

International
IR Rectifier

18TQ...
18TQ...S

SCHOTTKY RECTIFIER

18 Amp

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

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

Major Ratings and Characteristics

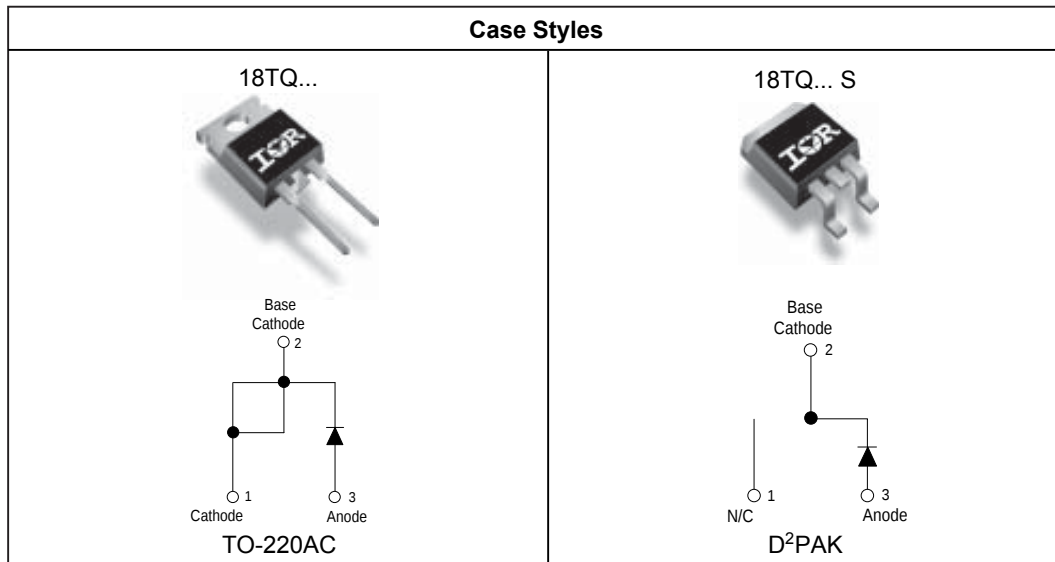
Characteristics	18TQ	Units
$I_{F(AV)}$ Rectangular waveform	18	A
V_{RRM} range	35 to 45	V
I_{FSM} @ $t_p = 5\mu\text{s}$ sine	1800	A
V_F @18Apk, $T_J = 125^\circ\text{C}$	0.53	V
T_J range	-55 to 175	$^\circ\text{C}$

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	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case	1.50	$^\circ\text{C/W}$	DC operation * See Fig. 4
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.50	$^\circ\text{C/W}$	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)	

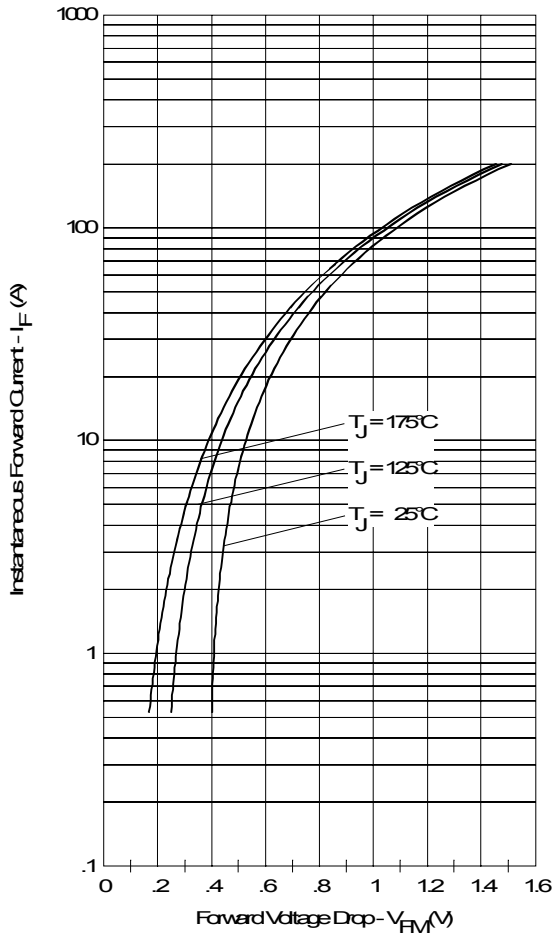


Fig. 1 - Maximum Forward Voltage Drop Characteristics

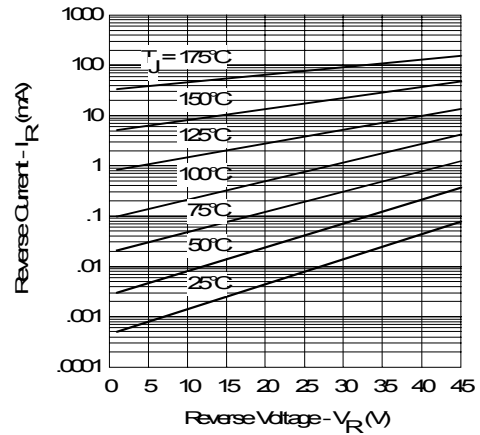


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

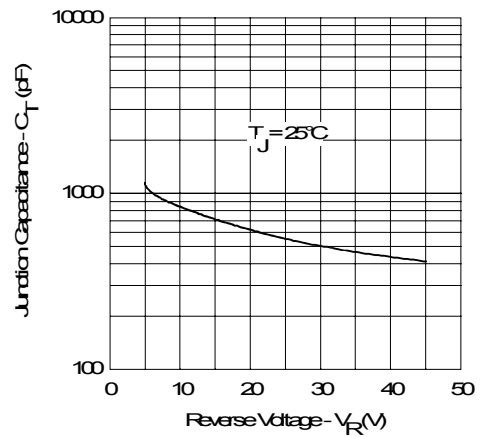


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

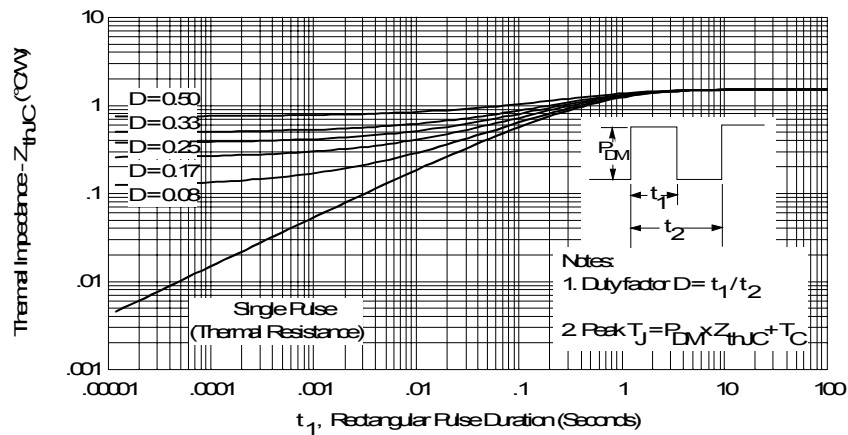


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

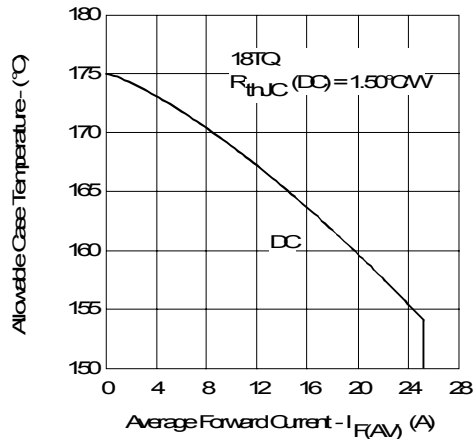


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

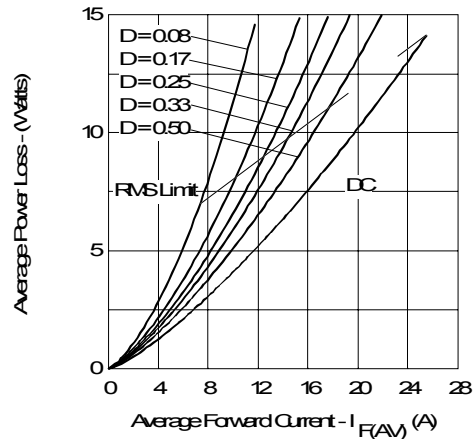


Fig. 6 - Forward Power Loss Characteristics

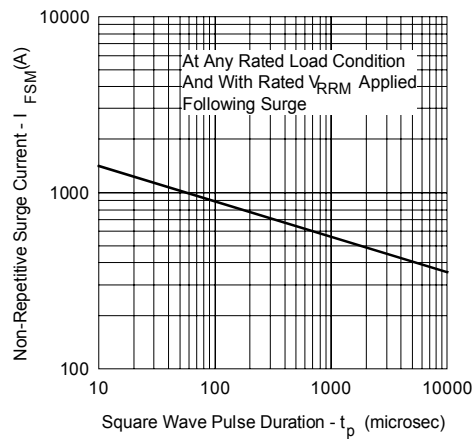


Fig. 7 - Maximum Non-Repetitive Surge Current

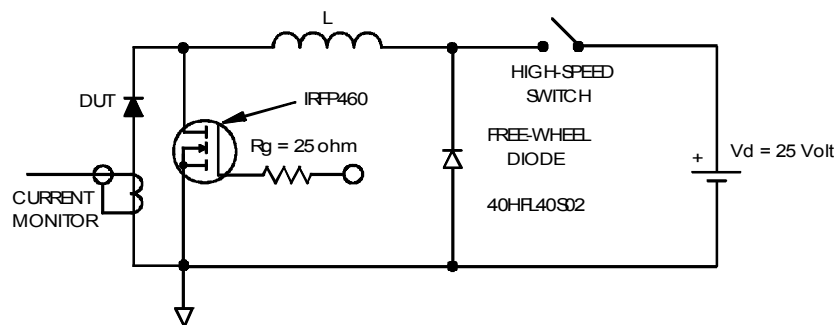
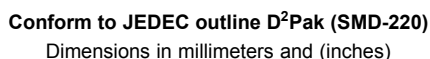


Fig. 8 - Unclamped Inductive Test Circuit

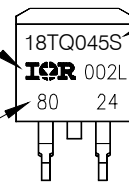
Outline Table



Marking Information

EXAMPLE: THIS IS A 18TQ045-S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

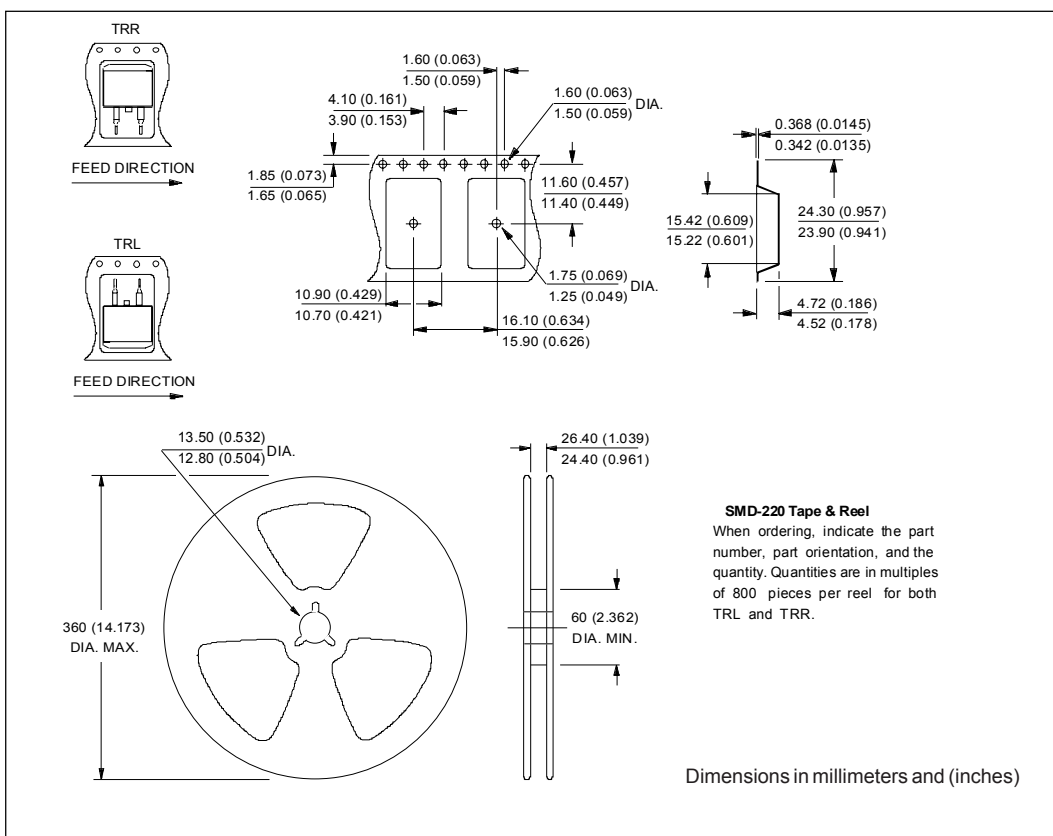
INTERNATIONAL
RECTIFIER
LOGO
ASSEMBLY
LOT CODE



PART NUMBER

DATE CODE
YEAR 0 = 2000
WEEK 02
LINE L

Tape & Reel Information



Ordering Information Table

Device Code				
18	T	Q	045	S
1	2	3	4	5
1	- Essential Part Number			
2	- T = TO-220			
3	- Q = Schottky Q Series			
4	- Voltage Rating			
5	- S = D ² Pak			
			035 = 35V	
			040 = 40V	
			045 = 45V	

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
```

18TQ... Series

Bulletin PD-20178 rev. C 07/03

International
IOR Rectifier

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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