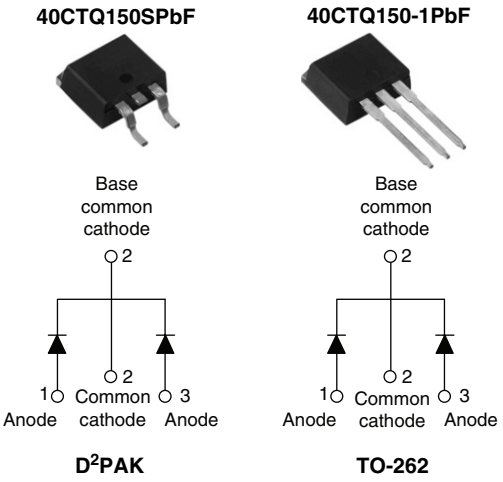
Schottky Rectifier, 2 x 20 A



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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level

Available
RoHS* COMPLIANT

DESCRIPTION

The 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	40CTQ150SPbF 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	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 140 °C, rectangular waveform		20	A
	per device				40	
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	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

* Pb containing terminations are not RoHS compliant, exemptions may apply

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	0.93	V
		40 A		1.16	
		20 A	T_J = 125 °C	0.71	
		40 A		0.85	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	50	µA
		T_J = 125 °C		15	mA
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °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	°C
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation See fig. 4	1.5	°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^2PAK	40CTQ150S	
			Case style TO-262	40CTQ150-1	

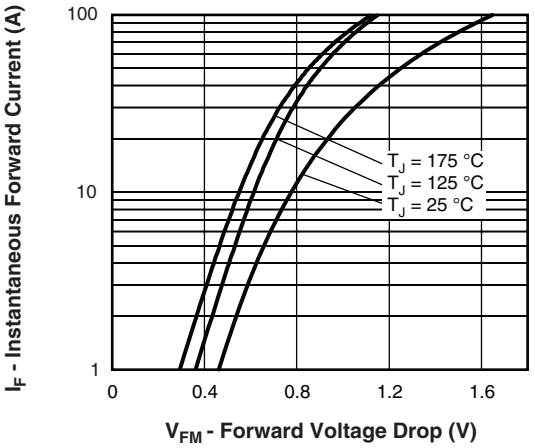


Fig. 1 - Maximum Forward Voltage Drop Characteristics

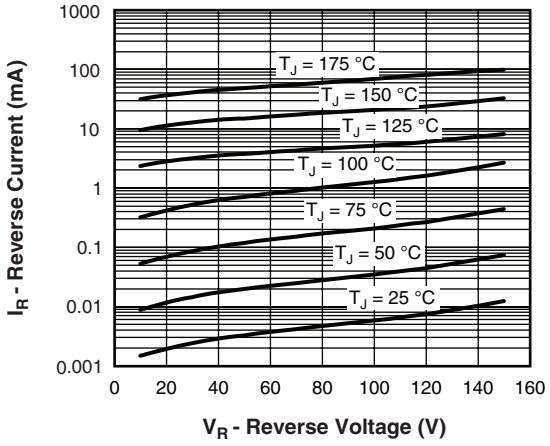


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

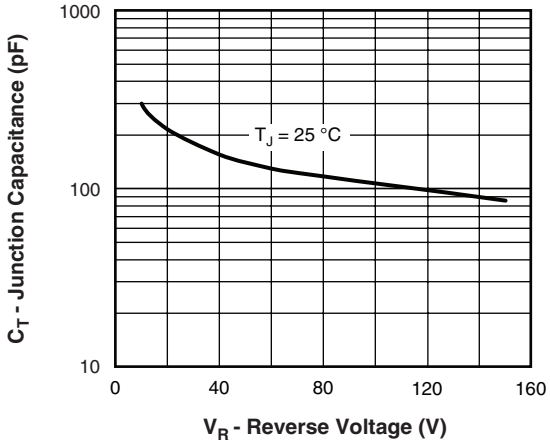


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

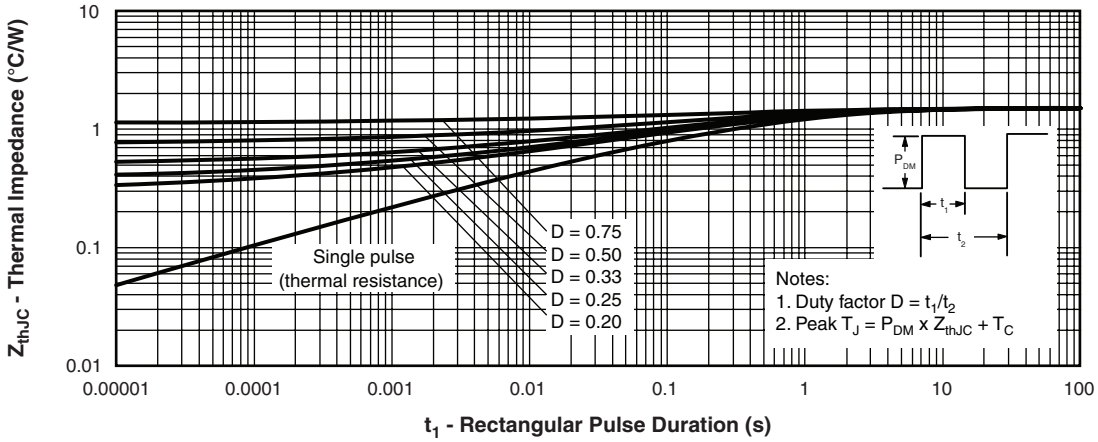


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

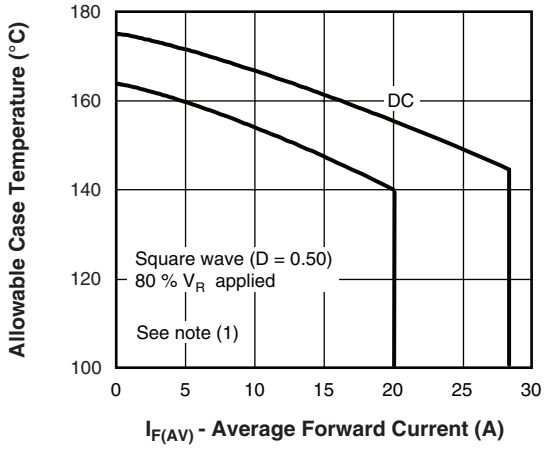


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

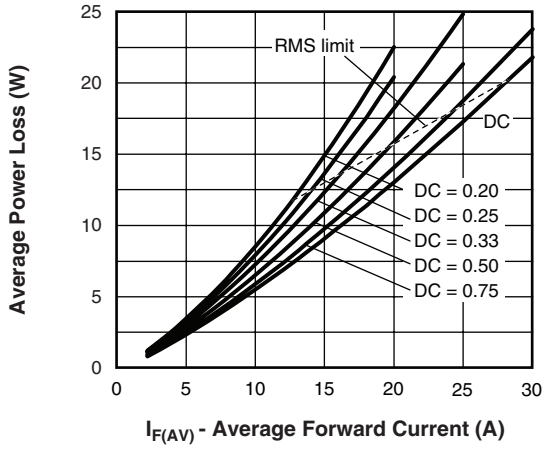


Fig. 6 - Forward Power Loss Characteristics

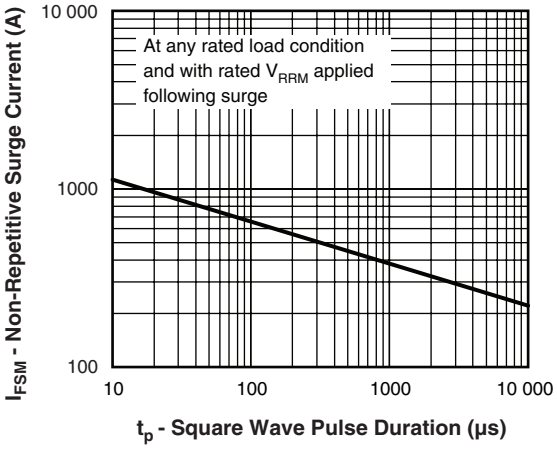


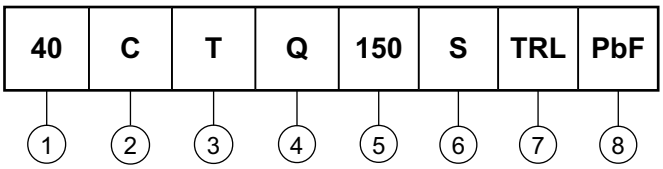
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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} = 80 % V_R applied

ORDERING INFORMATION TABLE

Device code



1 - Current rating (40 A)

2 - Circuit configuration:
C = Common cathode

3 - T = TO-220

4 - Schottky “Q” series

5 - Voltage rating (150 = 150 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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