

International IOR Rectifier

48CTQ060SPbF 48CTQ060-1PbF

SCHOTTKY RECTIFIER

40 Amp

$$I_{F(AV)} = 40\text{Amp}$$

$$V_R = 60\text{V}$$

Major Ratings and Characteristics

| Characteristics | Values | Units |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform | 40 | A |
| V_{RRM} | 60 | V |
| I_{FSM} @ $t_p = 5 \mu\text{s}$ sine | 1000 | A |
| V_F @20Apk, $T_J = 125^\circ\text{C}$ (per leg) | 0.58 | V |
| T_J range | -55 to 150 | $^\circ\text{C}$ |

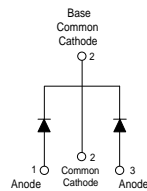
Description/ Features

This 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 configuration
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

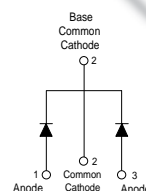
Case Styles

48CTQ060SPbF



D²PAK

48CTQ060-1PbF



TO-262

Voltage Ratings

| Parameters | 48CTQ060SPbF 48CTQ060-1PbF |
|---|-------------------------------|
| V_R Max. DC Reverse Voltage (V) | 60 |
| V_{RWM} Max. Working Peak Reverse Voltage (V) | |

Absolute Maximum Ratings

| Parameters | Values | Units | Conditions |
|--|-------------|-------|--|
| $I_{F(AV)}$ Max. Average Forward (Per Leg) Current * See Fig. 5 (Per Device) | 20 40 | A | 50% duty cycle @ $T_C = 111^\circ\text{C}$, rectangular wave form |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 1000 260 | A | 5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V_{RRM} applied |
| E_{AS} Non-Repetitive Avalanche Energy (Per Leg) | 13 | mJ | $T_J = 25^\circ\text{C}$, $I_{AS} = 1.50$ Amps, $L = 11.5$ mH |
| I_{AR} Repetitive Avalanche Current (Per Leg) | 1.50 | 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 | Values | Units | Conditions |
|---|------------------------------|------------------|---|
| V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1) | 0.61 0.83 0.58 0.75 | V | @ 20A @ 40A @ 20A @ 40A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ |
| I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 2 89 | mA | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$ |
| $V_{F(TO)}$ Threshold Voltage | 0.37 | V | $T_J = T_J \text{ max.}$ |
| r_t Forward Slope Resistance | 8.26 | m Ω | |
| C_T Max. Junction Capacitance (Per Leg) | 1220 | 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 | 10000 | V/ μs | (Rated V_R) |

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

Thermal-Mechanical Specifications

| Parameters | Values | 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) | 2.0 | $^\circ\text{C/W}$ | DC operation |
| R_{thJC} Max. Thermal Resistance Junction to Case (Per Package) | 1.0 | $^\circ\text{C/W}$ | DC operation |
| R_{thCS} Typical Thermal Resistance, Case to Heatsink | 0.50 | $^\circ\text{C/W}$ | Mounting surface, smooth and greased (only for TO-220) |
| wt Approximate Weight | 2 (0.07) | g (oz.) | |
| T Mounting Torque | Min. 6 (5) Max. 12 (10) | kg-cm (lbf-in) | |
| Marking Device | 48CTQ060S | | Case style D ² Pak |
| | 48CTQ060-1 | | Case style TO-262 |

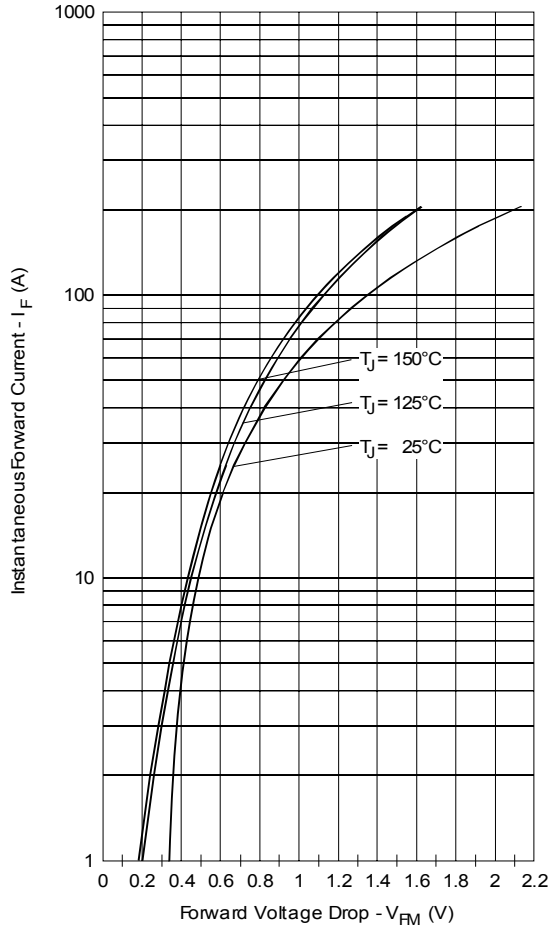


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

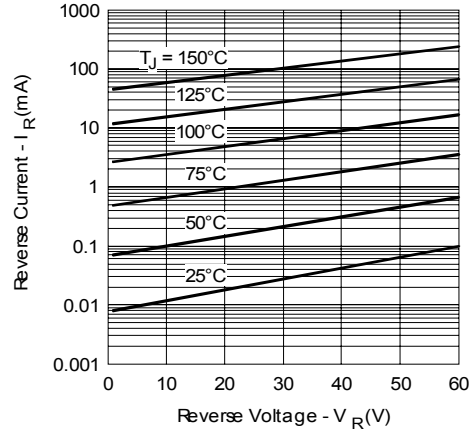


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

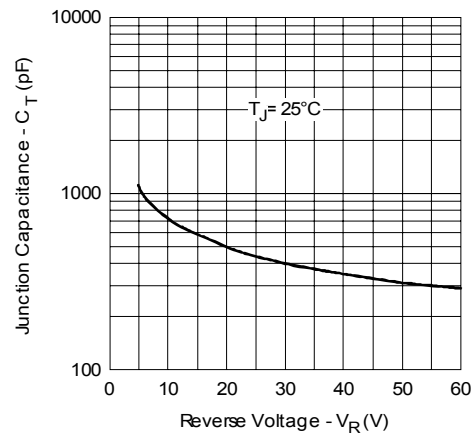


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

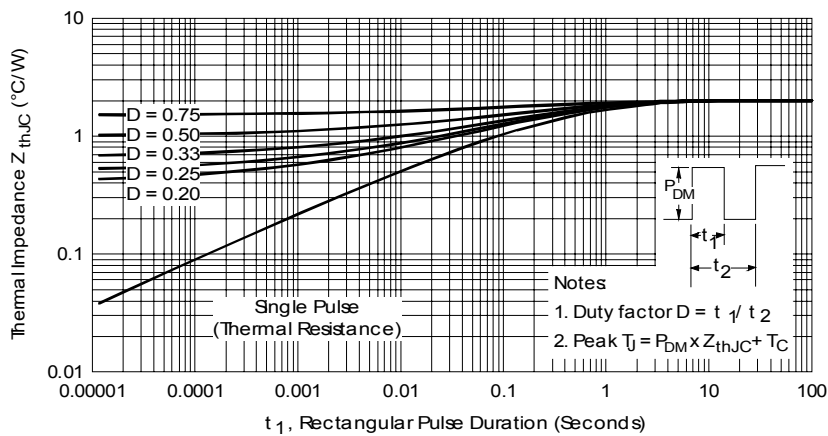


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

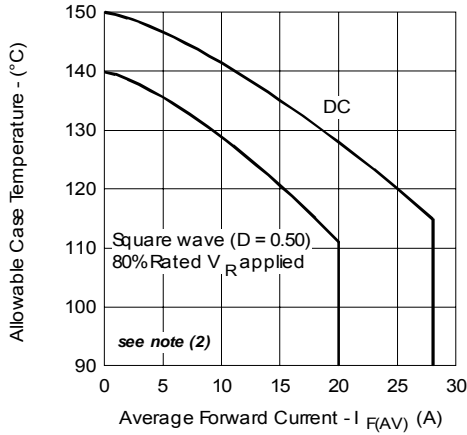


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

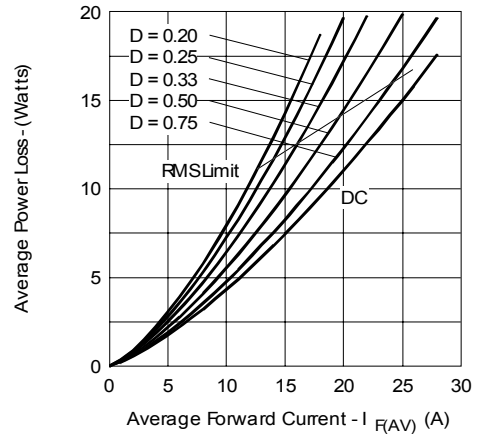


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

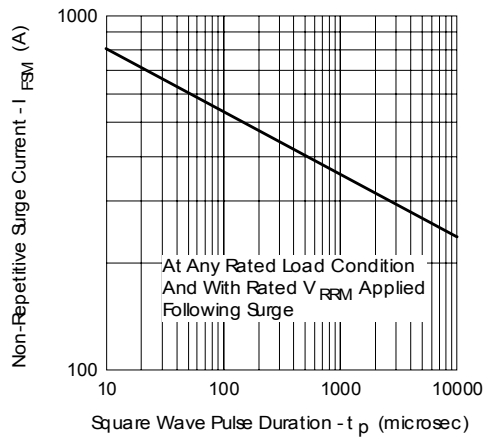


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

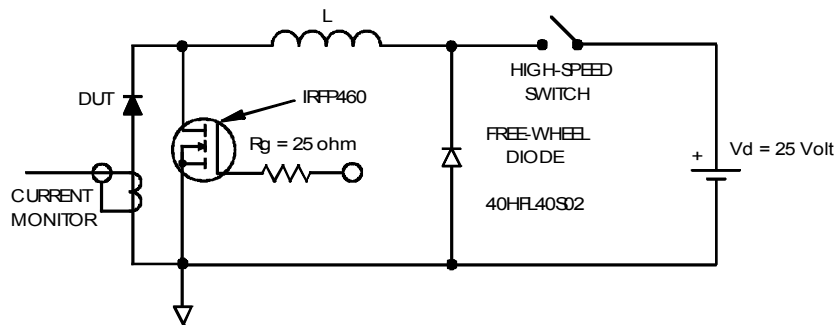


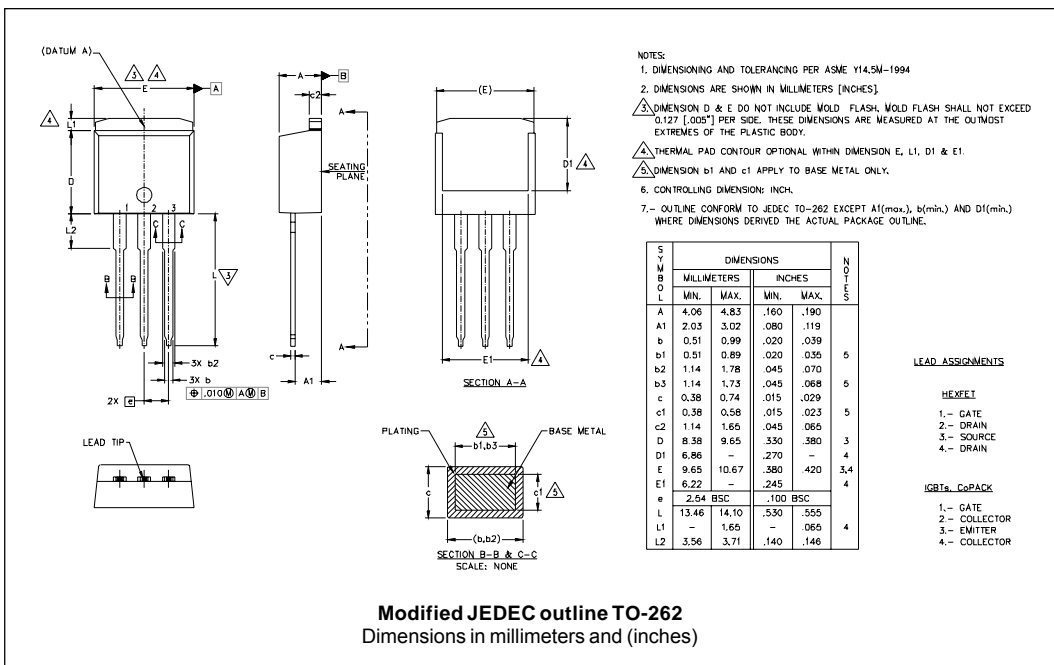
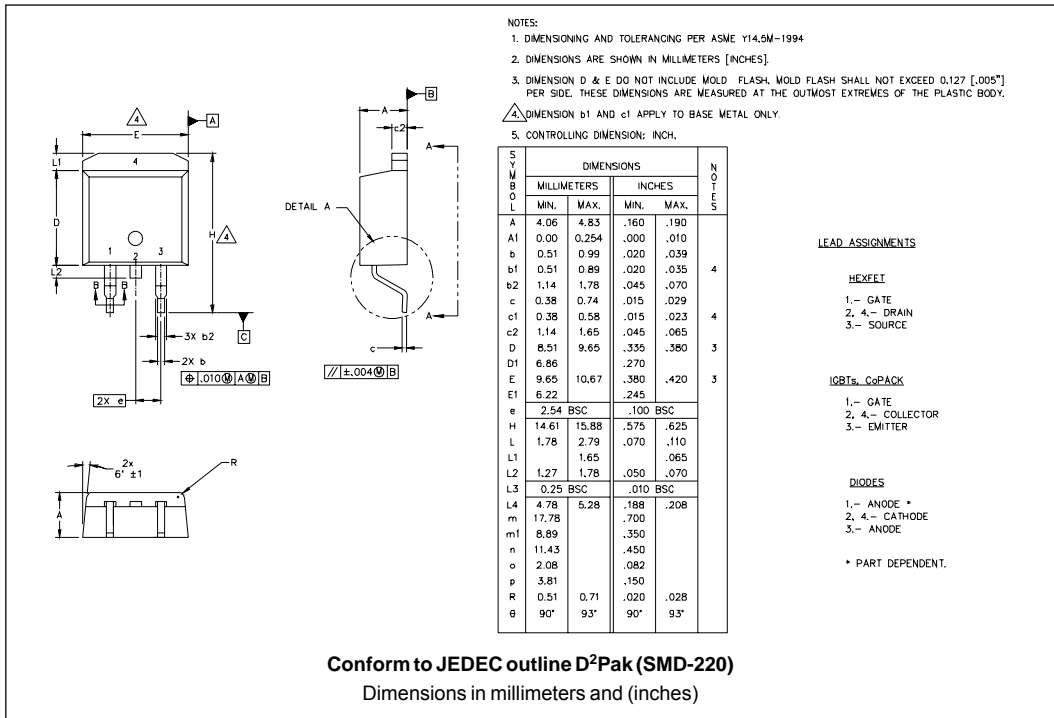
Fig. 8 - Unclamped Inductive Test Circuit

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

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

$Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D); I_{R1} @ V_{R1} = 10V$

Outlines Table



Part Marking Information

D²PAK

EXAMPLE: THIS IS A 48CTQ060S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

Note: "P" in assembly line position indicates "Lead-Free"

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE

YEAR 0 = 2000
WEEK 02
P = LEAD-FREE

TO-262

EXAMPLE: THIS IS A 48CTQ060-1
LOT CODE 1789
ASSEMBLED ON WW 19, 2002

Note: "P" in assembly line position indicates "Lead-Free"

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE

YEAR 2 = 2002
WEEK 19
P = LEAD-FREE

Tape & Reel Information

SECTION Y-Y

NOTES:

- 1.0 10 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ±.02
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 Ko MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
- 5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
- 6.0 VENDOR: (OPTIONAL)
- 7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDAR #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
- 8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO 10⁶ OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
- 9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
- 10.0 Ⓢ CRITICAL

| | | | |
|----|-------|-----|-----|
| Ao | 10.50 | +/- | 0.1 |
| Bo | 15.80 | +/- | 0.1 |
| B2 | 10.25 | +/- | 0.1 |
| Ko | 4.90 | +/- | 0.1 |
| F | 11.50 | +/- | 0.1 |
| P1 | 16.00 | +/- | 0.1 |
| W | 24.00 | +/- | 0.3 |

Dimensions in millimeters and (inches)

Ordering Information Table

| Device Code | | | | | | | | | | | | | | | | | |
|-------------|--|----|---|-----|---|-----|-----|-----|-----|---|---|---|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">48</td> <td style="padding: 5px;">C</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">Q</td> <td style="padding: 5px;">060</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">TRL</td> <td style="padding: 5px;">PbF</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> <td style="text-align: center;">⑧</td> </tr> </table> | 48 | C | T | Q | 060 | S | TRL | PbF | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| 48 | C | T | Q | 060 | S | TRL | PbF | | | | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | | | | | | | | | | |
| 1 | - Current Rating (40A) | | | | | | | | | | | | | | | | |
| 2 | - Circuit Configuration C = Common Cathode | | | | | | | | | | | | | | | | |
| 3 | - T = TO-220 | | | | | | | | | | | | | | | | |
| 4 | - Schottky "Q" Series | | | | | | | | | | | | | | | | |
| 5 | - Voltage Rating (060 = 60V) | | | | | | | | | | | | | | | | |
| 6 | - <ul style="list-style-type: none"> • S = D²Pak • -1= TO-262 | | | | | | | | | | | | | | | | |
| 7 | - <ul style="list-style-type: none"> • none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D²Pak only) • TRR = Tape & Reel (Right Oriented - for D²Pak only) | | | | | | | | | | | | | | | | |
| 8 | - <ul style="list-style-type: none"> • none = Standard Production • PbF = Lead-Free | | | | | | | | | | | | | | | | |

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.