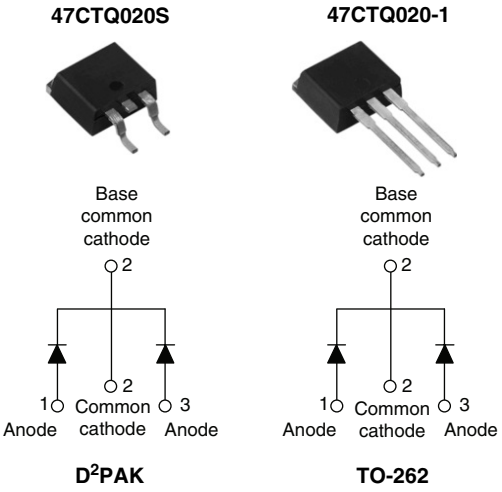
Schottky Rectifier, 2 x 20 A



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
- Designed and qualified for Q101 level

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	47CTQ020S 47CTQ020-1	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	$I_{F(AV)}$	50 % duty cycle at T_C = 135 °C, rectangular waveform		20	A
	per device				40	
Maximum peak one cycle non-repetitive surge current per leg		I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	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

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	
		40 A		0.44	
		20 A	T_J = 150 °C	0.31	
		40 A		0.42	
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	
		T_J = 25 °C	V_R = Rated V_R	3	
		T_J = 125 °C		310	
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 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 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 (Only for TO-262)	0.50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style D^2PAK	47CTQ020S	
			Case style TO-262	47CTQ020-1	

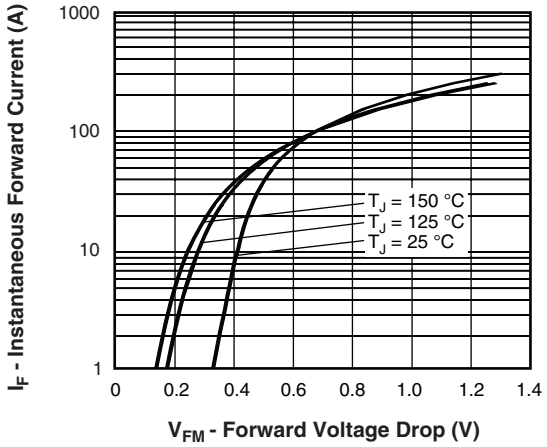


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

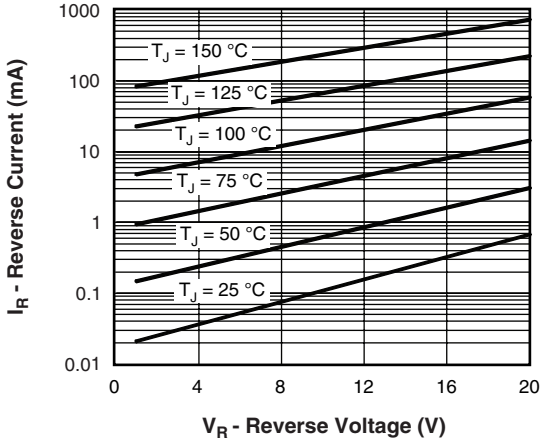


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

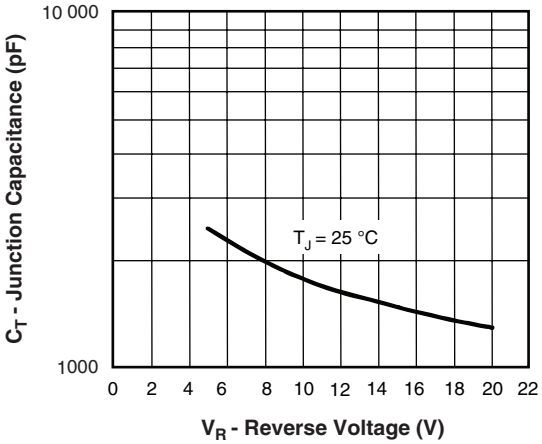


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

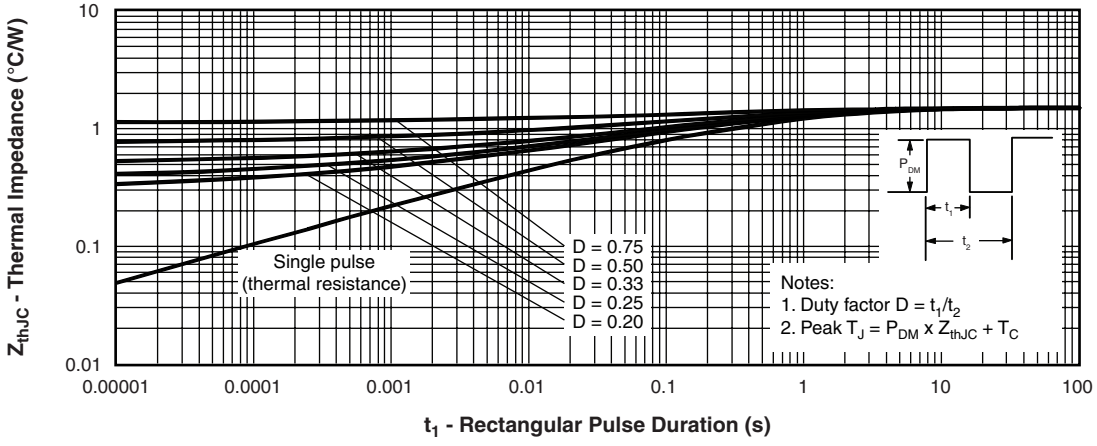


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

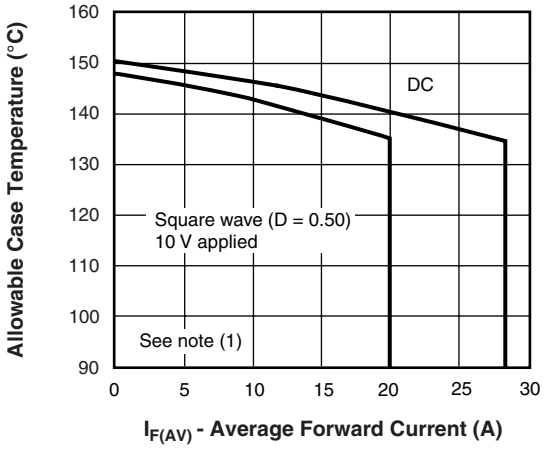


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

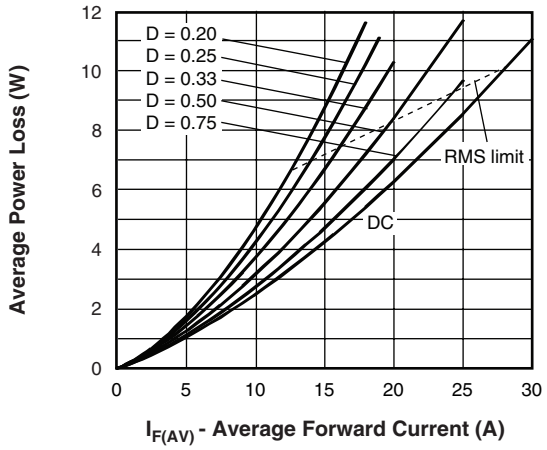


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

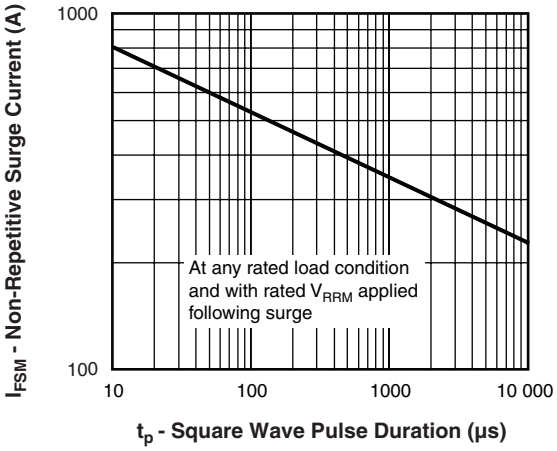


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

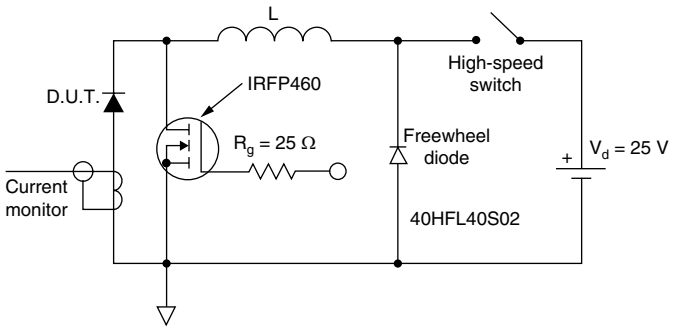


Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 10 V

ORDERING INFORMATION TABLE

Device code

47	C	T	Q	020	S	TRL	-
1	2	3	4	5	6	7	8

- 1 - Current rating (40 A)
- 2 - Circuit configuration:
  C = Common cathode
- 3 - T = TO-220
- 4 - Schottky “Q” series
- 5 - Voltage rating (020 = 20 V)
- 6 - • S = D^2PAK
  • -1 = TO-262
- 7 - • None = Tube (50 pieces)
  • TRL = Tape and reel (left oriented - for D^2PAK only)
  • TRR = Tape and reel (right oriented - for D^2PAK only)
- 8 - • None = Standard production
  • PbF = Lead (Pb)-free

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

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