

## Standard Recovery Diodes (Stud Version), 600 A



B-8

### FEATURES

- Wide current range
- High voltage ratings up to 3200 V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Compression bonded encapsulations
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

$I_{F(AV)}$	600 A
Package	B-8
Circuit configuration	Single Diode

### TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	SD600N/R		UNITS
		04 to 20	22 to 32	
$I_{F(AV)}$		600	600	A
	$T_C$	92	54	°C
$I_{F(RMS)}$		940	940	A
$I_{FSM}$	50 Hz	13 000	10 500	
	60 Hz	13 600	11 000	
$I^2t$	50 Hz	845	551	kA <sup>2</sup> s
	60 Hz	772	503	
$V_{RRM}$	Range	400 to 2000	2200 to 3200	V
$T_J$		- 40 to 180	- 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 $T_J = T_J$ MAXIMUM mA
VS-SD600N/R	04	400	500	35
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
	22	2200	2300	
	28	2800	2900	
	32	3200	3300	



FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS	SD600N/R		UNITS		
			04 to 20	22 to 32			
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave	600		A		
			92	54	°C		
			570	375	A		
			100		°C		
Maximum RMS forward current	$I_{F(RMS)}$	DC at $T_C = 75\text{ °C}$ (04 to 20), $T_C = 36\text{ °C}$ (25 to 32)	940				
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	Sinusoidal half wave, initial $T_J = T_J$ maximum	t = 10 ms	No voltage reapplied	13 000	10 500	A
			t = 8.3 ms	No voltage reapplied	13 600	11 000	
			t = 10 ms	100 % $V_{RRM}$ reapplied	10 900	8830	
			t = 8.3 ms	100 % $V_{RRM}$ reapplied	11 450	9250	
Maximum $I^2t$ for fusing	$I^2t$	Sinusoidal half wave, initial $T_J = T_J$ maximum	t = 10 ms	No voltage reapplied	845	551	kA <sup>2</sup> s
			t = 8.3 ms	No voltage reapplied	772	503	
			t = 10 ms	100 % $V_{RRM}$ reapplied	598	390	
			t = 8.3 ms	100 % $V_{RRM}$ reapplied	546	356	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied	8450	5510	kA <sup>2</sup> √s		
Low level value of threshold voltage	$V_{F(TO)1}$	( $16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum	0.78	0.84	V		
High level value of threshold voltage	$V_{F(TO)2}$	( $I > \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum	0.87	0.88			
Low level value of forward slope resistance	$r_{f1}$	( $16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum	0.35	0.40	mW		
High level value of forward slope resistance	$r_{f2}$	( $I > \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum	0.31	0.38			
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 1500\text{ A}$ , $T_J = T_J$ maximum, $t_p = 10\text{ ms}$ sinusoidal wave	1.31	1.44	V		

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	SD600N/R		UNITS
			04 to 20	22 to 32	
Maximum junction operating temperature range	$T_J$		- 40 to 180	- 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		
Maximum allowed mounting torque ± 10 %		Not-lubricated threads	50		Nm
Approximate weight			454		g
Case style		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	$T_J = T_J$ maximum	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. 3 - Current Ratings Characteristics



Fig. 2 - Current Ratings Characteristics



Fig. 4 - Current Ratings Characteristics



Fig. 5 - Forward Power Loss Characteristics



Fig. 6 - Forward Power Loss Characteristics



Fig. 7 - Forward Power Loss Characteristics



Fig. 8 - Forward Power Loss Characteristics



Fig. 9 - Maximum Non-Repetitive Surge Current

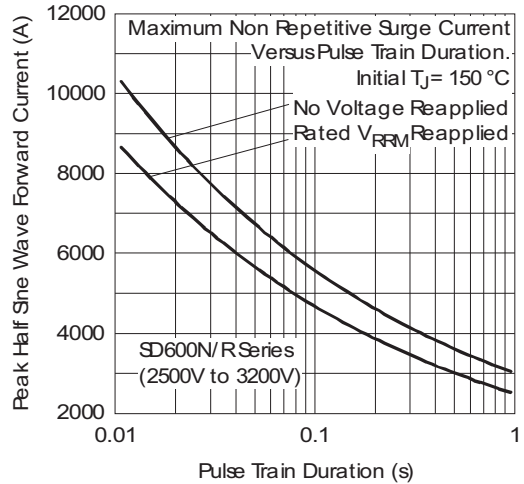


Fig. 12 - Maximum Non-Repetitive Surge Current



Fig. 10 - Maximum Non-Repetitive Surge Current

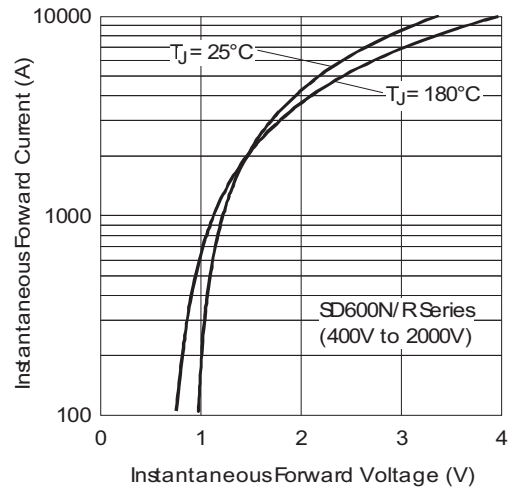


Fig. 13 - Forward Voltage Drop Characteristics



Fig. 11 - Maximum Non-Repetitive Surge Current

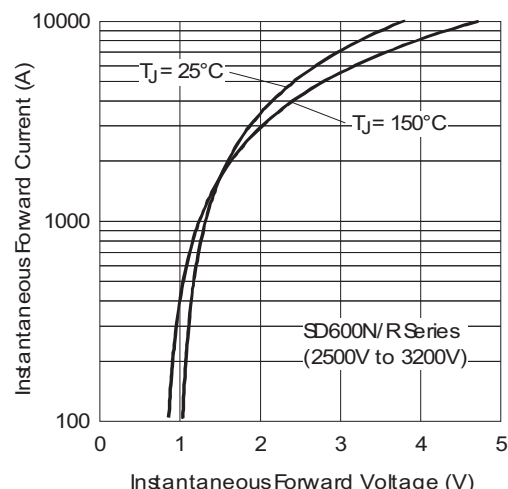


Fig. 14 - Forward Voltage Drop Characteristics



Fig. 15 - Thermal Impedance  $Z_{thJC}$  Characteristics

### ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>SD</b>	<b>60</b>	<b>0</b>	<b>N</b>	<b>32</b>	<b>P</b>	<b>C</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 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
- 8** - C = Ceramic cap

For metric device M24 x 1.5 contact factory

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95303">www.vishay.com/doc?95303</a>

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**DIMENSIONS** in millimeters (inches)



\*For metric device: M24 x 1.5 - length 21 (0.83) MAX.  
contact factory



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