

## Fast Recovery Diodes (Hockey PUK Version), 810 A, 910 A


**B-43**

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	810 A, 910 A
Package	B-43
Circuit configuration	Single

**FEATURES**

- High power fast recovery diode series
- 2.0  $\mu$ s to 3.0  $\mu$ s recovery time
- High voltage ratings up to 2500 V
- High current capability
- Optimized turn-on and turn-off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press PUK encapsulation
- Hockey PUK version case style B-43
- Maximum junction temperature 150 °C
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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				
PARAMETER	TEST CONDITIONS	SD823C..C		UNITS
		S20	S30	
$I_{F(AV)}$		810	910	A
	$T_{hs}$	55	55	°C
$I_{F(RMS)}$		1500	1690	A
$I_{FSM}$	50 Hz	9300	9600	
	60 Hz	9730	10 050	
$V_{RRM}$	Range	1200 to 2500	1200 to 2500	V
$t_{rr}$		2.0	3.0	$\mu$ s
	$T_J$	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-SD823C..S20C VS-SD823C..S30C	12	1200	1300	50
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	



FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS			SD823C..C		UNITS
					S20	S30	
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled			810 (425)	910 (470)	A
					55 (85)	55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled			1500	1690	A
Maximum peak, one-cycle forward, non-repetitive current	$I_{FSM}$	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	9300	9600	
		t = 8.3 ms			9730	10 050	
		t = 10 ms	100 % $V_{RRM}$ reappplied		7820	8070	
		t = 8.3 ms			8190	8450	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reappplied		432	460	kA <sup>2</sup> s
		t = 8.3 ms			395	420	
		t = 10 ms	100 % $V_{RRM}$ reappplied		306	326	
		t = 8.3 ms			279	297	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reappplied			4320	4600	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			1.00	0.95	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum			1.11	1.06	
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			0.80	0.60	mW
High level value of forward slope resistance	$r_{f2}$	(I > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum			0.76	0.57	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 1500$ A, $T_J = T_J$ maximum $t_p = 10$ ms sinusoidal wave			2.20	1.85	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)	
S20	2.0	1000	50	-50	3.5	240	110	
S30	3.0				5.0	380	130	

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	0.076	K/W
		DC operation double side cooled	0.038	
Mounting force, ± 10 %			9800 (1000)	N (kg)
Approximate weight			83	g
Case style		See dimensions - link at the end of datasheet	B-43	

$\Delta R_{thJ-hs}$ CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.007	0.007	0.005	0.005	$T_J = T_J$ maximum	K/W
120°	0.008	0.008	0.008	0.008		
90°	0.010	0.010	0.011	0.011		
60°	0.015	0.015	0.016	0.016		
30°	0.026	0.026	0.026	0.026		

**Note**

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

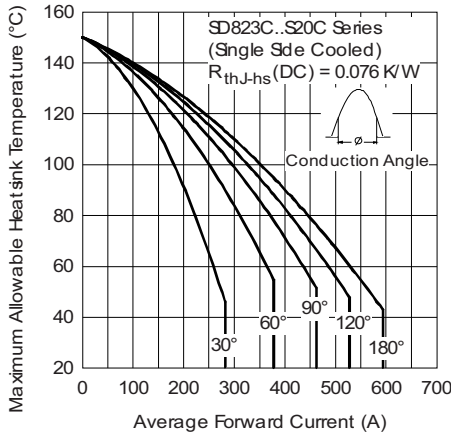


Fig. 1 - Current Ratings Characteristics

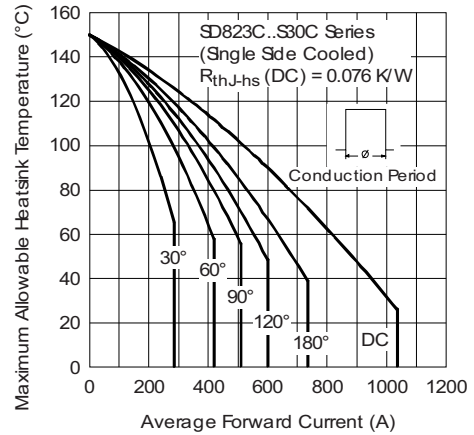


Fig. 4 - Current Ratings Characteristics

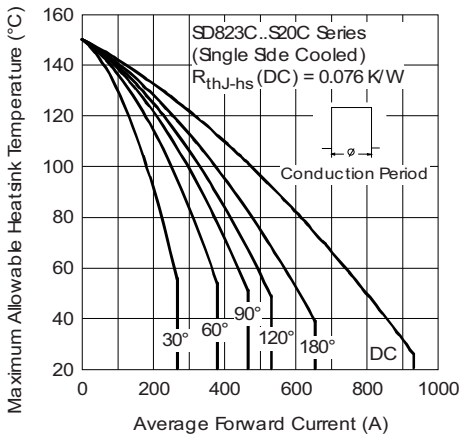


Fig. 2 - Current Ratings Characteristics

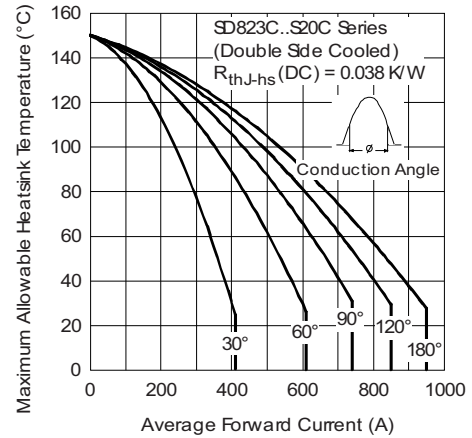


Fig. 5 - Current Ratings Characteristics

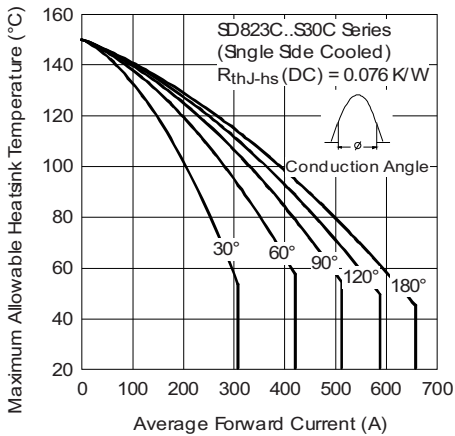


Fig. 3 - Current Ratings Characteristics

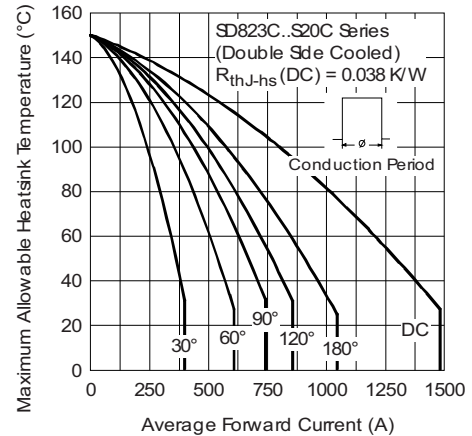


Fig. 6 - Current Ratings Characteristics

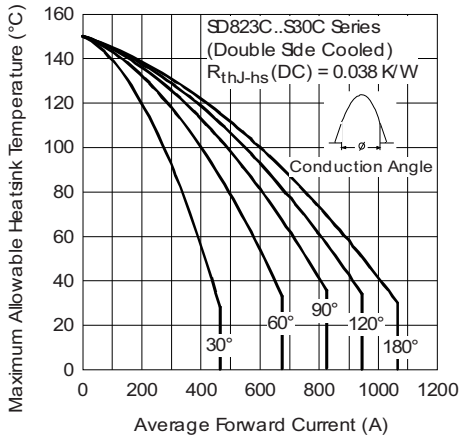


Fig. 7 - Current Ratings Characteristics

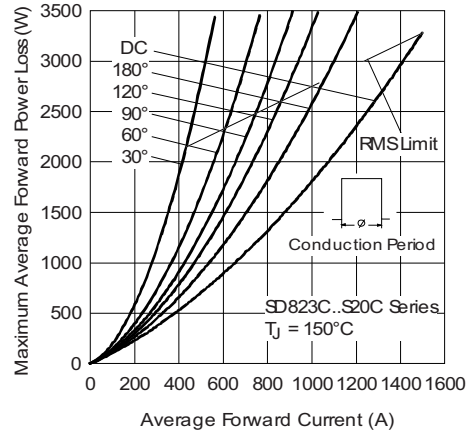


Fig. 10 - Forward Power Loss Characteristics

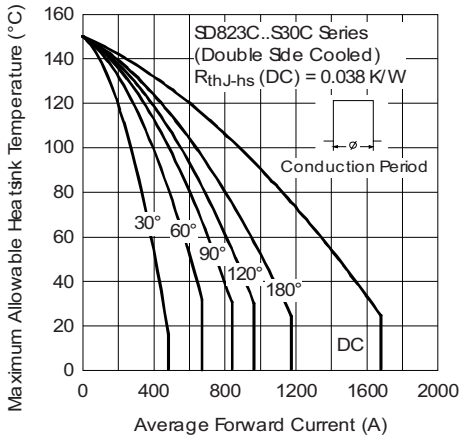


Fig. 8 - Current Ratings Characteristics

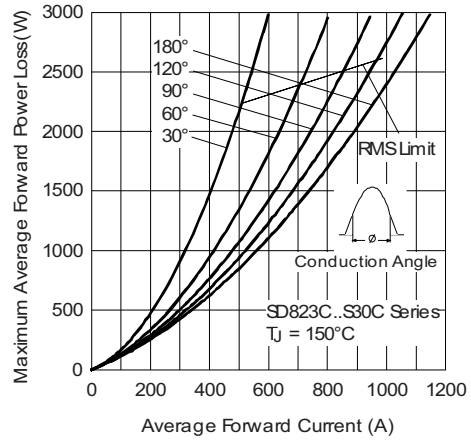


Fig. 11 - Forward Power Loss Characteristics

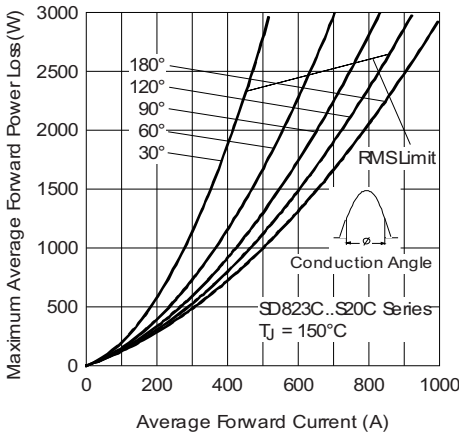


Fig. 9 - Forward Power Loss Characteristics

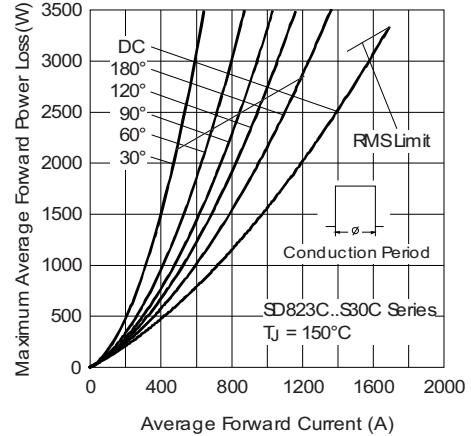


Fig. 12 - Forward Power Loss Characteristics

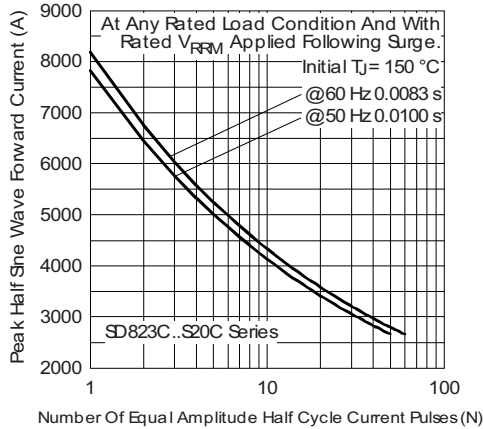


Fig. 13 - Maximum Non-Repetitive Surge Current

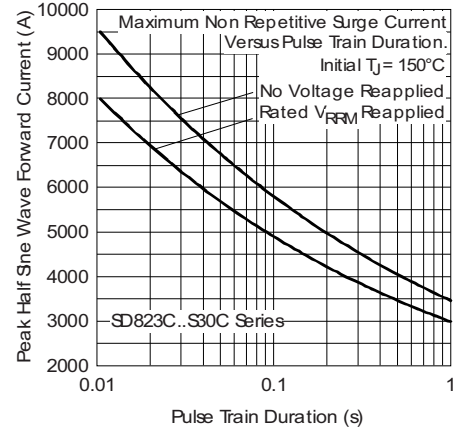


Fig. 16 - Maximum Non-Repetitive Surge Current

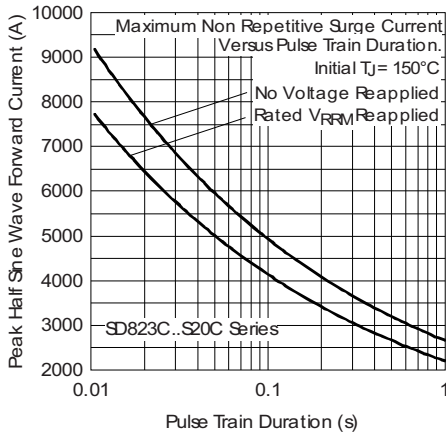


Fig. 14 - Maximum Non-Repetitive Surge Current

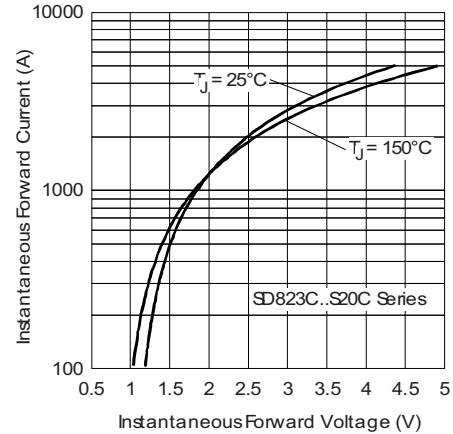


Fig. 17 - Forward Voltage Drop Characteristics

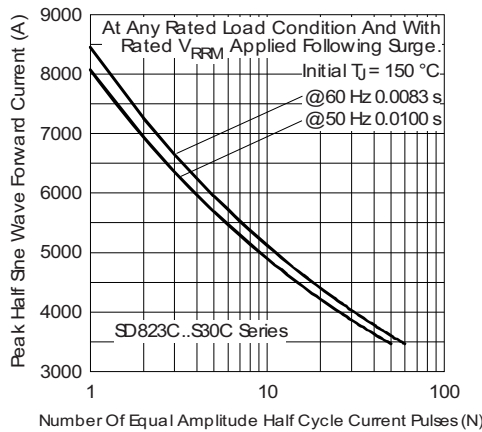


Fig. 15 - Maximum Non-Repetitive Surge Current

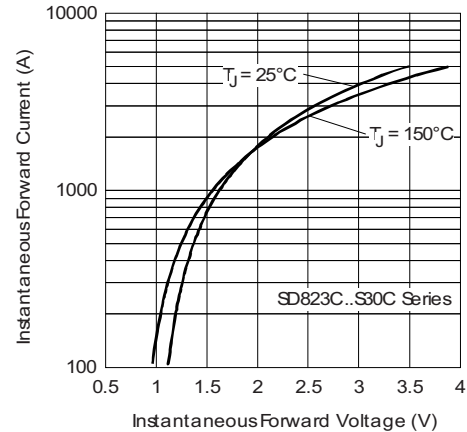


Fig. 18 - Forward Voltage Drop Characteristics

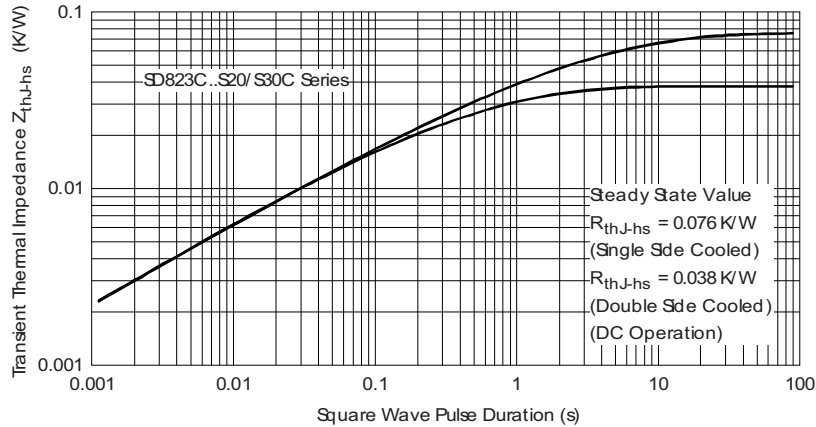


Fig. 19 - Thermal Impedance  $Z_{thJ-hs}$  Characteristic

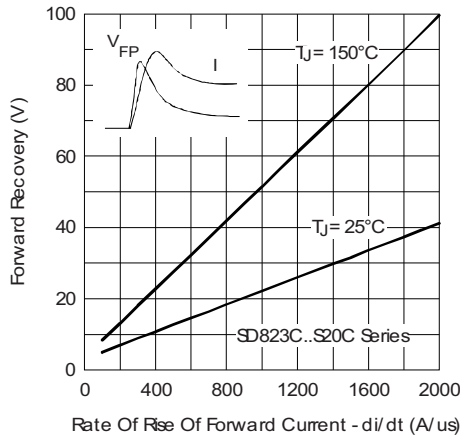


Fig. 20 - Typical Forward Recovery Characteristics

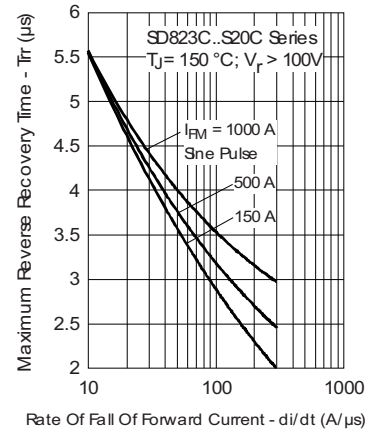


Fig. 22 - Recovery Time Characteristics

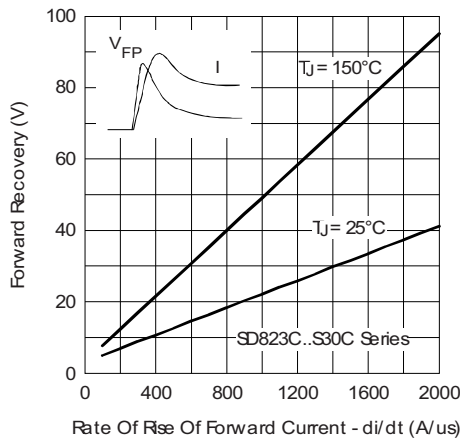


Fig. 21 - Typical Forward Recovery Characteristics

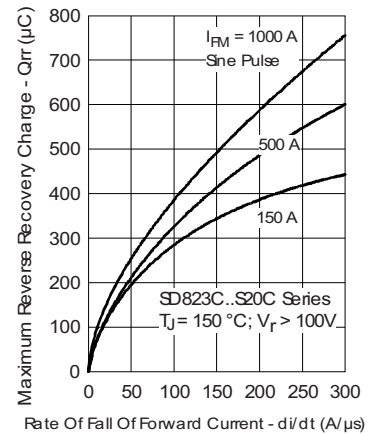


Fig. 23 - Recovery Charge Characteristics

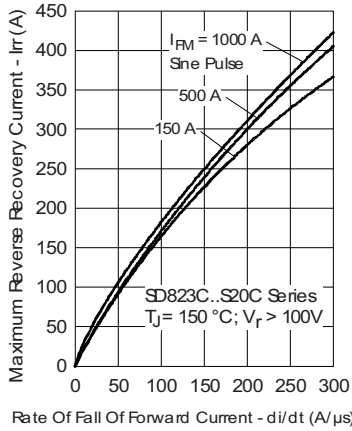


Fig. 24 - Recovery Current Characteristics

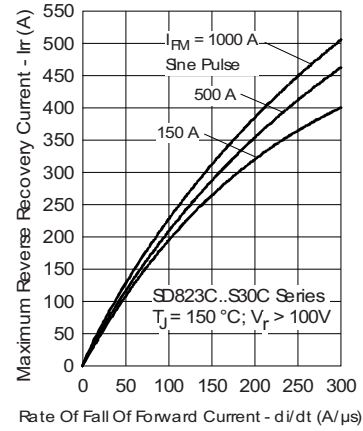


Fig. 27 - Recovery Current Characteristics

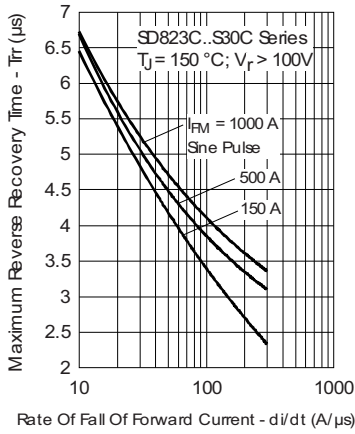


Fig. 25 - Recovery Time Characteristics

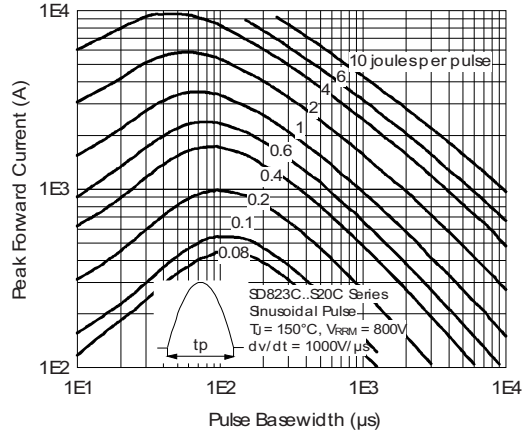


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

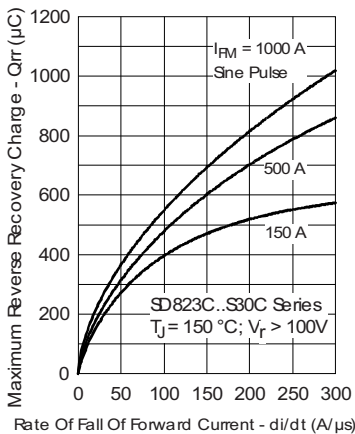


Fig. 26 - Recovery Charge Characteristics

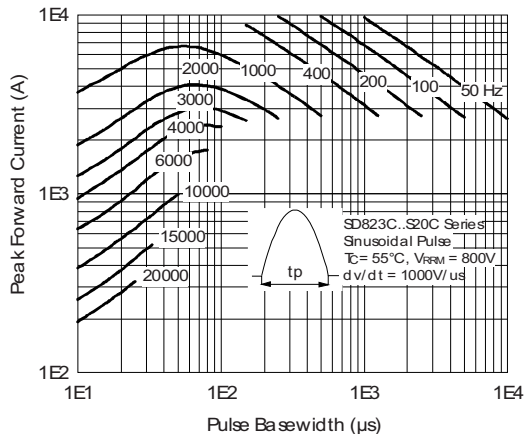


Fig. 29 - Frequency Characteristics

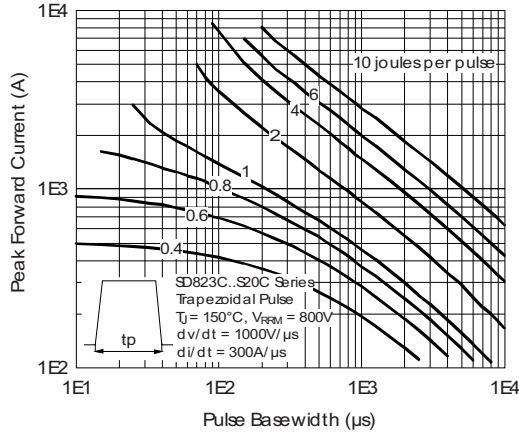


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

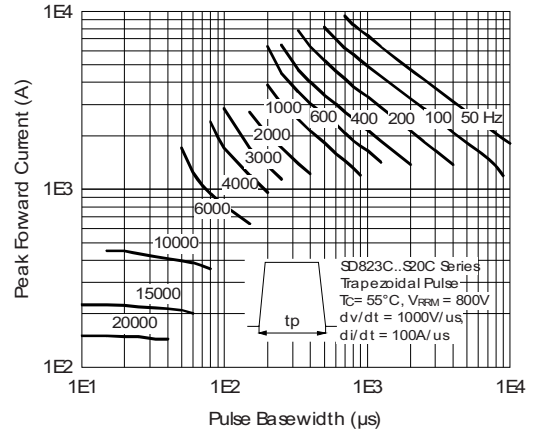


Fig. 33 - Frequency Characteristics

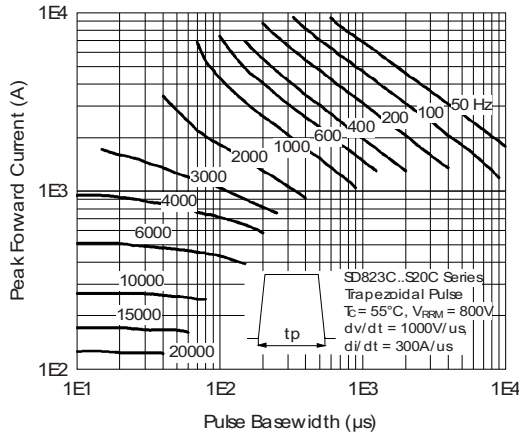


Fig. 31 - Frequency Characteristics

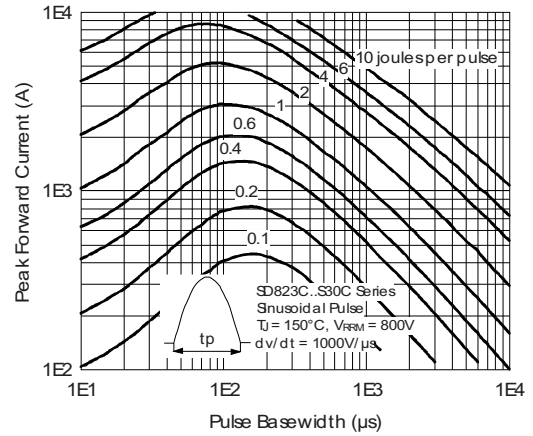


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

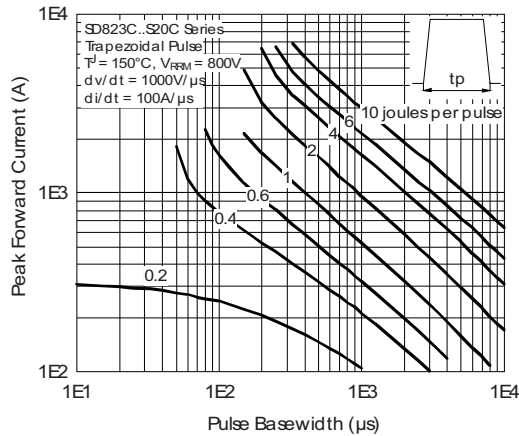


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

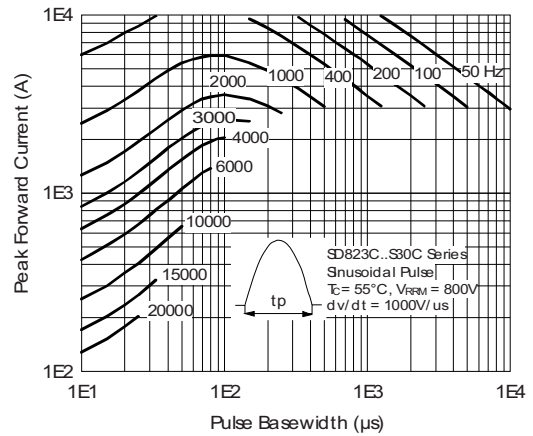


Fig. 35 - Frequency Characteristics



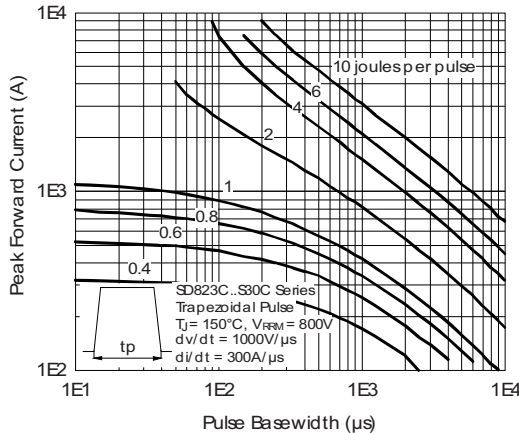


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

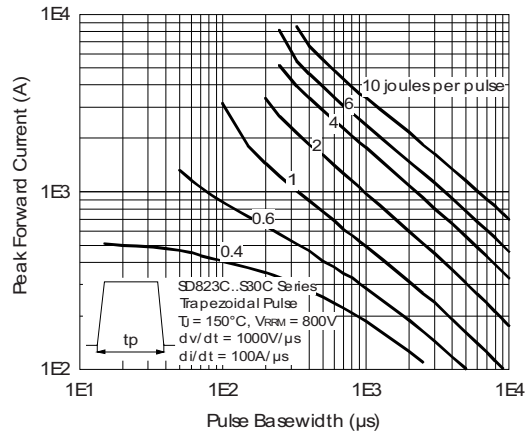


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

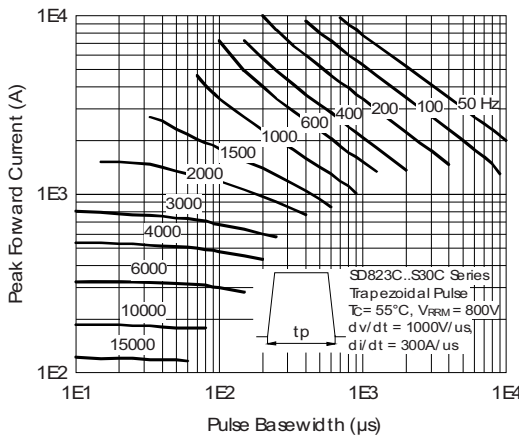


Fig. 37 - Frequency Characteristics

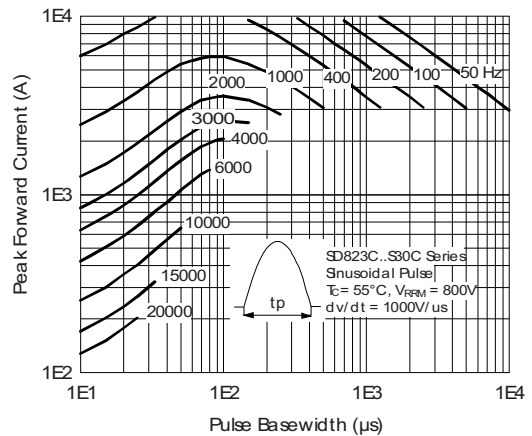


Fig. 39 - Frequency Characteristics

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>SD</b>	<b>82</b>	<b>3</b>	<b>C</b>	<b>25</b>	<b>S20</b>	<b>C</b>
	①	②	③	④	⑤	⑥	⑦	⑧
<b>1</b>	-	Vishay Semiconductors product						
<b>2</b>	-	Diode						
<b>3</b>	-	Essential part number						
<b>4</b>	-	3 = fast recovery						
<b>5</b>	-	C = ceramic PUK						
<b>6</b>	-	Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table)						
<b>7</b>	-	$t_{rr}$ code						
<b>8</b>	-	C = PUK case B-43						

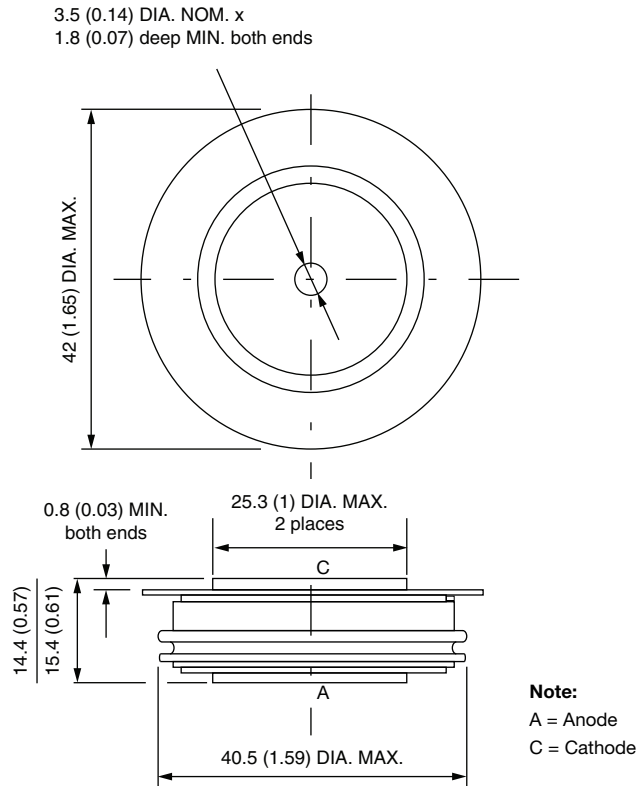
### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95249">www.vishay.com/doc?95249</a>
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## B-43

**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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