

SCHOTTKY RECTIFIER

40 Amp

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

Major Ratings and Characteristics

Characteristics	Values	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, $T_J=125^{\circ}\text{C}$ (per leg)	0.71	V
T_J	-55 to 175	$^{\circ}\text{C}$

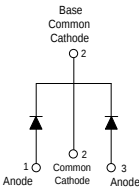
Description/ Features

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 $^{\circ}$ C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 175 $^{\circ}$ 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)

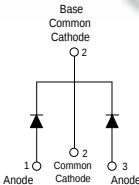
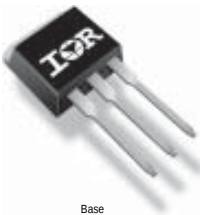
Case Styles

40CTQ150SPbF



D²PAK

40CTQ150-1PbF



TO-262

Voltage Ratings

Parameters	40CTQ150SPbF, 40CTQ150-1PbF
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 40	A	50% duty cycle @ $T_C = 140^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	1500 250	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
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	1.0	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.5$ 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. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	40CTQ..	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.93 1.16 0.71 0.85	V V V V	@ 20A @ 40A @ 20A @ 40A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	50 15	μA mA	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
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	10000	V/ μs	(Rated V_R)

(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. Max.	6 (5) 12 (10)	Kg-cm (lbf-in)	Non-lubricated threads
Marking Device	40CTQ150S		Case style D ² Pak
	40CTQ150-1		Case style TO-262

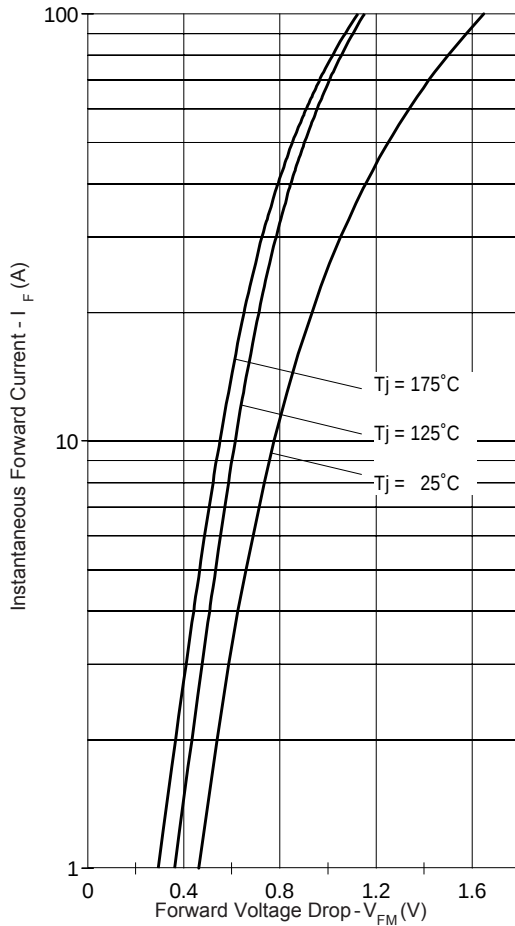


Fig. 1 - Maximum Forward Voltage Drop Characteristics

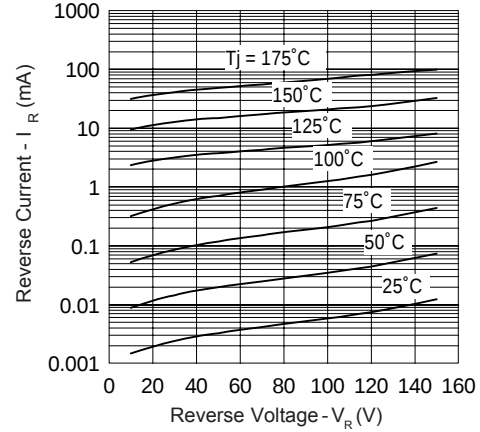


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

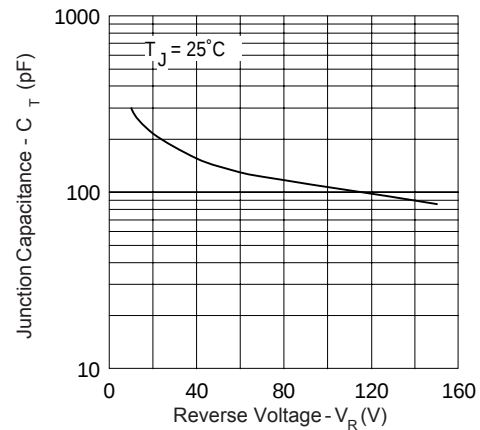


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

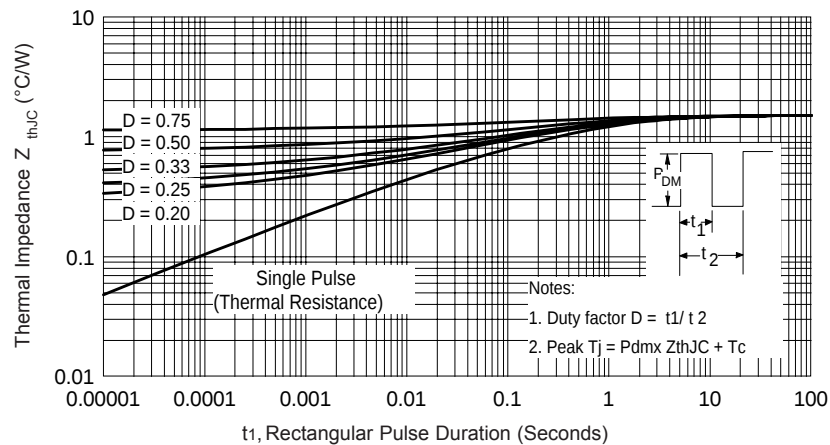


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

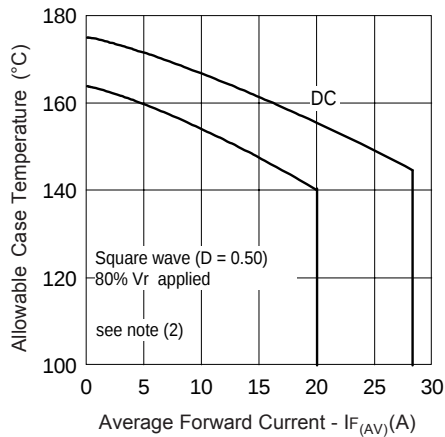


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

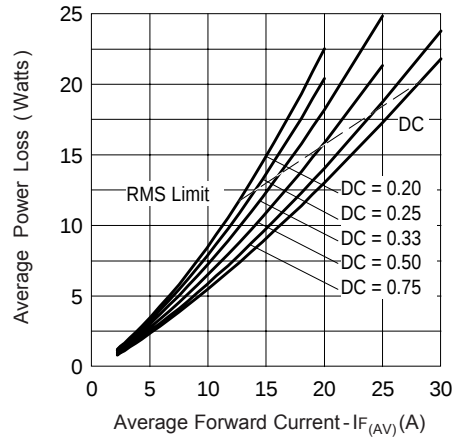


Fig. 6 - Forward Power Loss Characteristics

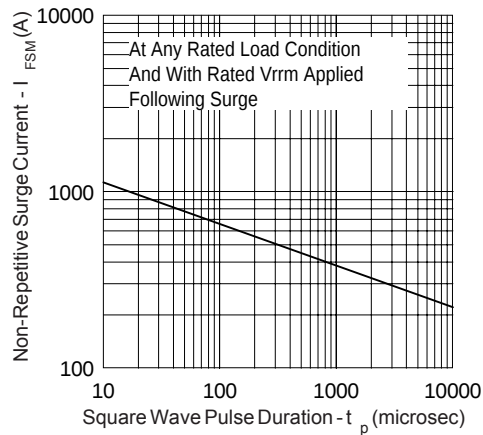


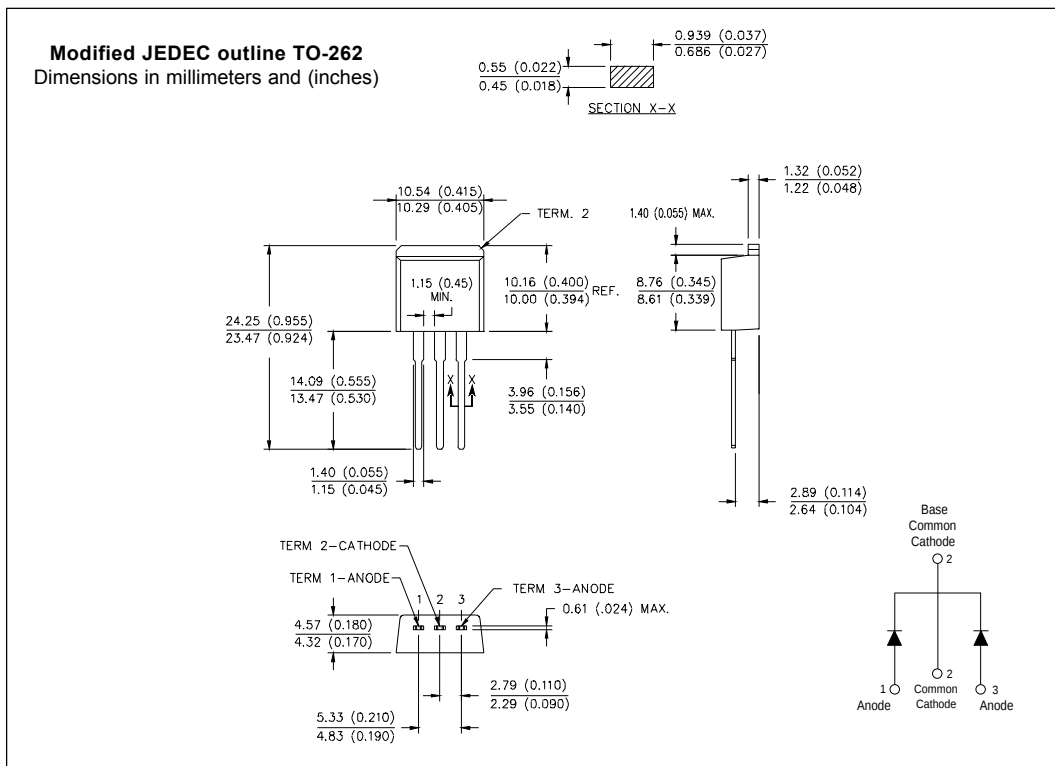
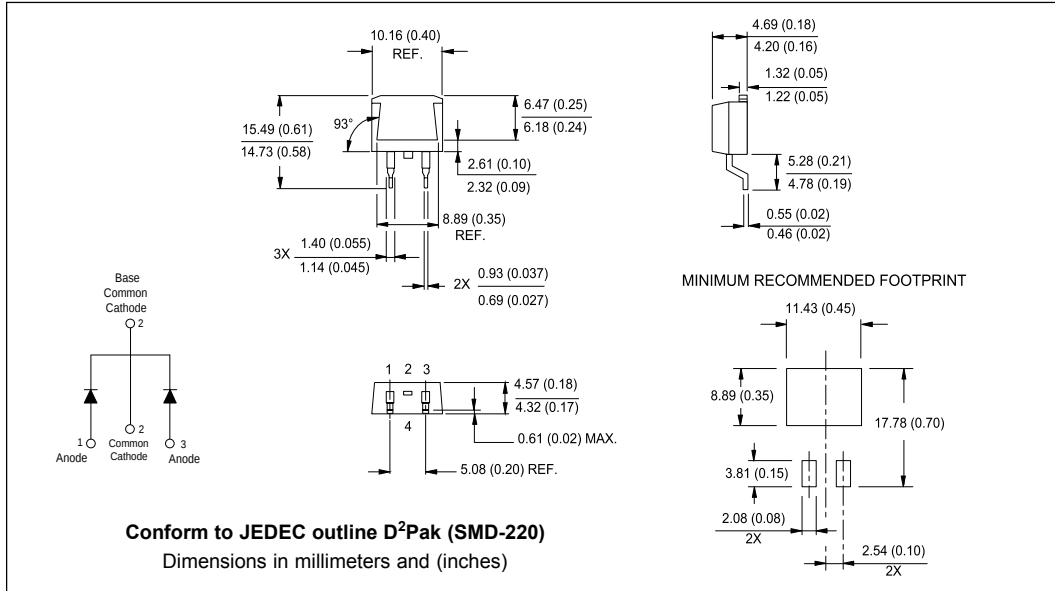
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

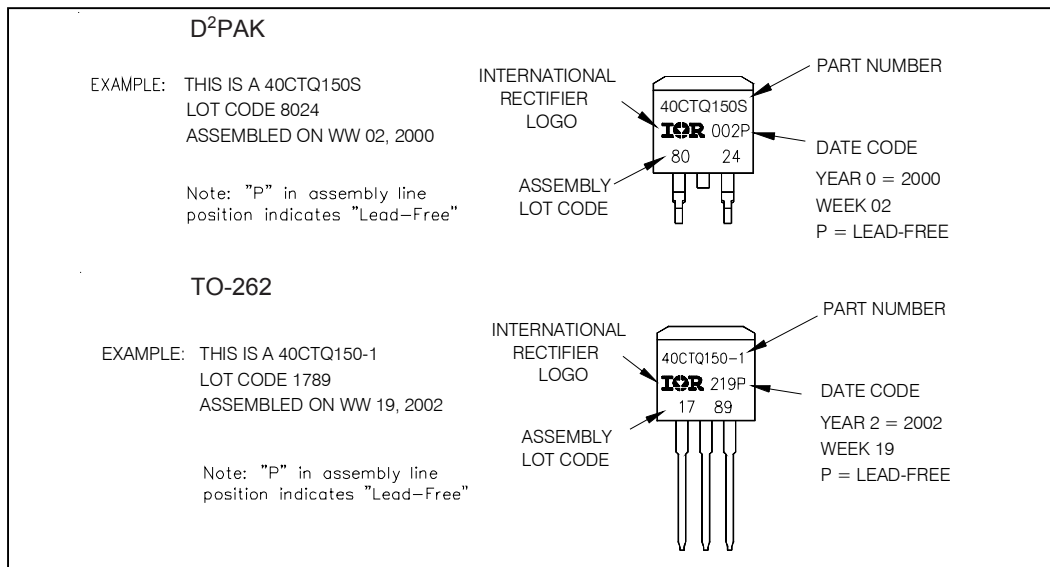
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

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

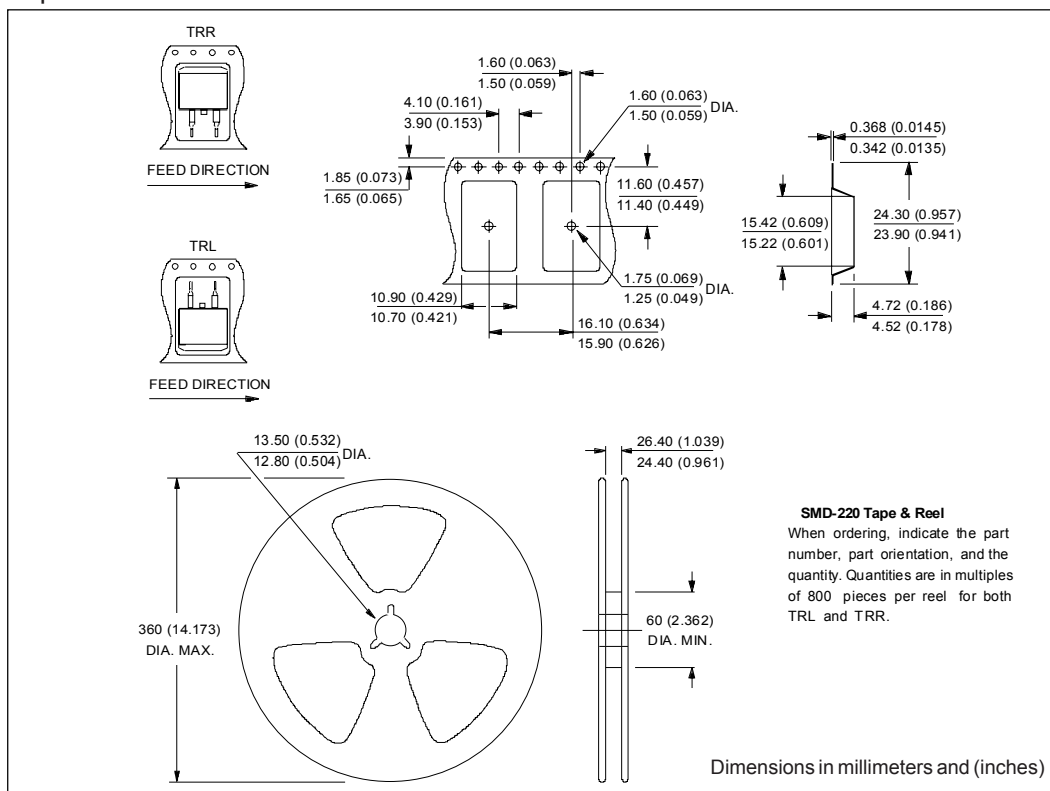
Outline Table



Part Marking Information



Tape & Reel Information



Ordering Information Table

Device Code							
	40	C	T	Q	150	S	TRL PbF
	1	2	3	4	5	6	7 8
1	-	Current Rating (40A)					
2	-	Circuit Configuration					
		C = Common Cathode					
3	-	T = TO-220					
4	-	Schottky "Q" Series					
5	-	Voltage Rating (150 = 150V)					
6	-	- S = D²Pak -1= TO-262					
7	-	- none = Tube (50 pieces) - TRL = Tape & Reel (Left Oriented - for D²Pak only) - TRR = Tape & Reel (Right Oriented - for D²Pak only)					
8	-	- none = Standard Production - PbF = Lead-Free					

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
IR Rectifier

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