Bulletin PD-20850 10/04

International
IOR Rectifier

40CTQ150PbF

SCHOTTKY RECTIFIER

40 Amp

$I_{F(AV)}$ = 40Amp
V_R = 150V

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	40	A
V_{RRM}	150	V
I_{FSM} @ tp = 5 µs sine	150	A
V_F @ 20 Apk, T_J=125°C (per leg)	0.71	V
T_J	- 55 to 175	°C

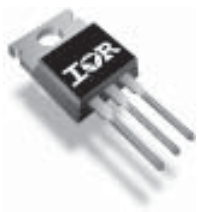
Description/ Features

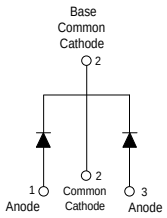
The 40CTQ...PbF center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 175° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 175° C T_J operation
- Center tap TO-220 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

Case Styles

40CTQ150PbF





TO-220

Voltage Ratings

	Part number	40CTQ150PbF
V_R	Max. DC Reverse Voltage (V)	150
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	40CTQ..	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward (Per Leg)	20	A	50% duty cycle @ T_C = 140 °C, rectangular wave form	
	Current * See Fig. 5 (Per Device)	40			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	1500	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	250		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	1.0	mJ	T_J = 25 °C, I_{AS} = 1.5 Amps, L = 0.9 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	1.5	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	40CTQ..	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.93	V	@ 20A	T_J = 25 °C
		1.16	V	@ 40A	
		0.71	V	@ 20A	T_J = 125 °C
		0.85	V	@ 40A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	50	µA	T_J = 25 °C	V_R = rated V_R
		15	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance (Per Leg)	450	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	8.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10000	V/ µs		

(1) Pulse Width < 300µs, Duty Cycle <2%

Thermal-Mechanical Specifications

	Parameters		40CTQ..	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 175	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 175	°C	
R_{thJC}	Max. Thermal Resistance Per Leg Junction to Case		1.5	°C/W	DC operation * See Fig. 4
R_{thJC}	Max. Thermal Resistance Per Package Junction to Case		0.75	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.5	°C/W	Mounting surface , smooth and greased
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	12 (10)		
	Marking Device		40CTQ150		

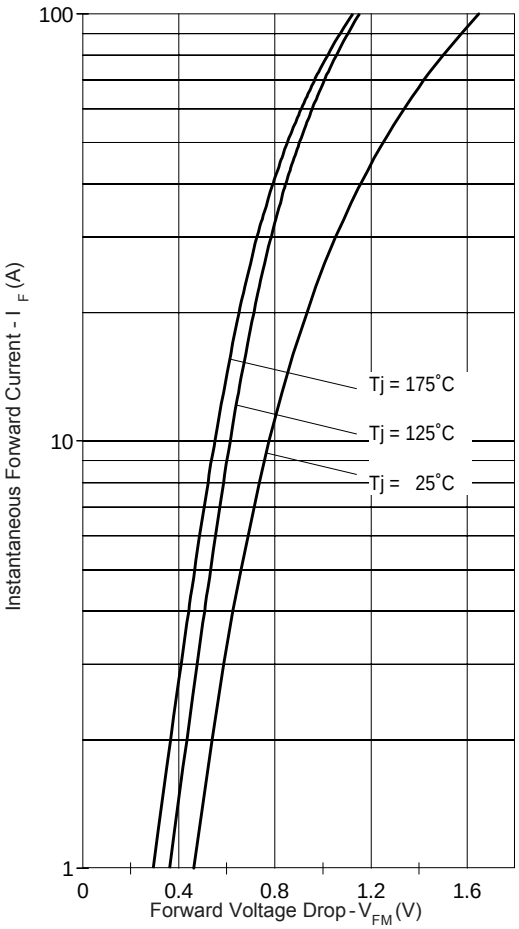


Fig. 1 - Maximum Forward Voltage Drop Characteristics

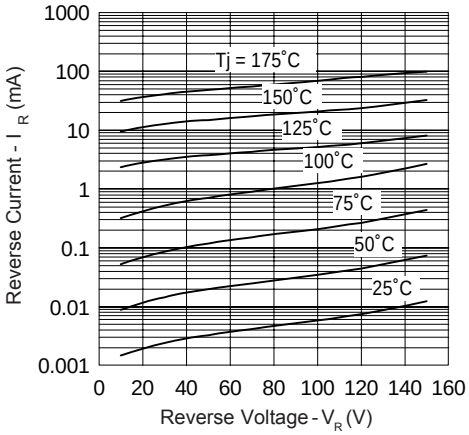


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

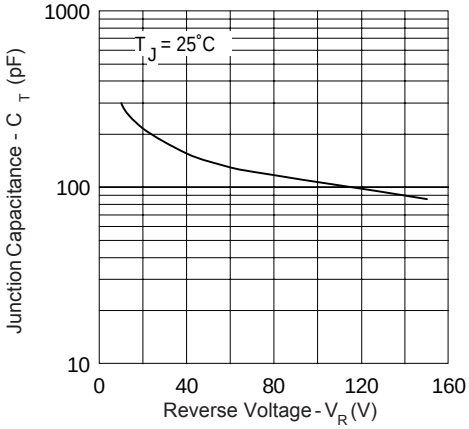


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

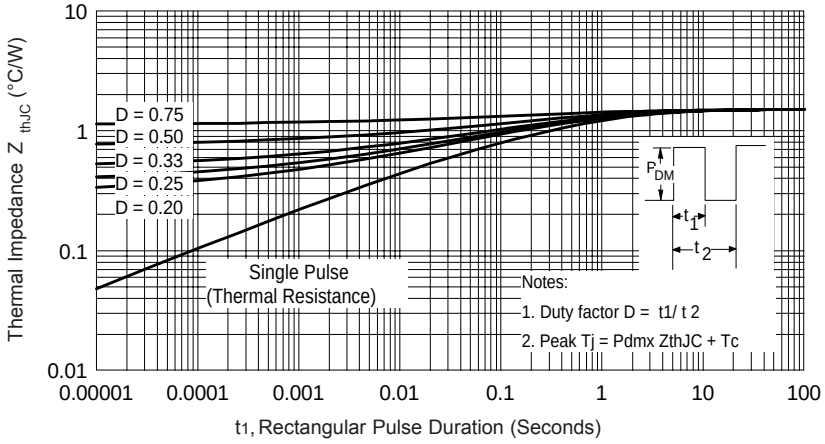


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

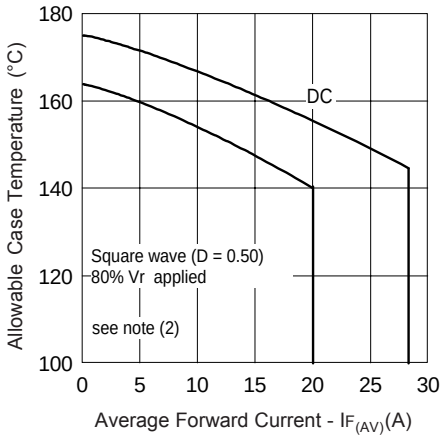


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

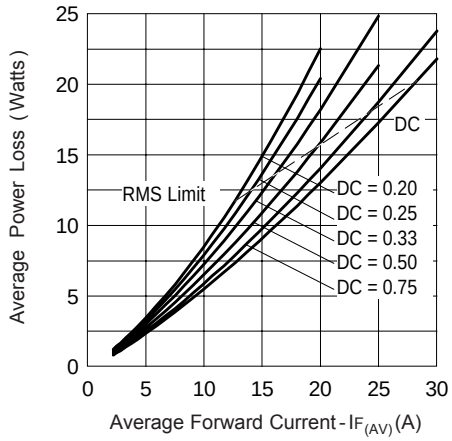


Fig. 6 - Forward Power Loss Characteristics

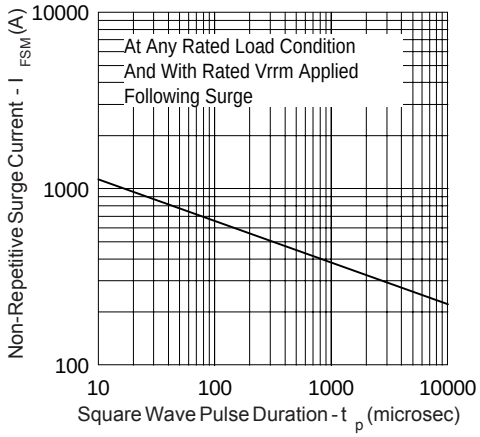
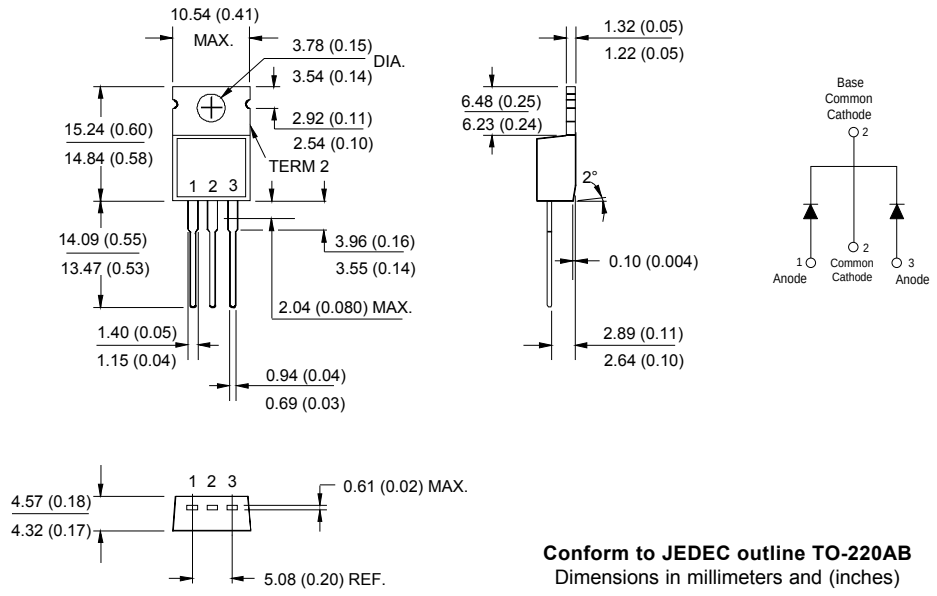


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_R$ = 80% V_R applied

Outline Table



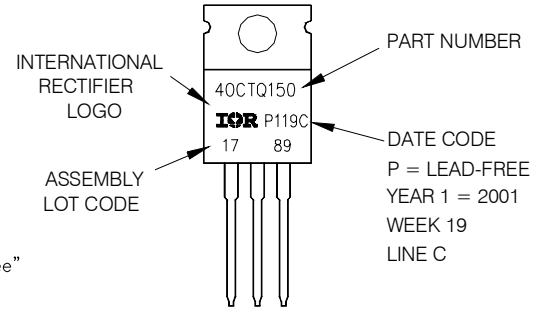
Conform to JEDEC outline TO-220AB
Dimensions in millimeters and (inches)

Part Marking Information

IRXC Assembly Line

EXAMPLE: THIS IS A 40CTQ150
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

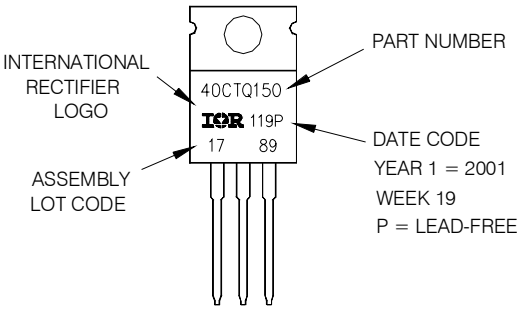
Note: "P" in the beginning of
date code indicates "Lead-Free"



IRMX Assembly Line

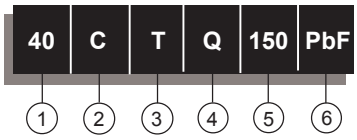
EXAMPLE: THIS IS A 40CTQ150
LOT CODE 1789
ASSEMBLED ON WW 19, 2001

Note: "P" in assembly line
position indicates "Lead-Free"



Ordering Information Table

Device Code



1 - Current Rating (40 = 40A)

2 - Circuit Configuration
C = Common Cathode

3 - Package
T = TO-220

4 - Schottky "Q" Series

5 - Voltage Rating (150 = 150V)

6 - • none = Standard Production
• PbF = Lead-Free

Tube Standard Pack Quantity : 50 pieces

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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