

## Standard Recovery Diodes (Stud Version), 380 A



DO-205AB (DO-9)

### FEATURES

- Wide current range
- High voltage ratings up to 3200 V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Compression bonded encapsulations
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 380 A           |
| Package               | DO-205AB (DO-9) |
| Circuit configuration | Single diode    |

### TYPICAL APPLICATIONS

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

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VS-SD300N/R  |              | UNITS             |
|--------------|-----------------|--------------|--------------|-------------------|
|              |                 | 16 to 20     | 25 to 32     |                   |
| $I_{F(AV)}$  |                 | 380          | 380          | A                 |
|              | $T_C$           | 100          | 70           | °C                |
| $I_{F(RMS)}$ |                 | 595          | 425          | A                 |
| $I_{FSM}$    | 50 Hz           | 6050         | 6050         |                   |
|              | 60 Hz           | 6335         | 6335         |                   |
| $I^2t$       | 50 Hz           | 183          | 183          | kA <sup>2</sup> s |
|              | 60 Hz           | 167          | 167          |                   |
| $V_{RRM}$    | Range           | 1600 to 2000 | 2500 to 3200 | V                 |
| $T_J$        |                 | - 40 to 180  | - 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 REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM<br>mA |
|-------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------|
| VS-SD300N/R | 16           | 1600                                                     | 1700                                                         | 15                                             |
|             | 20           | 2000                                                     | 2100                                                         |                                                |
|             | 25           | 2500                                                     | 2600                                                         |                                                |
|             | 28           | 2800                                                     | 2900                                                         |                                                |
|             | 32           | 3200                                                     | 3300                                                         |                                                |

**FORWARD CONDUCTION**

| PARAMETER                                                     | SYMBOL              | TEST CONDITIONS                                                                                            |                                  |                                                                       | SD300N/R |          | UNITS              |
|---------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------|----------|----------|--------------------|
|                                                               |                     |                                                                                                            |                                  |                                                                       | 16 to 20 | 25 to 32 |                    |
| Maximum average forward current at case temperature           | I <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                                            |                                  |                                                                       | 380      | 270      | A                  |
|                                                               |                     |                                                                                                            |                                  |                                                                       | 100      | 100      | °C                 |
|                                                               |                     |                                                                                                            |                                  |                                                                       | 300      | 380      | A                  |
|                                                               |                     |                                                                                                            |                                  |                                                                       | 125      | 70       | °C                 |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> | DC at T <sub>C</sub> = 88 °C (02 to 24), T <sub>C</sub> = 91 °C (25 to 32)                                 |                                  |                                                                       | 595      | 425      |                    |
| 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 | 6050     |          | A                  |
|                                                               |                     | t = 8.3 ms                                                                                                 |                                  |                                                                       | 6335     |          |                    |
|                                                               |                     | t = 10 ms                                                                                                  | 100 % V <sub>RRM</sub> reapplied |                                                                       | 5090     |          |                    |
|                                                               |                     | t = 8.3 ms                                                                                                 |                                  |                                                                       | 5330     |          |                    |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                                  | No voltage reapplied             |                                                                       | 183      |          | kA <sup>2</sup> s  |
|                                                               |                     | t = 8.3 ms                                                                                                 |                                  |                                                                       | 167      |          |                    |
|                                                               |                     | t = 10 ms                                                                                                  | 100 % V <sub>RRM</sub> reapplied |                                                                       | 129      |          |                    |
|                                                               |                     | t = 8.3 ms                                                                                                 |                                  |                                                                       | 118      |          |                    |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 to 10 ms, no voltage reapplied                                                                     |                                  |                                                                       | 1830     |          | 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 |                                  |                                                                       | 0.95     |          | 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                                     |                                  |                                                                       | 1.05     |          |                    |
| 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 |                                  |                                                                       | 0.75     |          | mΩ                 |
| 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                                     |                                  |                                                                       | 0.66     |          |                    |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 1180 A, T <sub>J</sub> = T <sub>J</sub> maximum, t <sub>p</sub> = 10 ms sinusoidal wave  |                                  |                                                                       | 1.83     | 1.83     | V                  |

**THERMAL AND MECHANICAL SPECIFICATIONS**

| PARAMETER                                    | SYMBOL            | TEST CONDITIONS                               | SD300N/R        |            | UNITS |
|----------------------------------------------|-------------------|-----------------------------------------------|-----------------|------------|-------|
|                                              |                   |                                               | 16 to 20        | 25 to 32   |       |
| Maximum junction operating temperature range | T <sub>J</sub>    |                                               | -40 to 180      | -40 to 150 | °C    |
| Maximum storage temperature range            | T <sub>Stg</sub>  |                                               | -55 to 200      |            |       |
| Maximum thermal resistance, junction to case | R <sub>thJC</sub> | DC operation                                  | 0.11            |            | K/W   |
| Maximum thermal resistance, case to heatsink | R <sub>thCS</sub> | Mounting surface, smooth, flat and greased    | 0.04            |            |       |
| Maximum allowed mounting torque ± 10 %       |                   | Not-lubricated threads                        | 27              |            | Nm    |
| Approximate weight                           |                   |                                               | 250             |            | g     |
| Case style                                   |                   | See dimensions (link at the end of datasheet) | DO-205AB (DO-9) |            |       |



| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                     |       |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
| 180°                         | 0.019                 | 0.013                  | $T_J = T_J$ maximum | K/W   |
| 120°                         | 0.023                 | 0.023                  |                     |       |
| 90°                          | 0.028                 | 0.030                  |                     |       |
| 60°                          | 0.042                 | 0.044                  |                     |       |
| 30°                          | 0.073                 | 0.074                  |                     |       |

## Note

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

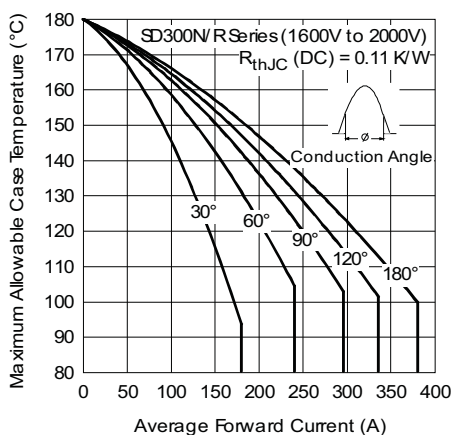


Fig. 1 - Current Ratings Characteristics

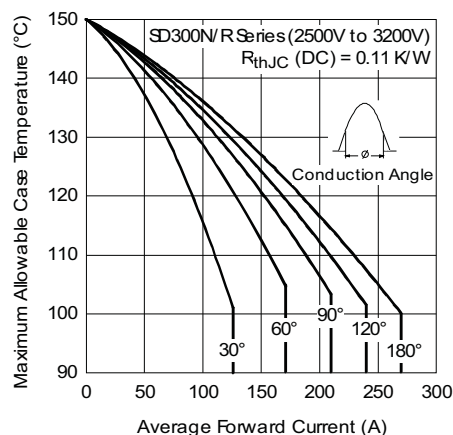


Fig. 3 - Current Ratings Characteristics

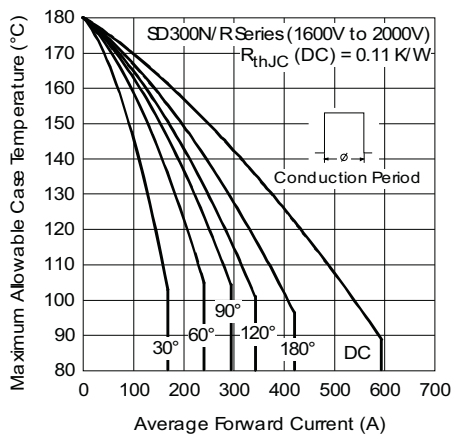


Fig. 2 - Current Ratings Characteristics

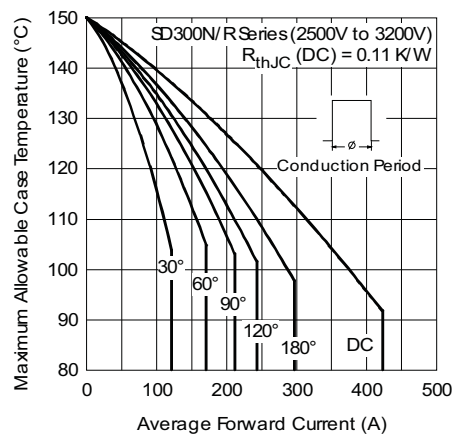


Fig. 4 - Current Ratings Characteristics

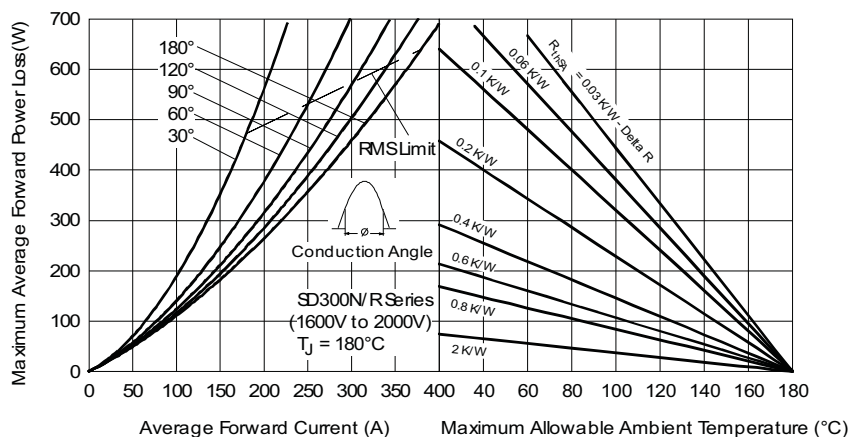


Fig. 5 - Forward Power Loss Characteristics

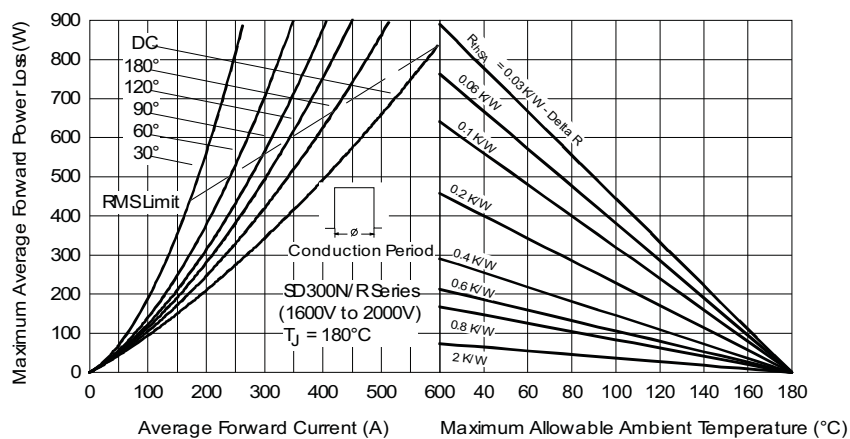


Fig. 6 - Forward Power Loss Characteristics

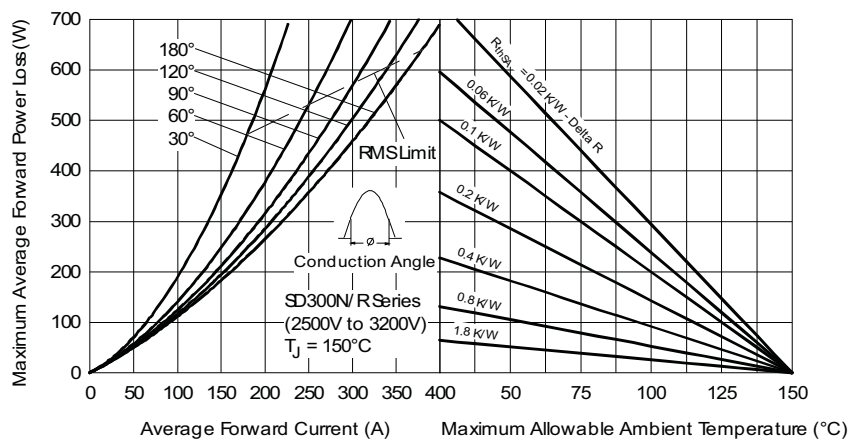


Fig. 7 - Forward Power Loss Characteristics

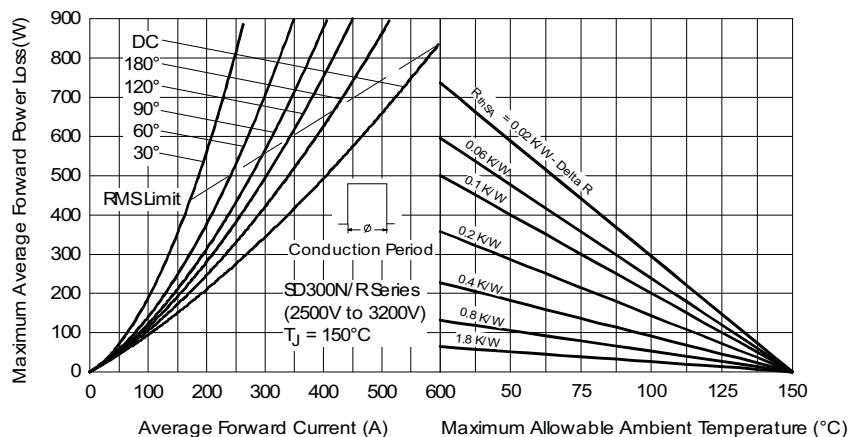


Fig. 8 - Forward Power Loss Characteristics

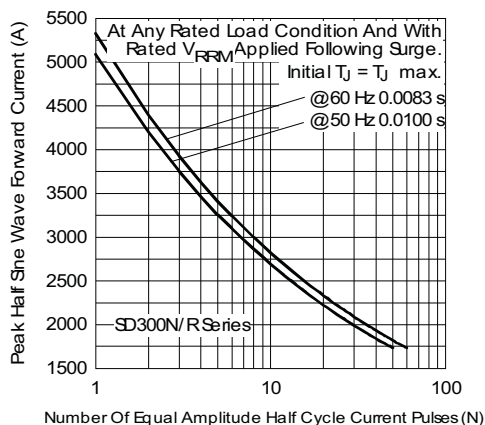


Fig. 9 - Maximum Non-Repetitive Surge Current

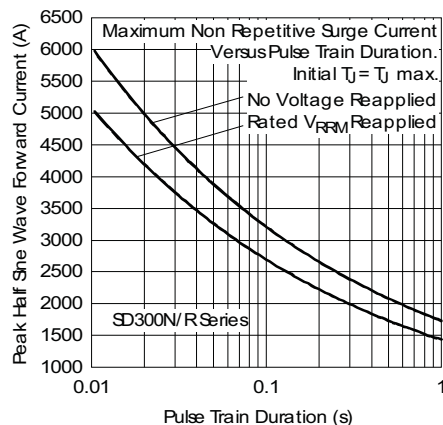


Fig. 10 - Maximum Non-Repetitive Surge Current

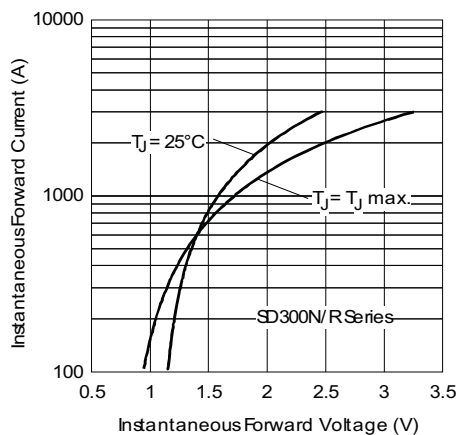
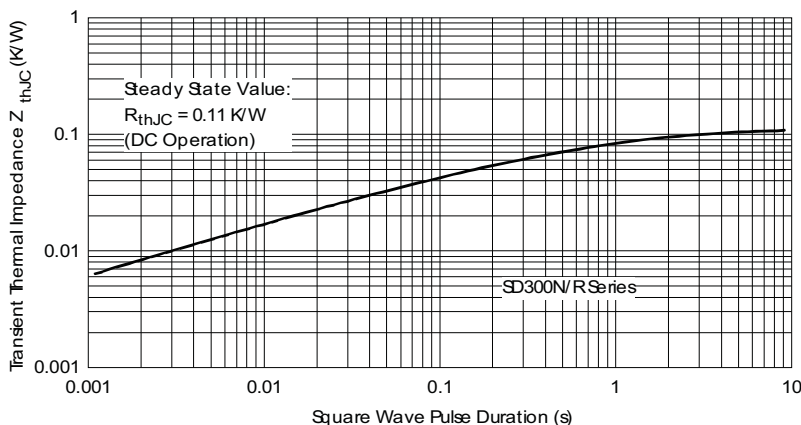


Fig. 11 - Forward Voltage Drop Characteristics


Fig. 12 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

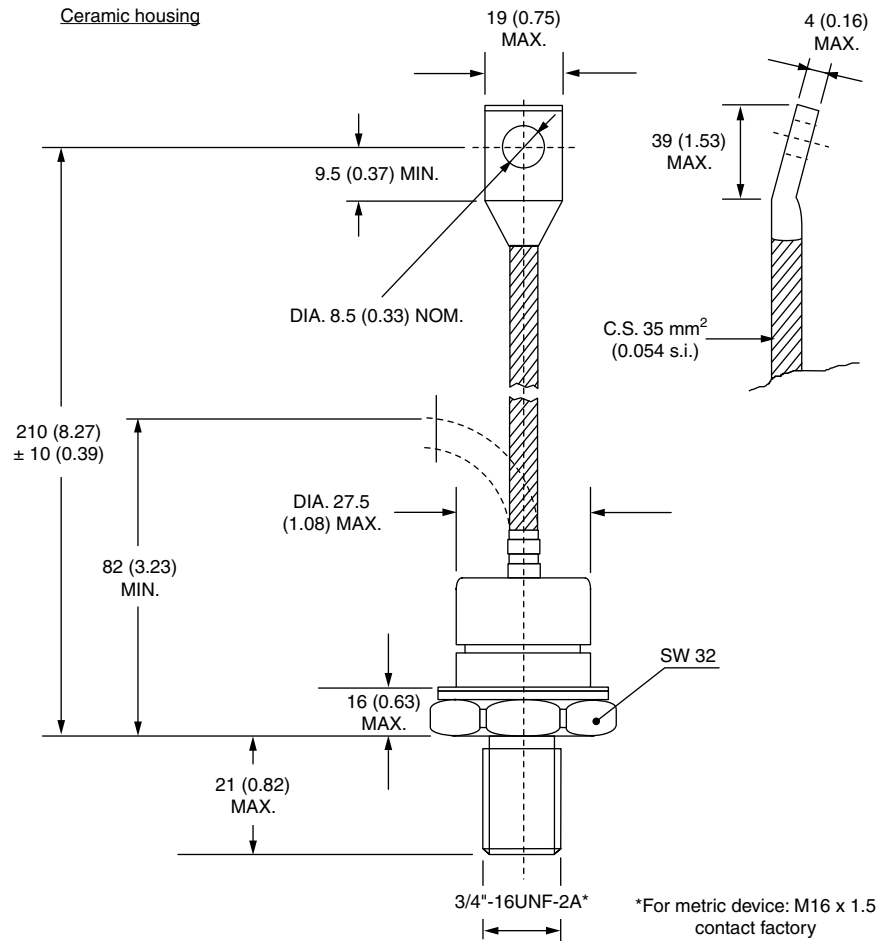
| Device code | VS-                                                                                         | SD | 30 | 0 | N | 32 | P | C |
|-------------|---------------------------------------------------------------------------------------------|----|----|---|---|----|---|---|
|             | ①                                                                                           | ②  | ③  | ④ | ⑤ | ⑥  | ⑦ | ⑧ |
| ①           | - Vishay semiconductors product                                                             |    |    |   |   |    |   |   |
| ②           | - Diode                                                                                     |    |    |   |   |    |   |   |
| ③           | - Essential part number                                                                     |    |    |   |   |    |   |   |
| ④           | - 0 = standard recovery                                                                     |    |    |   |   |    |   |   |
| ⑤           | • N = stud normal polarity (cathode to stud)<br>• R = stud reverse polarity (anode to stud) |    |    |   |   |    |   |   |
| ⑥           | - Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table)                                |    |    |   |   |    |   |   |
| ⑦           | - P = stud base DO-205AB (DO-9) 3/4" 16UNF-2A                                               |    |    |   |   |    |   |   |
| ⑧           | - C = ceramic housing                                                                       |    |    |   |   |    |   |   |

For metric device M16 x 1.5 contact factory

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95301">www.vishay.com/doc?95301</a> |

## DO-205AB (DO-9)

**DIMENSIONS** in millimeters (inches)





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