



20TQ...  
20TQ...S

SCHOTTKY RECTIFIER

20 Amp

$I_{F(AV)} = 19\text{Amp}$   
 $V_R = 35/ 45\text{V}$

**Major Ratings and Characteristics**


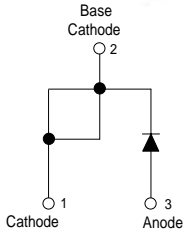

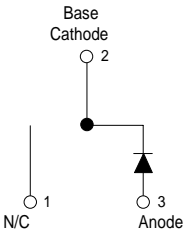
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	20	A
$V_{RRM}$ range	35/45	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	1800	A
$V_F$ @20 Apk, $T_J = 125^\circ\text{C}$	0.51	V
$T_J$ range	-55 to 150	$^\circ\text{C}$

**Description/ Features**

The 20TQ Schottky rectifier series 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
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

**Case Styles**

<p>20TQ...</p>  <p>Base Cathode 2</p>  <p>1 Cathode 3 Anode</p> <p>TO-220AC</p>	<p>20TQ... S</p>  <p>Base Cathode 2</p>  <p>1 N/C 3 Anode</p> <p>D<sup>2</sup>PAK</p>
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## Voltage Ratings

Part number	20TQ035	20TQ040	20TQ045
$V_R$ Max. DC Reverse Voltage (V)	35	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)			

## Absolute Maximum Ratings

Parameters	20TQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	20	A	50% duty cycle @ $T_C = 116^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	1800	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse
	400		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non-Repetitive Avalanche Energy	27	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 4$ Amps, $L = 3.4$ mH
$I_{AR}$ Repetitive Avalanche Current	4	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	20TQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (1) * See Fig. 1	0.57	V	@ 20A
	0.73	V	@ 40A
	0.51	V	@ 20A
	0.67	V	@ 40A
$I_{RM}$ Max. Reverse Leakage Current (1) * See Fig. 2	2.7	mA	$T_J = 25^\circ\text{C}$
	105	mA	$T_J = 125^\circ\text{C}$
$C_T$ Max. Junction Capacitance	1400	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance	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	20TQ	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	1.50	$^\circ\text{C}/\text{W}$	DC operation * See Fig. 4
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.50	$^\circ\text{C}/\text{W}$	Mounting surface, smooth and greased
wt Approximate Weight	2 (0.07)		g (oz.)
T Mounting Torque	Min. 6 (5)	Kg-cm (lbf-in)	
	Max. 12 (10)		
Marking Device	20TQ045	Case Style TO-220	
	20TQ045S	Case Style D <sup>2</sup> Pak	

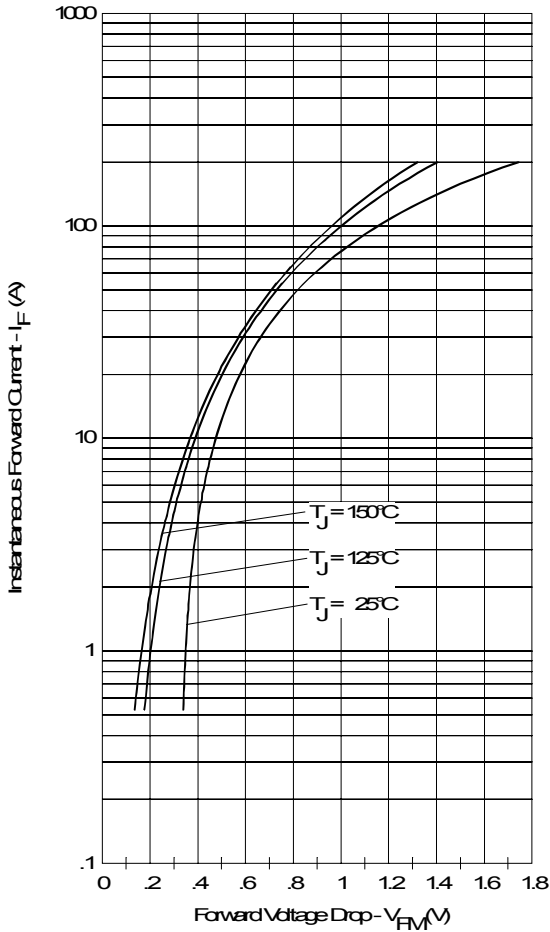


Fig. 1 - Maximum Forward Voltage Drop Characteristics

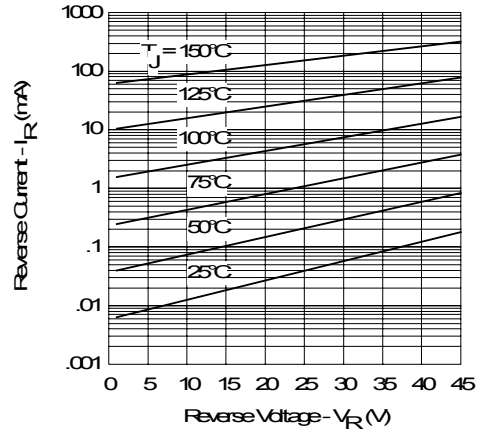


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

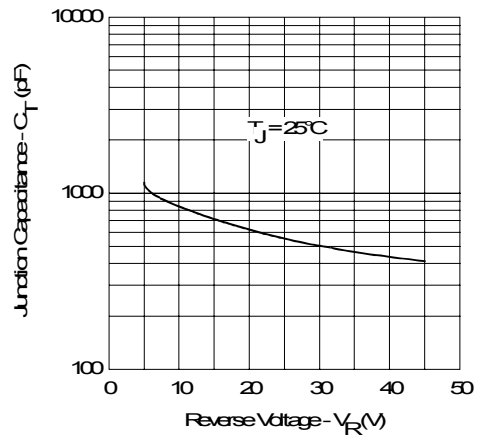


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

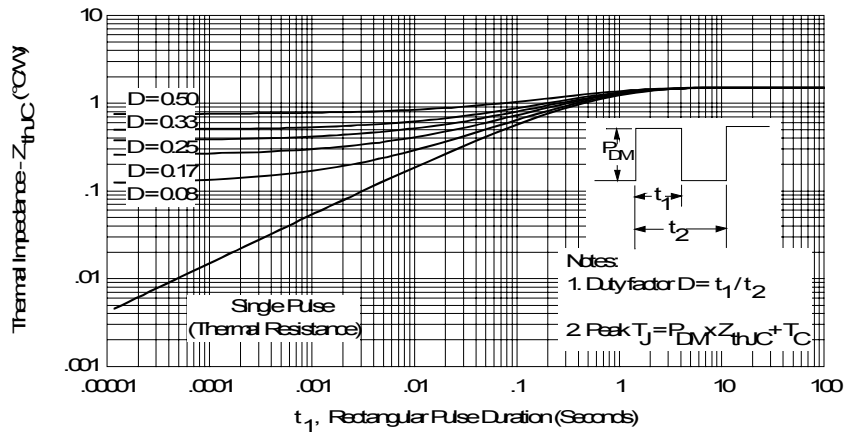


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

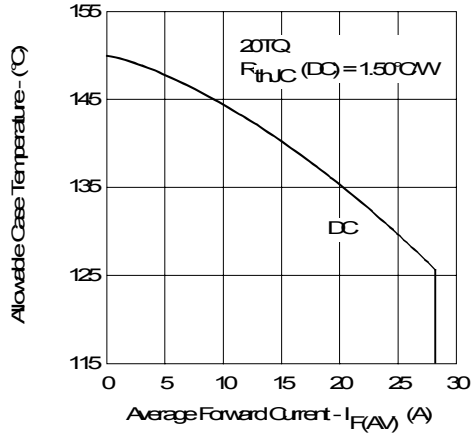


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

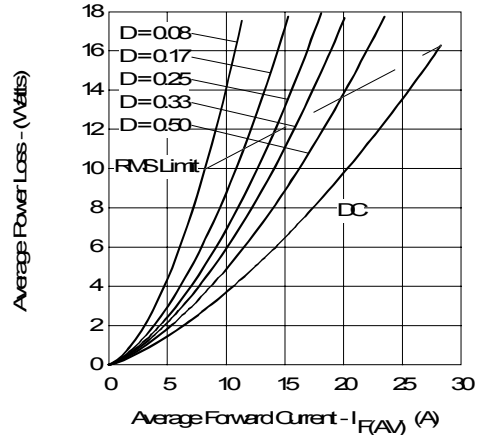


Fig. 6 - Forward Power Loss Characteristics

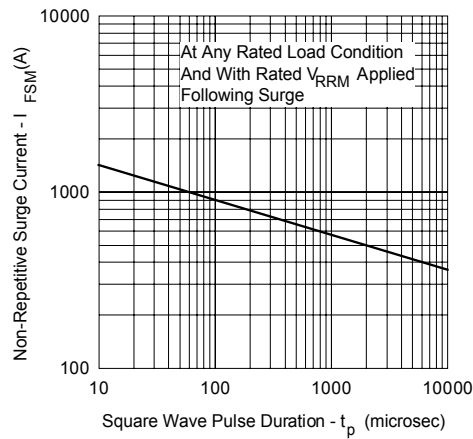


Fig. 7 - Maximum Non-Repetitive Surge Current

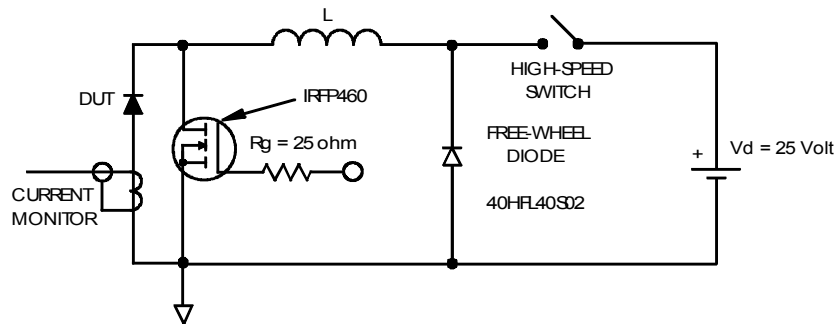
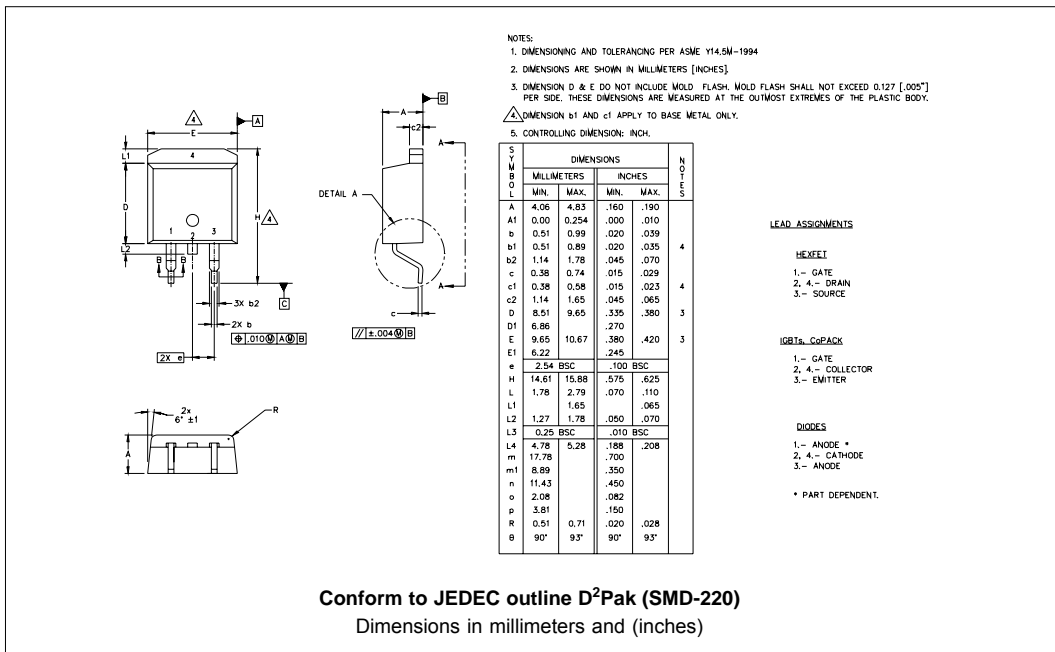
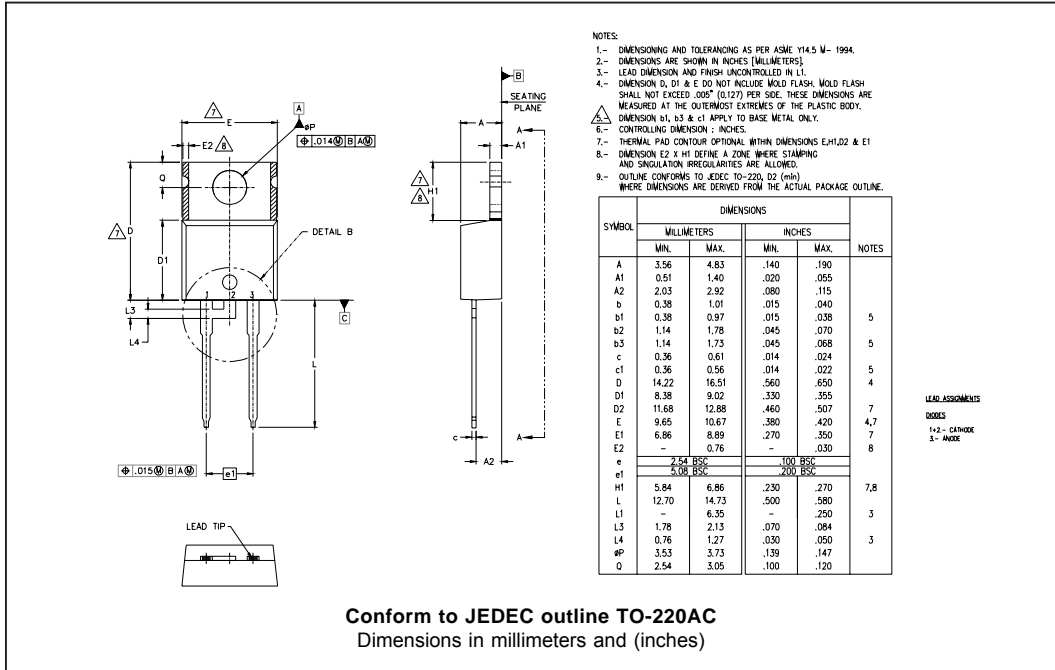


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table



Part Marking Information

**TO-220AC**

EXAMPLE: THIS IS A 20TQ045  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE "C"

INTERNATIONAL RECTIFIER LOGO  
ASSEMBLY LOT CODE  
PART NUMBER  
DATE CODE  
YEAR 1 = 2001  
WEEK 19  
LINE C

**D<sup>2</sup>Pak**

EXAMPLE: THIS IS A 20TQ045S  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000

INTERNATIONAL RECTIFIER LOGO  
ASSEMBLY LOT CODE  
PART NUMBER  
DATE CODE  
YEAR 0 = 2000  
WEEK 02  
LINE C

Tape & Reel Information

SECTION Y-Y

Ao	10.50	+/- 0.1
Bo	15.80	+/- 0.1
B2	10.25	+/- 0.1
Ko	4.90	+/- 0.1
F	11.50	+/- 0.1
P1	16.00	+/- 0.1
W	24.00	+/- 0.3

NOTES:

- 1.0 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ±.02
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 Ko MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
- 5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
- 6.0 VENDOR: (OPTIONAL)
- 7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDAR #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
- 8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO 10<sup>6</sup> OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
- 9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
- 10.0 © CRITICAL

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code					
20	T	Q	045	S	-
(1)	(2)	(3)	(4)	(5)	(6)

<p><b>1</b> - Current Rating (20 = 20A)</p> <p><b>2</b> - Package T = TO-220</p> <p><b>3</b> - Schottky "Q" Series</p> <p><b>4</b> - Voltage Ratings</p> <p><b>5</b> -                  • none = TO-220                  • S = D<sup>2</sup>Pak</p> <p><b>6</b> -                  • none = Standard Production                  • PbF = Lead-Free</p>	<table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">035 = 35V</td> </tr> <tr> <td style="padding: 2px;">040 = 40V</td> </tr> <tr> <td style="padding: 2px;">045 = 45V</td> </tr> </table>	035 = 35V	040 = 40V	045 = 45V
035 = 35V				
040 = 40V				
045 = 45V				

Tube Standard Pack Quantity : 50 pieces

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.