

Bulletin PD-20694 rev. B 07/03

International
IR Rectifier

40CTQ150
40CTQ150S
40CTQ150-1

SCHOTTKY RECTIFIER

40 Amp

Major Ratings and Characteristics

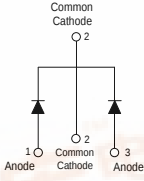
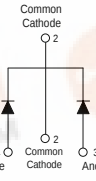
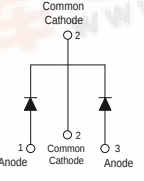
Characteristics	40CTQ...	Units
$I_{F(AV)}$ Rectangular waveform	40	A
V_{RRM}	150	V
I_{FSM} @tp = 5 μ s sine	1500	A
V_F @20 Apk, T_J = 125°C (per leg)	0.71	V
T_J	-55 to 175	°C

Description/ Features

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, 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

Case Styles

40CTQ150	40CTQ150S	40CTQ150-1
  TO-220AB	  D ² PAK	  TO-262



Voltage Ratings

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

Electrical Specifications

Parameters	40CTQ..	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.93	V	@ 20A $T_J = 25^\circ\text{C}$
	1.16	V	
	0.71	V	@ 20A $T_J = 125^\circ\text{C}$
	0.85	V	
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	50	μA	$T_J = 25^\circ\text{C}$
	15	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
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 < 300 μs , Duty Cycle <2%

Thermal-Mechanical Specifications

Parameters	40CTQ..	Units	Conditions
T_J Max. Junction Temperature Range	-55 to 175	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Per Leg Junction to Case	1.5	$^\circ\text{C/W}$	DC operation * See Fig. 4
R_{thJC} Max. Thermal Resistance Per Package Junction to Case	0.75	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.5	$^\circ\text{C/W}$	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)		

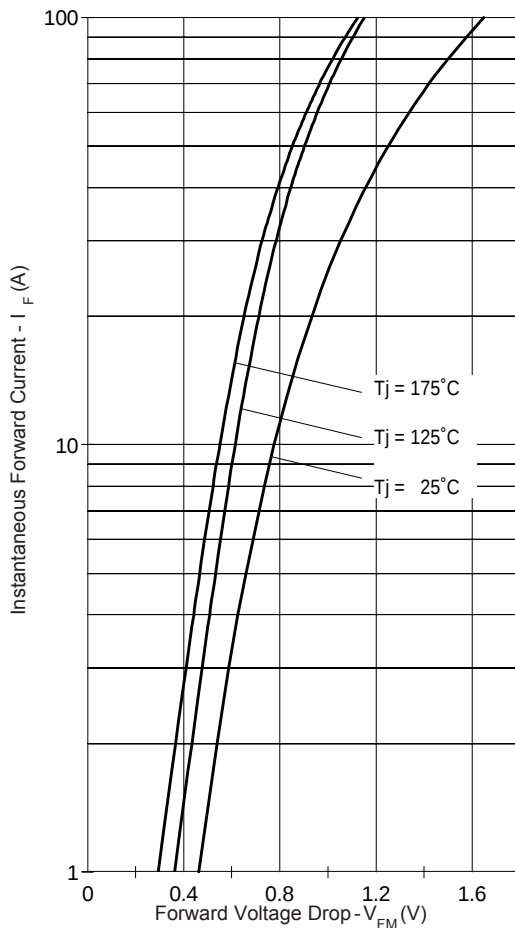


Fig. 1 - Maximum Forward Voltage Drop Characteristics

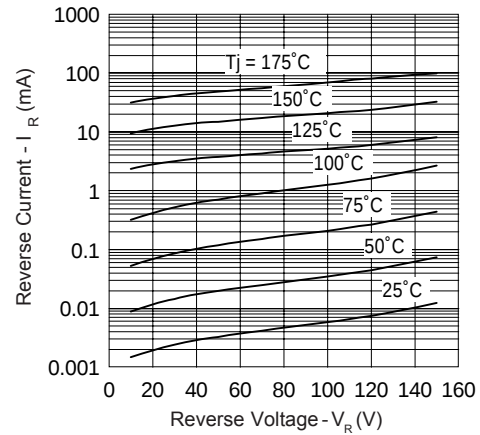


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

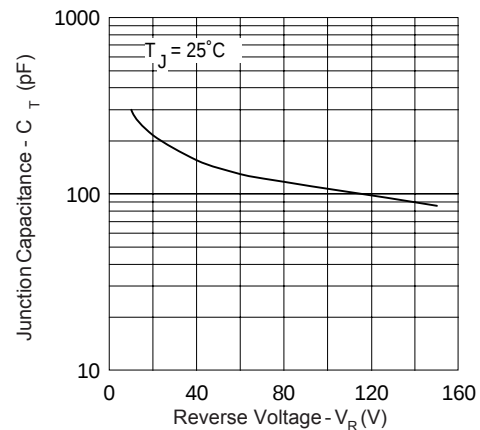


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

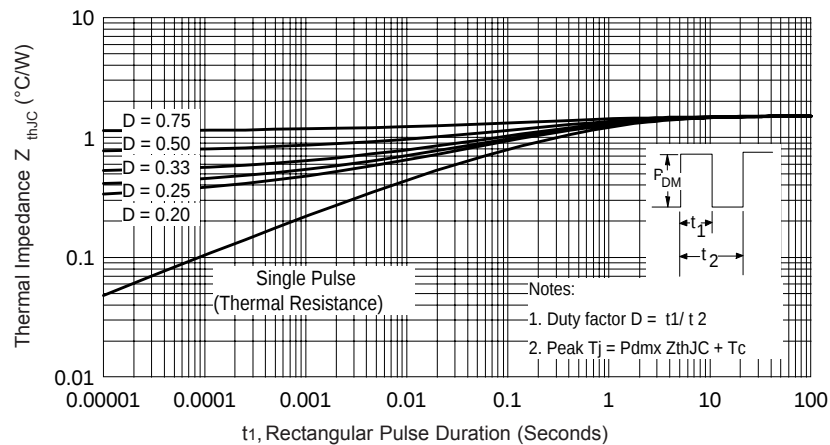


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

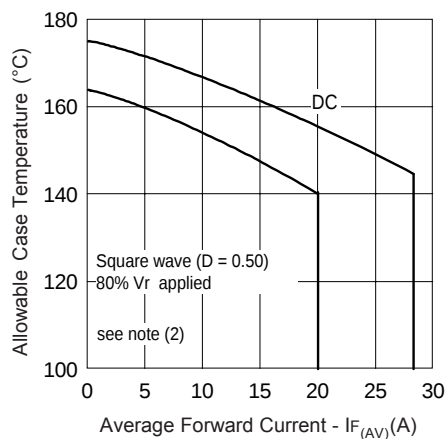


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

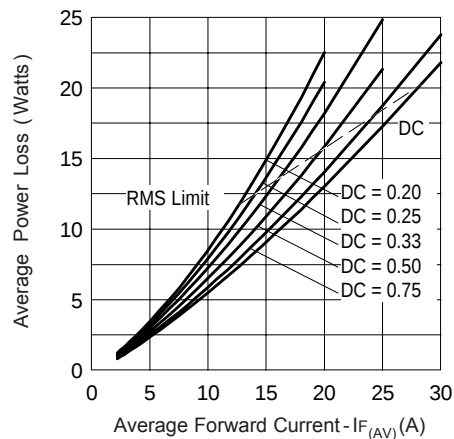


Fig. 6 - Forward Power Loss Characteristics

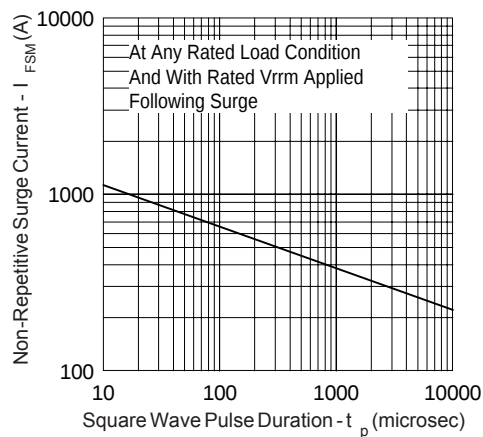


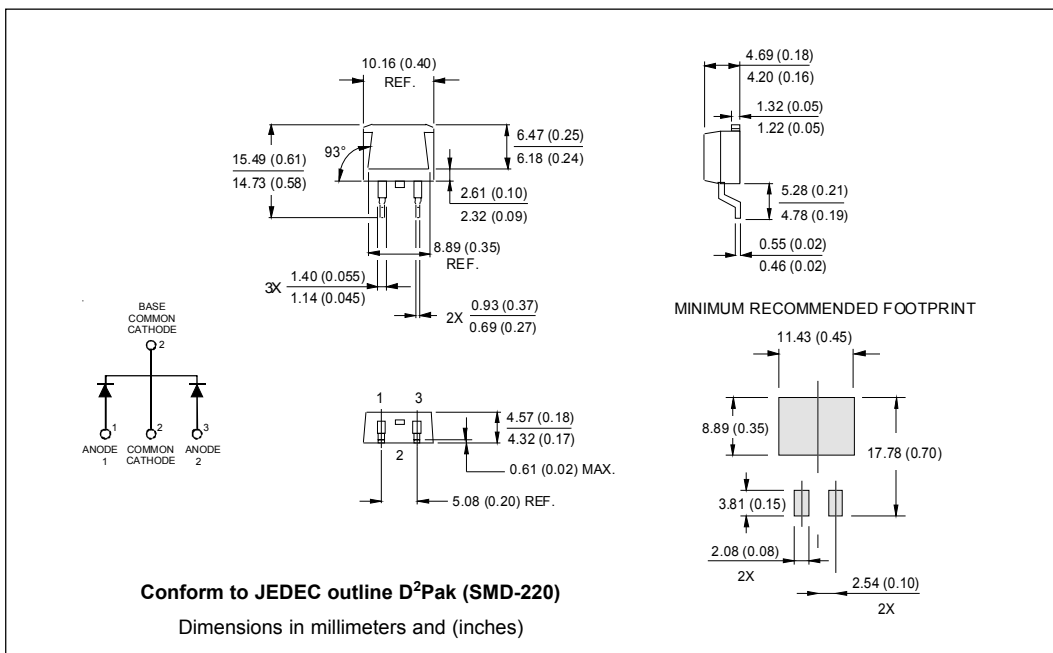
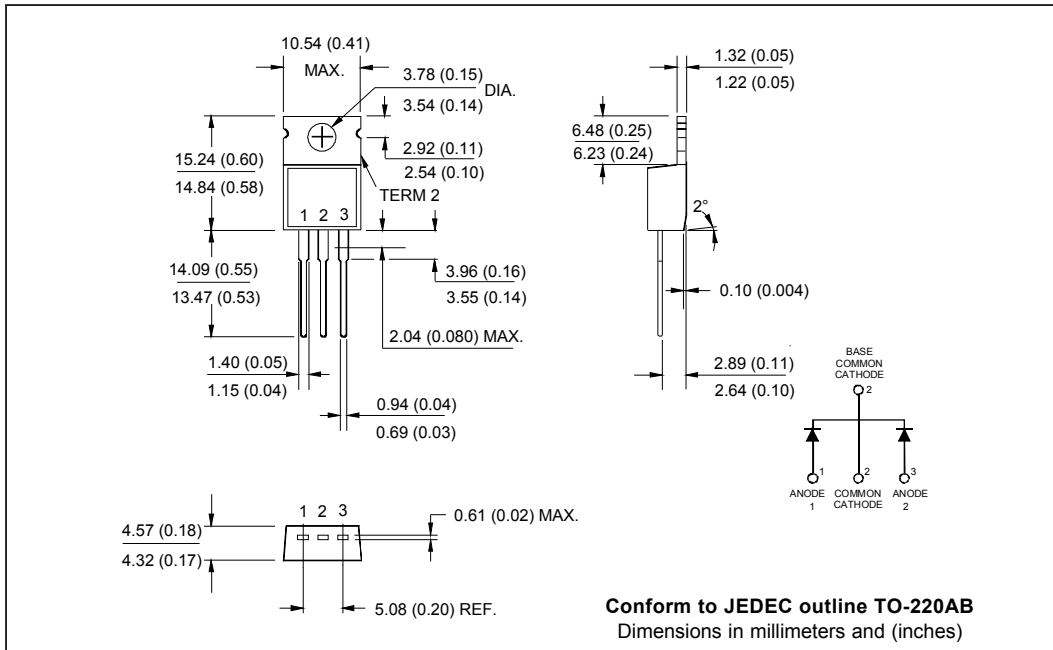
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

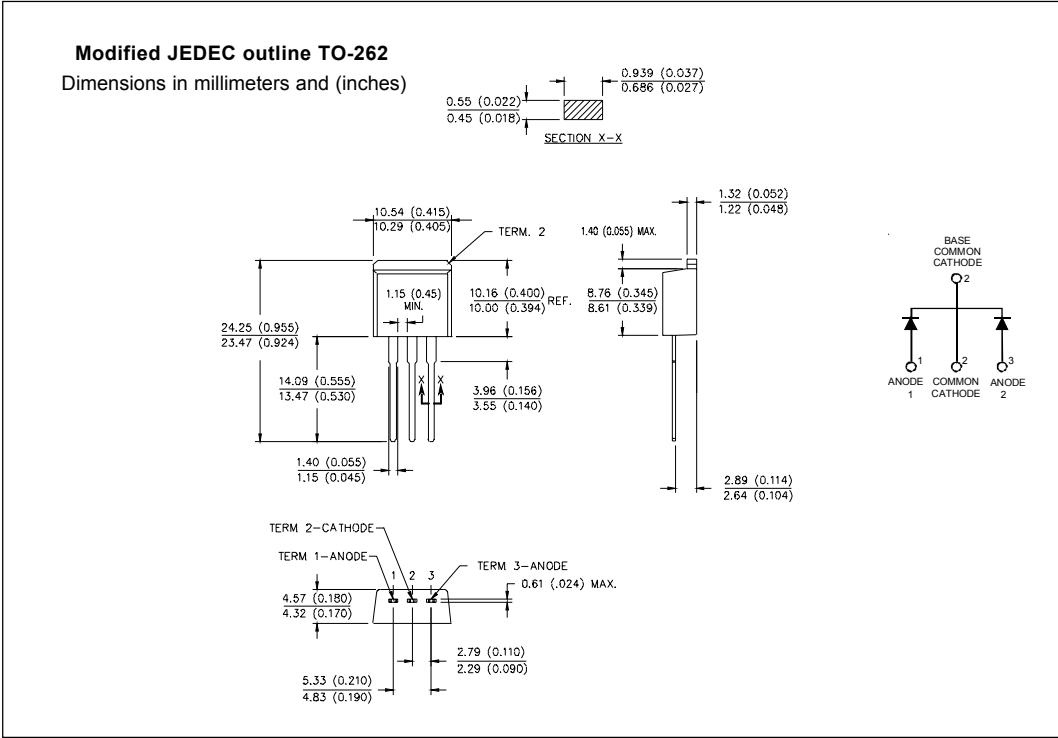
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_R = 80\% V_R$ applied

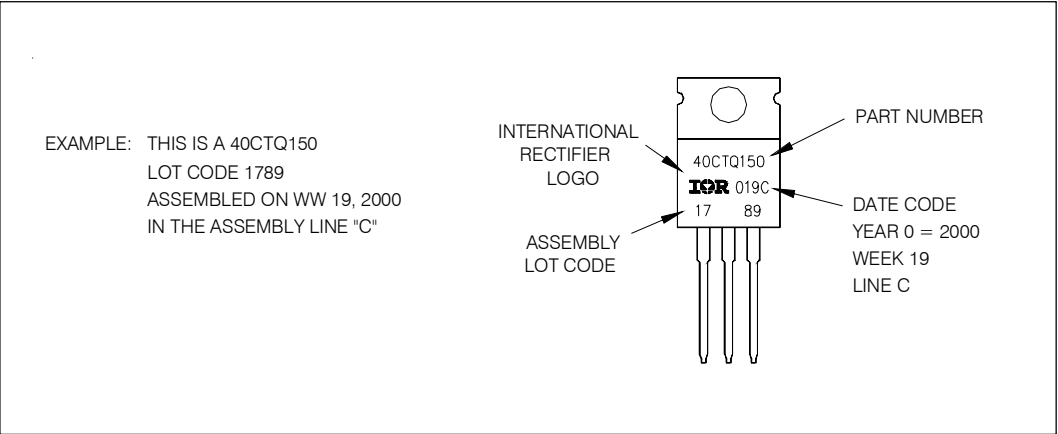
Outline Table



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Marking Information



Ordering Information Table

Device Code					
40	C	T	Q	150	-1
①	②	③	④	⑤	⑥
1	-	Essential Part Number			
2	-	Common Cathode			
3	-	T = TO-220			
4	-	Q = Schottky Q Series			
5	-	Voltage Rating 150 = 150V			
6	-	"-1" = TO-262 Option			
		S = D ² Pak			
		None = TO-220AB			

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

International
IR Rectifier

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