Bulletin PD-20561 rev. D 07/03

International Rectifier

# 8TQ...
# 8TQ...S

## SCHOTTKY RECTIFIER

8 Amp

$I_{F(AV)}$ = 8 Amp
$V_R$ = 80 - 100V

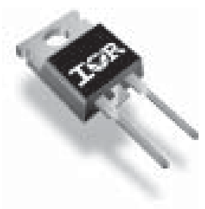
### Major Ratings and Characteristics

| Characteristics | 8TQ | Units |
|---|---|---|
| $I_{F(AV)}$ Rectangular waveform | 8 | A |
| $V_{RRM}$ range | 80 - 100 | V |
| $I_{FSM}$ @ tp = 5 μs sine | 850 | A |
| $V_F$ @ 8 Apk, $T_J$ = 125°C | 0.58 | V |
| $T_J$ range | - 55 to 175 | °C |

### Description/ Features

The 8TQ 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 | |
|---|---|
| 8TQ... | 8TQ... S |
|  |  |
| TO-220 | $D^2$PAK |

## Voltage Ratings

| | Part number | 8TQ080 | 8TQ100 |
|---|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 80 | 100 |
| $V_{RWM}$ | Max. Working Peak Reverse Voltage (V) | | |

## Absolute Maximum Ratings

| | Parameters | 8TQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current<br>* See Fig. 5 | 8 | A | 50% duty cycle @ $T_C$ = 157° C, rectangular wave form | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 850 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | Surge Current * See Fig. 7 | 230 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non-Repetitive Avalanche Energy | 7.50 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 0.50 Amps, L = 60 mH | |
| $I_{AR}$ | Repetitive Avalanche Current | 0.50 | A | Current decaying linearly to zero in 1 µsec<br>Frequency limited by $T_J$ max. $V_A$ = 1.5 x $V_R$ typical | |

## Electrical Specifications

| | Parameters | 8TQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (1) | 0.72 | V | @ 8A | $T_J$ = 25 °C |
| | * See Fig. 1 | 0.88 | V | @ 16A | |
| | | 0.58 | V | @ 8A | $T_J$ = 125 °C |
| | | 0.69 | V | @ 16A | |
| $I_{RM}$ | Max. Reverse Leakage Current (1) | 0.55 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | * See Fig. 2 | 7 | mA | $T_J$ = 125 °C | |
| $C_T$ | Max. Junction Capacitance | 500 | pF | $V_R$ = 5$V_{DC}$ (test signal range 100Khz to 1Mhz) 25 °C | |
| $L_S$ | Typical Series Inductance | 8 | 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 | | 8TQ | 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 | | 2.0 | °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 (Ibf-in) | |
| | | Max. | 12 (10) | | |

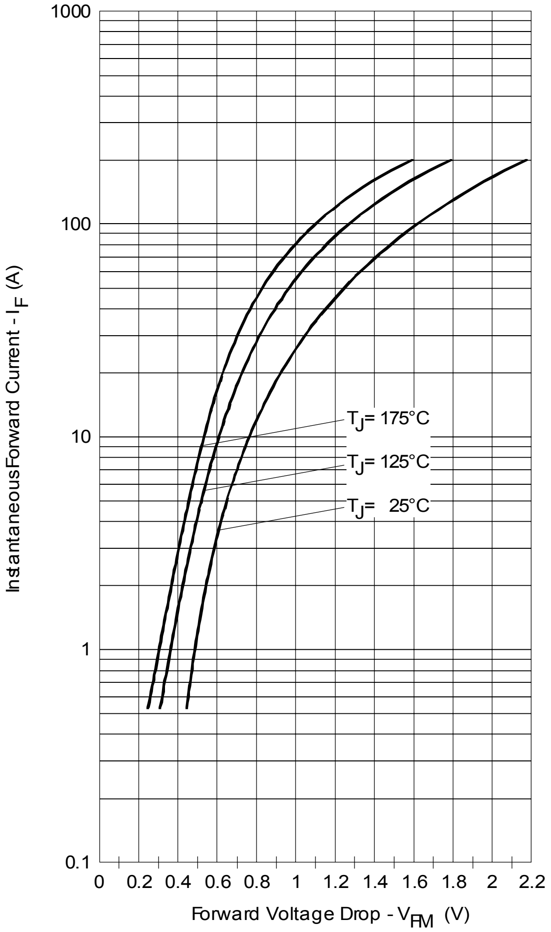



Fig. 1 - Maximum Forward Voltage Drop Characteristics

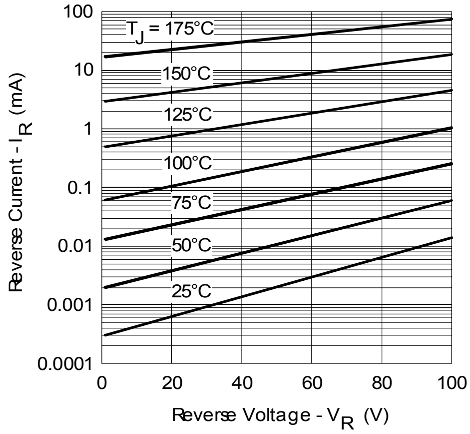



Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

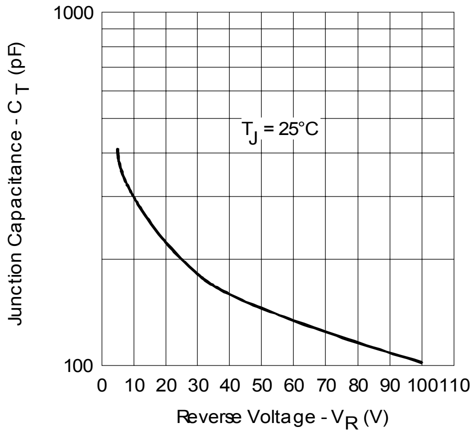



Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

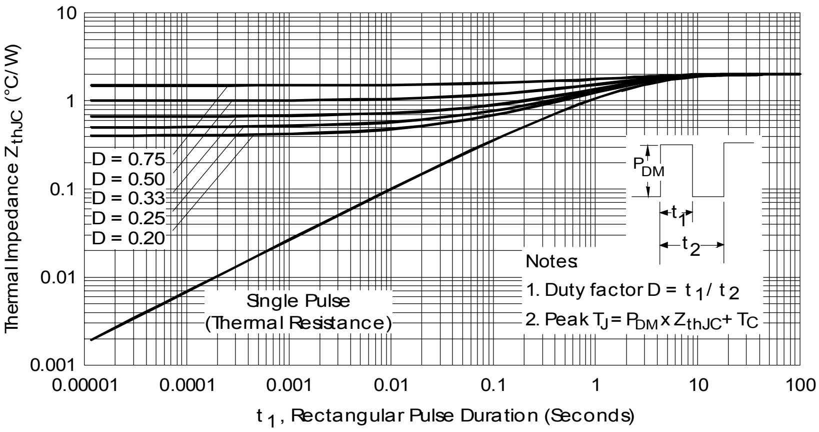



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

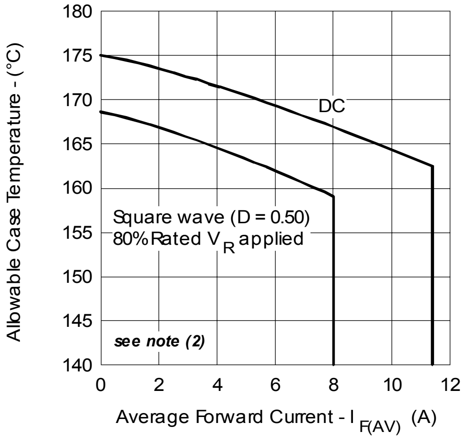



Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

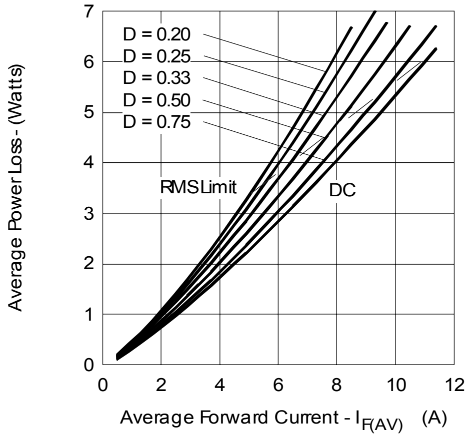



Fig. 6 - Forward Power Loss Characteristics

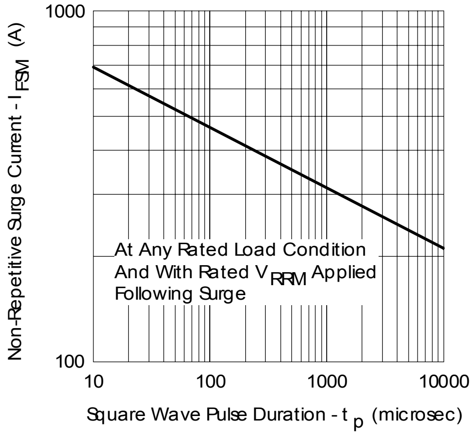



Fig. 7 - Maximum Non-Repetitive Surge Current

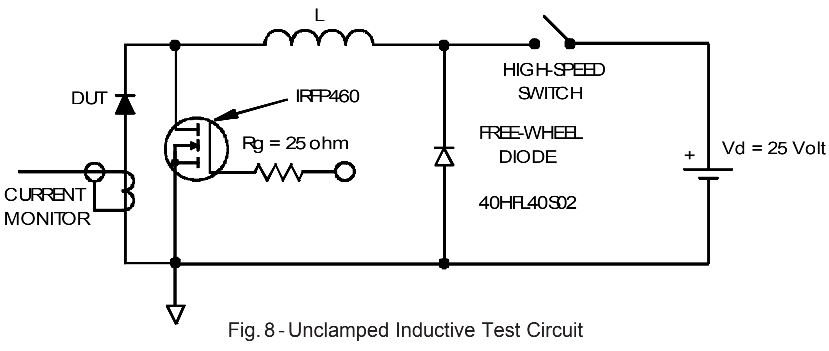


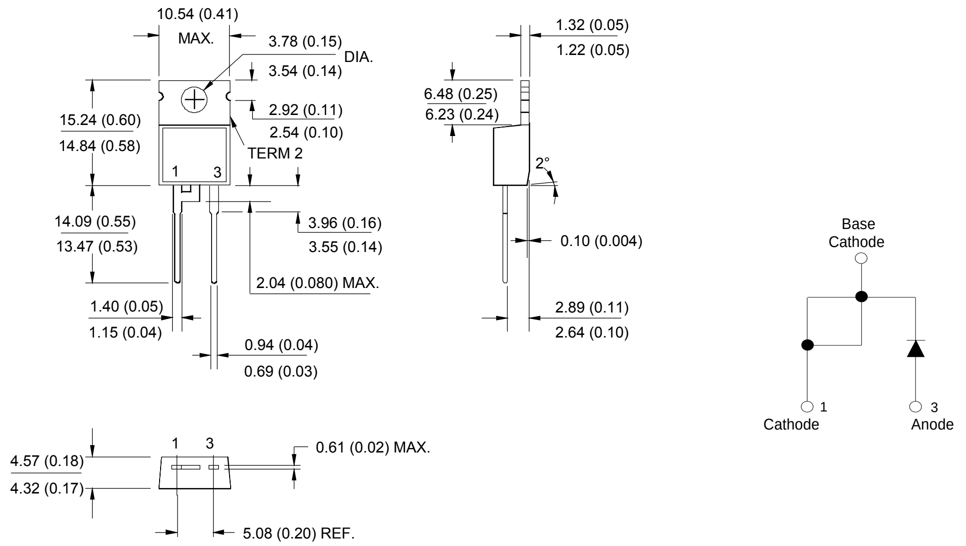

Fig. 8 - Unclamped Inductive Test Circuit

**(2)** Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

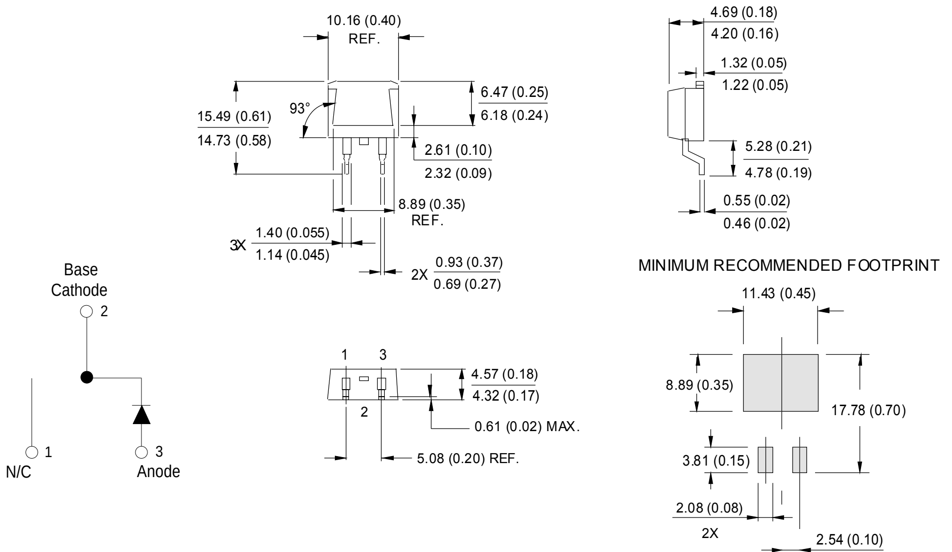
$Pd$ = Forward Power Loss = $I_{F(AV)} \times V_{FM}$ @ $(I_{F(AV)} / D)$ (see Fig. 6);

$Pd_{REV}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R$ @ $V_{R1}$ = 80% rated $V_R$

## Outline Table




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




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

## Ordering Information Table

**Device Code**

| 8 | T | Q | 100 | S |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

1 - Essential Part Number
2 - T = TO-220
3 - Q = Schottky Q Series
4 - Voltage Rating (080 = 80V; 100 = 100V)
5 - S = $D^2$Pak

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8TQ100
*********************************************
*     This model has been developed by      *
*    Wizard SPICE MODEL GENERATOR (1999)    *
*  (International Rectifier Corporation)    *
*    Contain Proprietary Information        *
*********************************************
* SPICE Model Diode is composed by a        *
* simple diode plus paralled VCG2T          *
*********************************************
.SUBCKT 8TQ100 ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=1.15938021883115E-03A,N=1.95244918720315,BV=120V,
+ IBV=5.37891460505463A,RS= 0.00127602,CJO=9.9895753025115E-09,
+ VJ=2.30070034831946,XTI=2, EG=0.758916909331649)
*********************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=-90.2420977904848)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((1.635248E-02/-90.2421)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*4.011038E-03*ABS(V(ANO,CAT)))-1)}
*********************************************
.ENDS 8TQ100


Thermal Model Subcircuit
.SUBCKT 8TQ100  5 1

CTHERM1      5    4      1.45E+00
CTHERM2      4    3      4.54E+00
CTHERM3      3    2      1.09E+01
CTHERM4      2    1      1.01E+02

RTHERM1      5    4      2.49E+00
RTHERM2      4    3      5.20E-04
RTHERM1      3    2      5.43E-01
RTHERM1      2    1      3.05E-02


.ENDS 8TQ100
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International
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