

International
IR Rectifier

18TQ...
18TQ...S

SCHOTTKY RECTIFIER

18 Amp

$$I_{F(AV)} = 18\text{Amp}$$

$$V_R = 35/45\text{V}$$

Major Ratings and Characteristics

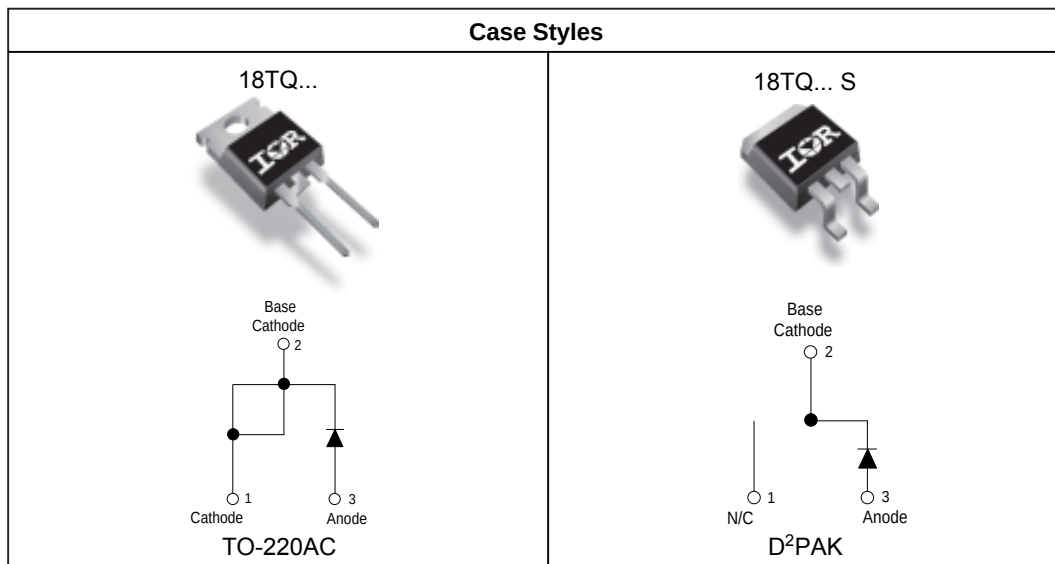
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	18	A
V_{RRM} range	35/ 45	V
I_{FSM} @tp = 5 μ s sine	1800	A
V_F @18 Apk, $T_J = 125^\circ\text{C}$	0.53	V
T_J range	-55 to 175	$^\circ\text{C}$

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

- 175°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



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 μs Sine or 3 μs Rect. pulse
	390		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	24	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 3.6\text{Amps}$, $L = 3.7\text{mH}$
I_{AR} Repetitive Avalanche Current	3.6	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	18TQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1) * See Fig. 1	0.60	V	@ 18A
	0.72	V	@ 36A
	0.53	V	@ 18A
	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	$T_J = 125^\circ\text{C}$
C_T Max. Junction Capacitance	1400	pF	$V_R = 5V_{DC}$, (test signal range 100Khz to 1Mhz) 25°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/ μs	

(1) Pulse Width < 300 μs , Duty Cycle < 2%

Thermal-Mechanical Specifications

Parameters		18TQ	Units	Conditions
T _J	Max. Junction Temperature Range	-55 to 175	°C	
T _{stg}	Max. Storage Temperature Range	-55 to 175	°C	
R _{thJC}	Max. Thermal Resistance Junction to Case	1.50	°C/W	DC operation * See Fig. 4
R _{thCS}	Typical Thermal Resistance, Case to Heatsink	0.50	°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)
		Max.	12 (10)	
Marking Device		18TQ045		Case Style TO-220
		18TQ045S		Case Style D ² Pak

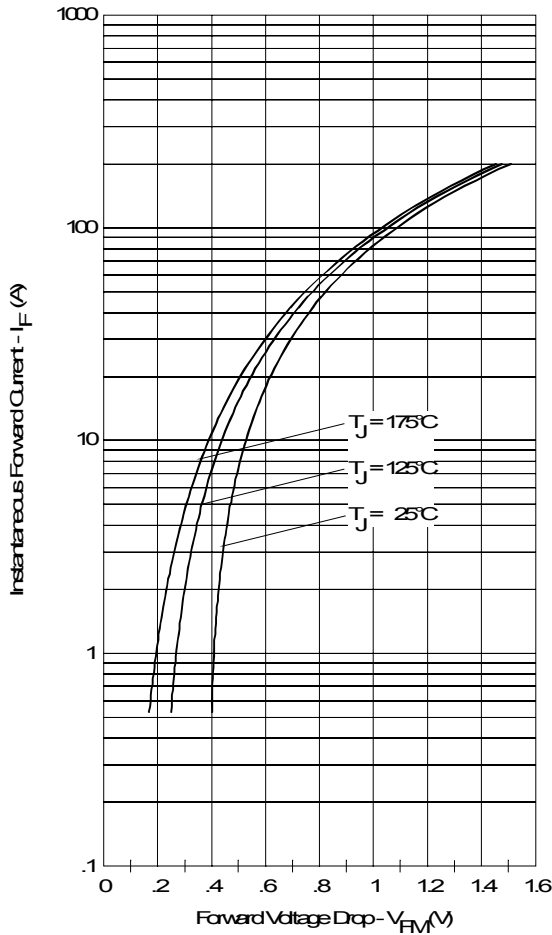


Fig. 1 - Maximum Forward Voltage Drop Characteristics

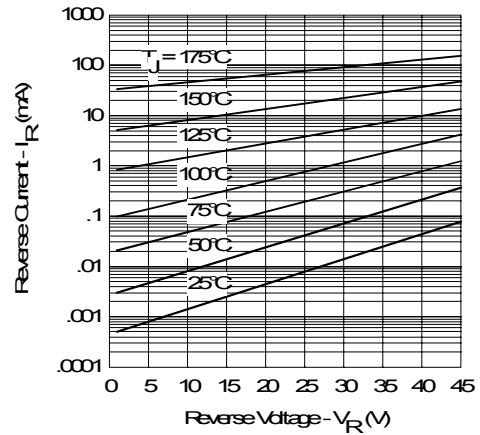


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

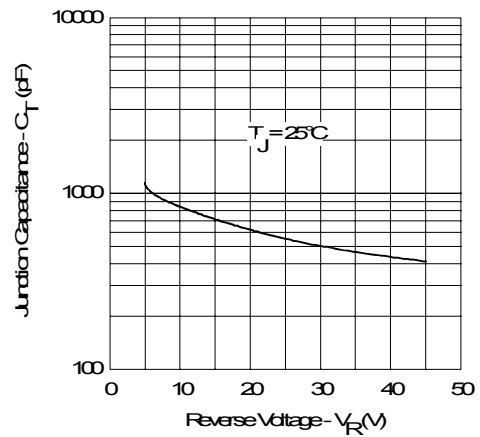


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

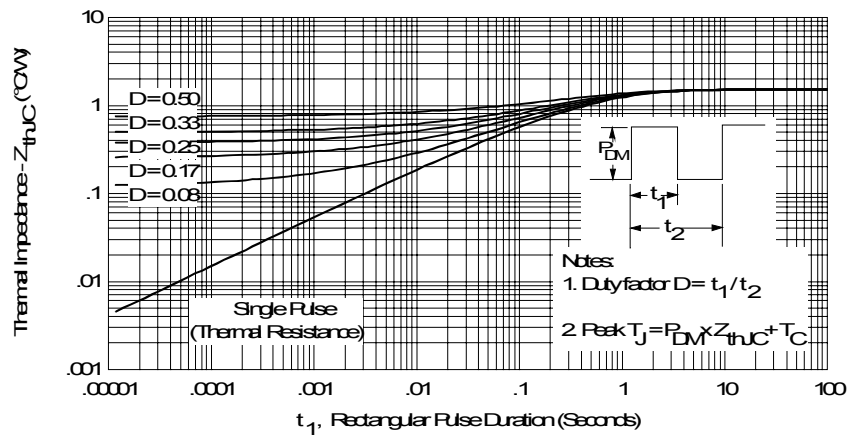


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

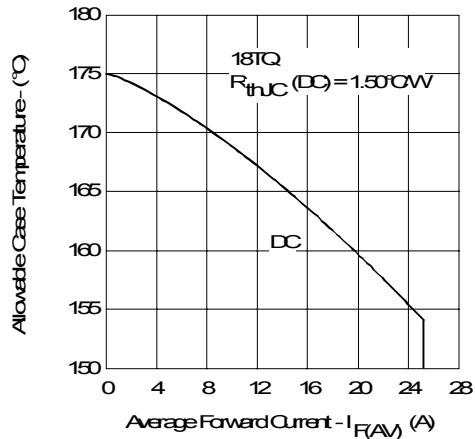


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

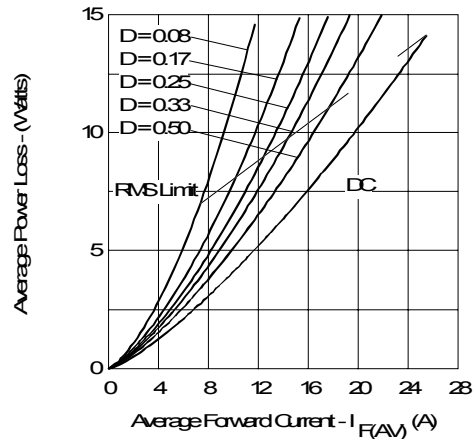


Fig. 6 - Forward Power Loss Characteristics

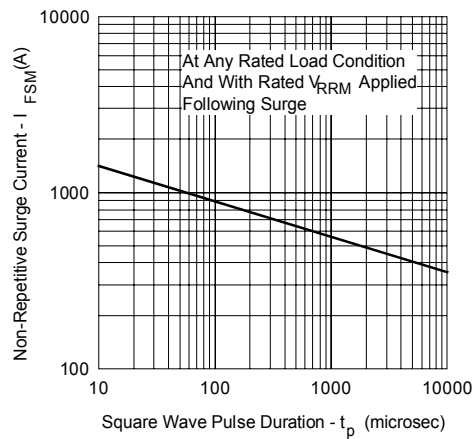


Fig. 7 - Maximum Non-Repetitive Surge Current

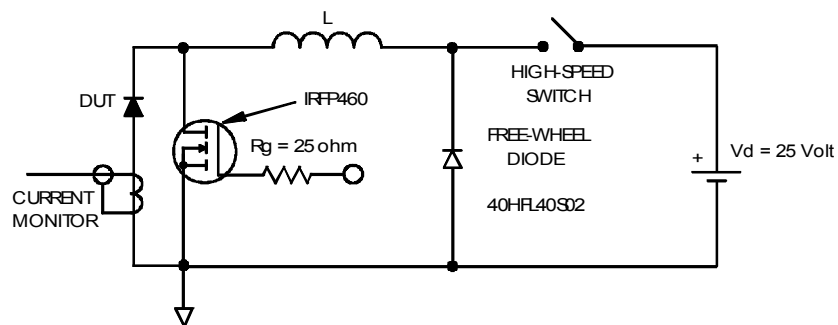
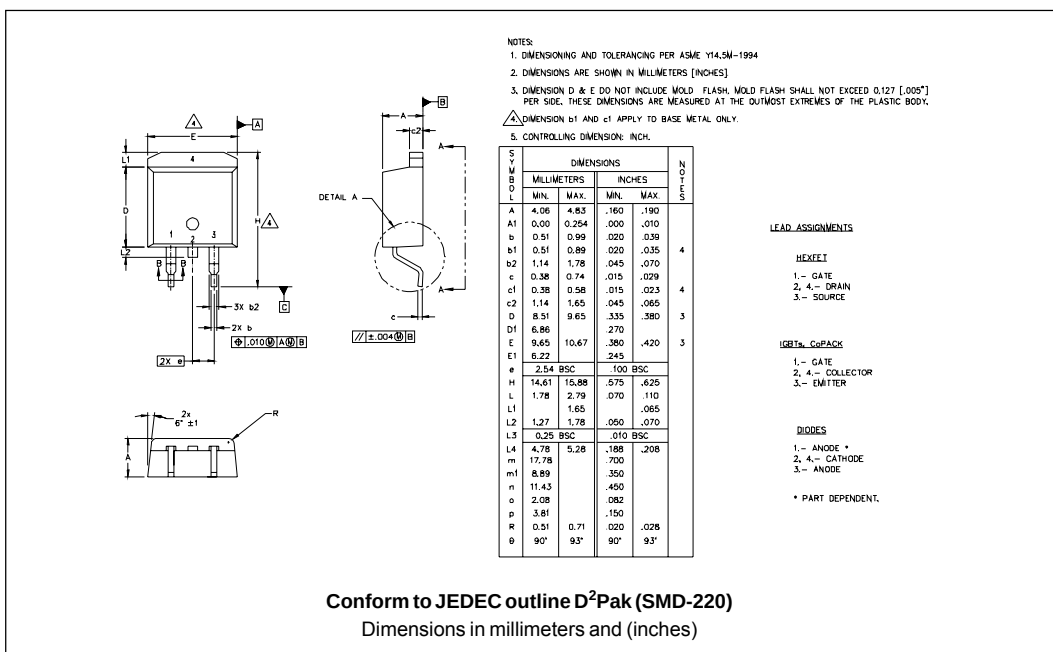
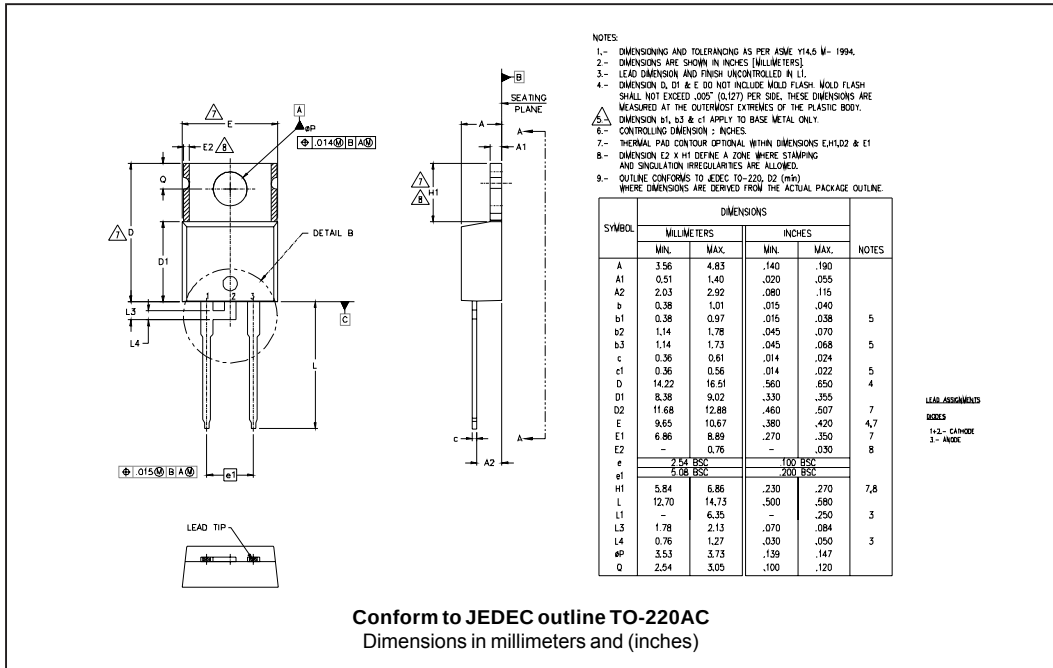


Fig. 8 - Unclamped Inductive Test Circuit

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"

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

DATE CODE
YEAR 1 = 2001
WEEK 19
LINE C

ASSEMBLY LOT CODE

D²Pak

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

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

DATE CODE
YEAR 0 = 2000
WEEK 02
LINE C

ASSEMBLY LOT CODE

Tape & Reel Information

SECTION Y-Y

NOTES:

- 1.0 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ± 0.02
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 K_0 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 10^6 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

A_0	10.50	+/- 0.1
B_0	15.80	+/- 0.1
B2	10.25	+/- 0.1
K_0	4.90	+/- 0.1
F	11.50	+/- 0.1
P1	16.00	+/- 0.1
W	24.00	+/- 0.3

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

18	T	Q	045	S	-
1	2	3	4	5	6

- 1** - Current Rating (18 = 18A)
- 2** - Package
T = TO-220
- 3** - Schottky "Q" Series
- 4** - Voltage Ratings
- 5** -
 - none = TO-220
 - S = D²Pak
- 6** -
 - none = Standard Production
 - PbF = Lead-Free

035 = 35V
045 = 45V

Tube Standard Pack Quantity : 50 pieces

18TQ... Series

Bulletin PD-20178 rev. D 06/06

International
IR Rectifier

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)))}

.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

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.

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