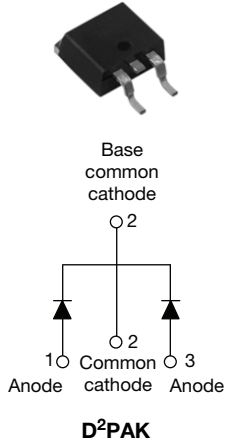
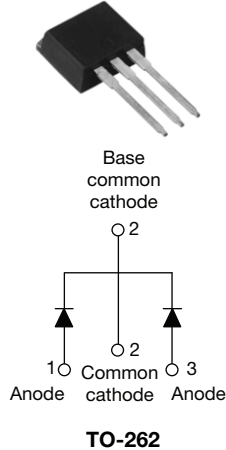


Schottky Rectifier, 2 x 6 A

VS-12CTQ...SPbF



VS-12CTQ...-1PbF



FEATURES

- 175 °C T_J operation
- Center tap TO-220 package
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- 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
- 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-12CTQ... center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. 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 6 A
V _R	35 V to 45 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform	12	A
V _{RRM}	Range	35 to 45	V
I _{FSM}	t _p = 5 μs sine	690	A
V _F	6 Apk, T _J = 125 °C (per leg)	0.53	V
T _J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-12CTQ035SPbF VS-12CTQ035-1PbF	VS-12CTQ040SPbF VS-12CTQ040-1PbF	VS-12CTQ045SPbF VS-12CTQ045-1PbF	UNITS
Maximum DC reverse voltage	V _R	35	40	45	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 = 160 °C, rectangular waveform	per leg	6	A
			per device	12	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	690	A
		10 ms sine or 6 ms rect. pulse		140	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 1.20 A, L = 11.10 mH	8	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	1.20	A	

VS-12CTQ...SPbF, VS-12CTQ...-1PbF Series



Vishay High Power Products

Schottky Rectifier,
2 x 6 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	6 A	$T_J = 25\text{ }^\circ\text{C}$	0.60	V
		12 A		0.73	
		6 A	$T_J = 125\text{ }^\circ\text{C}$	0.53	
		12 A		0.64	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.8	mA
		$T_J = 125\text{ }^\circ\text{C}$		7.0	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.35	V
Forward slope resistance	r_t			18.23	m Ω
Maximum junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		400	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/ 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, T_{Stg}			- 55 to 175	$^\circ\text{C}$	
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation See fig. 4		3.50	$^\circ\text{C/W}$	
Maximum thermal resistance, junction to case per package		DC operation		1.75		
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased		0.50		
Approximate weight				2	g	
				0.07	oz.	
Mounting torque				6 (5)	kgf · cm	
				12 (10)	(lbf · in)	
Marking device		Case style D ² PAK		12CTQ035S		
				12CTQ040S		
				12CTQ045S		
		Case style TO-262			12CTQ035-1	
					12CTQ040-1	
					12CTQ045-1	



VS-12CTQ...SPbF, VS-12CTQ...-1PbF Series

Schottky Rectifier,
2 x 6 A

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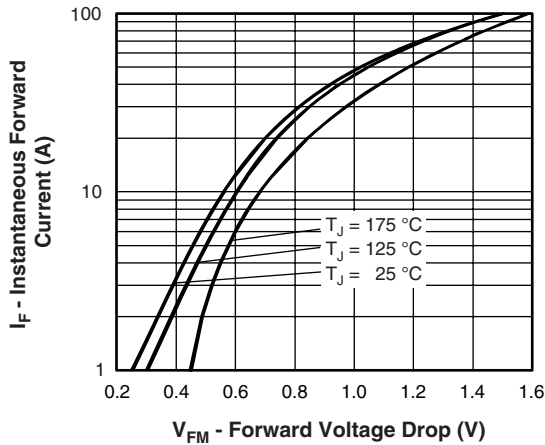


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

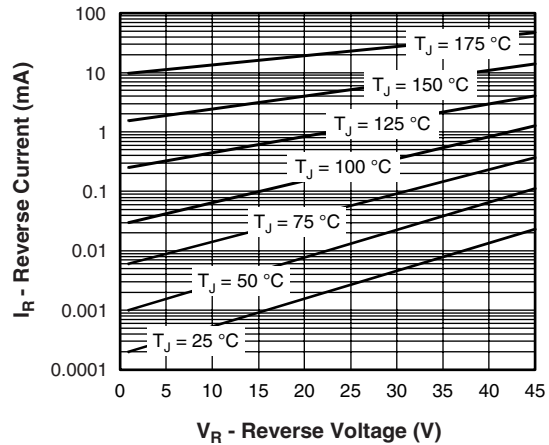


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

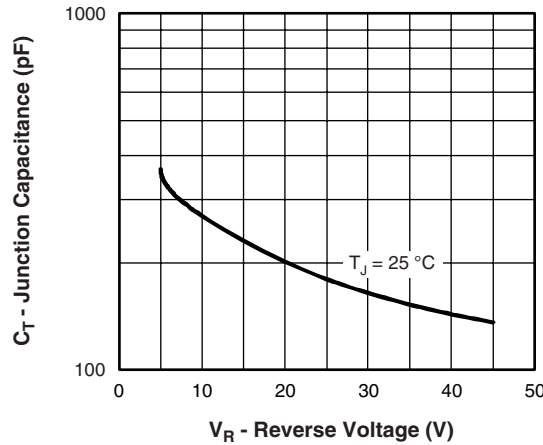


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

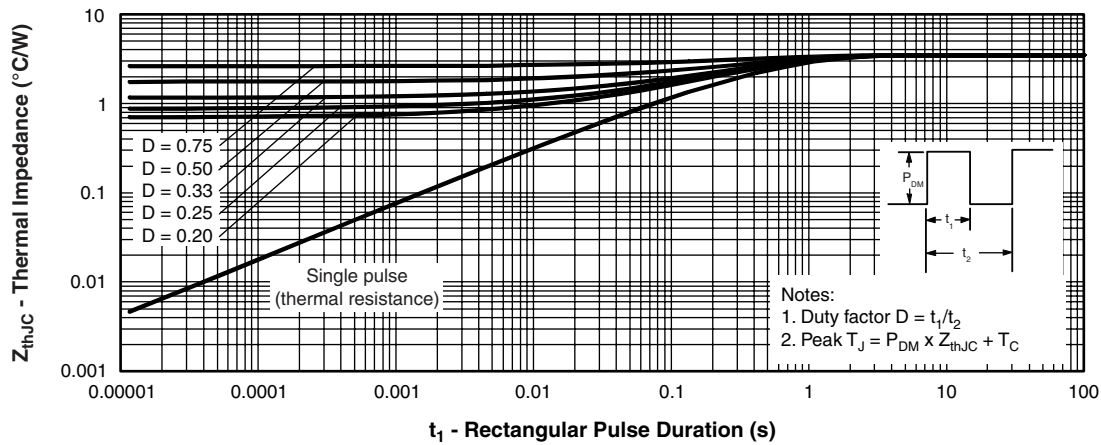


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

VS-12CTQ...SPbF, VS-12CTQ...-1PbF Series



Vishay High Power Products

Schottky Rectifier,
2 x 6 A

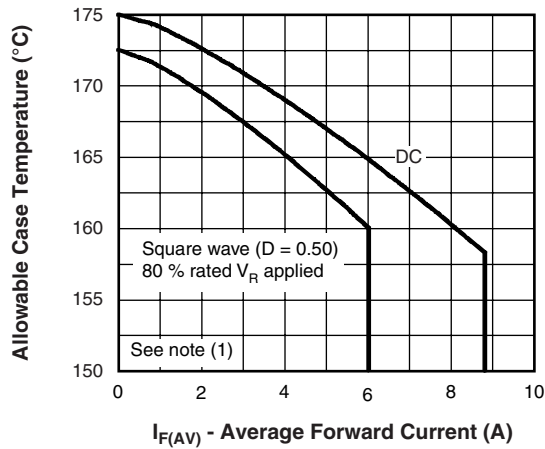


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

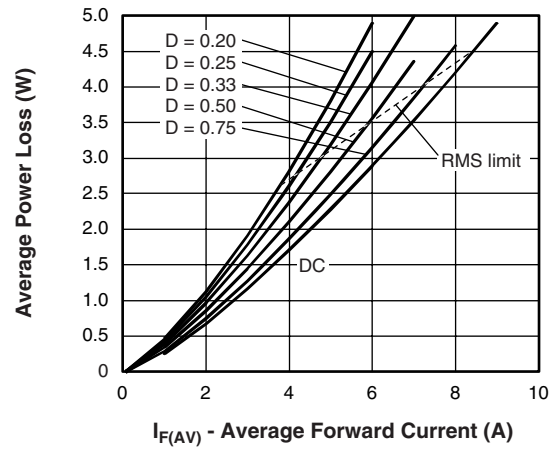


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

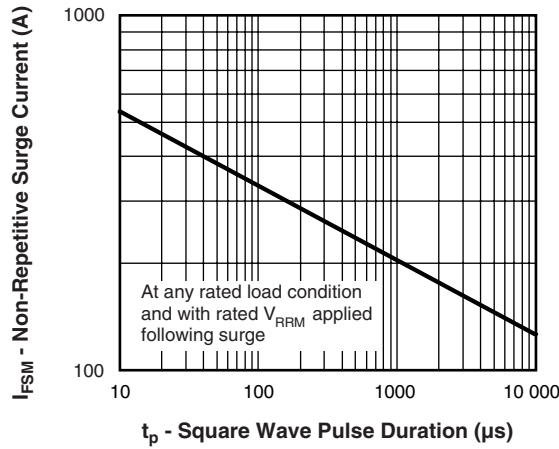


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

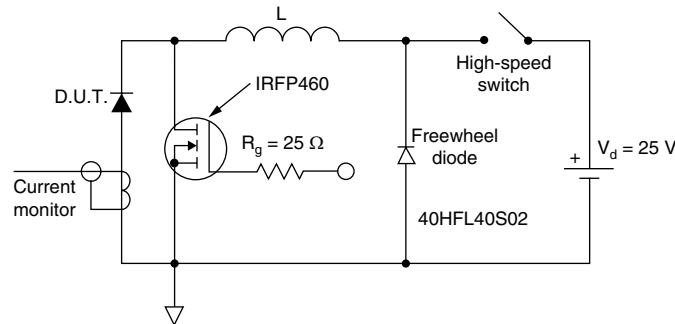


Fig. 8 - Unclamped Inductive Test Circuit

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



VS-12CTQ...SPbF, VS-12CTQ...-1PbF Series

Schottky Rectifier,
2 x 6 A

Vishay High Power Products

ORDERING INFORMATION TABLE

Device code	VS-	12	C	T	Q	045	S	TRL	PbF
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - HPP product suffix
- 2** - Current rating (12 A)
- 3** - Circuit configuration: C = Common cathode
- 4** - T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage ratings

035 = 35 V
040 = 40 V
045 = 45 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



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