

International IRF Rectifier

40CTQ150SPbF 40CTQ150-1PbF

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	$^\circ\text{C}$

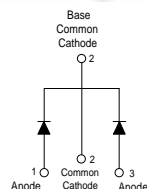
Description/ Features

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

- 175 $^\circ\text{C}$ 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)

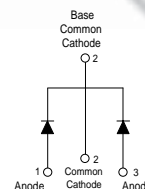
Case Styles

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 Current * See Fig. 5 (Per Leg) (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	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.5$ 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	V	@ 20A $T_J = 25^\circ\text{C}$
	1.16	V	@ 40A
	0.71	V	@ 20A $T_J = 125^\circ\text{C}$
	0.85	V	@ 40A
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	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	$^\circ\text{C}/\text{W}$	DC operation * See Fig. 4
R_{thJC} Max. Thermal Resistance Per Package Junction to Case	0.75	$^\circ\text{C}/\text{W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.5	$^\circ\text{C}/\text{W}$	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	40CTQ150S	Case style D ² Pak	
	40CTQ150-1	Case style TO-262	

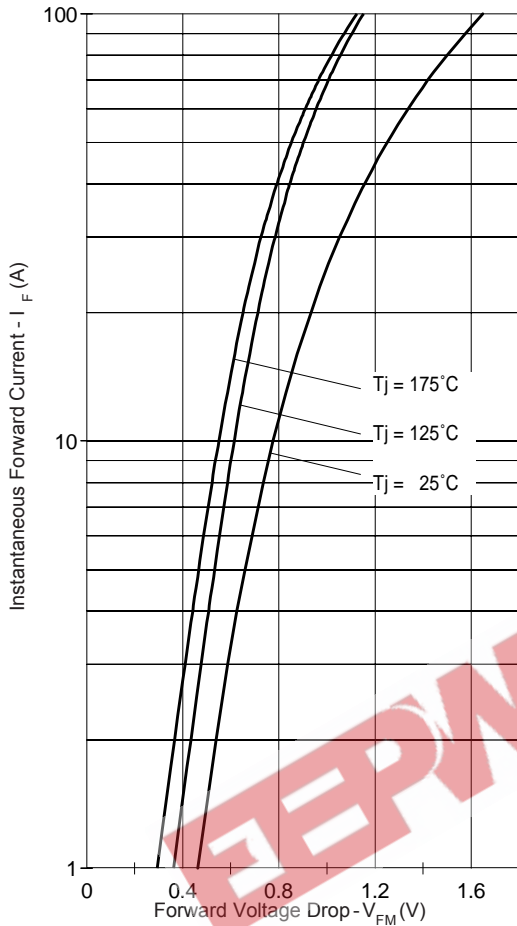


Fig. 1 - Maximum Forward Voltage Drop Characteristics

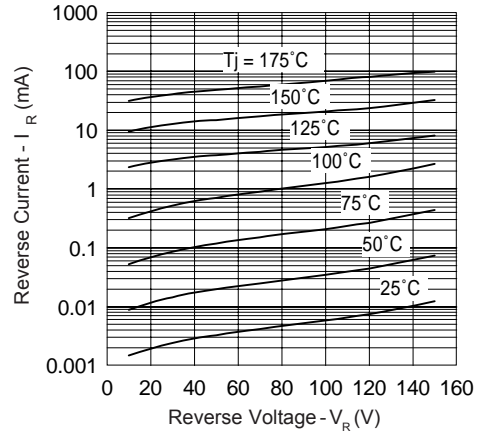


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

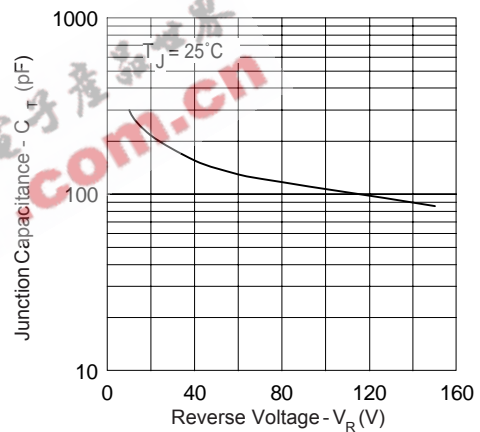


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

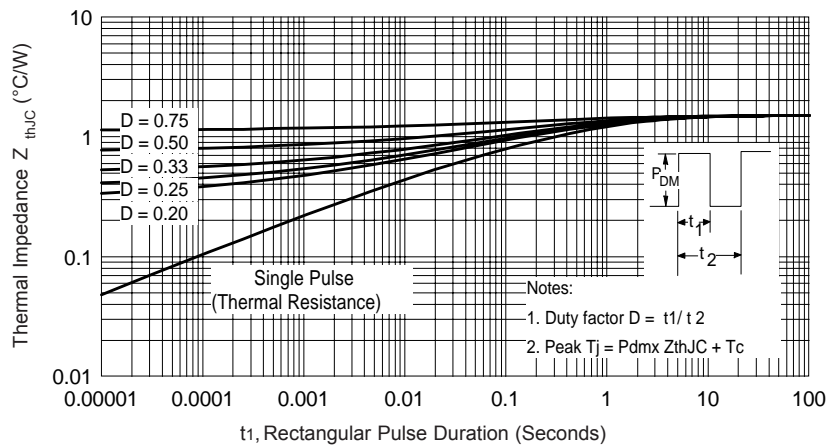


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

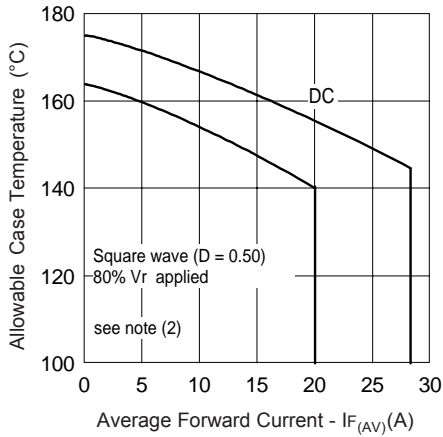


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

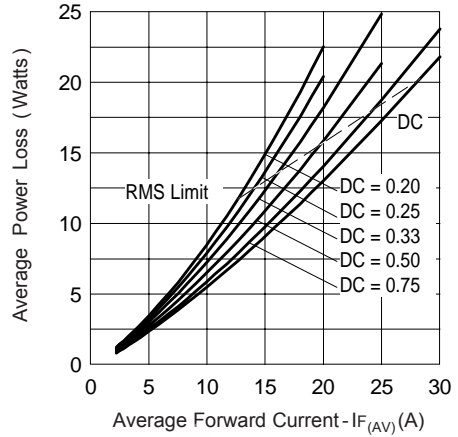


Fig. 6 - Forward Power Loss Characteristics

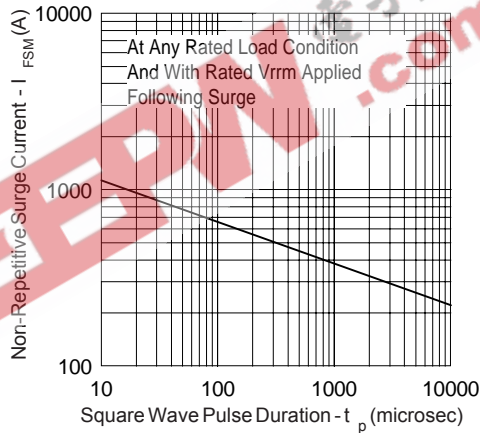
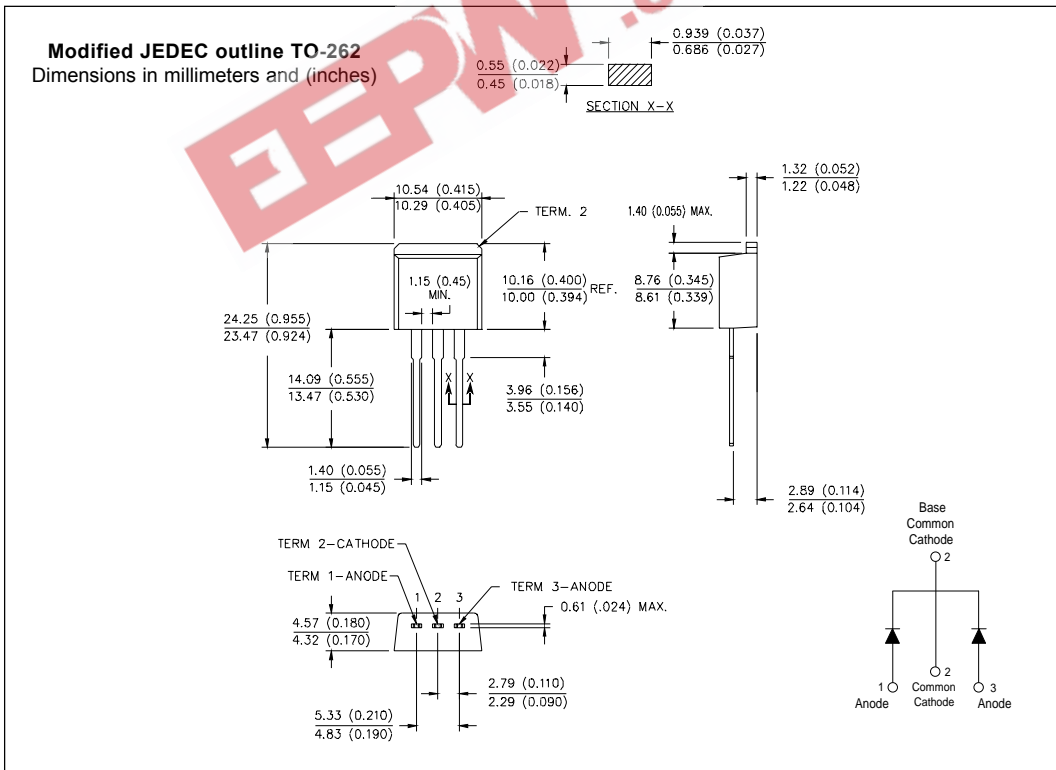
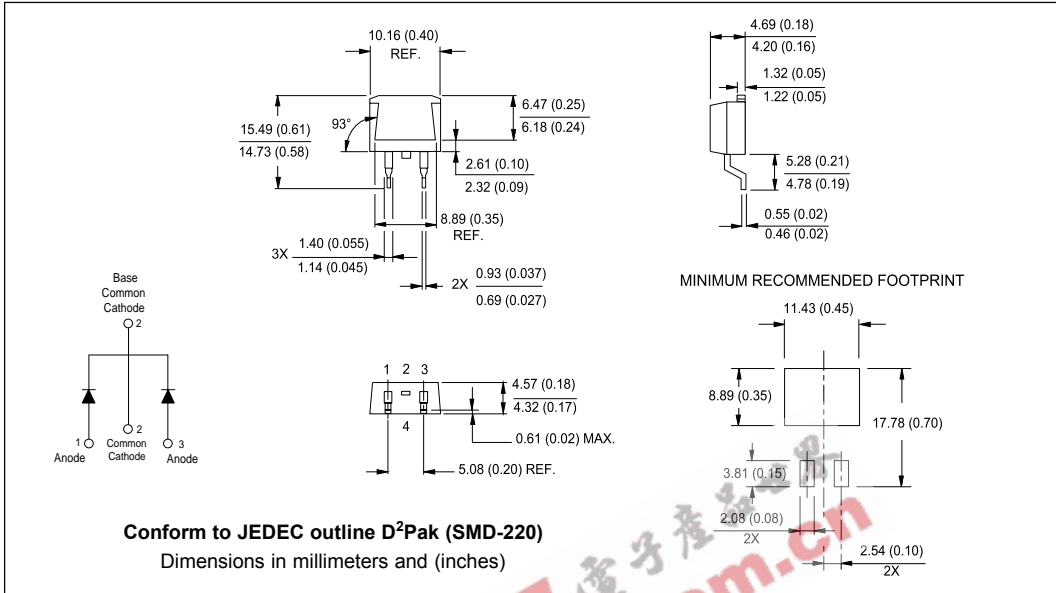


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

Outline Table



Part Marking Information

D²PAK

EXAMPLE: THIS IS A 40CTQ150S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

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

INTERNATIONAL RECTIFIER LOGO
PART NUMBER
DATE CODE
YEAR 0 = 2000
WEEK 02
P = LEAD-FREE
ASSEMBLY LOT CODE

TO-262

EXAMPLE: THIS IS A 40CTQ150-1
LOT CODE 1789
ASSEMBLED ON WW 19, 2002

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

INTERNATIONAL RECTIFIER LOGO
PART NUMBER
DATE CODE
YEAR 2 = 2002
WEEK 19
P = LEAD-FREE
ASSEMBLY LOT CODE

Tape & Reel Information

TRR
FEED DIRECTION

TRL
FEED DIRECTION

Dimensions in millimeters and (inches):

- 1.60 (0.063)
- 1.50 (0.059)
- 1.60 (0.063) DIA.
- 1.50 (0.059) DIA.
- 4.10 (0.161)
- 3.90 (0.153)
- 1.85 (0.073)
- 1.65 (0.065)
- 11.60 (0.457)
- 11.40 (0.449)
- 0.368 (0.0145)
- 0.342 (0.0135)
- 15.42 (0.609)
- 15.22 (0.601)
- 24.30 (0.957)
- 23.90 (0.941)
- 1.75 (0.069) DIA.
- 1.25 (0.049) DIA.
- 4.72 (0.186)
- 4.52 (0.178)
- 10.90 (0.429)
- 10.70 (0.421)
- 16.10 (0.634)
- 15.90 (0.626)
- 13.50 (0.532)
- 12.80 (0.504) DIA.
- 360 (14.173) DIA. MAX.
- 26.40 (1.039)
- 24.40 (0.961)
- 60 (2.362) DIA. MIN.

SMD-220 Tape & Reel
When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code																	
	<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">40</td> <td style="padding: 5px;">C</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">Q</td> <td style="padding: 5px;">150</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">TRL</td> <td style="padding: 5px;">PbF</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> <td style="text-align: center;">⑧</td> </tr> </table>	40	C	T	Q	150	S	TRL	PbF	①	②	③	④	⑤	⑥	⑦	⑧
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 = D ² Pak • -1= TO-262																
7	- • none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D ² Pak only) • TRR = Tape & Reel (Right Oriented - for D ² Pak 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.