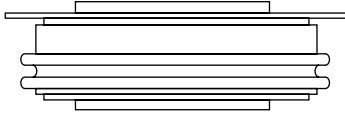


## Fast Recovery Diodes (Hockey PUK Version), 845 A


**B-43**
**FEATURES**

- High power FAST recovery diode series
- 1.0 to 1.5  $\mu$ s 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
- Case style conform to JEDEC B-43
- Maximum junction temperature 125 °C
- Lead (Pb)-free
- Designed and qualified for industrial level


**RoHS  
COMPLIANT**
**PRODUCT SUMMARY**

$I_{F(AV)}$	845 A
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**TYPICAL APPLICATIONS**

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

**MAJOR RATINGS AND CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		845	A
	$T_{hs}$	55	°C
$I_{F(RMS)}$		1326	A
	$T_{hs}$	25	°C
$I_{FSM}$	50 Hz	11 295	A
	60 Hz	11 830	
$I^2t$	50 Hz	640	kA <sup>2</sup> s
	60 Hz	583	
$V_{RRM}$	Range	400 to 1600	V
$t_{rr}$		1.0 to 1.5	$\mu$ s
	$T_J$	25	°C
$T_J$		- 40 to 125	

## ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	I <sub>RRM</sub> MAXIMUM AT T <sub>J</sub> = 125 °C mA
SD803C..S10C	04	400	500	45
	08	800	900	
	10	1000	1100	
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 <sub>F(AV)</sub>	180° conduction, half sine wave Double side (single side) cooled		845 (420)	A
				55 (75)	°C
Maximum RMS current	I <sub>F(RMS)</sub>	25 °C heatsink temperature double side cooled		1326	
Maximum peak, one-cycle non-repetitive forward current	I <sub>FSM</sub>	t = 10 ms	No voltage reappplied	11 295	A
		t = 8.3 ms		11 830	
		t = 10 ms	100 % V <sub>RRM</sub> reappplied	9500	
		t = 8.3 ms		9945	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reappplied	640	kA <sup>2</sup> s
		t = 8.3 ms		583	
		t = 10 ms	100 % V <sub>RRM</sub> reappplied	451	
		t = 8.3 ms		412	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 to 10 ms, no voltage reappplied		6400	kA <sup>2</sup> √s
Low level of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		1.02	V
High level of threshold voltage	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum		1.32	
Low level of forward slope resistance	r <sub>f1</sub>	(16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		0.38	mΩ
High level of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum		0.28	
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 2655 A, T <sub>J</sub> = 25 °C; t <sub>p</sub> = 10 ms sinusoidal wave		1.89	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT T <sub>J</sub> = 25 °C	TEST CONDITIONS			TYPICAL VALUES AT T <sub>J</sub> = 125 °C			
	t <sub>rr</sub> AT 25 % I <sub>RRM</sub> (μs)	I <sub>pk</sub> SQUARE PULSE (A)	di/dt (A/μs)	V <sub>r</sub> (V)	t <sub>rr</sub> AT 25 % I <sub>RRM</sub> (μs)	Q <sub>rr</sub> (μC)	I <sub>rr</sub> (A)	
S10	1.0	1000	25	-30	2.0	45	34	
S15	1.5				3.2	87	51	



<b>THERMAL AND MECHANICAL SPECIFICATIONS</b>				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum operating temperature range	$T_J$		- 40 to 125	°C
Maximum storage temperature range	$T_{Stg}$		- 40 to 150	
Maximum thermal resistance, junction to heatsink	$R_{thJ-hs}$	DC operation single side cooled	0.076	K/W
		DC operation double side cooled	0.038	
Mounting force, $\pm 10\%$			9800 (1000)	N (kg)
Approximate weight			83	g
Case style		See dimensions - link at the end of datasheet		B-43

<b><math>\Delta R_{thJ-hs}</math> CONDUCTION</b>						
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

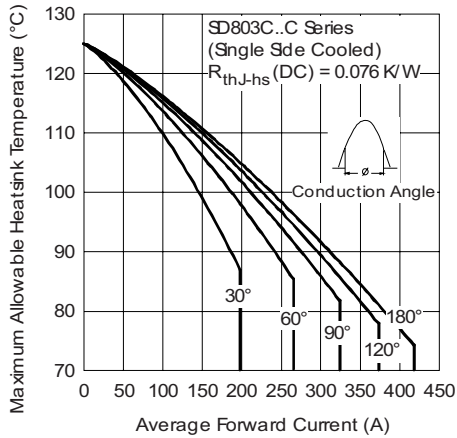


Fig. 1 - Current Ratings Characteristics

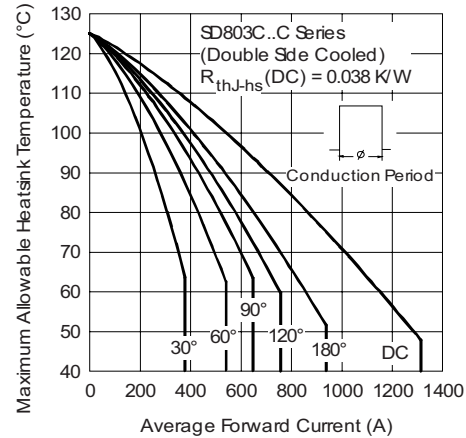


Fig. 4 - Current Ratings Characteristics

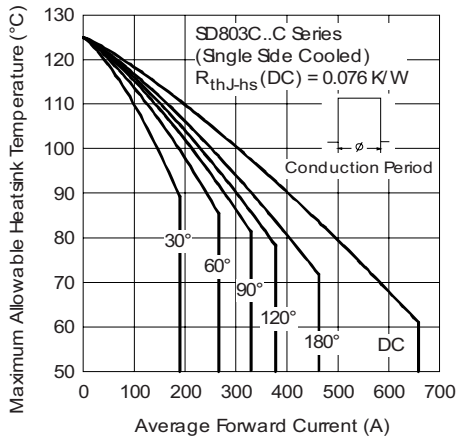


Fig. 2 - Current Ratings Characteristics

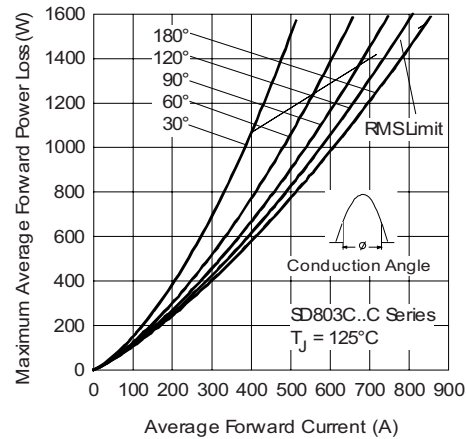


Fig. 5 - Forward Power Loss Characteristics

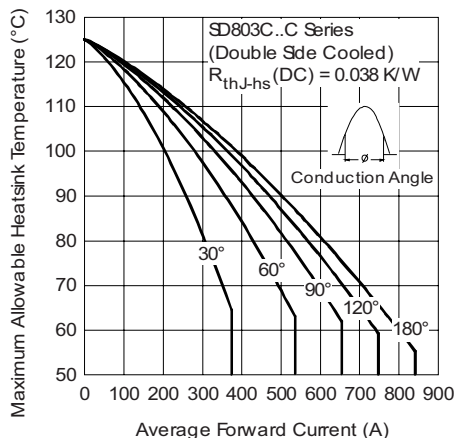


Fig. 3 - Current Ratings Characteristics

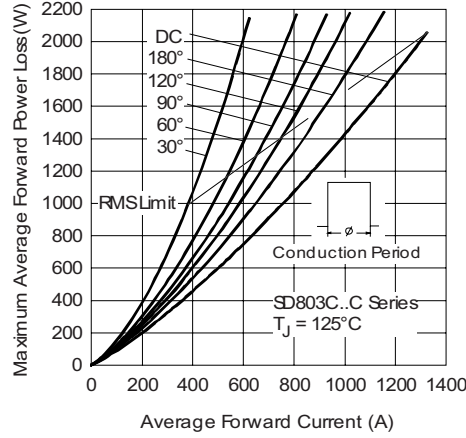


Fig. 6 - Forward Power Loss Characteristics

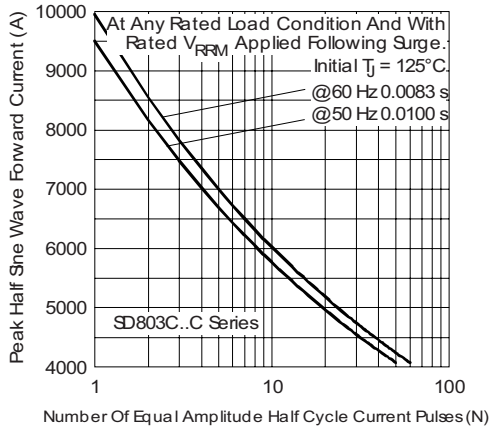


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

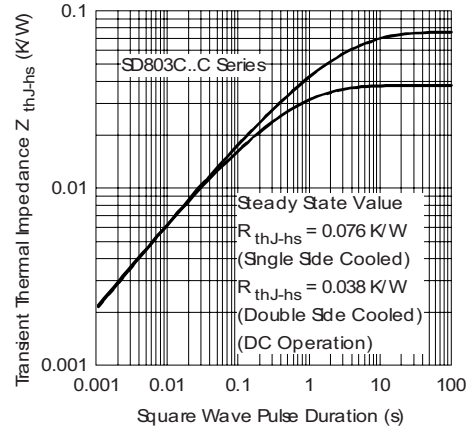


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

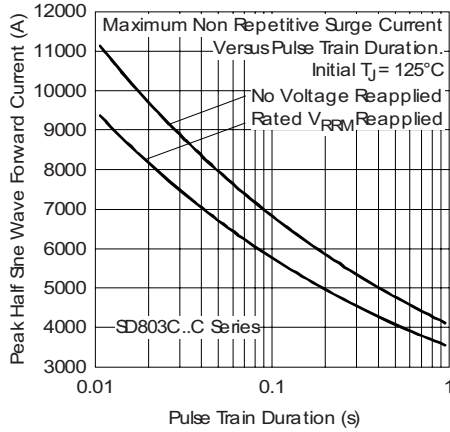


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

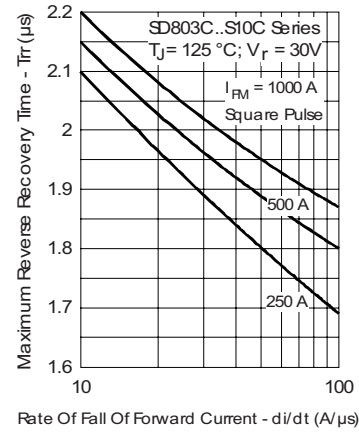


Fig. 11 - Recovery Time Characteristics

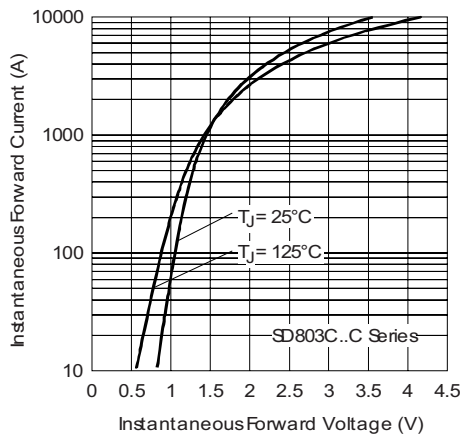


Fig. 9 - Forward Voltage Drop Characteristics

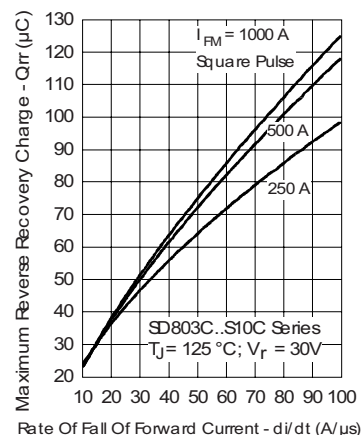


Fig. 12 - Recovery Charge Characteristics

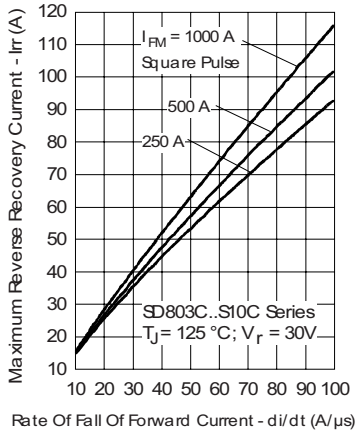


Fig. 13 - Recovery Current Characteristics

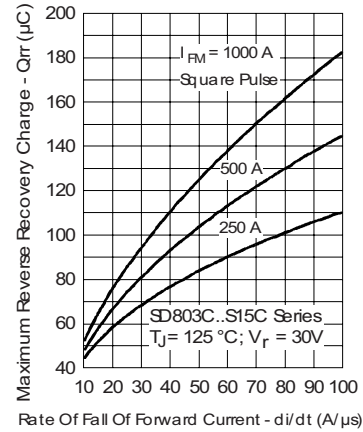


Fig. 15 - Recovery Charge Characteristics

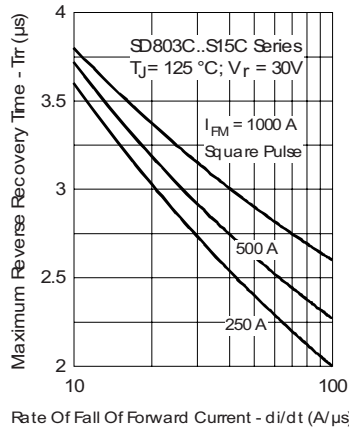


Fig. 14 - Recovery Time Characteristics

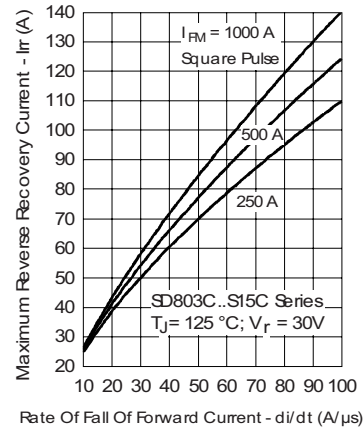


Fig. 16 - Recovery Current Characteristics

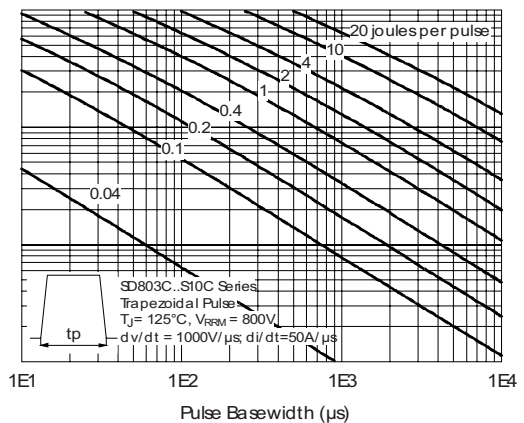
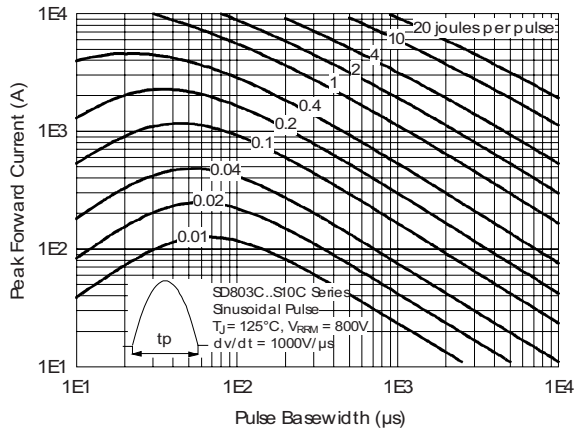


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

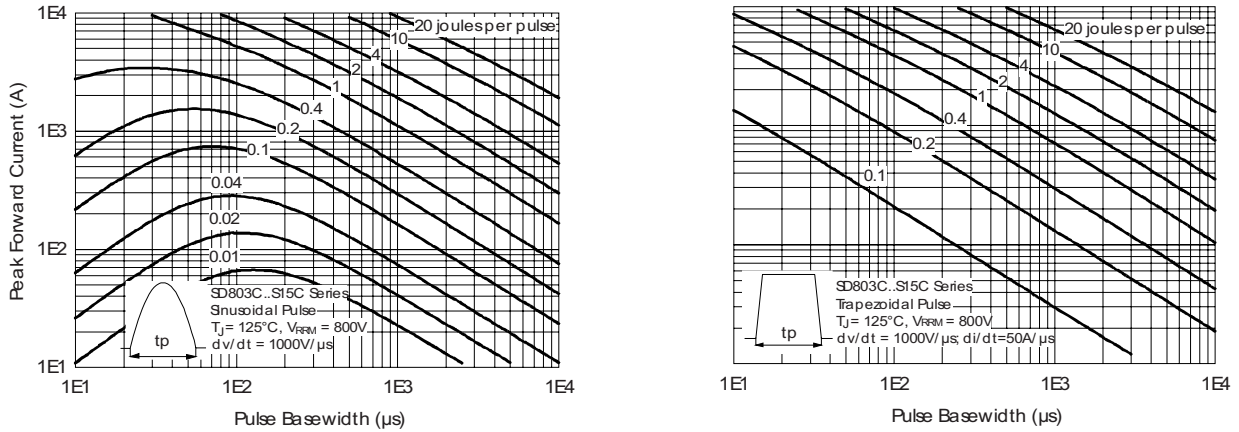


Fig. 18 - Maximum Total Energy Loss Per Pulse Characteristics

### ORDERING INFORMATION TABLE

Device code	<b>SD</b>	<b>80</b>	<b>3</b>	<b>C</b>	<b>16</b>	<b>S15</b>	<b>C</b>		
	①	②	③	④	⑤	⑥	⑦		
	<b>1</b>	-	Diode	<b>2</b>	-	Essential part number	<b>3</b>	-	3 = Fast recovery
	<b>4</b>	-	C = Ceramic PUK	<b>5</b>	-	Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table)	<b>6</b>	-	$t_{rr}$ code (see Recovery Characteristics table)
	<b>7</b>	-	C = PUK case B-43						

### LINKS TO RELATED DOCUMENTS

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