

International  
**IR** Rectifier

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

**SCHOTTKY RECTIFIER**

**30 Amp**

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


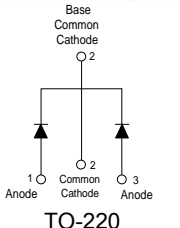

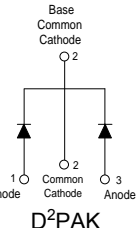

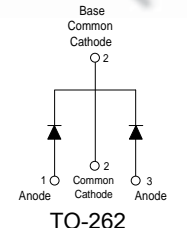
**Major Ratings and Characteristics**

| Characteristics                                   | 25CTQ      | Units            |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform                  | 30         | A                |
| $V_{RRM}$ range                                   | 35 to 45   | V                |
| $I_{FSM}$ @ tp = 5 $\mu$ 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 $^\circ\text{C}$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150 $^\circ\text{C}$   $T_J$  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   |   |  |
|---|---|--|
|  <p>25CTQ...</p>  <p>TO-220</p> |  <p>25CTQ... S</p>  <p>D<sup>2</sup>PAK</p> |  <p>25CTQ... -1</p>  <p>TO-262</p> |

## 25CTQ... Series

Bulletin PD-20242 rev. B 07/03

International  
IR 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<br>* 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 $V_{RWM}$ applied  |
|   | 250   |       |  |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                                | 20    | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 3$ Amps, $L = 4.40$ mH  |
| $I_{AR}$ Repetitive Avalanche Current (Per Leg)                                   | 3     | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>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) $25^\circ\text{C}$ |
| $L_S$ 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/ $\mu\text{s}$ |   |

(1) Pulse Width < 300 $\mu\text{s}$ , 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)                    |                                      |

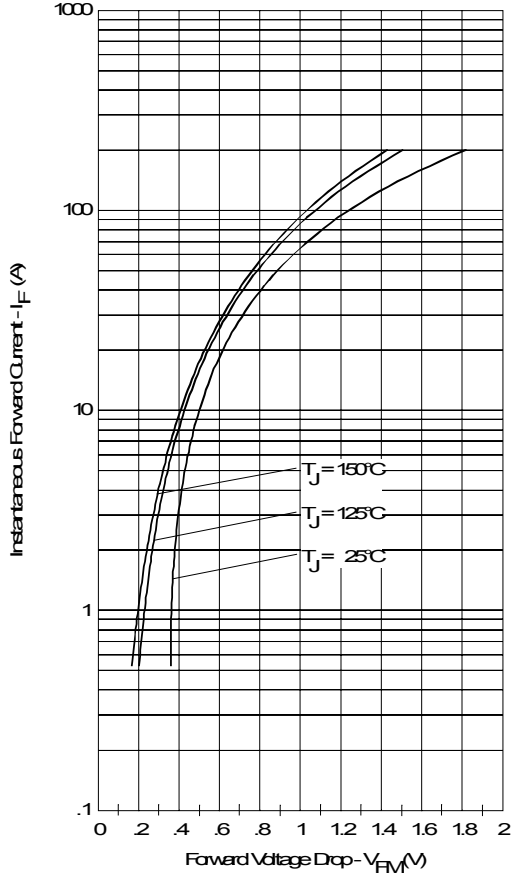


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

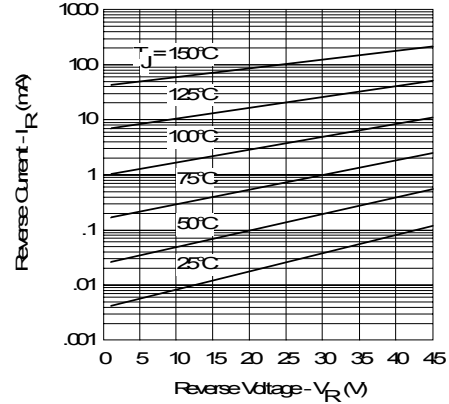


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

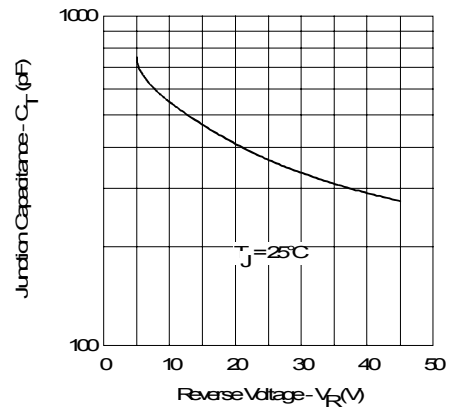


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

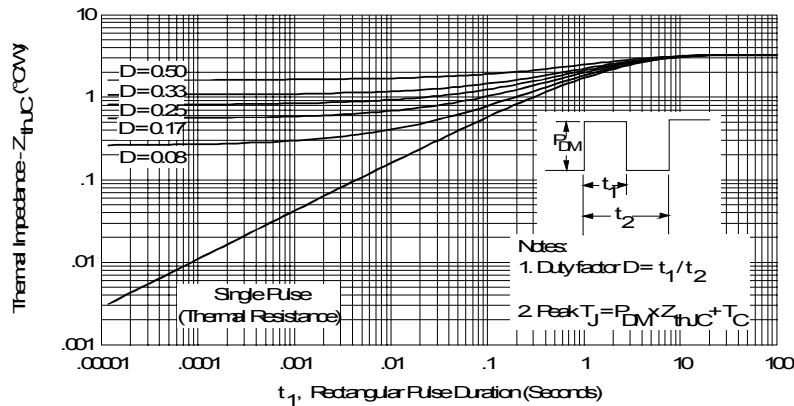


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

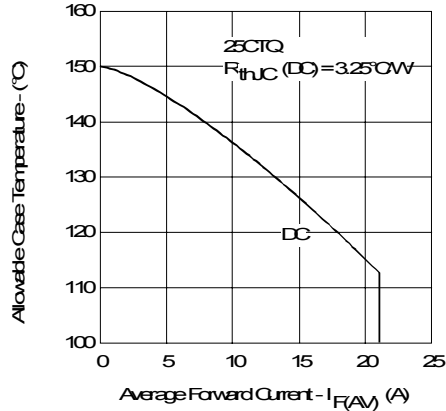


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

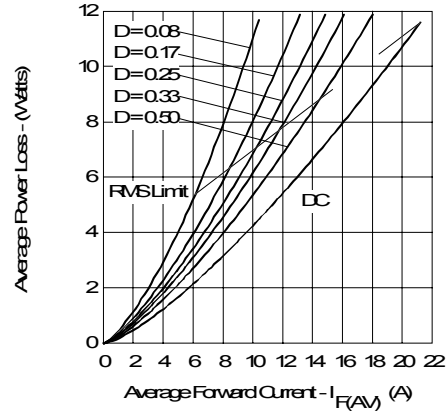


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

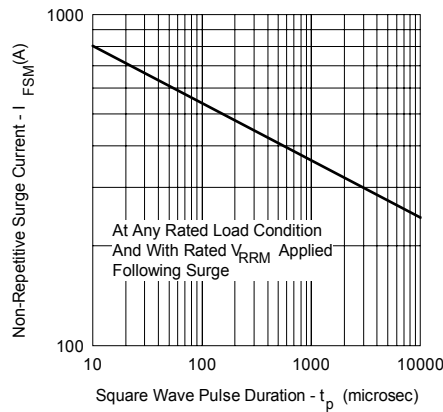


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

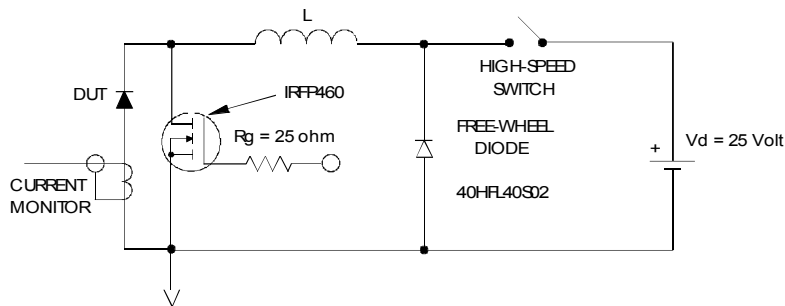
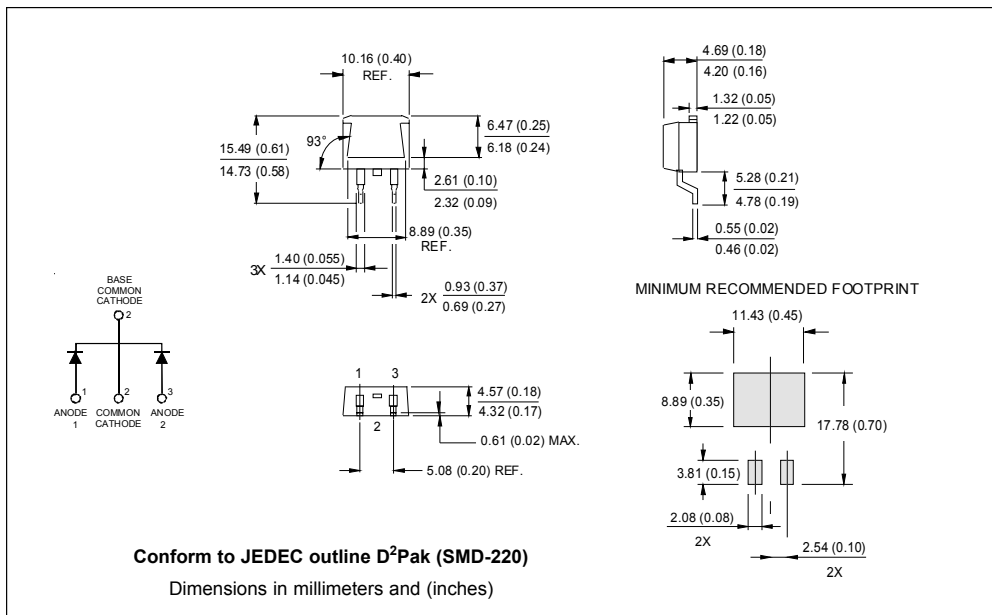
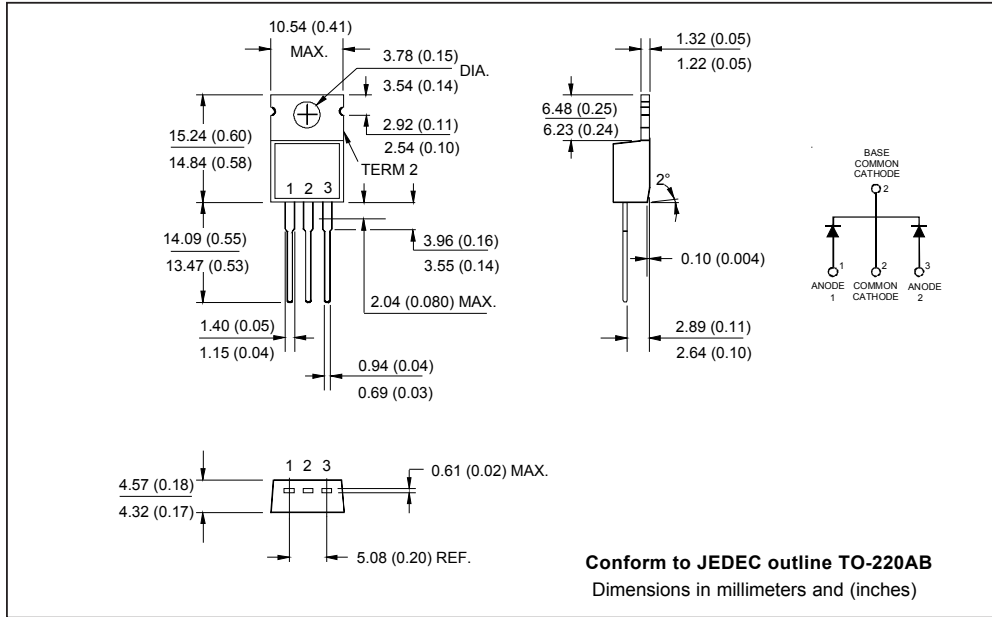
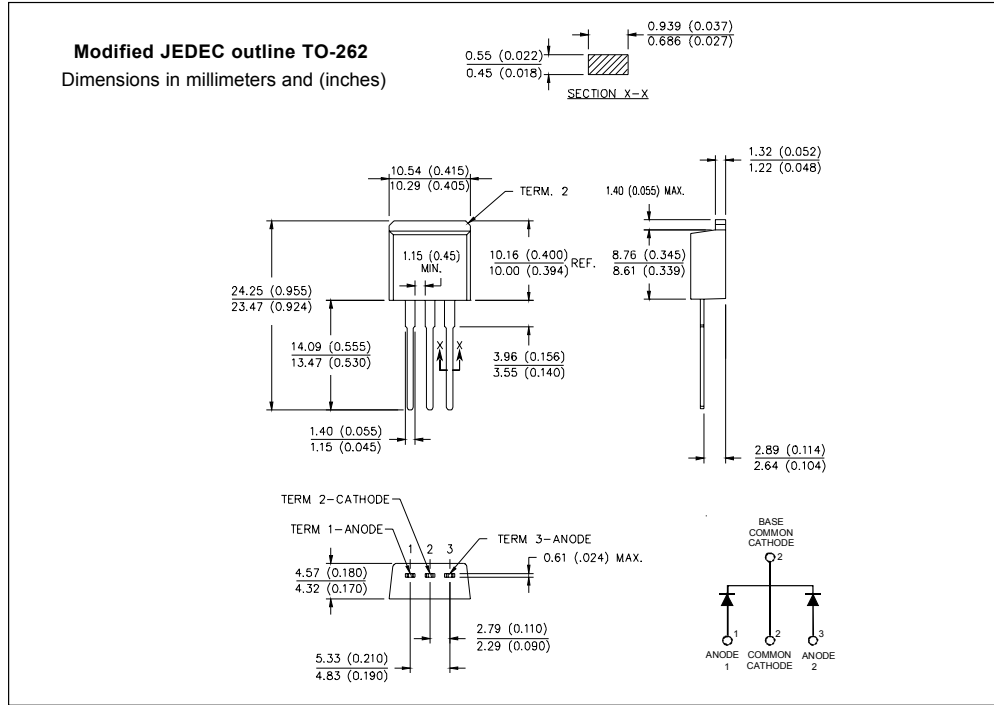


Fig. 8 - Unclamped Inductive Test Circuit

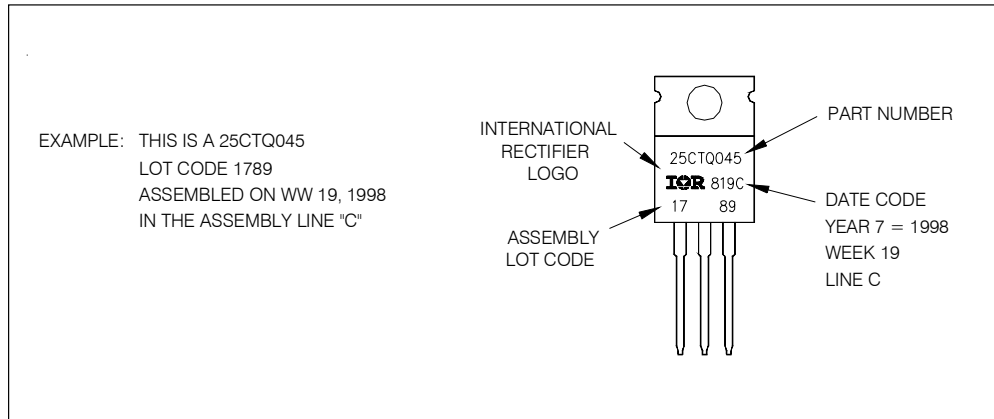
Outline Table



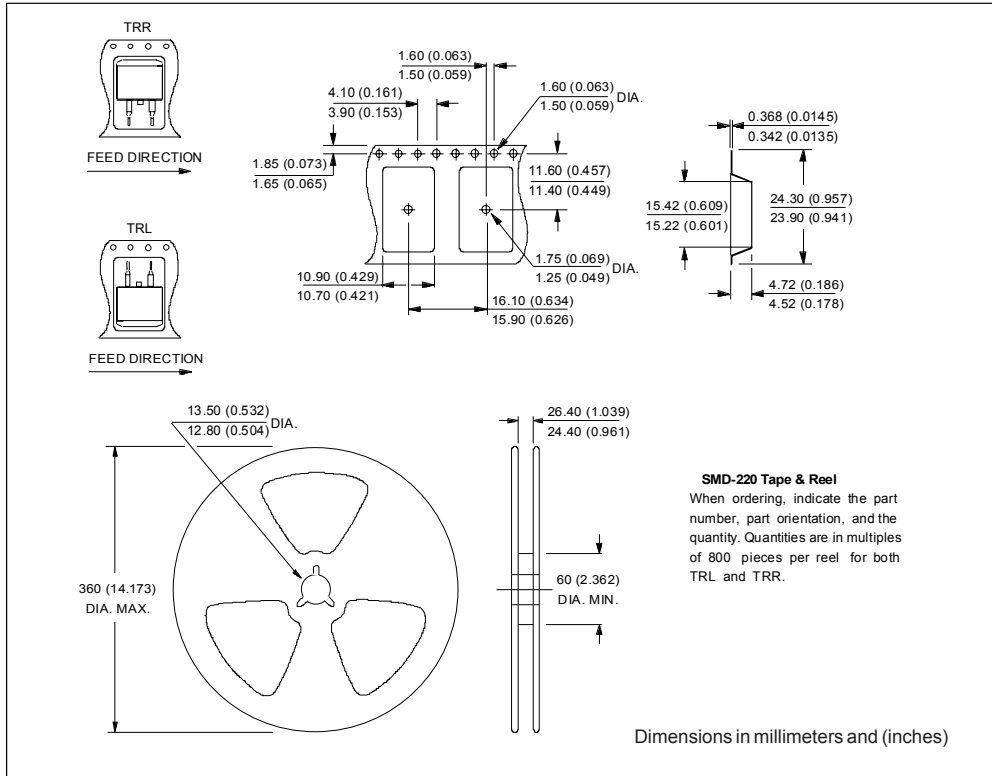
Outline Table



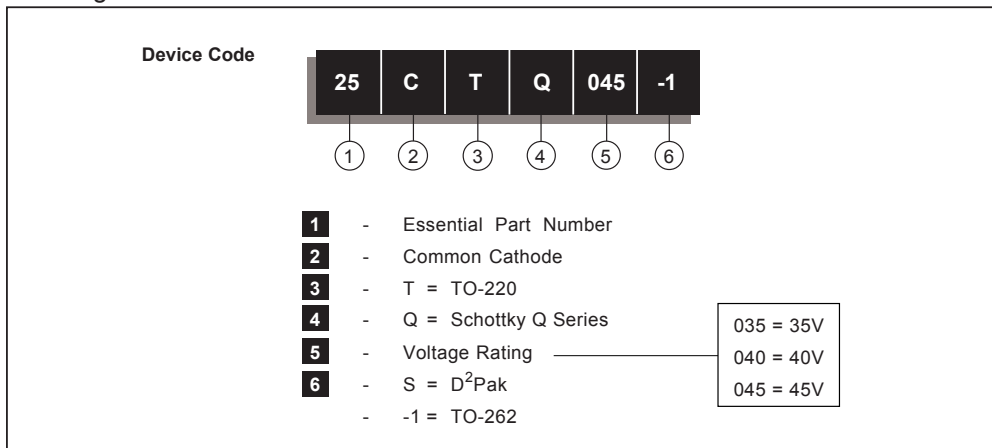
Marking Information



Tape & Reel Information



Ordering Information Table



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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 paralld 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

R THERM1 5 4 1.62E+00
R THERM2 4 3 1.22E+00
R THERM1 3 2 3.50E-01
R THERM1 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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