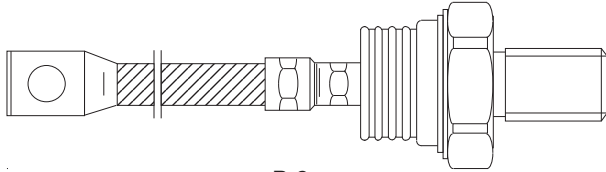


## Standard Recovery Diodes, (Stud Version), 475 A



B-8


**RoHS  
COMPLIANT**

### FEATURES

- Wide current range
- High voltage ratings up to 3600 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](http://www.vishay.com/doc?99912)

### 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 <sup>2</sup> s
	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



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	
Maximum peak, one cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reappplied	7500	A
		t = 8.3 ms		50 % $V_{RRM}$ reappplied	
		t = 10 ms	Sinusoidal half wave, initial $T_J = T_J \text{ max.}$		
		t = 8.3 ms		6600	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reappplied	281	kA <sup>2</sup> s
		t = 8.3 ms		50 % $V_{RRM}$ reappplied	
		t = 10 ms	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 reappplied		2810	kA <sup>2</sup> √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J \text{ max.}$		0.88	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J \text{ max.}$		0.97	
Low level value of forward slope resistance	$r_{f1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J \text{ max.}$		0.78	mΩ
High level value of forward slope resistance	$r_{f2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J \text{ max.}$		0.72	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 1000 \text{ A}$ , $T_J = T_J \text{ max.}$ $t_p = 10 \text{ ms}$ 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	

$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.012	0.008	$T_J = T_J \text{ max.}$	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

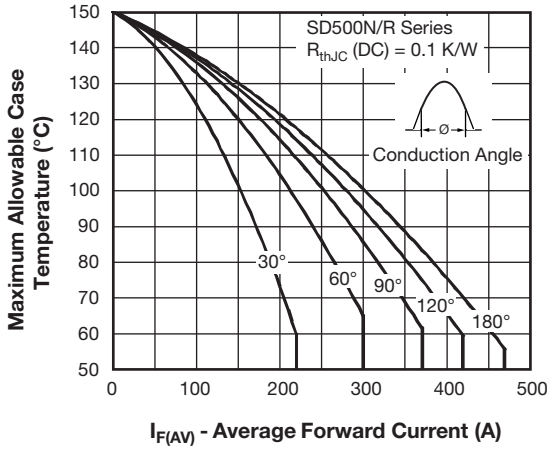


Fig. 1 - Current Ratings Characteristics

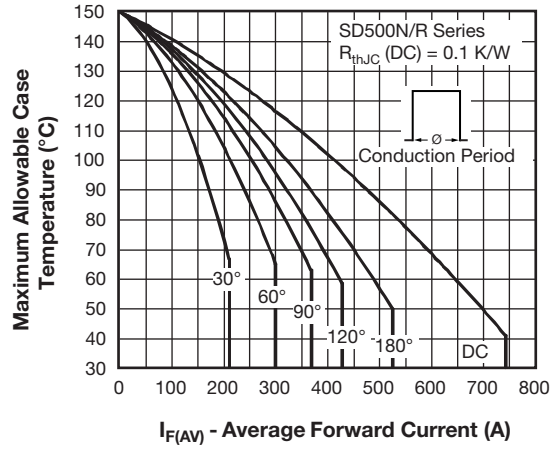


Fig. 2 - Current Ratings Characteristics

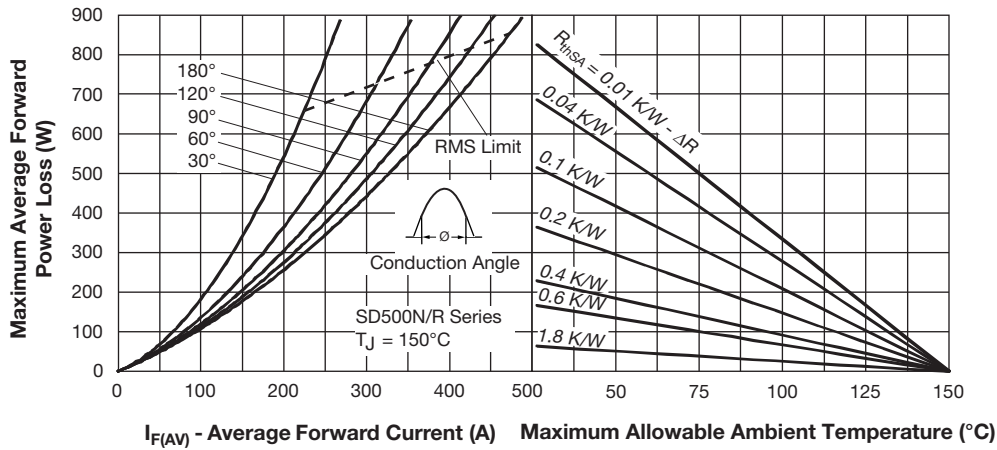


Fig. 3 - Forward Power Loss Characteristics

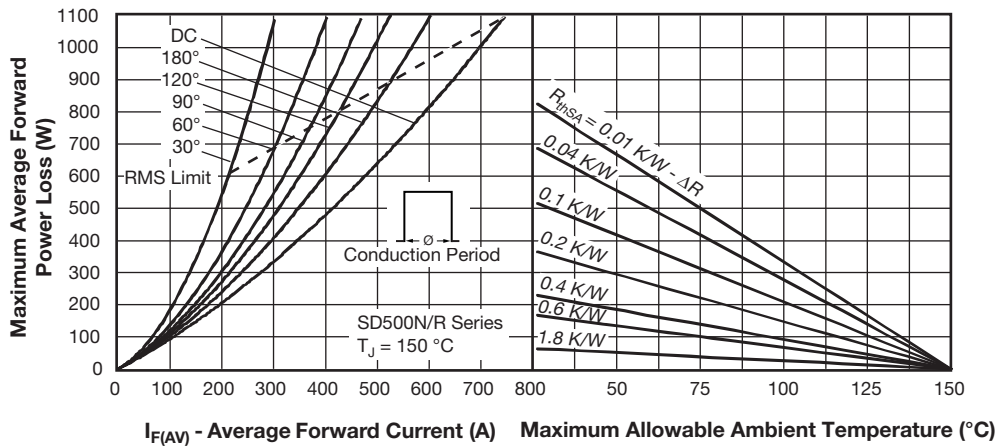


Fig. 4 - Forward Power Loss Characteristics

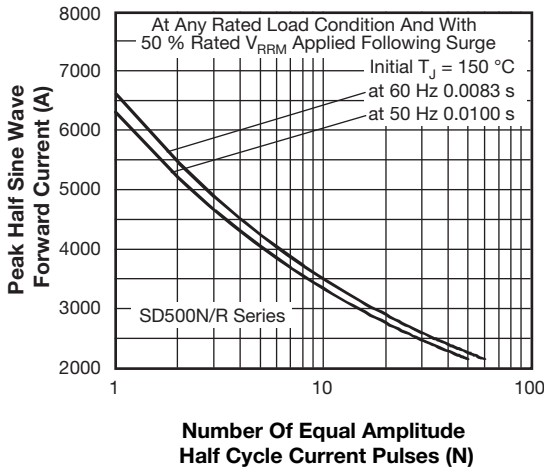


Fig. 5 - Maximum Non-Repetitive Surge Current

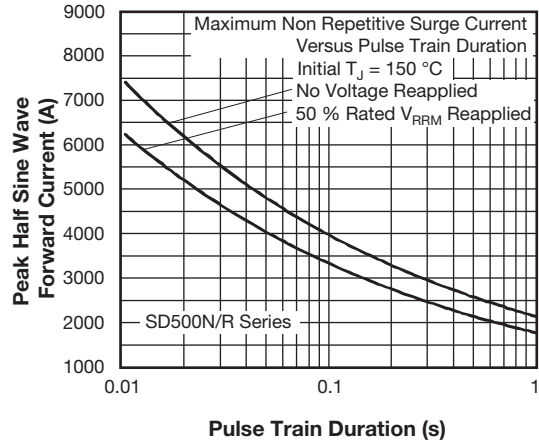


Fig. 6 - Maximum Non-Repetitive Surge Current

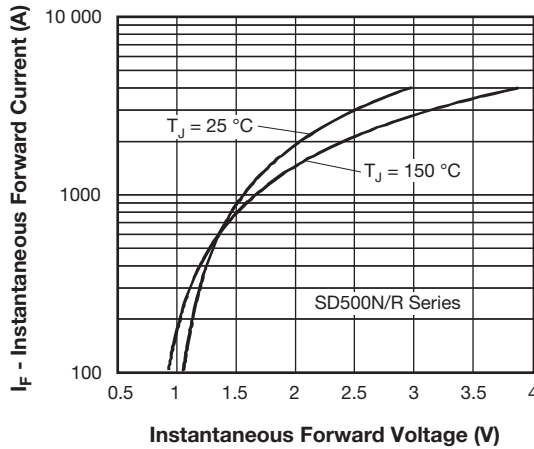


Fig. 7 - Forward Voltage Drop Characteristics

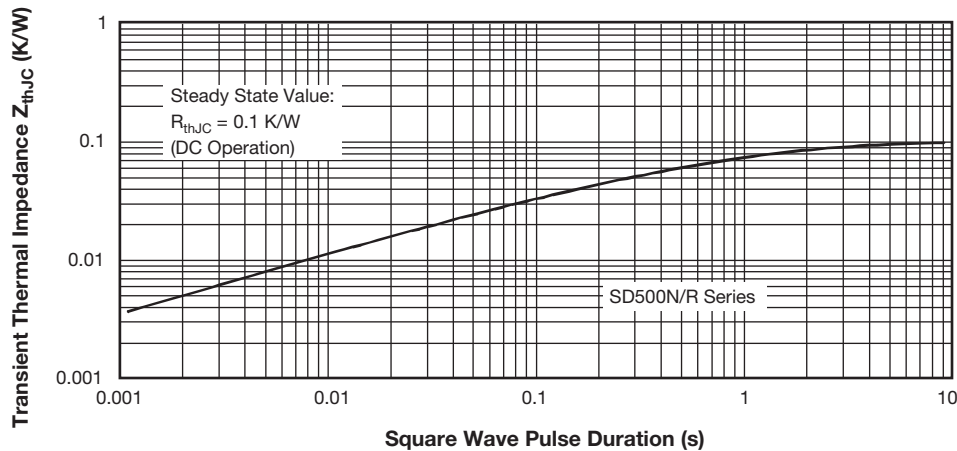


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



## ORDERING INFORMATION TABLE

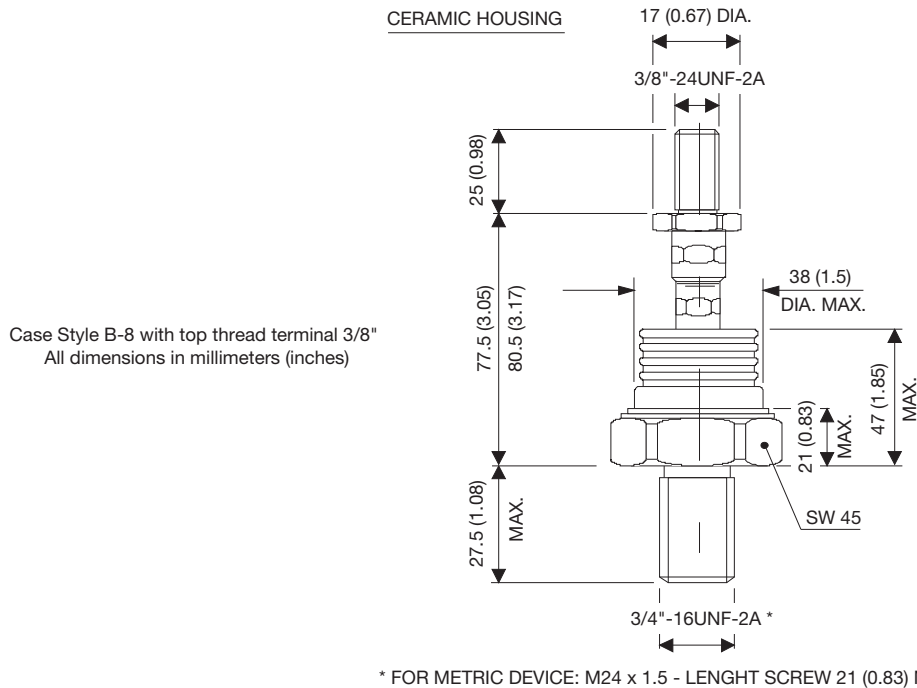
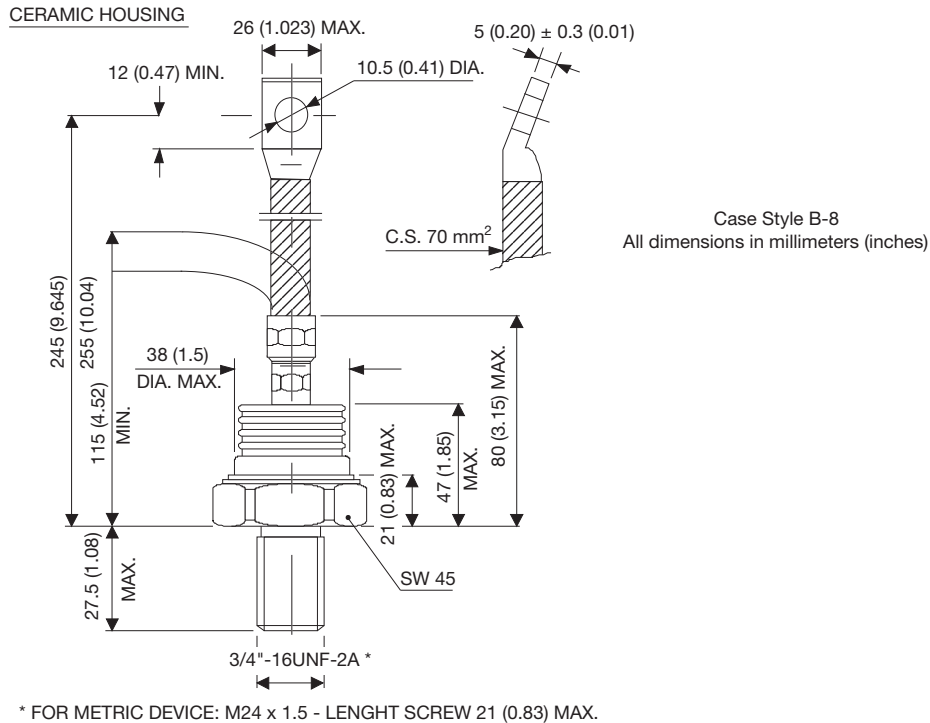
Device code	<b>VS-</b>	<b>SD</b>	<b>50</b>	<b>0</b>	<b>N</b>	<b>36</b>	<b>P</b>	<b>S</b>	<b>C</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 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)



### DIMENSIONS in millimeters (inches)





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