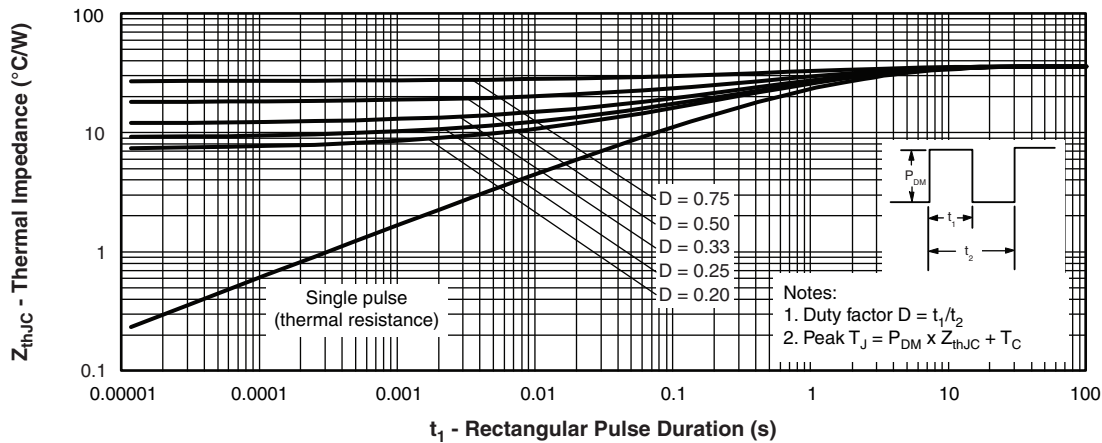


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

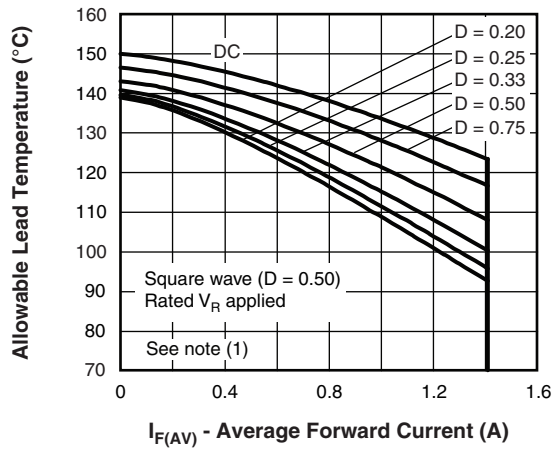


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

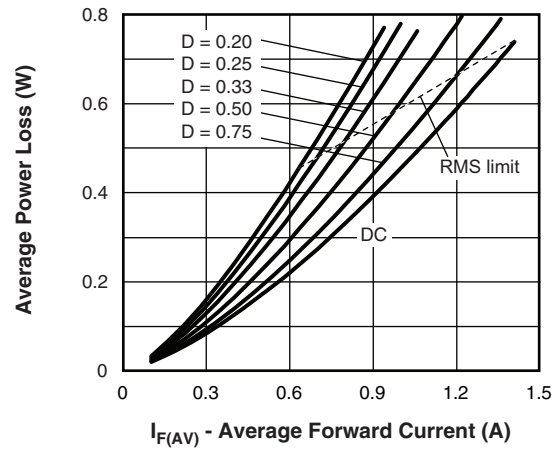


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

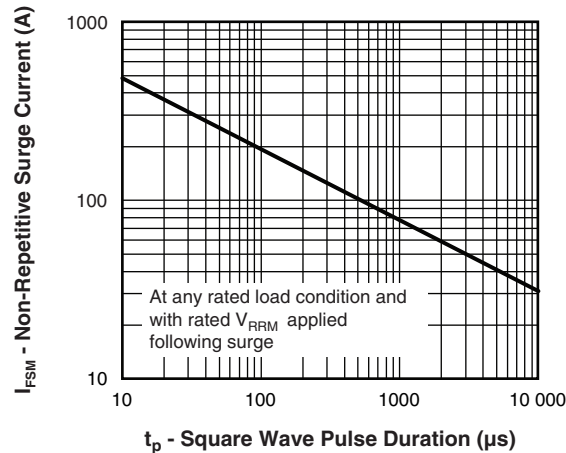


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

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

Device code	VS-	10	B	Q	040	TR	PbF
	1	2	3	4	5	6	7

- 1 - HPP product suffix
- 2 - Current rating
- 3 - B = Single lead diode
- 4 - Q = Schottky "Q" series
- 5 - Voltage rating (040 = 40 V)
- 6 -
 - None = Box (1000 pieces)
 - TR = Tape and reel (3000 pieces)
- 7 - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS		
Dimensions	www.vishay.com/doc?95017	
Part marking information	www.vishay.com/doc?95029	
Packaging information	Tape and reel	www.vishay.com/doc?95034
	Bulk	www.vishay.com/doc?95397
SPICE model		www.vishay.com/doc?95406



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