

## Standard Recovery Diodes, (Hockey PUK Version), 3000 A



K-PUK (DO-200AC)

### FEATURES

- Wide current range
- High voltage ratings up to 2500 V
- High surge current capabilities
- Diffused junction
- Hockey PUK version
- Case style K-PUK (DO-200AC)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

### PRIMARY CHARACTERISTICS

|                       |                  |
|-----------------------|------------------|
| $I_{F(AV)}$           | 3000 A           |
| Package               | K-PUK (DO-200AC) |
| Circuit configuration | Single           |

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES       | UNITS             |
|--------------|-----------------|--------------|-------------------|
| $I_{F(AV)}$  |                 | 3000         | A                 |
|              | $T_{hs}$        | 55           | °C                |
| $I_{F(RMS)}$ |                 | 5000         | A                 |
|              | $T_{hs}$        | 25           | °C                |
| $I_{FSM}$    | 50 Hz           | 31 000       | A                 |
|              | 60 Hz           | 32 460       |                   |
| $I^2t$       | 50 Hz           | 4810         | kA <sup>2</sup> s |
|              | 60 Hz           | 4390         |                   |
| $V_{RRM}$    | Range           | 1200 to 2500 | V                 |
| $T_J$        |                 | -40 to +180  | °C                |

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

| TYPE NUMBER   | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J = 180$ °C<br>mA |
|---------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------|
| VS-SD2500C..K | 12           | 1200                                                     | 1300                                                         | 75                                        |
|               | 16           | 1600                                                     | 1700                                                         |                                           |
|               | 20           | 2000                                                     | 2100                                                         |                                           |
|               | 24           | 2400                                                     | 2500                                                         |                                           |
|               | 25           | 2500                                                     | 2600                                                         |                                           |



| FORWARD CONDUCTION                                            |                     |                                                                                                             |                                  |                                                                       |             |                    |                   |
|---------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------|-------------|--------------------|-------------------|
| PARAMETER                                                     | SYMBOL              | TEST CONDITIONS                                                                                             |                                  |                                                                       | VALUES      | UNITS              |                   |
| Maximum average forward current at heatsink temperature       | I <sub>F(AV)</sub>  | 180° conduction, half sine wave<br>Double side (single side) cooled                                         |                                  |                                                                       | 3000 (1550) | A                  |                   |
|                                                               |                     |                                                                                                             |                                  |                                                                       | 55 (85)     | °C                 |                   |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> | 25 °C heatsink temperature double side cooled                                                               |                                  |                                                                       | 5000        |                    |                   |
| Maximum peak, one-cycle forward, non-repetitive surge current | I <sub>FSM</sub>    | t = 10 ms                                                                                                   | No voltage reapplied             | Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum | 31 000      | A                  |                   |
|                                                               |                     | t = 8.3 ms                                                                                                  |                                  |                                                                       | 32 460      |                    |                   |
|                                                               |                     | t = 10 ms                                                                                                   | 100 % V <sub>RRM</sub> reapplied |                                                                       | 26 050      |                    |                   |
|                                                               |                     | t = 8.3 ms                                                                                                  |                                  |                                                                       | 27 300      |                    |                   |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                                   | No voltage reapplied             |                                                                       |             | 4810               | kA <sup>2</sup> s |
|                                                               |                     | t = 8.3 ms                                                                                                  |                                  |                                                                       |             | 4390               |                   |
|                                                               |                     | t = 10 ms                                                                                                   | 100 % V <sub>RRM</sub> reapplied |                                                                       |             | 3400               |                   |
|                                                               |                     | t = 8.3 ms                                                                                                  |                                  |                                                                       |             | 3100               |                   |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 to 10 ms, no voltage reapplied                                                                      |                                  |                                                                       | 48 100      | kA <sup>2</sup> √s |                   |
| Low level value of threshold voltage                          | V <sub>F(TO)1</sub> | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum   |                                  |                                                                       | 0.76        | V                  |                   |
| High level value of threshold voltage                         | V <sub>F(TO)2</sub> | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                      |                                  |                                                                       | 0.97        |                    |                   |
| Low level value of forward slope resistance                   | r <sub>f1</sub>     | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum   |                                  |                                                                       | 0.16        | mW                 |                   |
| High level value of forward slope resistance                  | r <sub>f2</sub>     | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                      |                                  |                                                                       | 0.13        |                    |                   |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 4000 A, T <sub>J</sub> = T <sub>J</sub> maximum<br>t <sub>p</sub> = 10 ms sinusoidal wave |                                  |                                                                       | 1.41        | V                  |                   |

| THERMAL AND MECHANICAL SPECIFICATIONS            |                     |                                               |                  |        |
|--------------------------------------------------|---------------------|-----------------------------------------------|------------------|--------|
| PARAMETER                                        | SYMBOL              | TEST CONDITIONS                               | VALUES           | UNITS  |
| Maximum junction operating temperature range     | T <sub>J</sub>      |                                               | -40 to +180      | °C     |
| Maximum storage temperature range                | T <sub>Stg</sub>    |                                               | -55 to +200      |        |
| Maximum thermal resistance, junction to heatsink | R <sub>thJ-hs</sub> | DC operation single side cooled               | 0.042            | K/W    |
|                                                  |                     | DC operation double side cooled               | 0.020            |        |
| Mounting force, ± 10 %                           |                     |                                               | 22 250 (2250)    | N (kg) |
| Approximate weight                               |                     |                                               | 425              | g      |
| Case style                                       |                     | See dimensions - link at the end of datasheet | K-PUK (DO-200AC) |        |

| $\Delta R_{thJ-hs}$ CONDUCTION |                       |             |                        |             |                                         |       |
|--------------------------------|-----------------------|-------------|------------------------|-------------|-----------------------------------------|-------|
| CONDUCTION ANGLE               | SINUSOIDAL CONDUCTION |             | RECTANGULAR CONDUCTION |             | TEST CONDITIONS                         | UNITS |
|                                | SINGLE SIDE           | DOUBLE SIDE | SINGLE SIDE            | DOUBLE SIDE |                                         |       |
| 180°                           | 0.002                 | 0.002       | 0.001                  | 0.001       | T <sub>J</sub> = T <sub>J</sub> maximum | K/W   |
| 120°                           | 0.002                 | 0.002       | 0.002                  | 0.002       |                                         |       |
| 90°                            | 0.003                 | 0.003       | 0.003                  | 0.003       |                                         |       |
| 60°                            | 0.004                 | 0.004       | 0.004                  | 0.004       |                                         |       |
| 30°                            | 0.007                 | 0.007       | 0.007                  | 0.007       |                                         |       |

**Note**

- The table above shows the increment of thermal resistance  $R_{thJ-hs}$  when devices operate at different conduction angles than DC

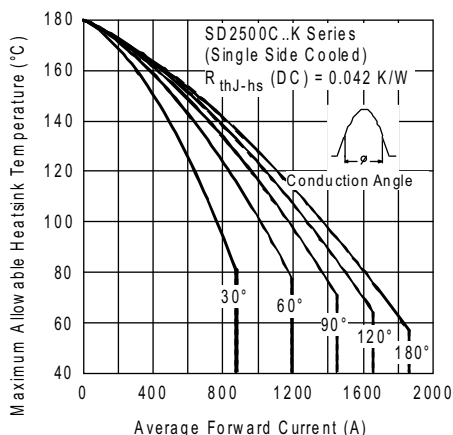


Fig. 1 - Current Ratings Characteristics

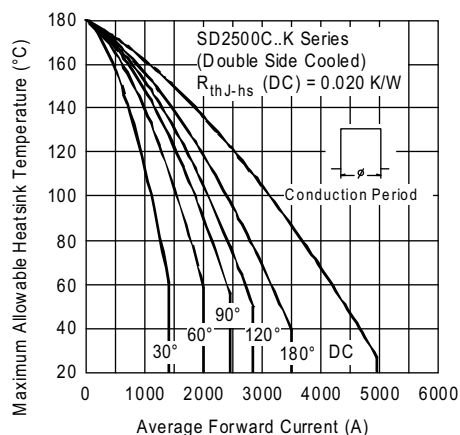


Fig. 4 - Current Ratings Characteristics

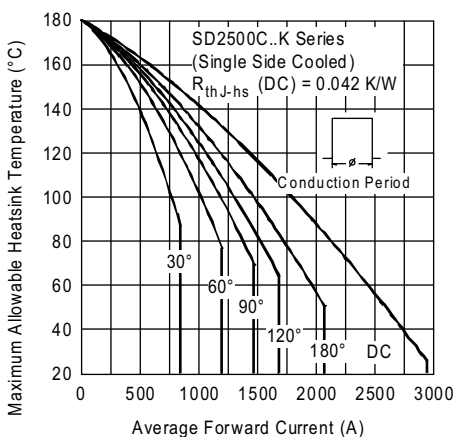


Fig. 2 - Current Ratings Characteristics

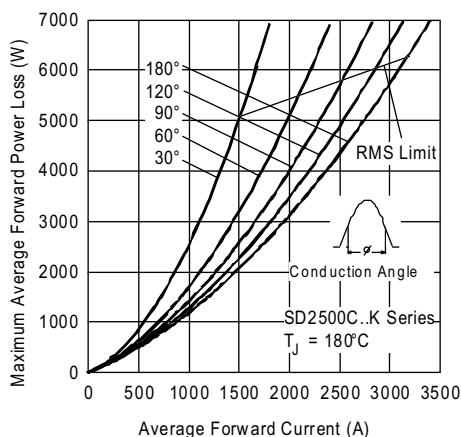


Fig. 5 - Forward Power Loss Characteristics

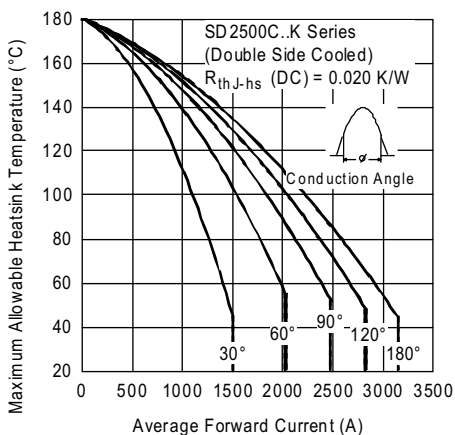


Fig. 3 - Current Ratings Characteristics

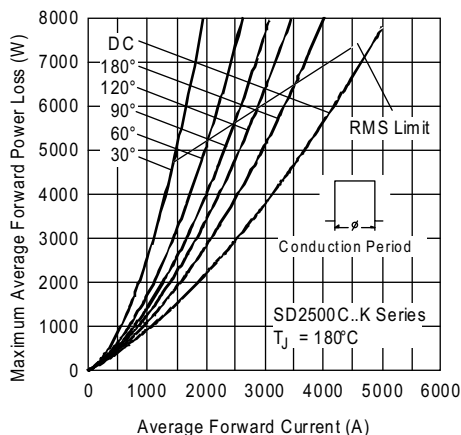


Fig. 6 - Forward Power Loss Characteristics

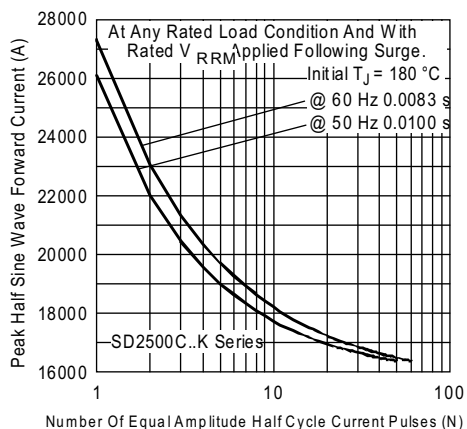


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

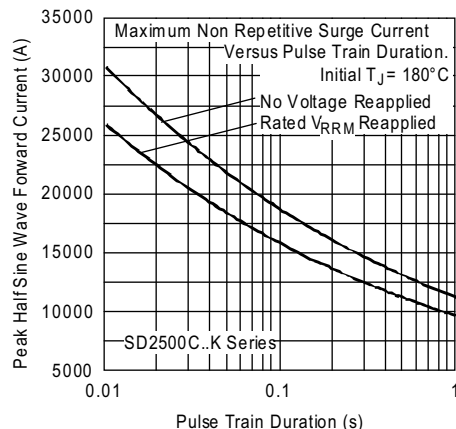


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

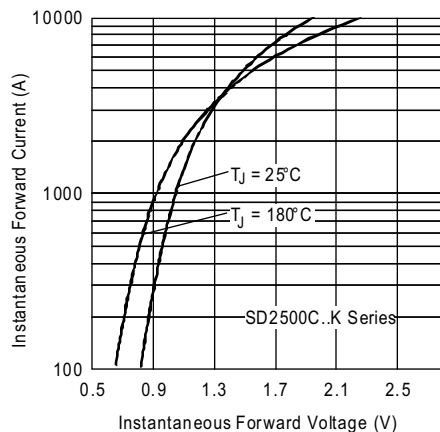


Fig. 9 - Forward Voltage Drop Characteristics

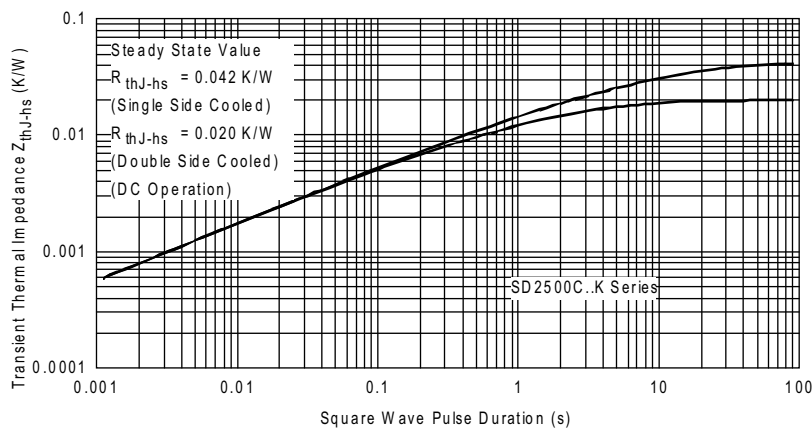


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics



## ORDERING INFORMATION TABLE

|             |     |    |     |   |   |    |   |
|-------------|-----|----|-----|---|---|----|---|
| Device code | VS- | SD | 250 | 0 | C | 25 | K |
|             | 1   | 2  | 3   | 4 | 5 | 6  | 7 |

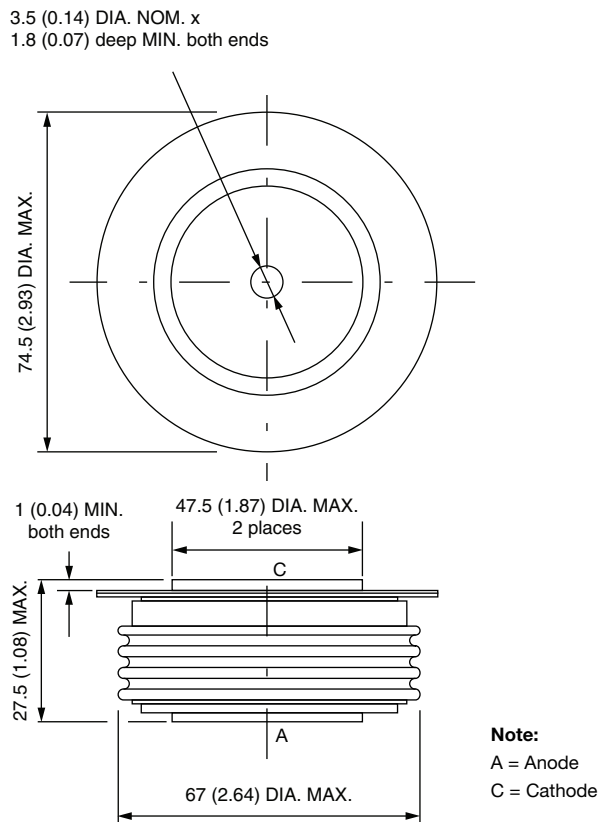
- |   |   |                                                            |
|---|---|------------------------------------------------------------|
| 1 | - | Vishay Semiconductors product                              |
| 2 | - | Diode                                                      |
| 3 | - | Essential part number                                      |
| 4 | - | 0 = standard recovery                                      |
| 5 | - | C = ceramic PUK                                            |
| 6 | - | Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table) |
| 7 | - | K = PUK case K-PUK (DO-200AC)                              |

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95247">www.vishay.com/doc?95247</a> |



## K-PUK (DO-200AC)

**DIMENSIONS** in millimeters (inches)



Quote between upper and lower pole pieces has to be considered after application of mounting force (see Thermal and Mechanical Specifications)



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