Fast Recovery Diodes (Hockey PUK Version), 920 A, 1050 A



B-PUK (DO-200AB)

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® B-PUK (DO-200AB)
- Maximum junction temperature 150 °C
- Designed and qualified for industrial level
- 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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	920 A, 1050 A
Package	B-PUK (DO-200AB)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS				
PARAMETER	TEST CONDITIONS	SD1053C..L		UNITS
		S20	S30	
$I_{F(AV)}$		1050	920	A
	T_{hs}	55	55	°C
$I_{F(RMS)}$		1940	1700	A
I_{FSM}	50 Hz	15 000	13 000	
	60 Hz	15 700	13 610	
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-SD1053C..S20L	18	1800	1900	50
	22	2200	2300	
	24	2400	2500	
	25	2500	2600	
VS-SD1053C..S30L	18	1800	1900	
	22	2200	2300	
	25	2500	2600	
	28	2800	2900	
	30	3000	3100	

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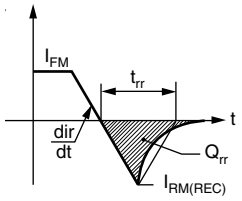
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FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			SD1053C..L S20	SD1053C..L S30	UNITS
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave			1050 (450)	920 (390)	A
		Double side (single side) cooled			55 (85)	55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled			1940	1700	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	15 000	13 000	
		t = 8.3 ms			15 700	13 610	
		t = 10 ms	100 % V_{RRM} reapplied		12 620	10 930	
		t = 8.3 ms			13 210	11 450	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		1125	845	kA^2s
		t = 8.3 ms			1027	772	
		t = 10 ms	100 % V_{RRM} reapplied		796	598	
		t = 8.3 ms			727	546	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			11 250	8450	$kA^2\sqrt{s}$
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			1.34	1.51	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			1.48	1.67	
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			0.37	0.50	mΩ
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.33	0.45	
Maximum forward voltage drop	V_{FM}	I_{pk} = 1500 A, $T_J = T_J$ maximum, t_p = 10 ms sinusoidal wave			1.90	2.26	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	4.0	400	180
S30	3.0				4.5	550	230



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	0.073	K/W
		DC operation double side cooled	0.031	
Mounting force, ± 10 %			14 700 (1500)	N (kg)
Approximate weight			255	g
Case style		See dimensions - link at the end of datasheet	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	0.008	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	0.021	0.021	0.022		
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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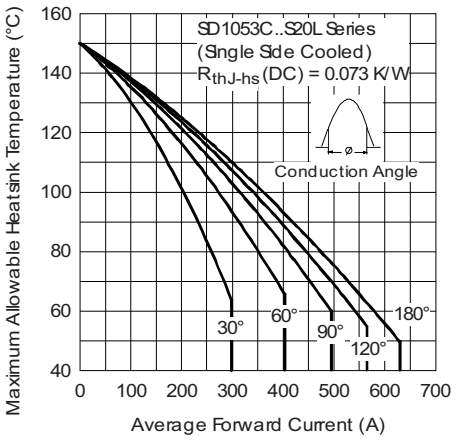


Fig. 1 - Current Ratings Characteristics

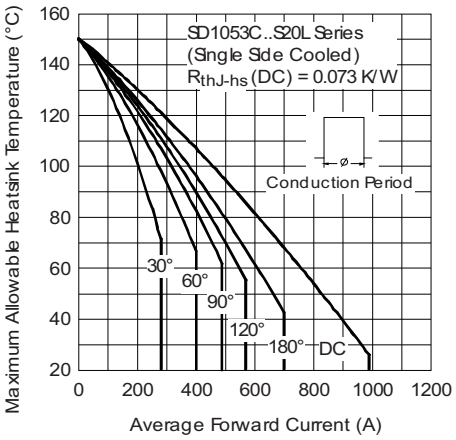


Fig. 2 - Current Ratings Characteristics

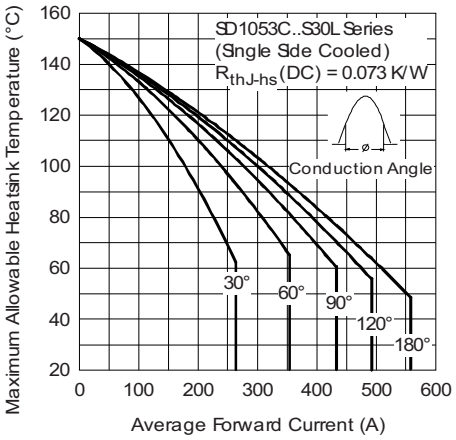


Fig. 3 - Current Ratings Characteristics

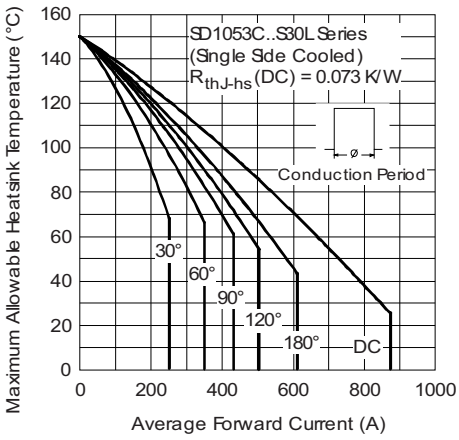


Fig. 4 - Current Ratings Characteristics

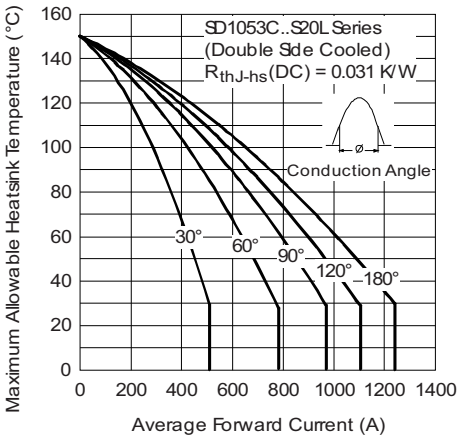


Fig. 5 - Current Ratings Characteristics

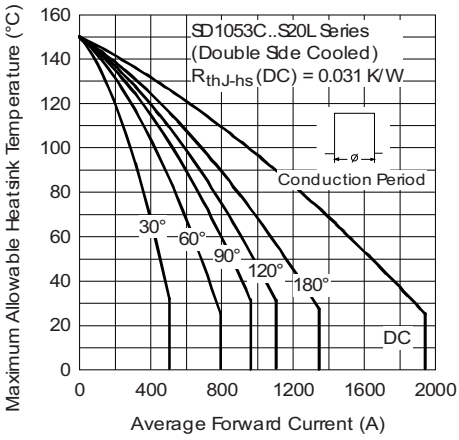


Fig. 6 - Current Ratings Characteristics

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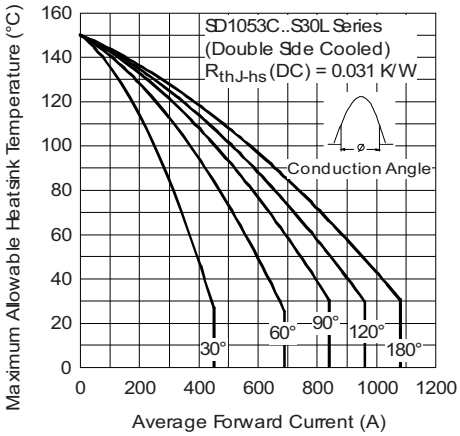


Fig. 7 - Current Ratings Characteristics

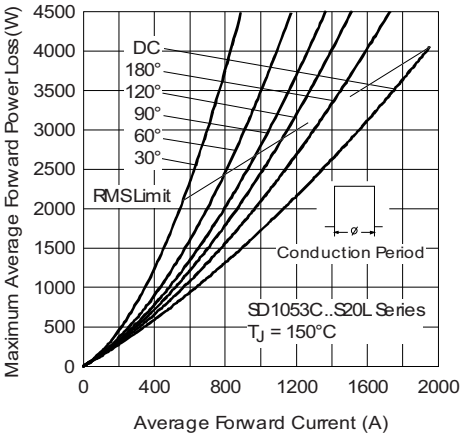


Fig. 10 - Forward Power Loss Characteristics

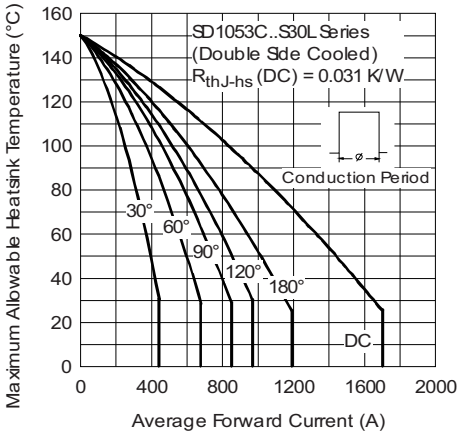


Fig. 8 - Current Ratings Characteristics

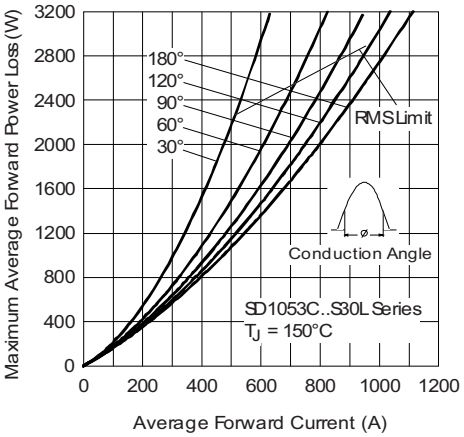


Fig. 11 - Forward Power Loss Characteristics

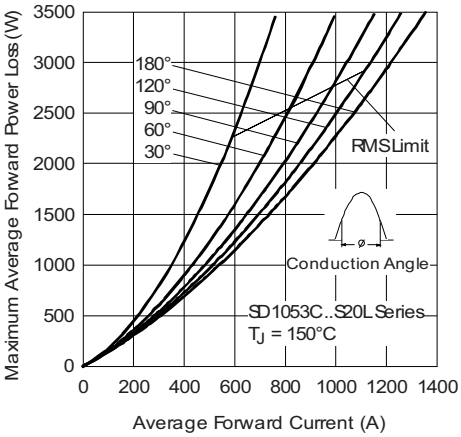


Fig. 9 - Forward Power Loss Characteristics

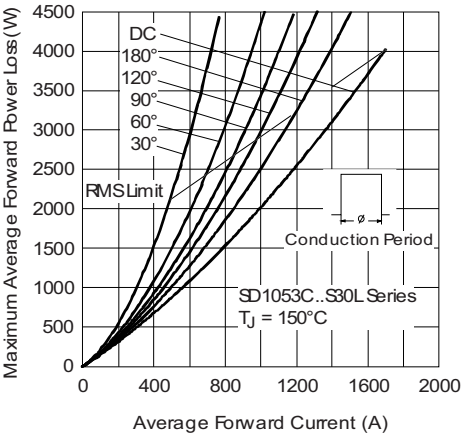


Fig. 12 - Forward Power Loss Characteristics

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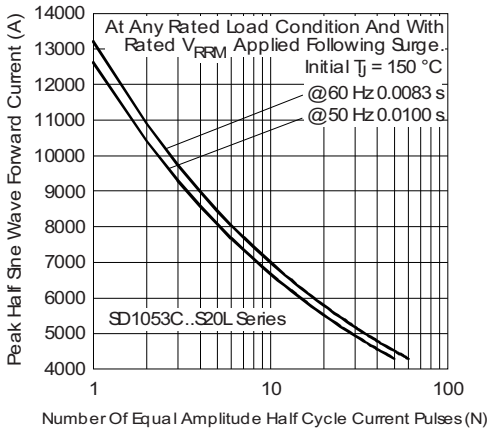


Fig. 13 - Maximum Non-Repetitive Surge Current

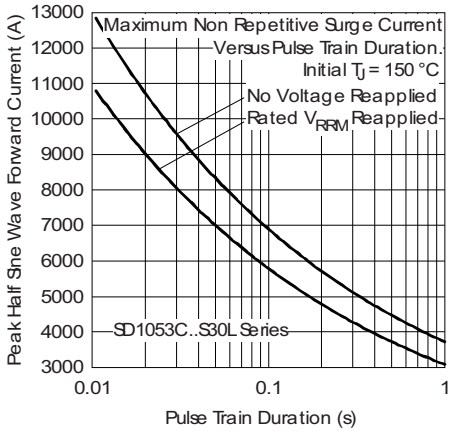


Fig. 16 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

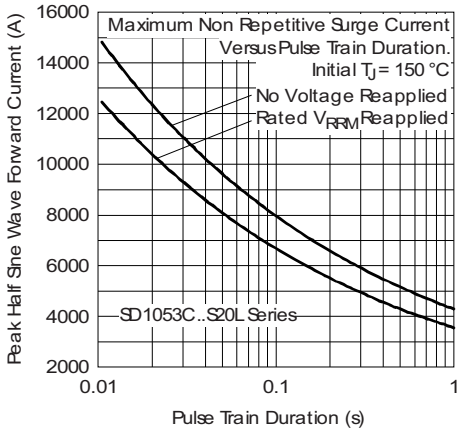


Fig. 14 - Maximum Non-Repetitive Surge Current

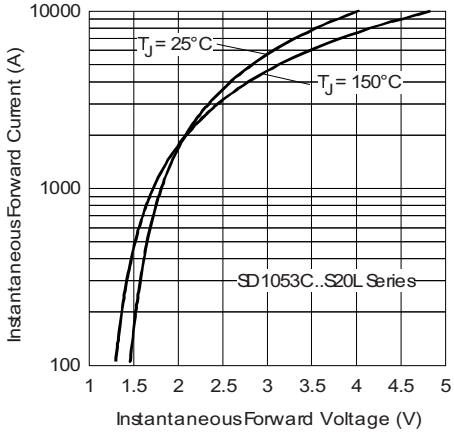


Fig. 17 - Forward Voltage Drop Characteristics

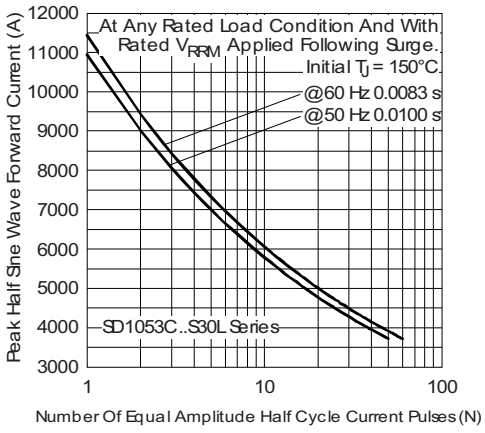


Fig. 15 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

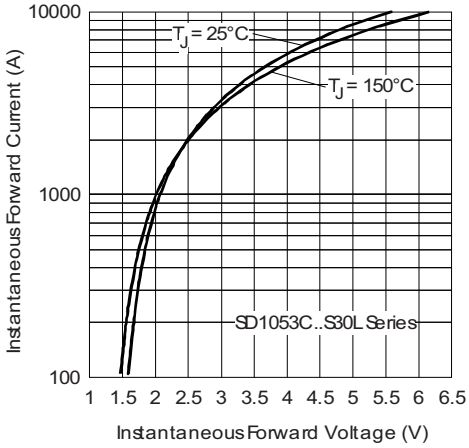


Fig. 18 - Forward Voltage Drop Characteristics

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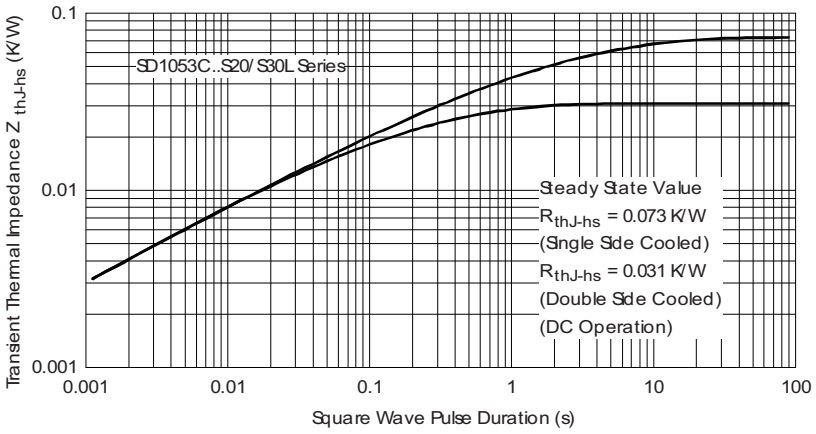


Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic

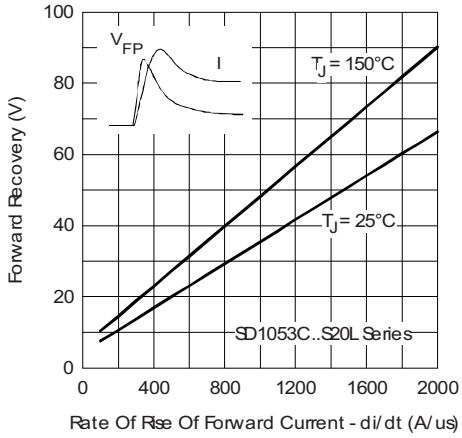


Fig. 20 - Typical Forward Recovery Characteristics

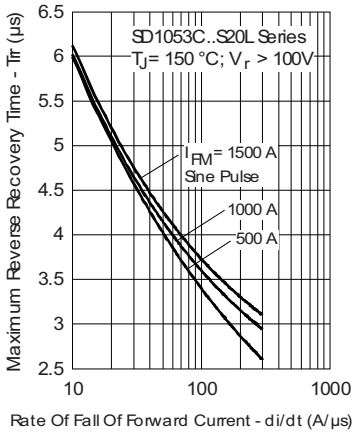


Fig. 22 - Recovery Time Characteristics

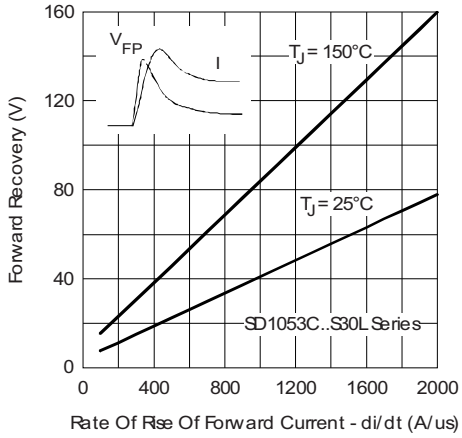


Fig. 21 - Typical Forward Recovery Characteristics

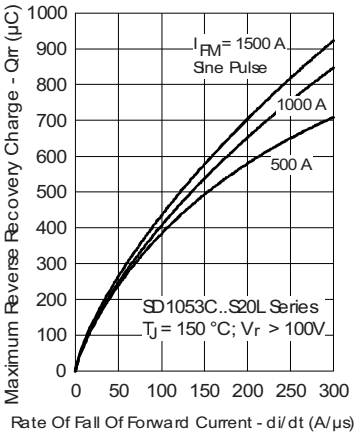


Fig. 23 - Recovery Charge Characteristics

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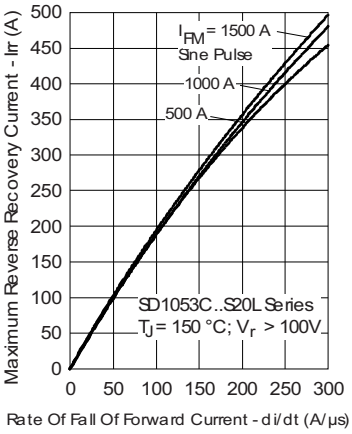


Fig. 24 - Recovery Current Characteristics

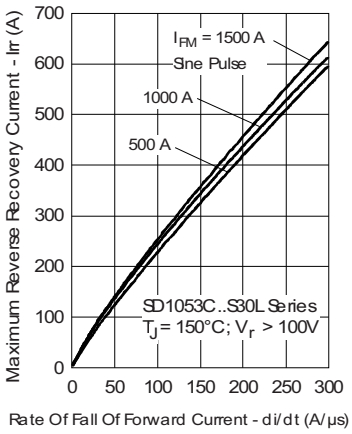


Fig. 27 - Recovery Current Characteristics

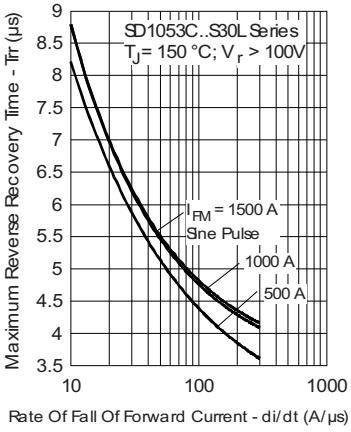


Fig. 25 - Recovery Time Characteristics

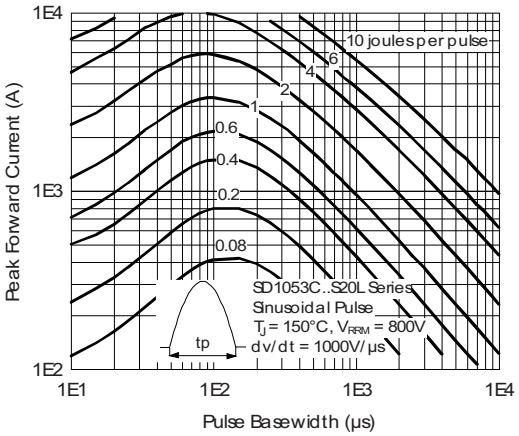


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

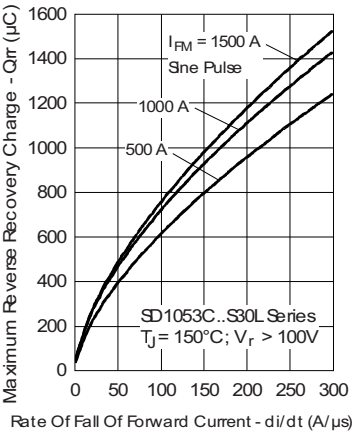


Fig. 26 - Recovery Charge Characteristics

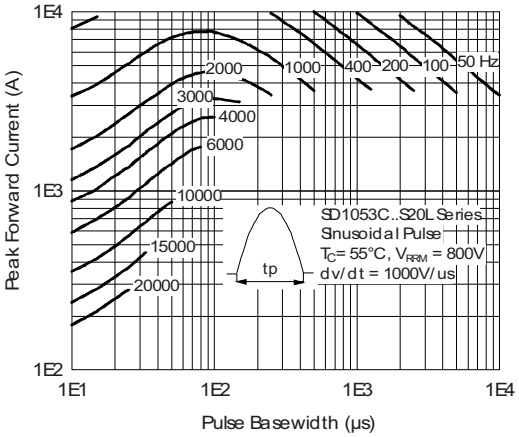


Fig. 29 - Frequency Characteristics

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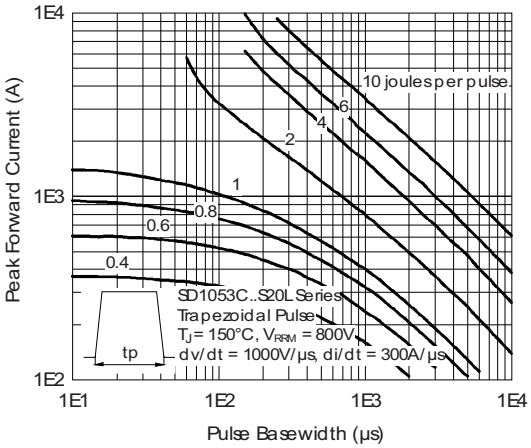


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

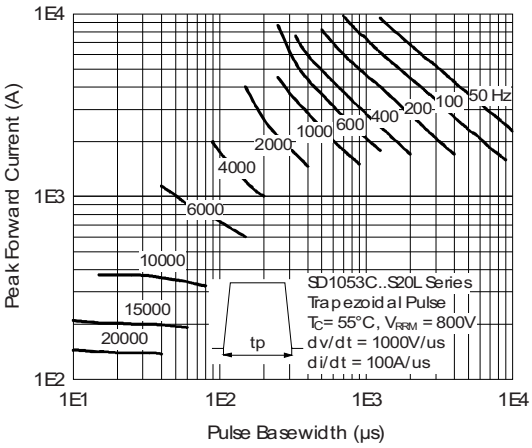


Fig. 33 - Frequency Characteristics

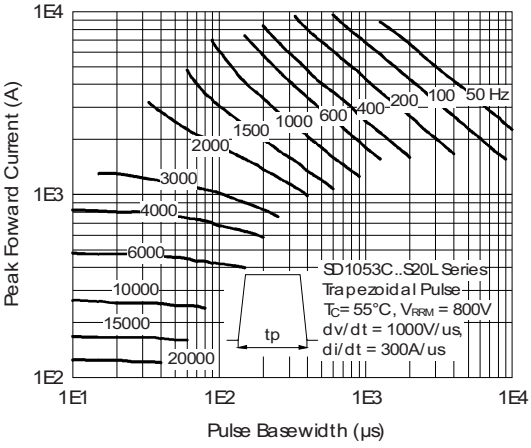


Fig. 31 - Frequency Characteristics

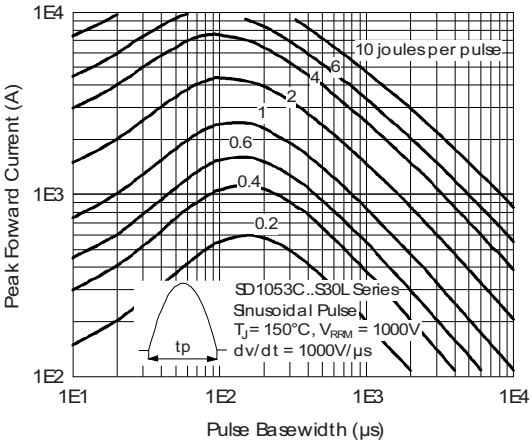


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

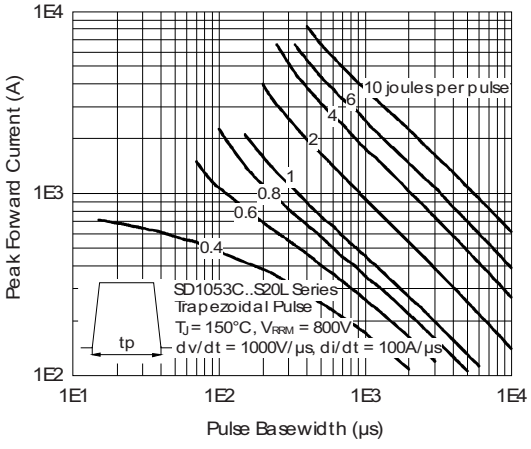


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

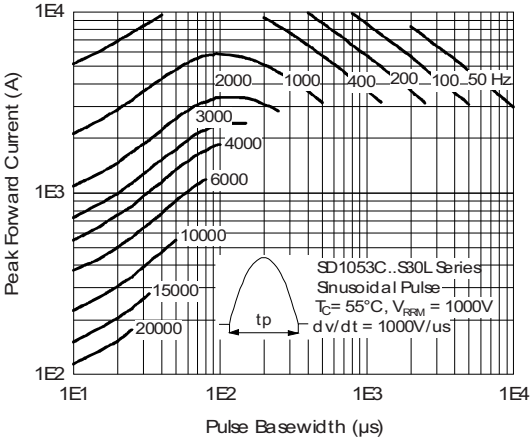


Fig. 35 - Frequency Characteristics

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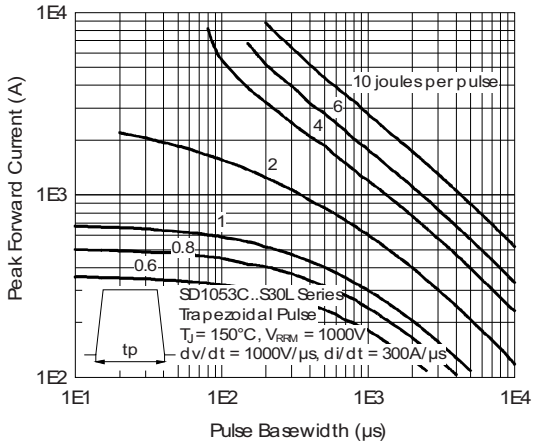


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

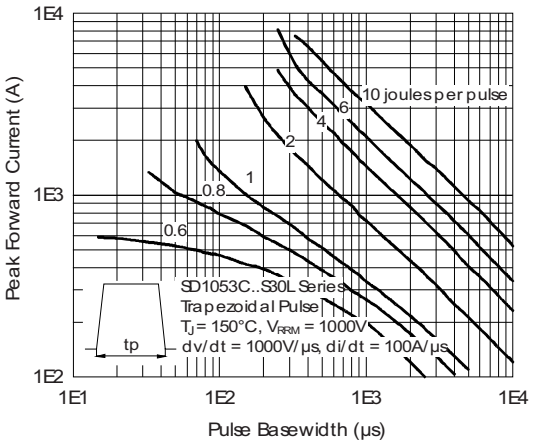


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

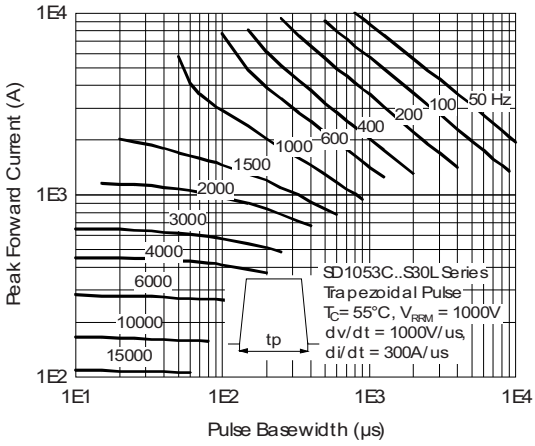


Fig. 37 - Frequency Characteristics

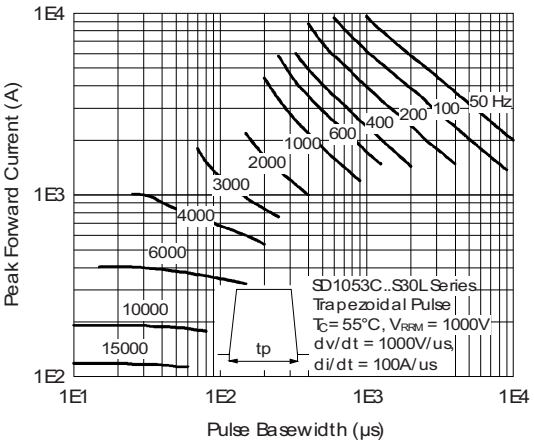


Fig. 39 - Frequency Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	SD	105	3	C	30	S30	L
1	2	3	4	5	6	7	8

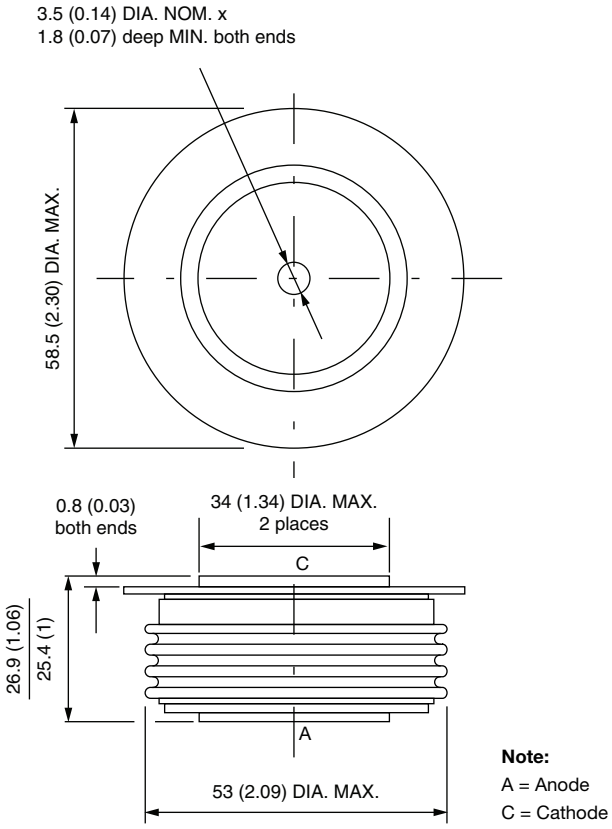
- **1** - Vishay Semiconductors product
- **2** - Diode
- **3** - Essential part number
- **4** - 3 = fast recovery
- **5** - C = ceramic PUK
- **6** - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)
- **7** - t_{rr} code
- **8** - L = PUK case B-PUK (DO-200AB)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95246

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com
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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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