

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
- RoHS Compliant

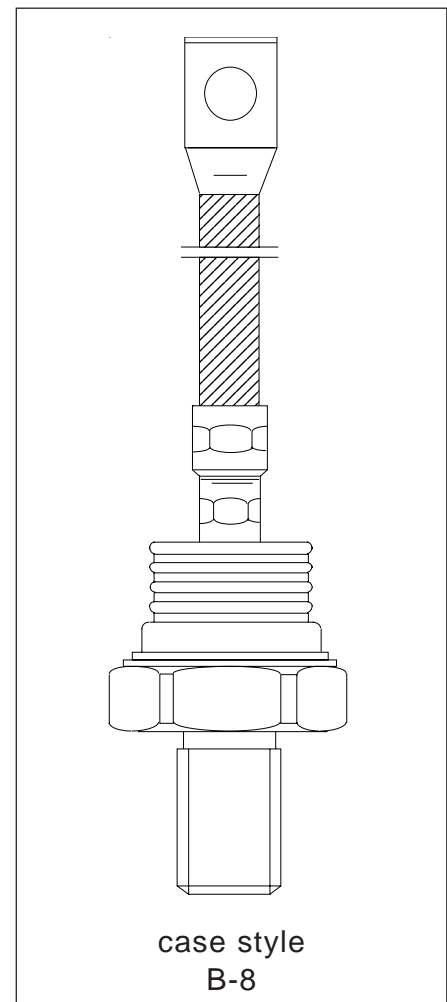
Typical Applications

- 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 |

475A



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 $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ max. |
| $V_{F(TO)2}$ High level value of threshold voltage | 0.97 | | ($I > \pi$ 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 $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ max. |
| r_{f2} High level value of forward slope resistance | 0.72 | | ($I > \pi$ 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

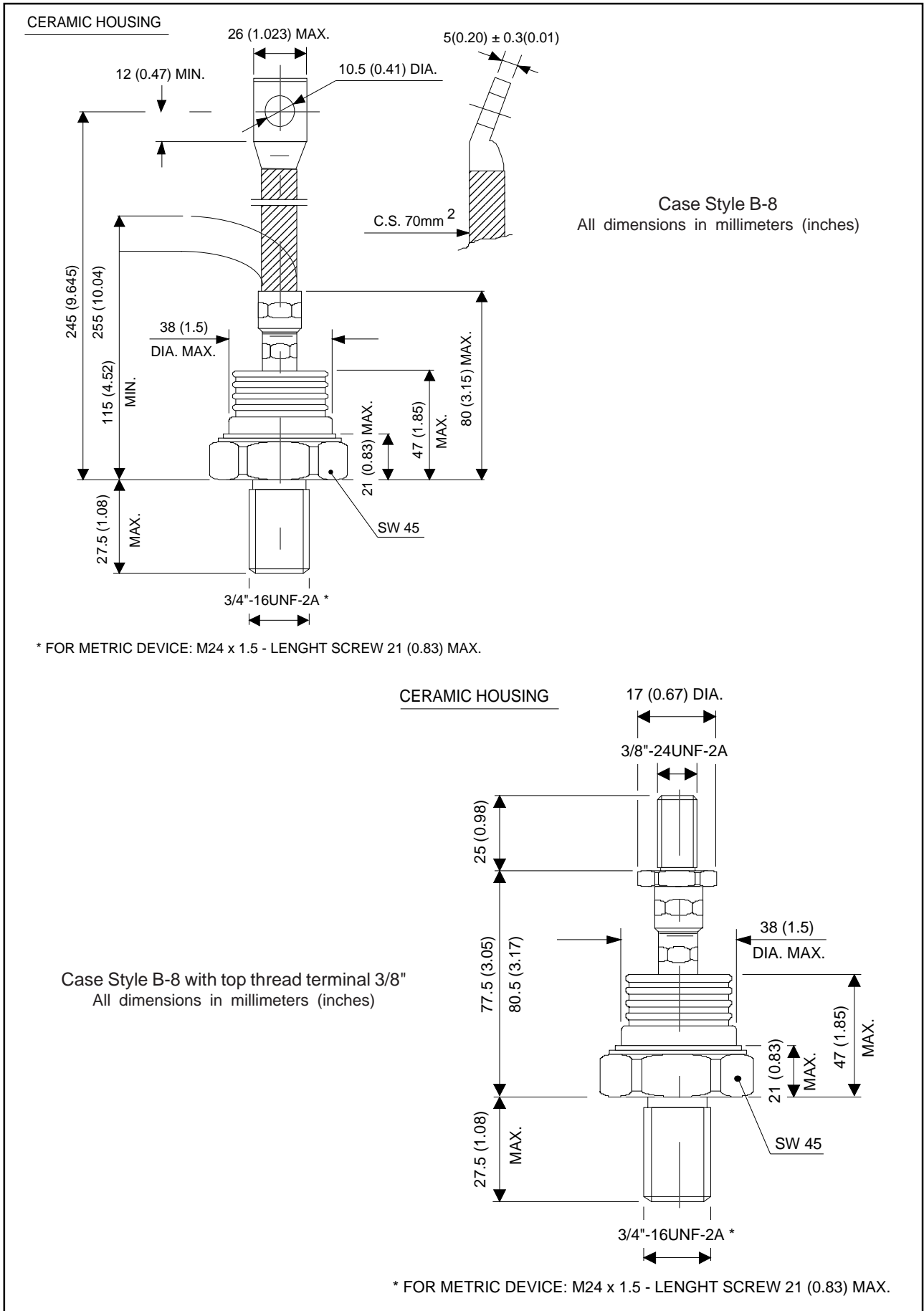
Device Code

| | | | | | | | |
|----|----|---|---|----|---|---|---|
| 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)

Outlines Table



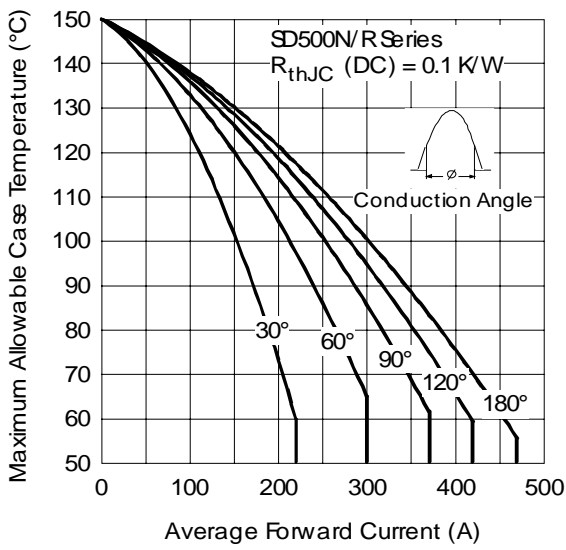


Fig. 1 - Current Ratings Characteristics

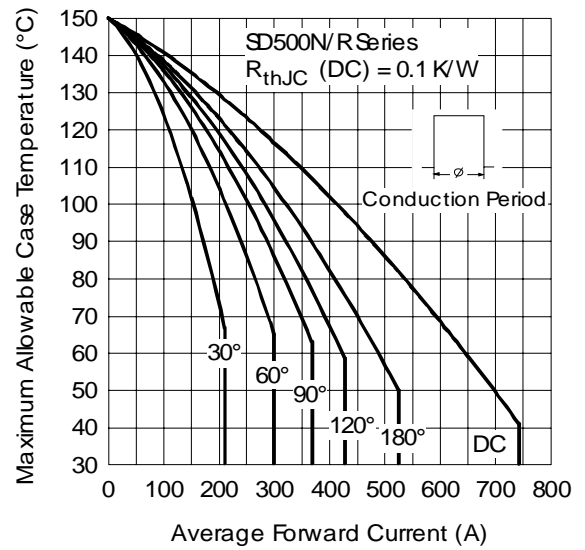


Fig. 2 - Current Ratings Characteristics

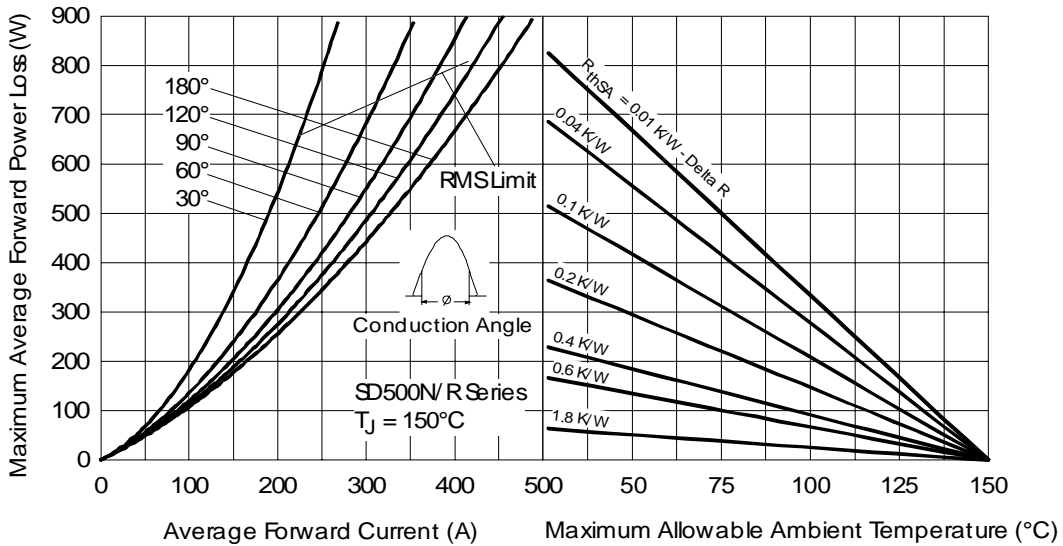


Fig. 3 - Forward Power Loss Characteristics

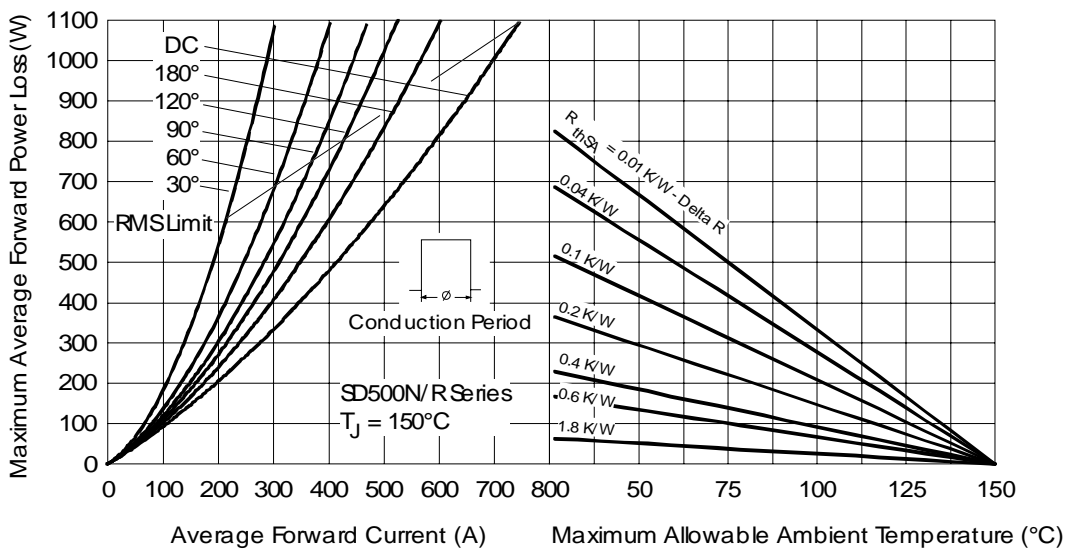


Fig. 4 - Forward Power Loss Characteristics

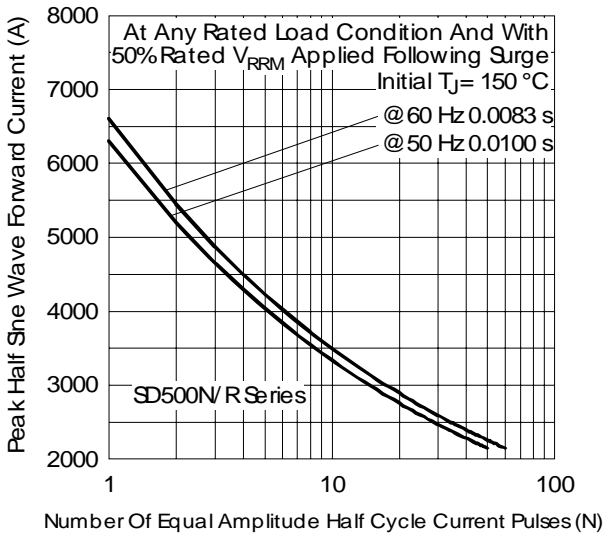


Fig. 5 - Maximum Non-Repetitive Surge Current

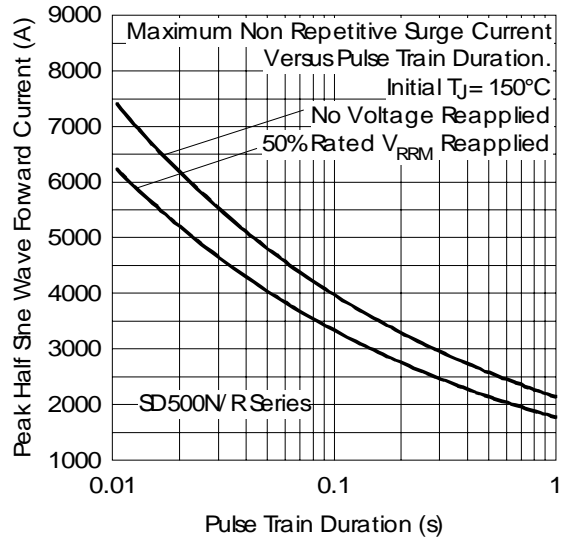


Fig. 6 - Maximum Non-Repetitive Surge Current

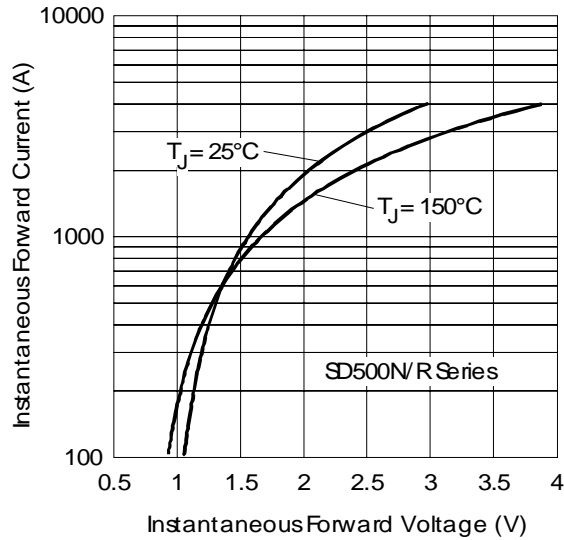


Fig. 7 - Forward Voltage Drop Characteristics

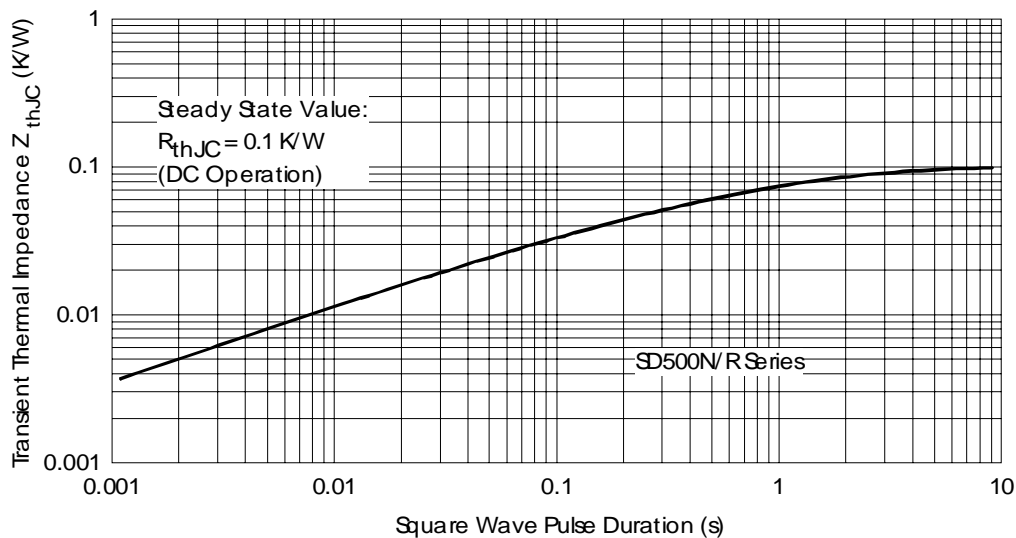


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309

Visit us at www.irf.com for sales contact information. 09/06