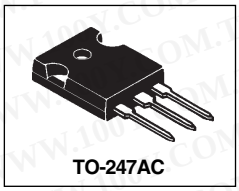
PD-20557 rev. B 11/99

International
IOR Rectifier

# 72CPQ030

## SCHOTTKY RECTIFIER

## 70 Amp



TO-247AC

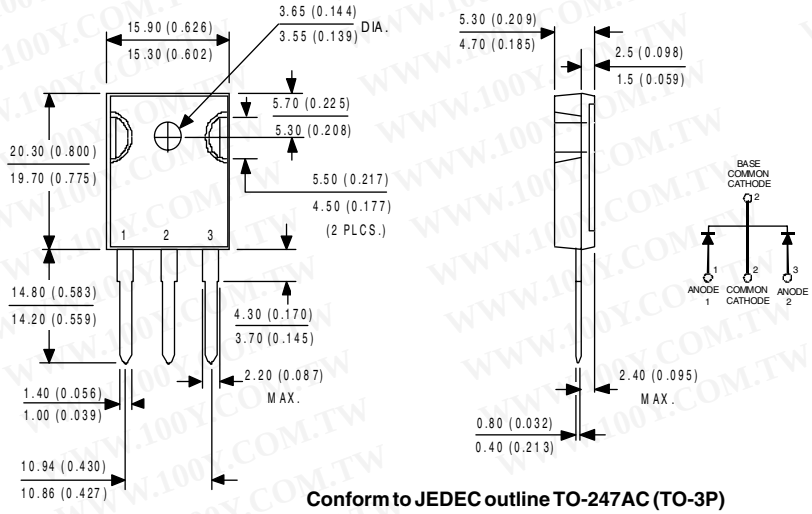
### Major Ratings and Characteristics

| Characteristics | | 72CPQ030 | Units |
|---|---|---|---|
| $I_{F(AV)}$ | Rectangular waveform | 70 | A |
| $V_{RRM}$ | | 30 | V |
| $I_{FSM}$ | @ tp = 5 µs sine | 2180 | A |
| $V_F$ | @ 35 Apk, $T_J$ = 125°C (per leg) | 0.43 | V |
| $T_J$ | range | -55 to 150 | °C |

### Description/Features

The 72CPQ030 center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. 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-247 package
- 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




**Conform to JEDEC outline TO-247AC (TO-3P)**
Dimensions in millimeters and inches

## Voltage Ratings

| | Part number | 72CPQ030 |
|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 30 |
| $V_{RWM}$ | Max. Working Peak Reverse Voltage (V) | |

## Absolute Maximum Ratings

| | Parameters | 72CPQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward (Per Leg) | 35 | A | 50% duty cycle @ $T_C$ = 125°C, rectangular wave form | |
| | Current *See Fig. 5 (Per Device) | 70 | | | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 2180 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | Surge Current (Per Leg) *See Fig. 7 | 600 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non-Repetitive Avalanche Energy (Per Leg) | 27 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 6 Amps, L = 1.5 mH | |
| $I_{AR}$ | Repetitive Avalanche Current (Per Leg) | 6 | A | Current decaying linearly to zero in 1 µsec Frequency limited by $T_J$ max. $V_A$ = 1.5 x $V_R$ typical | |

## Electrical Specifications

| | Parameters | 72CPQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1) | 0.51 | V | @ 35A | $T_J$ = 25 °C |
| | | 0.61 | V | @ 70A | |
| | | 0.43 | V | @ 35A | $T_J$ = 125 °C |
| | | 0.58 | V | @ 70A | |
| $I_{RM}$ | Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 1.9 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | | 450 | mA | $T_J$ = 125 °C | |
| $V_{F(TO)}$ | Threshold Voltage | 0.25 | V | $T_J$ = $T_J$ max. | |
| $r_t$ | Forward Slope Resistance | 4.70 | mΩ | | |
| $C_T$ | Max. Junction Capacitance (Per Leg) | 4600 | pF | $V_R$ = 5$V_{DC}$, (test signal range 100Khz to 1Mhz) 25°C | |
| $L_S$ | Typical Series Inductance (Per Leg) | 7.5 | nH | Measured lead to lead 5mm from package body | |
| dv/dt | Max. Voltage Rate of Change (Rated $V_R$) | 10,000 | V/ µs | | |

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

## Thermal-Mechanical Specifications

| | Parameters | | 72CPQ | Units | Conditions |
|---|---|---|---|---|---|
| $T_J$ | Max. Junction Temperature Range | | -55 to 150 | °C | |
| $T_{stg}$ | Max. Storage Temperature Range | | -55 to 150 | °C | |
| $R_{thJC}$ | Max. Thermal Resistance Junction to Case (Per Leg) *See Fig. 4 | | 0.8 | °C/W | DC operation |
| $R_{thJC}$ | Max. Thermal Resistance Junction to Case (Per Package) | | 0.4 | °C/W | DC operation |
| $R_{thCS}$ | Typical Thermal Resistance, Case to Heatsink | | 0.25 | °C/W | Mounting surface, smooth and greased |
| wt | Approximate Weight | | 6 (0.21) | g (oz.) | |
| T | Mounting Torque | Min. | 6 (5) | Kg-cm (lbf-in) | |
| | | Max. | 12 (10) | | |
| | Case Style | | TO-247AC (TO-3P) | | JEDEC |

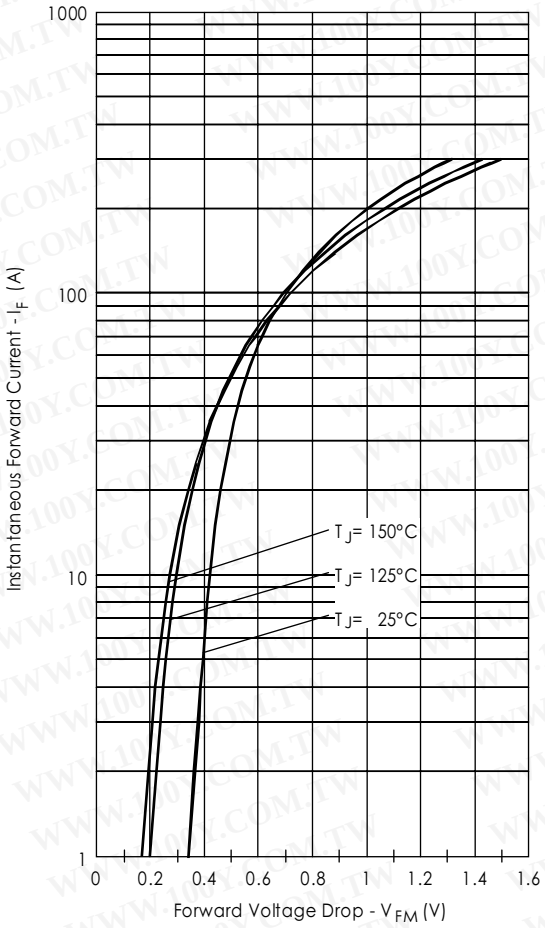



Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

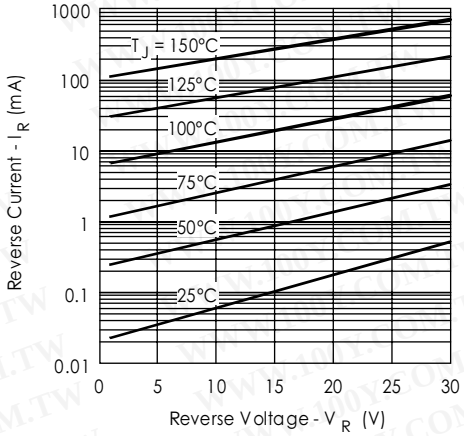



Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

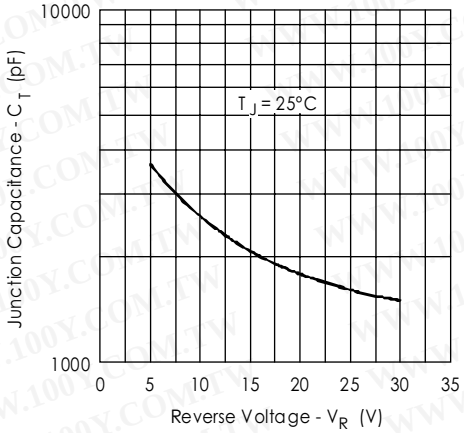



Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

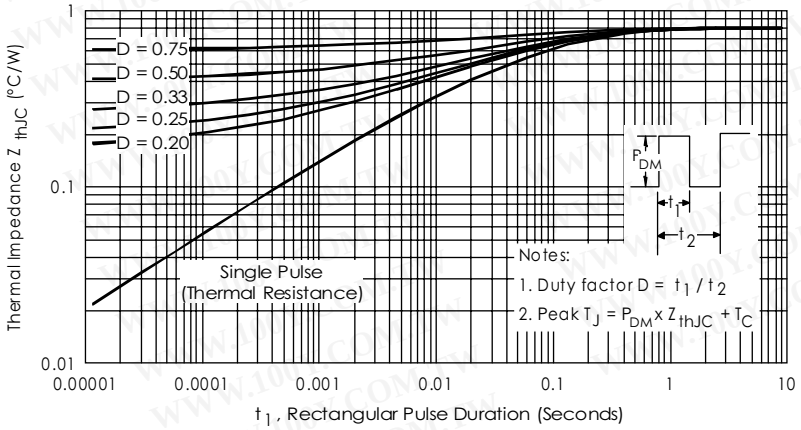



Fig. 4 - Max. Thermal Impedance $Z_{thJC}$ Characteristics (PerLeg)

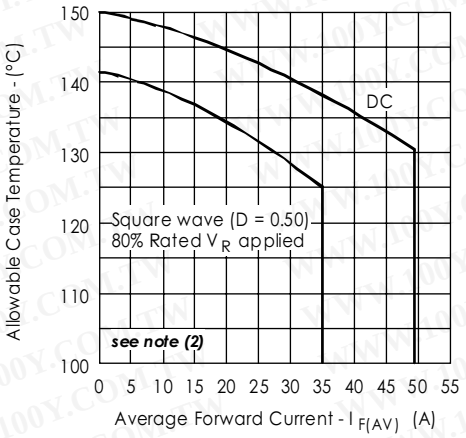



Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

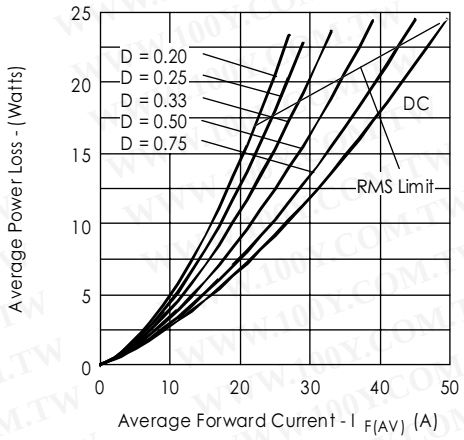



Fig. 6 - Forward Power Loss Characteristics (Per Leg)

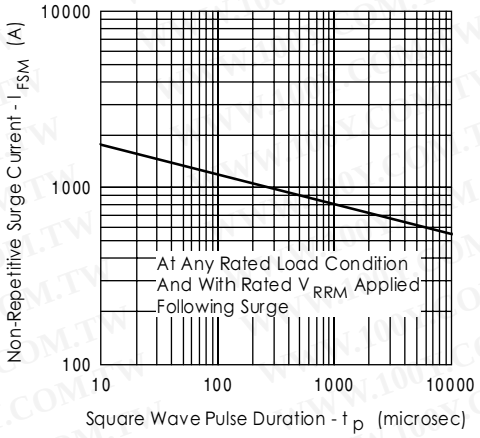



Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

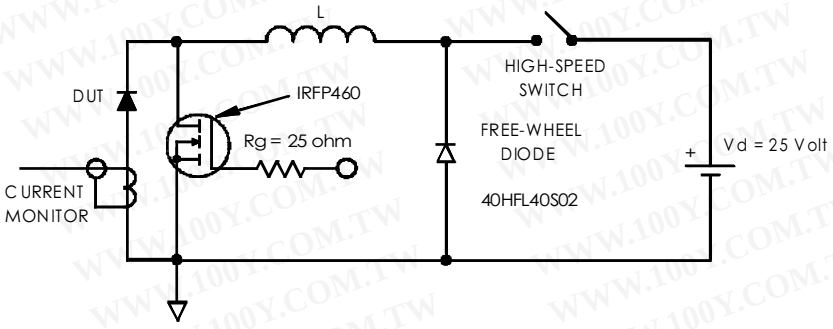



Fig. 8 - Unclamped Inductive Test Circuit

**(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 $V_R$