

### STANDARD RECOVERY DIODES

### Hockey Puk Version

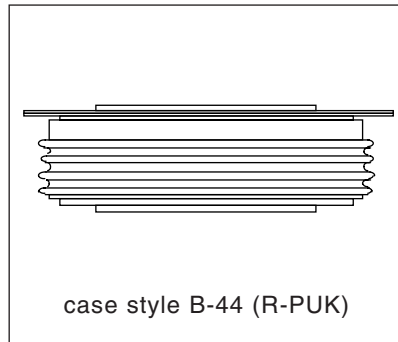
#### Features

- Wide current range
- High voltage ratings up to 4000V
- High surge current capabilities
- Diffused junction
- Hockey Puk version
- Case style B-44 (R-PUK)

#### Typical Applications

- Converters
- Power supplies
- High power drives
- Auxiliary system supplies for traction applications

4450A



#### Major Ratings and Characteristics

| Parameters      | SD4000C..R   | Units |                   |
|-----------------|--------------|-------|-------------------|
| $I_{F(AV)}$     | 4450         | A     |                   |
| @ $T_{hs}$      | 55           | °C    |                   |
| $I_{F(RMS)}$    | 7700         | A     |                   |
| @ $T_{hs}$      | 25           | °C    |                   |
| $I_{FSM}$       | @ 50Hz       | 57300 | A                 |
|                 | @ 60Hz       | 60000 | A                 |
| $I^2t$          | @ 50Hz       | 16430 | KA <sup>2</sup> s |
|                 | @ 60Hz       | 15000 | KA <sup>2</sup> s |
| $V_{RRM}$ range | 3000 to 4000 | V     |                   |
| $T_J$           | - 40 to 150  | °C    |                   |

**ELECTRICAL SPECIFICATIONS**

## Voltage Ratings

| Type number | Voltage Code | $V_{RRM}$ : maximum repetitive peak reverse voltage<br>V | $V_{RSM}$ : maximum non-repetitive peak rev. voltage<br>V | $I_{RRM}$ max.<br>@ $T_J = 150^\circ\text{C}$<br>mA |
|-------------|--------------|--|---|---|
| SD4000C..R  | 30           | 3000   | 3100  | 100   |
|             | 34           | 3400   | 3500  |   |
|             | 38           | 3800   | 3900  |   |
|             | 40           | 4000   | 4100  |   |

## Forward Conduction

| Parameter   | SD4000C..R  | Units              | Conditions   |
|---|-------------|--------------------|--|
| $I_{F(AV)}$ Max. average forward current<br>@ Heatsink temperature      | 4450 (2200) | A                  | 180° conduction, half sine wave  |
|   | 55 (85)     | °C                 | Double side (single side) cooled   |
| $I_{F(RMS)}$ Max. RMS forward current                                   | 7700        | A                  | @ 25°C heatsink temperature double side cooled                                       |
| $I_{FSM}$ Max. peak, one-cycle forward,<br>non-repetitive surge current | 57300       | A                  | t = 10ms No voltage reappplied   |
|   | 60000       |                    | t = 8.3ms reappplied   |
|   | 48200       |                    | t = 10ms 100% $V_{RRM}$ reappplied   |
|   | 50470       |                    | t = 8.3ms reappplied   |
| $I^2t$ Maximum $I^2t$ for fusing  | 16430       | KA <sup>2</sup> s  | t = 10ms No voltage reappplied   |
|   | 15000       |                    | t = 8.3ms reappplied   |
|   | 11615       |                    | t = 10ms 100% $V_{RRM}$ reappplied   |
|   | 10605       |                    | t = 8.3ms reappplied   |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing                          | 164300      | KA <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reappplied   |
| $V_{F(TO)1}$ Low level value of threshold voltage                       | 0.830       | V                  | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ max. |
| $V_{F(TO)2}$ High level value of threshold voltage                      | 1.112       |                    | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.                                      |
| $r_{f1}$ Low level value of forward slope resistance                    | 0.101       | mΩ                 | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ max. |
| $r_{f2}$ High level value of forward slope resistance                   | 0.071       |                    | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.                                      |
| $V_{FM}$ Max. forward voltage drop                                      | 1.44        | V                  | $I_{pk} = 6000A$ , $T_J = T_J$ max, $t_p = 10ms$ sinusoidal wave                     |

**Thermal and Mechanical Specifications**

| Parameter   | SD400C..R       | Units     | Conditions   |
|---|-----------------|-----------|--|
| T <sub>J</sub> Max. junction operating temperature range          | -40 to 150      | °C        |  |
| T <sub>stg</sub> Max. storage temperature range                   | -55 to 200      |           |  |
| R <sub>thJ-hs</sub> Max. thermal resistance, junction to heatsink | 0.02<br>0.01    | K/W       | DC operation single side cooled<br>DC operation double side cooled |
| F Mounting force, ± 10%   | 39200<br>(4000) | N<br>(Kg) |  |
| wt Approximate weight   | 1590            | g         |  |
| Case style  | B-44 (R-PUK)    |           | See Outline Table  |

**ΔR<sub>thJ-hs</sub> Conduction**

(The following table shows the increment of thermal resistance R<sub>thJ-hs</sub> when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction |             | Rectangular conduction |             | Units | Conditions                           |
|------------------|-----------------------|-------------|------------------------|-------------|-------|--------------------------------------|
|                  | Single Side           | Double Side | Single Side            | Double Side |       |                                      |
| 180°             | 0.0009                | 0.0010      | 0.0006                 | 0.0006      | K/W   | T <sub>J</sub> = T <sub>J</sub> max. |
| 120°             | 0.0010                | 0.0011      | 0.0010                 | 0.0010      |       |                                      |
| 90°              | 0.0013                | 0.0013      | 0.0014                 | 0.0014      |       |                                      |
| 60°              | 0.0019                | 0.0019      | 0.0020                 | 0.0020      |       |                                      |
| 30°              | 0.0033                | 0.0033      | 0.0034                 | 0.0034      |       |                                      |

**Ordering Information Table**

|   |  |    |     |    |   |    |   |   |   |   |   |   |   |
|---|--|----|-----|----|---|----|---|---|---|---|---|---|---|
| <b>Device Code</b>  | <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">SD</td> <td style="padding: 5px;">400</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">C</td> <td style="padding: 5px;">40</td> <td style="padding: 5px;">R</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> </tr> </table> | SD | 400 | 0  | C | 40 | R | ① | ② | ③ | ④ | ⑤ | ⑥ |
| SD  | 400  | 0  | C   | 40 | R |    |   |   |   |   |   |   |   |
| ①   | ②  | ③  | ④   | ⑤  | ⑥ |    |   |   |   |   |   |   |   |
| <ul style="list-style-type: none"> <li><b>1</b> - Diode</li> <li><b>2</b> - Essential part number</li> <li><b>3</b> - 0 = Standard recovery</li> <li><b>4</b> - C = Ceramic Puk</li> <li><b>5</b> - Voltage code: code x 100 = V<sub>RRM</sub> (see Voltage Ratings Table)</li> <li><b>6</b> - R = Puk Case B-44 (R-PUK)</li> </ul> |  |    |     |    |   |    |   |   |   |   |   |   |   |

# SD4000C..R Series

Bulletin I2033 rev.B 04/00

International  
**IRF** Rectifier

## Outline Table

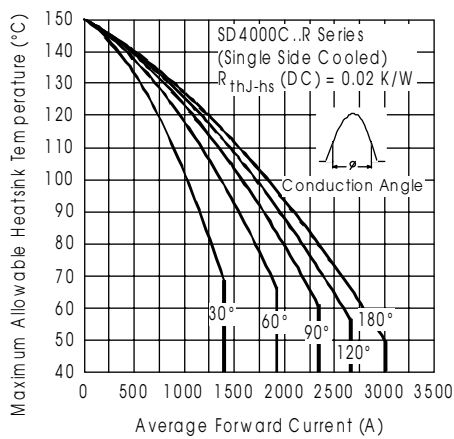
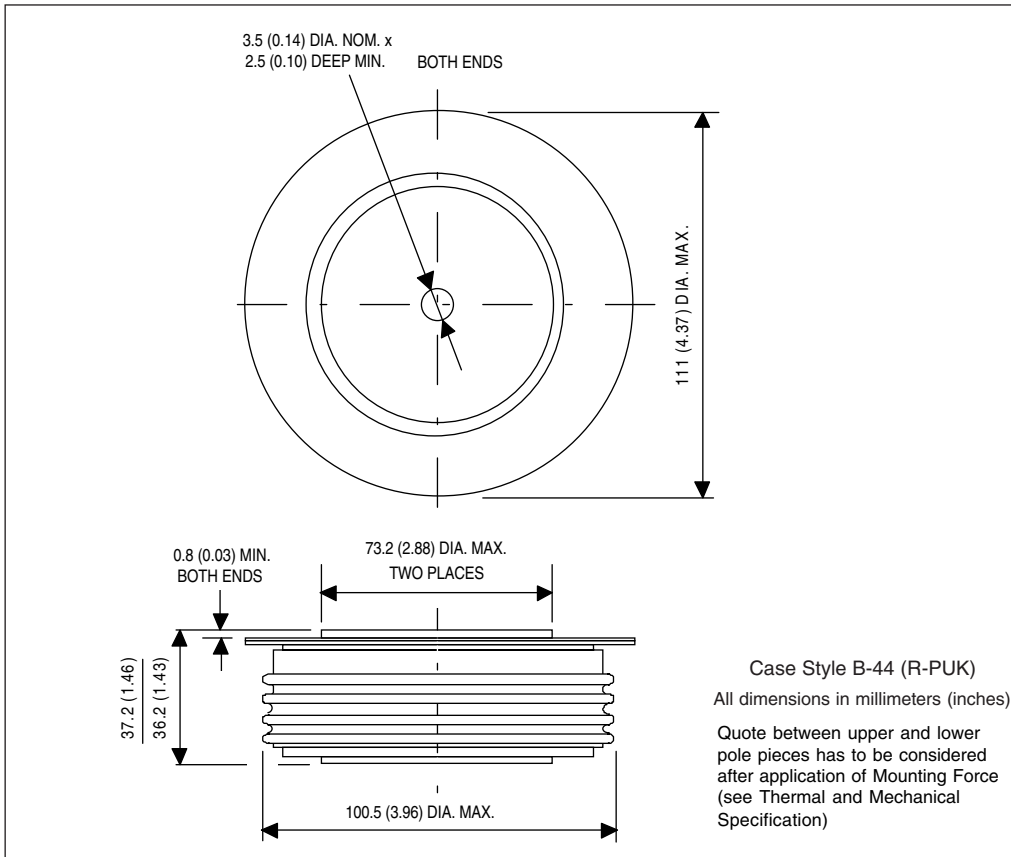


Fig. 1 - Current Ratings Characteristics

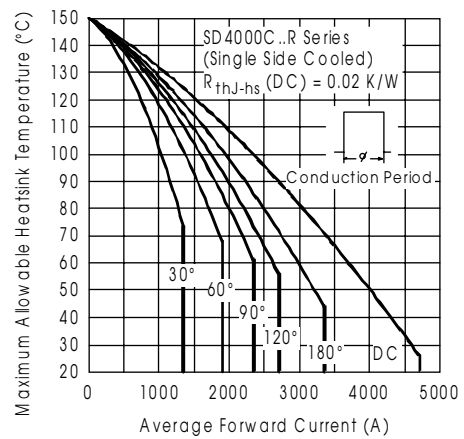


Fig. 2 - Current Ratings Characteristics

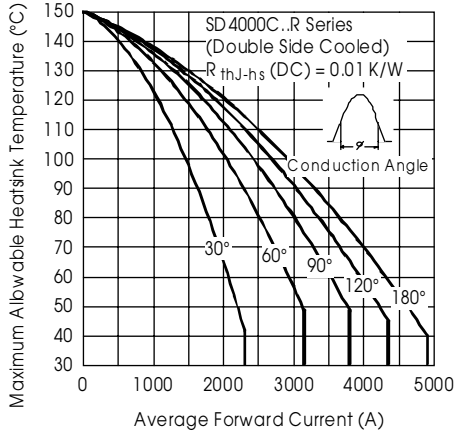


Fig. 3 - Current Ratings Characteristics

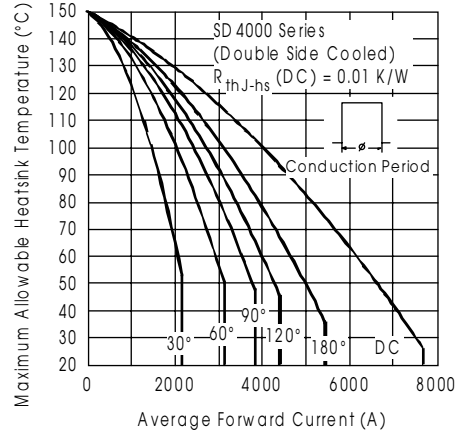


Fig. 4 - Current Ratings Characteristics

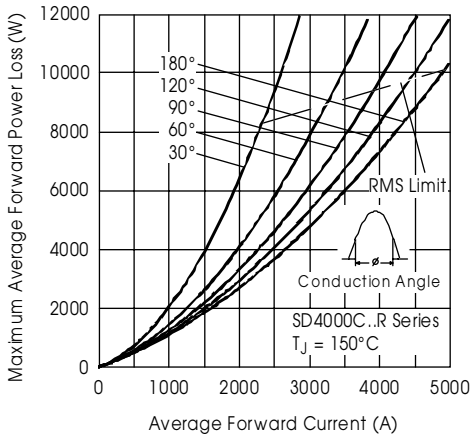


Fig. 5 - Forward Power Loss Characteristics

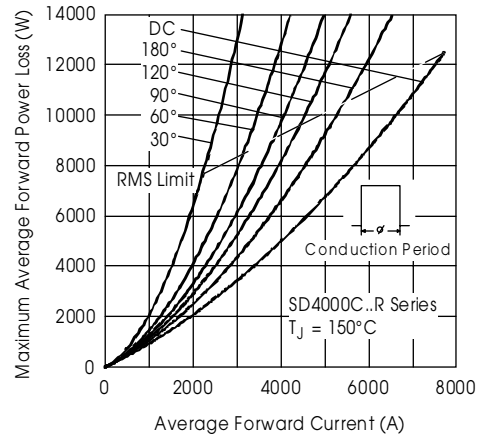


Fig. 6 - Forward Power Loss Characteristics

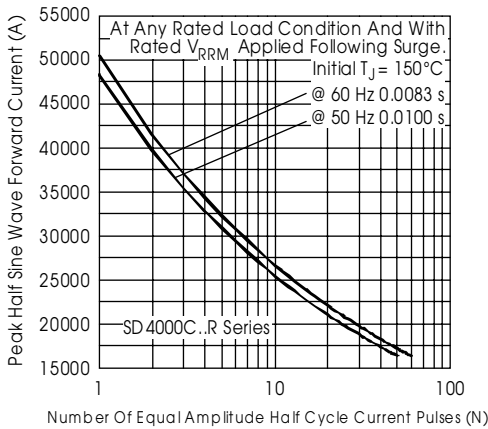


Fig. 7 - Maximum Non-Repetitive Surge Current  
Single and Double Side Cooled

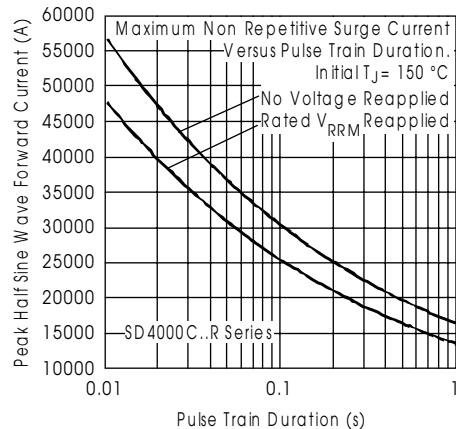


Fig. 8 - Maximum Non-Repetitive Surge Current  
Single and Double Side Cooled

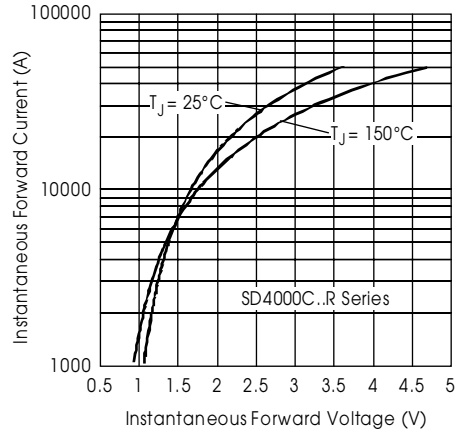


Fig. 9 - Forward Voltage Drop Characteristics

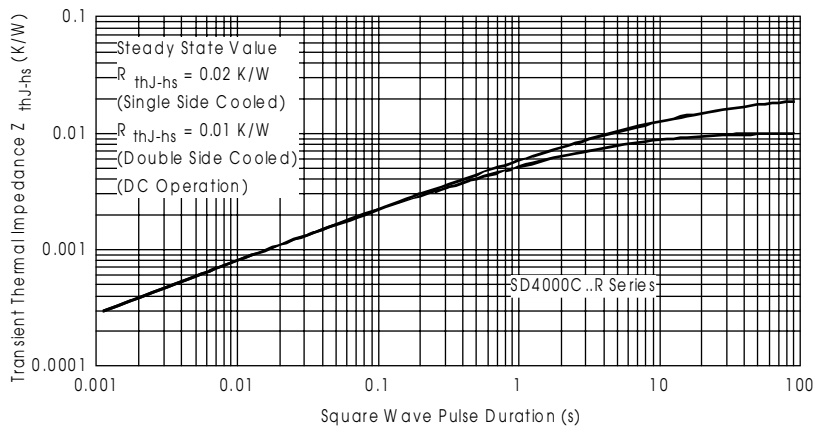


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics