Fast Recovery Diodes (Hockey PUK Version), 560 A

B-PUK (DO-200AB)

FEATURES

- High power fast recovery diode series
- 6.0 µs 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

Pb-free

RoHS COMPLIANT

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

TYPICAL APPLICATIONS

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

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^2s
	60 Hz	658	
V_{RRM}	Range	3000 to 4500	V
t_{rr}		5.0	µs
	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	

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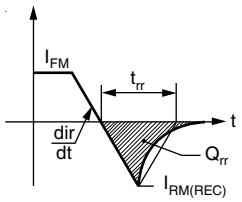
FORWARD CONDUCTION

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	Sinusoidal half wave, initial $T_J = T_J$ maximum	12 000	
		t = 8.3 ms			12 570	
		t = 10 ms	50 % V_{RRM} reapplied		10 100	
		t = 8.3 ms			10 570	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		721	kA^2s
		t = 8.3 ms			658	
		t = 10 ms	50 % V_{RRM} reapplied		510	
		t = 8.3 ms			466	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			7210	$kA^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			1.77	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			1.95	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.98	mW
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ 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)	

ΔR_{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

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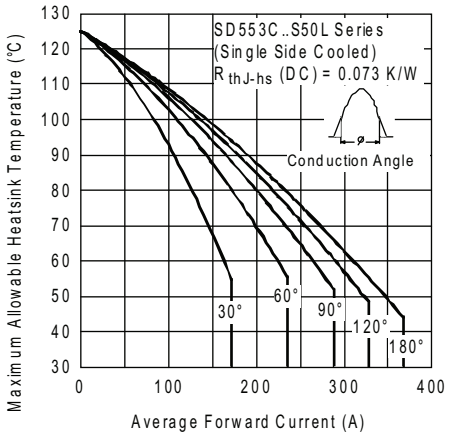

Fig. 1 - Current Ratings Characteristics

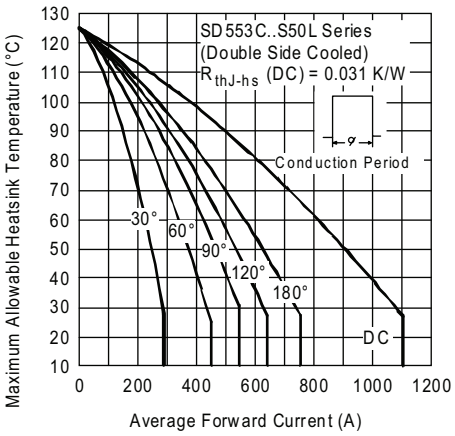

Fig. 4 - Current Ratings Characteristics

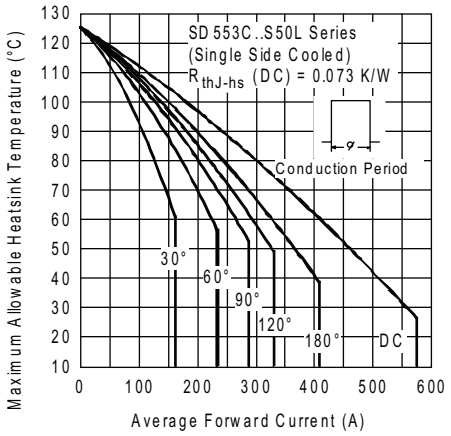

Fig. 2 - Current Ratings Characteristics

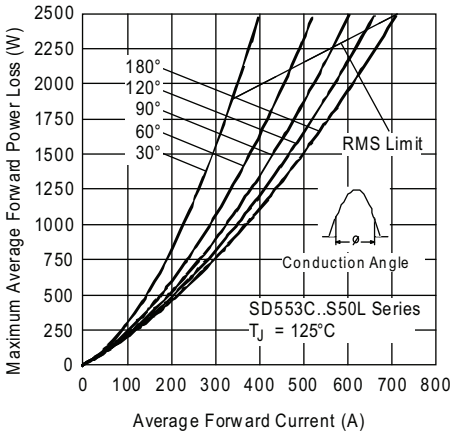

Fig. 5 - Forward Power Loss Characteristics

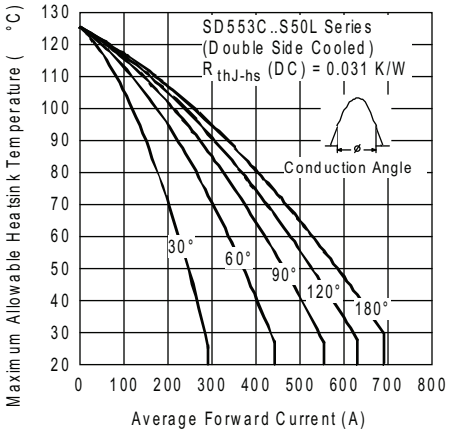

Fig. 3 - Current Ratings Characteristics

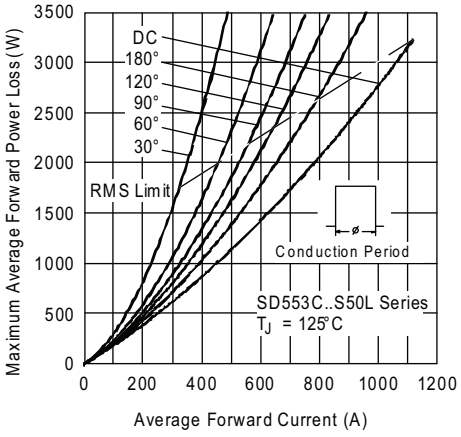

Fig. 6 - Forward Power Loss Characteristics

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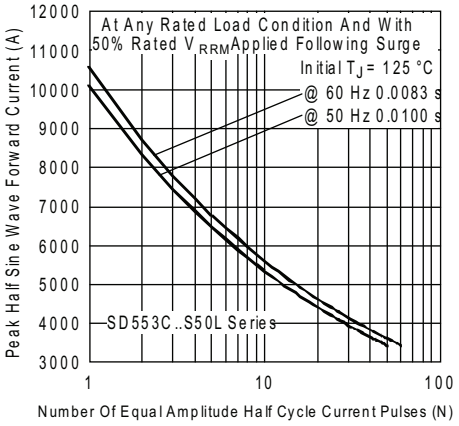

Fig. 7 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

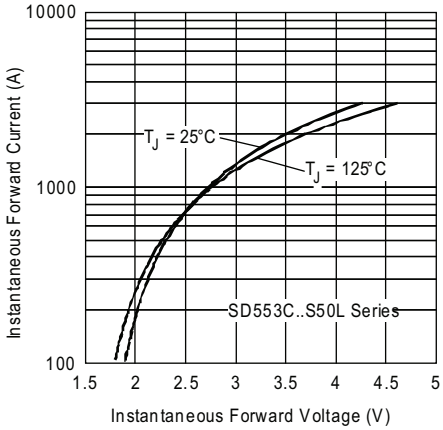

Fig. 9 - Forward Voltage Drop Characteristics

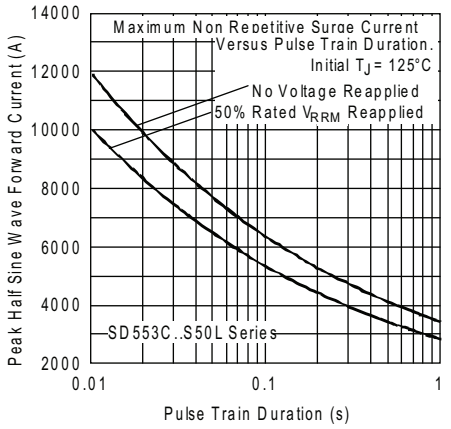

Fig. 8 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

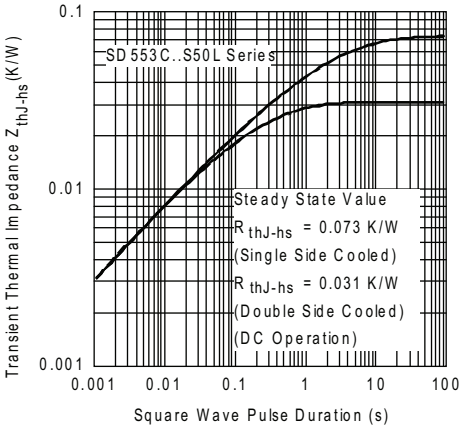

Fig. 10 - Thermal Impedance $Z_{thJ\text{-}hs}$ Characteristic

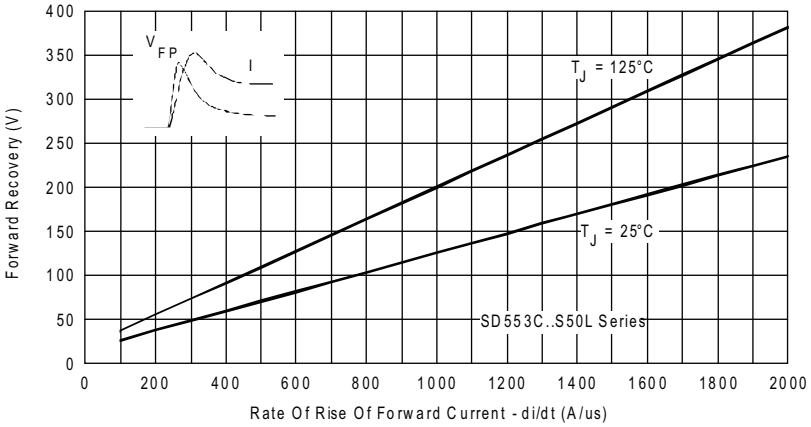

Fig. 11 - Typical Forward Recovery Characteristics

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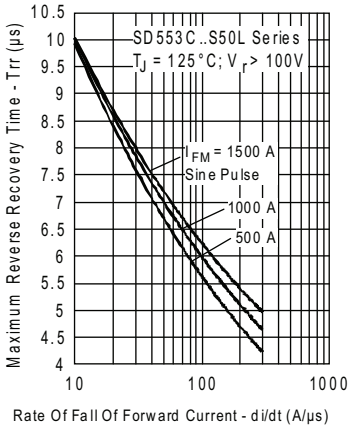

Fig. 12 - Recovery Time Characteristics

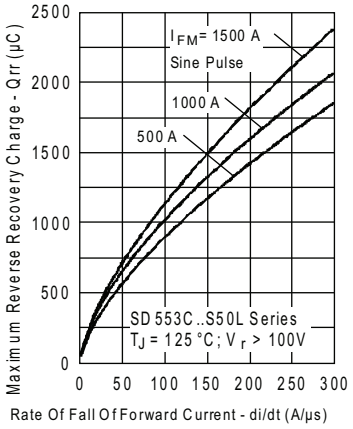

Fig. 13 - Recovery Charge Characteristics

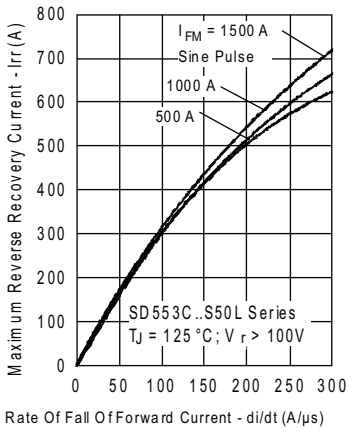

Fig. 14 - Recovery Current Characteristics

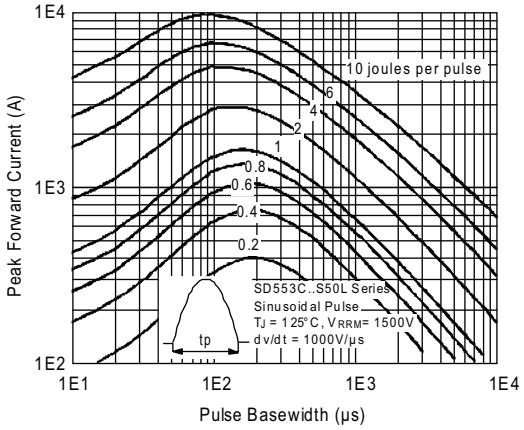

Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

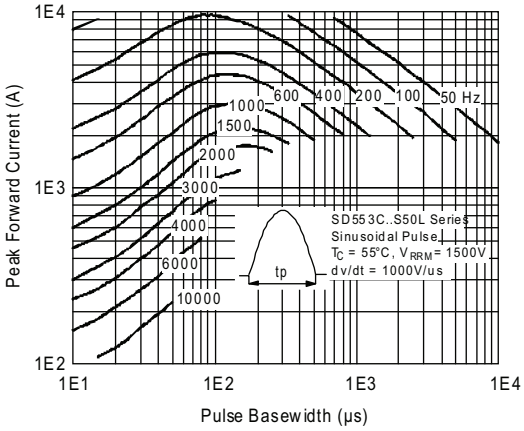

Fig. 16 - Frequency Characteristics

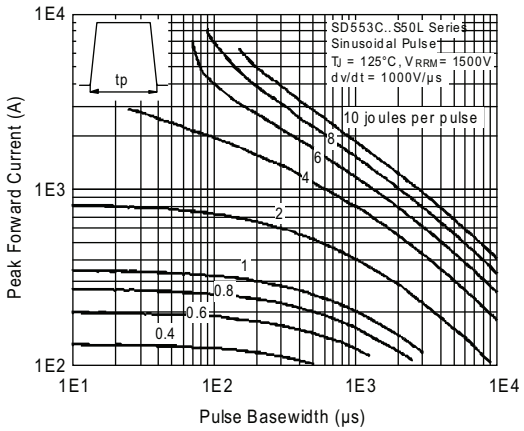

Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

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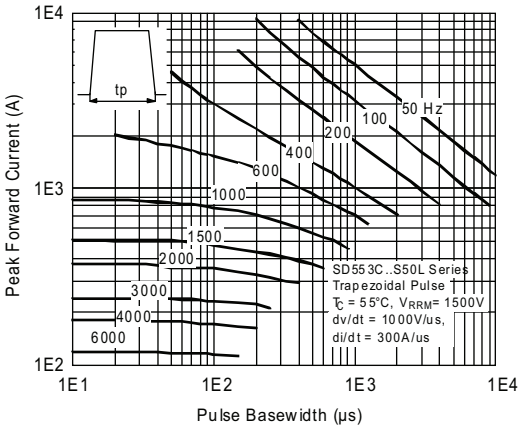

Fig. 18 - Frequency Characteristics

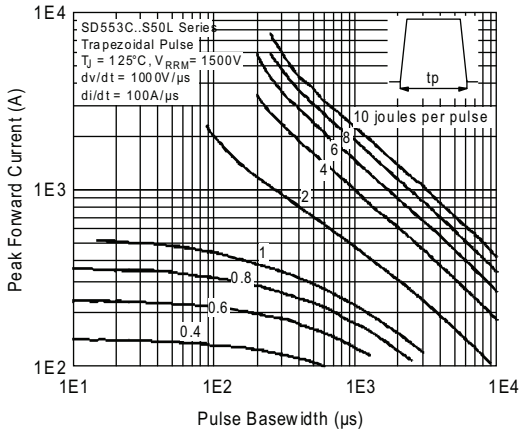

Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

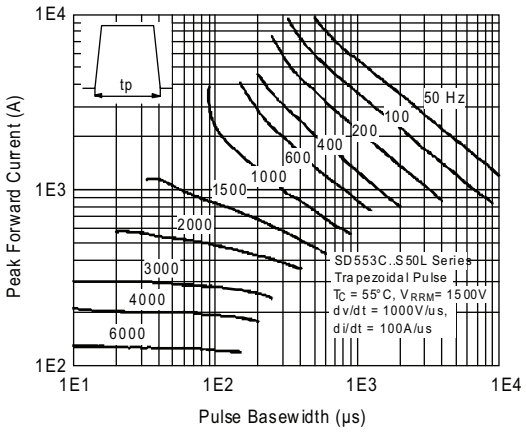

Fig. 20 - Frequency Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	SD	55	3	C	45	S50	L
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	www.vishay.com/doc?95246

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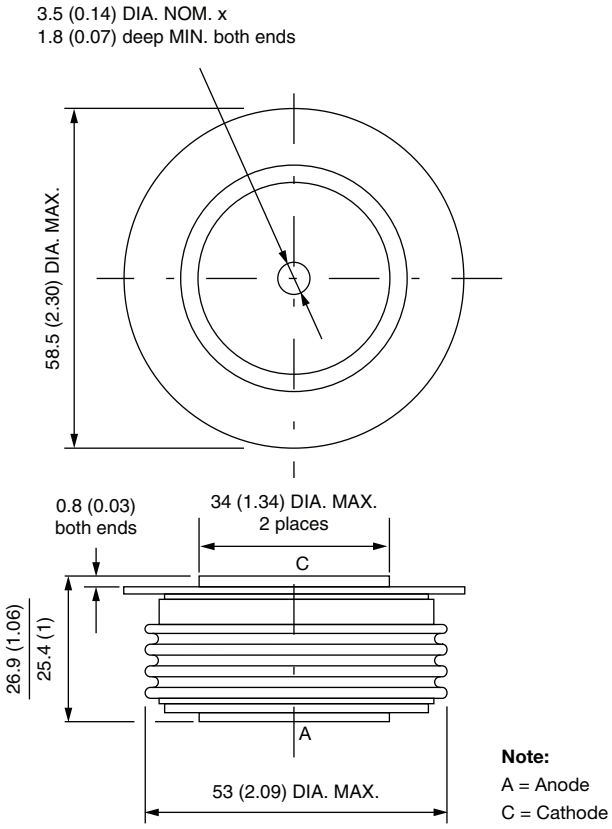
B-PUK (DO-200AB)

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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