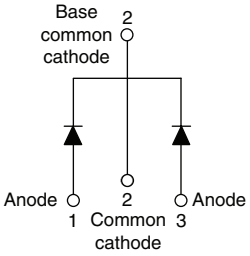
Schottky Rectifier, 10 A

TO-220AB



FEATURES

- 175 °C T_J operation
- Center tap configuration
- 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

Pb-free Available

RoHS* COMPLIANT

DESCRIPTION

This 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	
$I_{F(AV)}$	10 A
V_R	150 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	10	A
V_{RRM}		150	V
I_{FSM}	t_p = 5 µs sine	620	A
V_F	5 Apk, T_J = 125 °C (per leg)	0.73	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	10CTQ150PbF	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 (per leg) See fig. 5	$I_{F(AV)}$	50 % duty cycle at T_C = 155 °C, rectangular waveform		5	A
Maximum average forward current (per device) See fig. 5	$I_{F(AV)}$	50 % duty cycle at T_C = 155 °C, rectangular waveform		10	A
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	620	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	10 ms sine or 6 ms rect. pulse	Following any rated load condition and with rated V_{RRM} applied	115	A
Non-repetitive avalanche energy per leg	E_{AS}	T_J = 25 °C, I_{AS} = 0.30 A, L = 150 mH		6.75	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		0.30	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)	5 A	T_J = 25 °C	0.93	V
		10 A		1.10	
		5 A	T_J = 125 °C	0.73	
		10 A		0.86	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.05	mA
		T_J = 125 °C		7	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.468	V
Forward slope resistance	r_t			28	mΩ
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		200	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	3.50	°C/W
Maximum thermal resistance, junction to case per package				1.75	
Typical thermal resistance, case to heatsink (only for TO-220)		R_{thCS}	Mounting surface, smooth and greased	0.50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device				10CTQ150	

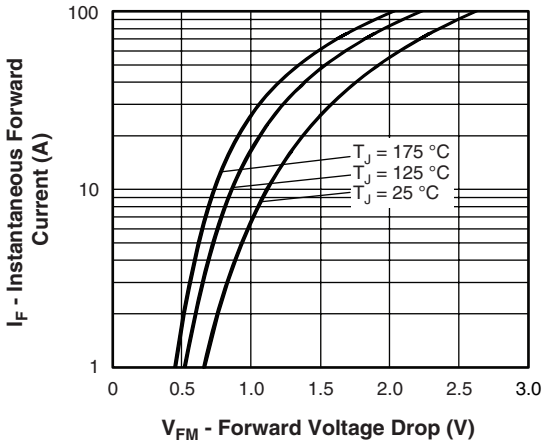


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

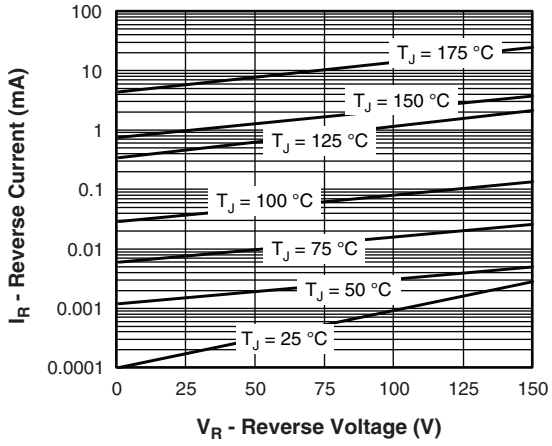


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

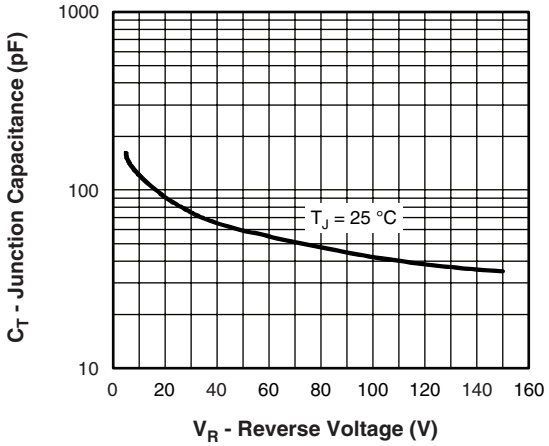


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

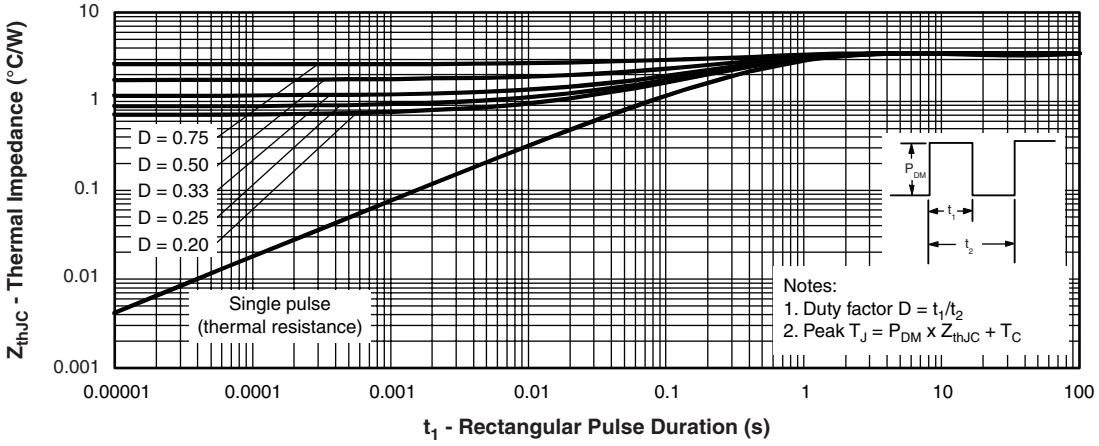


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

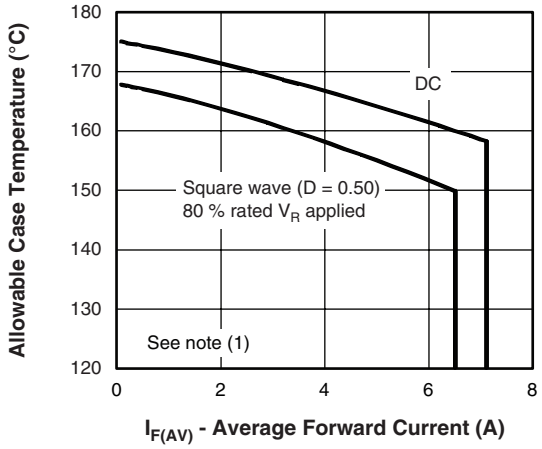


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

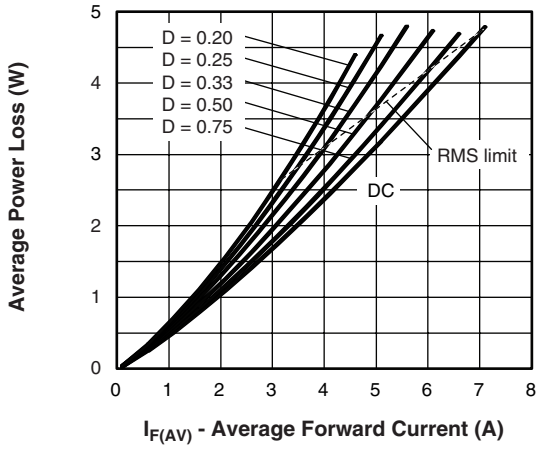


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

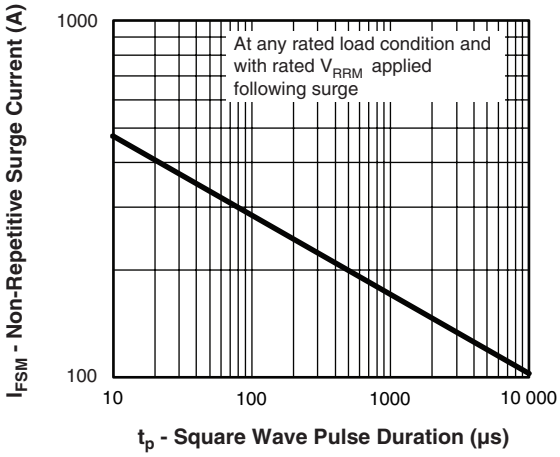


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

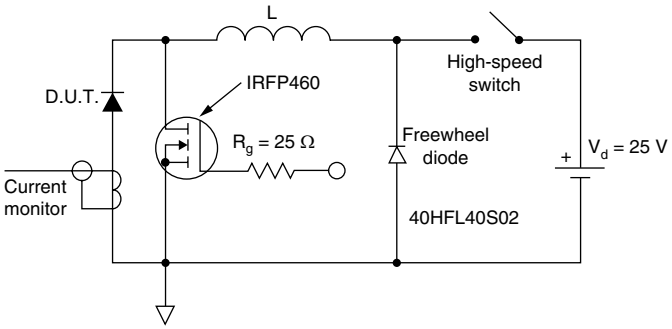


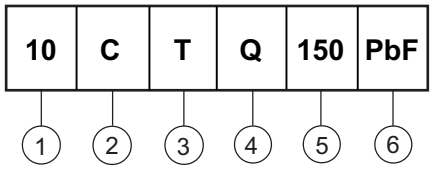
Fig. 8 - Unclamped Inductive Test Circuit

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



1 - Current rating (10 = 10 A)

2 - Circuit configuration

C = Common cathode

3 - Package

T = TO-220

4 - Schottky “Q” series

5 - Voltage rating (150 = 150 V)

6 - • None = Standard production

• PbF = Lead (Pb)-free

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95215

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