

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


B-43

FEATURES

- High power FAST recovery diode series
- 2.0 μ s to 3.0 μ 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


RoHS
COMPLIANT

PRODUCT SUMMARY

$I_{F(AV)}$	810A /910 A
Package	B-43
Circuit configuration	Single diode

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	μs
	T _J	25		°C
T _J		- 40 to 150		

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

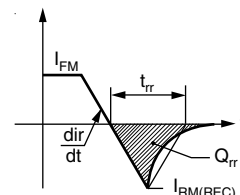
TYPE NUMBER	VOLTAGE CODE	V_{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} MAXIMUM AT $T_J = T_J$ MAXIMUM mA
VS-SD823C..C	12	1200	1300	50
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	

**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	
Maximum peak, one-cycle forward, non-repetitive current	I _{FSM}	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial T _J = T _J maximum	9300	9600	A
		t = 8.3 ms			9730	10 050	
		t = 10 ms	100 % V _{RRM} reapplied		7820	8070	
		t = 8.3 ms			8190	8450	
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reapplied		432	460	kA ² s
		t = 8.3 ms			395	420	
		t = 10 ms	100 % V _{RRM} reapplied		306	326	
		t = 8.3 ms			279	297	
Maximum I ² √t for fusing	I ² √t	t = 0.1 to 10 ms, no voltage reapplied			4320	4600	kA ² √s
Low level value of threshold voltage	V _{F(TO)1}	(16.7 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum			1.00	0.95	V
High level value of threshold voltage	V _{F(TO)2}	(I > π × I _{F(AV)}), T _J = T _J maximum			1.11	1.06	
Low level value of forward slope resistance	r _{f1}	(16.7 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum			0.80	0.60	mW
High level value of forward slope resistance	r _{f2}	(I > π × 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 _o = 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 _R RM (μs)	I _{pk} SQUARE PULSE (A)	di/dt (A/μs)	V _r (V)	t _{rr} AT 25 % I _R RM (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	

 ΔR_{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

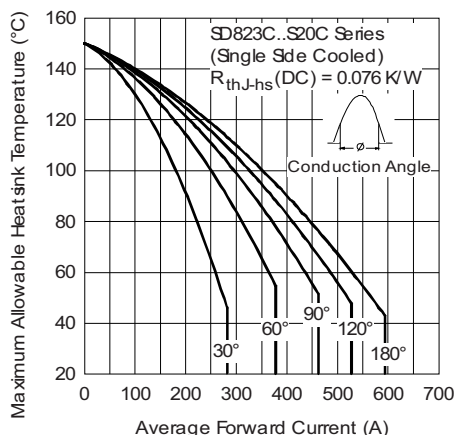


Fig. 1 - Current Ratings Characteristics

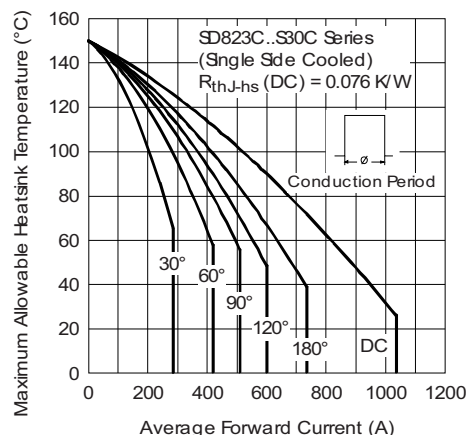


Fig. 4 - Current Ratings Characteristics

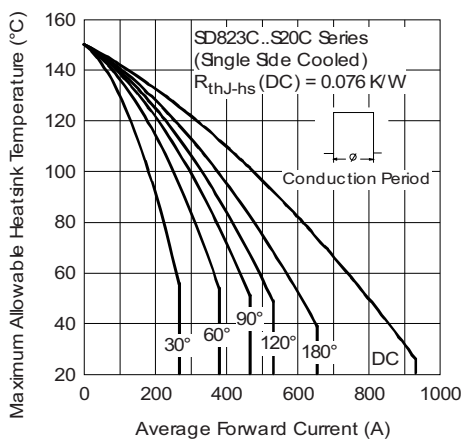


Fig. 2 - Current Ratings Characteristics

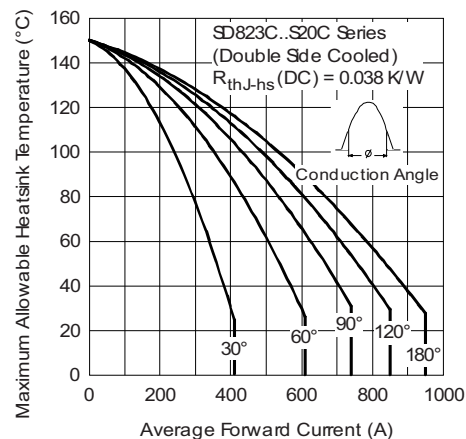


Fig. 5 - Current Ratings Characteristics

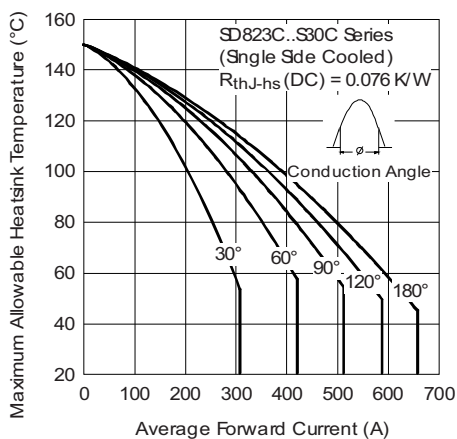


Fig. 3 - Current Ratings Characteristics

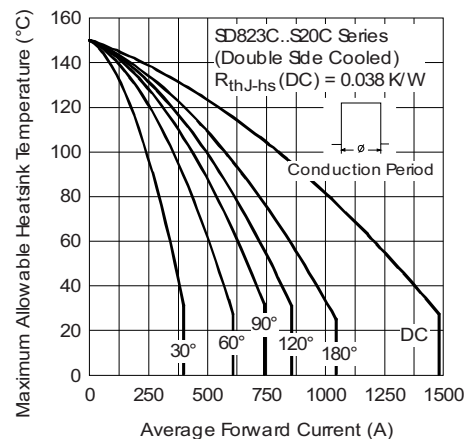


Fig. 6 - Current Ratings Characteristics

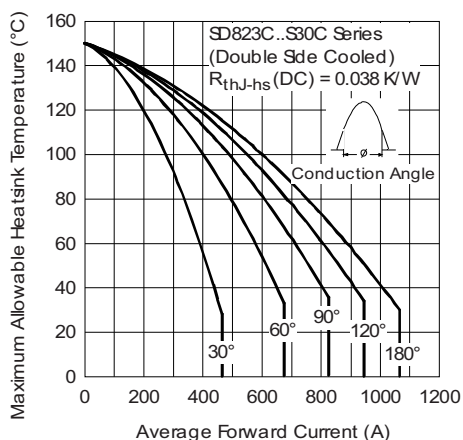


Fig. 7 - Current Ratings Characteristics

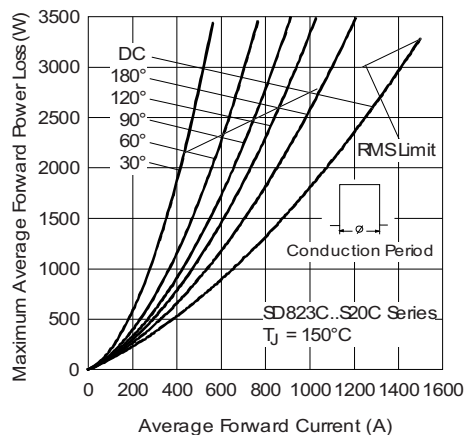


Fig. 10 - Forward Power Loss Characteristics

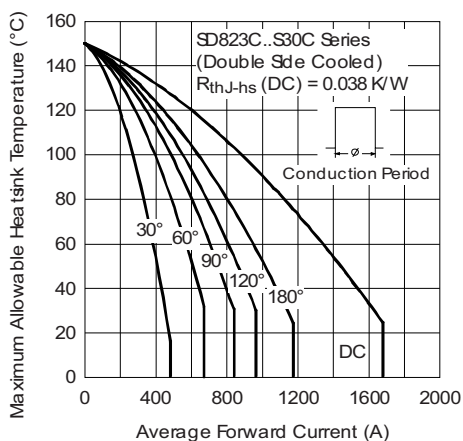


Fig. 8 - Current Ratings Characteristics

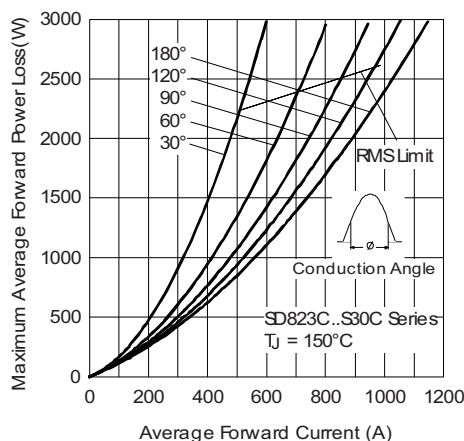


Fig. 11 - Forward Power Loss Characteristics

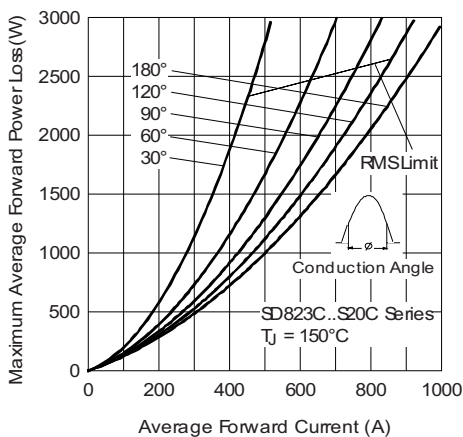


Fig. 9 - Forward Power Loss Characteristics

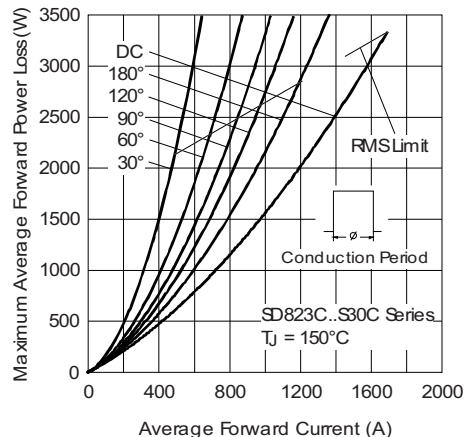


Fig. 12 - Forward Power Loss Characteristics

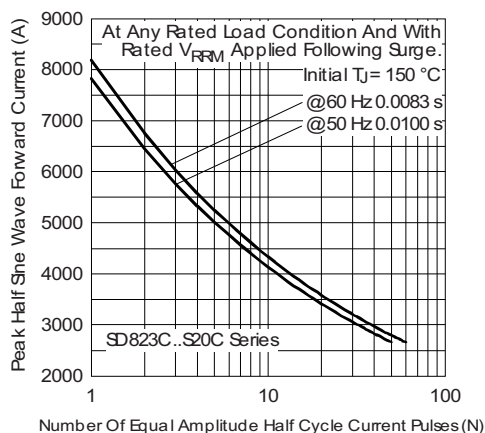


Fig. 13 - Maximum Non-Repetitive Surge Current

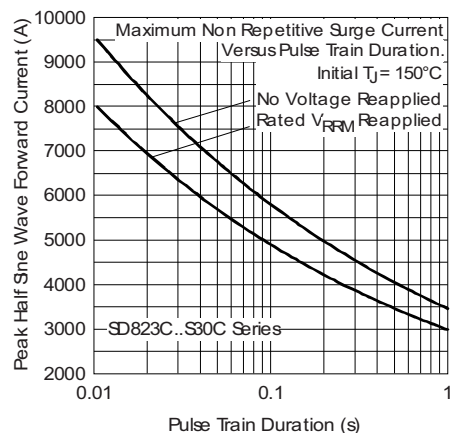


Fig. 16 - Maximum Non-Repetitive Surge Current

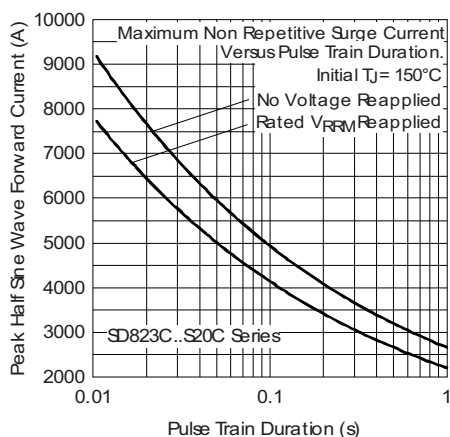


Fig. 14 - Maximum Non-Repetitive Surge Current

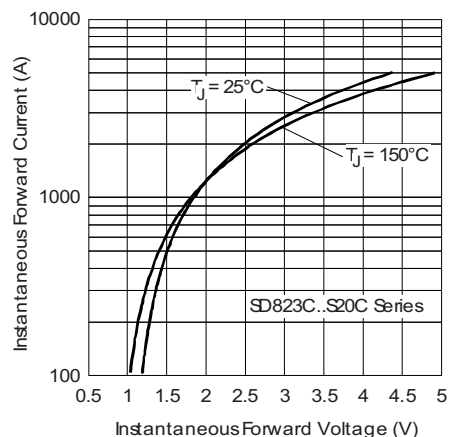


Fig. 17 - Forward Voltage Drop Characteristics

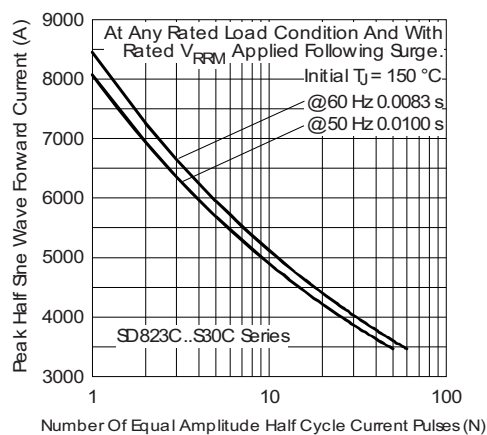


Fig. 15 - Maximum Non-Repetitive Surge Current

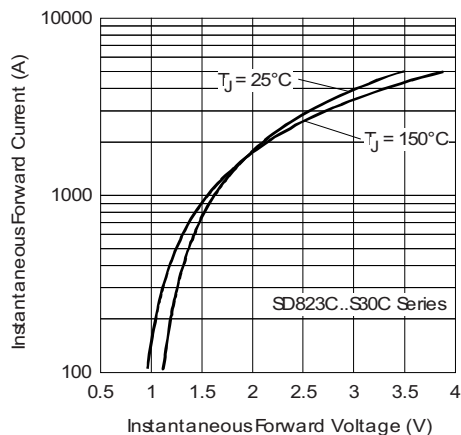


Fig. 18 - Forward Voltage Drop Characteristics

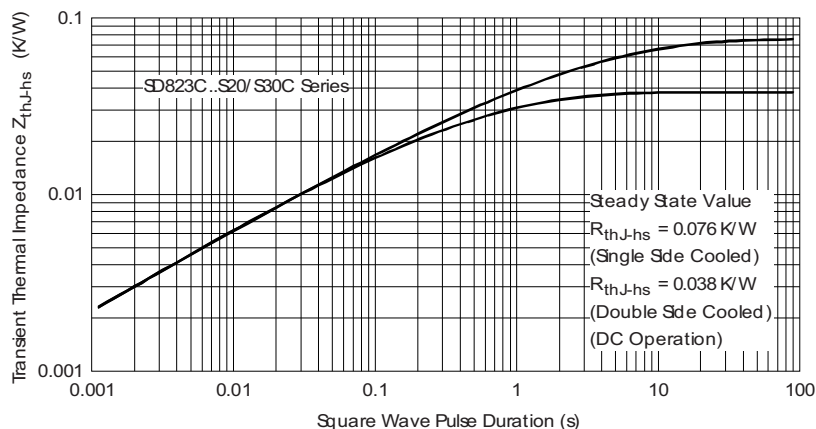
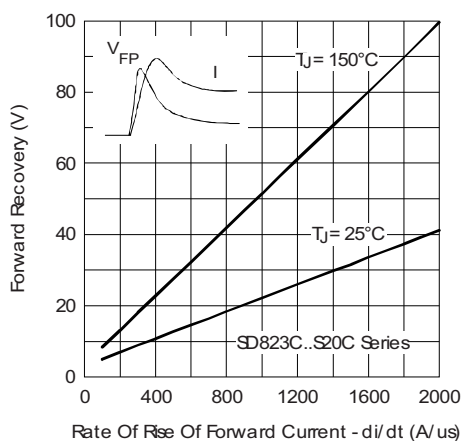

Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic


Fig. 20 - Typical Forward Recovery Characteristics

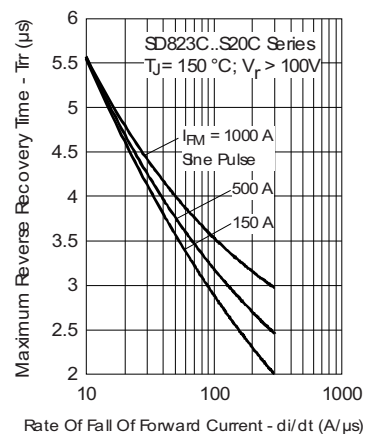


Fig. 22 - Recovery Time Characteristics

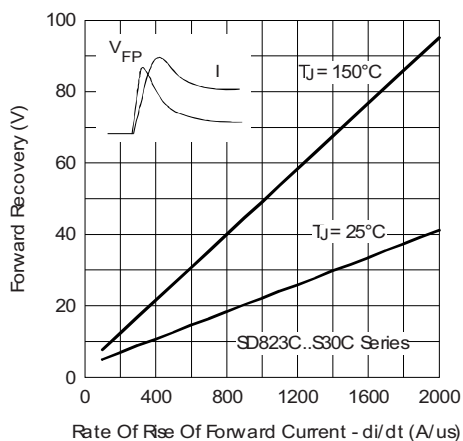


Fig. 21 - Typical Forward Recovery Characteristics

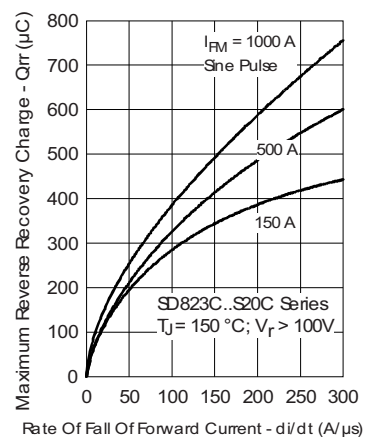


Fig. 23 - Recovery Charge Characteristics

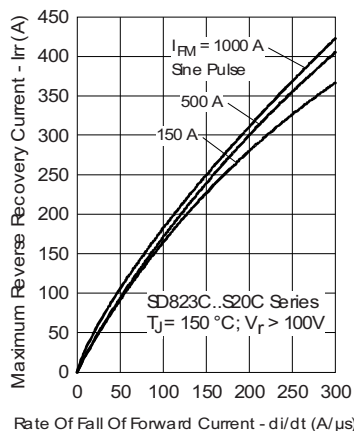


Fig. 24 - Recovery Current Characteristics

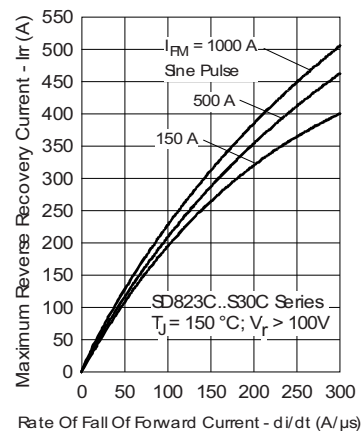


Fig. 27 - Recovery Current Characteristics

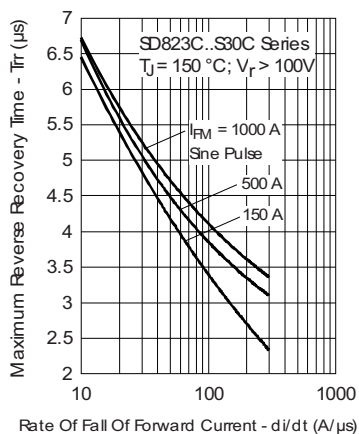


Fig. 25 - Recovery Time Characteristics

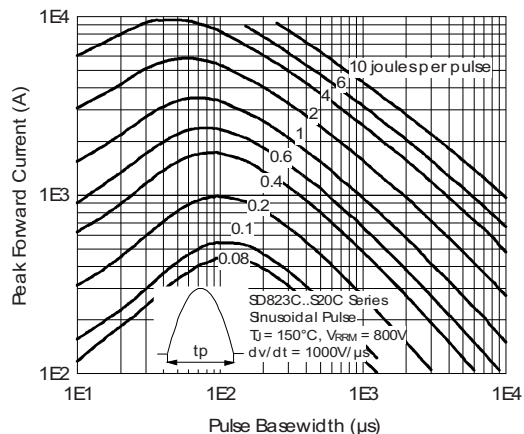


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

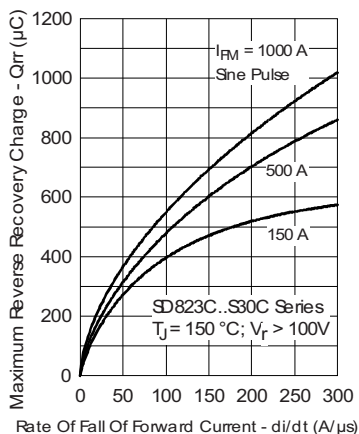


Fig. 26 - Recovery Charge Characteristics

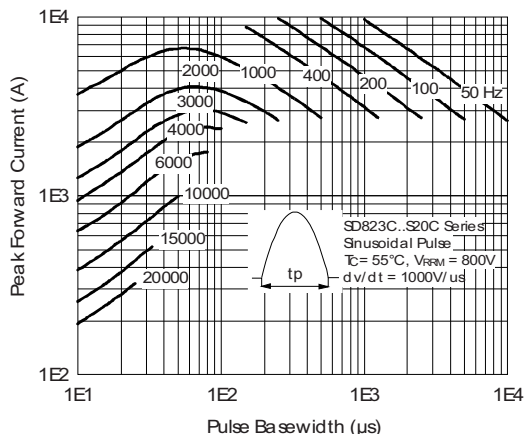


Fig. 29 - Frequency Characteristics

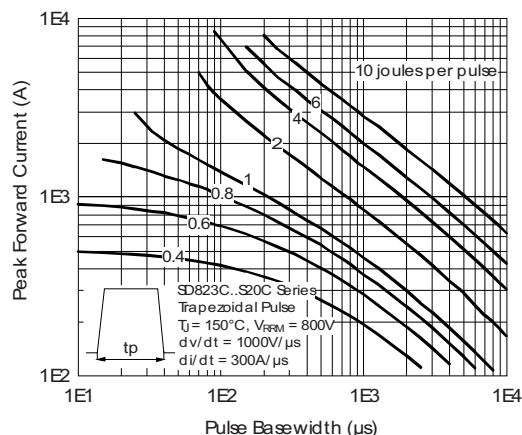


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

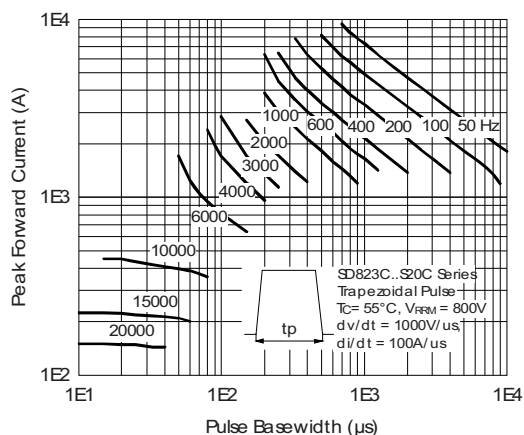


Fig. 33 - Frequency Characteristics

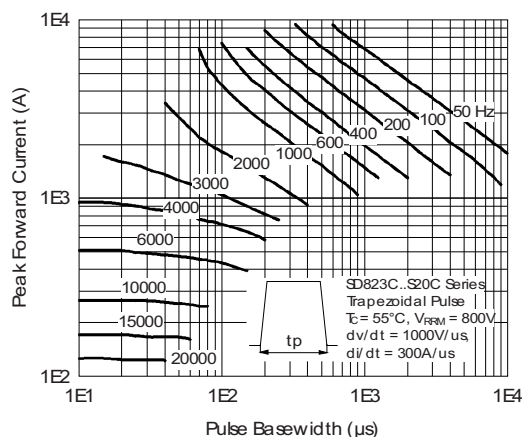


Fig. 31 - Frequency Characteristics

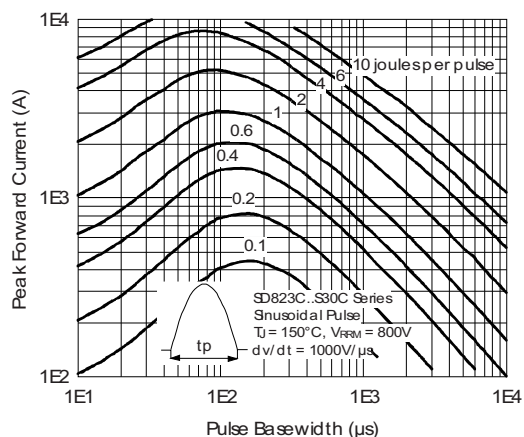


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

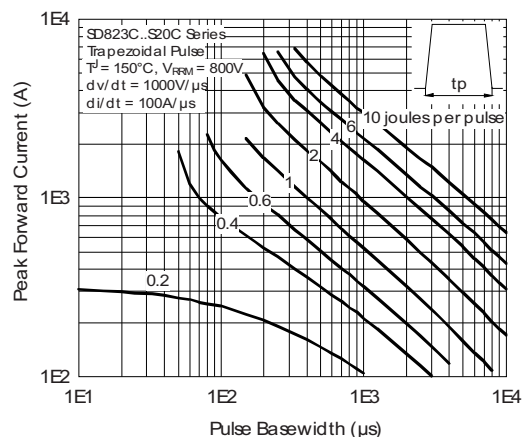


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

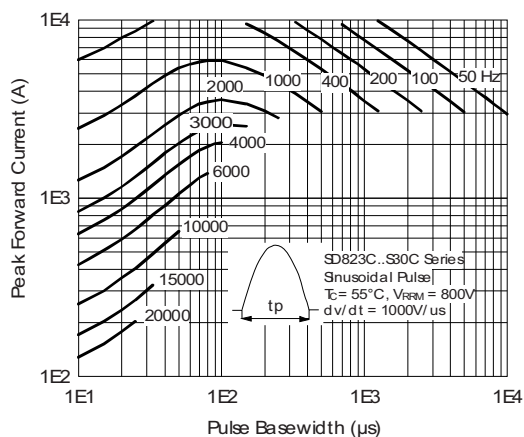


Fig. 35 - Frequency Characteristics

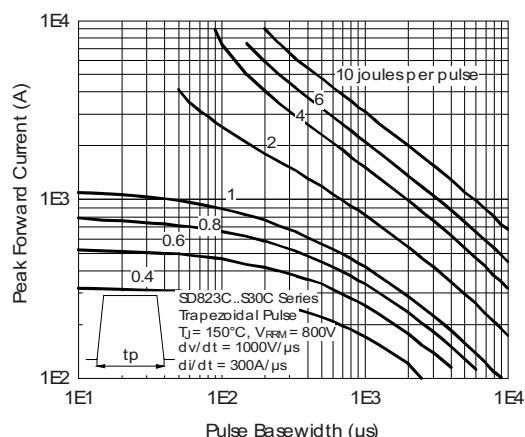


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

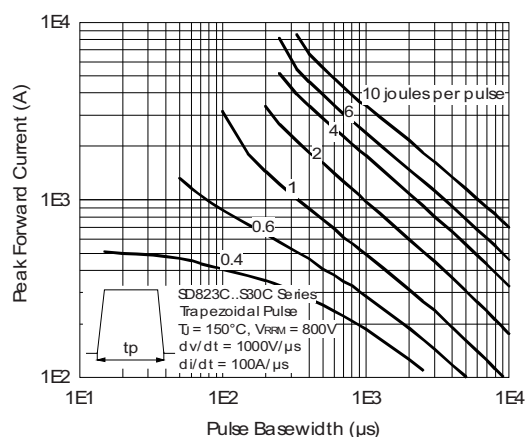


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

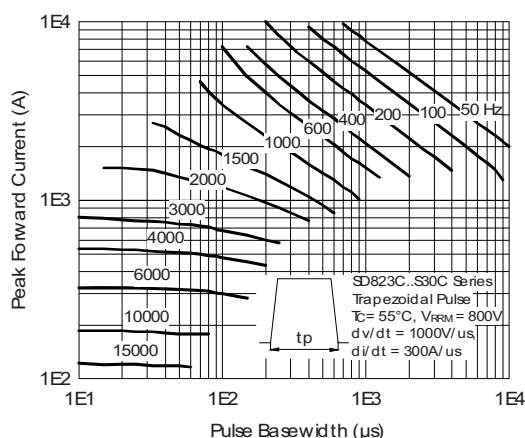


Fig. 37 - Frequency Characteristics

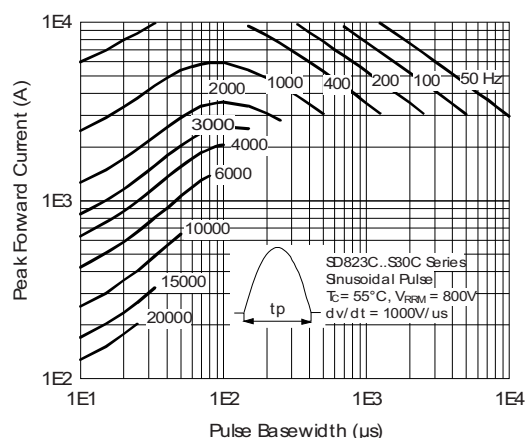


Fig. 39 - Frequency Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	SD	82	3	C	25	S20	C
	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	- C = PUK case B-43							

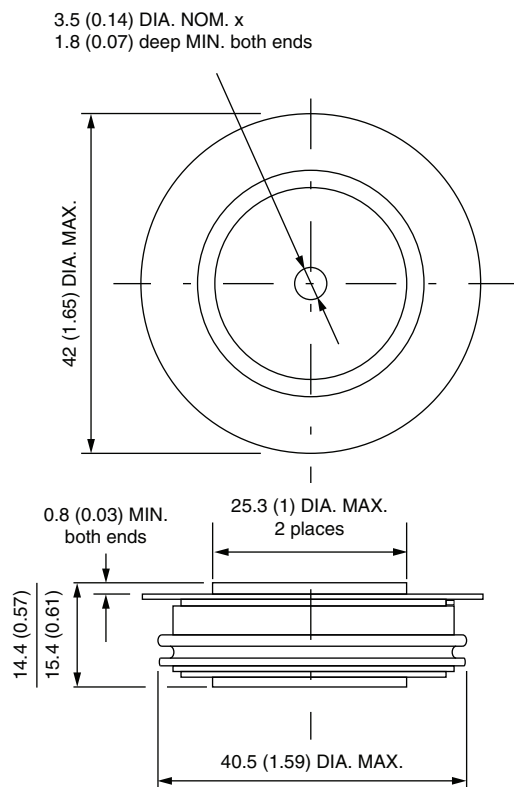
LINKS TO RELATED DOCUMENTS

Dimensions

www.vishay.com/doc?95249

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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