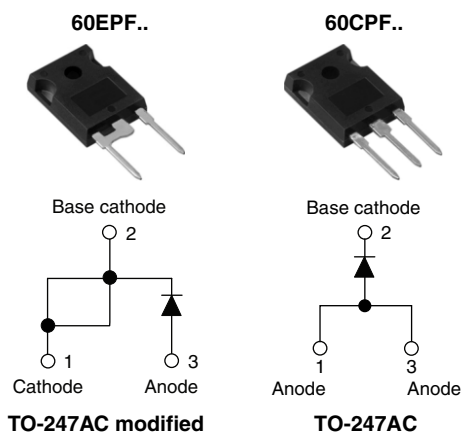


## Fast Soft Recovery Rectifier Diode, 60 A



### FEATURES/DESCRIPTION

The 60EPF.. and 60CPF.. fast soft recovery 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.

This product series has been designed and qualified for industrial level.

### APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

### PRODUCT SUMMARY

|               |                |
|---------------|----------------|
| $V_F$ at 30 A | < 1.1 V        |
| $t_{rr}$      | 70 ns          |
| $V_{RRM}$     | 200 V to 600 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                | VALUES      | UNITS            |
|-------------|--------------------------------|-------------|------------------|
| $V_{RRM}$   |                                | 200 to 600  | V                |
| $I_{F(AV)}$ | Sinusoidal waveform            | 60          | A                |
| $I_{FSM}$   |                                | 830         |                  |
| $t_{rr}$    | 1 A, 100 A/ $\mu$ s            | 70          | ns               |
| $V_F$       | 30 A, $T_J = 25^\circ\text{C}$ | 1.1         | V                |
| $T_J$       |                                | - 40 to 150 | $^\circ\text{C}$ |

### 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>AT 150 $^\circ\text{C}$<br>mA |
|------------------|-----------------------------------------------|--------------------------------------------------------------|--------------------------------------------|
| 60EPF02, 60CPF02 | 200                                           | 300                                                          | 5                                          |
| 60EPF04, 60CPF04 | 400                                           | 500                                                          |                                            |
| 60EPF06, 60CPF06 | 600                                           | 700                                                          |                                            |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                           | SYMBOL        | TEST CONDITIONS                                            | VALUES | UNITS                       |
|-----------------------------------------------------|---------------|------------------------------------------------------------|--------|-----------------------------|
| Maximum average forward current                     | $I_{F(AV)}$   | $T_C = 106^\circ\text{C}$ , 180° conduction half sine wave | 60     | A                           |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$     | 10 ms sine pulse, rated $V_{RRM}$ applied                  | 700    |                             |
|                                                     |               | 10 ms sine pulse, no voltage reapplied                     | 830    |                             |
| Maximum $I^2t$ for fusing                           | $I^2t$        | 10 ms sine pulse, rated $V_{RRM}$ applied                  | 2450   | $\text{A}^2\text{s}$        |
|                                                     |               | 10 ms sine pulse, no voltage reapplied                     | 3460   |                             |
| Maximum $I^2\sqrt{t}$ for fusing                    | $I^2\sqrt{t}$ | $t = 0.1$ ms to 10 ms, no voltage reapplied                | 34 600 | $\text{A}^2\sqrt{\text{s}}$ |

# 60EPF.., 60CPF.. Soft Recovery Series

Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 60 A



## ELECTRICAL SPECIFICATIONS

| PARAMETER                       | SYMBOL      | TEST CONDITIONS                          |                               | VALUES | UNITS            |
|---------------------------------|-------------|------------------------------------------|-------------------------------|--------|------------------|
| Maximum forward voltage drop    | $V_{FM}$    | 60 A, $T_J = 25\text{ }^{\circ}\text{C}$ |                               | 1.3    | V                |
| Forward slope resistance        | $r_t$       | $T_J = 150\text{ }^{\circ}\text{C}$      |                               | 5.0    | $\text{m}\Omega$ |
| Threshold voltage               | $V_{F(TO)}$ |                                          |                               | 0.88   | V                |
| Maximum reverse leakage current | $I_{RM}$    | $T_J = 25\text{ }^{\circ}\text{C}$       | $V_R = \text{Rated } V_{RRM}$ | 0.1    | mA               |
|                                 |             | $T_J = 150\text{ }^{\circ}\text{C}$      |                               | 5.0    |                  |

## RECOVERY CHARACTERISTICS

| PARAMETER                | SYMBOL   | TEST CONDITIONS                                                 | VALUES | UNITS         |  |
|--------------------------|----------|-----------------------------------------------------------------|--------|---------------|--|
| Reverse recovery time    | $t_{rr}$ | $I_F$ at 60 Apk<br>25 A/ $\mu\text{s}$<br>25 $^{\circ}\text{C}$ | 180    | ns            |  |
| Reverse recovery current | $I_{rr}$ |                                                                 | 3.4    | A             |  |
| Reverse recovery charge  | $Q_{rr}$ |                                                                 | 0.5    | $\mu\text{C}$ |  |
| Snap factor              | S        | Typical                                                         | 0.5    |               |  |

## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER                                       | SYMBOL                            | TEST CONDITIONS                      | VALUES           | UNITS                  |
|-------------------------------------------------|-----------------------------------|--------------------------------------|------------------|------------------------|
| Maximum junction and storage temperature range  | T <sub>J</sub> , T <sub>Stg</sub> |                                      | - 40 to 150      | °C                     |
| Maximum thermal resistance, junction to case    | R <sub>thJC</sub>                 | DC operation                         | 0.4              | °C/W                   |
| Maximum thermal resistance, junction to ambient | R <sub>thJA</sub>                 |                                      | 40               |                        |
| Typical thermal resistance, case to heatsink    | R <sub>thCS</sub>                 | Mounting surface, smooth and greased | 0.2              |                        |
| Approximate weight                              |                                   |                                      | 6                | g                      |
|                                                 |                                   |                                      | 0.21             | oz.                    |
| Mounting torque                                 | minimum                           |                                      | 6 (5)            | kgf · cm<br>(lbf · in) |
|                                                 | maximum                           |                                      | 12 (10)          |                        |
| Marking device                                  |                                   | Case style TO-247AC modified (JEDEC) | 60EPF02, 60CPF02 |                        |
|                                                 |                                   |                                      | 60EPF04, 60CPF04 |                        |
|                                                 |                                   |                                      | 60EPF06, 60CPF06 |                        |



# 60EPF.., 60CPF.. Soft Recovery Series

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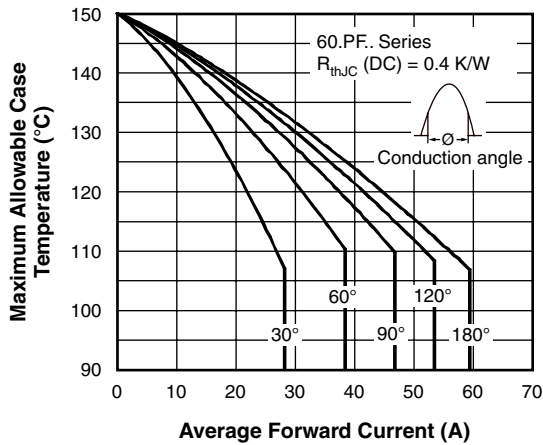


Fig. 1 - Current Rating Characteristics

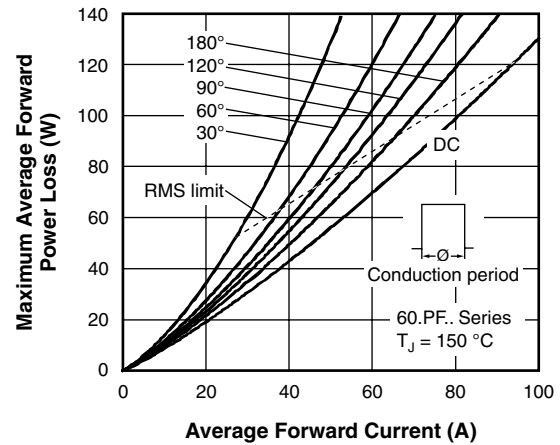


Fig. 4 - Forward Power Loss Characteristics

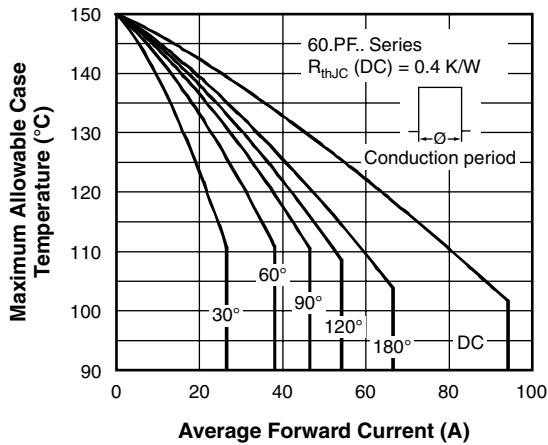


Fig. 2 - Current Rating Characteristics

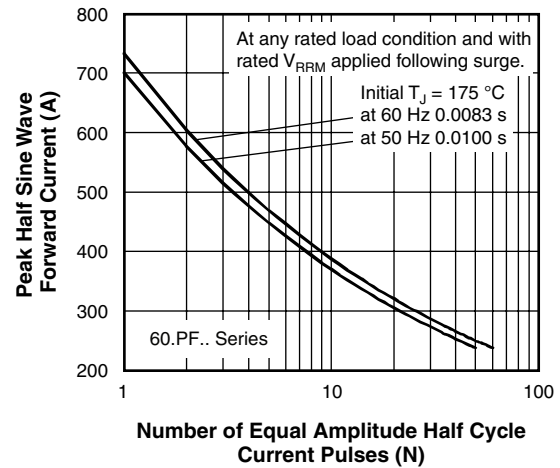


Fig. 5 - Maximum Non-Repetitive Surge Current

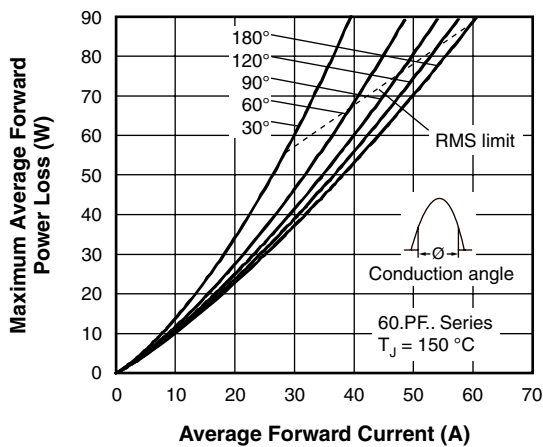


Fig. 3 - Forward Power Loss Characteristics

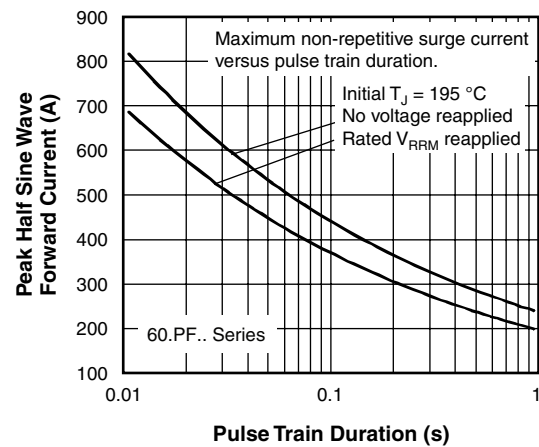


Fig. 6 - Maximum Non-Repetitive Surge Current

# 60EPF.., 60CPF.. Soft Recovery Series

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Fast Soft Recovery  
Rectifier Diode, 60 A

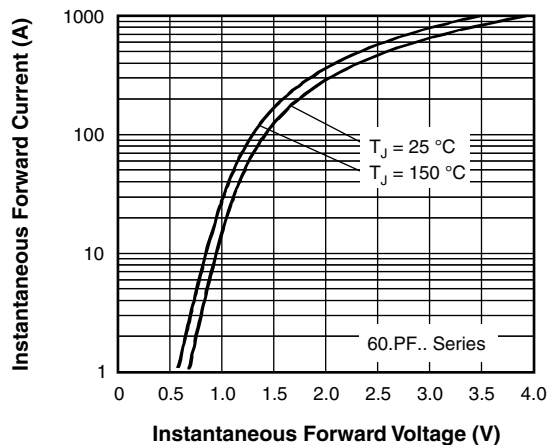


Fig. 7 - Forward Voltage Drop Characteristics

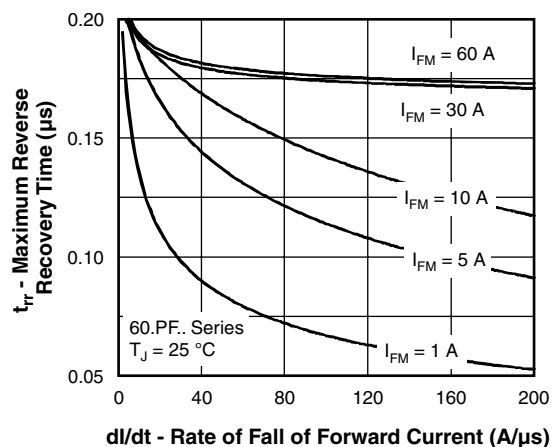


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

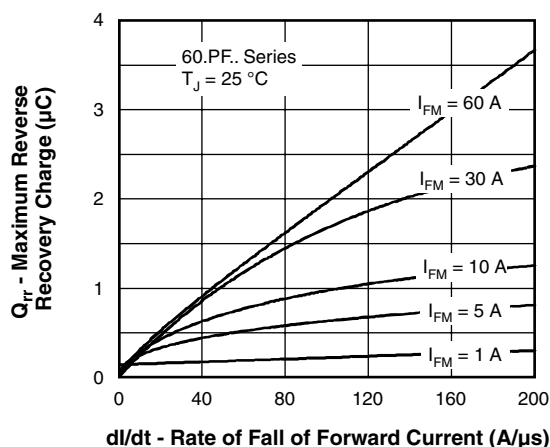


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

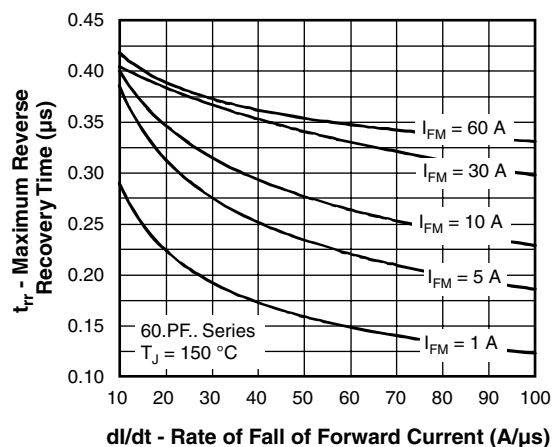


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$

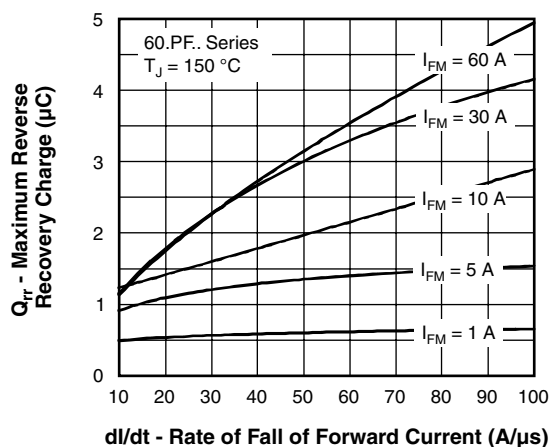


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$



## 60EPF.., 60CPF.. Soft Recovery Series

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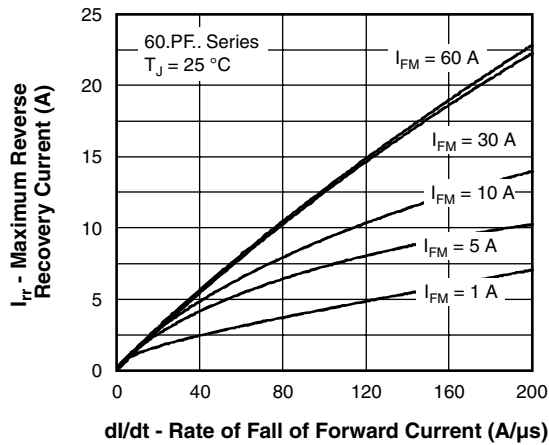


Fig. 12 - Recovery Current Characteristics,  $T_J = 25^\circ C$

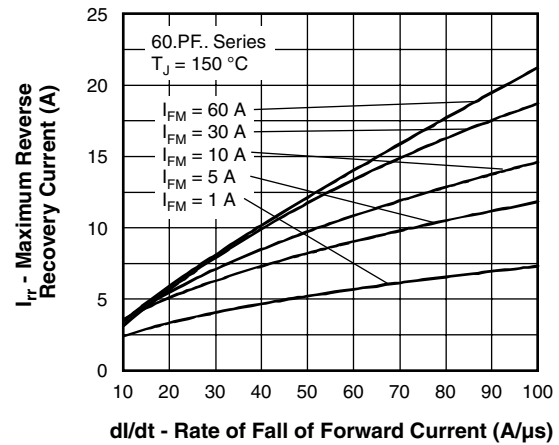


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ C$

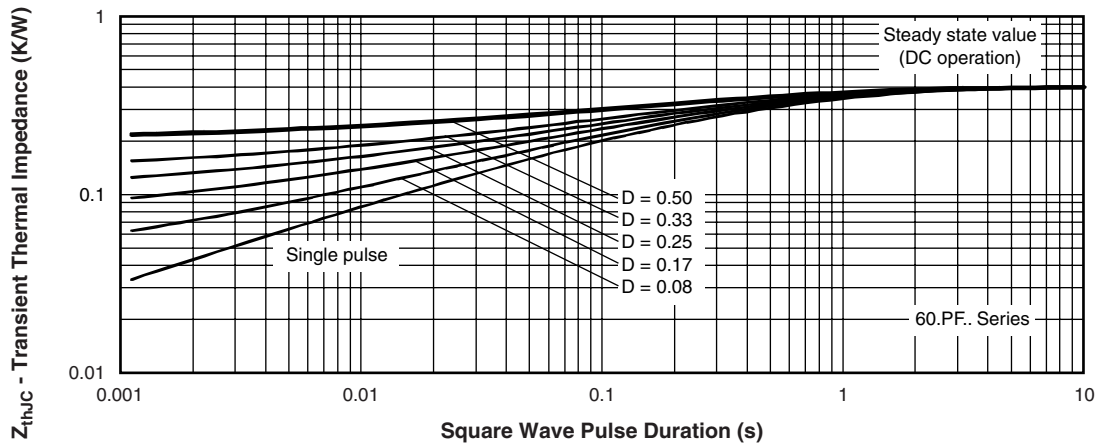


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 60EPF.., 60CPF.. Soft Recovery Series



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## ORDERING INFORMATION TABLE

|             |                                                                          |   |   |   |    |   |
|-------------|--------------------------------------------------------------------------|---|---|---|----|---|
| Device code | 60                                                                       | E | P | F | 06 | - |
|             | 1                                                                        | 2 | 3 | 4 | 5  | 6 |
| 1           | - Current rating (60 = 60 A)                                             |   |   |   |    |   |
| 2           | - Circuit configuration:<br>E = Single diode<br>C = Single diode, 3 pins |   |   |   |    |   |
| 3           | - Package:<br>P = TO-247AC modified                                      |   |   |   |    |   |
| 4           | - Type of silicon:<br>F = Fast recovery                                  |   |   |   |    |   |
| 5           | - Voltage code x 100 = $V_{RRM}$                                         |   |   |   |    |   |
| 6           | - • None = Standard production<br>• PbF = Lead (Pb)-free                 |   |   |   |    |   |

02 = 200 V  
04 = 400 V  
06 = 600 V

| LINKS TO RELATED DOCUMENTS |                   |                                                                        |
|----------------------------|-------------------|------------------------------------------------------------------------|
| Dimensions                 | TO-247AC modified | <a href="http://www.vishay.com/doc?95253">www.vishay.com/doc?95253</a> |
|                            | TO-247AC          | <a href="http://www.vishay.com/doc?95223">www.vishay.com/doc?95223</a> |
| Part marking information   | TO-247AC modified | <a href="http://www.vishay.com/doc?95255">www.vishay.com/doc?95255</a> |
|                            | TO-247AC          | <a href="http://www.vishay.com/doc?95226">www.vishay.com/doc?95226</a> |
| SPICE model                |                   | <a href="http://www.vishay.com/doc?95275">www.vishay.com/doc?95275</a> |



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