



# THE DATASHEET OF SD500R40PSC



### 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

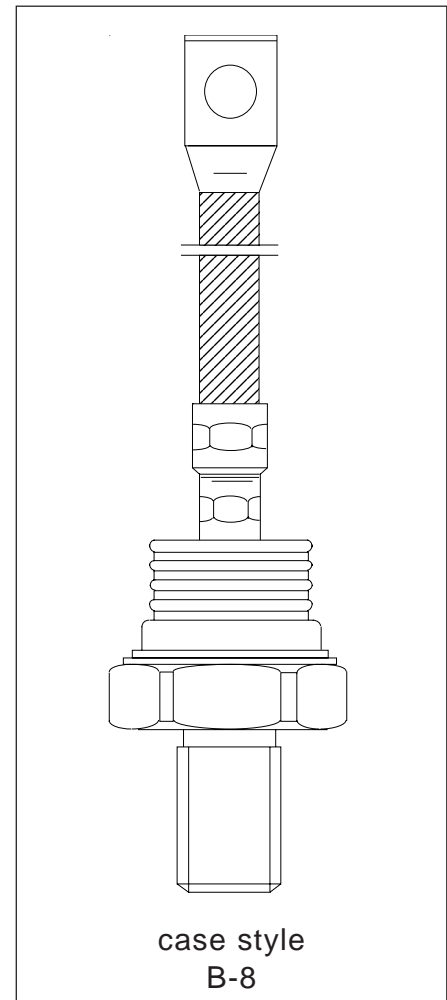
#### Typical Applications

- 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 <sup>2</sup> s
@ 60Hz	257	KA <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> √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 $\pi$ 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 $\pi$ 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 <sub>J</sub> Max. junction operating temperature range	-40 to 150	°C	
T <sub>stg</sub> Max. storage temperature range	-55 to 200		
R <sub>thJC</sub> Max. thermal resistance, junction to case	0.1	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%	50	Nm	Not lubricated threads
wt Approximate weight	454	g	
Case style	B - 8		See Outline Table

### ΔR<sub>thJC</sub> Conduction

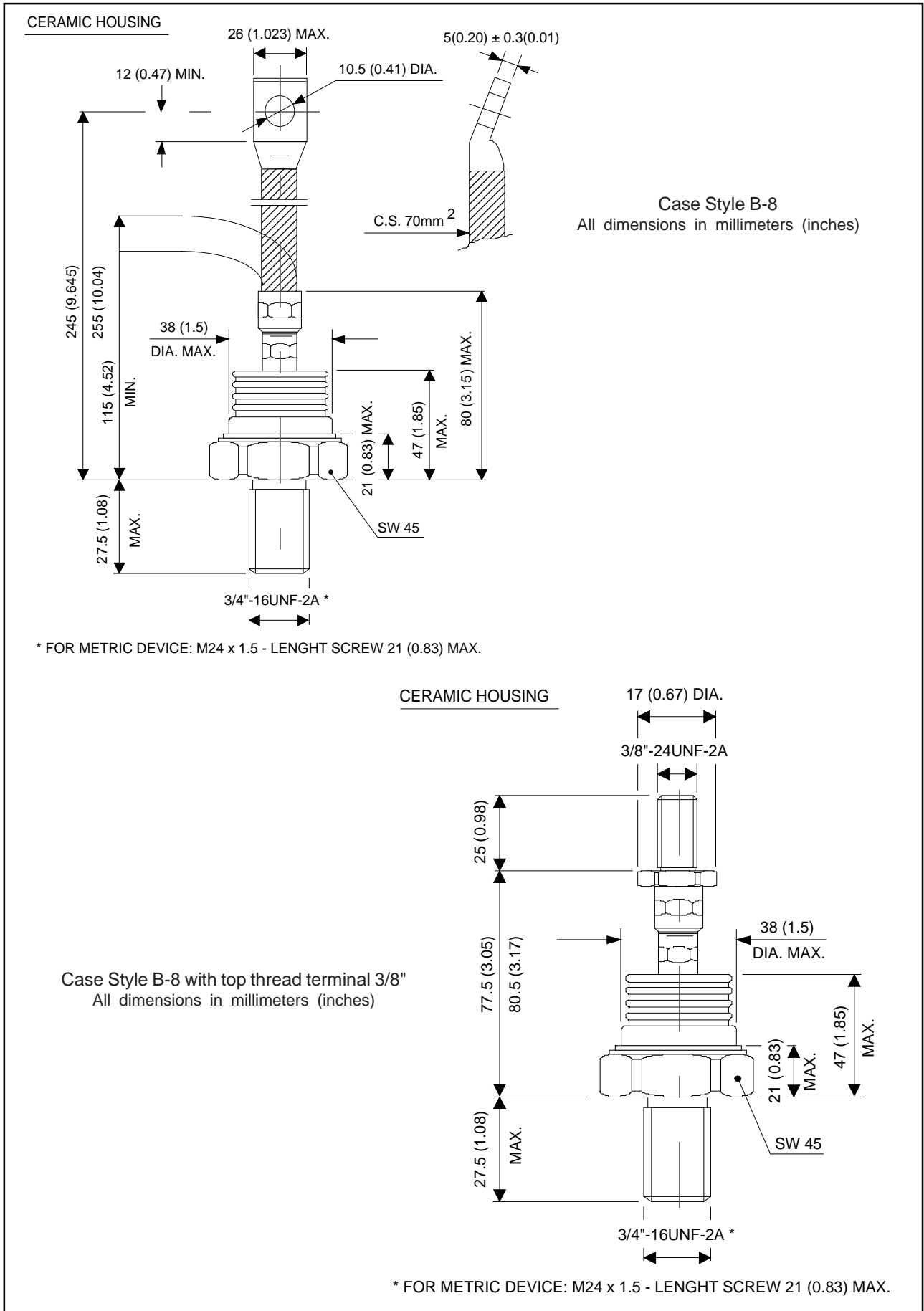
(The following table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.012	0.008	K/W	T <sub>J</sub> = T <sub>J</sub> 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	
<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) R = Stud Reverse Polarity (Anode to Stud)	
<b>5</b> - Voltage code: Code x 100 = V <sub>RRM</sub> (See Voltage Ratings table)	
<b>6</b> - P = Stud base B-8 3/4" 16UNF-2A M = Stud base B-8 M24 X 1.5	
<b>7</b> - S = Isolated lead with silicone sleeve (Red = Reverse Polarity; Blue = Normal Polarity) T = Threaded Top Terminal 3/8" 24UNF-2A None = Non isolated lead	
<b>8</b> - C = Ceramic Housing	
NOTE: Available for rotating applications (Contact factory)	

**Outlines Table**



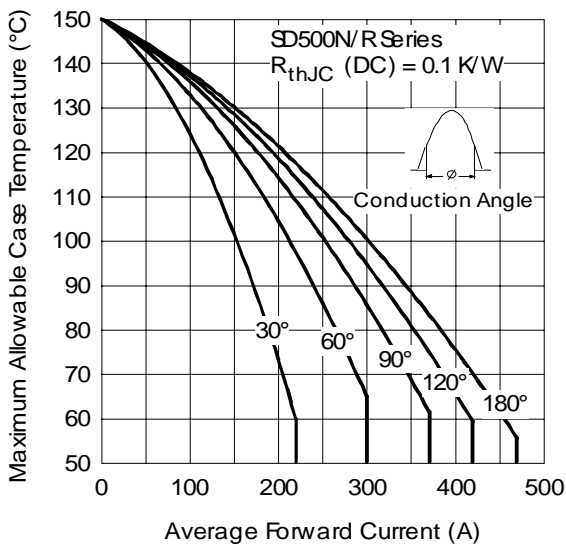


Fig. 1 - Current Ratings Characteristics

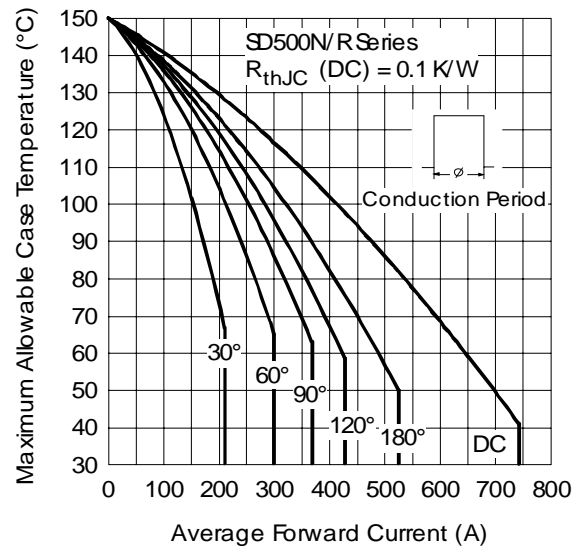


Fig. 2 - Current Ratings Characteristics

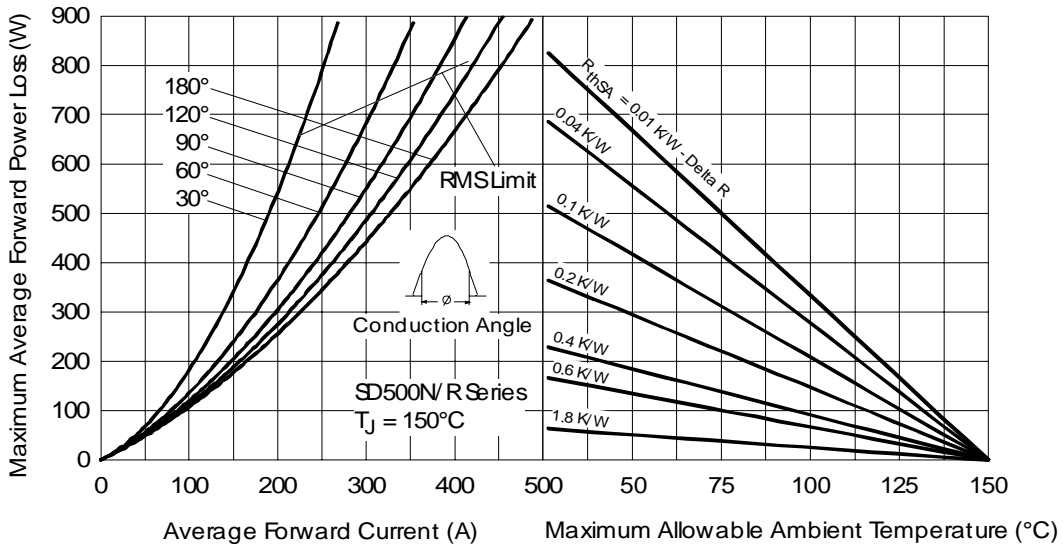


Fig. 3 - Forward Power Loss Characteristics

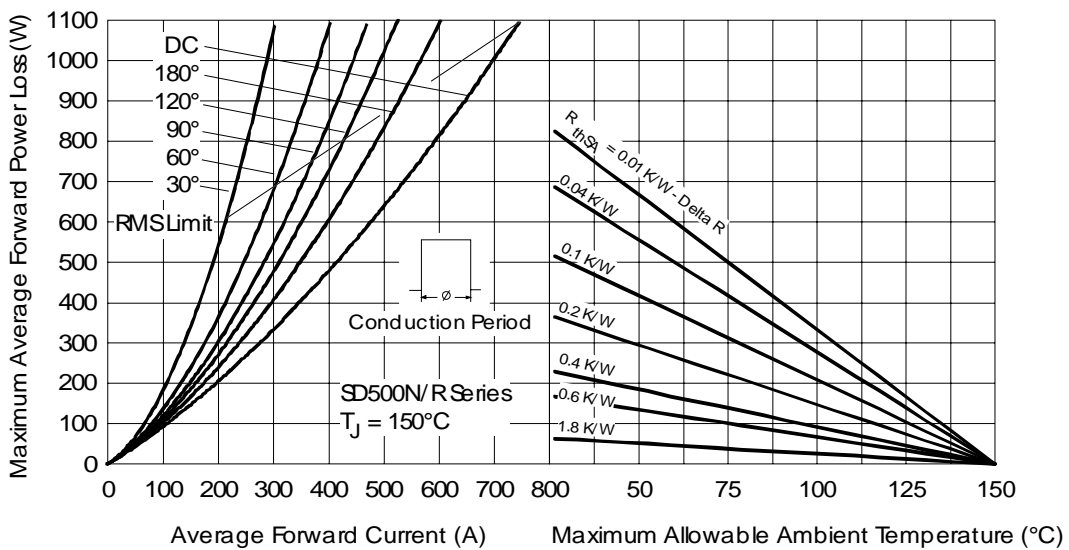


Fig. 4 - Forward Power Loss Characteristics

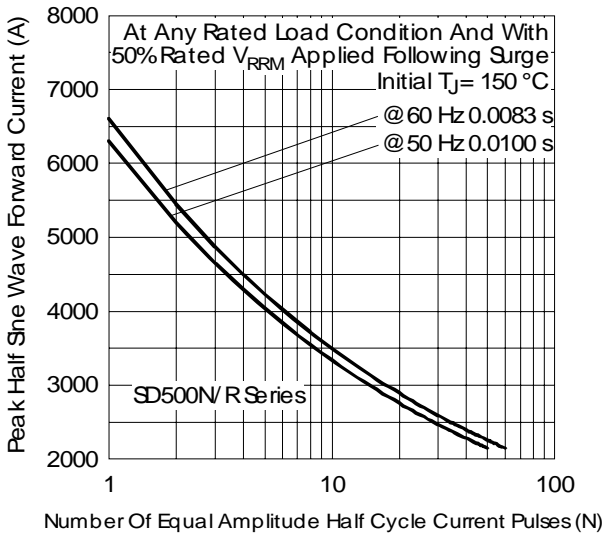


Fig. 5 - Maximum Non-Repetitive Surge Current

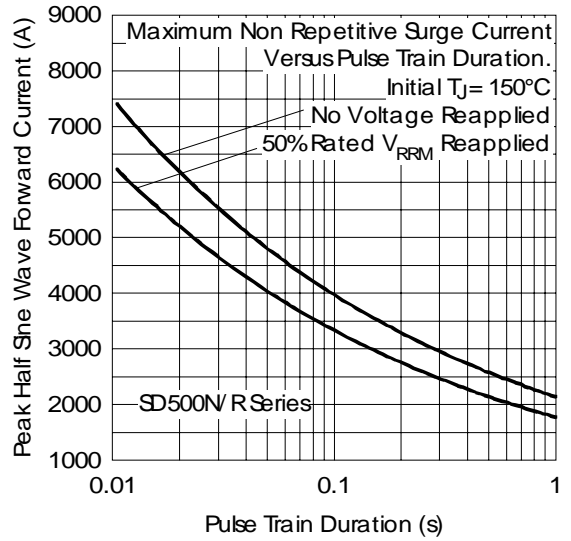


Fig. 6 - Maximum Non-Repetitive Surge Current

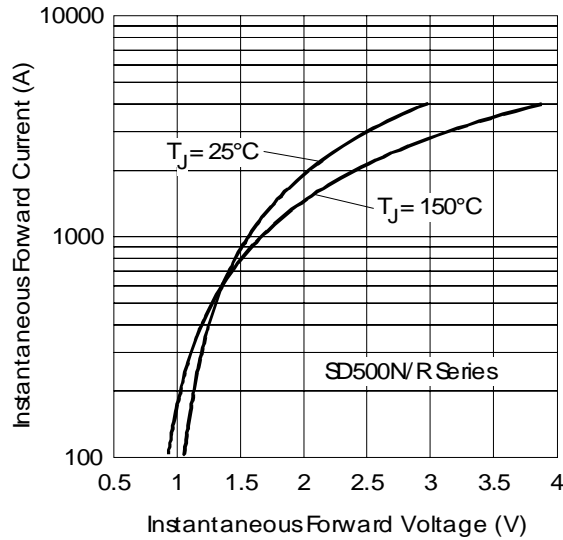


Fig. 7 - Forward Voltage Drop Characteristics

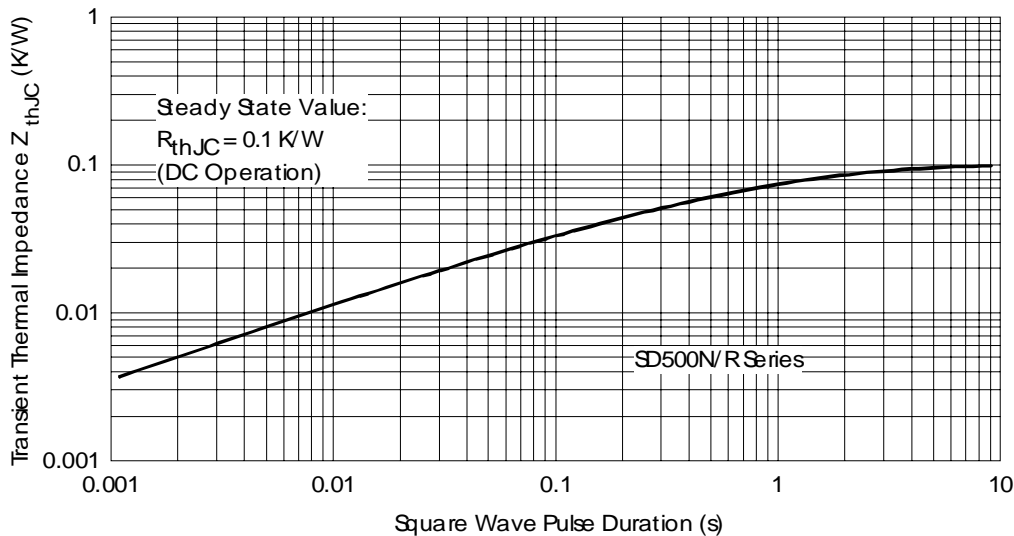


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

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  
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