

## Fast Recovery Diodes (Hockey PUK Version), 560 A


**B-PUK (DO-200AB)**

**RoHS  
COMPLIANT**
**FEATURES**

- High power fast recovery diode series
- 6.0  $\mu$ s recovery time
- High voltage ratings up to 4500 V
- High current capability
- Optimized turn-on and turn-off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press PUK encapsulation
- Case style conform to JEDEC® B-PUK (DO-200AB)
- Maximum junction temperature 125 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**TYPICAL APPLICATIONS**

- Snubber diode for GTO
- High voltage freewheeling diode
- Fast recovery rectifier applications

**PRIMARY CHARACTERISTICS**

$I_{F(AV)}$	560 A
Package	B-PUK (DO-200AB)
Circuit configuration	Single

**MAJOR RATINGS AND CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		560	A
	$T_{hs}$	55	°C
$I_{F(RMS)}$		1120	A
	$T_{hs}$	25	°C
$I_{FSM}$	50 Hz	12 000	A
	60 Hz	12 570	
$I^2t$	50 Hz	721	kA <sup>2</sup> s
	60 Hz	658	
$V_{RRM}$	Range	3000 to 4500	V
$t_{rr}$		5.0	$\mu$ s
	$T_J$	125	°C
$T_J$		-40 to +125	

**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 $T_J = 125$ °C mA
VS-SD553C..S50L	30	3000	3100	75
	36	3600	3700	
	40	4000	4100	
	45	4500	4600	



FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled		560 (210)	A
				55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled		1120	A
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reapplied	12 000	
		t = 8.3 ms	No voltage reapplied	12 570	
		t = 10 ms	50 % $V_{RRM}$ reapplied	10 100	
		t = 8.3 ms	50 % $V_{RRM}$ reapplied	10 570	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	721	kA <sup>2</sup> s
		t = 8.3 ms	No voltage reapplied	658	
		t = 10 ms	50 % $V_{RRM}$ reapplied	510	
		t = 8.3 ms	50 % $V_{RRM}$ reapplied	466	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		7210	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)		1.77	V
High level value of threshold voltage	$V_{F(TO)2}$	(1 > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		1.95	
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)		0.98	mW
High level value of forward slope resistance	$r_{f2}$	(1 > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		0.89	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 1500$ A, $T_J = 125$ °C, $t_p = 10$ ms sinusoidal wave		3.24	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT $T_J = 25$ °C	TEST CONDITIONS			TYPICAL VALUES AT $T_J = 125$ °C			
	$t_{rr}$ AT 25 % $I_{RRM}$ (μs)	$I_{pk}$ SQUARE PULSE (A)	di/dt (A/μs)	$V_r$ (V)	$t_{rr}$ AT 25 % $I_{RRM}$ (μs)	$Q_{rr}$ (μC)	$I_{rr}$ (A)	
S50	5.0	1000	100	-50	6.0	900	250	

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	$T_J$		-40 to 125	°C
Maximum storage temperature range	$T_{Stg}$		-40 to 150	
Maximum thermal resistance, junction to heatsink	$R_{thJ-hs}$	DC operation single side cooled	0.073	K/W
		DC operation double side cooled	0.031	
Mounting force, ± 10 %			14 700 (1500)	N (kg)
Approximate weight			255	g
Case style		Conforms to JEDEC®	B-PUK (DO-200AB)	

$\Delta R_{thJ-hs}$ CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.009	0.009	0.006	0.006	$T_J = T_J$ maximum	K/W
120°	0.011	0.011	0.011	0.011		
90°	0.014	0.014	0.015	0.015		
60°	0.020	0.020	0.021	0.021		
30°	0.036	0.036	0.036	0.036		

**Note**

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

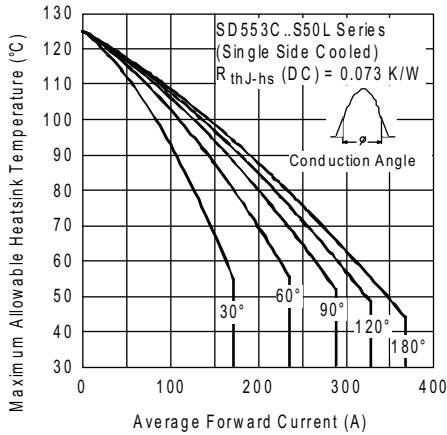


Fig. 1 - Current Ratings Characteristics

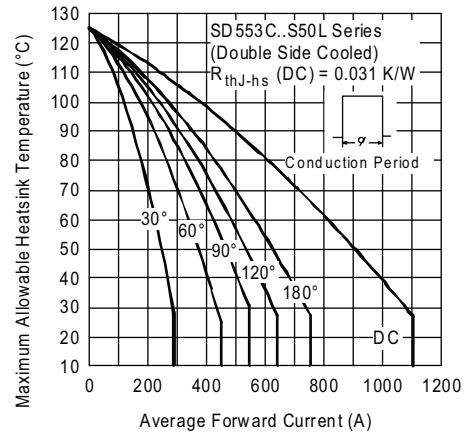


Fig. 4 - Current Ratings Characteristics

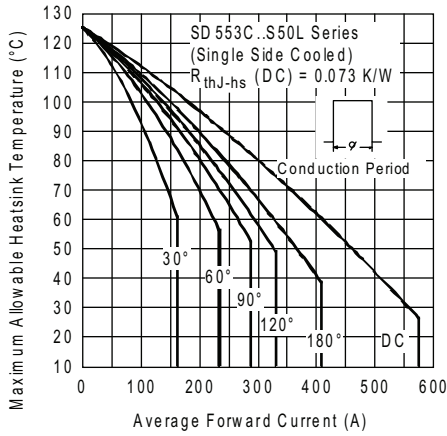


Fig. 2 - Current Ratings Characteristics

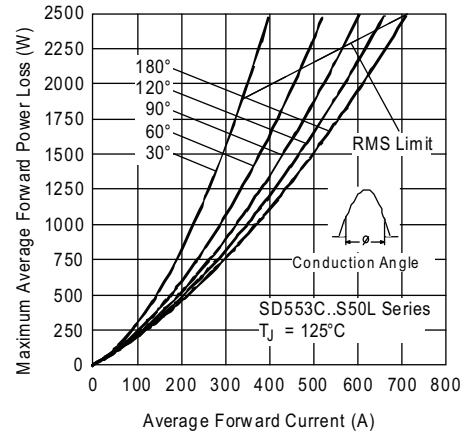


Fig. 5 - Forward Power Loss Characteristics

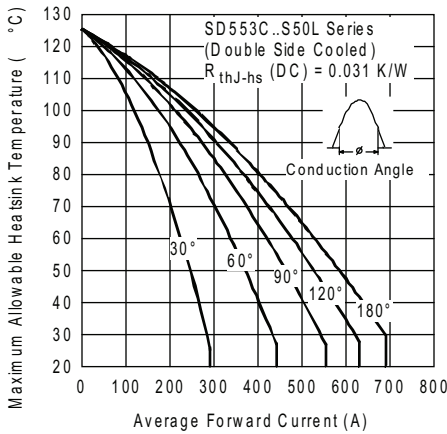


Fig. 3 - Current Ratings Characteristics

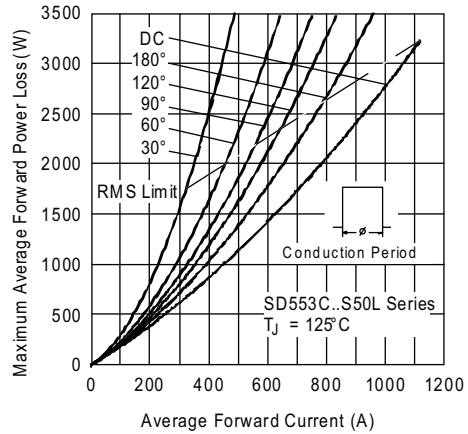


Fig. 6 - Forward Power Loss Characteristics

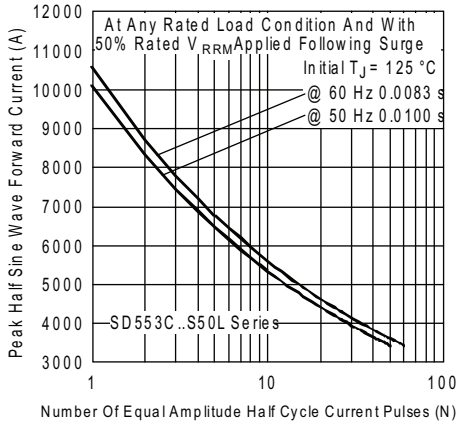


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

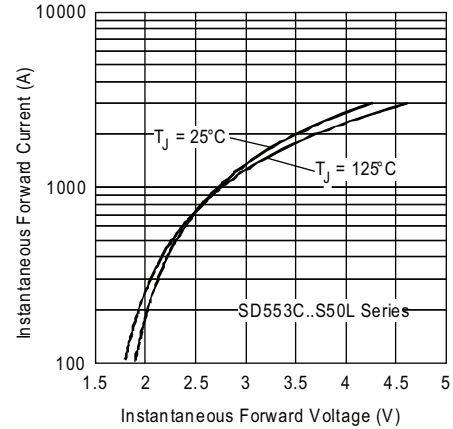


Fig. 9 - Forward Voltage Drop Characteristics

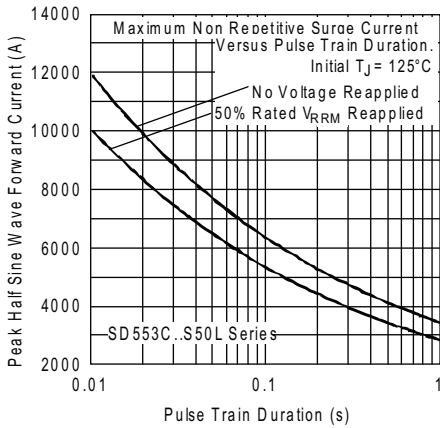


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

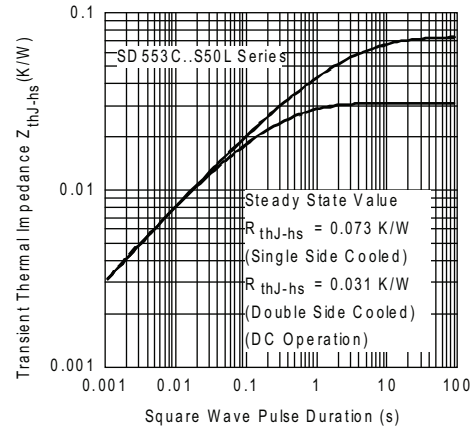


Fig. 10 - Thermal Impedance  $Z_{thj-hs}$  Characteristic

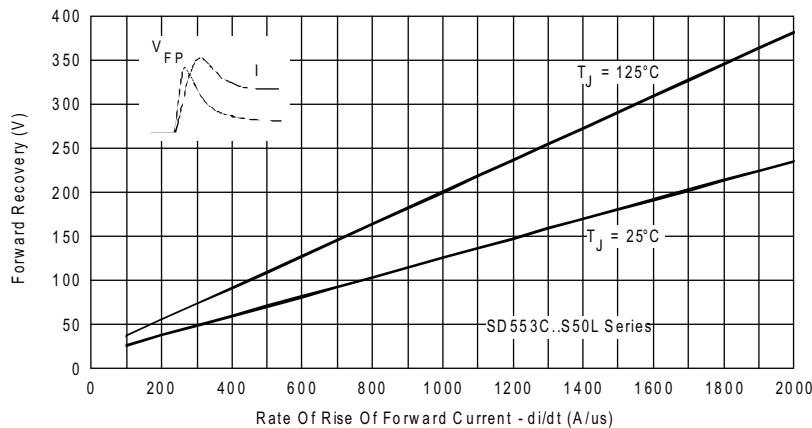


Fig. 11 - Typical Forward Recovery Characteristics

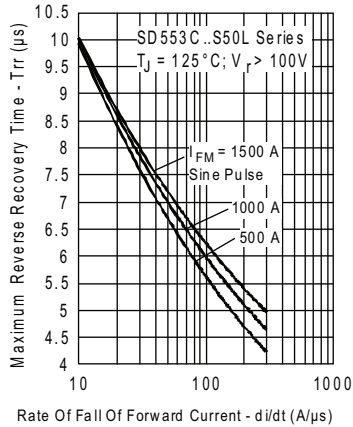


Fig. 12 - Recovery Time Characteristics

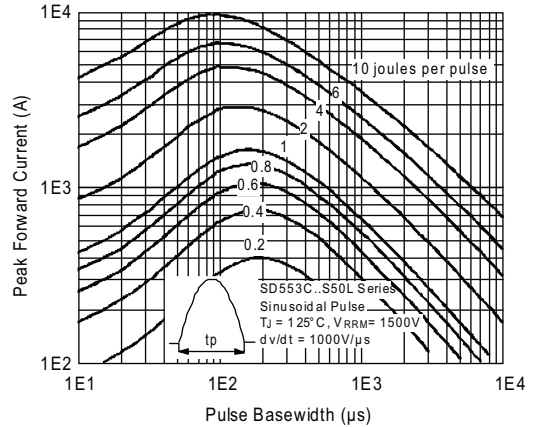


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

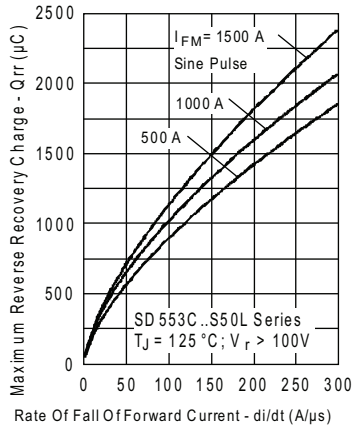


Fig. 13 - Recovery Charge Characteristics

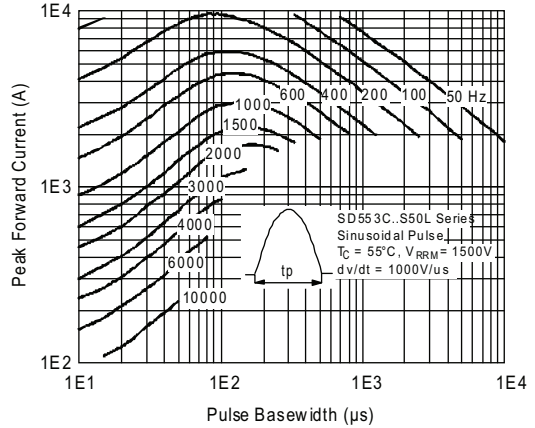


Fig. 16 - Frequency Characteristics

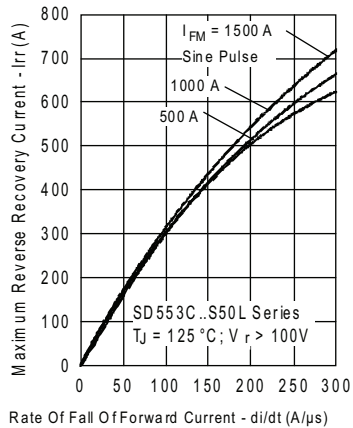


Fig. 14 - Recovery Current Characteristics

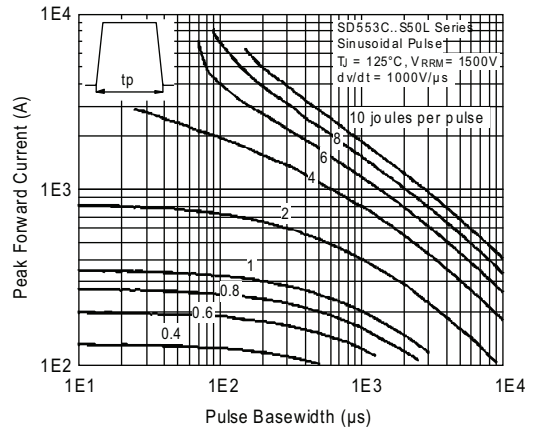


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

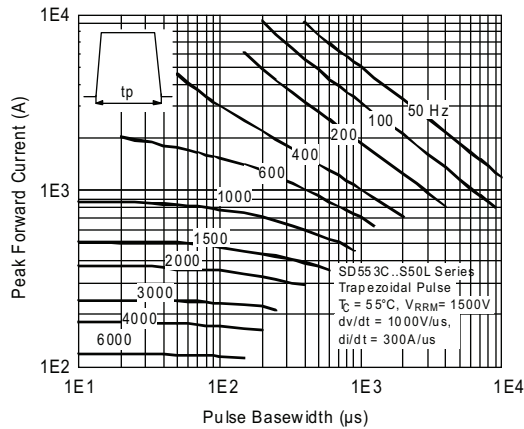


Fig. 18 - Frequency Characteristics

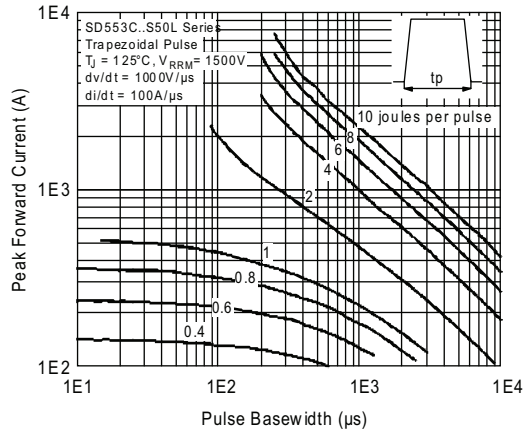


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

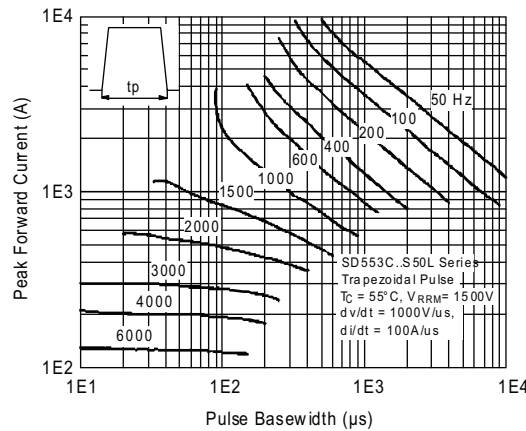


Fig. 20 - Frequency Characteristics

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>SD</b>	<b>55</b>	<b>3</b>	<b>C</b>	<b>45</b>	<b>S50</b>	<b>L</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 1** - Vishay Semiconductors product
- 2** - Diode
- 3** - Essential part number
- 4** - 3 = fast recovery
- 5** - C = ceramic PUK
- 6** - Voltage code x 100 =  $V_{RRM}$  (see Voltage Ratings table)
- 7** -  $t_{rr}$  code
- 8** - L = PUK case B-PUK (DO-200AB)

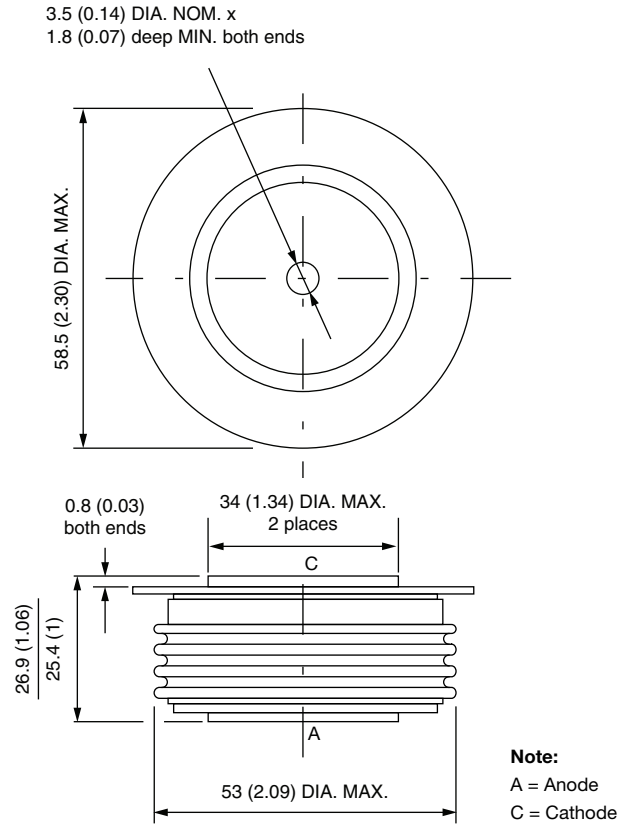
### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95246">www.vishay.com/doc?95246</a>
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## B-PUK (DO-200AB)

**DIMENSIONS** in millimeters (inches)



Quote between upper and lower pole pieces has to be considered after application of mounting force (see Thermal and Mechanical Specifications)



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