

STANDARD RECOVERY DIODES

Stud Version

Features

- Wide current range
- High voltage ratings up to 4500V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC types

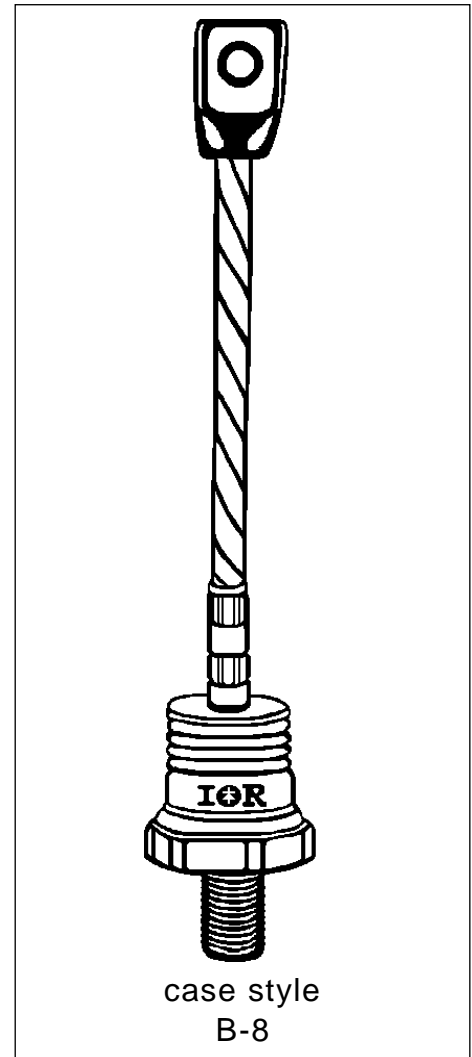
475A

Typical Applications

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

Major Ratings and Characteristics

| Parameters | SD500N/R | Units |
|------------------|--------------|-------------------|
| $I_{F(AV)}$ | 475 | A |
| @ T_C | 55 | °C |
| $I_{F(RMS)}$ | 745 | A |
| I_{FSM} @ 50Hz | 7500 | A |
| @ 60Hz | 7850 | A |
| I^2t @ 50Hz | 281 | KA ² s |
| @ 60Hz | 257 | KA ² s |
| V_{RRM} range | 3000 to 4500 | V |
| T_J | - 40 to 150 | °C |



SD500N/R Series

ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | Voltage Code | V_{RRM} , maximum repetitive peak reverse voltage V | V_{RSM} , maximum non-repetitive peak rev. voltage V | I_{RRM} max. @ $T_J = T_J$ max. mA |
|-------------|--------------|--|---|--|
| SD500N/R | 30 | 3000 | 3100 | 50 |
| | 36 | 3600 | 3700 | |
| | 40 | 4000 | 4100 | |
| | 45 | 4500 | 4600 | |

Forward Conduction

| Parameter | SD500N/R | Units | Conditions |
|--|----------|--------------------|--|
| $I_{F(AV)}$ Max. average forward current @ Case temperature | 475 | A | 180° conduction, half sine wave |
| | 55 | °C | |
| $I_{F(AV)}$ Max. average forward current @ Case temperature | 300 | A | 180° conduction, half sine wave |
| | 100 | °C | |
| $I_{F(RMS)}$ Max. RMS forward current | 745 | A | DC @ 40°C case temperature |
| I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current | 7500 | A | t = 10ms No voltage |
| | 7850 | | t = 8.3ms reappplied |
| | 6310 | | t = 10ms 50% V_{RRM} |
| | 6600 | | t = 8.3ms reappplied |
| I^2t Maximum I^2t for fusing | 281 | KA ² s | t = 10ms No voltage |
| | 257 | | t = 8.3ms reappplied |
| | 199 | | t = 10ms 50% V_{RRM} |
| | 182 | | t = 8.3ms reappplied |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing | 2810 | KA ² √s | t = 0.1 to 10ms, no voltage reappplied |
| $V_{F(TO)1}$ Low level value of threshold voltage | 0.88 | V | (16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max. |
| $V_{F(TO)2}$ High level value of threshold voltage | 0.97 | | (I > π x $I_{F(AV)}$), $T_J = T_J$ max. |
| r_{f1} Low level value of forward slope resistance | 0.78 | mΩ | (16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max. |
| r_{f2} High level value of forward slope resistance | 0.72 | | (I > π x $I_{F(AV)}$), $T_J = T_J$ max. |
| V_{FM} Max. forward voltage drop | 1.66 | V | $I_{pk} = 1000A$, $T_J = T_J$ max, $t_p = 10ms$ sinusoidal wave |

Thermal and Mechanical Specifications

| Parameter | SD500N/R | Units | Conditions |
|---|------------|-------|--|
| T _J Max. junction operating temperature range | -40 to 150 | °C | |
| T _{stg} Max. storage temperature range | -55 to 200 | | |
| R _{thJC} Max. thermal resistance, junction to case | 0.1 | K/W | DC operation |
| R _{thCS} Max. thermal resistance, case to heatsink | 0.04 | | Mounting surface, smooth, flat and greased |
| T Max. allowed mounting torque ±10% | 50 | Nm | Not lubricated threads |
| wt Approximate weight | 454 | g | |
| Case style | B - 8 | | See Outline Table |

 ΔR_{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 |
|------------------|-----------------------|------------------------|-------|--------------------------------------|
| 180° | 0.012 | 0.008 | K/W | T _J = T _J max. |
| 120° | 0.014 | 0.014 | | |
| 90° | 0.017 | 0.019 | | |
| 60° | 0.025 | 0.026 | | |
| 30° | 0.042 | 0.042 | | |

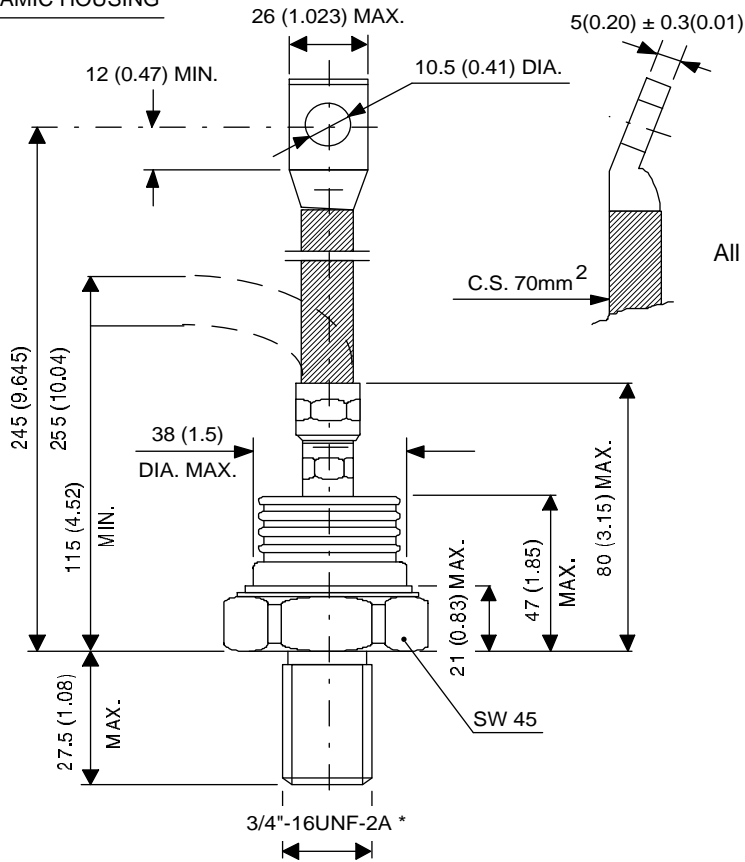
Ordering Information Table

| Device Code | | | | | | | | | | | | | | | | | |
|---|--|----|----|----|---|----|---|---|---|---|---|---|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">SD</td> <td style="padding: 5px;">50</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">N</td> <td style="padding: 5px;">45</td> <td style="padding: 5px;">P</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">C</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> <td style="text-align: center;">⑦</td> <td style="text-align: center;">⑧</td> </tr> </table> | SD | 50 | 0 | N | 45 | P | S | C | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| SD | 50 | 0 | N | 45 | P | S | C | | | | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | | | | | | | | | | |
| 1 | - Diode | | | | | | | | | | | | | | | | |
| 2 | - Essential part number | | | | | | | | | | | | | | | | |
| 3 | - 0 = Standard recovery | | | | | | | | | | | | | | | | |
| 4 | - N = Stud Normal Polarity (Cathode to Stud) R = Stud Reverse Polarity (Anode to Stud) | | | | | | | | | | | | | | | | |
| 5 | - Voltage code: Code x 100 = V _{RRM} (See Voltage Ratings table) | | | | | | | | | | | | | | | | |
| 6 | - P = Stud base B-8 3/4" 16UNF-2A M = Stud base B-8 M24 X 1.5 | | | | | | | | | | | | | | | | |
| 7 | - S = Isolated lead with silicone sleeve (Red = Reverse Polarity; Blue = Normal Polarity) T = Threaded Top Terminal 3/8" 24UNF-2A None = Non isolated lead | | | | | | | | | | | | | | | | |
| 8 | - C = Ceramic Housing | | | | | | | | | | | | | | | | |
| NOTE: Available for rotating applications (Contact factory) | | | | | | | | | | | | | | | | | |

SD500N/R Series

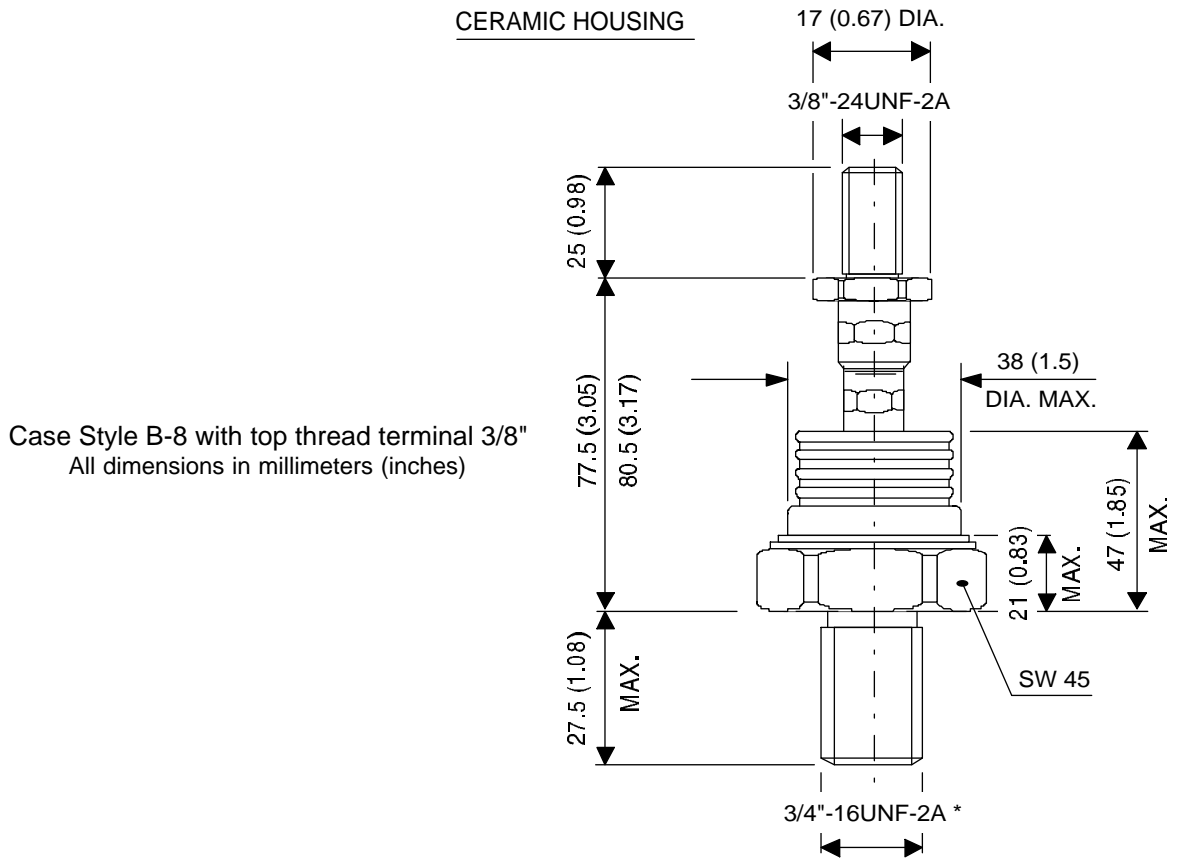
Outlines Table

CERAMIC HOUSING



* FOR METRIC DEVICE: M24 x 1.5 - SCREW LENGTH — 21(0.83) MAX.

CERAMIC HOUSING



* FOR METRIC DEVICE: M24 x 1.5 - SCREW LENGTH — 21(0.83)

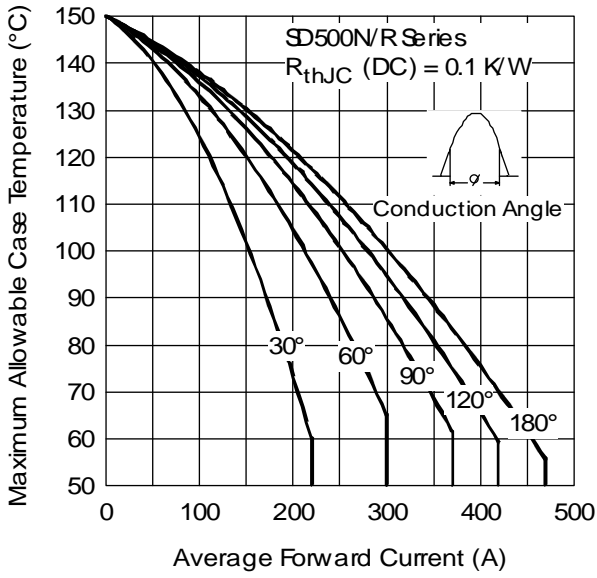


Fig. 1 - Current Ratings Characteristics

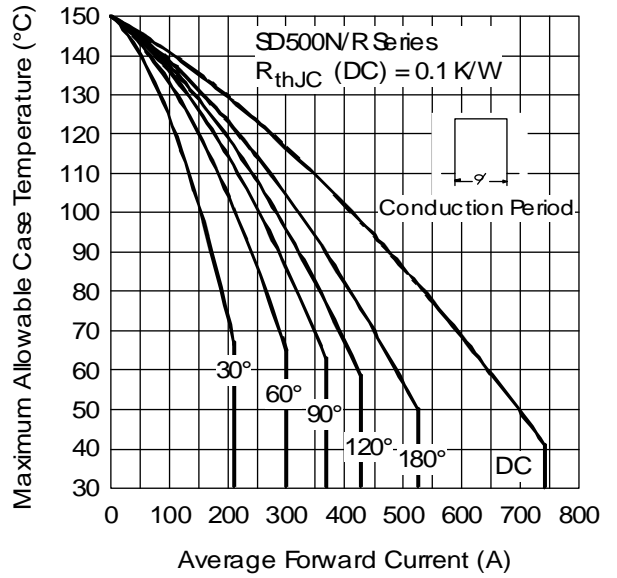


Fig. 2 - Current Ratings Characteristics

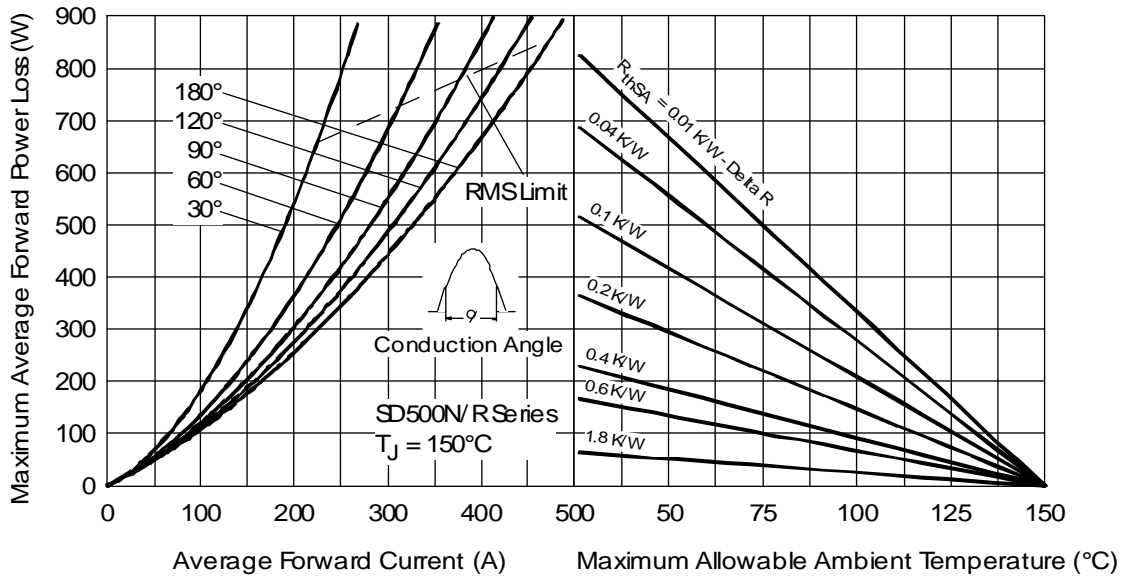


Fig. 3 - Forward Power Loss Characteristics

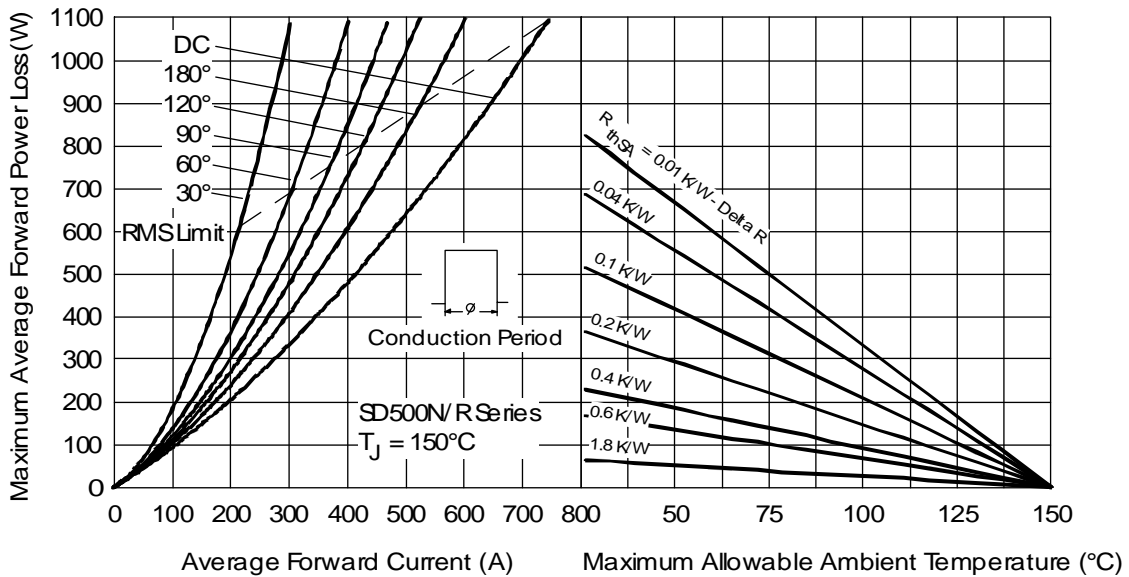


Fig. 4 - Forward Power Loss Characteristics

SD500N/R Series

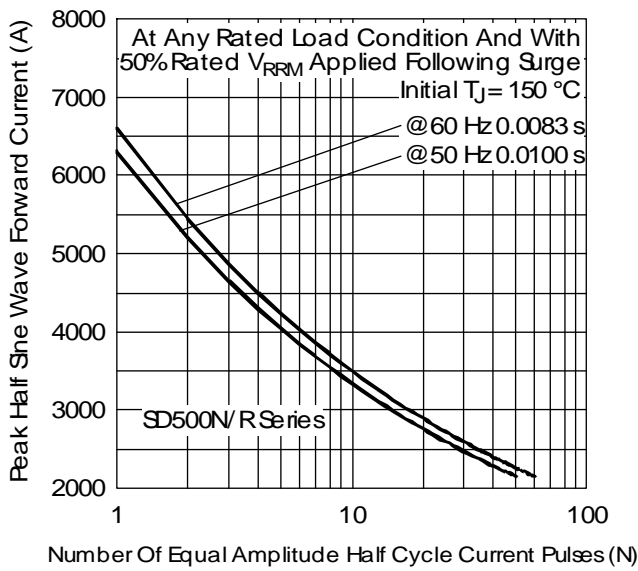


Fig. 5 - Maximum Non-Repetitive Surge Current

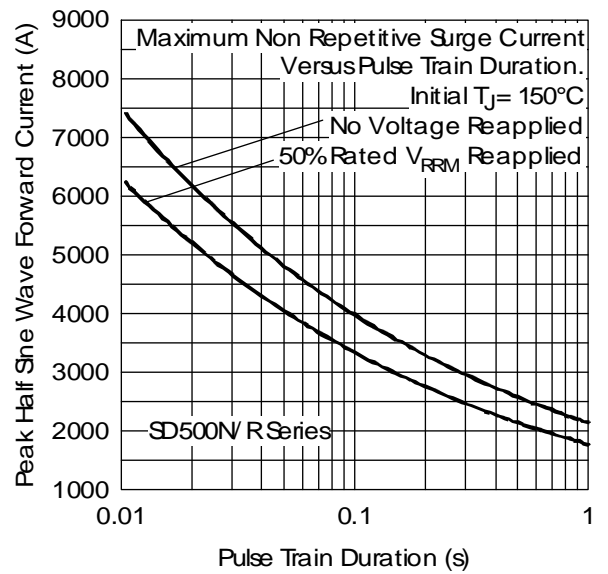


Fig. 6 - Maximum Non-Repetitive Surge Current

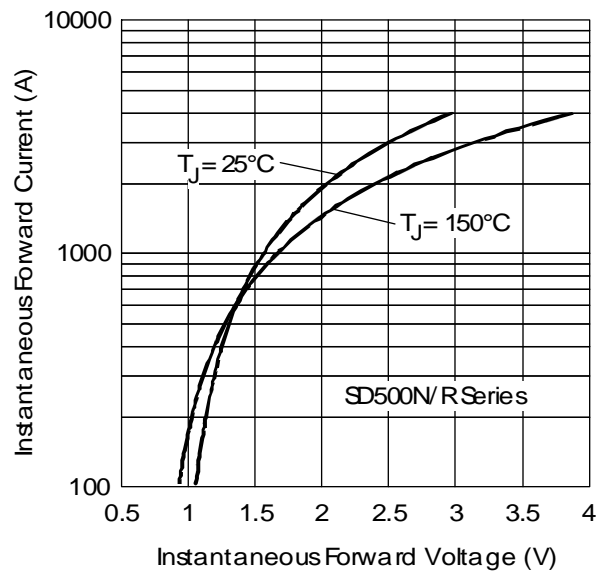


Fig. 7 - Forward Voltage Drop Characteristics

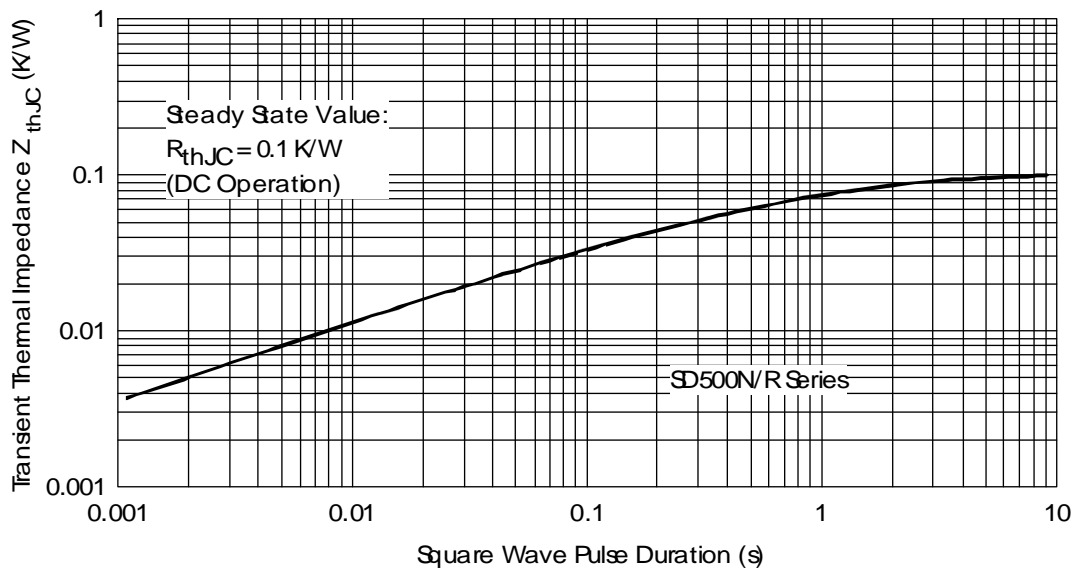


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics