

International IR Rectifier

25CTQ... 25CTQ...S 25CTQ.. -1

SCHOTTKY RECTIFIER

30 Amp

$I_{F(AV)} = 30\text{Amp}$
 $V_R = 35 \text{ to } 45\text{V}$

Major Ratings and Characteristics

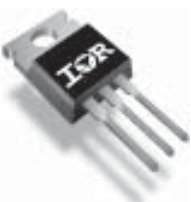
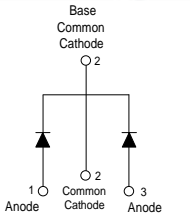

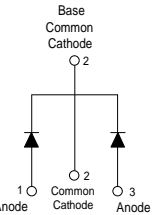

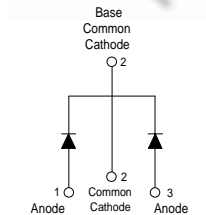
| Characteristics | 25CTQ | Units |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform | 30 | A |
| V_{RRM} range | 35 to 45 | V |
| I_{FSM} @tp = 5 μ s sine | 990 | A |
| V_F @ 15 Apk, $T_J=125^\circ\text{C}$ (per leg) | 0.50 | V |
| T_J range | -55 to 150 | $^\circ\text{C}$ |

Description/ Features

The 25CTQ center tap 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
- Center tap TO-220 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

| 25CTQ... | 25CTQ... S | 25CTQ... -1 |
|---|---|---|
|  Base Common Cathode  TO-220 |  Base Common Cathode  D ² PAK |  Base Common Cathode  TO-262 |

25CTQ... Series

Bulletin PD-20242 rev. B 07/03

International
IRF Rectifier

Voltage Ratings

| Part number | 25CTQ035 | 25CTQ040 | 25CTQ045 |
|---|----------|----------|----------|
| V_R Max. DC Reverse Voltage (V) | 35 | 40 | 45 |
| V_{RWM} Max. Working Peak Reverse Voltage (V) | | | |

Absolute Maximum Ratings

| Parameters | 25CTQ | Units | Conditions |
|---|-------|-------|--|
| $I_{F(AV)}$ Max. Average Forward Current * See Fig. 5 | 30 | A | 50% duty cycle @ $T_C = 102^\circ\text{C}$, rectangular wave form |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 990 | A | Following any rated load condition and with rated V_{RRM} applied |
| | 250 | | |
| E_{AS} Non-Repetitive Avalanche Energy (Per Leg) | 20 | mJ | $T_J = 25^\circ\text{C}$, $I_{AS} = 3\text{Amps}$, $L = 4.40\text{mH}$ |
| I_{AR} Repetitive Avalanche Current (Per Leg) | 3 | 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 | 25CTQ | Units | Conditions |
|--|-------|------------------|---|
| V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1) | 0.56 | V | @ 15A |
| | 0.71 | V | @ 30A |
| | 0.50 | V | @ 15A |
| | 0.64 | V | @ 30A |
| I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 1.75 | mA | $T_J = 25^\circ\text{C}$ |
| | 70 | mA | $T_J = 125^\circ\text{C}$ |
| C_T Max. Junction Capacitance (Per Leg) | 900 | pF | $V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°C |
| L_S Typical Series Inductance (Per Leg) | 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 | 25CTQ | 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 (Per Leg) | 3.25 | $^\circ\text{C}/\text{W}$ | DC operation * See Fig. 4 |
| R_{thJC} Max. Thermal Resistance Junction to Case (Per Package) | 1.63 | $^\circ\text{C}/\text{W}$ | DC operation |
| 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 (0.07) | g (oz.) | |
| T Mounting Torque | Min. | 6 (5) | Kg-cm (lbf-in) |
| | Max. | 12 (10) | |

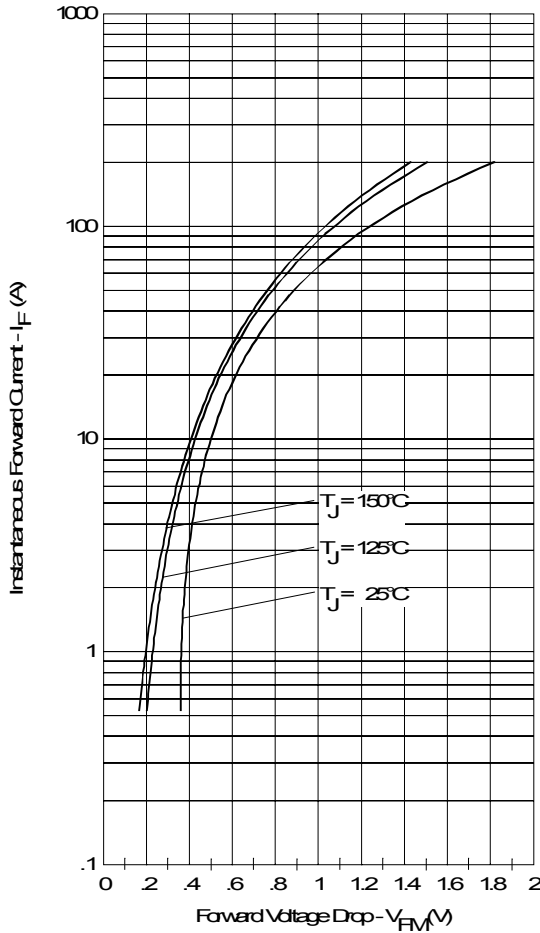


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

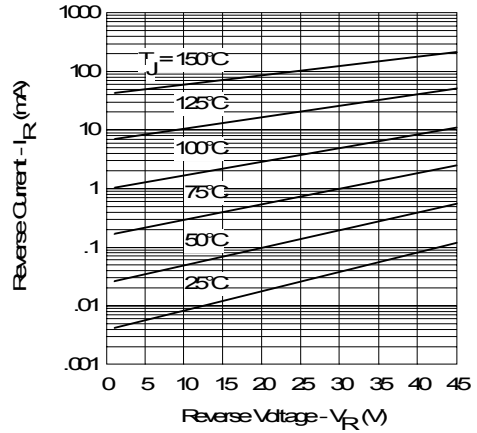


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

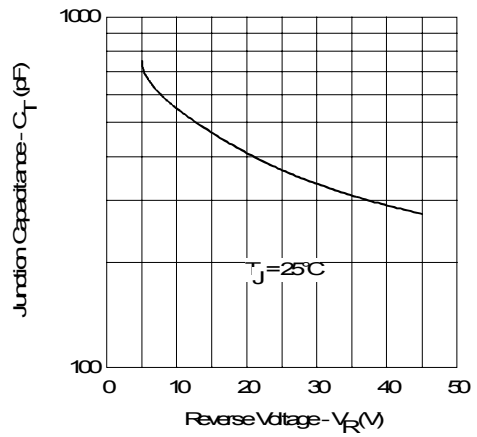


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

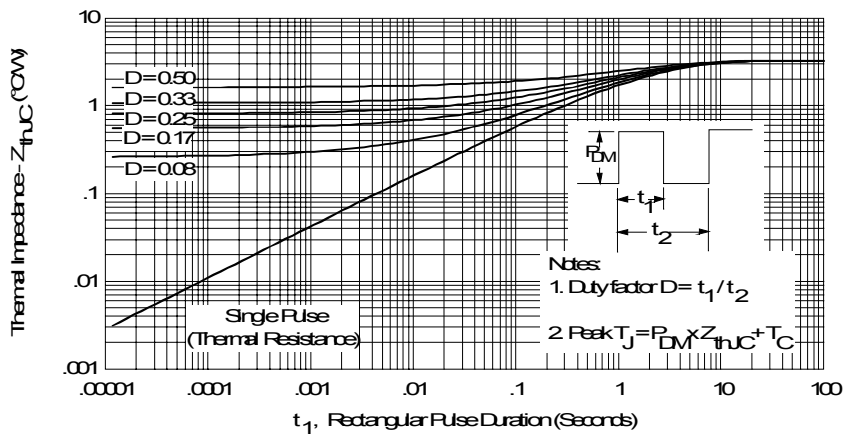


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

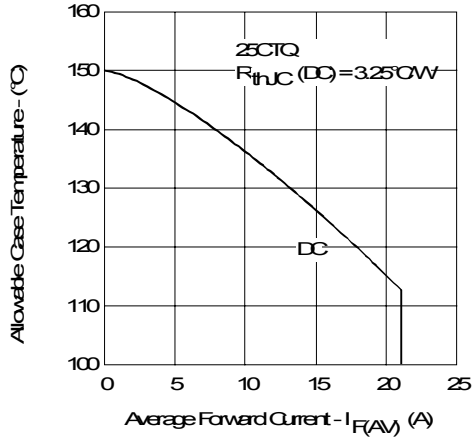


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

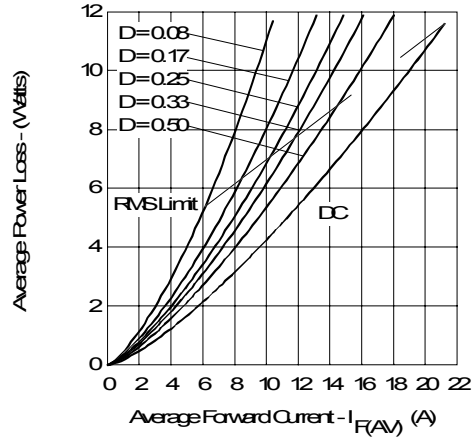


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

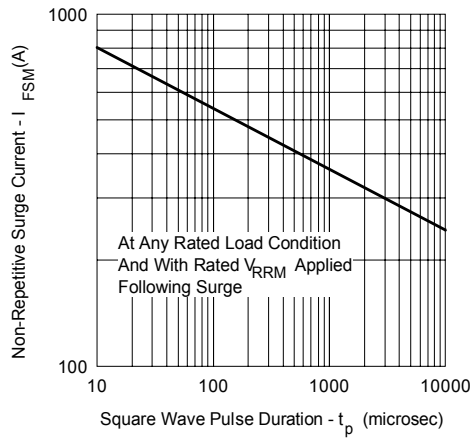


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

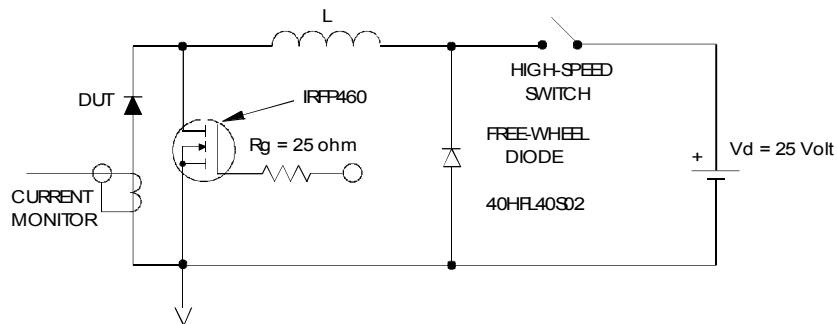
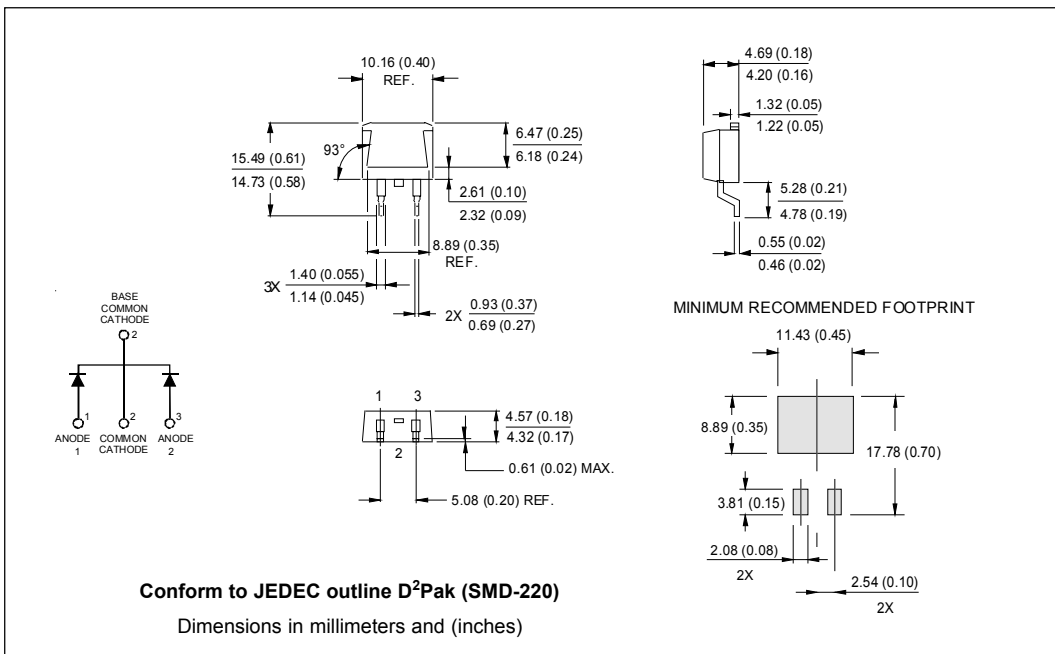
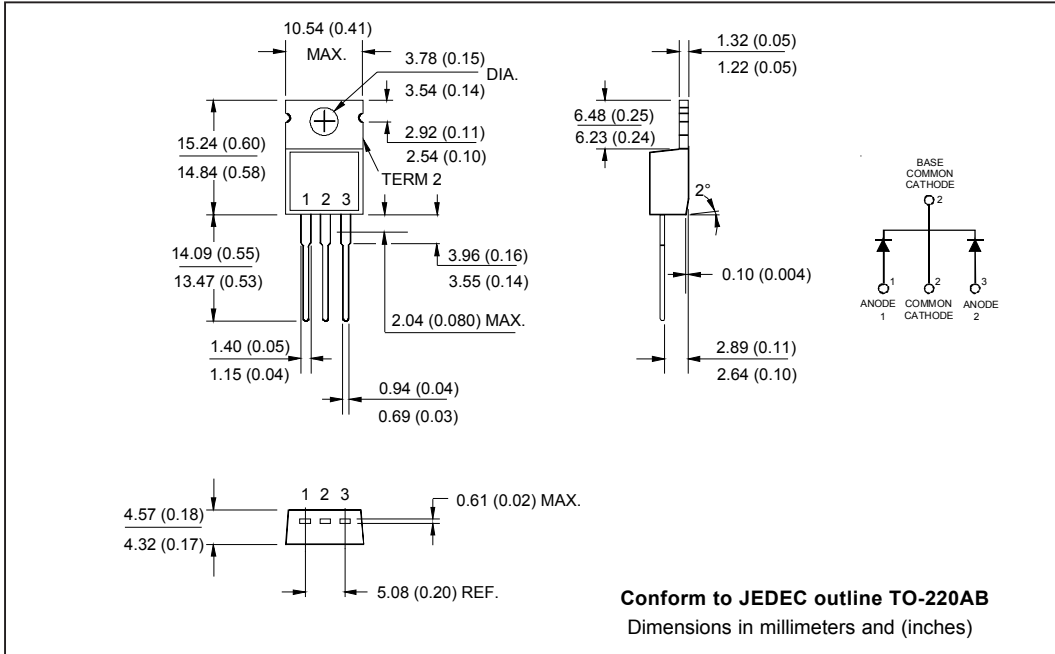
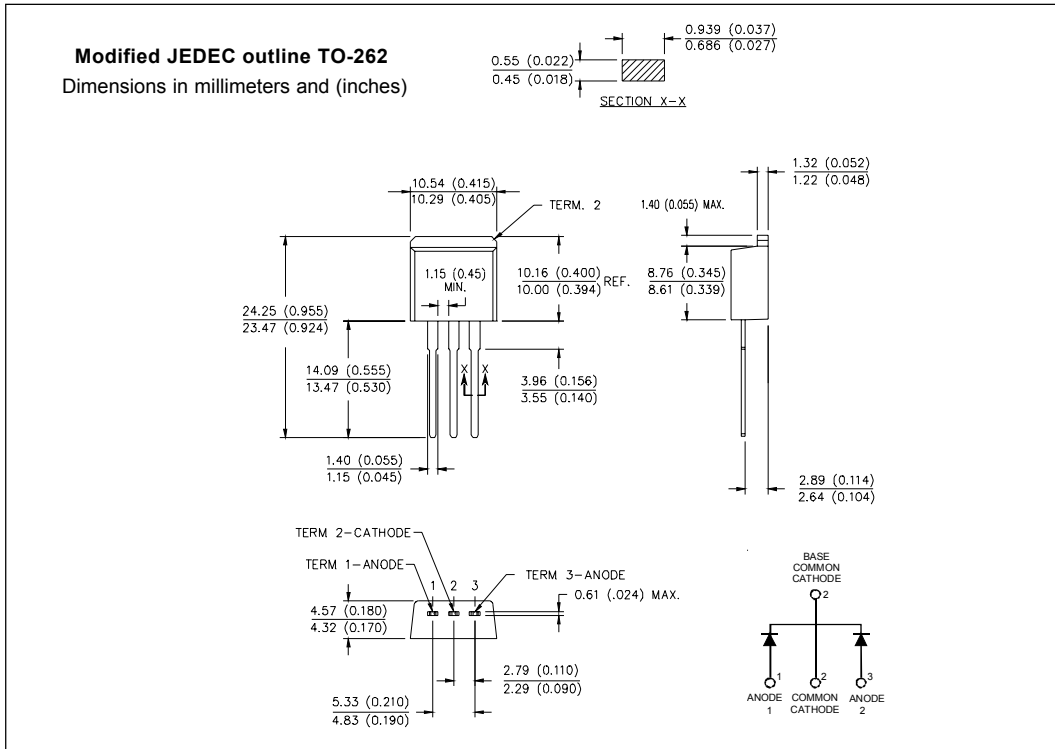


Fig. 8 - Unclamped Inductive Test Circuit

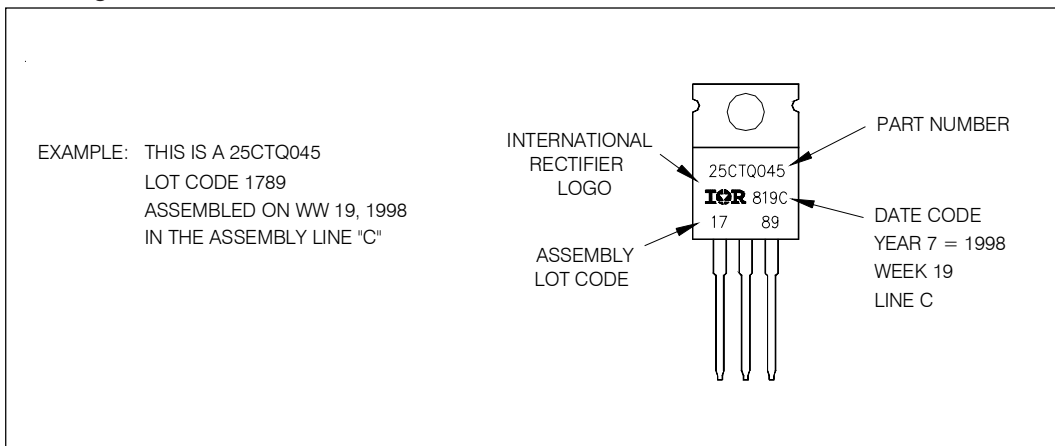
Outline Table



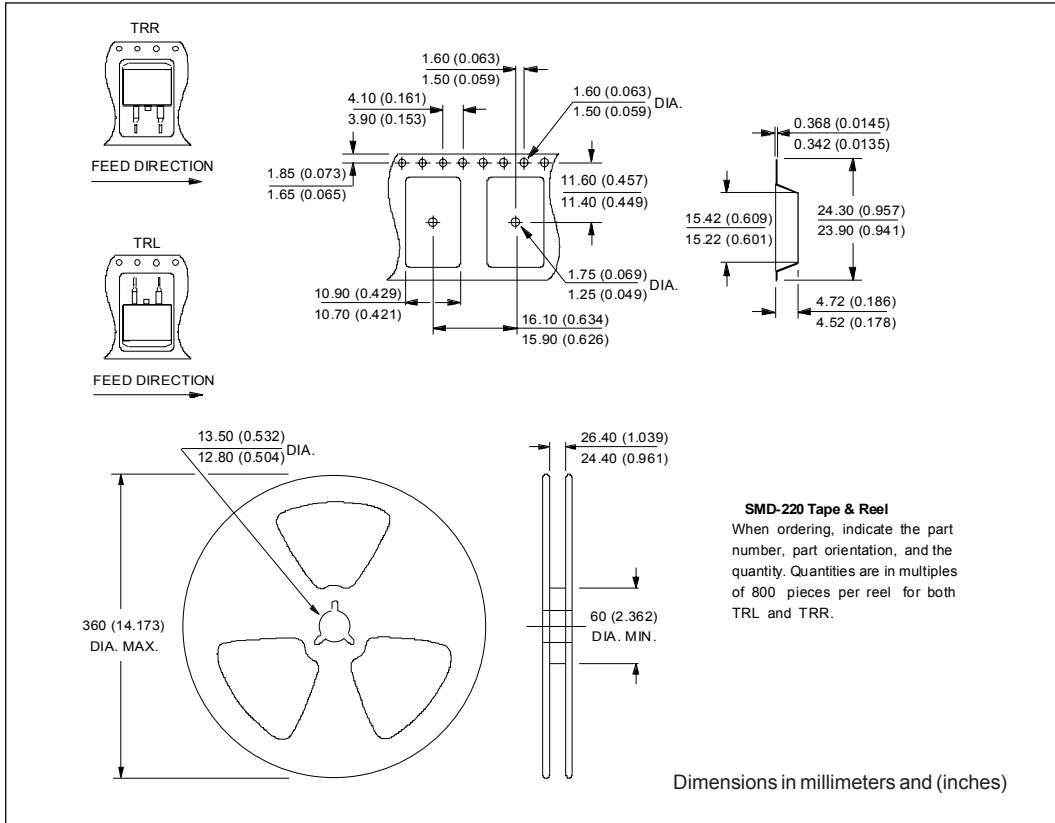
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

| Device Code | | | | | |
|-------------|--------------------------|---|---|-----|----|
| 25 | C | T | Q | 045 | -1 |
| ① | ② | ③ | ④ | ⑤ | ⑥ |
| 1 | - Essential Part Number | | | | |
| 2 | - Common Cathode | | | | |
| 3 | - T = TO-220 | | | | |
| 4 | - Q = Schottky Q Series | | | | |
| 5 | - Voltage Rating | | | | |
| 6 | - S = D ² Pak | | | | |
| | - -1 = TO-262 | | | | |

035 = 35V
 040 = 40V
 045 = 45V

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25CTQ045
*****
* 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 paraladed VCG2T *
*****
.SUBCKT 25CTQ045 ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=1.72789623043916E-04A,N=1.16449261507669,BV=52V,
+ IBV=0.347382965330896A,RS= 0.000623832,CJO=2.01681525450576E-08,
+ VJ=1.79426113441105,XTI=2, EG=0.778356513713514)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=30.866905105089)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-2.873853E-03/30.86691)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*5.486216E-02*ABS(V(ANO,CAT)))-1)}
*****
.ENDS 25CTQ045

Thermal Model Subcircuit
.SUBCKT 25CTQ045 5 1

CTHERM1 5 4 4.04E-01
CTHERM2 4 3 2.01E+00
CTHERM3 3 2 8.32E+00
CTHERM4 2 1 3.80E+02

RTHERM1 5 4 1.62E+00
RTHERM2 4 3 1.22E+00
RTHERM1 3 2 3.50E-01
RTHERM1 2 1 4.34E-02

.ENDS 25CTQ045
    
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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.



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