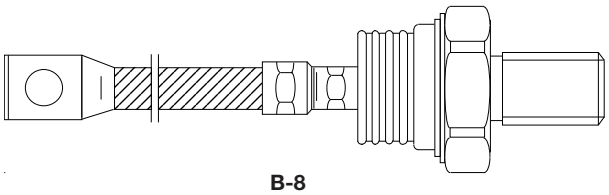
Standard Recovery Diodes, (Stud Version), 475 A



B-8

FEATURES

- Wide current range
- High voltage ratings up to 4500 V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	475 A
Package	B-8
Circuit configuration	Single

TYPICAL APPLICATIONS

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

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		475	A
	T_C	55	°C
$I_{F(RMS)}$		745	A
I_{FSM}	50 Hz	7500	A
	60 Hz	7850	
I^2t	50 Hz	281	kA^2s
	60 Hz	257	
V_{RRM}	Range	3600	V
T_J		-40 to +150	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V_{RRM}, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} MAXIMUM AT $T_J = T_J$ MAX. mA
SD500N, SD500R	36	3600	3700	50

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FORWARD CONDUCTION

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

THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	T_J		-40 to +150	°C
Maximum storage temperature range	T_{Stg}		-55 to +200	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.1	K/W
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, flat, and greased	0.04	
Max. allowed mounting torque ± 10 %		Not lubricated threads	50	Nm
Approximate weight			454	g
SD500N, SD500R		See dimensions - link at the end of datasheet	B-8	

ΔR_{thJC} CONDUCTION

CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.012	0.008	$T_J = T_J$ max.	K/W
120°	0.014	0.014		
90°	0.017	0.019		
60°	0.025	0.026		
30°	0.042	0.042		

Note

- The table above shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

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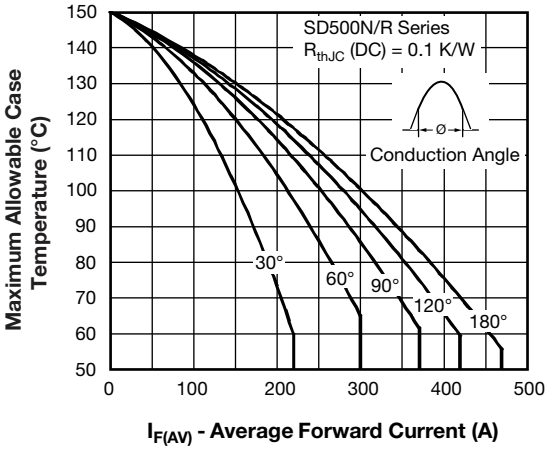

Fig. 1 - Current Ratings Characteristics

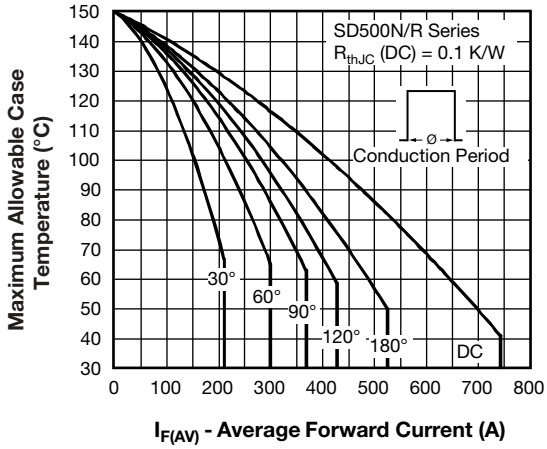

Fig. 2 - Current Ratings Characteristics

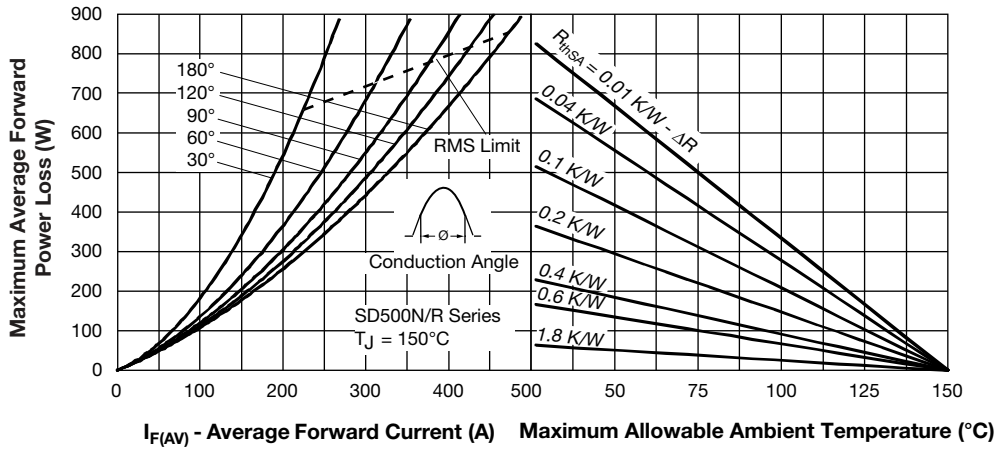

Fig. 3 - Forward Power Loss Characteristics

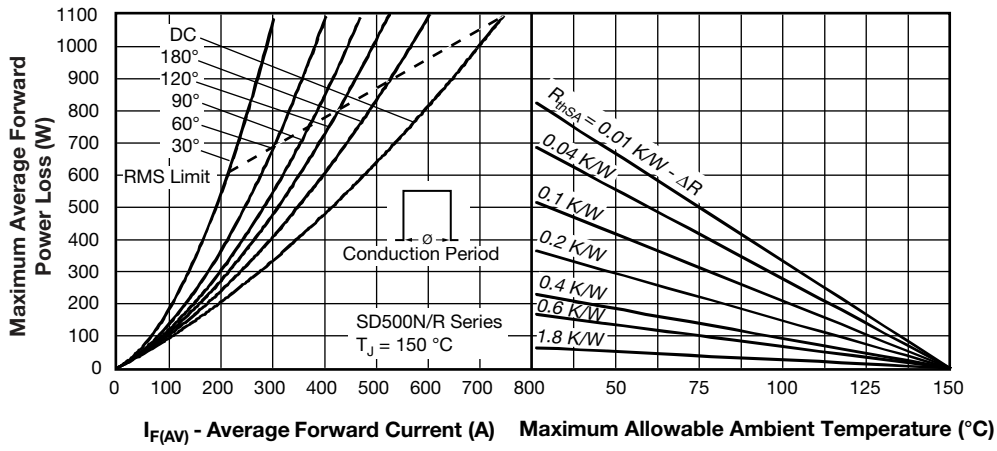

Fig. 4 - Forward Power Loss Characteristics

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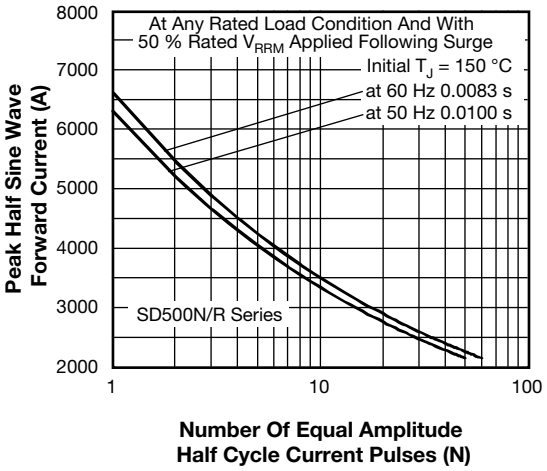

Fig. 5 - Maximum Non-Repetitive Surge Current

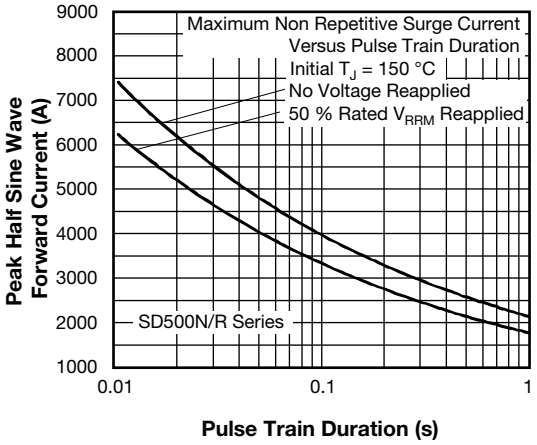

Fig. 6 - Maximum Non-Repetitive Surge Current

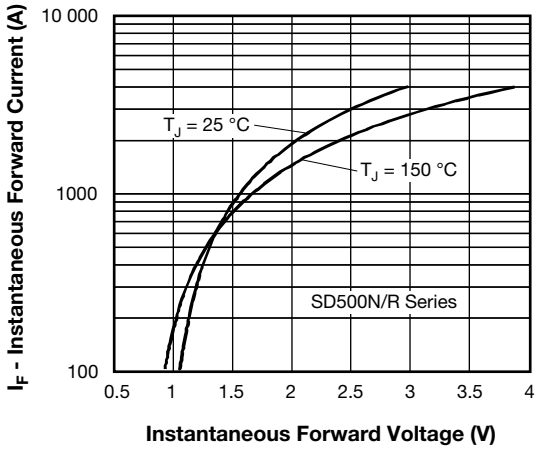

Fig. 7 - Forward Voltage Drop Characteristics

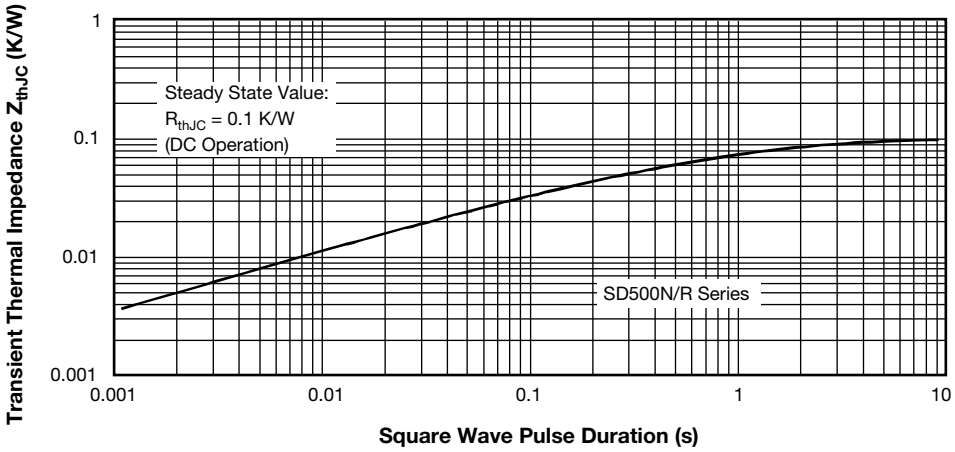

Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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ORDERING INFORMATION TABLE

Device code

VS-	SD	50	0	N	45	P	S	C
1	2	3	4	5	6	7	8	9

1 - Vishay Semiconductors product

2 - Diode

3 - Essential part number

4 - 0 = standard recovery

5 - N = stud normal polarity (cathode to stud)
R = stud reverse polarity (anode to stud)

6 - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)

7 - P = stud base B-8 3/4″ 16UNF-2A
M = stud base B-8 M24 x 1.5

8 - S = isolated lead with silicone sleeve
(red = reverse polarity; blue = normal polarity)
T = threaded top terminal 3/8″ 24UNF-2A
None = non isolated lead

9 - C = ceramic housing

Note: available for rotating applications (contact factory)

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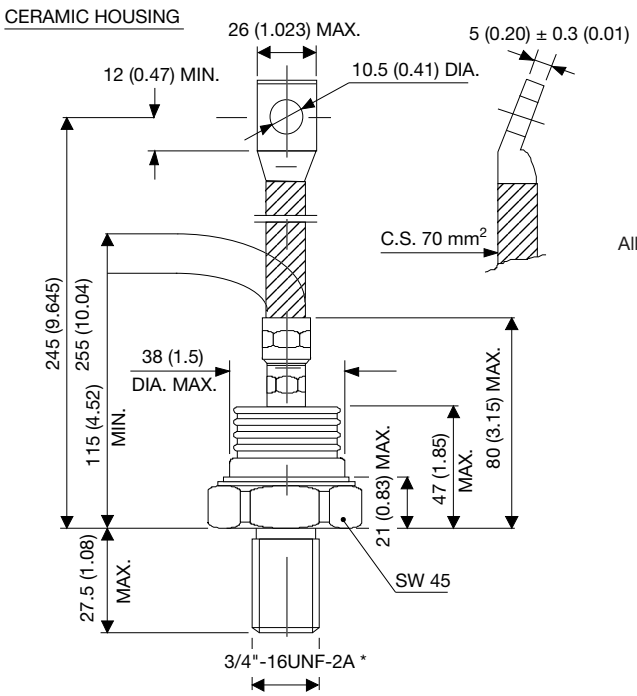
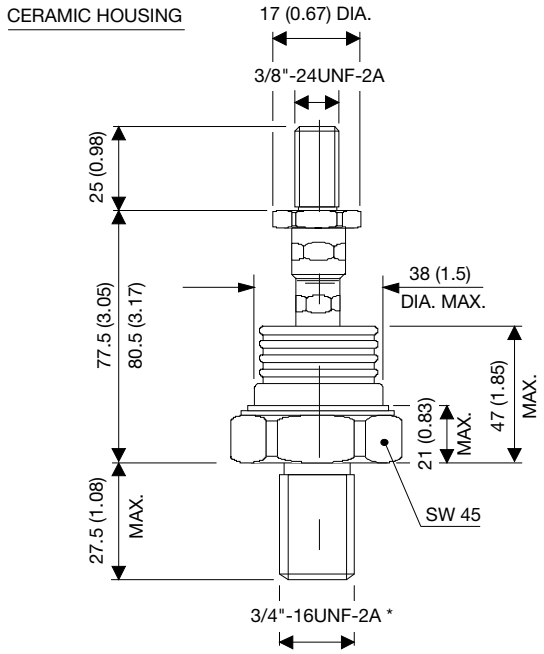
DIMENSIONS in millimeters (inches)



Case Style B-8
All dimensions in millimeters (inches)

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

Case Style B-8 with top thread terminal 3/8"
All dimensions in millimeters (inches)



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

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