Fast Recovery Diodes (Hockey PUK Version), 845 A

B-43

FEATURES

- High power fast recovery diode series
- 1.0 µs to 1.5 µs recovery time
- High voltage ratings up to 1600 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 125 °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	
$I_{F(AV)}$	845 A
Package	B-43
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS				
PARAMETER	TEST CONDITIONS	VS-SD803C..C		UNITS
		S10	S15	
$I_{F(AV)}$		845	845	A
	T_{hs}	55	55	°C
$I_{F(RMS)}$		1326	1326	A
	T_{hs}	25	25	°C
I_{FSM}	50 Hz	11 295	11 295	A
	60 Hz	11 830	11 830	
I^2t	50 Hz	640	640	A
	60 Hz	583	583	
V_{RRM}	Range	400 to 1000	1200 to 1600	V
t_{rr}		1.0	1.5	µs
	T_J	25	25	°C
T_J		-40 to +125	-40 to +125	

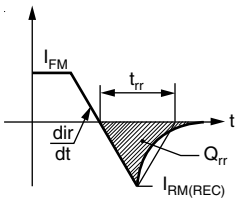
ELECTRICAL SPECIFICATIONS

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 = 125 °C mA
VS-SD803C..S10C	04	400	500	45
	08	800	900	
	10	1000	1100	
VS-SD803C..S15C	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled			845 (420)	A
					55 (75)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled			1326	A
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	11 295	
		t = 8.3 ms			11 830	
		t = 10 ms	100 % V_{RRM} reapplied		9500	
		t = 8.3 ms			9945	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		640	kA^2s
		t = 8.3 ms			583	
		t = 10 ms	100 % V_{RRM} reapplied		451	
		t = 8.3 ms			412	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			6400	$kA^2\sqrt{s}$
Low level 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			1.02	V
High level of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			1.32	
Low level 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			0.38	mW
High level of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.28	
Maximum forward voltage drop	V_{FM}	I_{pk} = 2655 A, $T_J = T_J$ maximum t_p = 10 ms sinusoidal wave			1.89	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)	
S10	1.0	1000	50	-30	2.0	45	34	
S15	1.5				3.2	87	51	

THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum operating temperature range	T_J		-40 to 125	°C
Maximum storage temperature range	T_{Stg}		-40 to 125	
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°	0.006	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

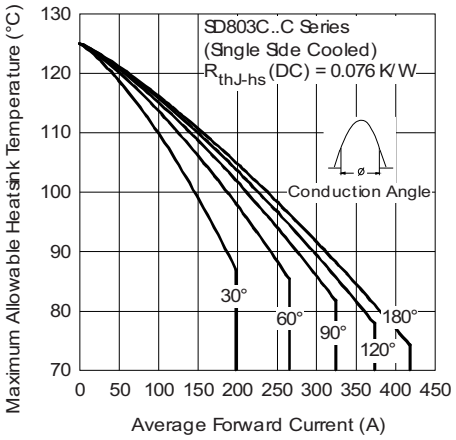


Fig. 1 - Current Ratings Characteristics

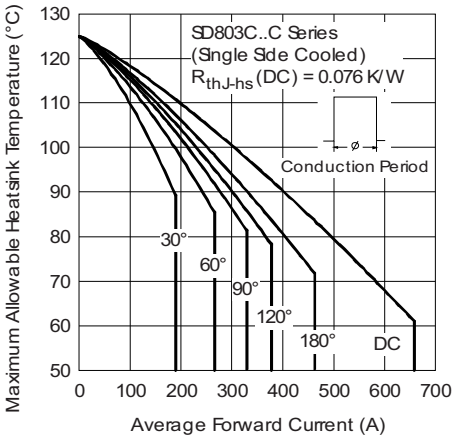


Fig. 2 - Current Ratings Characteristics

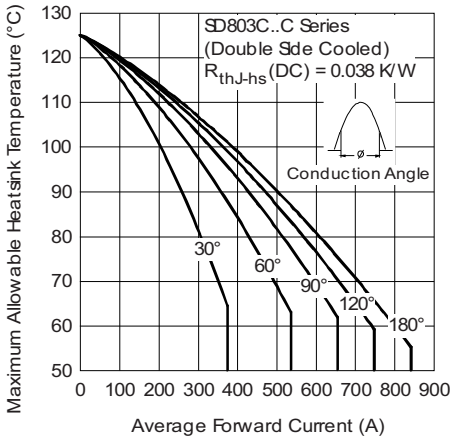


Fig. 3 - Current Ratings Characteristics

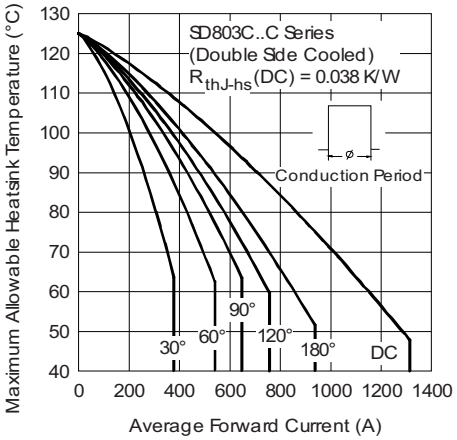


Fig. 4 - Current Ratings Characteristics

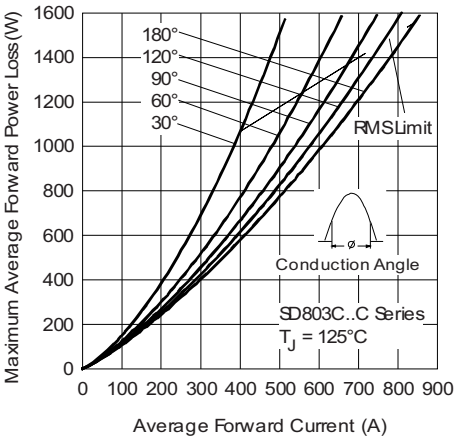


Fig. 5 - Forward Power Loss Characteristics

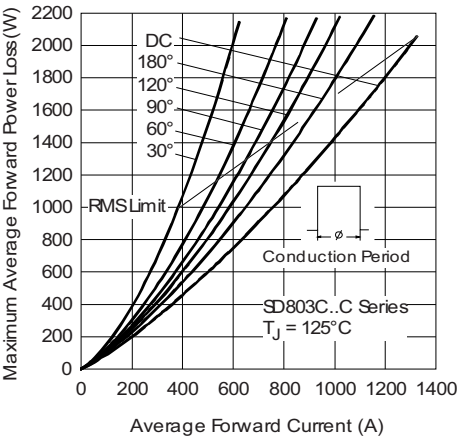


Fig. 6 - Forward Power Loss Characteristics

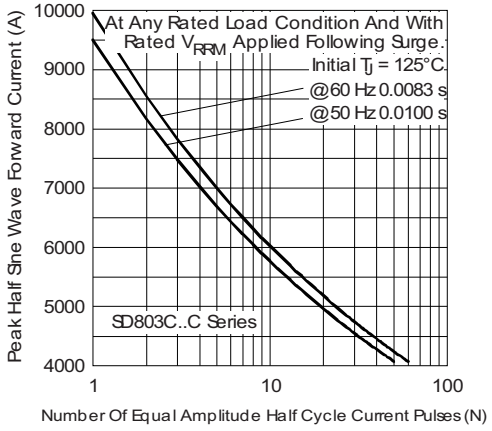


Fig. 7 - Maximum Non-Repetitive Surge Current
Single and Double-Side Cooled

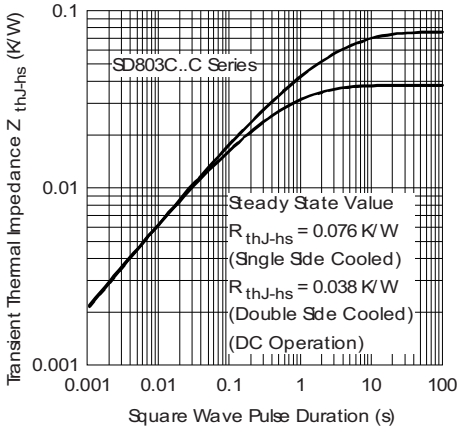


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

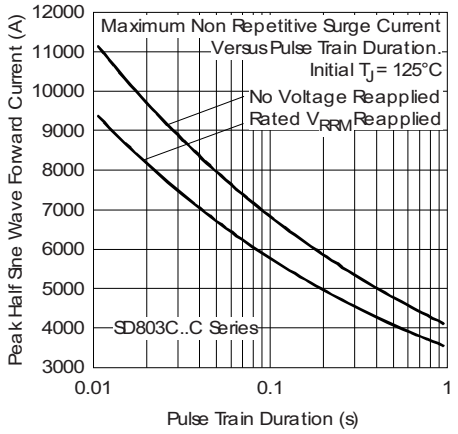


Fig. 8 - Maximum Non-Repetitive Surge Current
Single and Double-Side Cooled

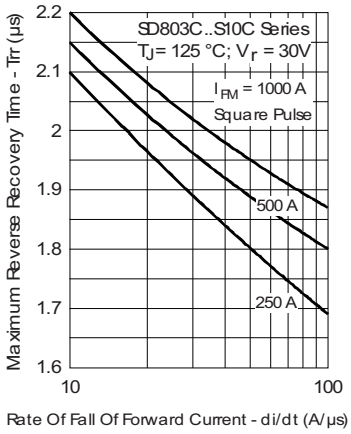


Fig. 11 - Recovery Time Characteristics

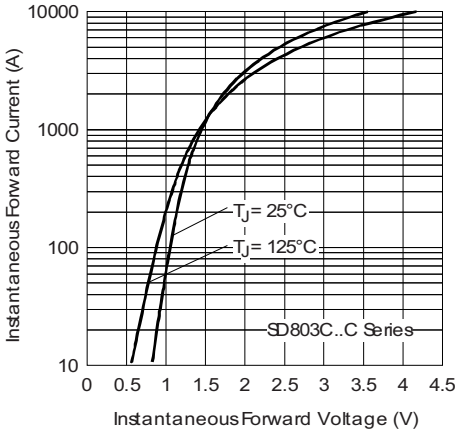


Fig. 9 - Forward Voltage Drop Characteristics

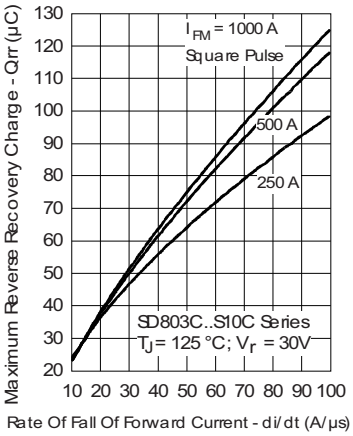


Fig. 12 - Recovery Charge Characteristics

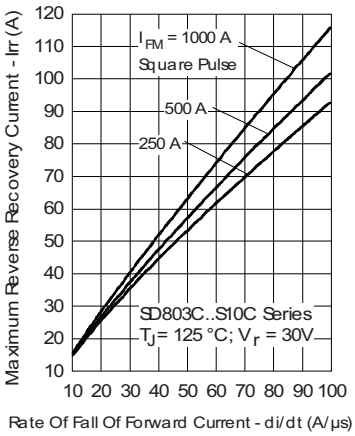


Fig. 13 - Recovery Current Characteristics

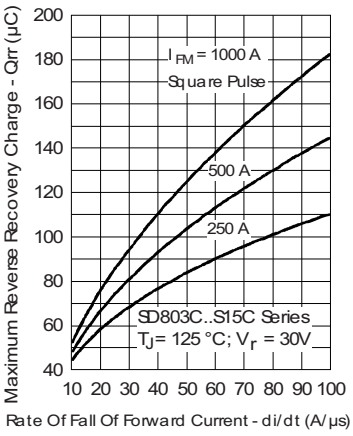


Fig. 15 - Recovery Charge Characteristics

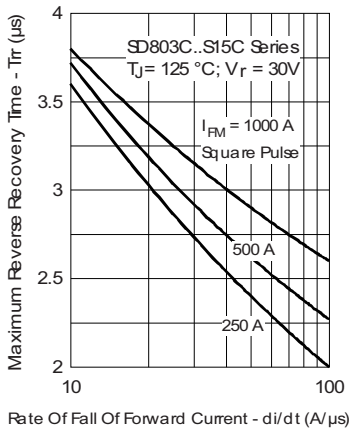


Fig. 14 - Recovery Time Characteristics

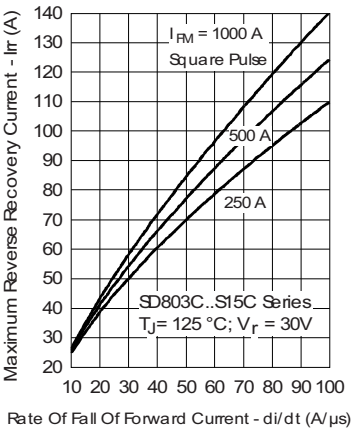


Fig. 16 - Recovery Current Characteristics

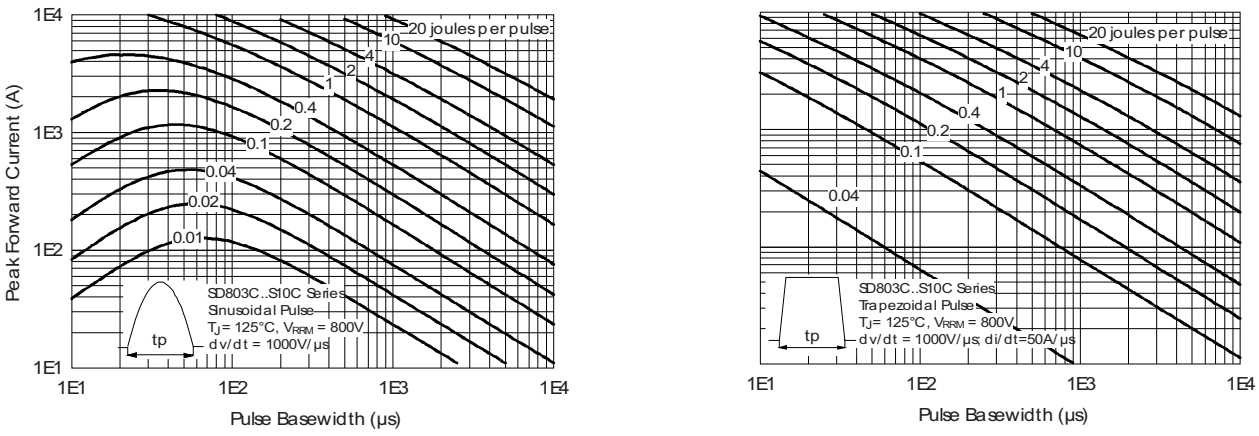


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

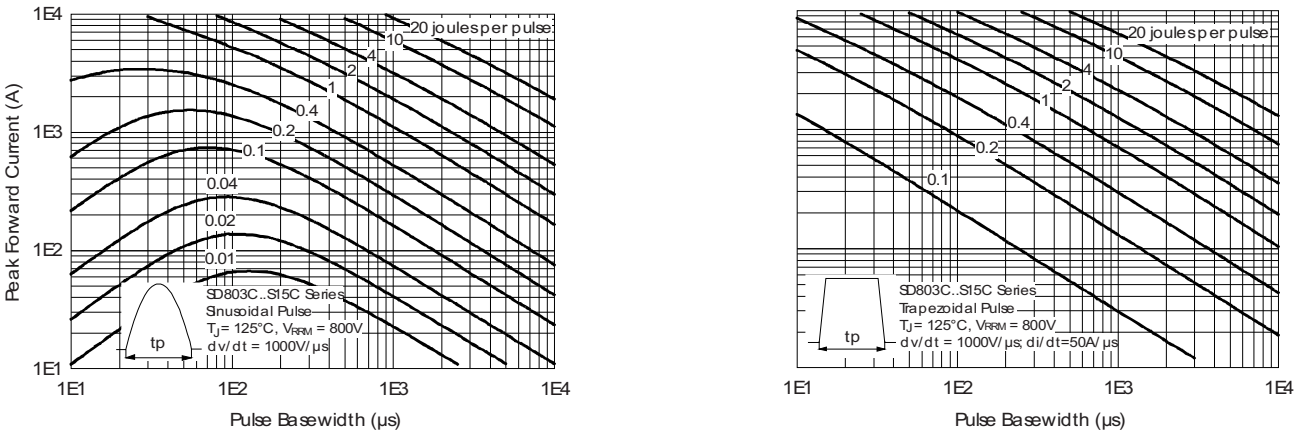


Fig. 18 - Maximum Total Energy Loss Per Pulse Characteristics

ORDERING INFORMATION TABLE

Device code

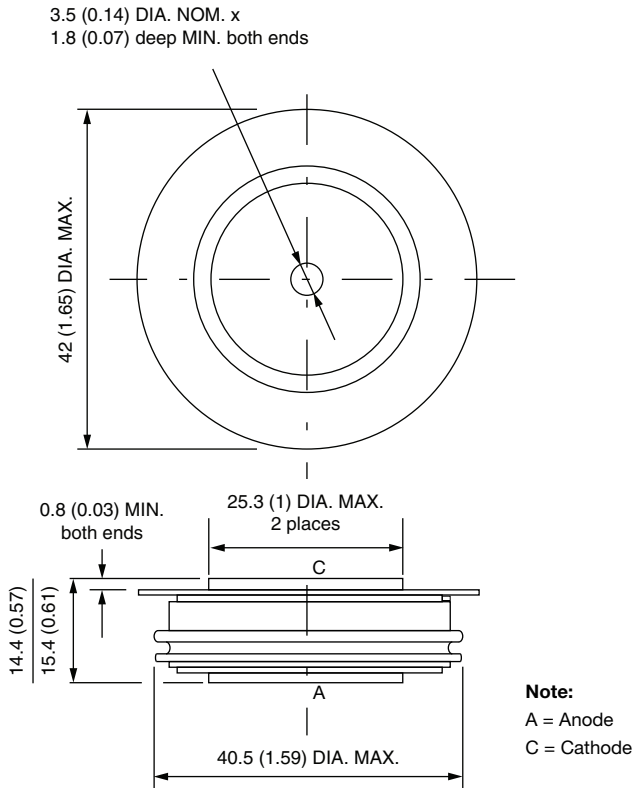
VS-	SD	80	3	C	16	S15	C
1	2	3	4	5	6	7	8

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 (see Recovery Characteristics table)
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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