

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 μ s to 3.0 μ s 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


RoHS
COMPLIANT

TYPICAL APPLICATIONS

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

MAJOR RATINGS AND CHARACTERISTICS

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

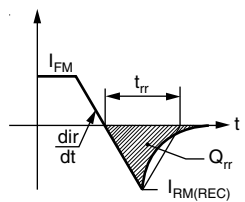
VOLTAGE RATINGS

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
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled	55 (85)	55 (85)	°C
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms No voltage reappplied	3100	2800	A
		t = 8.3 ms	25 000	22 000	
		t = 10 ms 100 % V_{RRM} reappplied	26 180	23 000	
		t = 8.3 ms	21 030	18 500	
Maximum I^2t for fusing	I^2t	t = 10 ms No voltage reappplied	22 010	19 370	kA ² s
		t = 8.3 ms	3126	2421	
		t = 10 ms 100 % V_{RRM} reappplied	2854	2210	
		t = 8.3 ms	2210	1712	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reappplied	2018	1563	kA ² √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	31 260	24 210	V
High level value of threshold voltage	$V_{F(TO)2}$	($I > \pi \times I_{F(AV)}$), $T_J = T_J$ maximum	1.15	1.31	
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	1.29	1.45	mW
High level value of forward slope resistance	r_{f2}	($I > \pi \times I_{F(AV)}$), $T_J = T_J$ maximum	0.27	0.32	
Maximum forward voltage drop	V_{FM}	$I_{pk} = 4000$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave	0.25	0.30	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

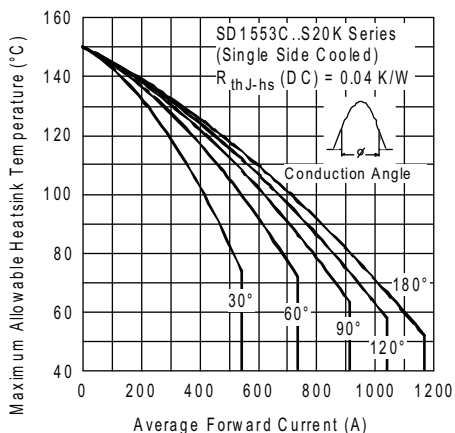


Fig. 1 - Current Ratings Characteristics

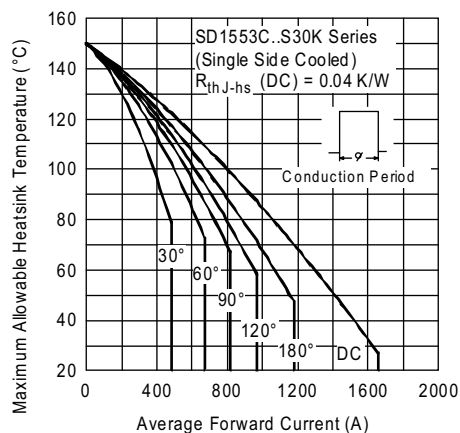


Fig. 4 - Current Ratings Characteristics

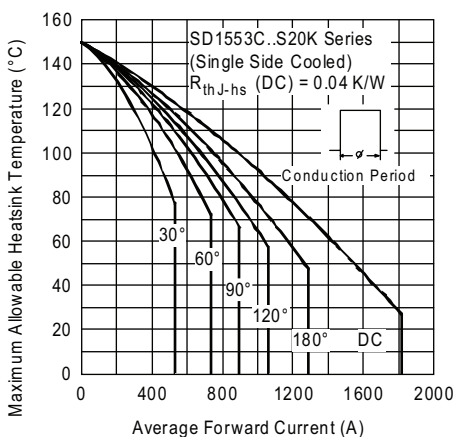


Fig. 2 - Current Ratings Characteristics

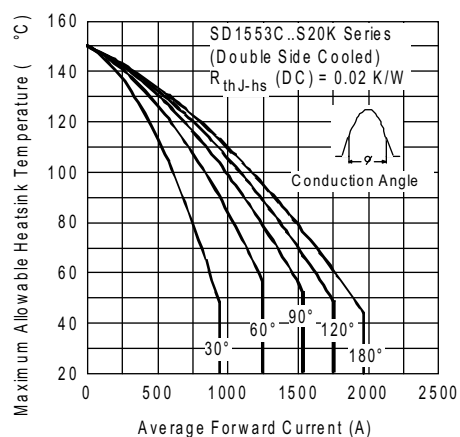


Fig. 5 - Current Ratings Characteristics

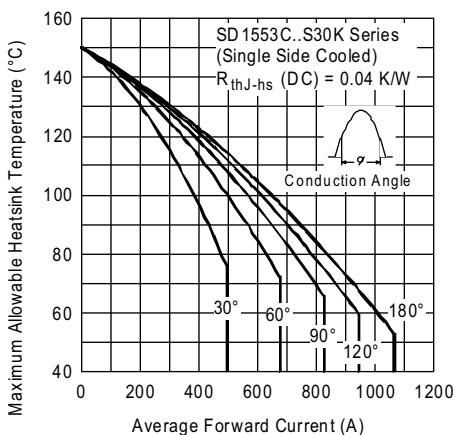


Fig. 3 - Current Ratings Characteristics

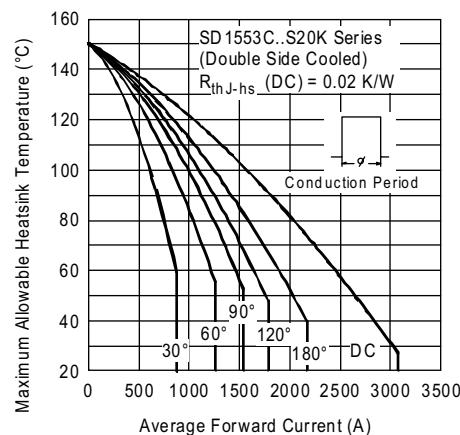


Fig. 6 - Current Ratings Characteristics

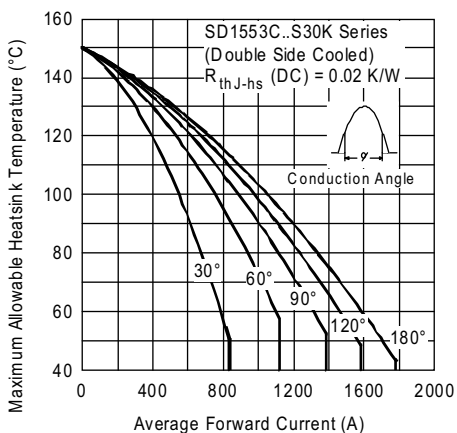


Fig. 7 - Current Ratings Characteristics

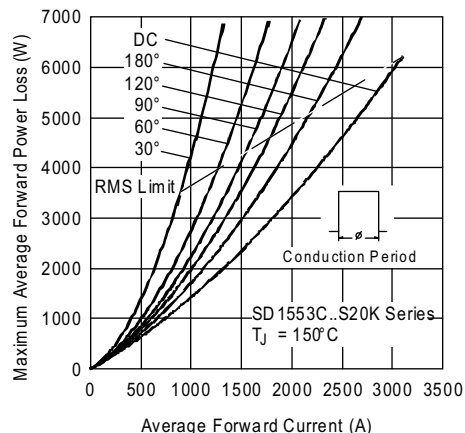


Fig. 10 - Forward Power Loss Characteristics

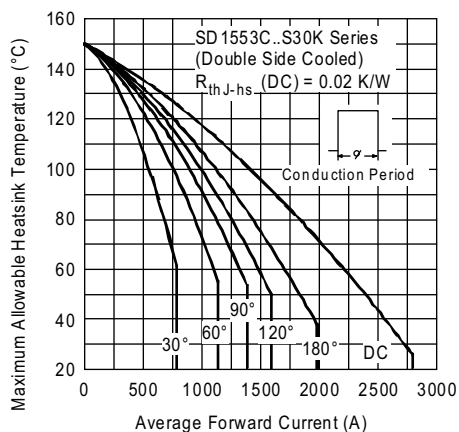


Fig. 8 - Current Ratings Characteristics

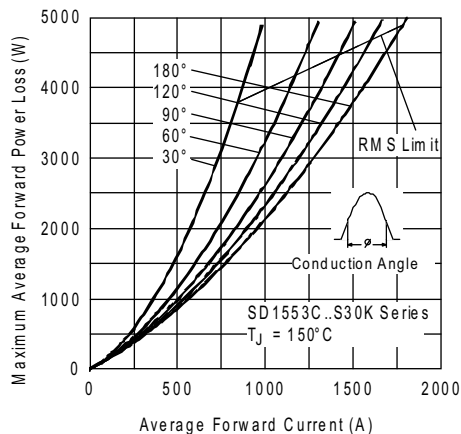


Fig. 11 - Forward Power Loss Characteristics

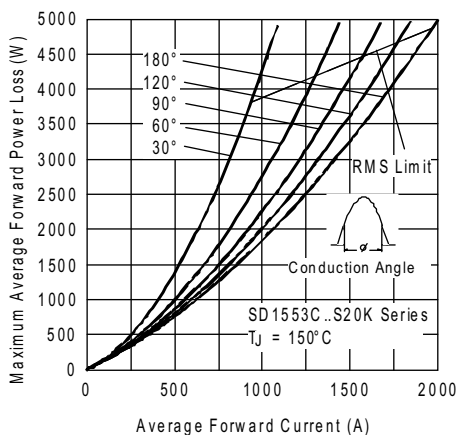


Fig. 9 - Forward Power Loss Characteristics

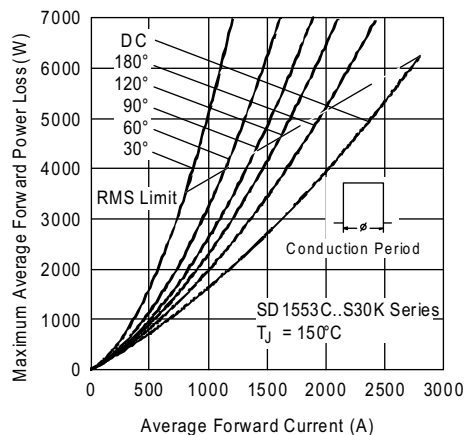


Fig. 12 - Forward Power Loss Characteristics

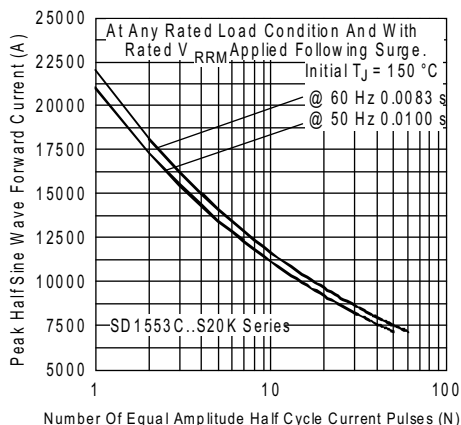


Fig. 13 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

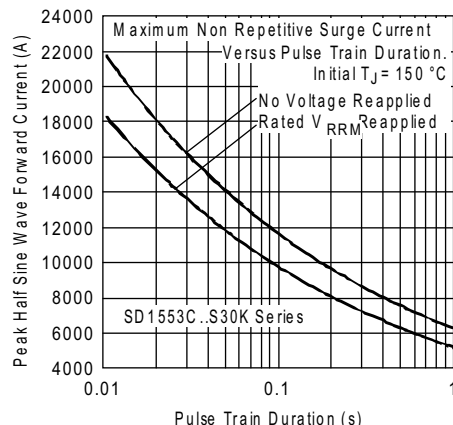


Fig. 16 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

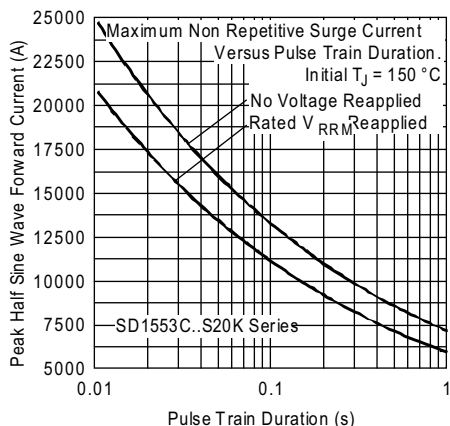


Fig. 14 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

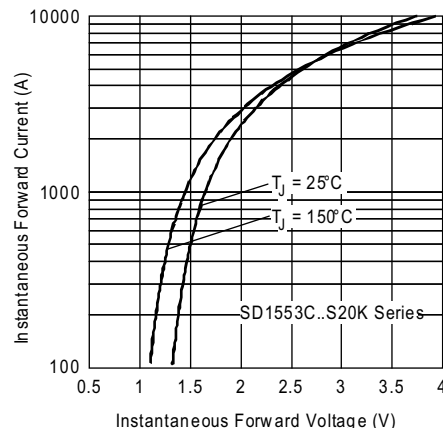


Fig. 17 - Forward Voltage Drop Characteristics

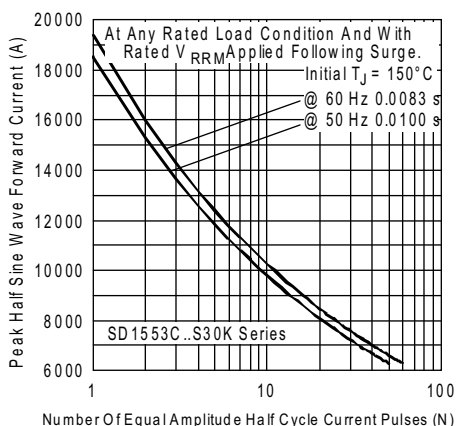


Fig. 15 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

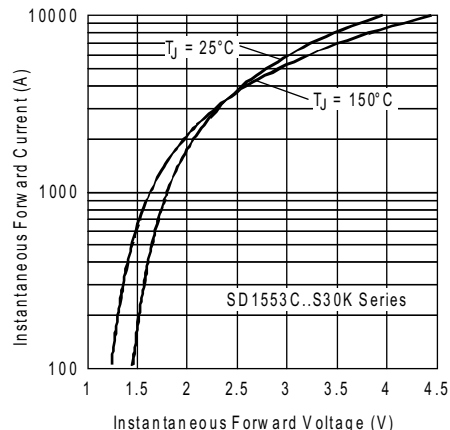


Fig. 18 - Forward Voltage Drop Characteristics

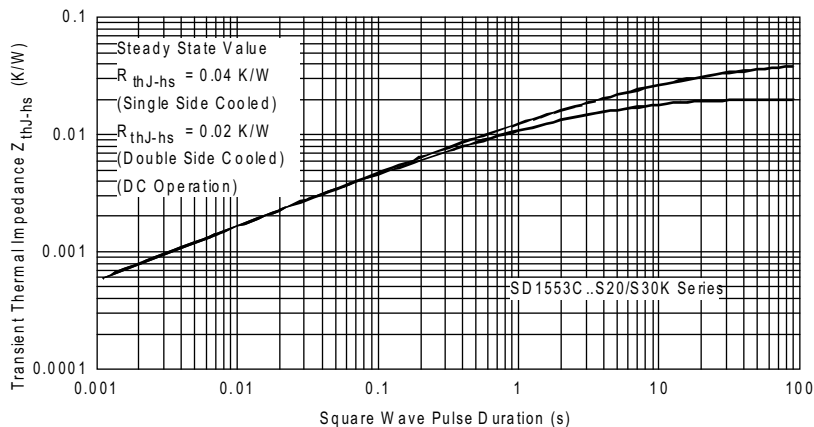
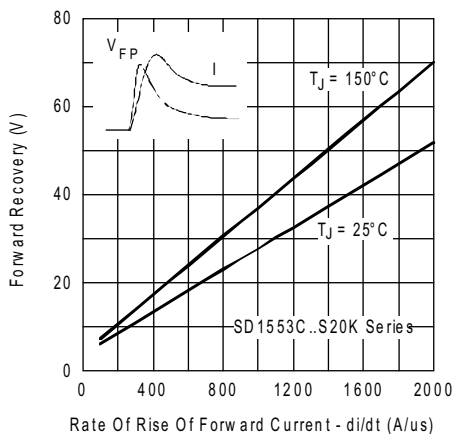

Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic


Fig. 20 - Typical Forward Recovery Characteristics

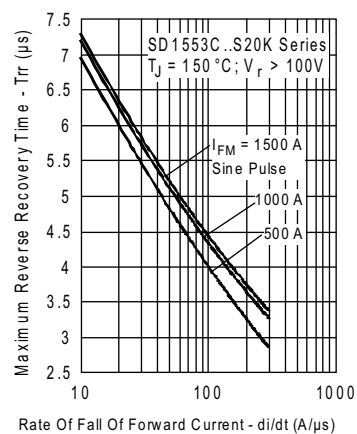


Fig. 22 - Recovery Time Characteristics

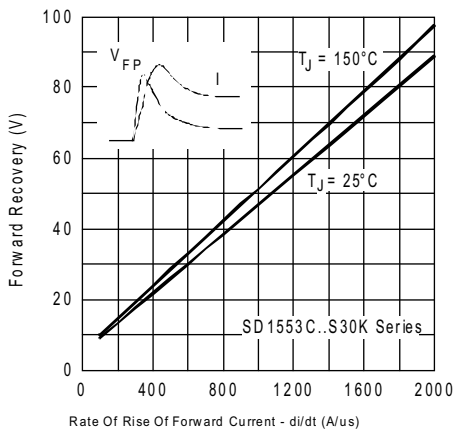


Fig. 21 - Typical Forward Recovery Characteristics

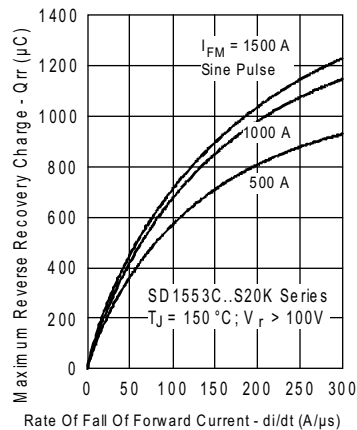


Fig. 23 - Recovery Charge Characteristics

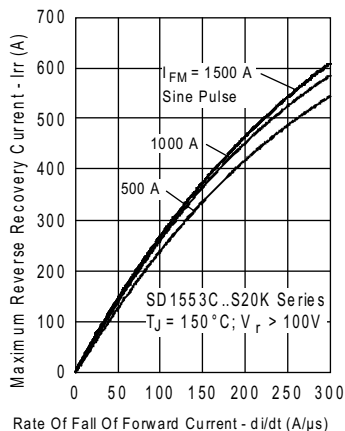


Fig. 24 - Recovery Current Characteristics

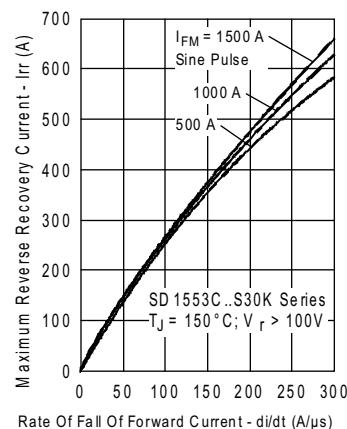


Fig. 27 - Recovery Current Characteristics

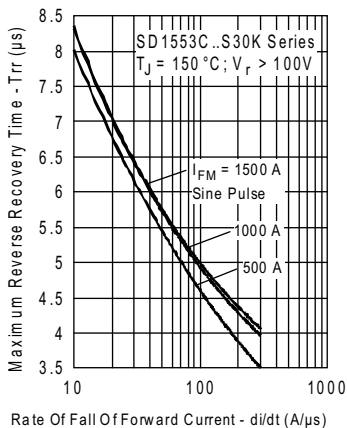


Fig. 25 - Recovery Time Characteristics

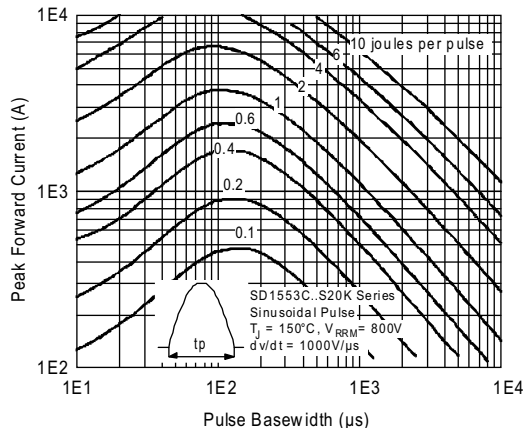


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

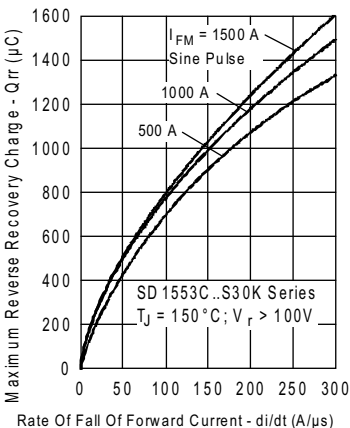


Fig. 26 - Recovery Charge Characteristics

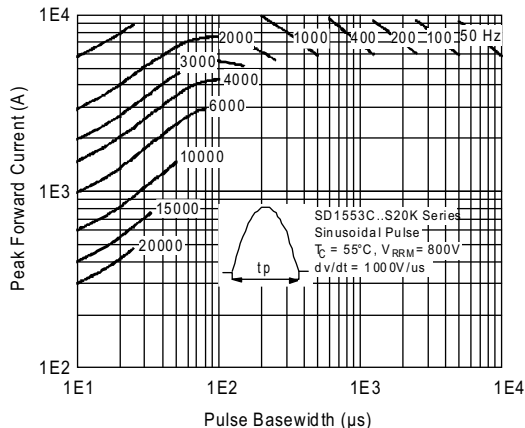


Fig. 29 - Frequency Characteristics

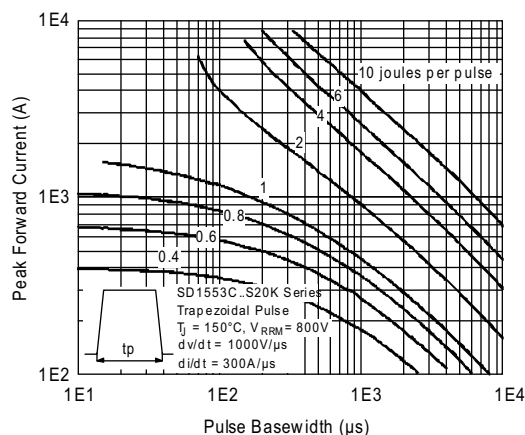


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

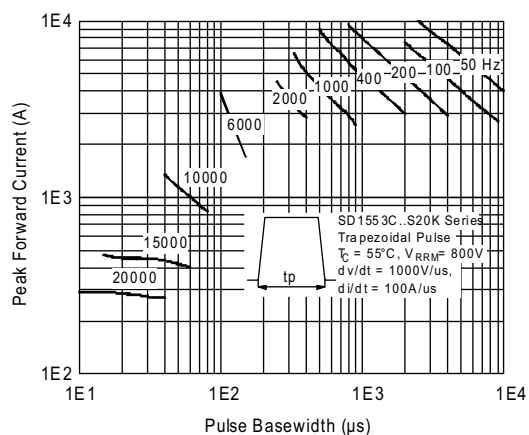


Fig. 33 - Frequency Characteristics

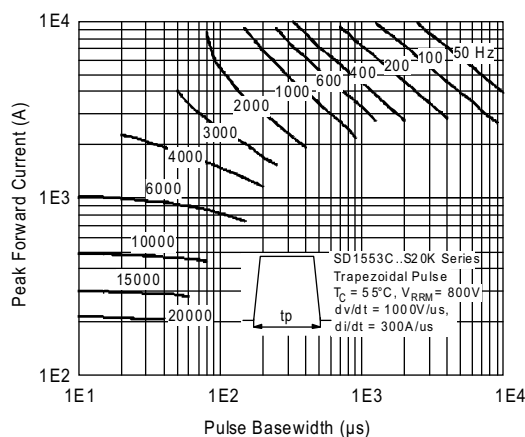


Fig. 31 - Frequency Characteristics

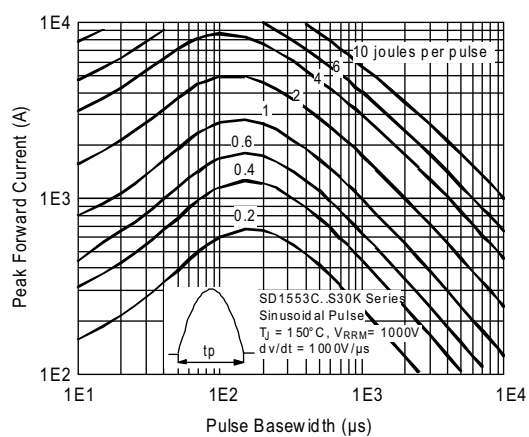


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

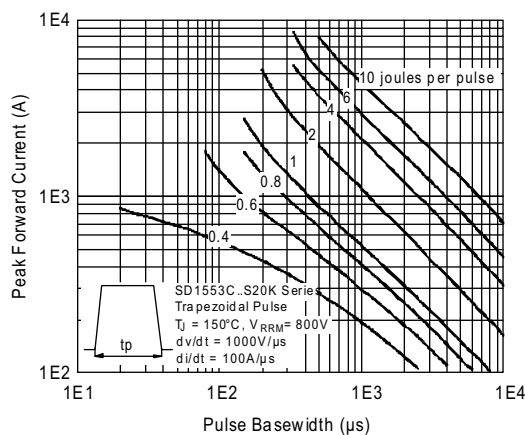


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

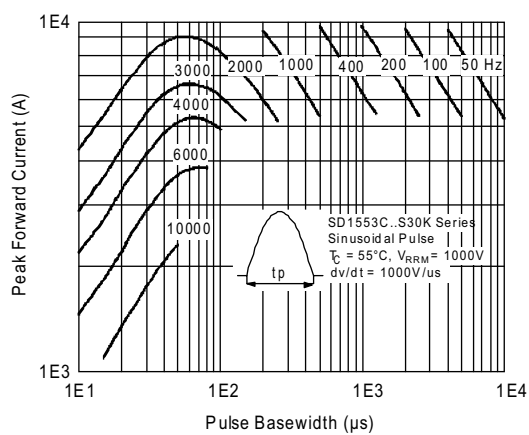


Fig. 35 - Frequency Characteristics

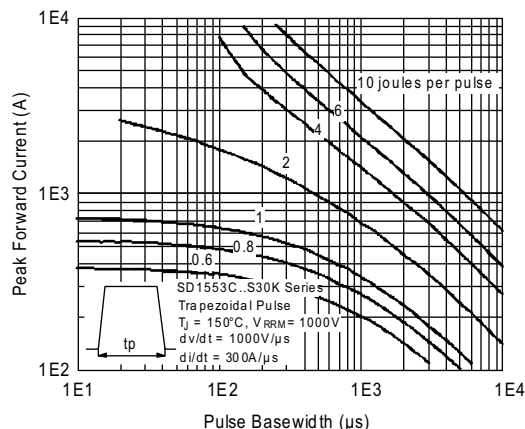


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

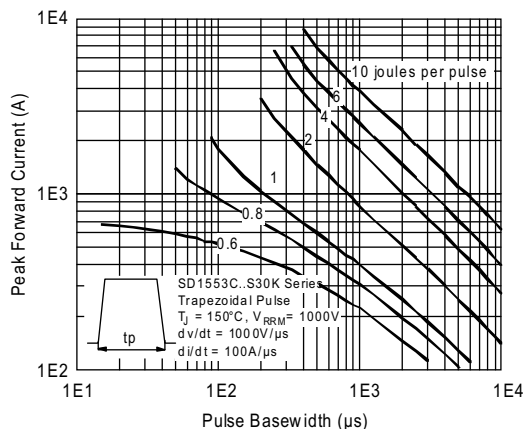


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

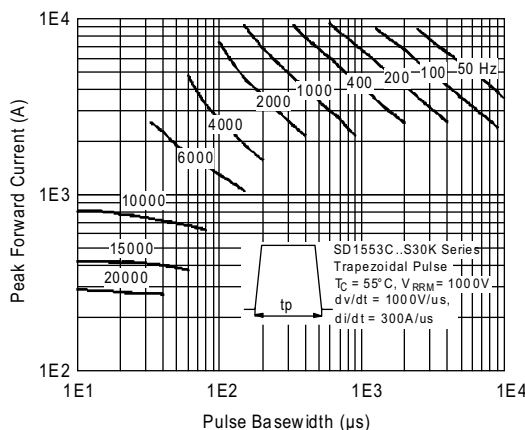


Fig. 37 - Frequency Characteristics

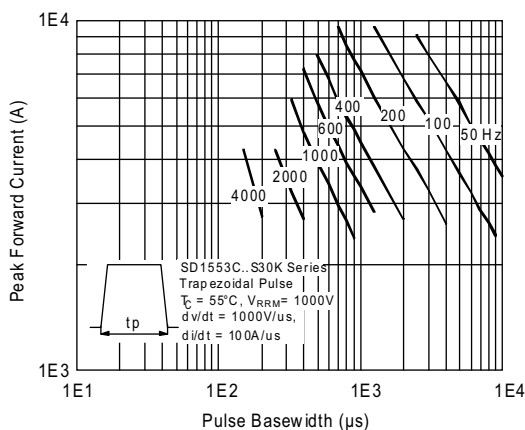


Fig. 39 - Frequency Characteristics

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)							

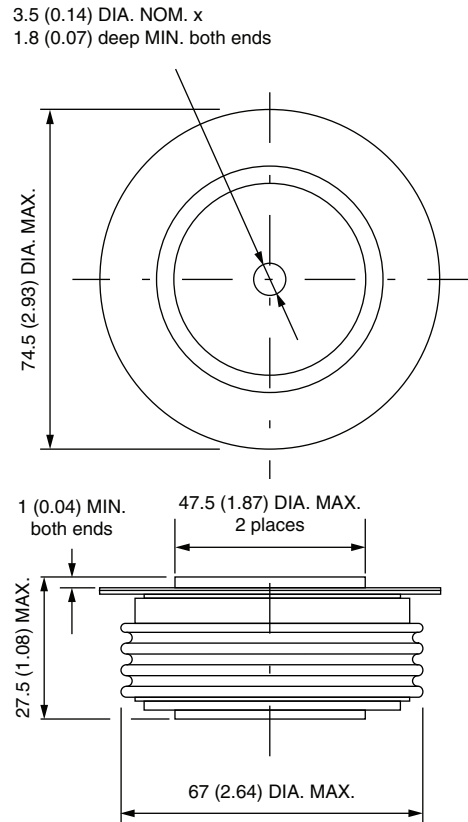
LINKS TO RELATED DOCUMENTS

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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