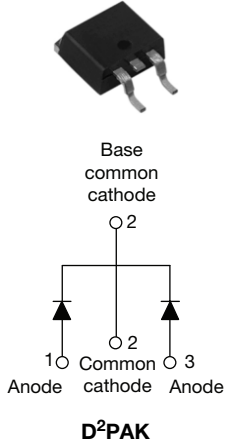
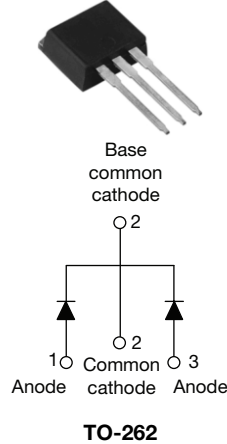


Schottky Rectifier, 2 x 20 A

VS-40CTQ150SPbF



VS-40CTQ150-1PbF



FEATURES

- 175 °C T_J operation
- Center tap TO-220 package
- Very low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION

The VS-40CTQ... center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

PRODUCT SUMMARY

I _{F(AV)}	2 x 20 A
V _R	150 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform	40	A
V _{RRM}		150	V
I _{FSM}	t _p = 5 μs sine	1500	A
V _F	20 Apk, T _J = 125 °C (per leg)	0.71	V
T _J		- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-40CTQ150SPbF VS-40CTQ150-1PbF	UNITS
Maximum DC reverse voltage	V _R	150	V
Maximum working peak reverse voltage	V _{RWM}		

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 140 °C, rectangular waveform	20	A
			40	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I _{FSM}	5 μs sine or 3 μs rect. pulse	1500	
		10 ms sine or 6 ms rect. pulse	250	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 1.5 A, L = 0.9 mH	1.0	mJ
Repetitive avalanche current per leg	I _{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T _J maximum V _A = 1.5 x V _R typical	1.5	A

VS-40CTQ150SPbF, VS-40CTQ150-1PbF



Vishay High Power Products Schottky Rectifier, 2 x 20 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^\circ\text{C}$	0.93	V
		40 A		1.16	
		20 A	$T_J = 125\text{ }^\circ\text{C}$	0.71	
		40 A		0.85	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	50	μA
		$T_J = 125\text{ }^\circ\text{C}$		15	mA
Maximum junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		450	pF
Typical series inductance per leg	L_S	Measured lead to lead 5 mm from package body		8.0	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, T_{Stg}			- 55 to 175	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation See fig. 4		1.5	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per package		DC operation		0.75	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased		0.5	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum	Non-lubricated threads		6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device		Case style D ² PAK		40CTQ150S	
		Case style TO-262		40CTQ150-1	

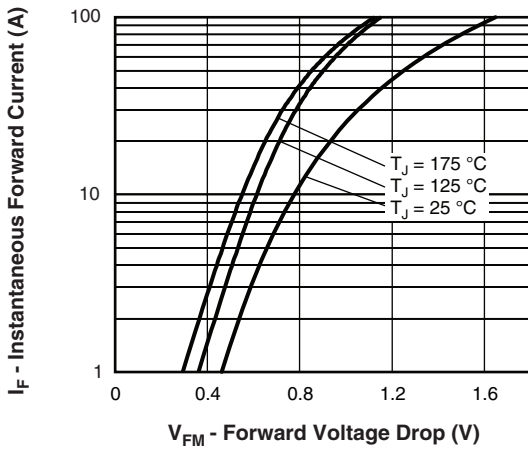


Fig. 1 - Maximum Forward Voltage Drop Characteristics

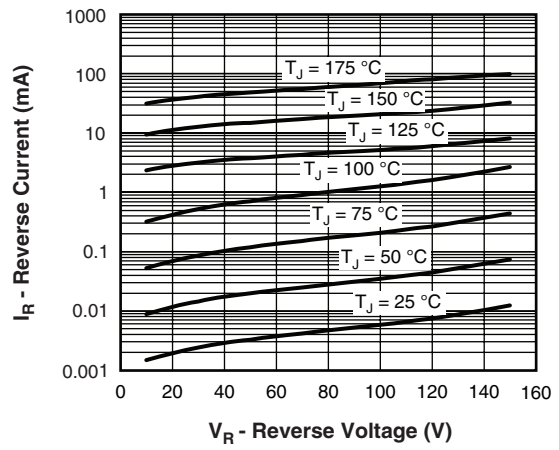


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

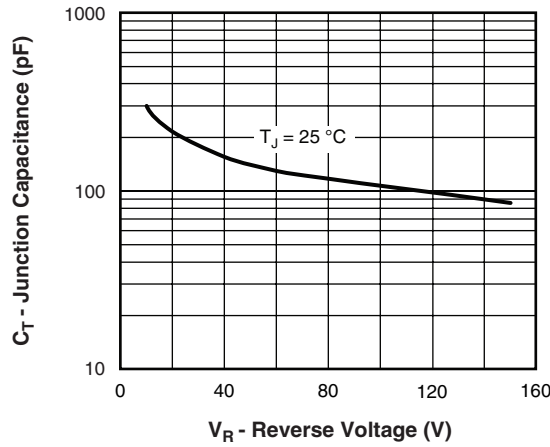


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

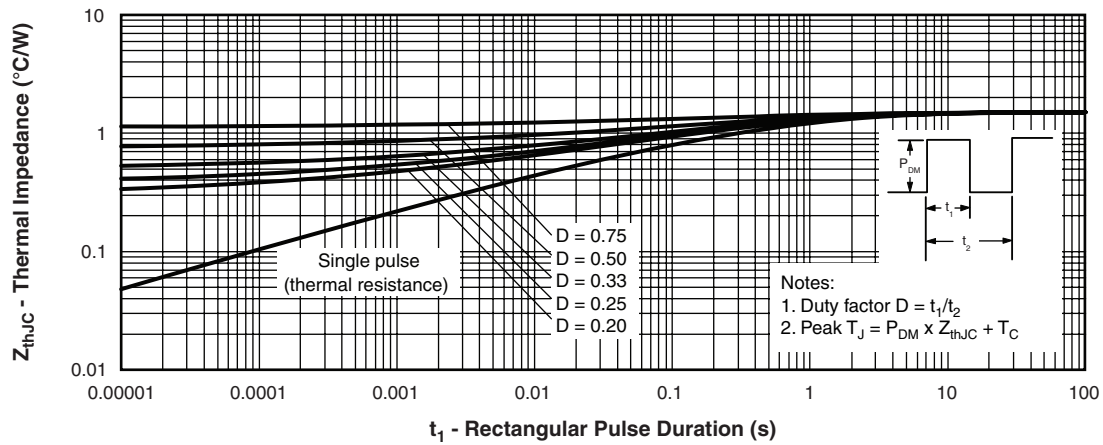


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

VS-40CTQ150SPbF, VS-40CTQ150-1PbF



Vishay High Power Products Schottky Rectifier, 2 x 20 A

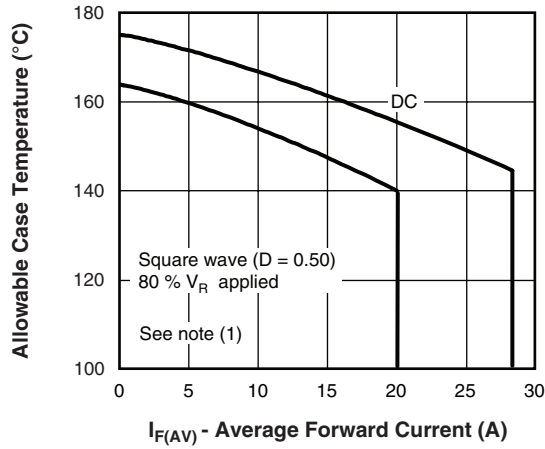


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

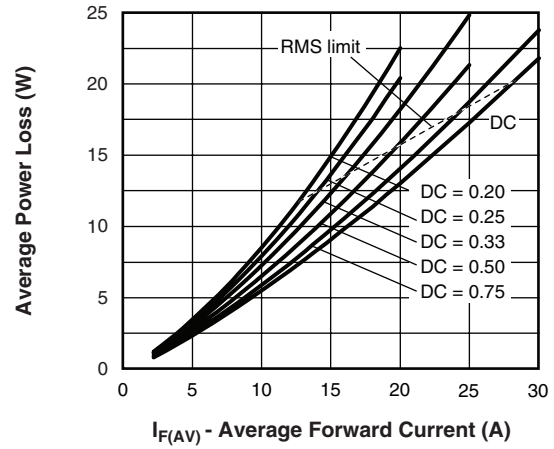


Fig. 6 - Forward Power Loss Characteristics

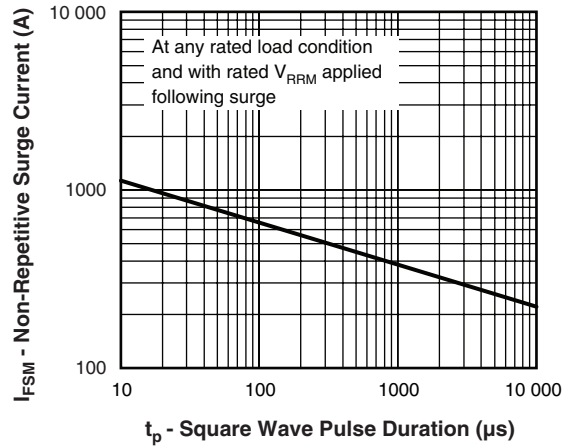


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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 $V_{R1} = 80\% V_R$ applied



VS-40CTQ150SPbF, VS-40CTQ150-1PbF

Schottky Rectifier, 2 x 20 A Vishay High Power Products

ORDERING INFORMATION TABLE

Device code	VS-	40	C	T	Q	150	S	TRL	PbF
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - HPP product suffix
- 2** - Current rating (40 A)
- 3** - Circuit configuration: C = Common cathode
- 4** - T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage rating (150 = 150 V)
- 7** -
 - S = D²PAK
 - -1 = TO-262
- 8** -
 - None = Tube (50 pieces)
 - TRL = Tape and reel (left oriented - for D²PAK only)
 - TRR = Tape and reel (right oriented - for D²PAK only)
- 9** - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95014
Part marking information	www.vishay.com/doc?95008
Packaging information	www.vishay.com/doc?95032



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.