

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

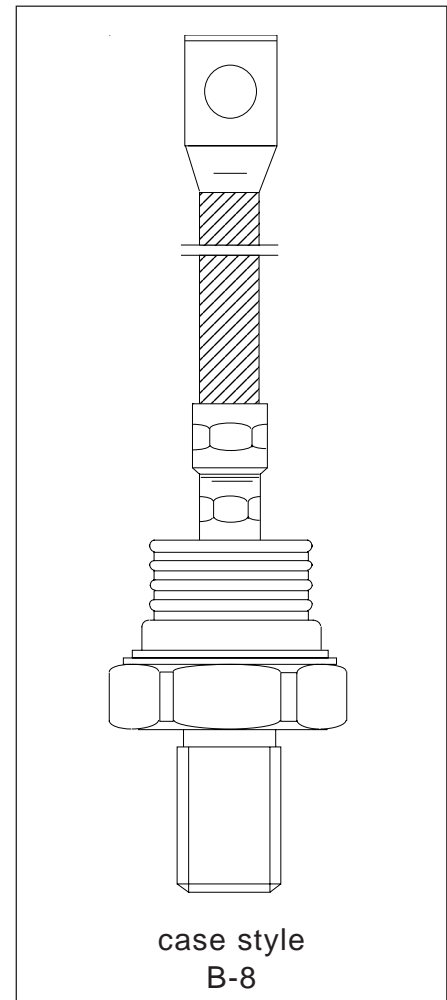
Typical Applications

- 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

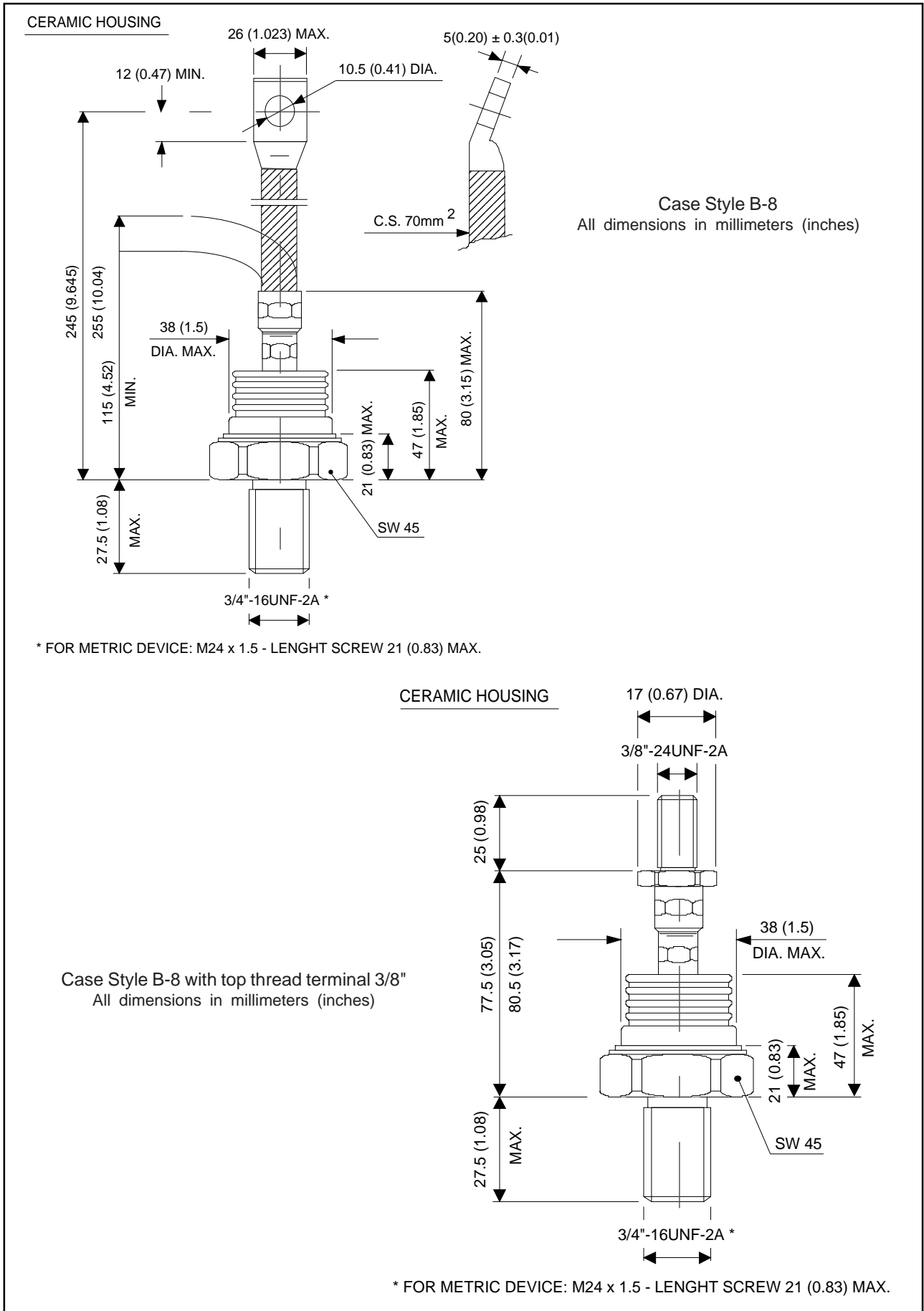
Device Code

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



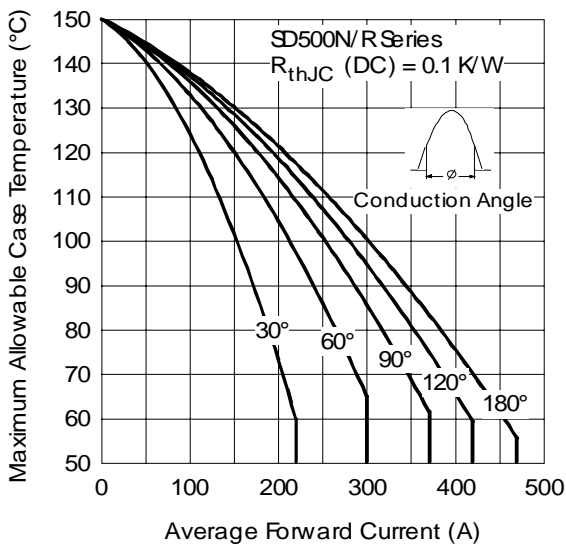


Fig. 1 - Current Ratings Characteristics

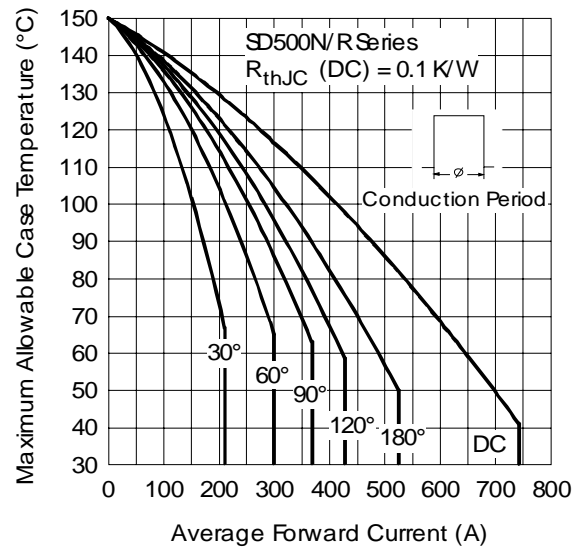


Fig. 2 - Current Ratings Characteristics

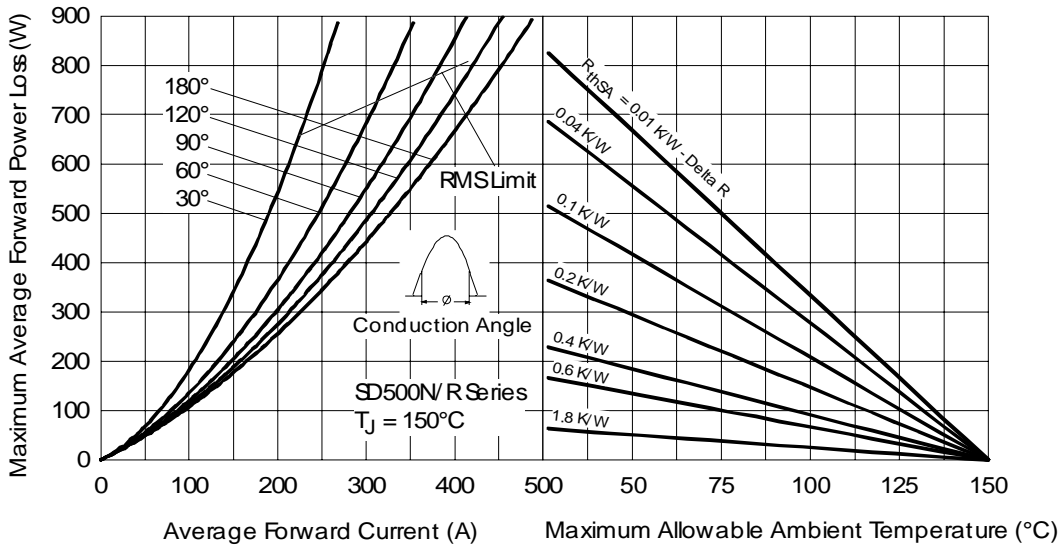


Fig. 3 - Forward Power Loss Characteristics

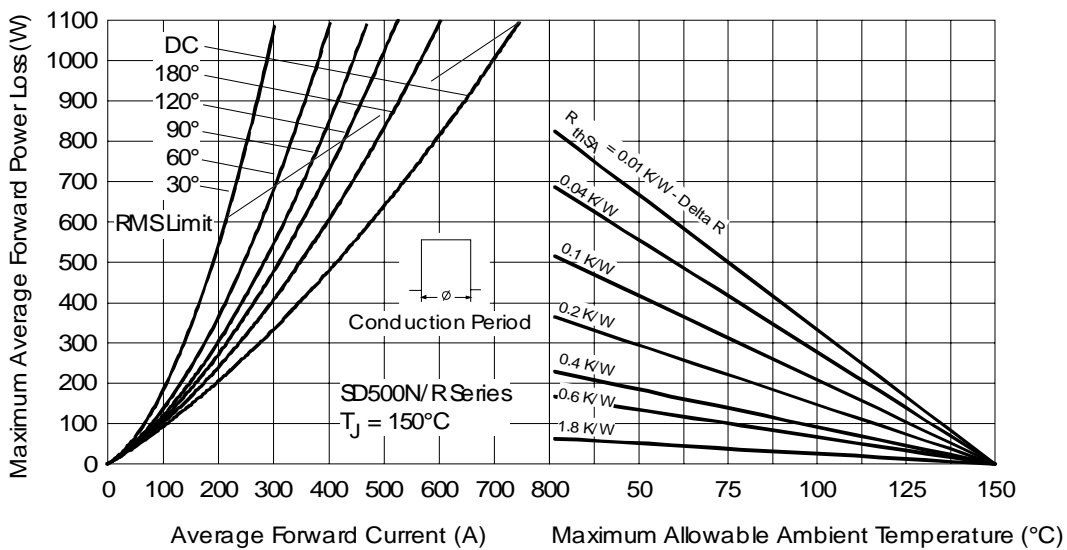


Fig. 4 - Forward Power Loss Characteristics

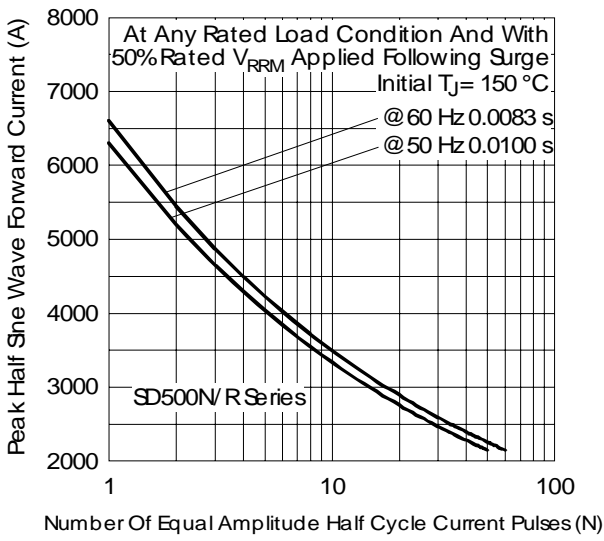


Fig. 5 - Maximum Non-Repetitive Surge Current

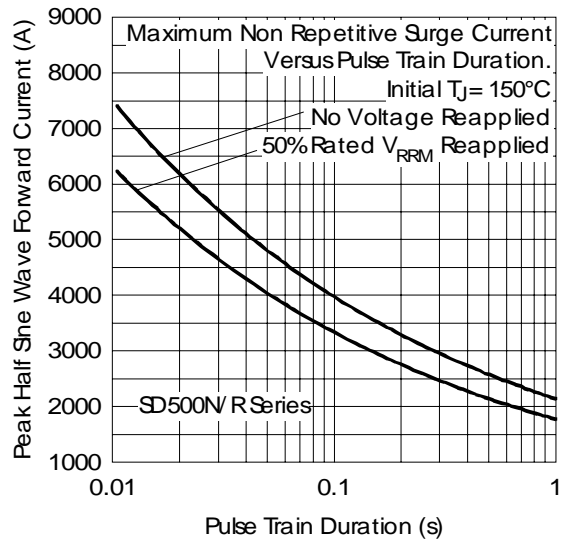


Fig. 6 - Maximum Non-Repetitive Surge Current

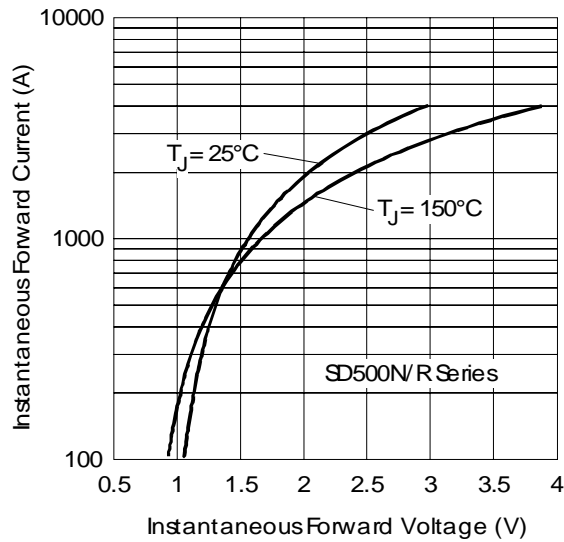


Fig. 7 - Forward Voltage Drop Characteristics

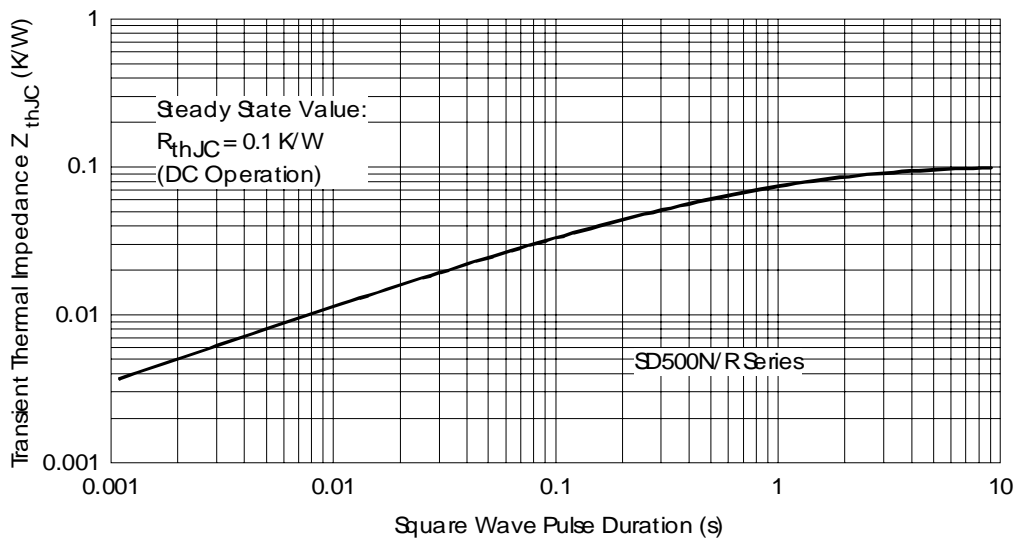


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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.

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