

International IR Rectifier

40CTQ045 40CTQ045S 40CTQ045-1

SCHOTTKY RECTIFIER

40 Amp

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

$$V_R = 45\text{V}$$

Major Ratings and Characteristics

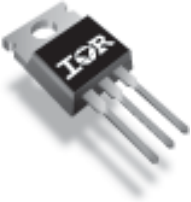


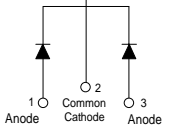
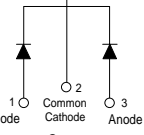
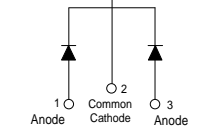
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	40	A
V_{RRM}	45	V
I_{FSM} @ $t_p = 5 \mu\text{s}$ sine	1240	A
V_F @ 20 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.48	V
T_J range	-55 to 150	$^\circ\text{C}$

Description/ Features

This 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 150°C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150°C T_J operation
- Center tap configuration
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

40CTQ...	40CTQ... S	40CTQ... -1
		
<p>Base Common Cathode O 2</p>  <p>1 O Anode O 2 Common Cathode O 3 Anode</p> <p>TO-220</p>	<p>Base Common Cathode O 2</p>  <p>1 O Anode O 2 Common Cathode O 3 Anode</p> <p>D²PAK</p>	<p>Base Common Cathode O 2</p>  <p>1 O Anode O 2 Common Cathode O 3 Anode</p> <p>TO-262</p>

Voltage Ratings

Parameters	40CTQ045 40CTQ045S 40CTQ045-1
V_R Max. DC Reverse Voltage (V)	45
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	20	A	50% duty cycle @ $T_C = 116^\circ\text{C}$, rectangular wave form
	40		
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	1240	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse
	350		
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 3\text{Amps}$, $L = 4.40\text{mH}$
I_{AR} Repetitive Avalanche Current (Per Leg)	3	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	Values	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.53	V	@ 20A $T_J = 25^\circ\text{C}$
	0.68	V	@ 40A
	0.48	V	@ 20A $T_J = 125^\circ\text{C}$
	0.67	V	@ 40A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	3	mA	$T_J = 25^\circ\text{C}$
	115	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$V_{F(TO)}$ Threshold Voltage	0.27	V	$T_J = T_J \text{ max.}$
r_t Forward Slope Resistance	8.72	m Ω	
C_T Max. Junction Capacitance (Per Leg)	2800	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	Values	Units	Conditions
T_J Max. Junction Temperature Range	-55 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	2.0	$^\circ\text{C/W}$	DC operation
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	1.0	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.50	$^\circ\text{C/W}$	Mounting surface, smooth and greased (only for TO-220)
wt Approximate Weight	2 (0.07)	g (oz.)	
T Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)
	Max.	12 (10)	

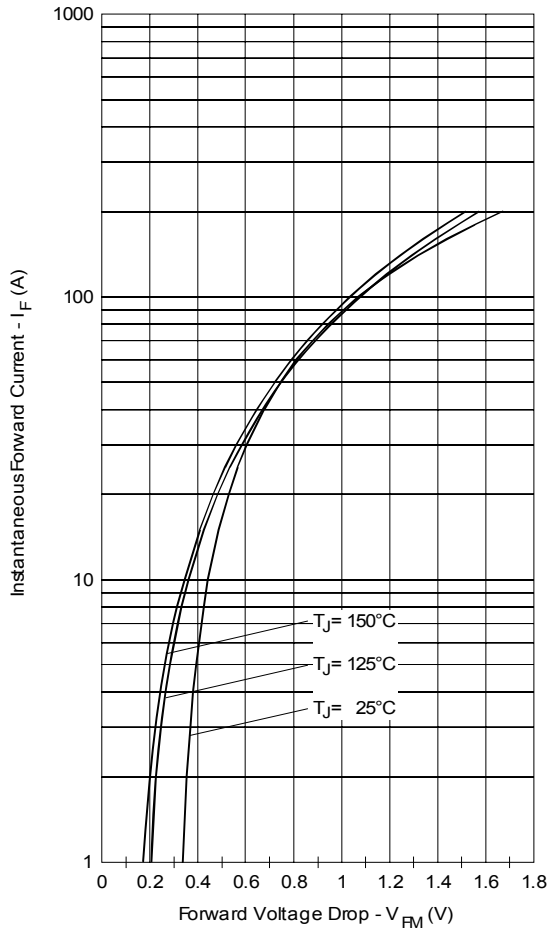


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

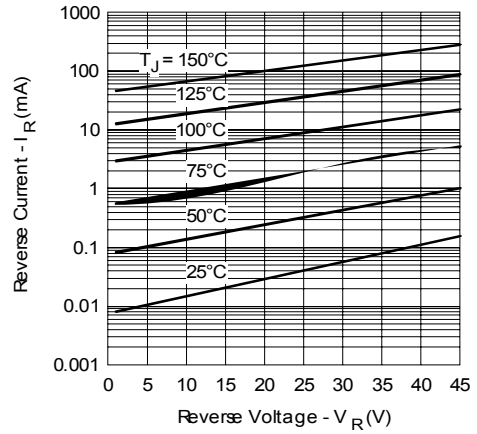


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

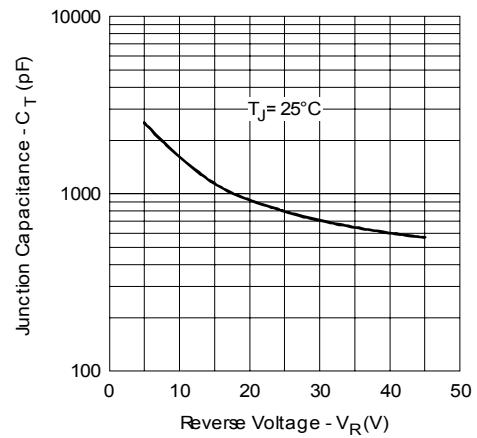


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

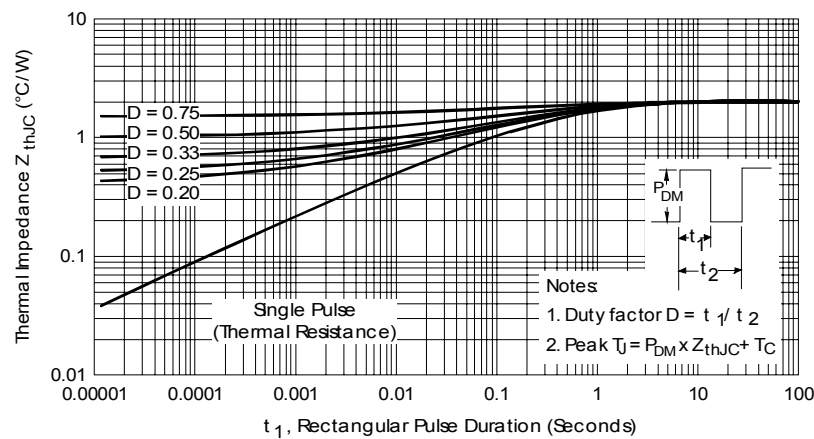


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

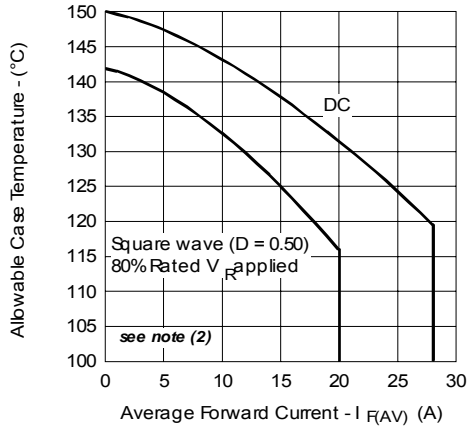


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

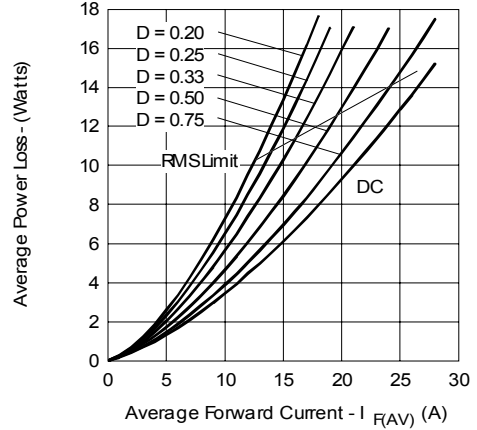


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

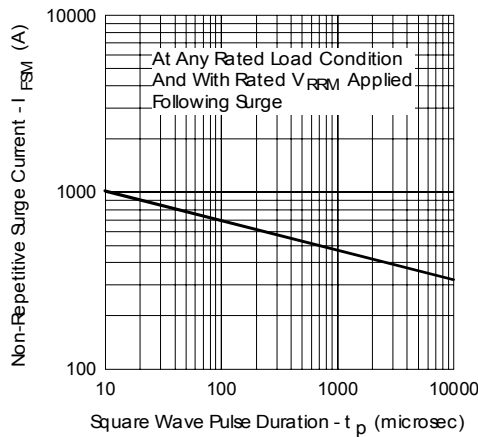


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

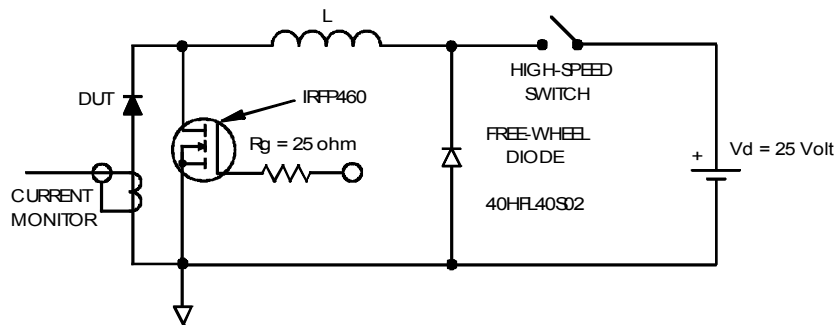
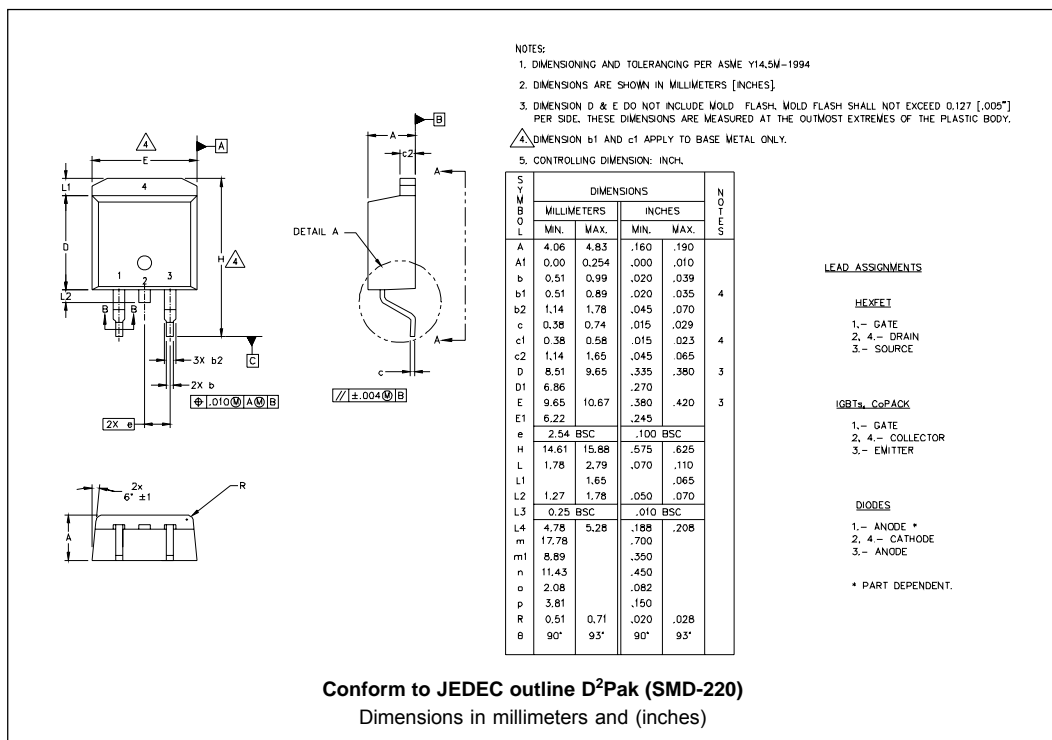
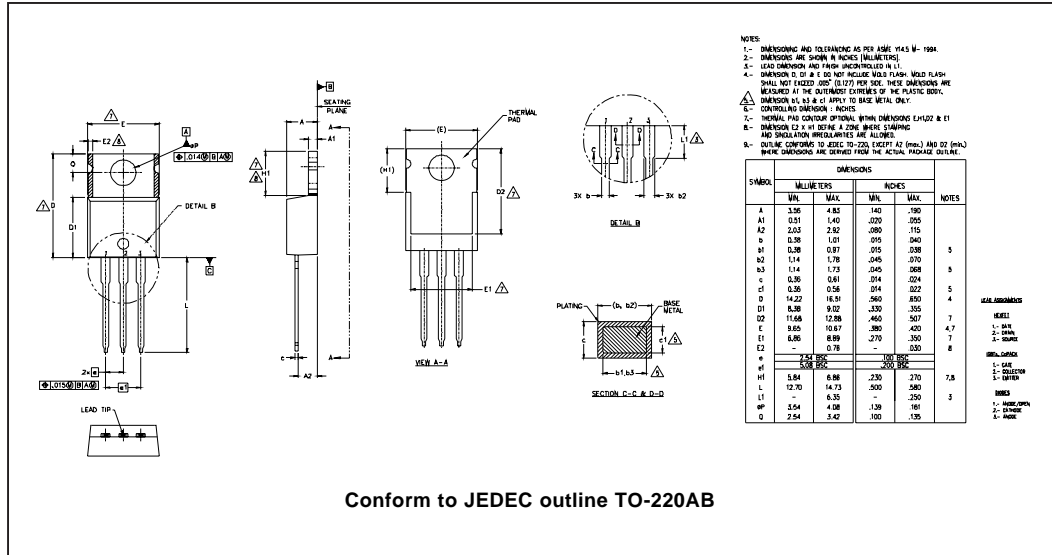


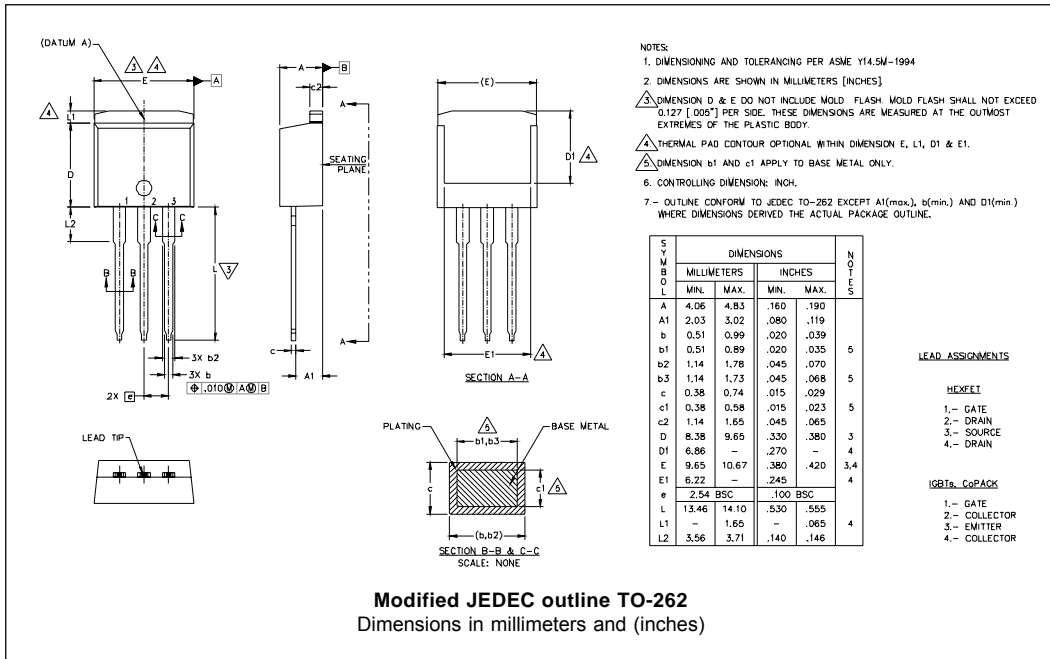
Fig. 8 - Unclamped Inductive Test Circuit

- (2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D); I_R @ V_{R1} = 10V$

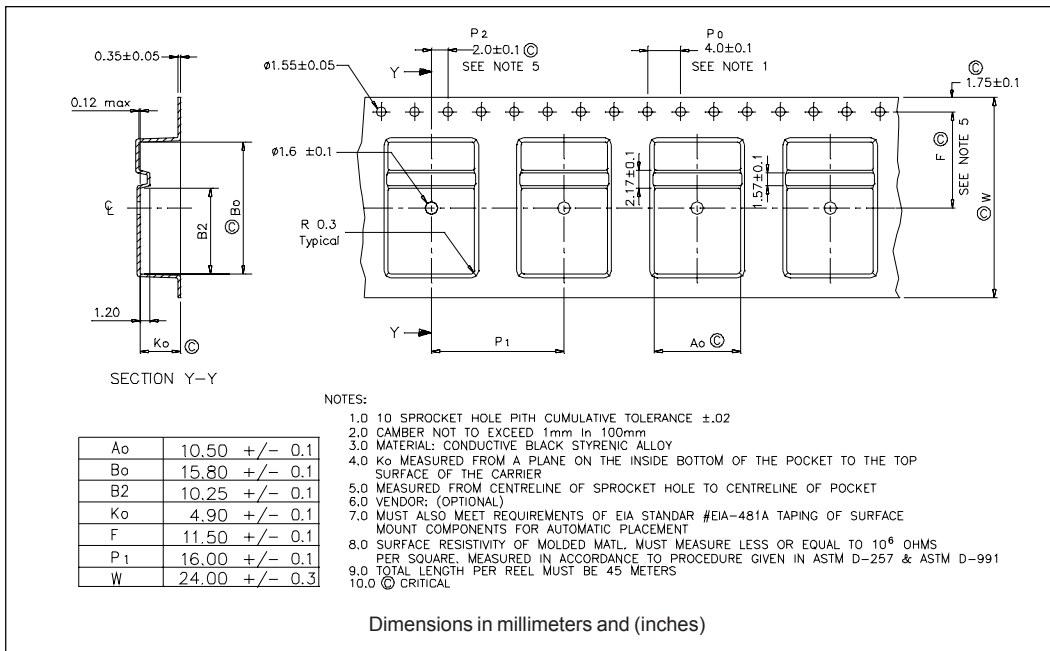
Outline Table



Outline Table



Tape & Reel Information



Part Marking Information

<p>TO-220</p>	<p>EXAMPLE: THIS IS A 40CTQ045 LOT CODE 1789 ASSEMBLED ON WW 19, 2000 IN THE ASSEMBLY LINE "C"</p>	<p>INTERNATIONAL RECTIFIER LOGO</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE</p> <p>YEAR 0 = 2000 WEEK 19 LINE C</p>
<p>D²PAK</p>	<p>EXAMPLE: THIS IS A 40CTQ045S LOT CODE 8024 ASSEMBLED ON WW 02, 2003 IN ASSEMBLY LINE "C"</p>	<p>INTERNATIONAL RECTIFIER LOGO</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE</p> <p>YEAR 3 = 2003 WEEK 02 LINE C</p>
<p>TO-262</p>	<p>EXAMPLE: THIS IS A 40CTQ045-1 LOT CODE 1789 ASSEMBLED ON WW 19, 2002 IN ASSEMBLY LINE "C"</p>	<p>INTERNATIONAL RECTIFIER LOGO</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE</p> <p>YEAR 2 = 2002 WEEK 19 LINE C</p>

Ordering Information Table

Device Code	
40	C
T	Q
045	S
TRL	-
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 (45 = 45V)
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.
 Qualification Standards can be found on IR's Web site.