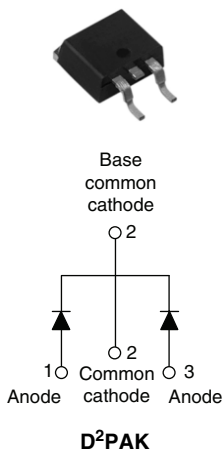
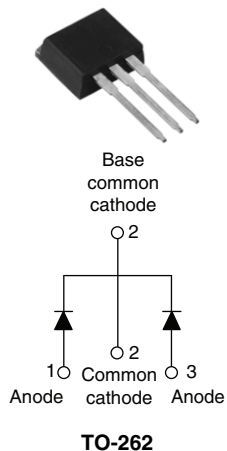


Schottky Rectifier, 2 x 20 A

VS-47CTQ020SPbF



VS-47CTQ020-1PbF



FEATURES

- 150 °C T_J operation
- Center tap configuration
- Optimized for 3.3 V application
- Ultralow forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- 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

This center tap Schottky rectifier module has been optimized for ultralow forward voltage drop specifically for 3.3 V output power supplies. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

PRODUCT SUMMARY

I _{F(AV)}	2 x 20 A
V _R	20 V
I _{RM}	310 mA at 125 °C

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform	40	A
V _{RRM}		20	V
I _{FSM}	t _p = 5 μs sine	1000	A
V _F	20 Apk, T _J = 125 °C	0.34	V
T _J		- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VS-47CTQ020SPbF VS-47CTQ020-1PbF	UNITS
Maximum DC reverse voltage	V _R	125 °C	20	V
		150 °C	10	

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg per device	I _{F(AV)}	50 % duty cycle at T _C = 135 °C, rectangular waveform	20	A
			40	
Maximum peak one cycle non-repetitive surge current per leg	I _{FSM}	5 μs sine or 3 μs rect. pulse	1000	
		10 ms sine or 6 ms rect. pulse	250	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 3 A, L = 3 mH	18	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	3	A

VS-47CTQ020SPbF, VS-47CTQ020-1PbF



Vishay High Power Products Schottky Rectifier, 2 x 20 A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg	V _{FM} ⁽¹⁾	20 A	T _J = 25 °C	0.45	V	
		40 A		0.51		
		20 A	T _J = 125 °C	0.34		0.44
		40 A				
		20 A	T _J = 150 °C	0.31		0.42
		40 A				
Maximum reverse leakage current per leg	I _{RM} ⁽¹⁾	T _J = 125 °C	V _R = 5 V	60	mA	
			V _R = 3.3 V	45		
		T _J = 150 °C	V _R = 10 V	306		3
		T _J = 25 °C	V _R = Rated V _R	310		
		T _J = 125 °C				
Threshold voltage	V _{F(TO)}	T _J = T _J maximum		0.188	V	
Forward slope resistance	r _t			5.9	mΩ	
Maximum junction capacitance per leg	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		3000	pF	
Typical series inductance per leg	L _S	Measured lead to lead 5 mm from package body		5.5	nH	
Maximum voltage rate of change	dV/dt	Rated V _R		10 000	V/μs	

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 150	°C
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation	1.5	°C/W
Maximum thermal resistance, junction to case per package			0.75	
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.50	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm
	maximum		12 (10)	(lbf · in)
Marking device		Case style D ² PAK	47CTQ020S	
		Case style TO-262	47CTQ020-1	

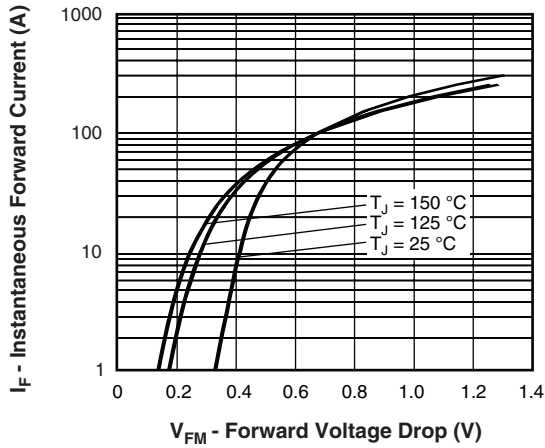


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

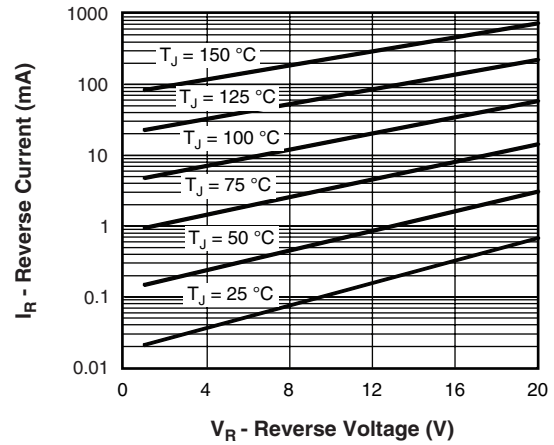


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

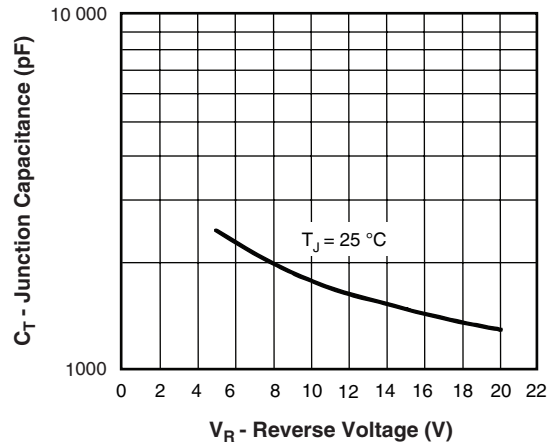


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

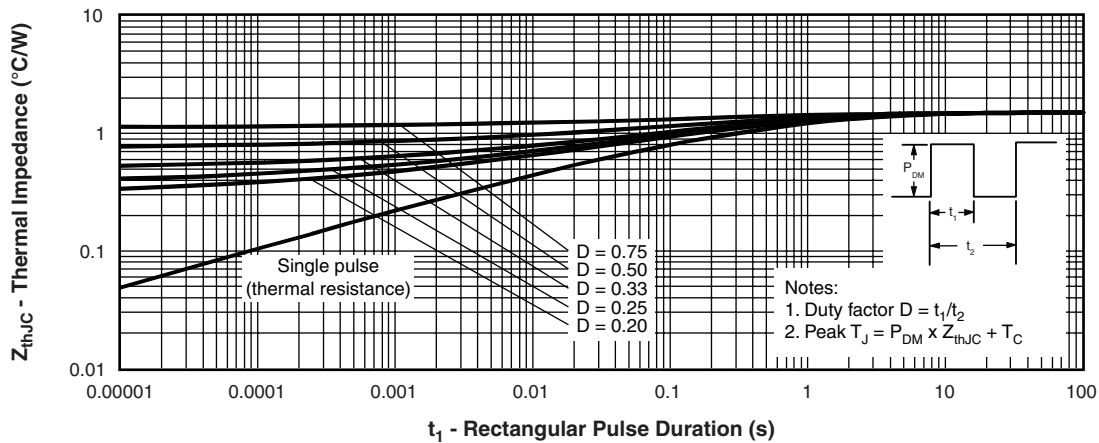


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

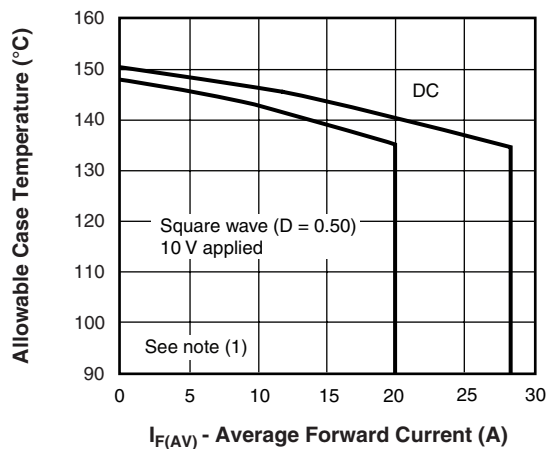


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

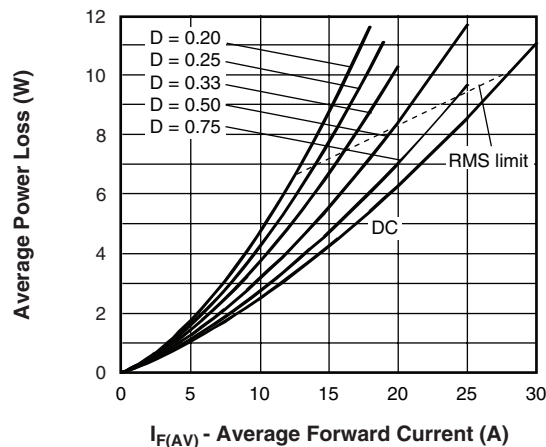


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

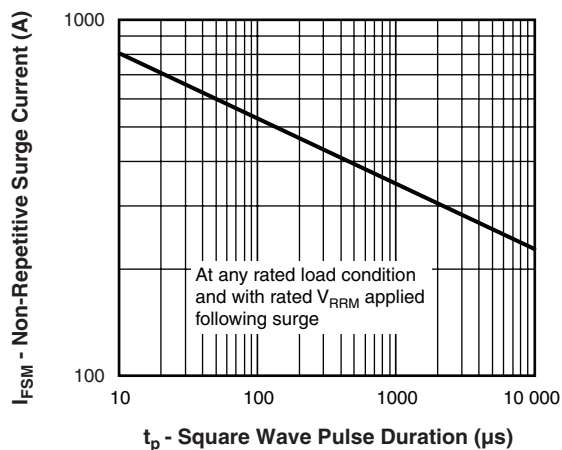


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

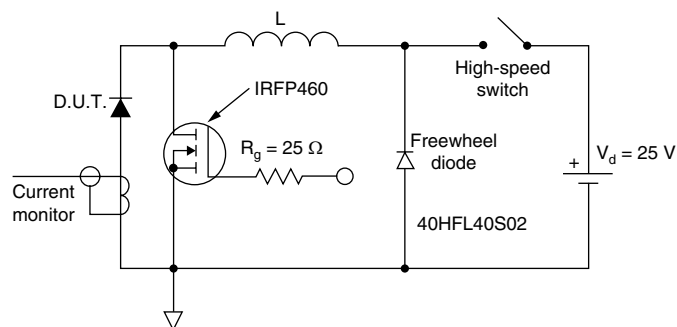


Fig. 8 - Unclamped Inductive Test Circuit

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 $V_{R1} = 10$ V



VS-47CTQ020SPbF, VS-47CTQ020-1PbF

Schottky Rectifier, 2 x 20 A Vishay High Power Products

ORDERING INFORMATION TABLE

Device code	VS-	47	C	T	Q	020	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 (020 = 20 V) |
| 7 | - | <ul style="list-style-type: none">• S = D²PAK• -1 = TO-262 |
| 8 | - | <ul style="list-style-type: none">• 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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