

FAST SOFT RECOVERY  
RECTIFIER DIODE



$V_F < 1.1V @ 30A$   
 $t_{rr} = 70ns$   
 $V_{RRM} 200 \text{ to } 600V$

Description/Features

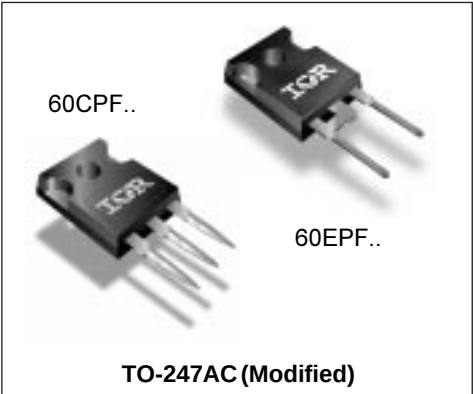
The 60EPF.. & 60CPF.. fast soft recovery **QUIETIR** rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop. The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

- Typical applications are both:
- Output rectification and freewheeling in inverters, choppers and converters
  - and input rectifications where severe restrictions on conducted EMI should be met.

Major Ratings and Characteristics

| Characteristics                 | 60EPF..<br>60CPF.. | Units       |
|---------------------------------|--------------------|-------------|
| $I_{F(AV)}$ Sinusoidal waveform | 60                 | A           |
| $V_{RRM}$                       | 200 to 600         | V           |
| $I_{FSM}$                       | 830                | A           |
| $V_F @ 30A, T_J = 25^{\circ}C$  | 1.1                | V           |
| $t_{rr} @ 1A, 100A/\mu s$       | 70                 | ns          |
| $T_J$                           | -40 to 150         | $^{\circ}C$ |

Package Outline



## Voltage Ratings

| Part Number      | $V_{RRM}$ , maximum peak reverse voltage<br>V | $V_{RSM}$ , maximum non repetitive peak reverse voltage<br>V | $I_{RRM}$<br>150°C<br>mA |
|------------------|-----------------------------------------------|--------------------------------------------------------------|--------------------------|
| 60EPF02, 60CPF02 | 200                                           | 300                                                          | 5                        |
| 60EPF04, 60CPF04 | 400                                           | 500                                                          |                          |
| 60EPF06, 60CPF06 | 600                                           | 700                                                          |                          |

## Absolute Maximum Ratings

| Parameters                                                 | 60.PF.. | Units         | Conditions                                                   |
|------------------------------------------------------------|---------|---------------|--------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current                   | 60      | A             | @ $T_C = 106^\circ\text{C}$ , 180° conduction half sine wave |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current | 700     | A             | 10ms Sine pulse, rated $V_{RRM}$ applied                     |
|                                                            | 830     |               | 10ms Sine pulse, no voltage reapplied                        |
| $I^2t$ Max. $I^2t$ for fusing                              | 2450    | $A^2s$        | 10ms Sine pulse, rated $V_{RRM}$ applied                     |
|                                                            | 3460    |               | 10ms Sine pulse, no voltage reapplied                        |
| $I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing                | 34600   | $A^2\sqrt{s}$ | $t = 0.1$ to 10ms, no voltage reapplied                      |

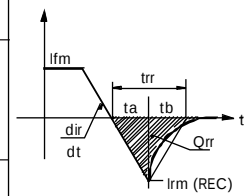
## Electrical Specifications

| Parameters                            | 60.PF.. | Units     | Conditions                      |
|---------------------------------------|---------|-----------|---------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop    | 1.3     | V         | @ 60A, $T_J = 25^\circ\text{C}$ |
| $r_t$ Forward slope resistance        | 5.0     | $m\Omega$ | $T_J = 150^\circ\text{C}$       |
| $V_{F(TO)}$ Threshold voltage         | 0.88    | V         |                                 |
| $I_{RM}$ Max. Reverse Leakage Current | 0.1     | mA        | $T_J = 25^\circ\text{C}$        |
|                                       | 5.0     |           | $T_J = 150^\circ\text{C}$       |

$V_R = \text{rated } V_{RRM}$

## Typical Recovery Characteristics

| Parameters                        | 60.PF.. | Units         | Conditions                                             |
|-----------------------------------|---------|---------------|--------------------------------------------------------|
| $t_{rr}$ Reverse Recovery Time    | 180     | ns            | $I_F @ 60\text{Apk}$<br>@ 25A/ $\mu\text{s}$<br>@ 25°C |
| $I_{rr}$ Reverse Recovery Current | 3.4     | A             |                                                        |
| $Q_{rr}$ Reverse Recovery Charge  | 0.5     | $\mu\text{C}$ |                                                        |
| S Snap Factor $t_b/t_a$           | 0.5     | typical       |                                                        |



### Thermal-Mechanical Specifications

| Parameters                                              | 60.PF..  | Units  | Conditions                        |
|---------------------------------------------------------|----------|--------|-----------------------------------|
| $T_J$ Max. Junction Temperature Range                   | -40to150 | °C     |                                   |
| $T_{stg}$ Max. Storage Temperature Range                | -40to150 | °C     |                                   |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case     | 0.4      | °C/W   | DCoperation                       |
| $R_{thJA}$ Max. Thermal Resistance Junction to Ambient  | 40       | °C/W   |                                   |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink | 0.2      | °C/W   | Mountingsurface, smoothandgreased |
| wt Approximate Weight                                   | 6(0.21)  | g(oz.) |                                   |
| T Mounting Torque                                       | Min.     | 6(5)   | Kg-cm<br>(lbf-in)                 |
|                                                         | Max.     | 12(10) |                                   |
| Case Style                                              | TO-247AC |        | JEDEC(Modified)                   |

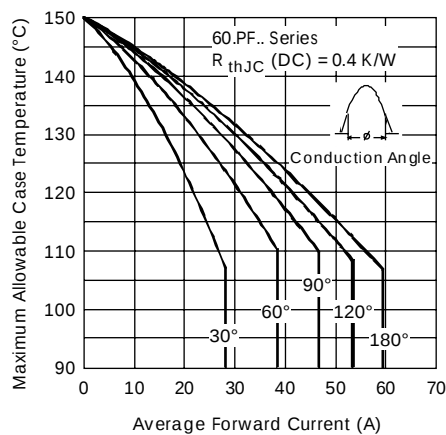


Fig. 1 - Current Rating Characteristics

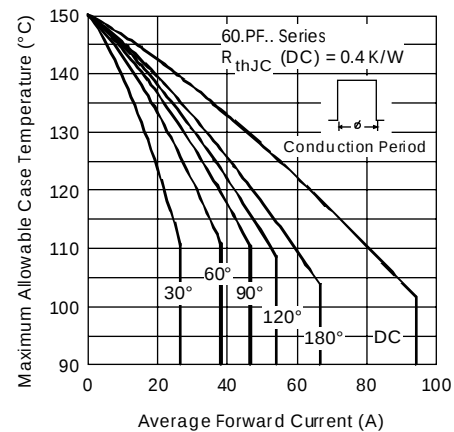


Fig. 2 - Current Rating Characteristics

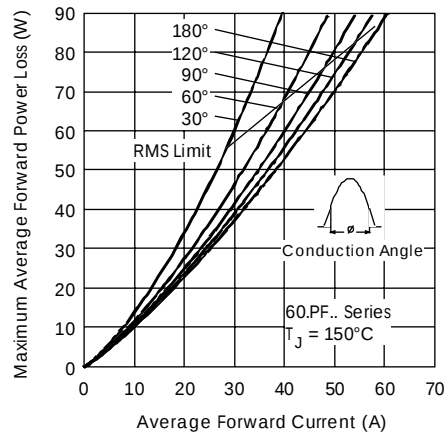


Fig. 3 - Forward Power Loss Characteristics

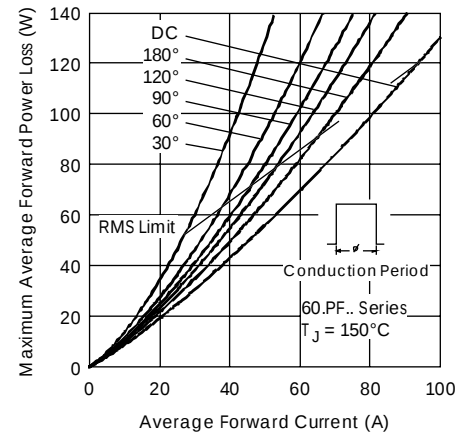


Fig. 4 - Forward Power Loss Characteristics

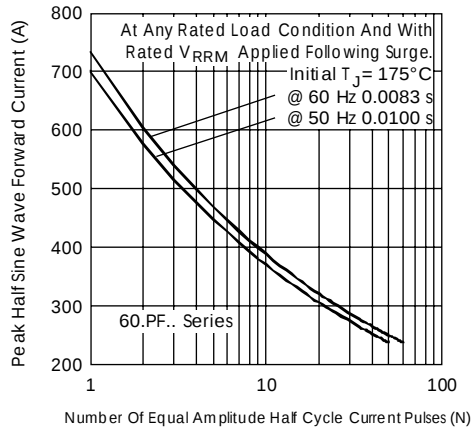


Fig. 5 - Maximum Non-Repetitive Surge Current

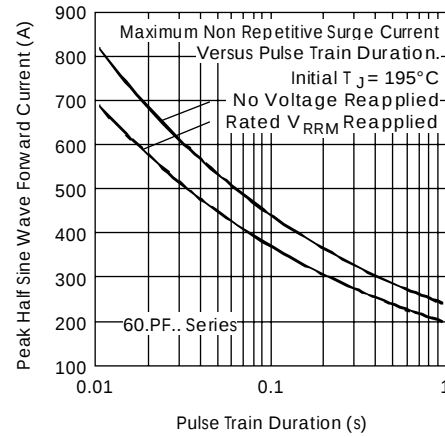


Fig. 6 - Maximum Non-Repetitive Surge Current

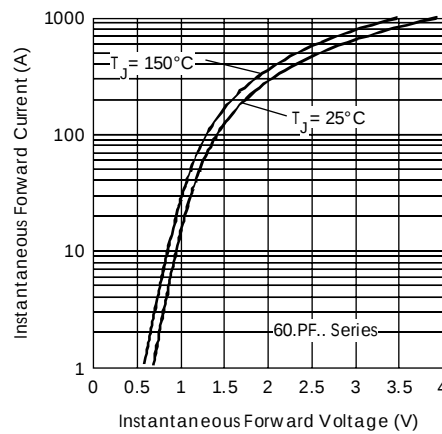


Fig. 7 - Forward Voltage Drop Characteristics

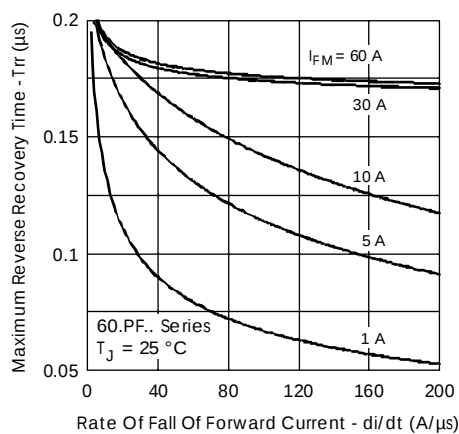


Fig. 8 - Recovery Time Characteristics,  $T_J = 25^\circ\text{C}$

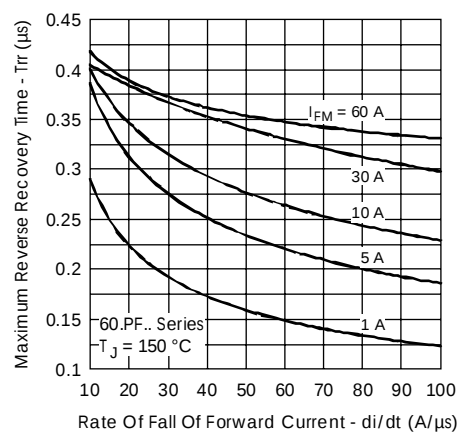


Fig. 9 - Recovery Time Characteristics,  $T_J = 150^\circ\text{C}$

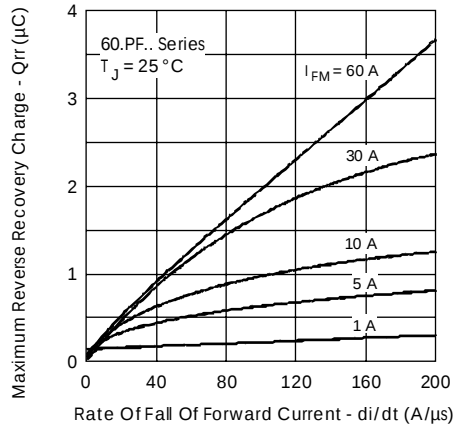


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25^\circ\text{C}$

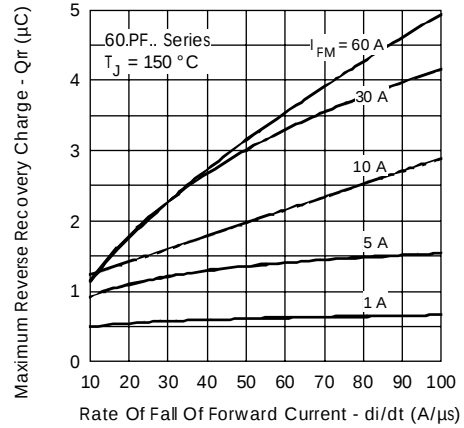


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150^\circ\text{C}$

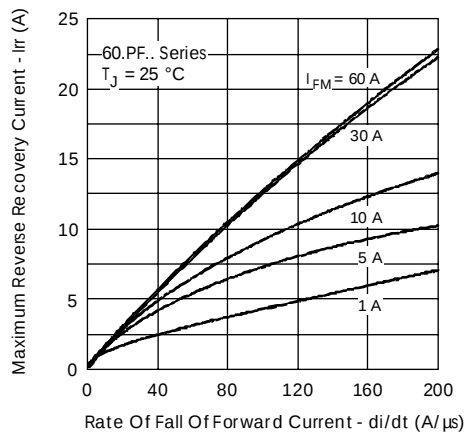


Fig. 12 - Recovery Current Characteristics,  $T_J = 25^\circ\text{C}$

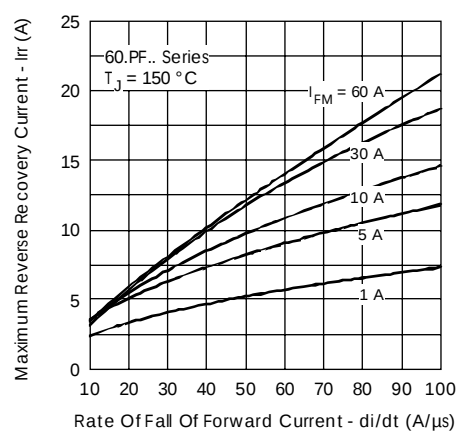


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ\text{C}$

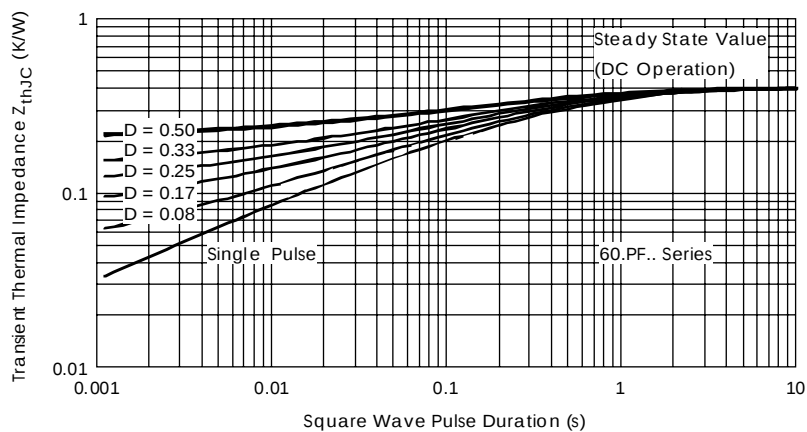
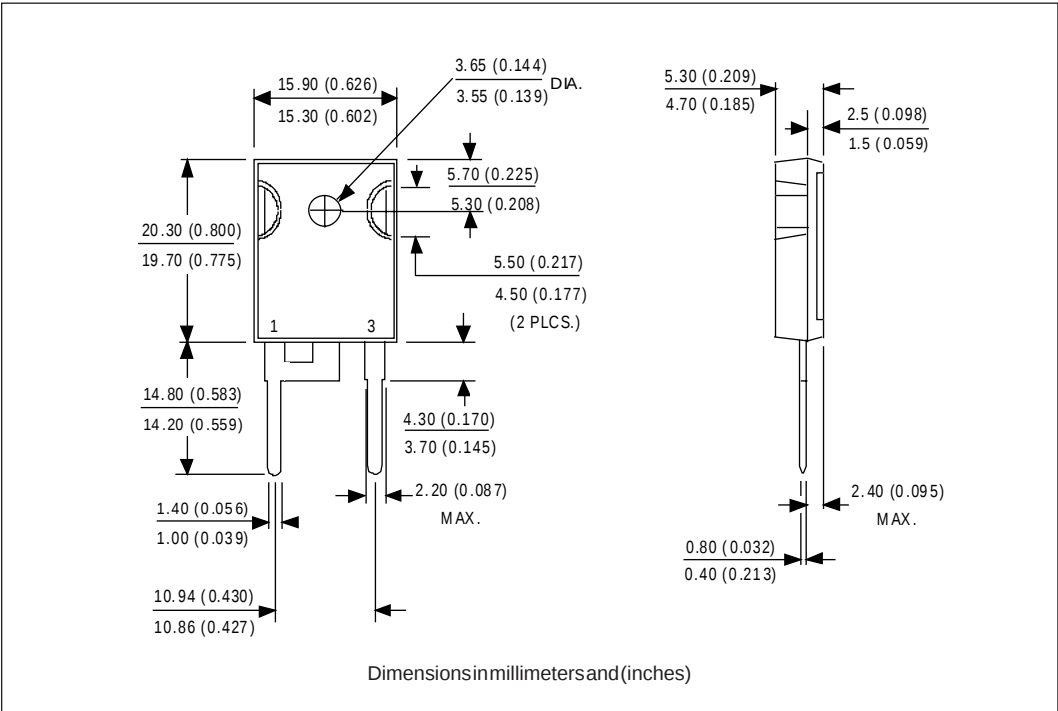


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

Outline Table



Ordering Information Table

### Device Code

|    |   |   |   |    |
|----|---|---|---|----|
| 60 | E | P | F | 06 |
|----|---|---|---|----|

Diagram showing the device code structure with five positions labeled 1 through 5 below the code digits.

- 1** - Current Rating
- 2** - Circuit Configuration:  
E = Single Diode
- 3** - Package:  
P = TO-247AC (Modified)
- 4** - Type of Silicon:  
F = Fast Recovery
- 5** - Voltage code: Code x 100 =  $V_{RRM}$

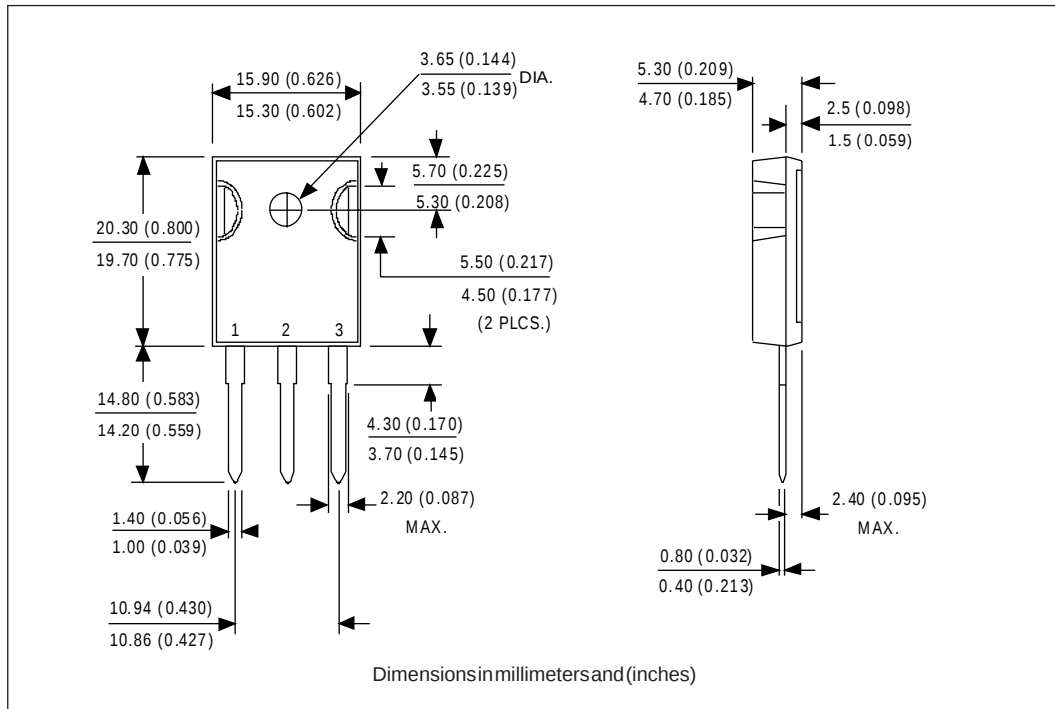
02 = 200V

04 = 400V

06 = 600V

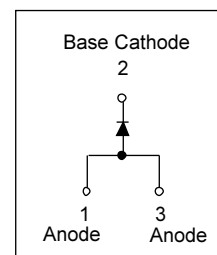
Diagram showing the internal circuit of the diode package. The terminals are labeled 1 (CATHODE), 2 (BASE), and 3 (ANODE). The circuit shows a diode connected between the cathode (1) and the anode (3), with the base (2) connected to the cathode (1).

## Outline Table



## Ordering Information Table

| Device Code |                                        |   |   |           |
|-------------|----------------------------------------|---|---|-----------|
| 60          | C                                      | P | F | 06        |
| 1           | 2                                      | 3 | 4 | 5         |
| 1           | - Current Rating                       |   |   |           |
| 2           | - Circuit Configuration:               |   |   |           |
|             | C = Single Diode, 3 pins               |   |   |           |
| 3           | - Package:                             |   |   |           |
|             | P = TO-247AC (Modified)                |   |   |           |
| 4           | - Type of Silicon:                     |   |   |           |
|             | F = Fast Recovery                      |   |   |           |
| 5           | - Voltage code: Code x 100 = $V_{RRM}$ |   |   |           |
|             |                                        |   |   | 02 = 200V |
|             |                                        |   |   | 04 = 400V |
|             |                                        |   |   | 06 = 600V |



International  
**IOR** Rectifier

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Data and specifications subject to change without notice.