Bulletin PD-20544 rev. C 12/01

International
IOR Rectifier

40CTQ045
40CTQ045S
40CTQ045-1

SCHOTTKY RECTIFIER

40 Amp

Major Ratings and Characteristics

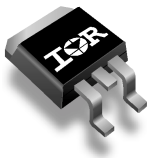
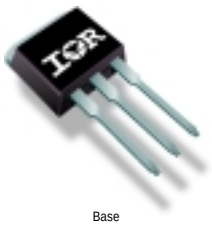
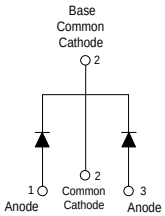
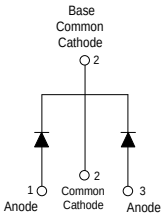
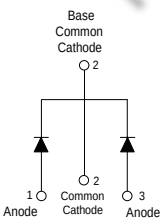
Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		45	V
I_{FSM}	@ tp = 5 µs sine	1240	A
V_F	@20Apk, T_J = 125°C (per leg)	0.48	V
T_J	range	-55 to 150	°C

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
		
		
TO-220	D^2PAK	TO-262

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 (Per Leg)	20	A	50% duty cycle @ T_C = 116°C, rectangular wave form
	Current * See Fig. 5 (Per Device)	40		
I_{FSM}	Max. Peak One Cycle Non-Repetitive	1240	A	5µs Sine or 3µs Rect. pulse — Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	350		10ms Sine or 6ms Rect. pulse
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	T_J = 25 °C, I_{AS} = 3 Amps, L = 4.40 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 x 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 °C
		0.68	V	@ 40A	
		0.48	V	@ 20A	T_J = 125 °C
		0.67	V	@ 40A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	3	mA	T_J = 25 °C	V_R = rated V_R
		115	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.27	V	T_J = T_J max.	
r_t	Forward Slope Resistance	8.72	mΩ		
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 < 300µs, Duty Cycle <2%

Thermal-Mechanical Specifications

Parameters			Values	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		2.0	°C/W	DC operation
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		1.0	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.50	°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)		

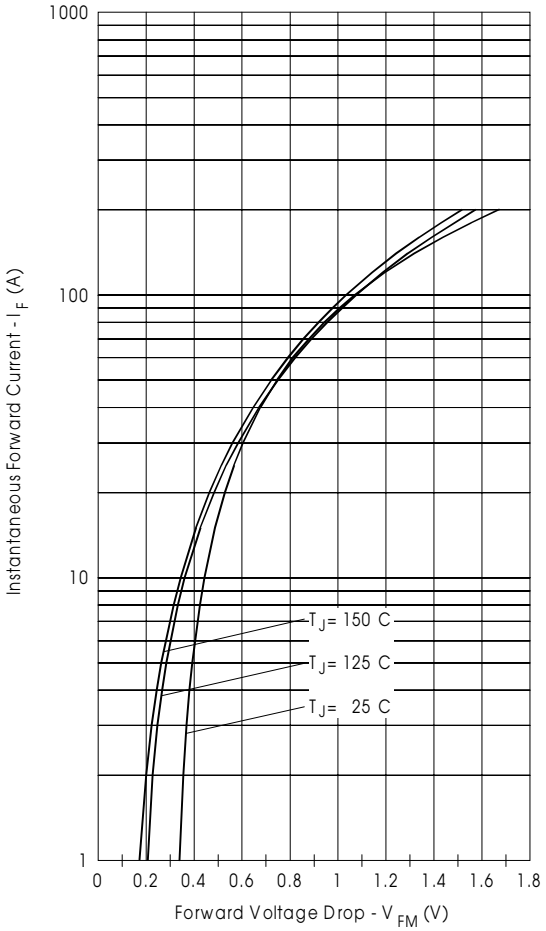


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

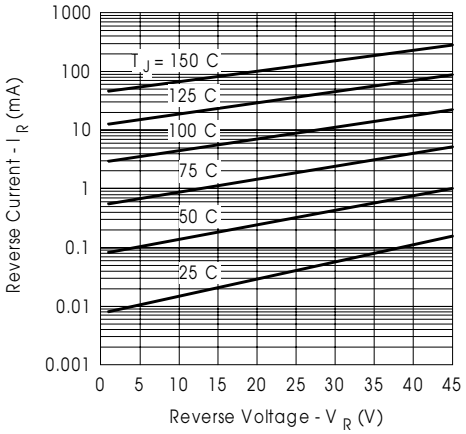


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

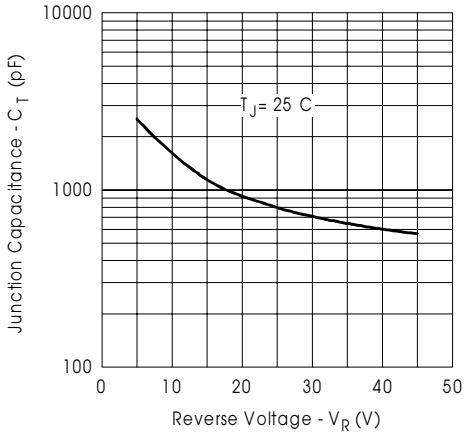


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

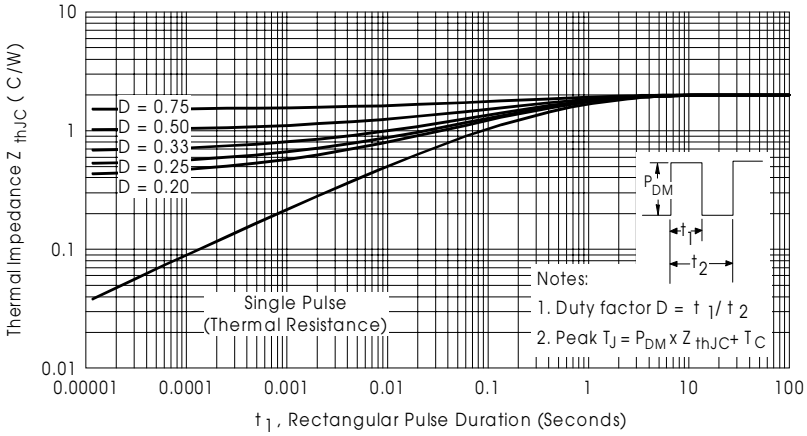


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

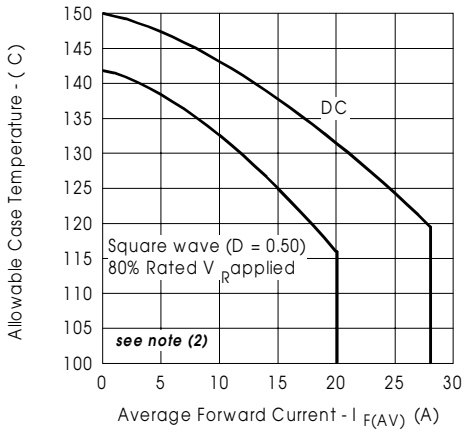


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

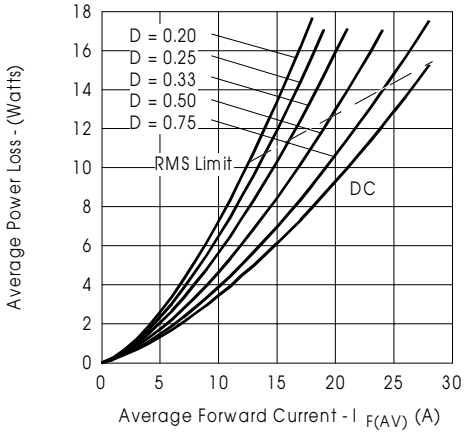


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

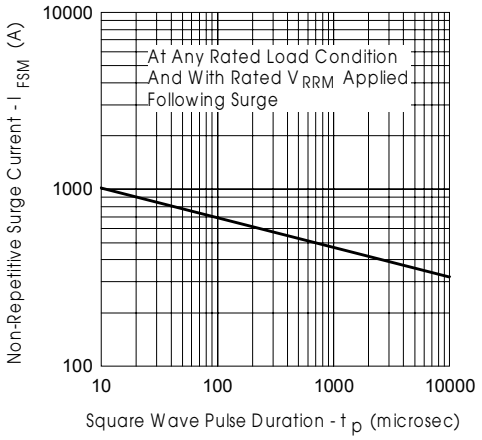


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

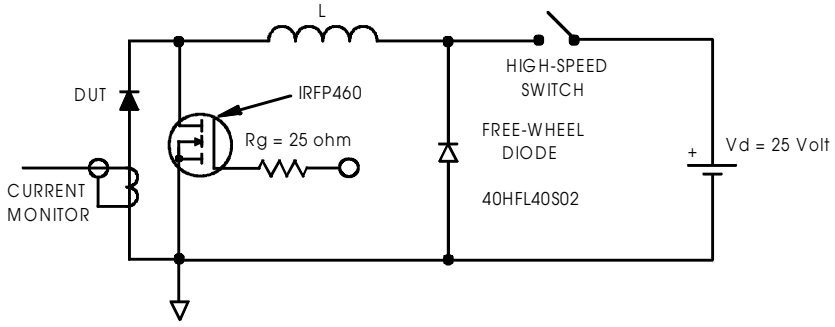
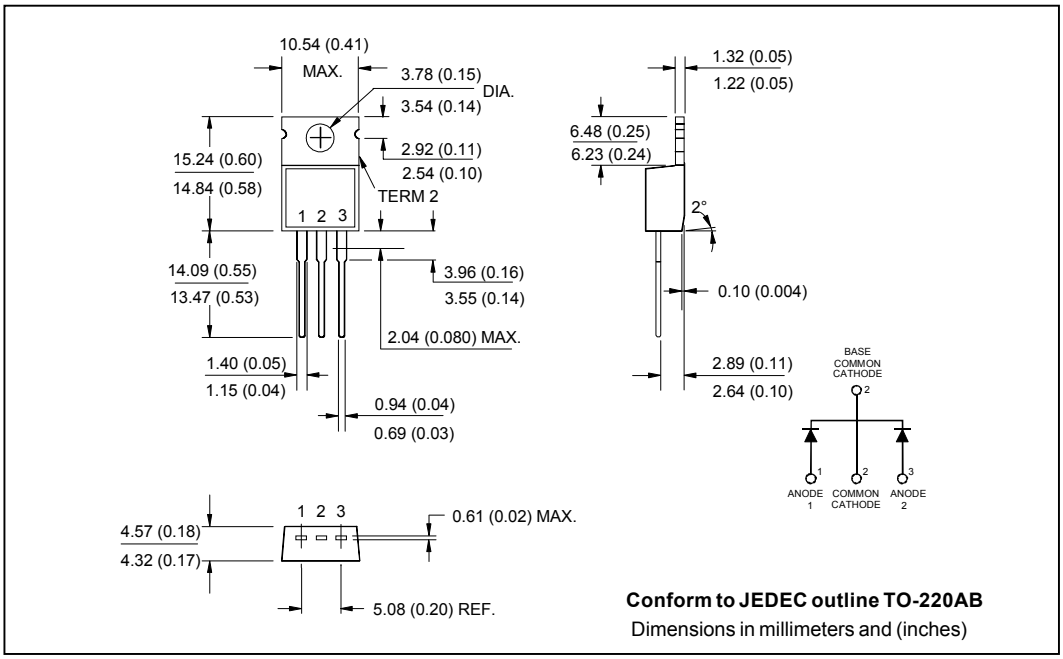


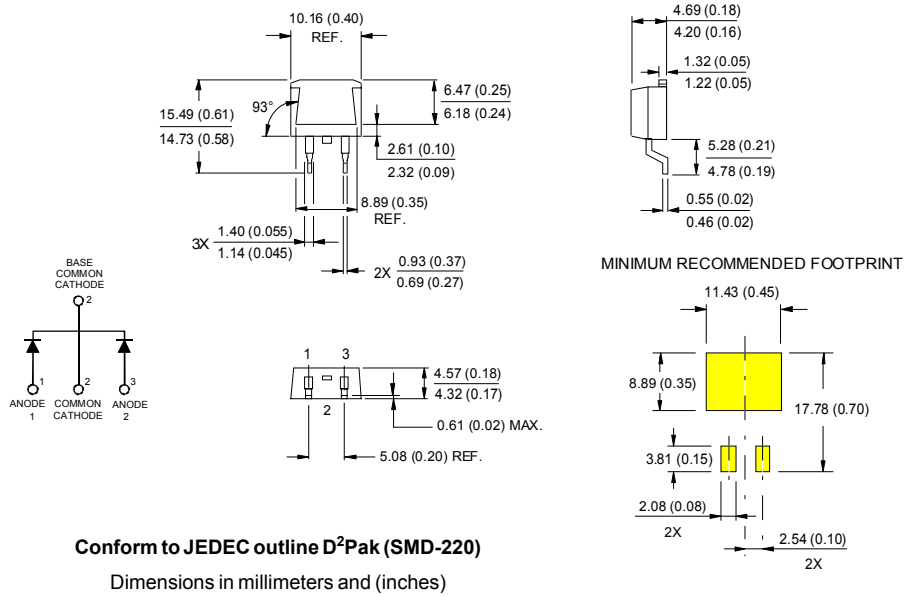
Fig. 8 - Unclamped Inductive Test Circuit

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

Outline Table



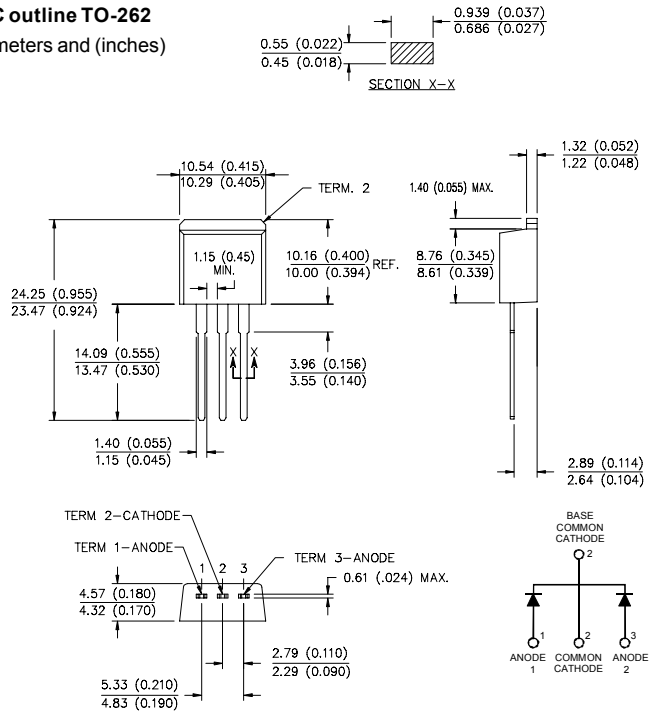
Conform to JEDEC outline TO-220AB
Dimensions in millimeters and (inches)



Conform to JEDEC outline D^2Pak (SMD-220)
Dimensions in millimeters and (inches)

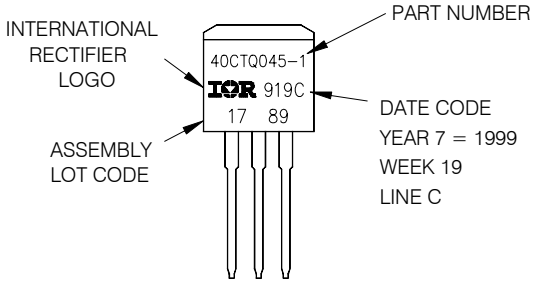
Outline Table

Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)

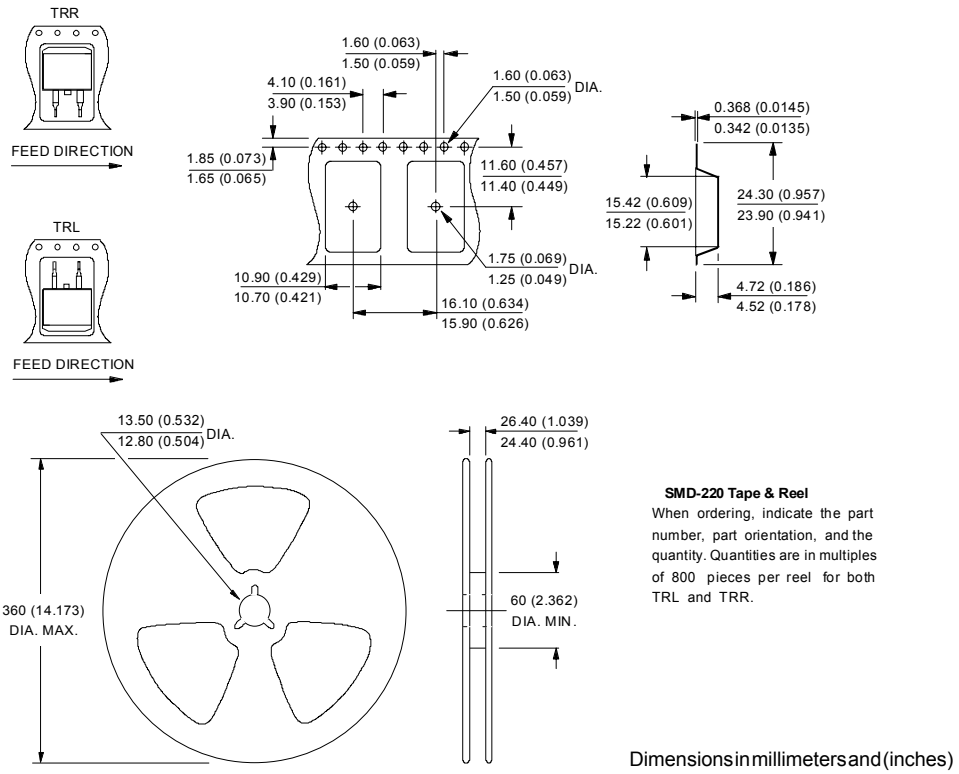


Marking Information

EXAMPLE: THIS IS A 40CTQ045-1
LOT CODE 1789
ASSEMBLED ON WW 19, 1999
IN THE ASSEMBLY LINE "C"



Tape & Reel Information

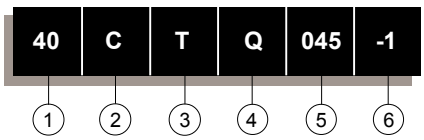


SMD-220 Tape & Reel
When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code



1 - Essential Part Number
2 - Common Cathode
3 - T = TO-220
4 - Q = Schottky Q Series
5 - Voltage Rating — 035 = 35V, 040 = 40V, 045 = 45V
6 - S = D^2Pak
- -1 = TO-262

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
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