Bulletin PD-20265 07/00

International
IOR Rectifier

# 32CTQ030
# 32CTQ030S
# 32CTQ030-1

## SCHOTTKY RECTIFIER

## 32 Amp

$I_{F(AV)}$ = 30Amp
$V_R$ = 30V

### Major Ratings and Characteristics

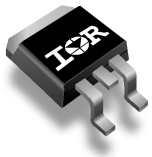
| Characteristics | 32CTQ | Units |
|---|---|---|
| $I_{F(AV)}$ Rectangular waveform | 30 | A |
| $V_{RRM}$ | 30 | V |
| $I_{FSM}$ @tp = 5 µs sine | 900 | A |
| $V_F$ @15 Apk, $T_J$ = 125°C | 0.40 | V |
| $T_J$ range | - 55 to 150 | °C |

### Description/Features

The 32CTQ030 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
- 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**

| 32CTQ030 | 32CTQ030S | 32CTQ030-1 |
|---|---|---|
|  |  |  |
| TO-220 | $D^2PAK$ | TO-262 |

## Voltage Ratings

| | Part number | 32CTQ030 |
|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 30 |
| $V_{RWM}$ | Max. Working Peak Reverse Voltage (V) | |

## Absolute Maximum Ratings

| | Parameters | 32CTQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current * See Fig. 5 | 30 | A | 50% duty cycle @ $T_C$ = 115° C, rectangular wave form | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 900 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | | 250 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non-Repetitive Avalanche Energy | 13 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 1.20 Amps, L = 11.10 mH | |
| $I_{AR}$ | Repetitive Avalanche Current | 3 | 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 | 32CTQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (1) * See Fig. 1 | 0.49 | V | @ 15A | $T_J$ = 25 °C |
| | | 0.58 | V | @ 30A | |
| | | 0.40 | V | @ 15A | $T_J$ = 125 °C |
| | | 0.53 | V | @ 30A | |
| $I_{RM}$ | Max. Reverse Leakage Current (1) * See Fig. 2 | 1.75 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | | 97 | mA | $T_J$ = 125 °C | |
| $V_{F(TO)}$ | Threshold Voltage | 0.233 | V | $T_J$ = $T_J$ max. | |
| $r_t$ | Forward Slope Resistance | 9.09 | mΩ | | |
| $C_T$ | Max. Junction Capacitance Per Leg | 1300 | pF | $V_R$ = 5$V_{DC}$, (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 $V_R$) | 10,000 | V/ µs | | |

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

## Thermal-Mechanical Specifications

| | Parameters | | 32CTQ | 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 | | 3.25 | °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 (lbf-in) | |
| | | Max. | 12 (10) | | |

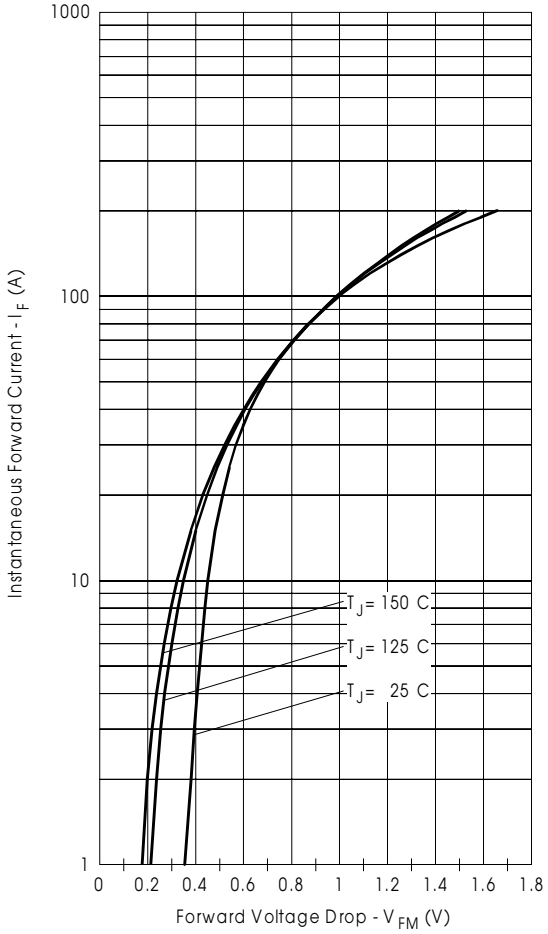



Fig. 1 - Maximum Forward Voltage Drop Characteristics

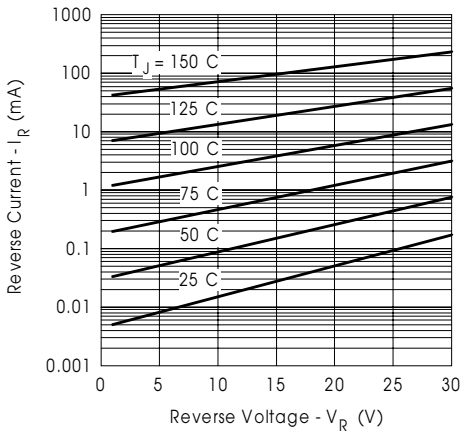



Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

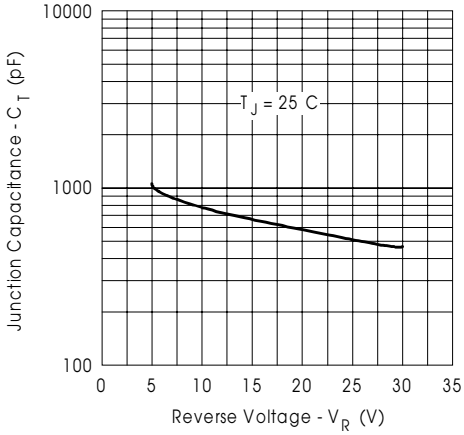



Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

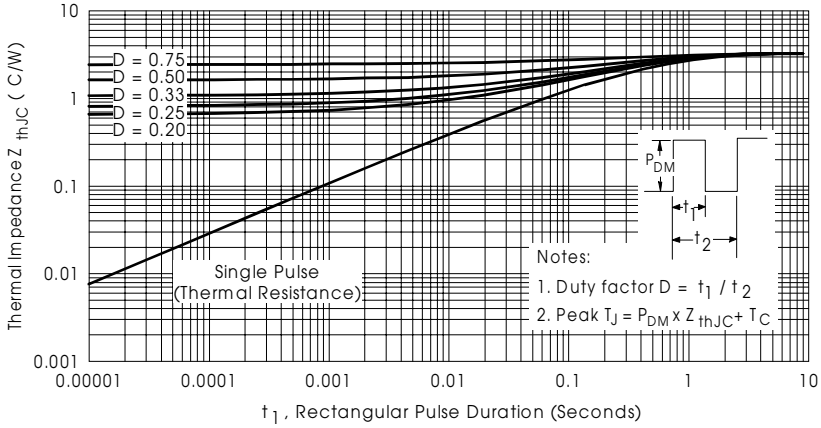



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

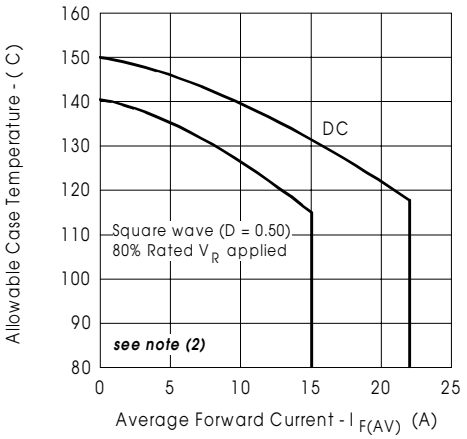



Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

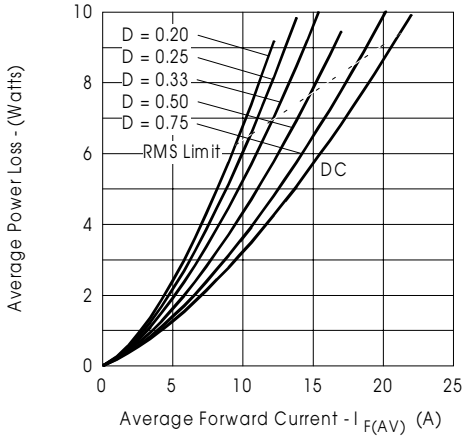



Fig. 6 - Forward Power Loss Characteristics

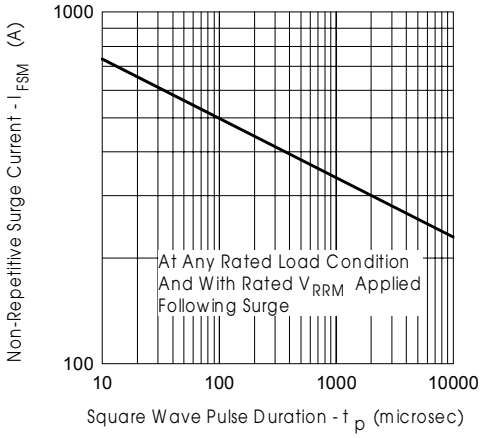



Fig. 7 - Maximum Non-Repetitive Surge Current

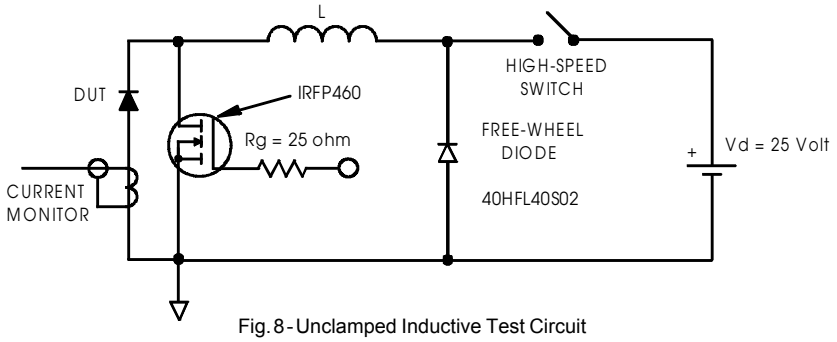
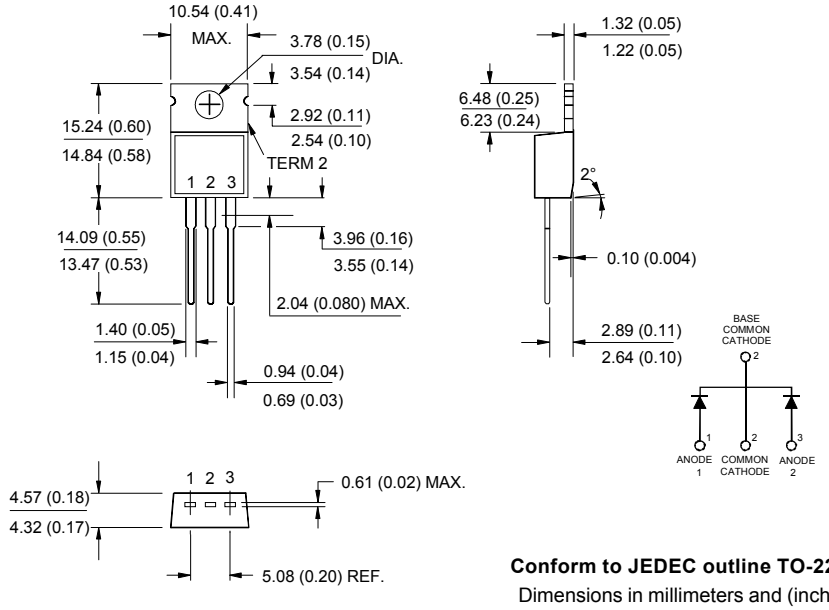


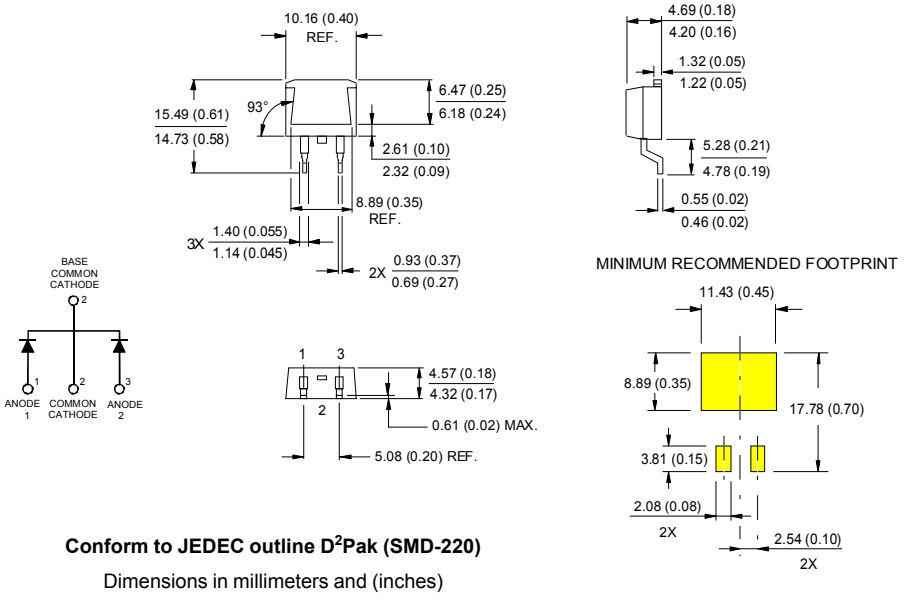

Fig. 8 - Unclamped Inductive Test Circuit

**(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



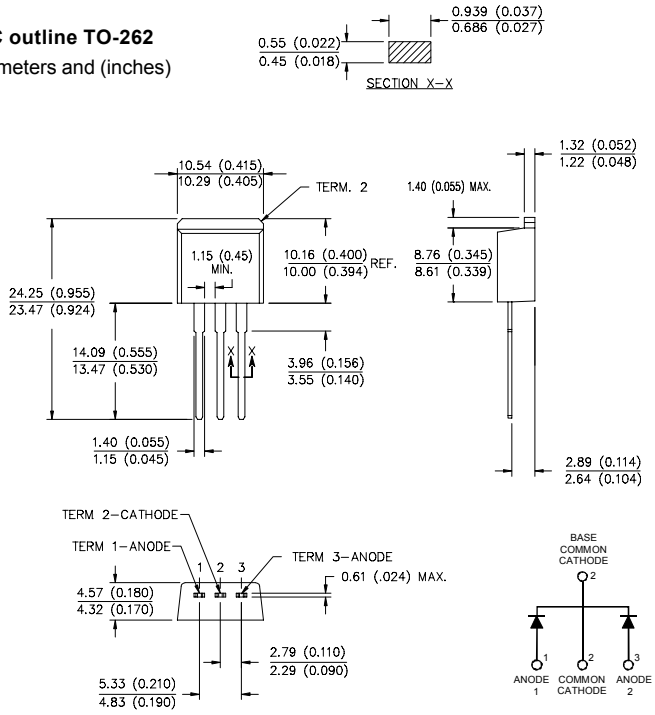

**Conform to JEDEC outline TO-220AB**
Dimensions in millimeters and (inches)




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

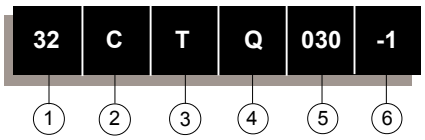
## Outline Table

**Modified JEDEC outline TO-262**
Dimensions in millimeters and (inches)




## Ordering Information Table

**Device Code**




| | | |
|---|---|---|
| **1** | - | Essential Part Number |
| **2** | - | Common Cathode |
| **3** | - | T = TO-220 |
| **4** | - | Q = Schottky Q Series |
| **5** | - | Voltage Rating 030 = 30V |
| **6** | - | S = $D^2$Pak |
| | - | -1 = TO-262 |