

## Fast Recovery Diodes (Hockey PUK Version), 375 A



DO-200AB (B-PUK)

### FEATURES

- High power FAST recovery diode series
- 4.5  $\mu$ s recovery time
- High voltage ratings up to 4500 V
- High current capability
- Optimized turn-on and turn-off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press PUK encapsulation
- Case style conform to JEDEC® DO-200AB (B-PUK)
- Maximum junction temperature 125 °C
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

|                       |                  |
|-----------------------|------------------|
| $I_{F(AV)}$           | 375 A            |
| Package               | B-PUK (DO-200AB) |
| Circuit configuration | Single Diode     |

### TYPICAL APPLICATIONS

- Snubber diode for GTO
- High voltage freewheeling diode
- Fast recovery rectifier applications

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES       | UNITS   |
|--------------|-----------------|--------------|---------|
| $I_{F(AV)}$  |                 | 375          | A       |
|              | $T_{hs}$        | 55           | °C      |
| $I_{F(RMS)}$ |                 | 408          | A       |
| $I_{FSM}$    | 50 Hz           | 5500         |         |
|              | 60 Hz           | 5760         |         |
| $V_{RRM}$    | Range           | 3000 to 4500 | V       |
| $t_{rr}$     |                 | 4.5          | $\mu$ s |
|              | $T_J$           | 125          | °C      |
| $T_J$        |                 | -40 to 125   |         |

### ELECTRICAL SPECIFICATIONS

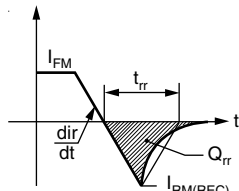
#### VOLTAGE RATINGS

| 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 $T_J = T_J$ MAXIMUM<br>mA |
|-----------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------|
| VS-SD263C..S50L | 30           | 3000                                                     | 3100                                                         | 50                                             |
|                 | 36           | 3600                                                     | 3700                                                         |                                                |
|                 | 40           | 4000                                                     | 4100                                                         |                                                |
|                 | 45           | 4500                                                     | 4600                                                         |                                                |

**FORWARD CONDUCTION**

| PARAMETER                                                     | SYMBOL        | TEST CONDITIONS                                                                                                                                                                | VALUES                       | UNITS              |
|---------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------|
| Maximum average forward current at heatsink temperature       | $I_{F(AV)}$   | 180° conduction, half sine wave<br>Double side (single side) cooled                                                                                                            | 375 (150)<br>55 (85)         | A<br>°C            |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  | 25 °C heatsink temperature double side cooled                                                                                                                                  | 725                          |                    |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | <div> <div> <math>t = 10\text{ ms}</math><br/> <math>t = 8.3\text{ ms}</math> </div> <div> No voltage<br/>reapplied<br/> 50 % <math>V_{RRM}</math><br/>reapplied </div> </div> | 5500<br>5760<br>4630<br>4850 | A                  |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | <div> <div> <math>t = 10\text{ ms}</math><br/> <math>t = 8.3\text{ ms}</math> </div> <div> No voltage<br/>reapplied<br/> 50 % <math>V_{RRM}</math><br/>reapplied </div> </div> | 151<br>138<br>107<br>98      | kA <sup>2</sup> s  |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | $t = 0.1$ to $10\text{ ms}$ , no voltage reapplied                                                                                                                             | 1510                         | kA <sup>2</sup> √s |
| Low level value of threshold voltage                          | $V_{F(TO)1}$  | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                                                                        | 1.56                         | V                  |
| High level value of threshold voltage                         | $V_{F(TO)2}$  | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                                                                                                             | 1.71                         |                    |
| Low level value of forward slope resistance                   | $r_{f1}$      | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                                                                        | 1.64                         | mW                 |
| High level value of forward slope resistance                  | $r_{f2}$      | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                                                                                                             | 1.53                         |                    |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 1000\text{ A}$ , $T_J = T_J$ maximum,<br>$t_p = 10\text{ ms}$ sinusoidal wave                                                                                        | 3.20                         | V                  |

**RECOVERY CHARACTERISTICS**

| CODE | MAXIMUM VALUE<br>AT $T_J = 25\text{ °C}$ | TEST CONDITIONS                    |                                  |              | TYPICAL VALUES<br>AT $T_J = 150\text{ °C}$ |                  |                 |  |
|------|------------------------------------------|------------------------------------|----------------------------------|--------------|--------------------------------------------|------------------|-----------------|--------------------------------------------------------------------------------------|
|      | $t_{rr}$ AT 25 % $I_{RRM}$<br>(μs)       | $I_{pk}$<br>SQUARE<br>PULSE<br>(A) | $dI/dt$ <sup>(1)</sup><br>(A/μs) | $V_r$<br>(V) | $t_{rr}$ AT 25 % $I_{RRM}$<br>(μs)         | $Q_{rr}$<br>(μC) | $I_{rr}$<br>(A) |                                                                                      |
| S50  | 5.0                                      | 1000                               | 100                              | - 50         | 4.5                                        | 680              | 240             |                                                                                      |

**Note**

<sup>(1)</sup>  $dI/dt = 25\text{ A/μs}$ ,  $T_J = 25\text{ °C}$

**THERMAL AND MECHANICAL SPECIFICATIONS**

| PARAMETER                                        | SYMBOL       | TEST CONDITIONS                                                    | VALUES           | UNITS  |
|--------------------------------------------------|--------------|--------------------------------------------------------------------|------------------|--------|
| Maximum junction operating temperature range     | $T_J$        |                                                                    | - 40 to 125      | °C     |
| Maximum storage temperature range                | $T_{Stg}$    |                                                                    | - 40 to 150      |        |
| Maximum thermal resistance, junction to heatsink | $R_{thJ-hs}$ | DC operation single side cooled<br>DC operation double side cooled | 0.11<br>0.05     | K/W    |
| Mounting force, ± 10 %                           |              |                                                                    | 9800 (1000)      | N (kg) |
| Approximate weight                               |              |                                                                    | 230              | g      |
| Case style                                       |              | See dimensions - link at the end of datasheet                      | DO-200AB (B-PUK) |        |

 **$\Delta R_{thJ-hs}$  CONDUCTION**

| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION |             | RECTANGULAR CONDUCTION |             | TEST CONDITIONS     | UNITS |
|------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
|                  | SINGLE SIDE           | DOUBLE SIDE | SINGLE SIDE            | DOUBLE SIDE |                     |       |
| 180°             | 0.012                 | 0.011       | 0.008                  | 0.008       | $T_J = T_J$ maximum | K/W   |
| 120°             | 0.014                 | 0.015       | 0.014                  | 0.014       |                     |       |
| 90°              | 0.018                 | 0.018       | 0.019                  | 0.019       |                     |       |
| 60°              | 0.026                 | 0.027       | 0.027                  | 0.028       |                     |       |
| 30°              | 0.045                 | 0.046       | 0.046                  | 0.046       |                     |       |

**Note**

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

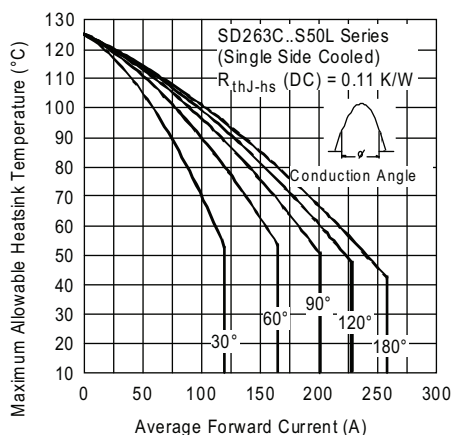


Fig. 1 - Current Ratings Characteristics

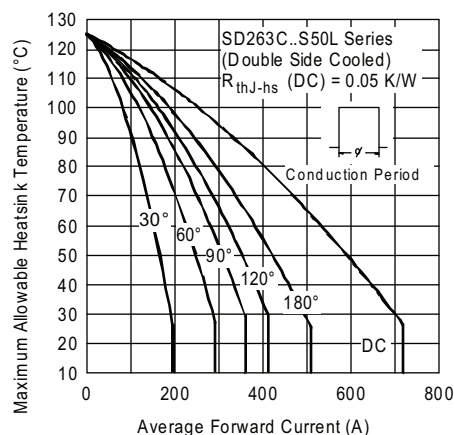


Fig. 4 - Current Ratings Characteristics

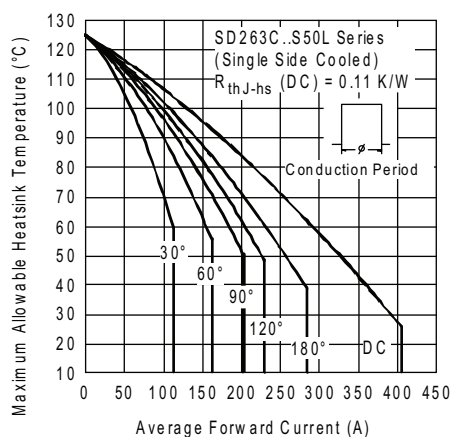


Fig. 2 - Current Ratings Characteristics

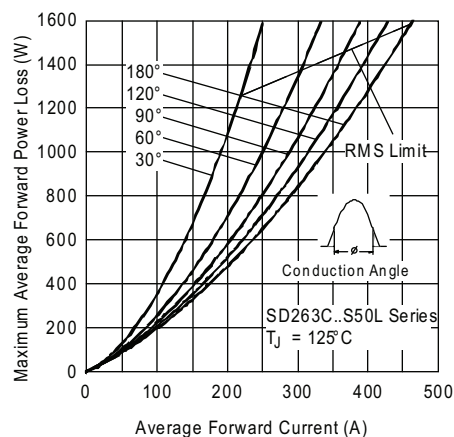


Fig. 5 - Forward Power Loss Characteristics

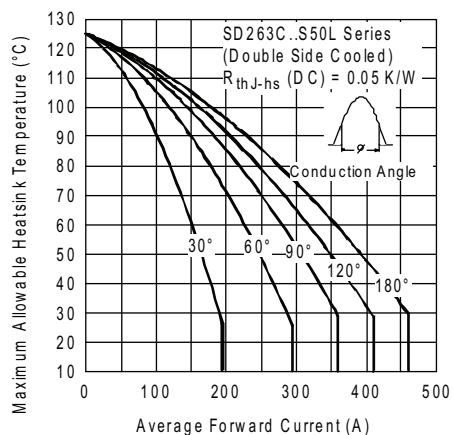


Fig. 3 - Current Ratings Characteristics

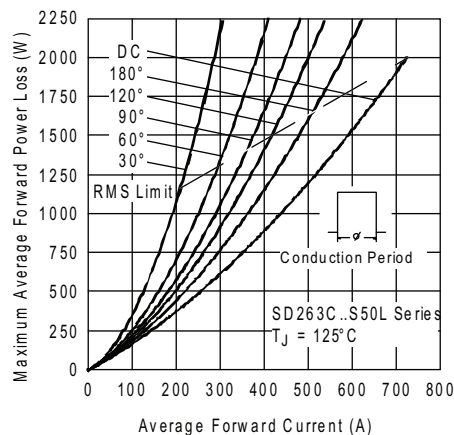


Fig. 6 - Forward Power Loss Characteristics

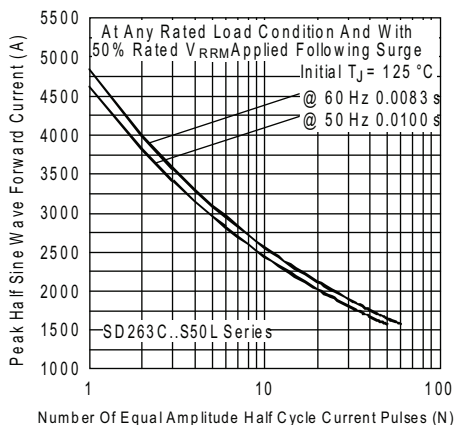


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

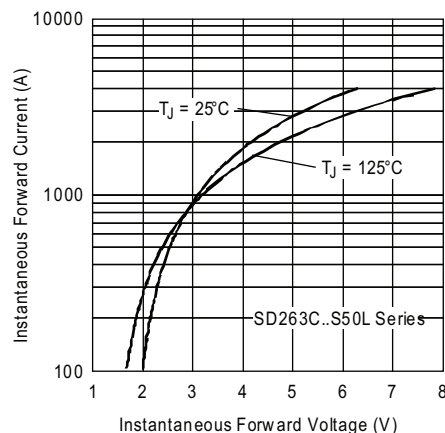


Fig. 9 - Forward Voltage Drop Characteristics

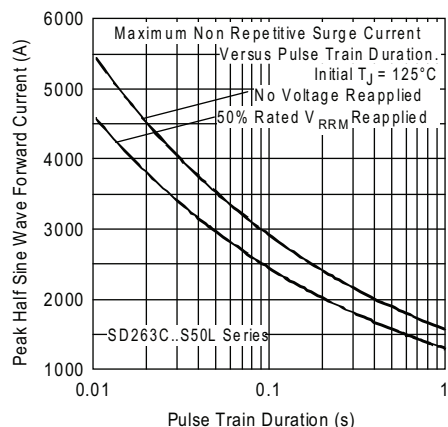


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

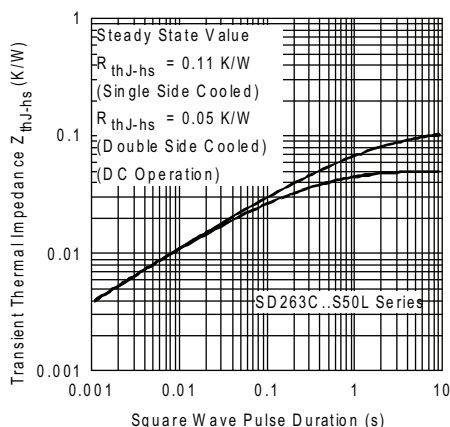


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristic

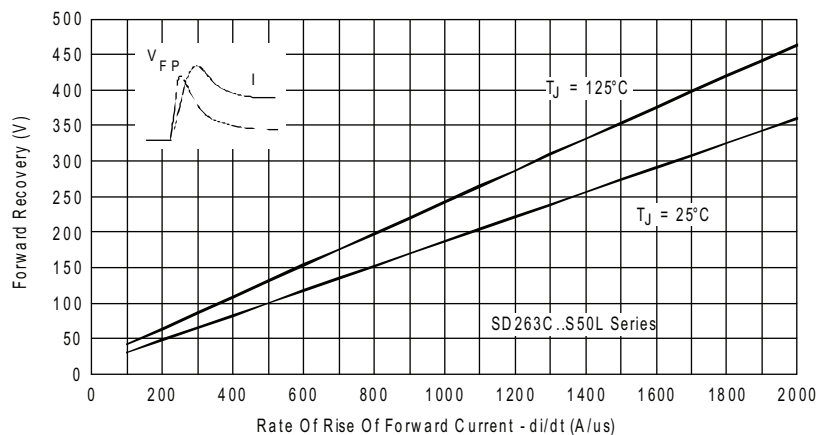


Fig. 11 - Typical Forward Recovery Characteristics

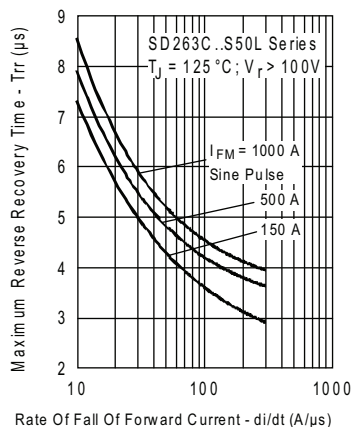


Fig. 12 - Recovery Time Characteristics

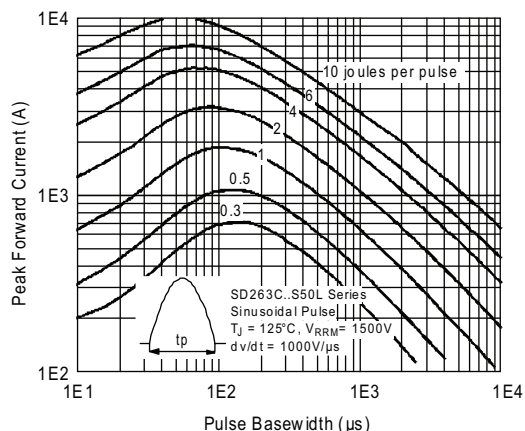


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

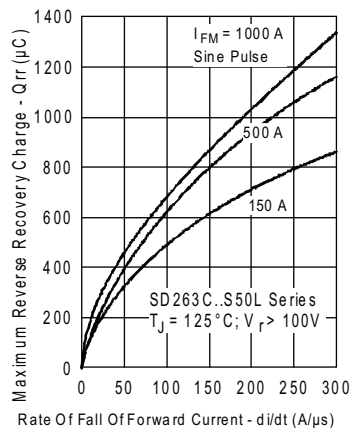


Fig. 13 - Recovery Charge Characteristics

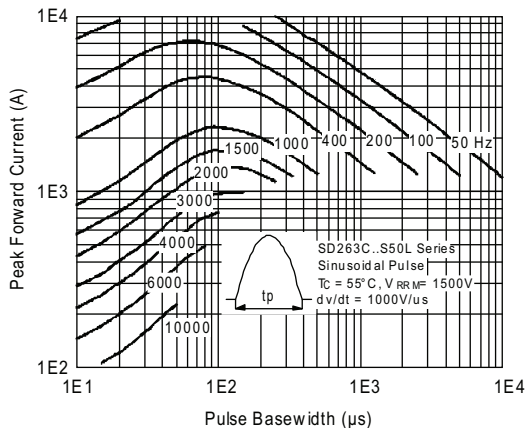


Fig. 16 - Frequency Characteristics

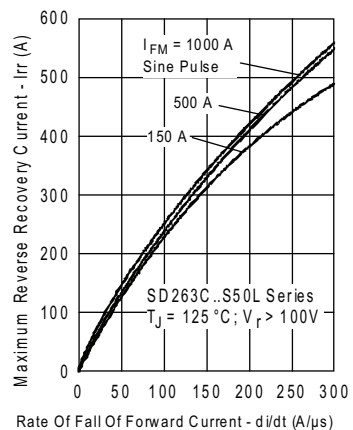


Fig. 14 - Recovery Current Characteristics

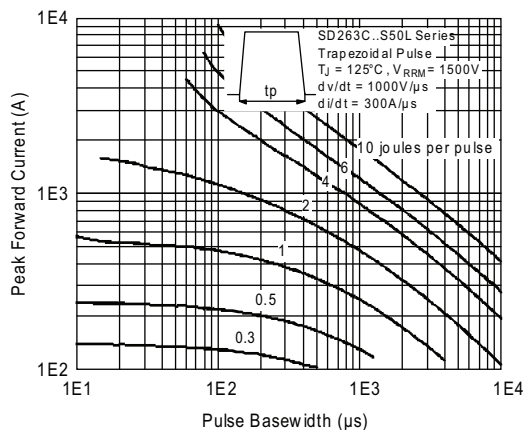


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

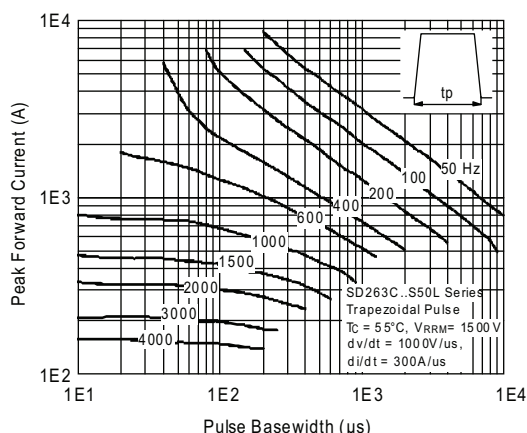


Fig. 18 - Frequency Characteristics

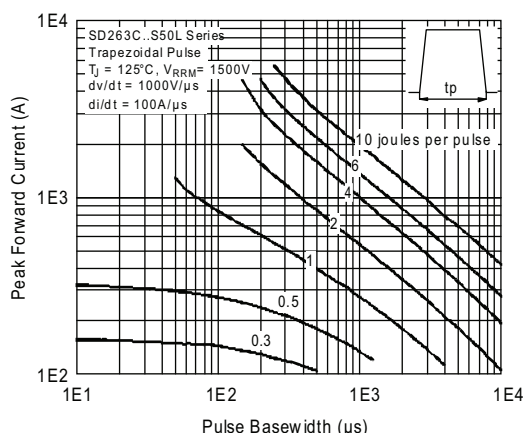


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

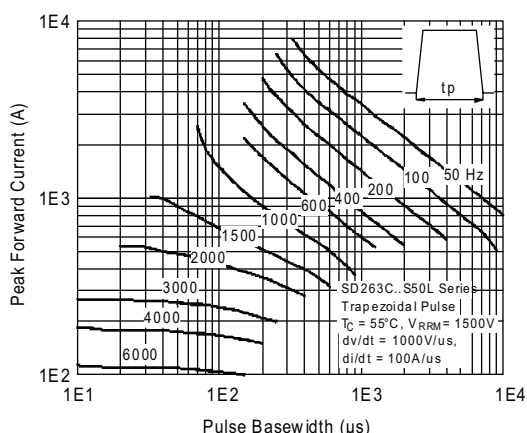


Fig. 20 - Frequency Characteristics

### ORDERING INFORMATION TABLE

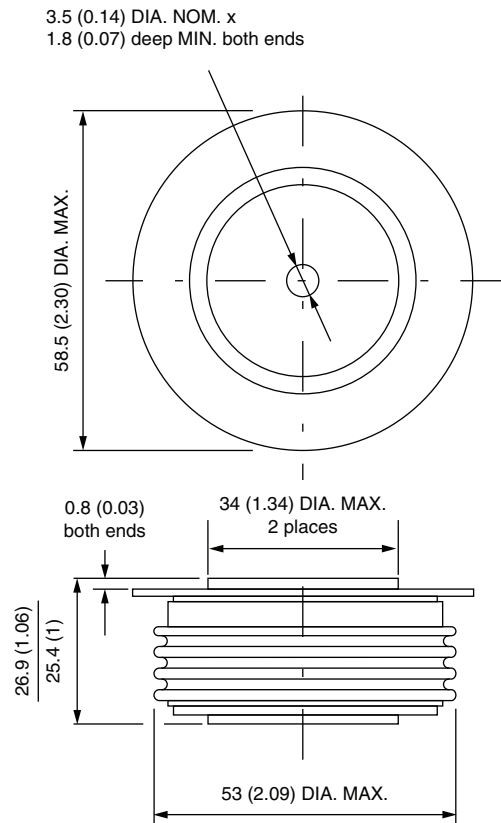
| Device code | VS-                                                        | SD | 26 | 3 | C | 45 | S50 | L |
|-------------|------------------------------------------------------------|----|----|---|---|----|-----|---|
|             | ①                                                          | ②  | ③  | ④ | ⑤ | ⑥  | ⑦   | ⑧ |
| 1           | Vishay Semiconductors product                              |    |    |   |   |    |     |   |
| 2           | Diode                                                      |    |    |   |   |    |     |   |
| 3           | Essential part number                                      |    |    |   |   |    |     |   |
| 4           | 3 = Fast recovery                                          |    |    |   |   |    |     |   |
| 5           | C = Ceramic PUK                                            |    |    |   |   |    |     |   |
| 6           | Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table) |    |    |   |   |    |     |   |
| 7           | $t_{rr}$ code                                              |    |    |   |   |    |     |   |
| 8           | L = PUK case DO-200AB (B-PUK)                              |    |    |   |   |    |     |   |

### LINKS TO RELATED DOCUMENTS

|            |                                                                        |
|------------|------------------------------------------------------------------------|
| Dimensions | <a href="http://www.vishay.com/doc?95246">www.vishay.com/doc?95246</a> |
|------------|------------------------------------------------------------------------|

## DO-200AB (B-PUK)

**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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