

# International IOR Rectifier

## 18TQ... 18TQ...S

SCHOTTKY RECTIFIER

18 Amp

$I_{F(AV)} = 18\text{Amp}$   
 $V_R = 35/ 45\text{V}$

### Major Ratings and Characteristics

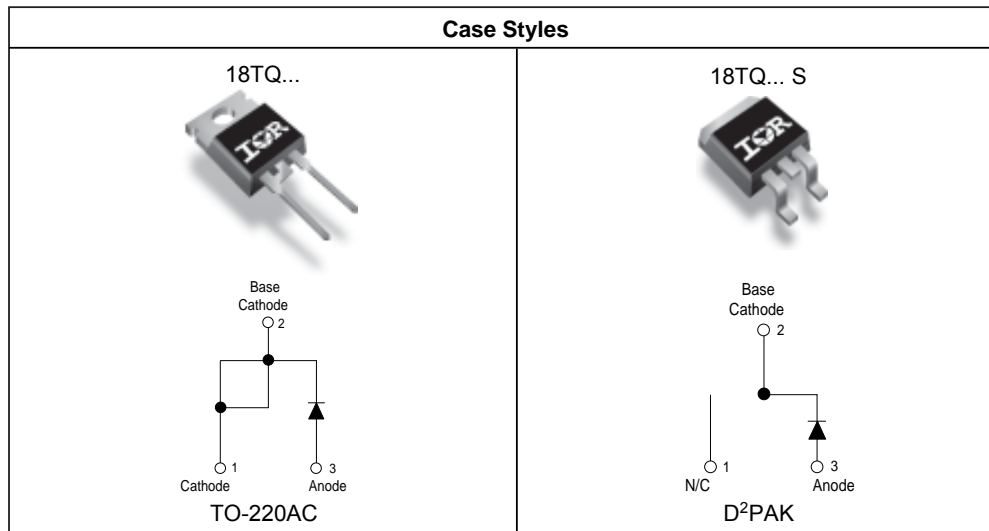
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	18	A
$V_{RRM}$ range	35/ 45	V
$I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine	1800	A
$V_F$ @ 18 Apk, $T_J = 125^\circ\text{C}$	0.53	V
$T_J$ range	-55 to 175	$^\circ\text{C}$

### Description/Features

The 18TQ Schottky rectifier series has been optimized for low reverse leakage at high temperature. 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
- 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



## 18TQ... Series

Bulletin PD-20178 rev. D 06/06

International  
**IRF** Rectifier

### Voltage Ratings

Part number	18TQ035	18TQ040	18TQ045
$V_R$ Max. DC Reverse Voltage (V)	35	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)			

### Absolute Maximum Ratings

Parameters	18TQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	18	A	50% duty cycle @ $T_C = 149^\circ\text{C}$ , 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
	390		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non-Repetitive Avalanche Energy	24	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 3.6$ Amps, $L = 3.7$ mH
$I_{AR}$ Repetitive Avalanche Current	3.6	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	18TQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (1) * See Fig. 1	0.60	V	@ 18A $T_J = 25^\circ\text{C}$
	0.72	V	@ 36A
	0.53	V	@ 18A $T_J = 125^\circ\text{C}$
	0.67	V	@ 36A
$I_{RM}$ Max. Reverse Leakage Current (1) * See Fig. 2	2.5	mA	$T_J = 25^\circ\text{C}$
	25	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$C_T$ 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	18TQ	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 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	18TQ045		Case Style TO-220
	18TQ045S		Case Style D <sup>2</sup> Pak

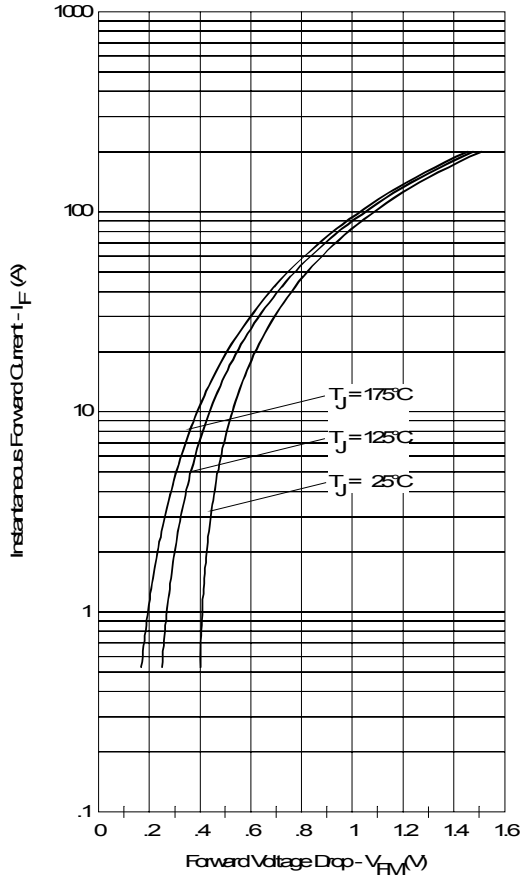


Fig. 1 - Maximum Forward Voltage Drop Characteristics

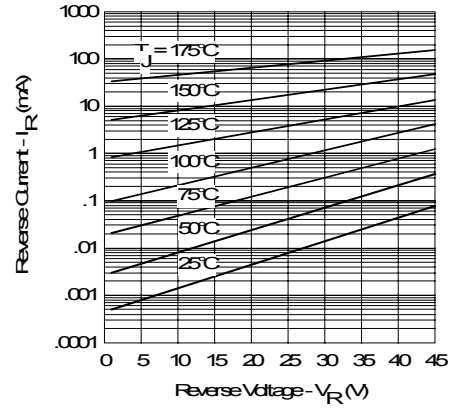


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

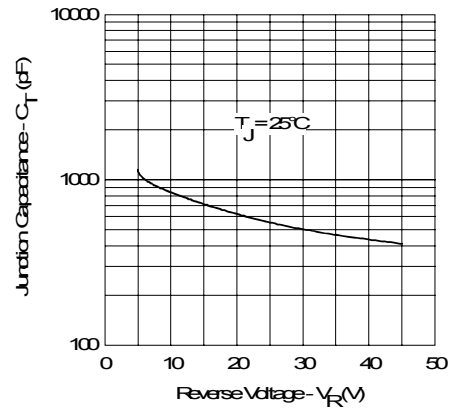


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

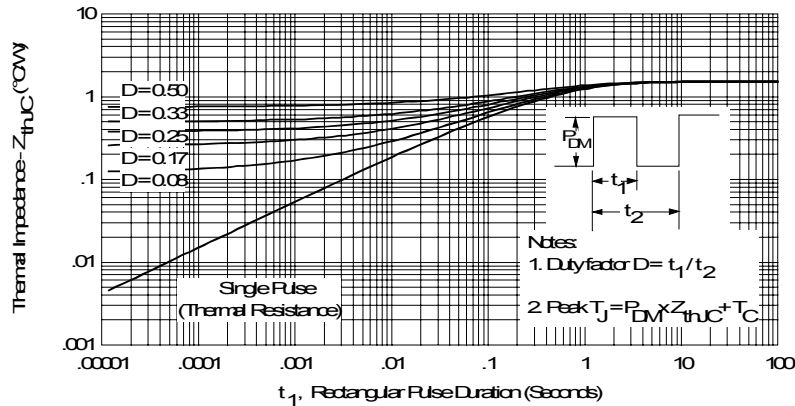


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

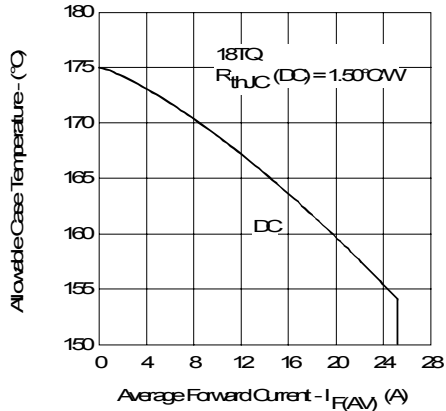


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

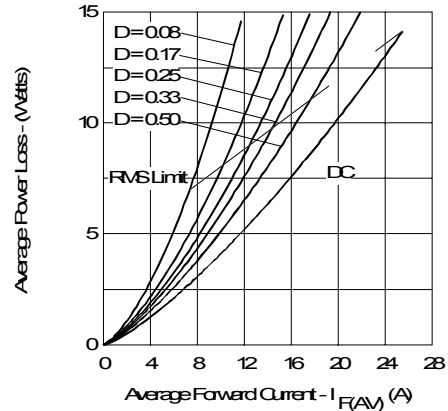


Fig. 6 - Forward Power Loss Characteristics

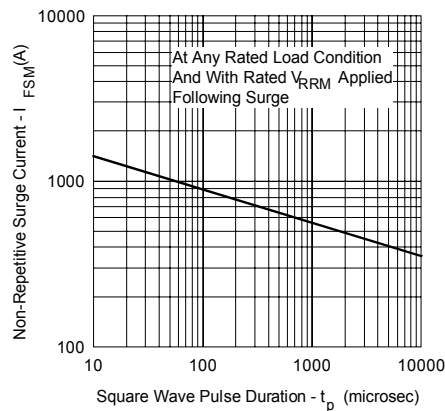


Fig. 7 - Maximum Non-Repetitive Surge Current

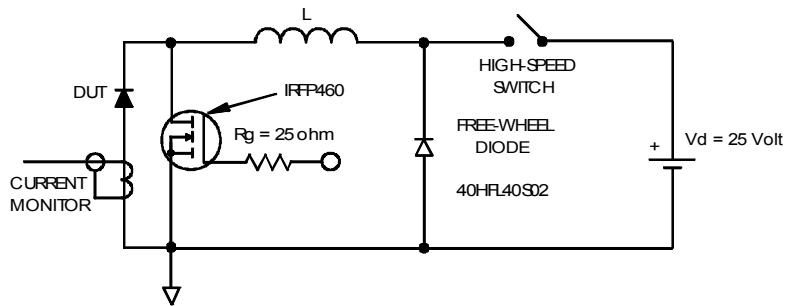
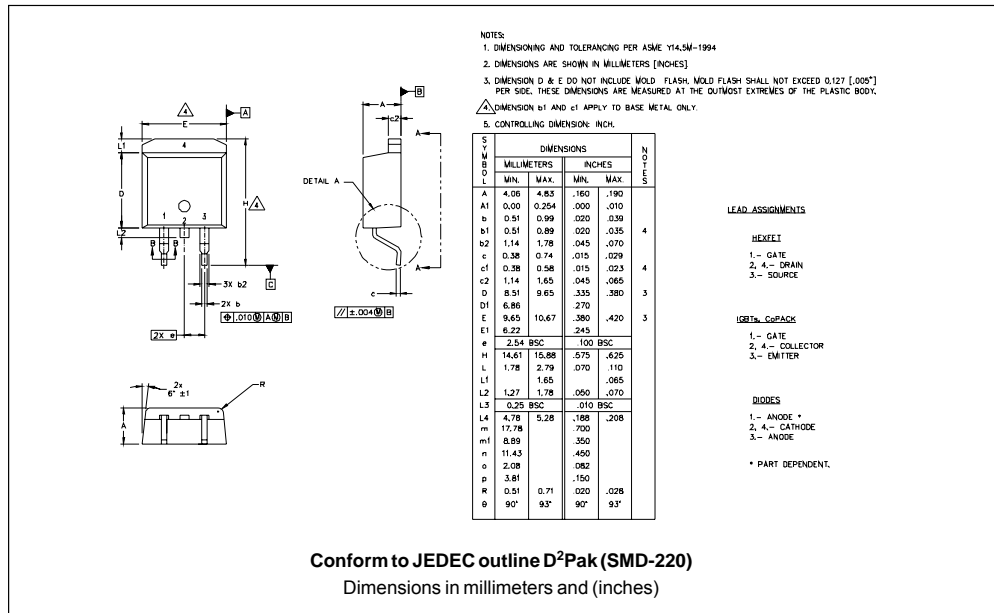
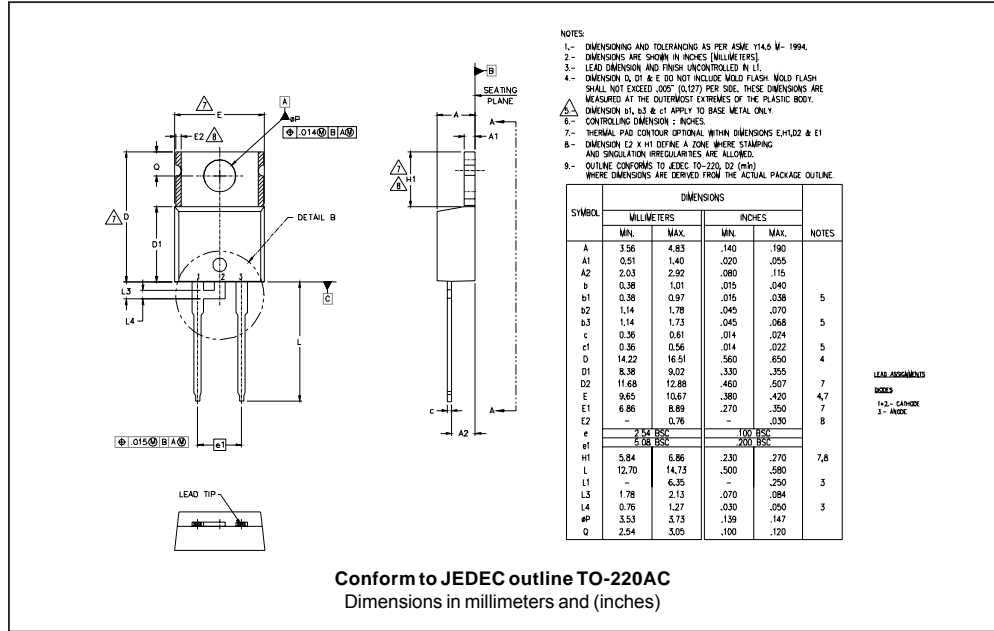


Fig. 8 - Unclamped Inductive Test Circuit

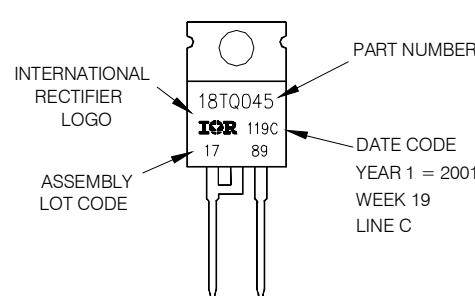
Outline Table



Part Marking Information

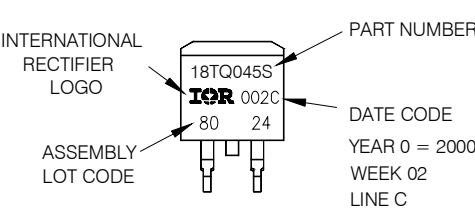
**TO-220AC**

EXAMPLE: THIS IS A 18TQ045  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE "C"

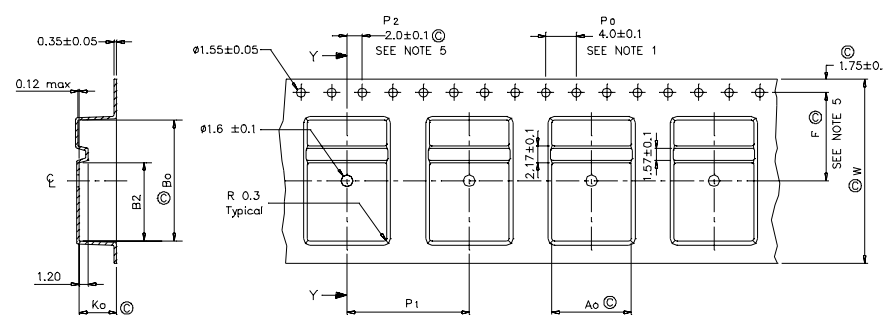


**D<sup>2</sup>Pak**

EXAMPLE: THIS IS A 18TQ045S  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000



Tape & Reel Information



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

SECTION Y-Y

**NOTES:**

- 1.0 10 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 STANDARD #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	
<b>18</b>	<b>T</b>
<b>Q</b>	<b>045</b>
<b>S</b>	<b>-</b>
①	②
③	④
⑤	⑥

<p><b>1</b> - Current Rating (18 = 18A)</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> -</p> <ul style="list-style-type: none"> <li>• none = TO-220</li> <li>• S = D<sup>2</sup>Pak</li> </ul> <p><b>6</b> -</p> <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">                 035 = 35V                  045 = 45V             </div>
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Tube Standard Pack Quantity : 50 pieces

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18TQ045
*****
* This model has been developed by *
* Wizard SPICE MODEL GENERATOR (1999) *
* (International Rectifier Corporation) *
* Contains Proprietary Information *
*****
* SPICE Model Diode is composed by a *
* simple diode plus paralalled VCG2T *
*****
.SUBCKT 18TQ045 ANO CAT
D1 ANO 1 DMOD (0.10899)
*Define diode model
.MODEL DMOD D(IS=4.49213078685186E-05A,N=1.23149728754907,BV=52V,
+ IBV=9.03115410463162E-02A,RS= 0.000664839,CJO=2.73074429693125E-08,
+ VJ=0.881972575936711,XTI=2, EG=0.789061316955255)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=18.1199792035774)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-3.316412E-03/18.11998)*(V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*6.806625E-02*ABS(V(ANO,CAT)))-1)}
*****
.ENDS 18TQ045

Thermal Model Subcircuit
.SUBCKT 18TQ045 5 1

CTHERM1 5 4 6.49E-01
CTHERM2 4 3 3.46E+00
CTHERM3 3 2 1.63E+01
CTHERM4 2 1 3.01E+02

RTHERM1 5 4 6.77E-01
RTHERM2 4 3 5.70E-01
RTHERM1 3 2 2.05E-01
RTHERM1 2 1 3.44E-02

.ENDS 18TQ045

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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  
**IOR** Rectifier

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Visit us at [www.irf.com](http://www.irf.com) for sales contact information. 06/06