

### STANDARD RECOVERY DIODES

### Stud Version

#### Features

- Wide current range
- High voltage ratings up to 3200V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC types

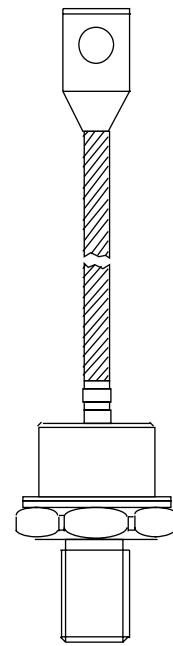
380A

#### Typical Applications

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

#### Major Ratings and Characteristics

| Parameters       | SD300N/R    |              | Units             |
|------------------|-------------|--------------|-------------------|
|                  | 04 to 20    | 25 to 32     |                   |
| $I_{F(AV)}$      | 380         | 380          | A                 |
| @ $T_C$          | 100         | 70           | °C                |
| $I_{F(RMS)}$     | 595         | 425          | A                 |
| $I_{FSM}$ @ 50Hz | 6050        | 6050         | A                 |
| @ 60Hz           | 6335        | 6335         | A                 |
| $I^2t$ @ 50Hz    | 183         | 183          | KA <sup>2</sup> s |
| @ 60Hz           | 167         | 167          | KA <sup>2</sup> s |
| $V_{RRM}$ range  | 400 to 2000 | 2500 to 3200 | V                 |
| $T_J$            | - 40 to 180 | - 40 to 150  | °C                |



case style  
DO-205AB (DO-9)

## SD300N/R Series

Bulletin I2081 rev. A 08/94

International  
**IR** Rectifier

### 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>@ $T_J = T_J$ max.<br>mA |
|-------------|--------------|----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------|
| SD300N/R    | 04           | 400                                                      | 500                                                       | 15                                         |
|             | 08           | 800                                                      | 900                                                       |                                            |
|             | 12           | 1200                                                     | 1300                                                      |                                            |
|             | 16           | 1600                                                     | 1700                                                      |                                            |
|             | 20           | 2000                                                     | 2100                                                      |                                            |
|             | 25           | 2500                                                     | 2600                                                      |                                            |
|             | 28           | 2800                                                     | 2900                                                      |                                            |
|             | 32           | 3200                                                     | 3300                                                      |                                            |

#### Forward Conduction

| Parameter           |                                                               | SD300N/R |          | Units              | Conditions                                                                                           |                       |                                                                       |  |
|---------------------|---------------------------------------------------------------|----------|----------|--------------------|------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------|--|
|                     |                                                               | 04 to 20 | 25 to 32 |                    |                                                                                                      |                       |                                                                       |  |
| I <sub>F(AV)</sub>  | Max. average forward current<br>@ Case temperature            | 380      | 270      | A                  | 180° conduction, half sine wave                                                                      |                       |                                                                       |  |
|                     |                                                               | 100      | 100      | °C                 |                                                                                                      |                       |                                                                       |  |
| I <sub>F(AV)</sub>  | Max. average forward current<br>@ Case temperature            | 300      | 380      | A                  | 180° conduction, half sine wave                                                                      |                       |                                                                       |  |
|                     |                                                               | 125      | 70       | °C                 |                                                                                                      |                       |                                                                       |  |
| I <sub>F(RMS)</sub> | Max. RMS forward current                                      | 595      | 425      | A                  | DC @ T <sub>C</sub> = 88°C (02 to 24), T <sub>C</sub> = 91°C (25 to 32)                              |                       |                                                                       |  |
| I <sub>FSM</sub>    | Max. peak, one-cycle forward,<br>non-repetitive surge current | 6050     | 6050     | A                  | t = 10ms                                                                                             | No voltage            | Sinusoidal half wave,<br>Initial T <sub>J</sub> = T <sub>J</sub> max. |  |
|                     |                                                               | 6335     | 6335     |                    | t = 8.3ms                                                                                            | reapplied             |                                                                       |  |
|                     |                                                               | 5090     | 5090     |                    | t = 10ms                                                                                             | 100% V <sub>RRM</sub> |                                                                       |  |
|                     |                                                               | 5330     | 5330     |                    | t = 8.3ms                                                                                            | reapplied             |                                                                       |  |
| I <sup>2</sup> t    | Maximum I <sup>2</sup> t for fusing                           | 183      | 183      | KA <sup>2</sup> s  | t = 10ms                                                                                             | No voltage            |                                                                       |  |
|                     |                                                               | 167      | 167      |                    | t = 8.3ms                                                                                            | reapplied             |                                                                       |  |
|                     |                                                               | 129      | 129      |                    | t = 10ms                                                                                             | 100% V <sub>RRM</sub> |                                                                       |  |
|                     |                                                               | 118      | 118      |                    | t = 8.3ms                                                                                            | reapplied             |                                                                       |  |
| I <sup>2</sup> √t   | Maximum I <sup>2</sup> √t for fusing                          | 1830     | 1830     | KA <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reapplied                                                                |                       |                                                                       |  |
| V <sub>F(TO)1</sub> | Low level value of threshold<br>voltage                       | 0.95     | 0.95     | V                  | (16.7% × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max. |                       |                                                                       |  |
| V <sub>F(TO)2</sub> | High level value of threshold<br>voltage                      | 1.05     | 1.05     |                    | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.                                  |                       |                                                                       |  |
| r <sub>f1</sub>     | Low level value of forward<br>slope resistance                | 0.75     | 0.75     | mΩ                 | (16.7% × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max. |                       |                                                                       |  |
| r <sub>f2</sub>     | High level value of forward<br>slope resistance               | 0.66     | 0.66     |                    | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.                                  |                       |                                                                       |  |
| V <sub>FM</sub>     | Max. forward voltage drop                                     | 1.83     | 1.83     | V                  | I <sub>pk</sub> = 1180A, T <sub>J</sub> = T <sub>J</sub> max, t <sub>p</sub> = 10ms sinusoidal wave  |                       |                                                                       |  |

### Thermal and Mechanical Specifications

| Parameter         |                                           | SD300N/R        |            | Units | Conditions                                 |
|-------------------|-------------------------------------------|-----------------|------------|-------|--------------------------------------------|
|                   |                                           | 04 to 20        | 25 to 32   |       |                                            |
| T <sub>j</sub>    | Max. junction operating temperature range | -40 to 180      | -40 to 150 | °C    |                                            |
| T <sub>stg</sub>  | Max. storage temperature range            | -55 to 200      | -55 to 200 |       |                                            |
| R <sub>thJC</sub> | Max. thermal resistance, junction to case | 0.11            |            | K/W   | DC operation                               |
| R <sub>thCS</sub> | Max. thermal resistance, case to heatsink | 0.04            |            |       | Mounting surface, smooth, flat and greased |
| T                 | Max. allowed mounting torque ±10%         | 27              |            | Nm    | Not lubricated threads                     |
| wt                | Approximate weight                        | 250             |            | g     |                                            |
| Case style        |                                           | DO-205AB (DO-9) |            |       | See Outline Table                          |

### $\Delta R_{thJC}$ Conduction

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

| Conduction angle | Sinusoidal conduction |          | Rectangular conduction |          | Units | Conditions               |
|------------------|-----------------------|----------|------------------------|----------|-------|--------------------------|
|                  | 04 to 20              | 25 to 32 | 04 to 20               | 25 to 32 |       |                          |
| 180°             | 0.019                 | 0.019    | 0.013                  | 0.013    | K/W   | $T_j = T_j \text{ max.}$ |
| 120°             | 0.023                 | 0.023    | 0.023                  | 0.023    |       |                          |
| 90°              | 0.028                 | 0.028    | 0.030                  | 0.030    |       |                          |
| 60°              | 0.042                 | 0.042    | 0.044                  | 0.044    |       |                          |
| 30°              | 0.073                 | 0.073    | 0.074                  | 0.074    |       |                          |

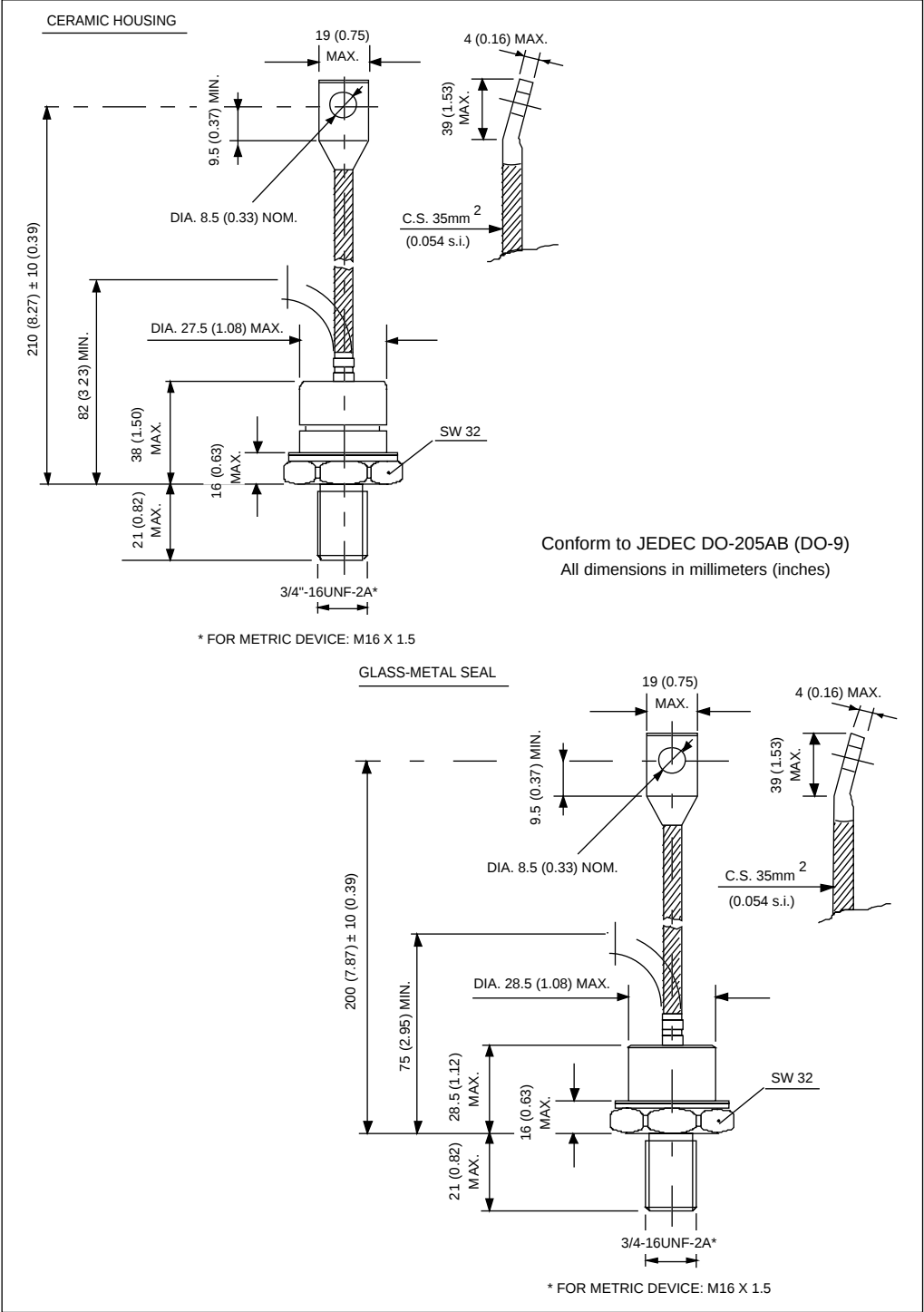
### Ordering Information Table

| Device Code |                                                                                                                                                                              |          |          |           |          |          |          |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|-----------|----------|----------|----------|
| <b>SD</b>   | <b>30</b>                                                                                                                                                                    | <b>0</b> | <b>N</b> | <b>32</b> | <b>P</b> | <b>B</b> | <b>C</b> |
| ①           | ②                                                                                                                                                                            | ③        | ④        | ⑤         | ⑥        | ⑦        | ⑧        |
| <b>1</b>    | - Diode                                                                                                                                                                      |          |          |           |          |          |          |
| <b>2</b>    | - Essential part number                                                                                                                                                      |          |          |           |          |          |          |
| <b>3</b>    | - 0 = Standard recovery                                                                                                                                                      |          |          |           |          |          |          |
| <b>4</b>    | - N = Stud Normal Polarity (Cathode to Stud)<br>R = Stud Reverse Polarity (Anode to Stud)                                                                                    |          |          |           |          |          |          |
| <b>5</b>    | - Voltage code: Code x 100 = $V_{RRM}$ (See Voltage Ratings table)                                                                                                           |          |          |           |          |          |          |
| <b>6</b>    | - P = Stud base DO-205AB (DO-9) 3/4" 16UNF-2A<br>M = Stud base DO-205AB (DO-9) M16 X 1.5                                                                                     |          |          |           |          |          |          |
| <b>7</b>    | - B = Flag top terminal (for Cathode/ Anode Leads)<br>S = Isolated lead with silicone sleeve<br>(Red = Reverse Polarity; Blue = Normal Polarity)<br>None = Non isolated lead |          |          |           |          |          |          |
| <b>8</b>    | - C = Ceramic Housing (over 1600V)<br>V = Glass-metal seal (only up to 1600V)                                                                                                |          |          |           |          |          |          |

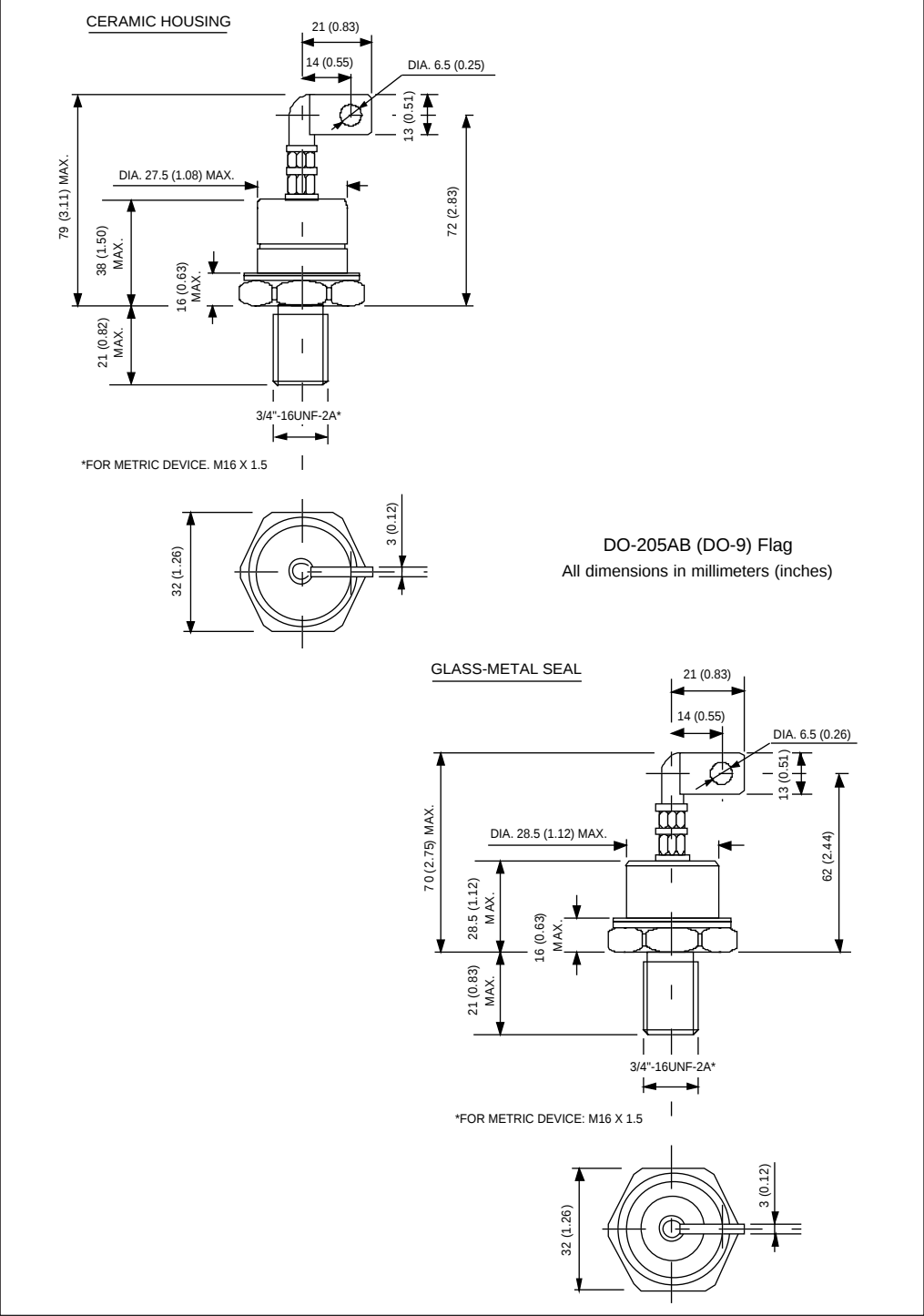
**SD300N/R Series**

Bulletin I2081 rev. A 08/94

**Outline Table**



Outline Table



## SD300N/R Series

Bulletin I2081 rev. A 08/94

International  
IRF Rectifier

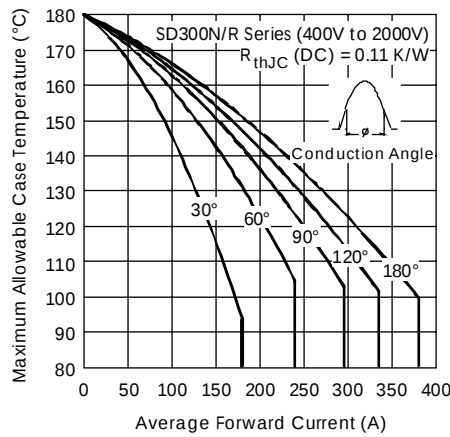


Fig. 1 - Current Ratings Characteristics

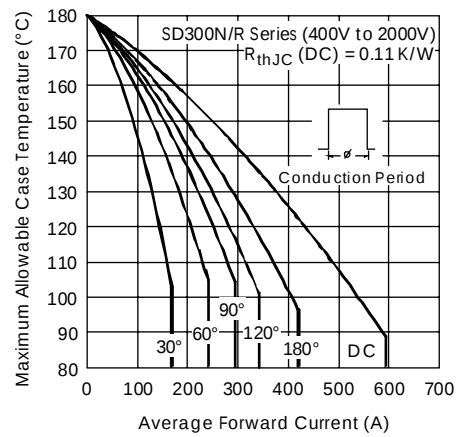


Fig. 2 - Current Ratings Characteristics

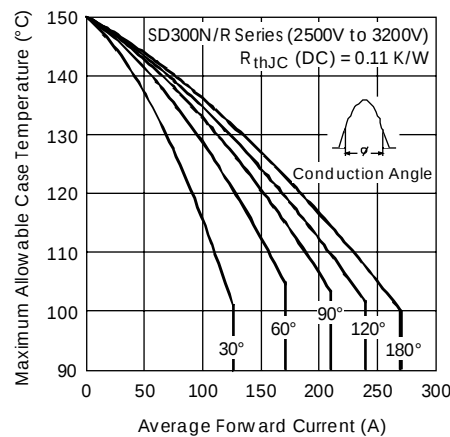


Fig. 3 - Current Ratings Characteristics

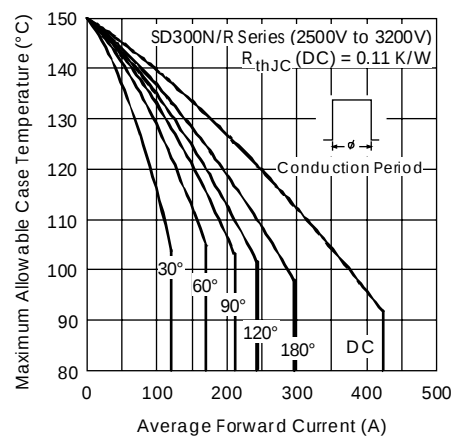


Fig. 4 - Current Ratings Characteristics

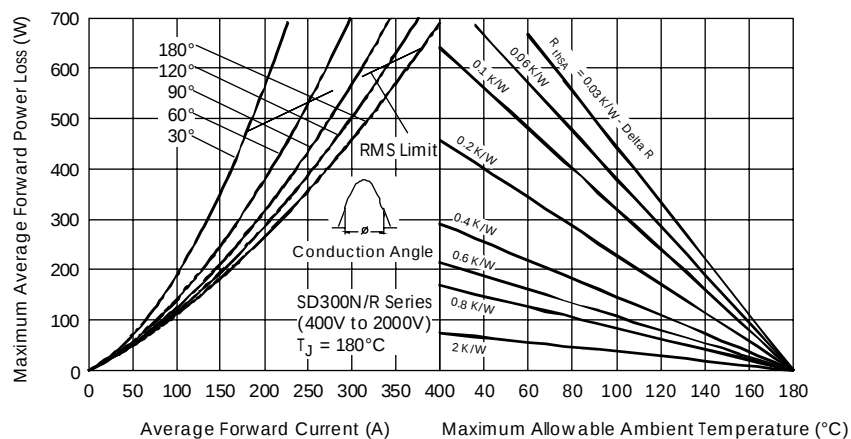


Fig. 5 - Forward Power Loss Characteristics

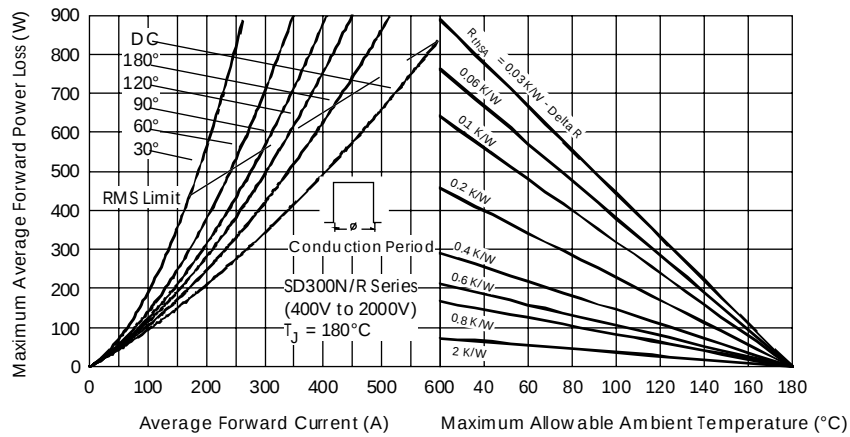


Fig. 6 - Forward Power Loss Characteristics

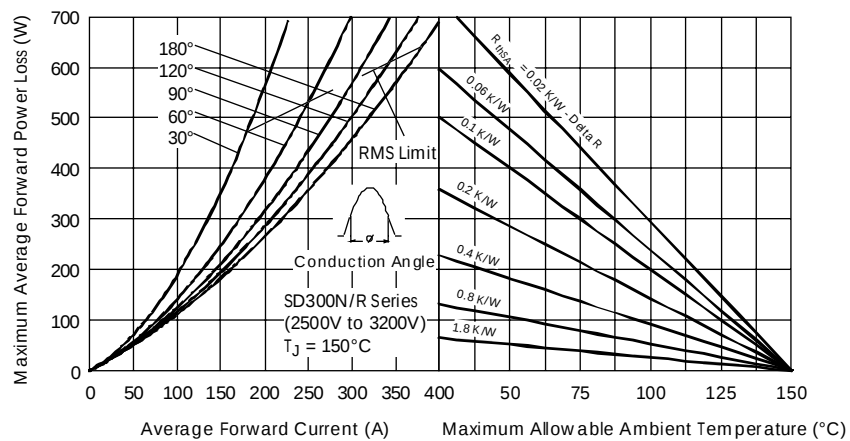


Fig. 7 - Forward Power Loss Characteristics

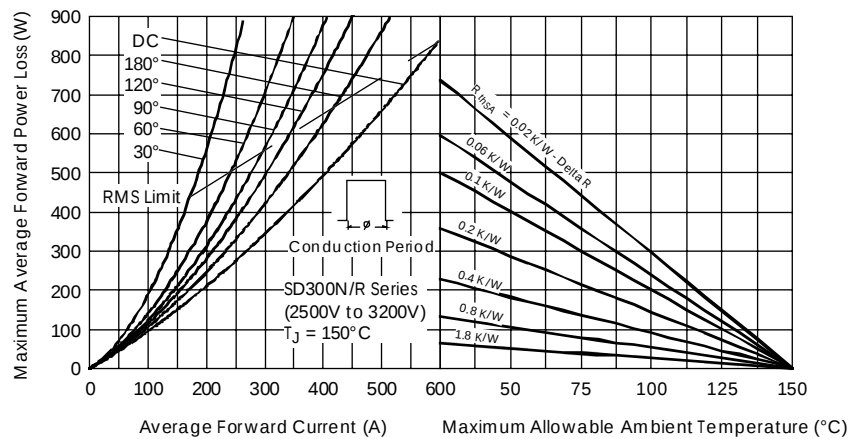


Fig. 8 - Forward Power Loss Characteristics

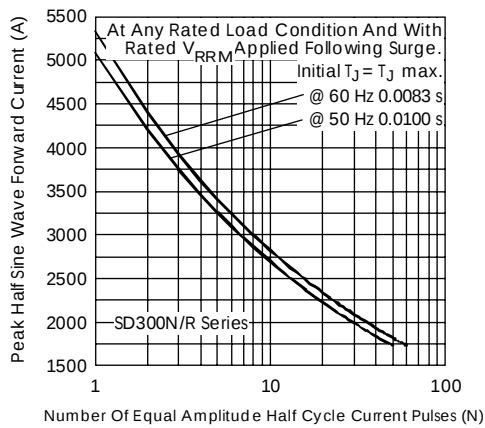


Fig. 9 - Maximum Non-Repetitive Surge Current

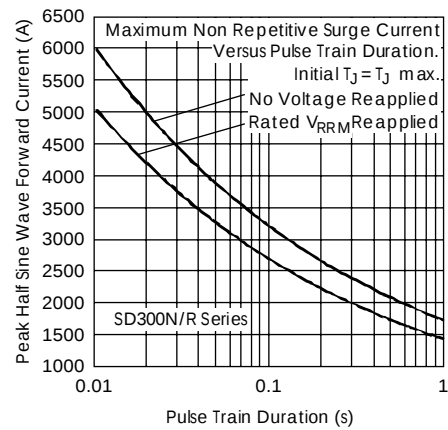


Fig. 10 - Maximum Non-Repetitive Surge Current

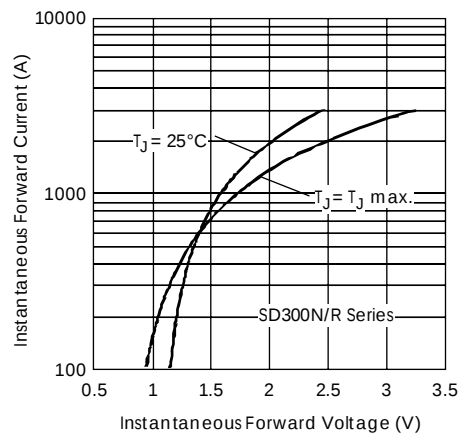
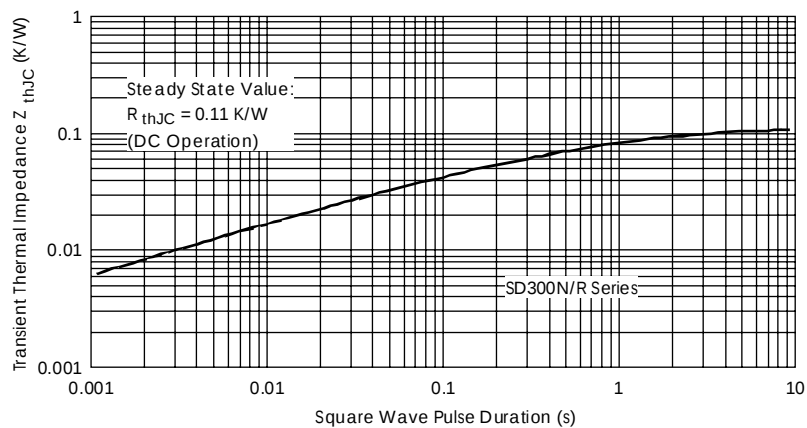


Fig. 11 - Forward Voltage Drop Characteristics

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