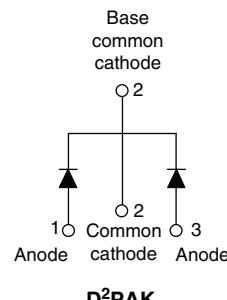
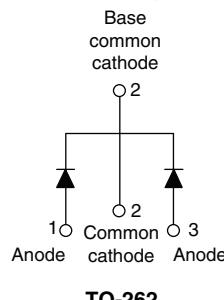


Schottky Rectifier, 2 x 20 A

40CTQ045S

40CTQ045-1


FEATURES

- 150 °C T_J operation
- Center tap configuration
- 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
- Designed and qualified for Q101 level

DESCRIPTION

This 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 150 °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	45 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform	40	A
V _{RRM}		45	V
I _{FSM}	t _p = 5 µs sine	1240	A
V _F	20 Apk, T _J = 125 °C (per leg)	0.48	V
T _J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	40CTQ045S 40CTQ045-1	UNITS
Maximum DC reverse voltage	V _R		
Maximum working peak reverse voltage	V _{RWM}	45	V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 116 °C, rectangular waveform	20 40	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I _{FSM}	5 µs sine or 3 µs rect. pulse	1240	
		10 ms sine or 6 ms rect. pulse	350	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 3 A, L = 4.40 mH	20	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 See fig. 1	V _{FM} ⁽¹⁾	20 A	T _J = 25 °C	0.53	V	
		40 A		0.68		
		20 A	T _J = 125 °C	0.48		
		40 A		0.67		
Maximum reverse leakage current per leg See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	3	mA	
		T _J = 125 °C		115		
Threshold voltage	V _{F(TO)}	T _J = T _J maximum			0.27 V	
Forward slope resistance	r _f	8.72		mΩ		
Maximum junction capacitance per leg	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz) 25 °C		2800	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 150	°C	
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation		2.0	°C/W	
				1.0		
Maximum thermal resistance, junction to case per package						
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 ² PAK		40CTQ045S		
		Case style TO-262		40CTQ045-1		

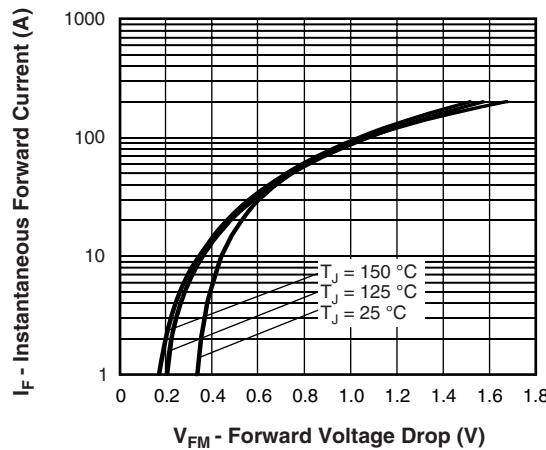


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

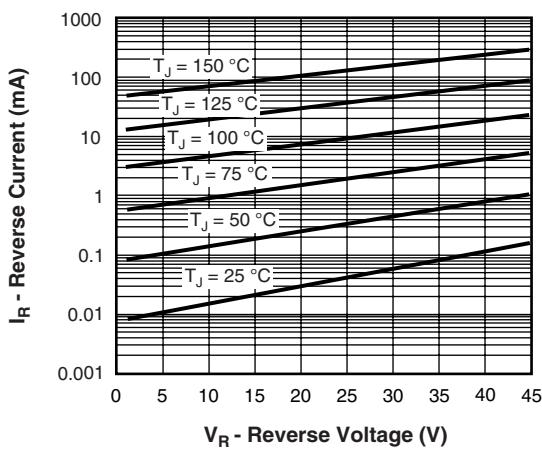


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

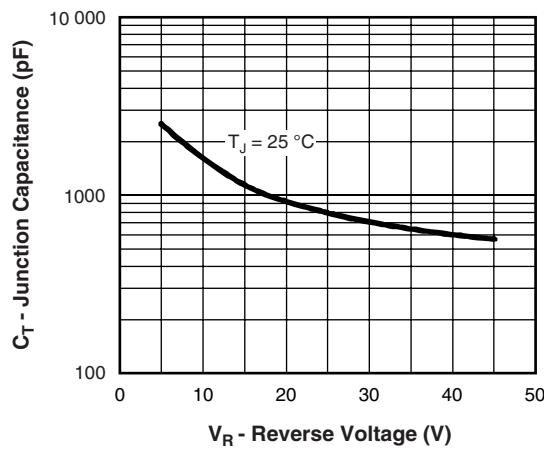


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

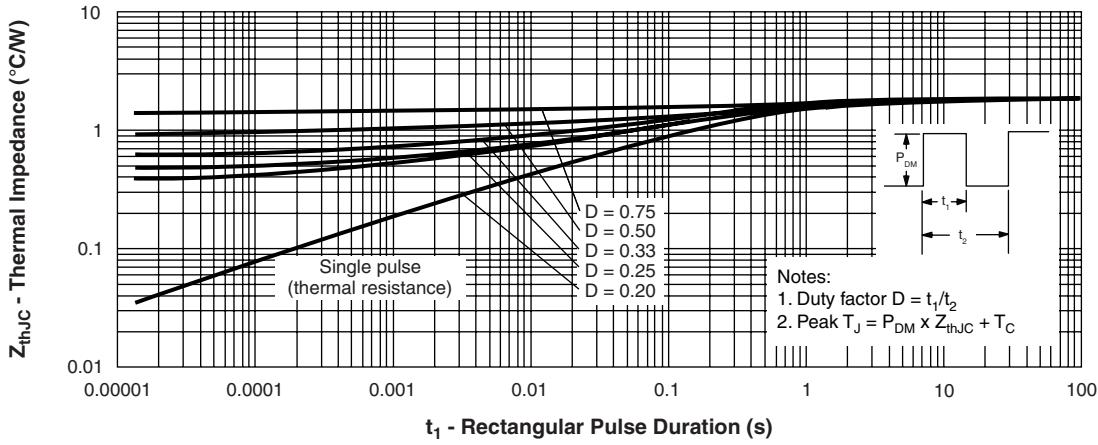


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

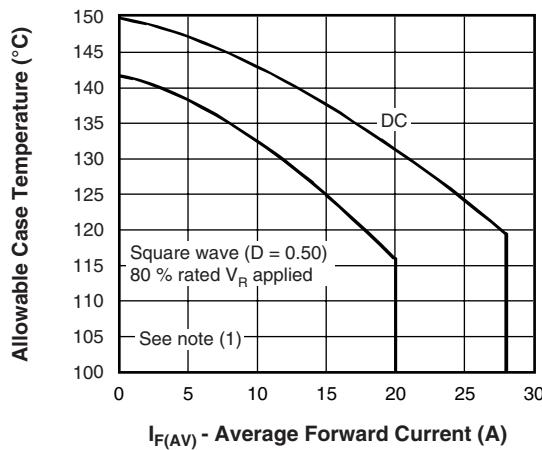


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current (Per Leg)

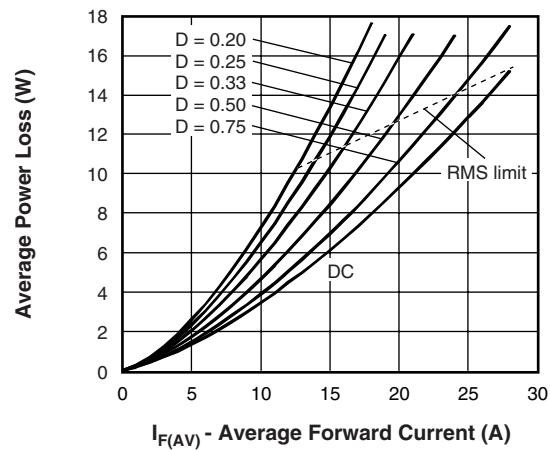


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

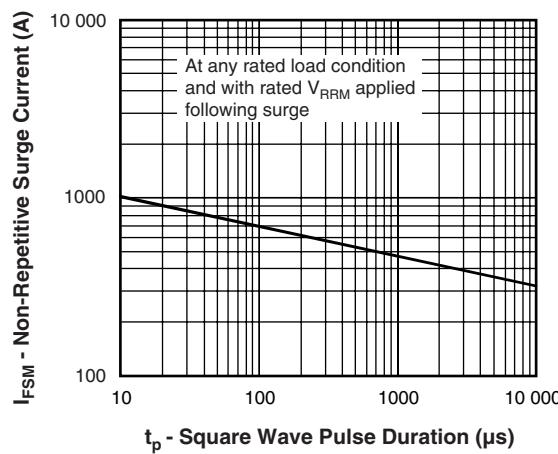


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

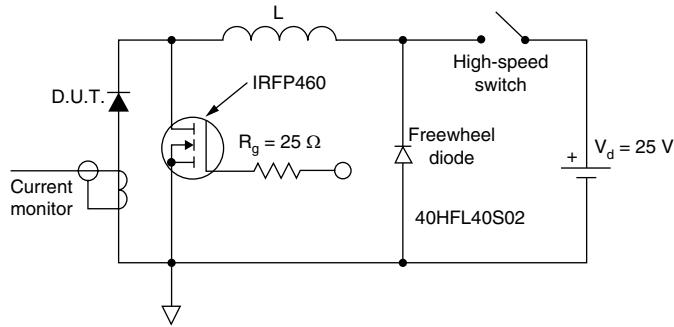


Fig. 8 - Unclamped Inductive Test Circuit

Note

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

ORDERING INFORMATION TABLE

Device code	40	C	T	Q	045	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 (045 = 45 V)							
6	<ul style="list-style-type: none"> • S = D²PAK • -1 = TO-262 							
7	<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) 							
8	<ul style="list-style-type: none"> - 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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