

Bulletin I2095 rev. A 08/94

International
IR Rectifier

SD500N/R SERIES

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

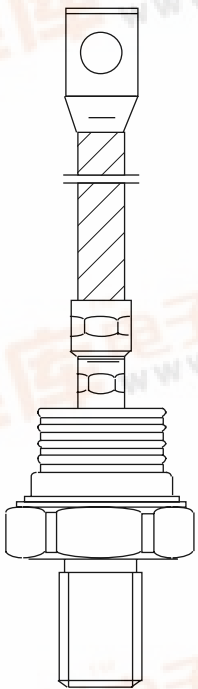
Typical Applications

- 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



case style
B-8



SD500N/R Series

Bulletin I2095 rev. A 08/94

International
IOR Rectifier

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	Sinusoidal half wave, Initial $T_J = T_J$ max.	
		7850		t = 8.3ms	reapplied		
		6310		t = 10ms	50% V_{RRM}		
		6600		t = 8.3ms	reapplied		
I^2t	Maximum I^2t for fusing	281	KA²s	t = 10ms	No voltage		
		257		t = 8.3ms	reapplied		
		199		t = 10ms	50% V_{RRM}		
		182		t = 8.3ms	reapplied		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	2810	KA²√s	t = 0.1 to 10ms, no voltage reapplied			
$V_{F(TO)1}$	Low level value of threshold voltage	0.88	V	(16.7% × π × $I_{F(AV)}$ < I < π × $I_{F(AV)}$), $T_J = T_J$ max.			
$V_{F(TO)2}$	High level value of threshold voltage	0.97		(I > π × $I_{F(AV)}$), $T_J = T_J$ max.			
r_{f1}	Low level value of forward slope resistance	0.78	mΩ	(16.7% × π × $I_{F(AV)}$ < I < π × $I_{F(AV)}$), $T_J = T_J$ max.			
r_{f2}	High level value of forward slope resistance	0.72		(I > π × $I_{F(AV)}$), $T_J = T_J$ 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 $\pm 10\%$	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	$T_J = T_J \text{ max.}$
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

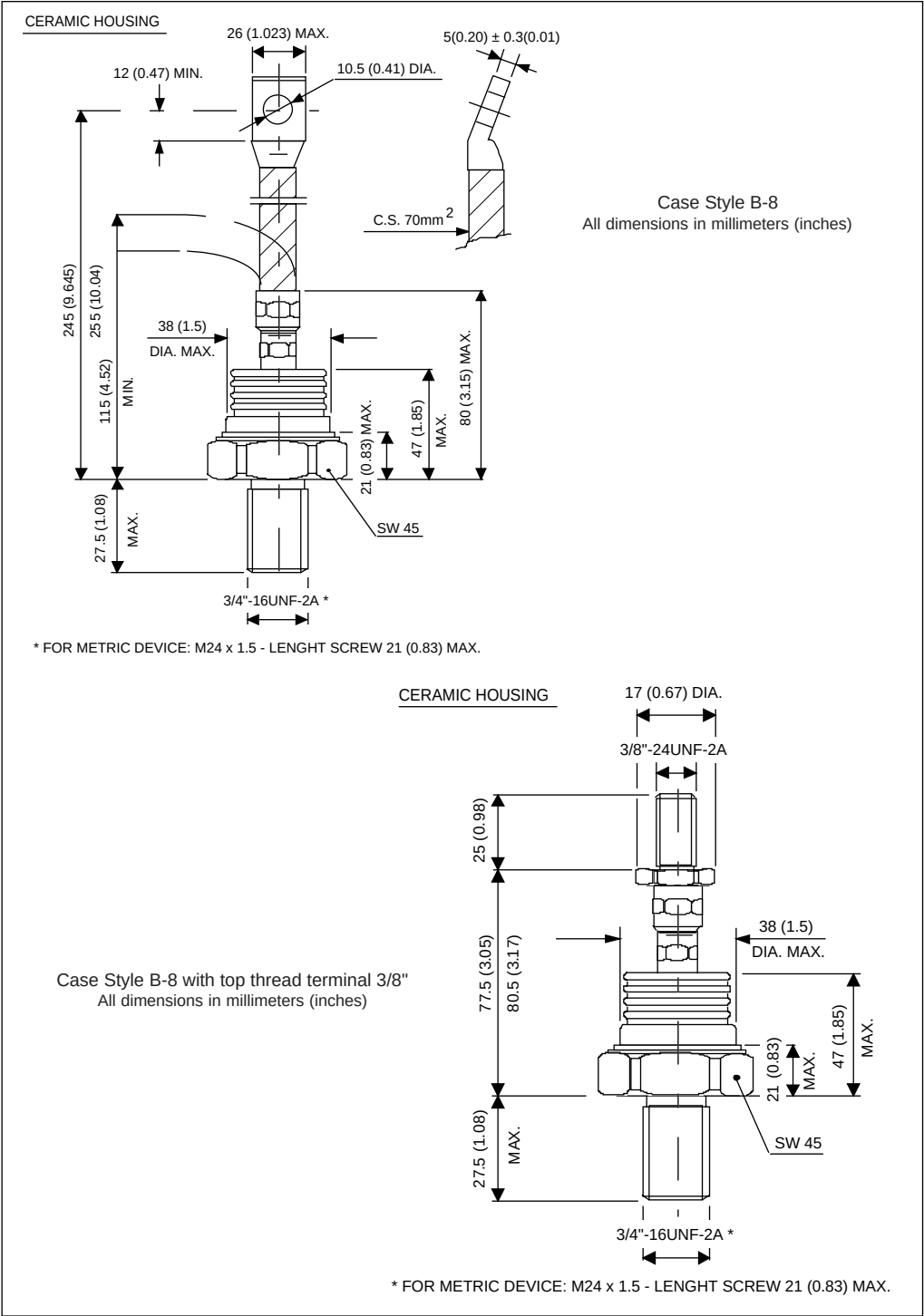
- 1** - Diode
- 2** - Essential part number
- 3** - 0 = Standard recovery
- 4** - N = Stud Normal Polarity (Cathode to Stud)
R = Stud Reverse Polarity (Anode to Stud)
- 5** - Voltage code: Code x 100 = V_{RRM} (See Voltage Ratings table)
- 6** - P = Stud base B-8 3/4" 16UNF-2A
M = Stud base B-8 M24 X 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)

SD500N/R Series

Bulletin I2095 rev. A 08/94

Outlines Table



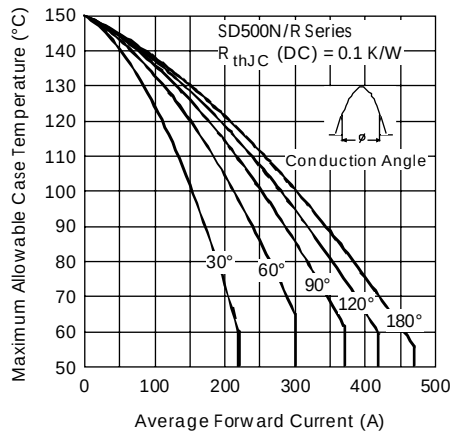


Fig. 1 - Current Ratings Characteristics

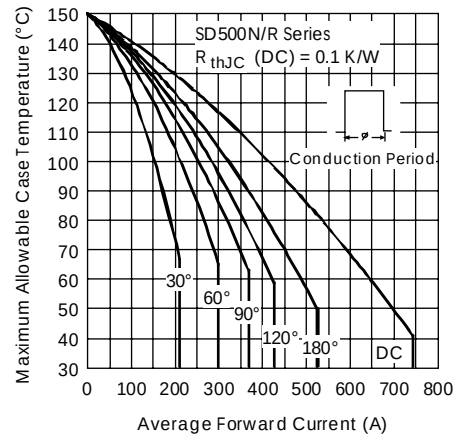


Fig. 2 - Current Ratings Characteristics

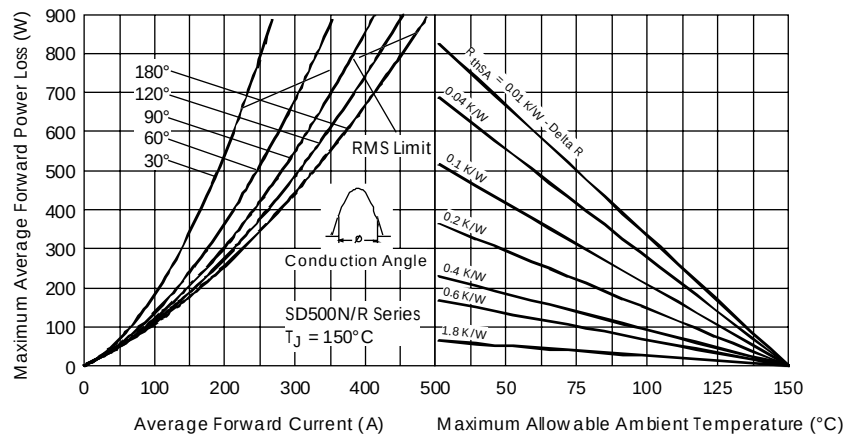


Fig. 3 - Forward Power Loss Characteristics

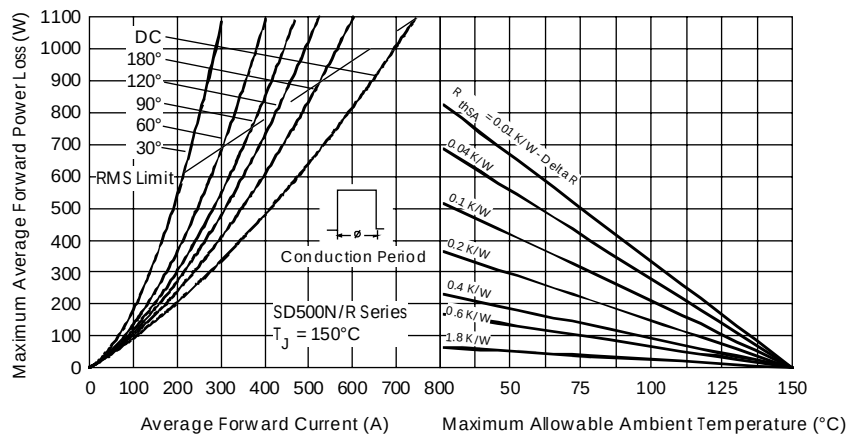


Fig. 4 - Forward Power Loss Characteristics

SD500N/R Series

Bulletin I2095 rev. A 08/94

International
IR Rectifier

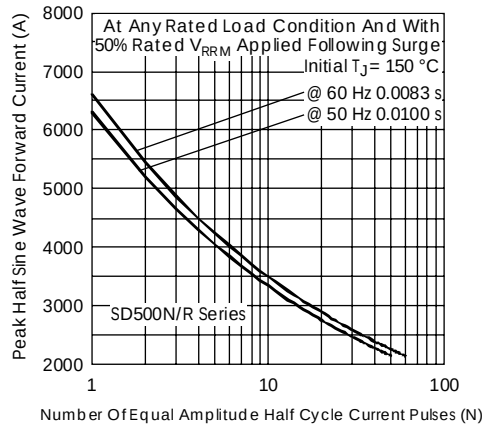


Fig. 5 - Maximum Non-Repetitive Surge Current

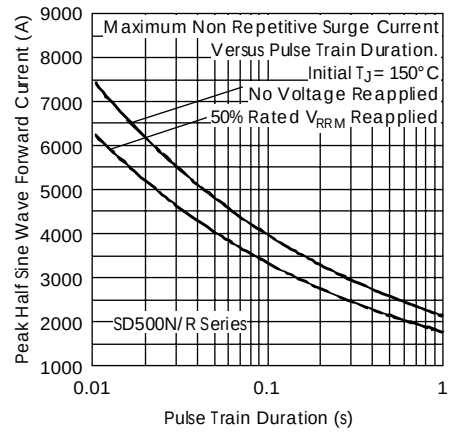


Fig. 6 - Maximum Non-Repetitive Surge Current

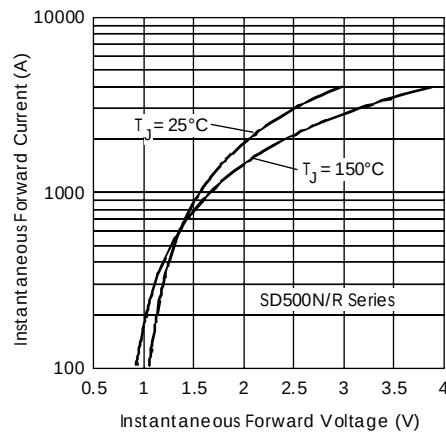


Fig. 7 - Forward Voltage Drop Characteristics

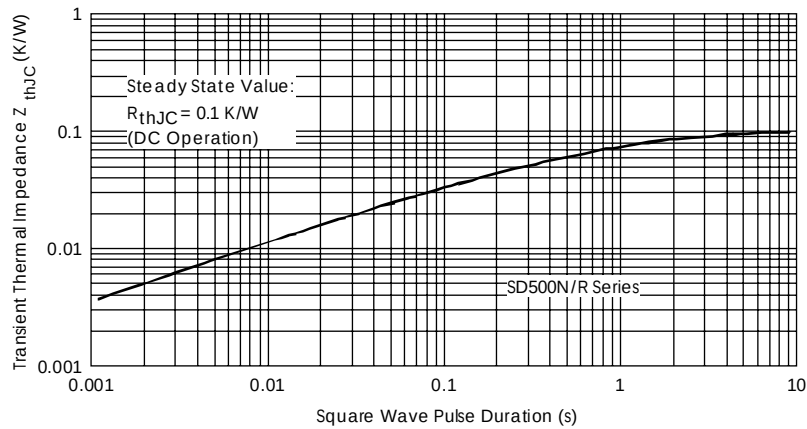


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics