

International  
**IOR** Rectifier

40CPQ035  
 40CPQ040  
 40CPQ045

SCHOTTKY RECTIFIER

40 Amp

#### Major Ratings and Characteristics

| Characteristics                                  | 40CPQ...   | Units            |
|--------------------------------------------------|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform                 | 40         | A                |
| $V_{RRM}$                                        | 35/40/45   | V                |
| $I_{FSM}$ @tp=5 $\mu$ s sine                     | 3500       | A                |
| $V_F$ @20 Apk, $T_J=125^\circ\text{C}$ (per leg) | 0.43       | V                |
| $T_J$                                            | -55 to 150 | $^\circ\text{C}$ |

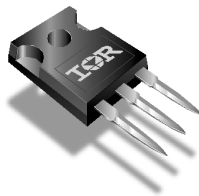
#### Description/Features

The 40CPQ... center tap Schottky rectifier 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.

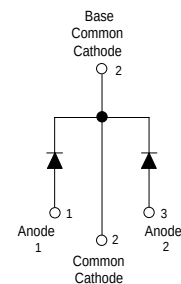
- $150^\circ\text{C}$   $T_J$  operation
- Center tap TO-247 package
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

#### Case Styles

40CPQ045



TO-247AC



## Voltage Ratings

| Part number                                     | 40CPQ035 | 40CPQ040 | 40CPQ045 |
|-------------------------------------------------|----------|----------|----------|
| $V_R$ Max. DC Reverse Voltage (V)               | 35       | 40       | 45       |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |          |          |          |

## Absolute Maximum Ratings

| Parameters  |                                                                         | 40CPQ... | Units | Conditions                                                                                                               |                                                                     |  |
|-------------|-------------------------------------------------------------------------|----------|-------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--|
| $I_{F(AV)}$ | Max. Average Forward Current<br>* See Fig. 5                            | 40       | A     | 50% duty cycle @ $T_c = 120^\circ\text{C}$ , rectangular wave form                                                       |                                                                     |  |
| $I_{FSM}$   | Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 3500     | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse                                                                      | Following any rated load condition and with rated $V_{RRM}$ applied |  |
|             |                                                                         | 430      |       | 10ms Sine or 6ms Rect. pulse                                                                                             |                                                                     |  |
| $E_{AS}$    | Non-Repetitive Avalanche Energy (Per Leg)                               | 27       | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 4\text{ Amps}$ , $L = 3.4\text{ mH}$                                                |                                                                     |  |
| $I_{AR}$    | Repetitive Avalanche Current (Per Leg)                                  | 4        | 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      |                                                            | 40CPQ... | Units | Conditions                                                                  |                                       |
|-----------------|------------------------------------------------------------|----------|-------|-----------------------------------------------------------------------------|---------------------------------------|
| V <sub>FM</sub> | Max. Forward Voltage Drop<br>(Per Leg) * See Fig. 1 (1)    | 0.49     | V     | @ 20A                                                                       | T <sub>J</sub> = 25 °C                |
|                 |                                                            | 0.59     | V     | @ 40A                                                                       |                                       |
|                 |                                                            | 0.43     | V     | @ 20A                                                                       | T <sub>J</sub> = 125 °C               |
|                 |                                                            | 0.56     | V     | @ 40A                                                                       |                                       |
| I <sub>RM</sub> | Max. Reverse Leakage Current<br>(Per Leg) * See Fig. 2 (1) | 4        | mA    | T <sub>J</sub> = 25 °C                                                      | V <sub>R</sub> = rated V <sub>R</sub> |
|                 |                                                            | 150      | mA    | T <sub>J</sub> = 125 °C                                                     |                                       |
| C <sub>T</sub>  | Max. Junction Capacitance (Per Leg)                        | 1850     | pF    | V <sub>R</sub> = 5V <sub>DC</sub> , (test signal range 100Khz to 1Mhz) 25°C |                                       |
| L <sub>S</sub>  | Typical Series Inductance (Per Leg)                        | 7.5      | nH    | Measured lead to lead 5mm from package body                                 |                                       |
| dv/dt           | Max. Voltage Rate of Change<br>(Rated V <sub>R</sub> )     | 10000    | V/ μs |                                                                             |                                       |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

## Thermal-Mechanical Specifications

| Parameters        |                                                        | 40CPQ...        | Units  | Conditions                            |
|-------------------|--------------------------------------------------------|-----------------|--------|---------------------------------------|
| T <sub>J</sub>    | Max. Junction Temperature Range                        | -55 to 150      | °C     |                                       |
| T <sub>stg</sub>  | Max. Storage Temperature Range                         | -55 to 150      | °C     |                                       |
| R <sub>thJC</sub> | Max. Thermal Resistance Junction to Case (Per Leg)     | 1.25            | °C/W   | DCoperation      * See Fig. 4         |
| R <sub>thJC</sub> | Max. Thermal Resistance Junction to Case (Per Package) | 0.63            | °C/W   | DCoperation                           |
| R <sub>thCS</sub> | Typical Thermal Resistance, Case to Heatsink           | 0.24            | °C/W   | Mounting surface , smooth and greased |
| wt                | Approximate Weight                                     | 6(0.21)         | g(oz.) |                                       |
| T                 | Mounting Torque                                        | Min.            | 6(5)   | Non-lubricated threads                |
|                   |                                                        | Max.            | 12(10) |                                       |
| Case Style        |                                                        | TO-247AC(TO-3P) | JEDEC  |                                       |

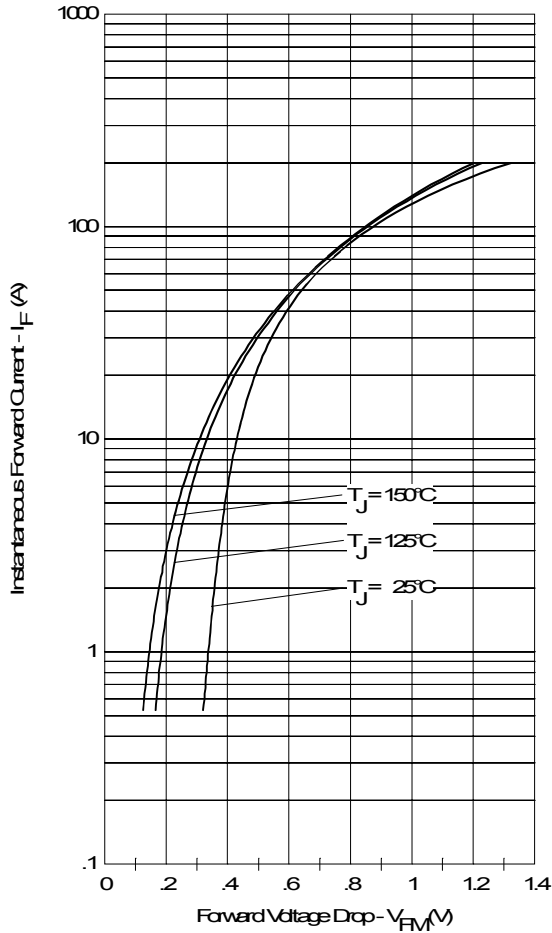


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

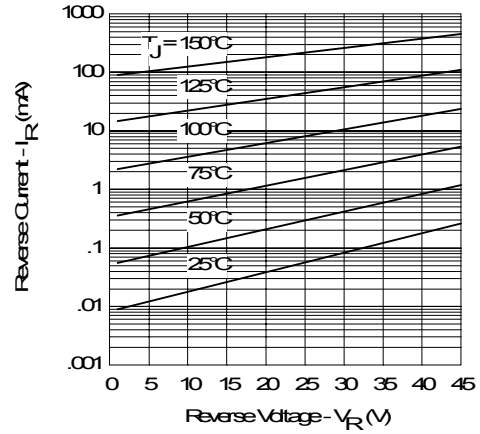


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

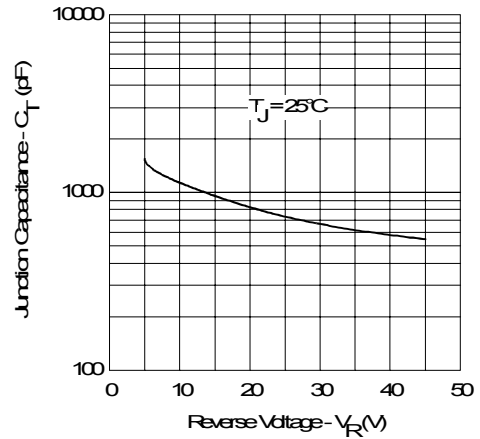


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

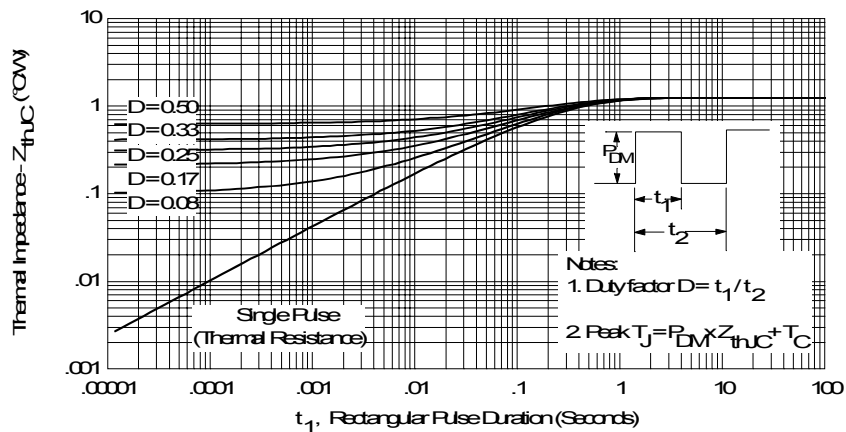


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

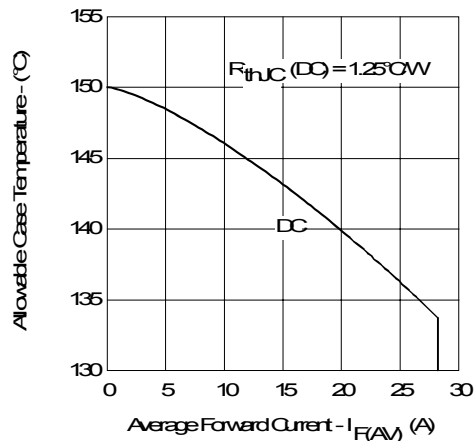


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

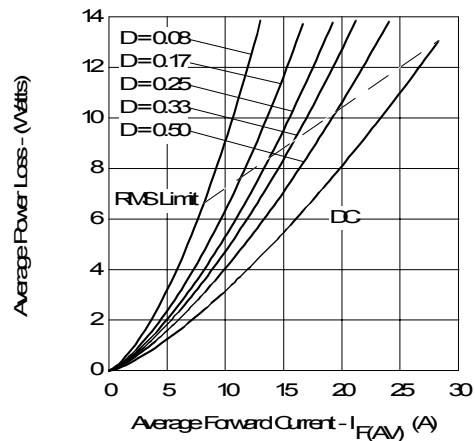


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

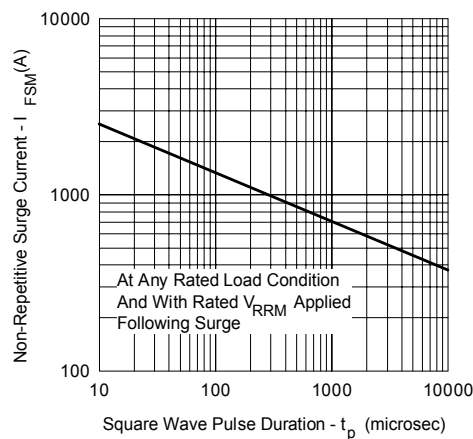


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

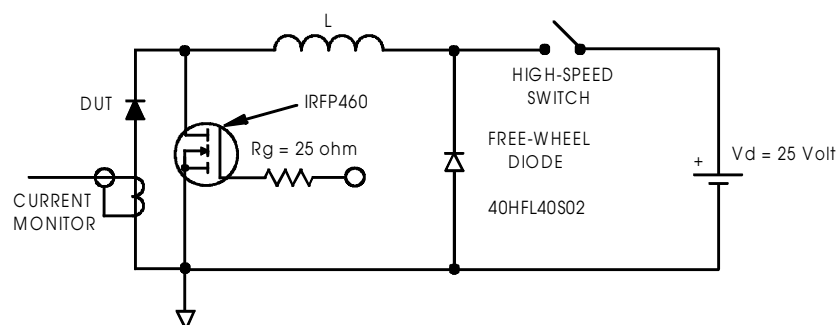
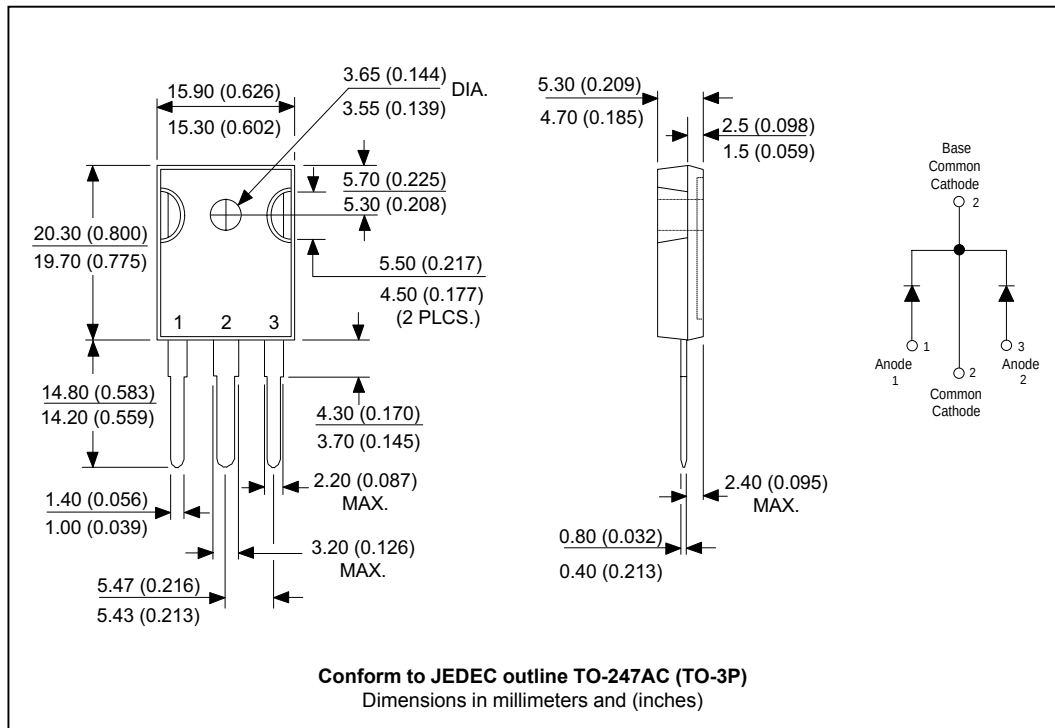
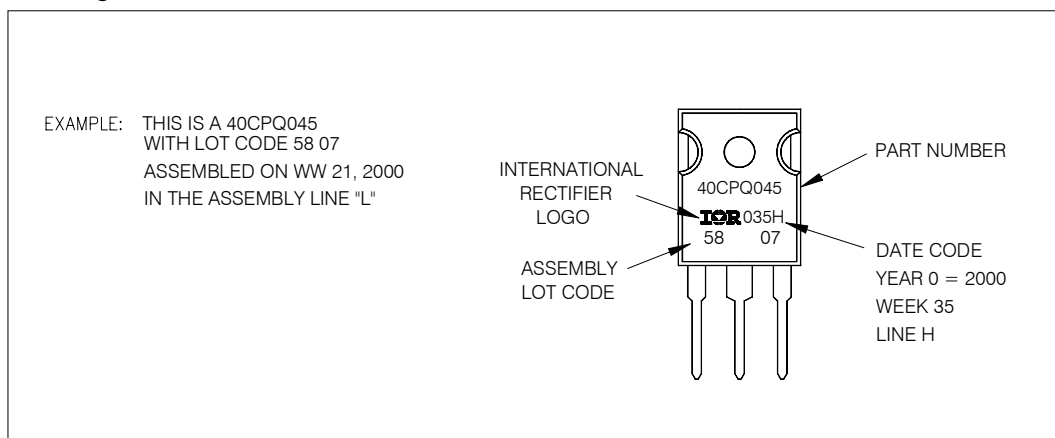


Fig. 8 - Unclamped Inductive Test Circuit

## Outline Table



## Marking Information



40CPQ035, 40CPQ040, 40CPQ045

Bulletin PD-2.307 rev. B 12/01

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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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**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7309

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