Fast Recovery Diodes (Hockey PUK Version), 1650/1825 A

DO-200AC (K-PUK)

PRODUCT SUMMARY	
$I_{F(AV)}$	1650/1825 A
Package	DO-200AC (K-PUK)
Circuit configuration	Single diode

FEATURES

- High power FAST recovery diode series
- 2.0 μs to 3.0 μs recovery time
- High voltage ratings up to 3000 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® DO-200AC (K-PUK)
- Maximum junction temperature 150 °C
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS
COMPLIANT

TYPICAL APPLICATIONS

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

MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	SD1553C..K		UNITS
		S20	S30	
$I_{F(AV)}$		1825	1650	A
	T_{hs}	55	55	°C
$I_{F(RMS)}$		3100	2800	A
I_{FSM}	50 Hz	25 000	22 000	
	60 Hz	26 180	23 000	
V_{RRM}	Range	1800 to 2500	1800 to 3000	V
t_{rr}		2.0	3.0	μs
	T_J	25		°C
T_J		-40 to 150		

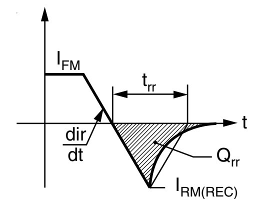
ELECTRICAL SPECIFICATIONS

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-SD1553C..S20K	18	1800	1900	75
	22	2200	2300	
	25	2500	2600	
VS-SD1553C..S30K	18	1800	1900	
	22	2200	2300	
	25	2500	2600	
	28	2800	2900	
	30	3000	3100	

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			SD1553C..K		UNITS
					S20	S30	
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled			1825 (865)	1650 (790)	A
					55 (85)	55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled			3100	2800	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	25 000	22 000	
		t = 8.3 ms			26 180	23 000	
		t = 10 ms	100 % V_{RRM} reapplied		21 030	18 500	
		t = 8.3 ms			22 010	19 370	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		3126	2421	kA^2s
		t = 8.3 ms			2854	2210	
		t = 10 ms	100 % V_{RRM} reapplied		2210	1712	
		t = 8.3 ms			2018	1563	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			31 260	24 210	$kA^2\sqrt{s}$
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			1.15	1.31	V
High level value of threshold voltage	$V_{F(TO)2}$	($I >$ π x $I_{F(AV)}$), $T_J = T_J$ maximum			1.29	1.45	
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			0.27	0.32	mW
High level value of forward slope resistance	r_{f2}	($I >$ π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.25	0.30	
Maximum forward voltage drop	V_{FM}	I_{pk} = 4000 A, $T_J = T_J$ maximum, t_p = 10 ms sinusoidal wave			2.23	2.60	V

RECOVERY CHARACTERISTICS

CODE	MAXIMUM VALUE AT T_J = 25 °C	TEST CONDITIONS			TYPICAL VALUES AT T_J = 150 °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)	
S20	2.0	1000	100	- 50	4.5	650	240	
S30	3.0				5.0	780	260	

THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating and storage temperature range	T_J, T_{Stg}		-40 to 150	°C
Maximum thermal resistance, case junction to heatsink	R_{thJ-hs}	DC operation single side cooled	0.04	K/W
		DC operation double side cooled	0.02	
Mounting force, ± 10 %			22 250 (2250)	N (kg)
Approximate weight			425	g
Case style		See dimensions - link at the end of datasheet	DO-200AC (K-PUK)	

ΔR_{thJ-hs} CONDUCTION

CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.0018	0.0019	0.0012	0.0012	$T_J = T_J$ maximum	K/W
120°	0.0021	0.0021	0.0021	0.0021		
90°	0.0027	0.0027	0.0029	0.0029		
60°	0.0039	0.0039	0.0041	0.0041		
30°	0.0067	0.0067	0.0068	0.0068		

Note

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

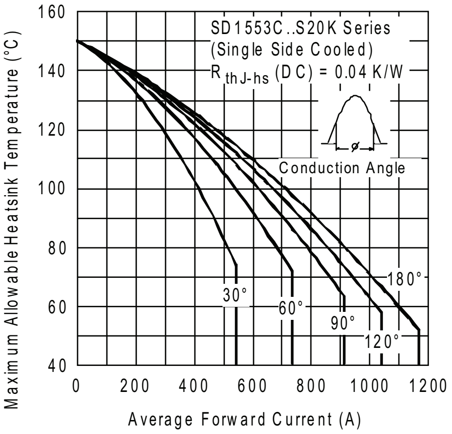


Fig. 1 - Current Ratings Characteristics

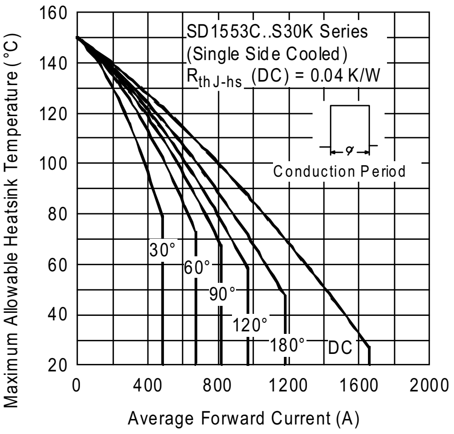


Fig. 4 - Current Ratings Characteristics

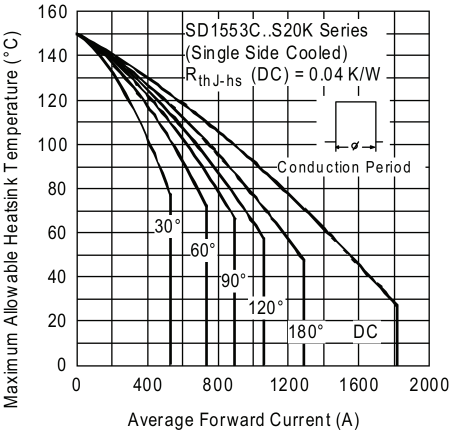


Fig. 2 - Current Ratings Characteristics

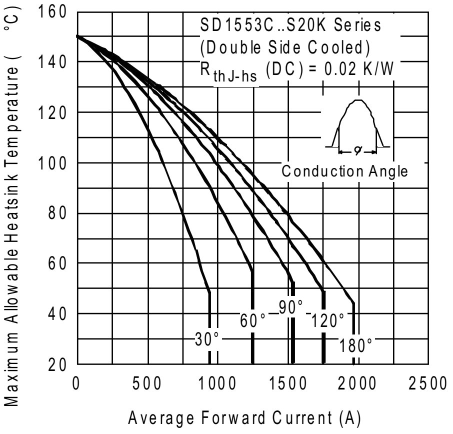


Fig. 5 - Current Ratings Characteristics

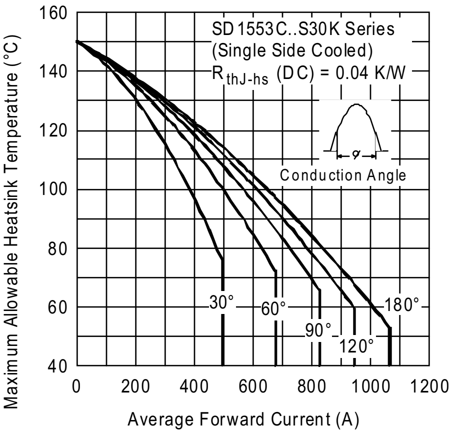


Fig. 3 - Current Ratings Characteristics

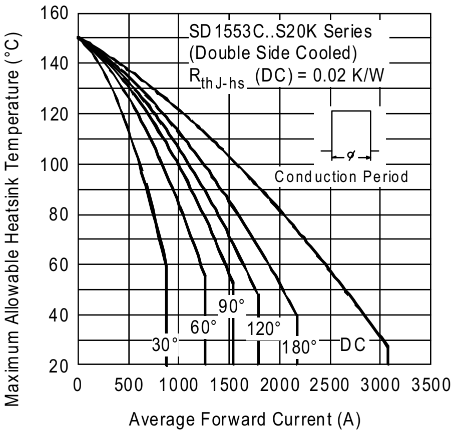


Fig. 6 - Current Ratings Characteristics

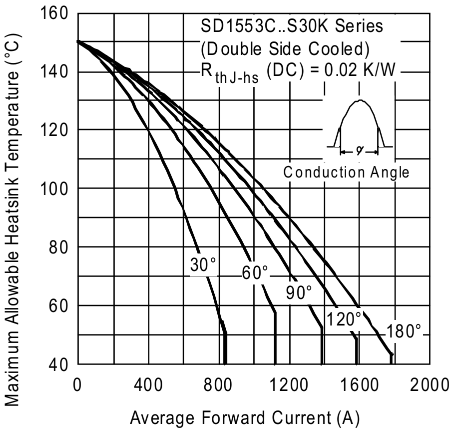


Fig. 7 - Current Ratings Characteristics

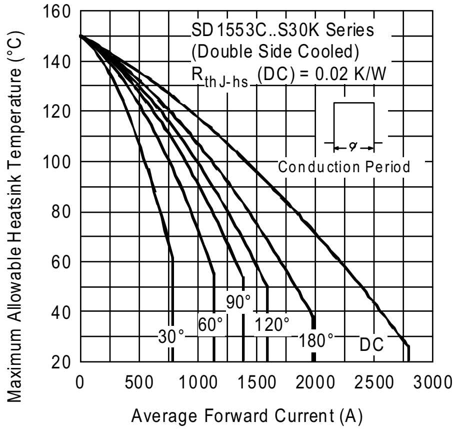


Fig. 8 - Current Ratings Characteristics

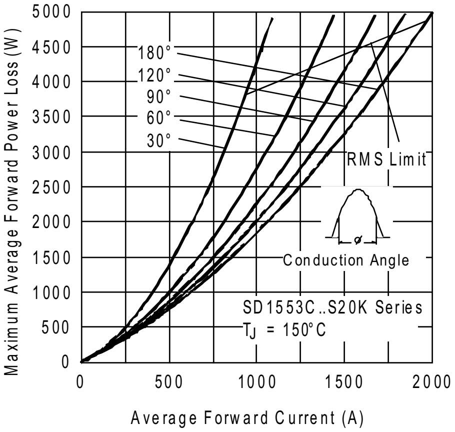


Fig. 9 - Forward Power Loss Characteristics

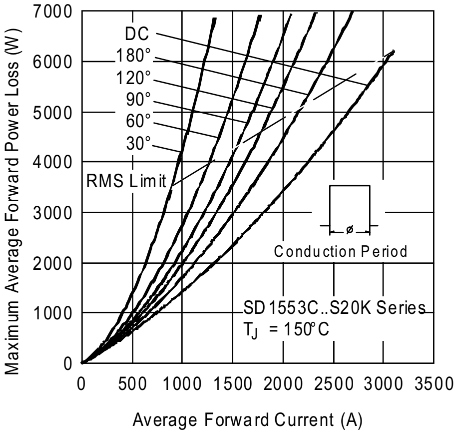


Fig. 10 - Forward Power Loss Characteristics

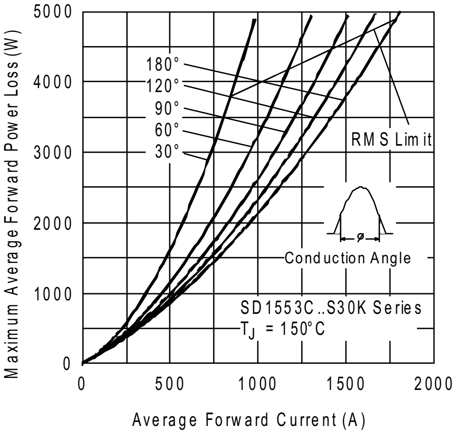


Fig. 11 - Forward Power Loss Characteristics

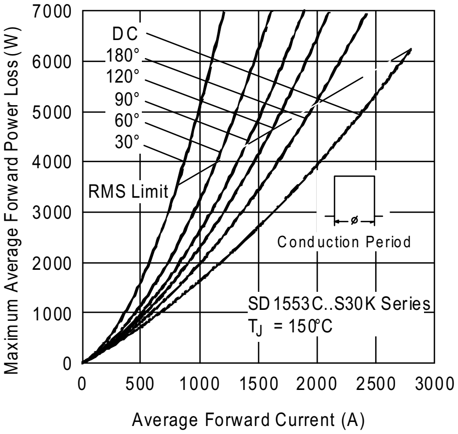


Fig. 12 - Forward Power Loss Characteristics

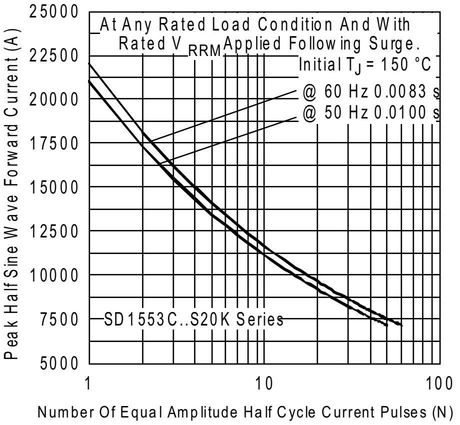


Fig. 13 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

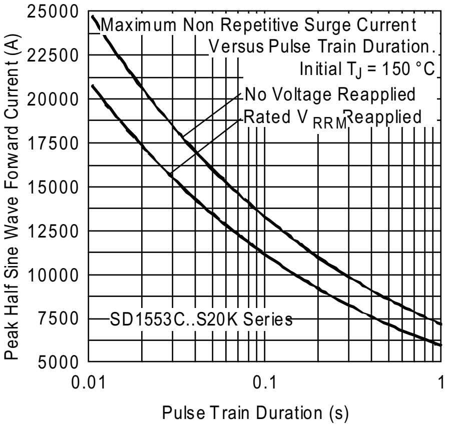


Fig. 14 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

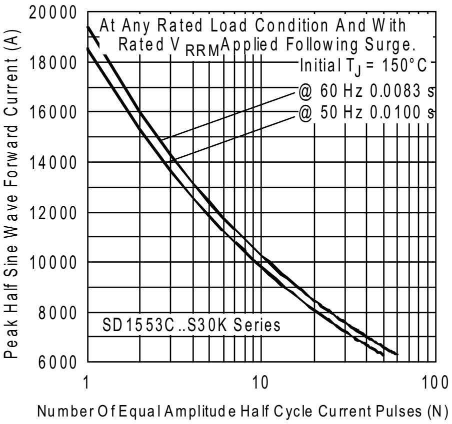


Fig. 15 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

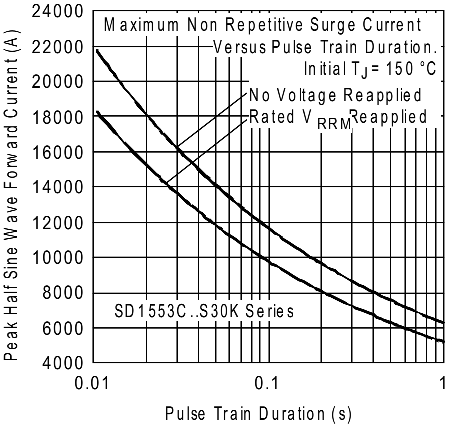


Fig. 16 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

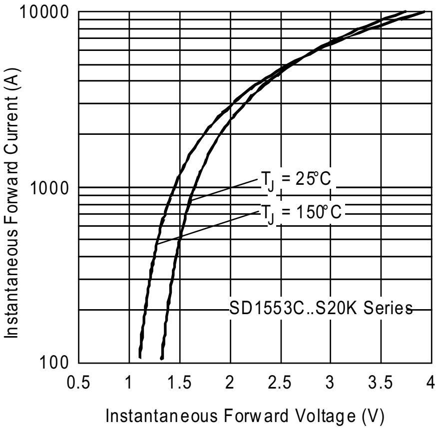


Fig. 17 - Forward Voltage Drop Characteristics

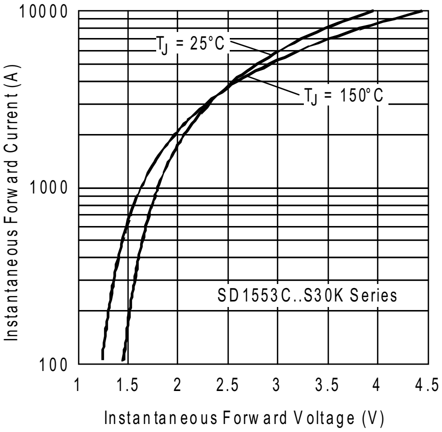


Fig. 18 - Forward Voltage Drop Characteristics

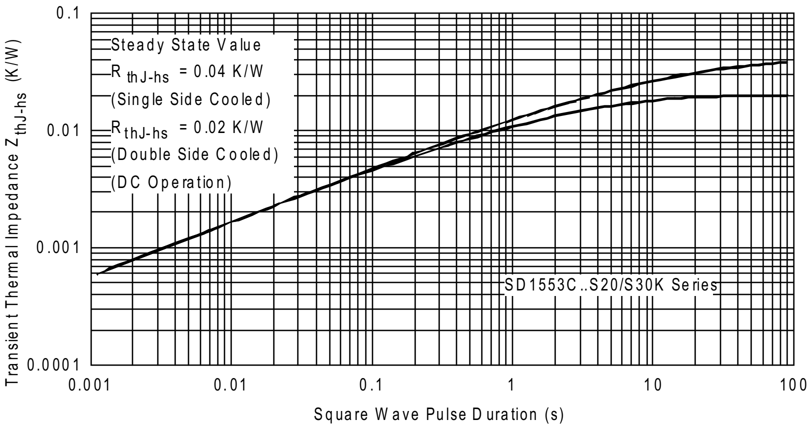


Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic

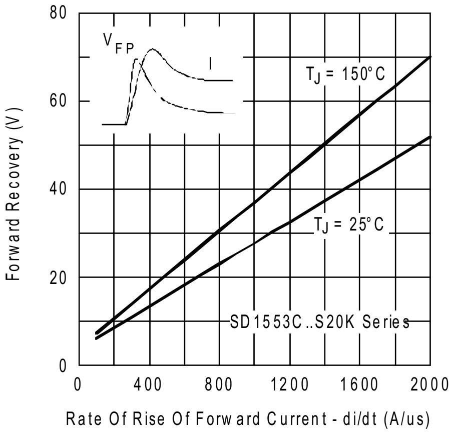


Fig. 20 - Typical Forward Recovery Characteristics

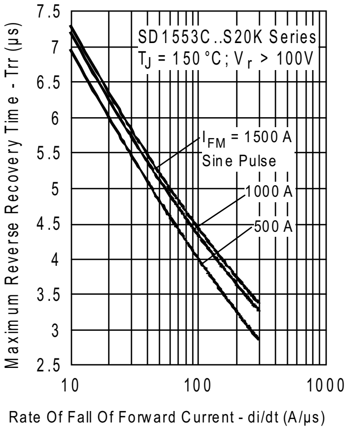


Fig. 22 - Recovery Time Characteristics

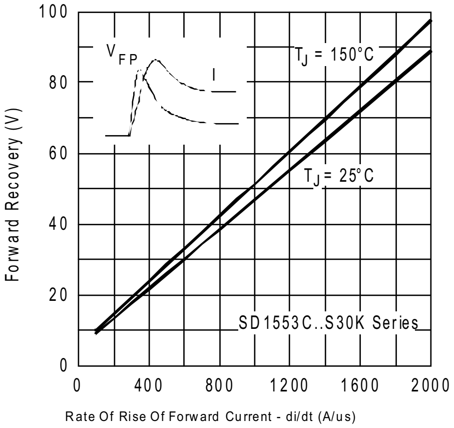


Fig. 21 - Typical Forward Recovery Characteristics

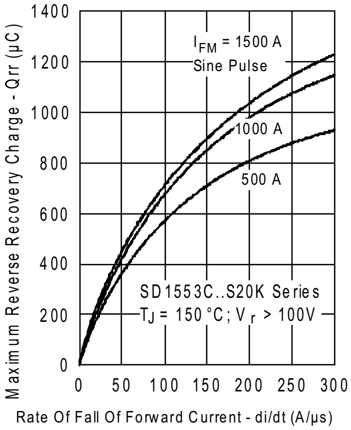


Fig. 23 - Recovery Charge Characteristics

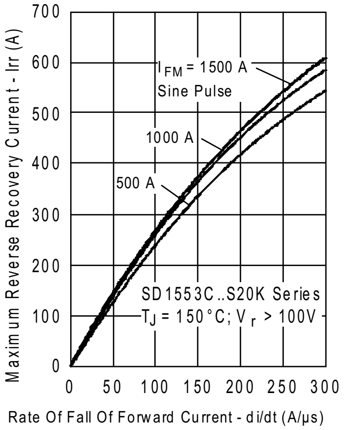


Fig. 24 - Recovery Current Characteristics

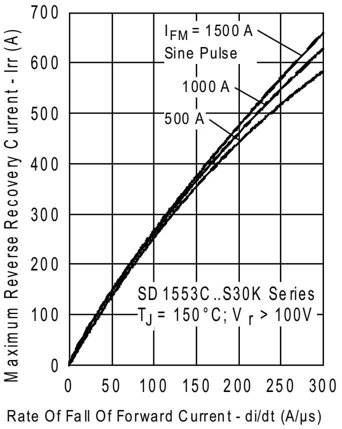


Fig. 27 - Recovery Current Characteristics

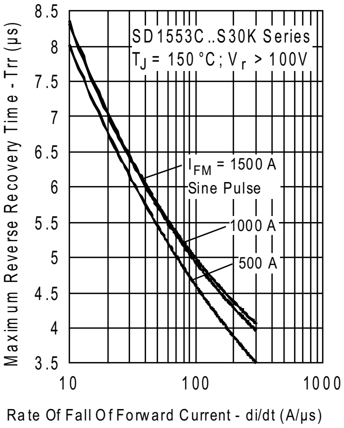


Fig. 25 - Recovery Time Characteristics

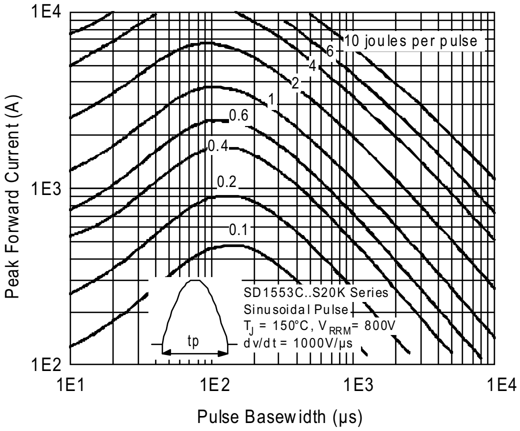


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

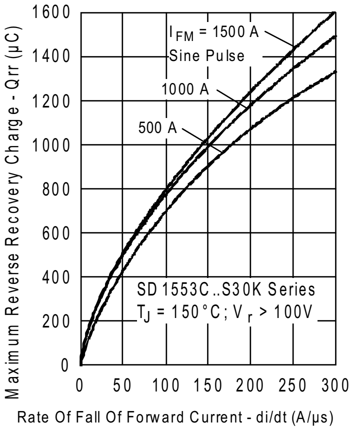


Fig. 26 - Recovery Charge Characteristics

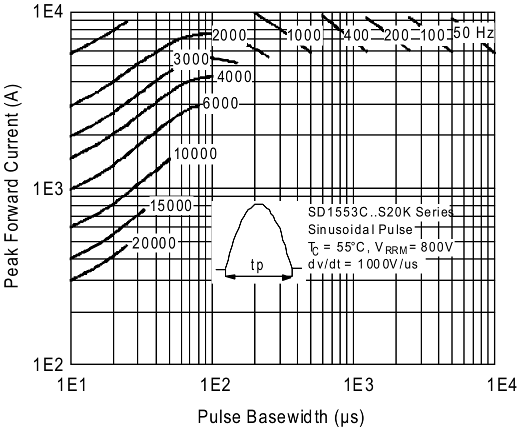


Fig. 29 - Frequency Characteristics

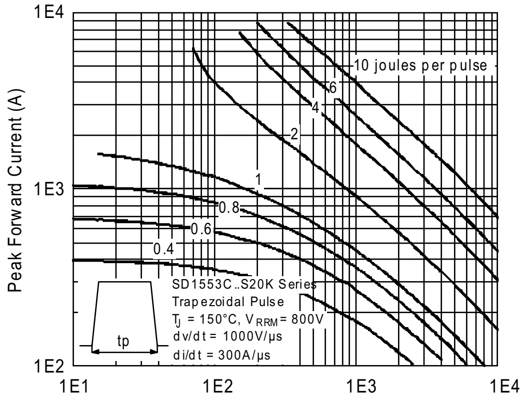


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

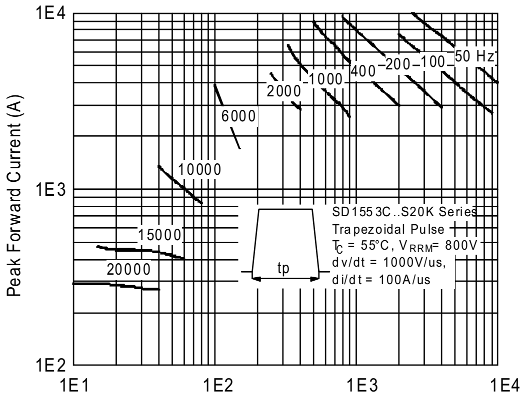


Fig. 33 - Frequency Characteristics

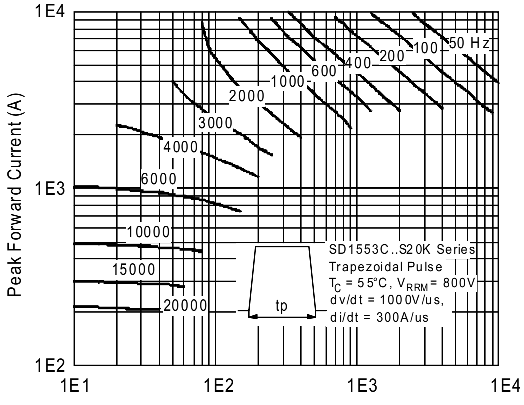


Fig. 31 - Frequency Characteristics

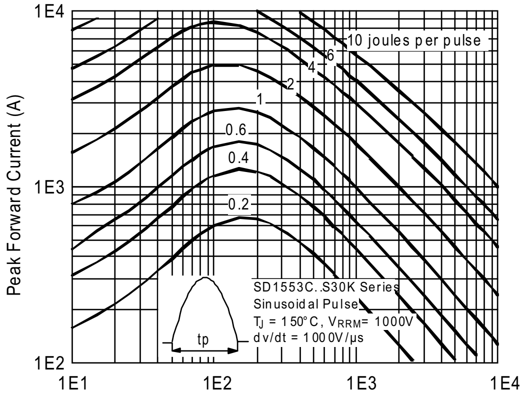


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

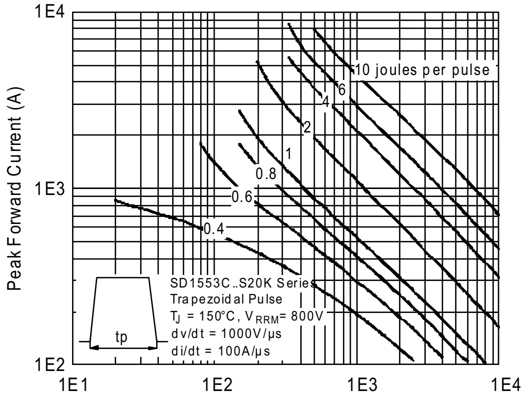


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

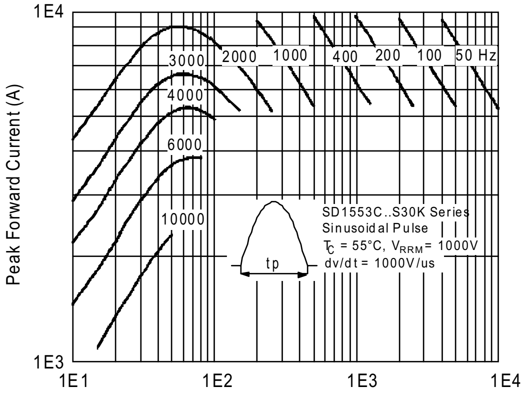


Fig. 35 - Frequency Characteristics

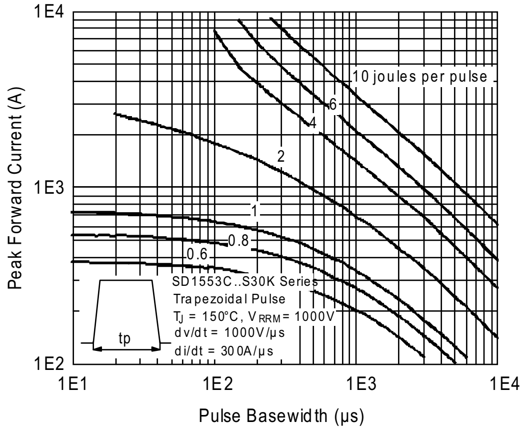


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

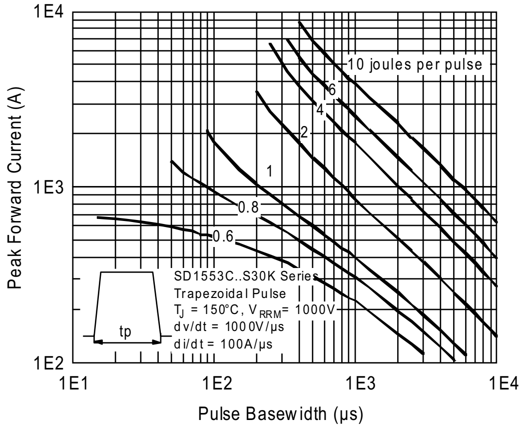


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

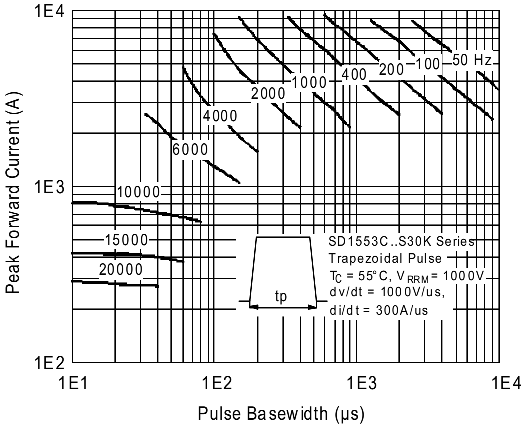


Fig. 37 - Frequency Characteristics

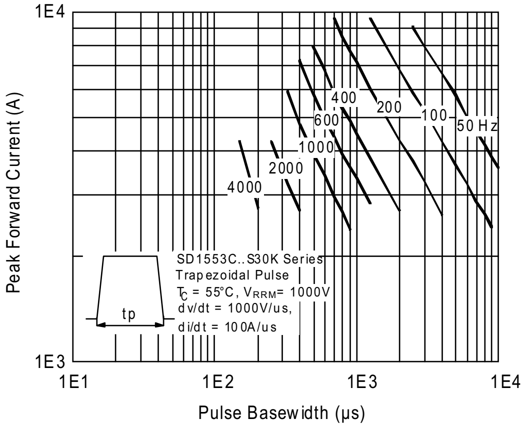


Fig. 39 - Frequency Characteristics

ORDERING INFORMATION TABLE

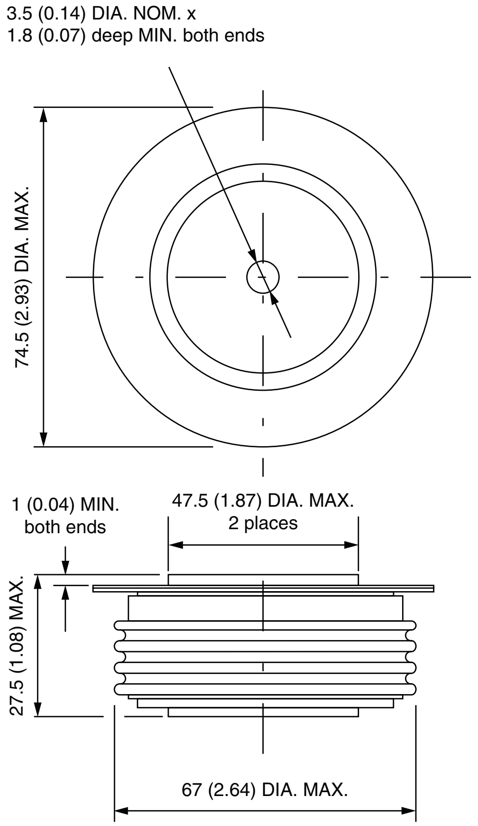
Device code	VS-	SD	155	3	C	30	S30	K
	①	②	③	④	⑤	⑥	⑦	⑧

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 - K = PUK case DO-200AC (K-PUK)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95247

DO-200AC (K-PUK)

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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