

International  
**IOR** Rectifier

40CTQ150PbF

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
$I_{FSM}$ @ $t_p = 5 \mu s$ sine	150	A
$V_F$ @ 20 Apk, $T_J = 125^\circ C$ (per leg)	0.71	V
$T_J$	-55 to 175	$^\circ C$

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.

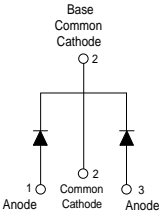
- 175° C  $T_J$  operation
- Center tap TO-220 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF"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

Case Styles

40CTQ150PbF



TO-220



## 40CTQ150PbF

Bulletin PD-20850 10/04

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### 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) 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 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ 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 $\mu\text{sec}$ 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	$\mu\text{A}$	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	15	mA	$T_J = 125^\circ\text{C}$
$C_T$ Max. Junction Capacitance (Per Leg)	450	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ 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/ $\mu\text{s}$	

(1) Pulse Width < 300 $\mu\text{s}$ , 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)		
Marking Device	40CTQ150		

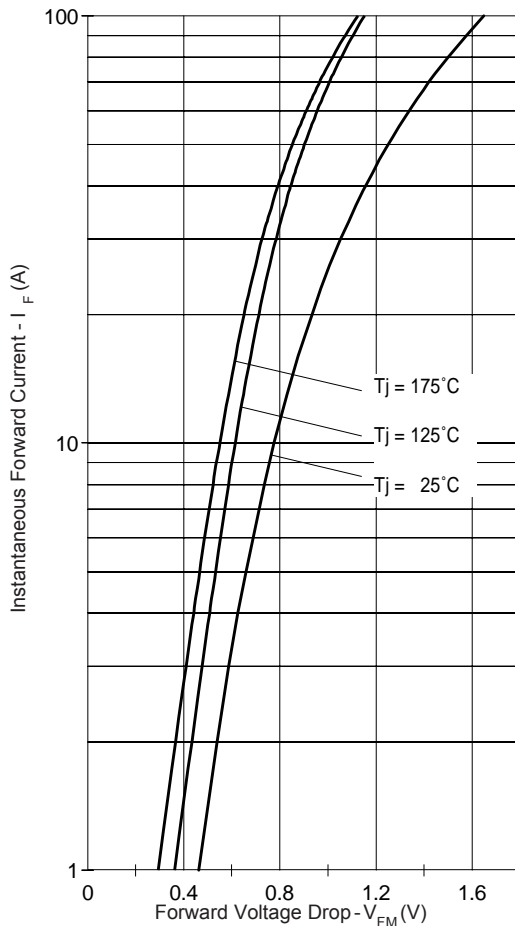


Fig. 1 - Maximum Forward Voltage Drop Characteristics

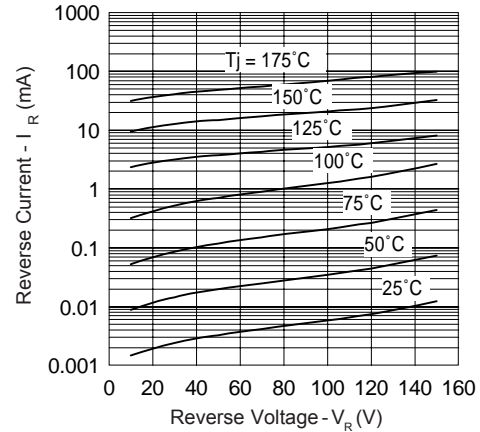


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

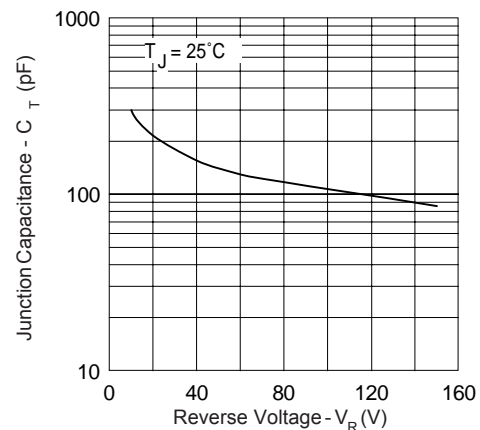


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

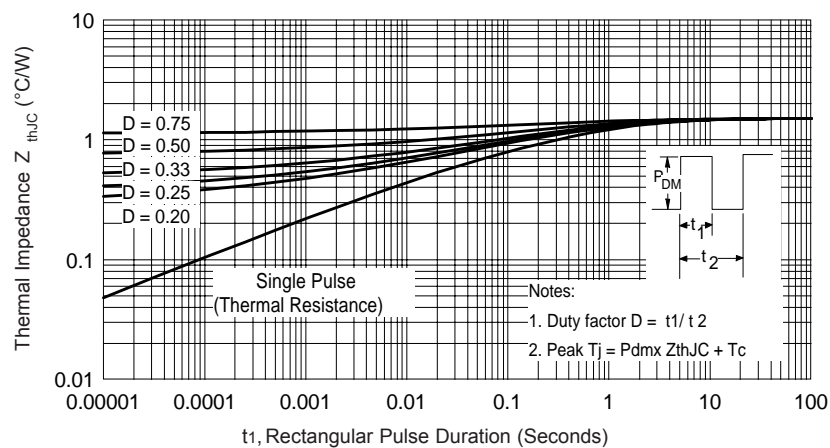


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

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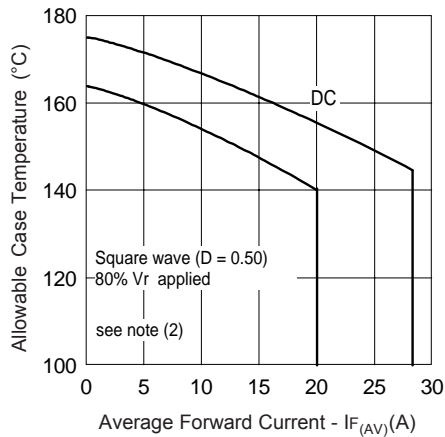


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

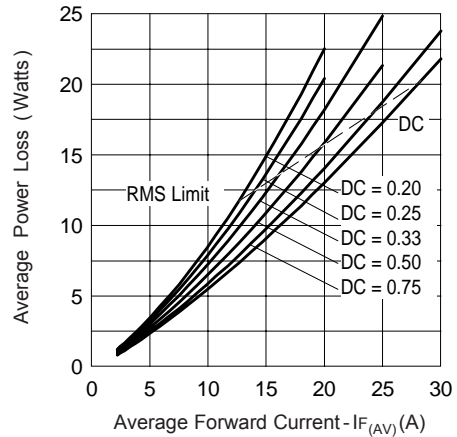


Fig. 6 - Forward Power Loss Characteristics

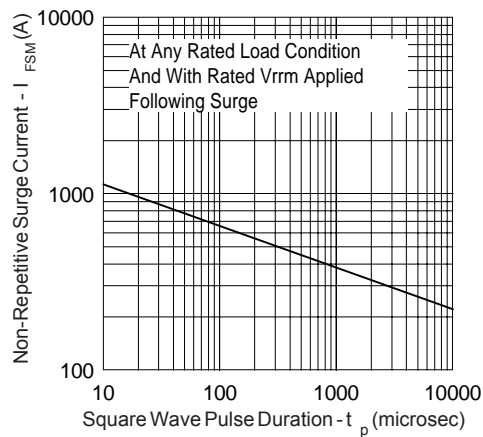
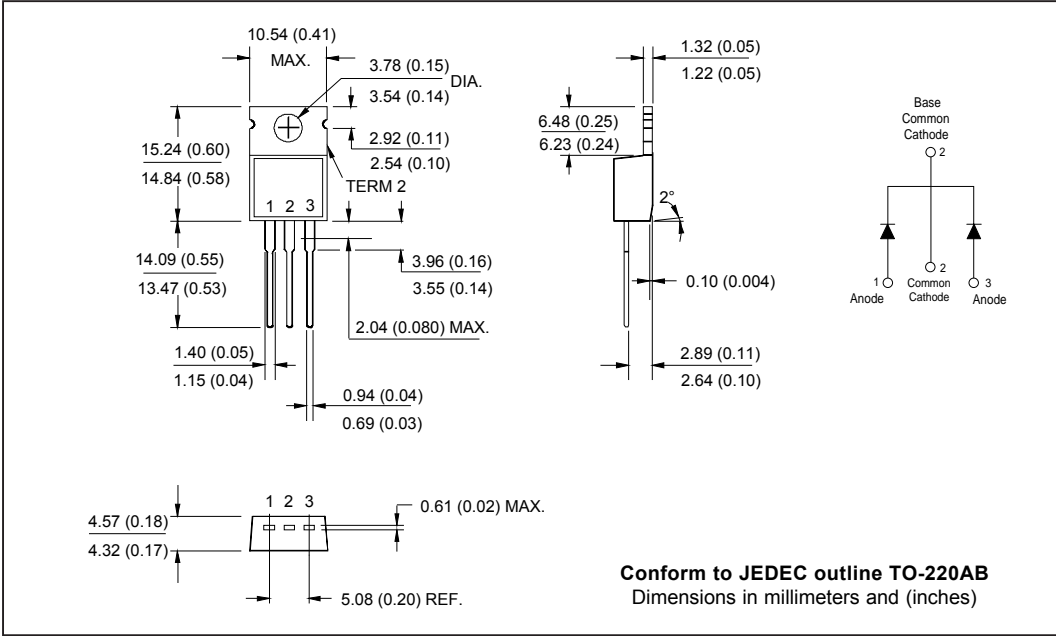


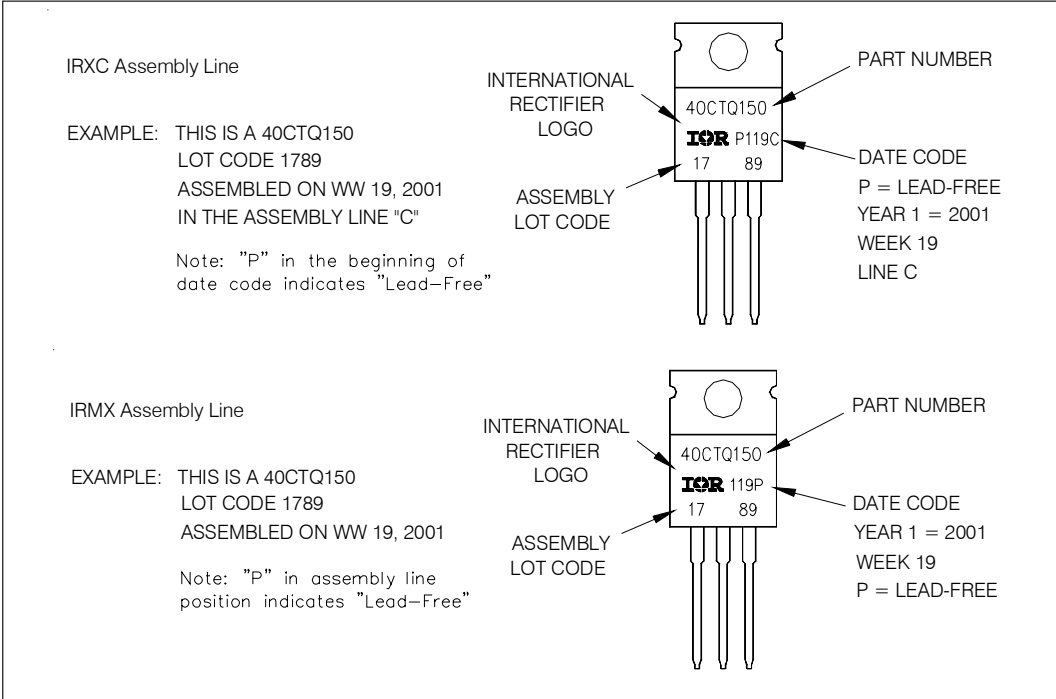
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

Outline Table



Part Marking Information



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### Ordering Information Table

## Device Code

40	C	T	Q	150	PbF
1	2	3	4	5	6

- 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.

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