

Fast Recovery Diodes (Hockey PUK Version), 430 A



DO-200AA

FEATURES

- High power FAST recovery diode series
- 1.0 μ s to 1.5 μ 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® DO-200AA
- Maximum junction temperature 125 °C
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**

PRODUCT SUMMARY

$I_{F(AV)}$	430 A
Package	DO-200AA
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	VALUES	UNITS
$I_{F(AV)}$		430	A
	T_{hs}	55	°C
$I_{F(RMS)}$		675	A
	T_{hs}	25	°C
I_{FSM}	50 Hz	6180	A
	60 Hz	6470	
I^2t	50 Hz	191	kA ² s
	60 Hz	175	
V_{RRM}	Range	400 to 1600	V
t_{rr}		1.0 to 1.5	μ s
	T_J	25	°C
T_J		- 40 to 125	

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V_{RRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	I_{RRM} MAXIMUM AT $T_J = 125$ °C mA
VS-SD403C..S10C	04	400	500	35
	08	800	900	
	10	1000	1100	
VS-SD403C..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		430 (210)	A
		Double side (single side) cooled		55 (75)	°C
Maximum RMS current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled		675	
Maximum peak, one-cycle, non-repetitive forward current	I_{FSM}	t = 10 ms	No voltage reapplied	6180	A
		t = 8.3 ms		6470	
		t = 10 ms	100 % V_{RRM} reapplied	5200	
		t = 8.3 ms		5445	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied	191	kA ² s
		t = 8.3 ms		175	
		t = 10 ms	100 % V_{RRM} reapplied	135	
		t = 8.3 ms		123	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		1910	kA ² √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	V
High level value of threshold voltage	$V_{F(TO)2}$	(1 $> \pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		1.20	
Low level 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)		0.56	mΩ
High level of forward slope resistance	r_{f2}	(1 $> \pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		0.70	
Maximum forward voltage drop	V_{FM}	$I_{pk} = 1350$ A, $T_J = 25$ °C; $t_p = 10$ ms sinusoidal wave		1.83	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	750	25	- 30	2.4	52	33	
S15	1.5				2.9	90	44	

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 150	
Maximum thermal resistance, junction to heatsink	R_{thJ-hs}	DC operation single side cooled		0.16	K/W
		DC operation double side cooled		0.08	
Mounting force, ± 10 %				4900 (500)	N (kg)
Approximate weight				70	g
Case style		See dimensions - link at the end of datasheet		DO-200AA	

ΔR_{thJ-hs} CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.010	0.011	0.008	0.008	$T_J = T_J$ maximum	K/W
120°	0.012	0.013	0.013	0.013		
90°	0.016	0.016	0.018	0.018		
60°	0.024	0.024	0.025	0.025		
30°	0.042	0.042	0.042	0.042		

Note

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

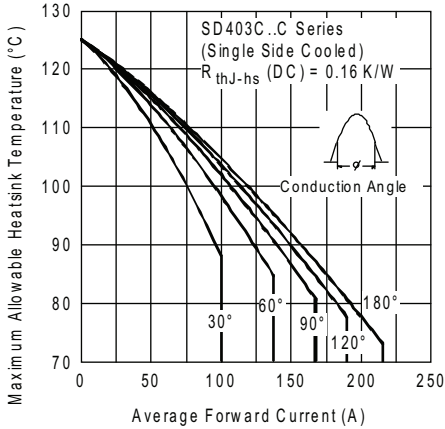


Fig. 1 - Current Ratings Characteristics

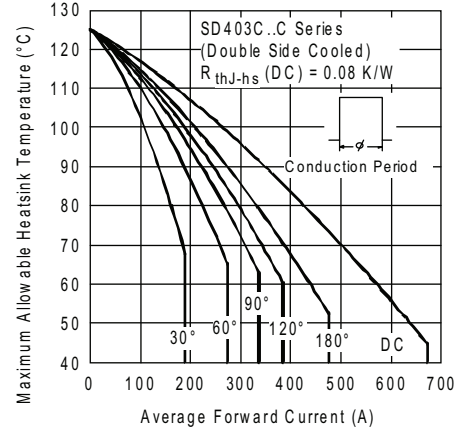


Fig. 4 - Current Ratings Characteristics

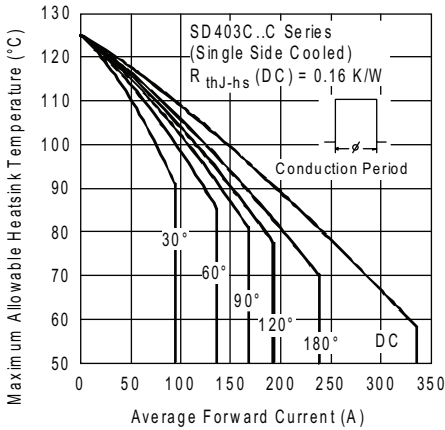


Fig. 2 - Current Ratings Characteristics

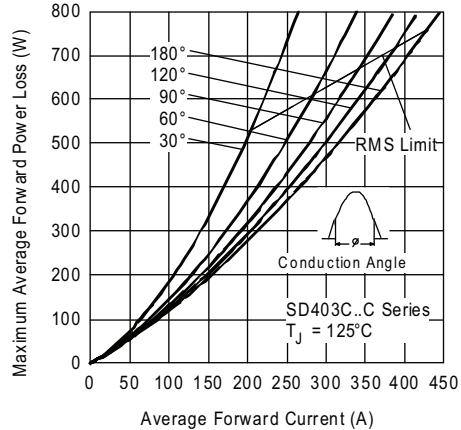


Fig. 5 - Forward Power Loss Characteristics

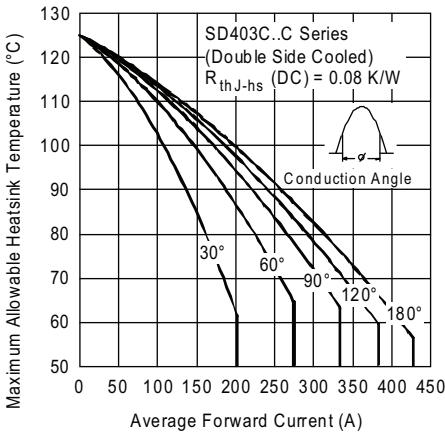


Fig. 3 - Current Ratings Characteristics

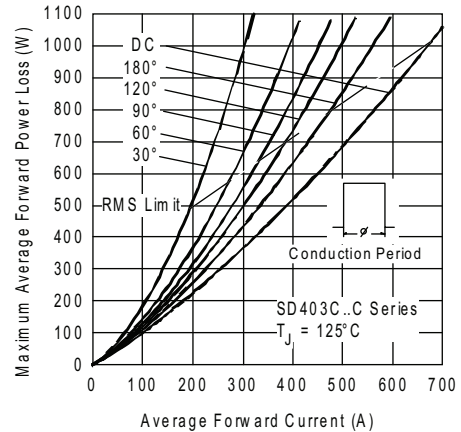


Fig. 6 - Forward Power Loss Characteristics

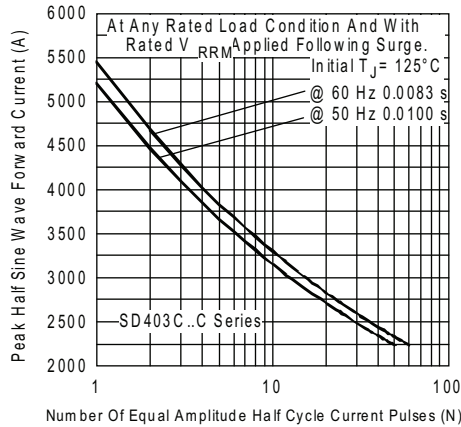


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

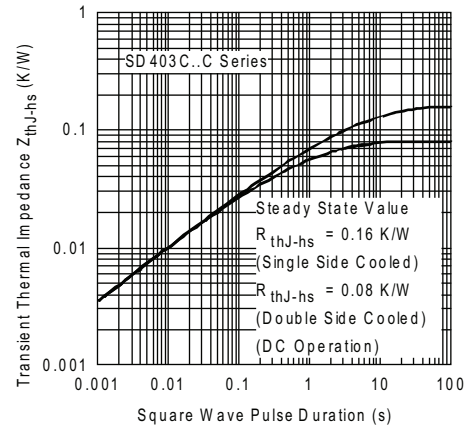


Fig. 1 - Thermal Impedance Z_{thJ-hs} Characteristics

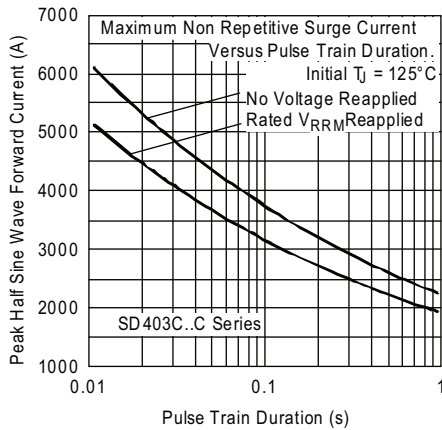


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

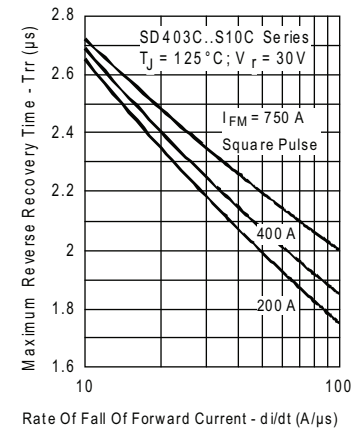


Fig. 10 - Recovery Time Characteristics

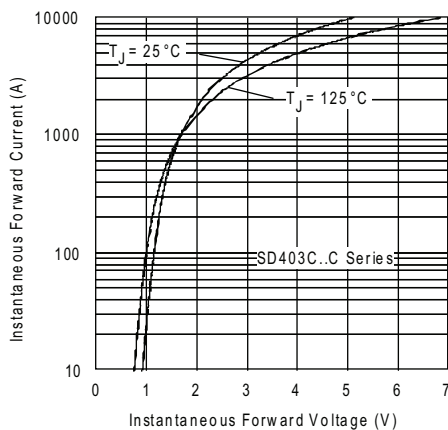


Fig. 9 - Forward Voltage Drop Characteristics

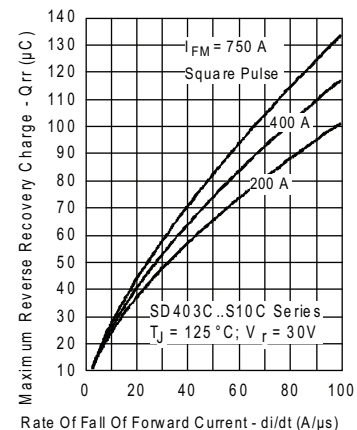


Fig. 11 - Recovery Charge Characteristics

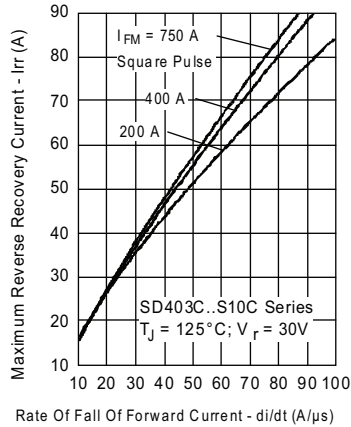


Fig. 12 - Recovery Current Characteristics

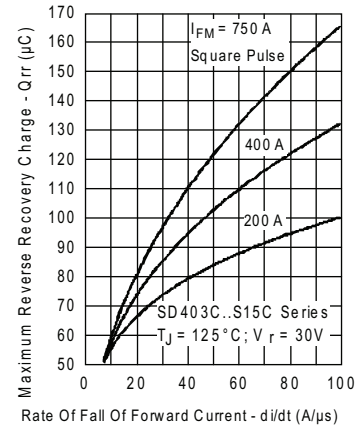


Fig. 14 - Recovery Charge Characteristics

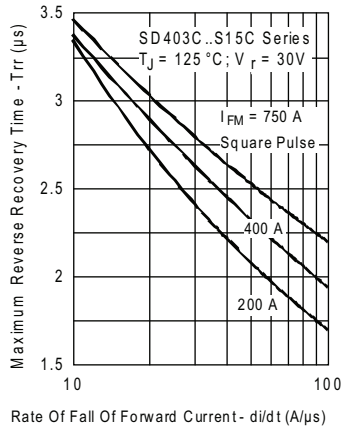


Fig. 13 - Recovery Time Characteristics

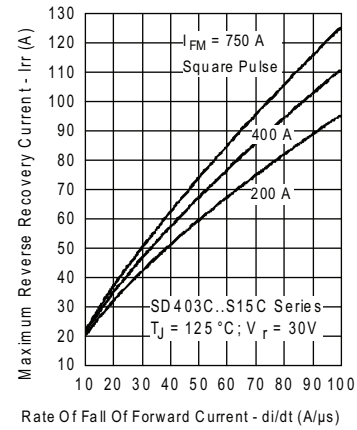


Fig. 15 - Recovery Current Characteristics

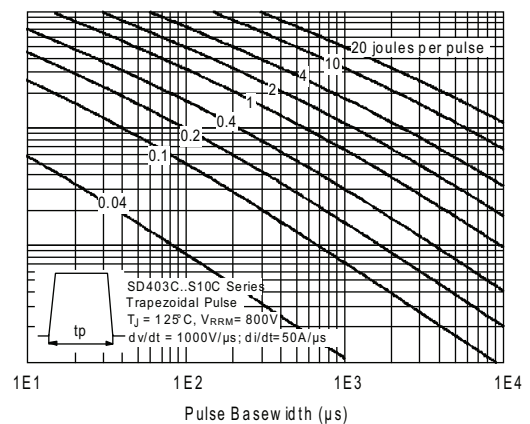
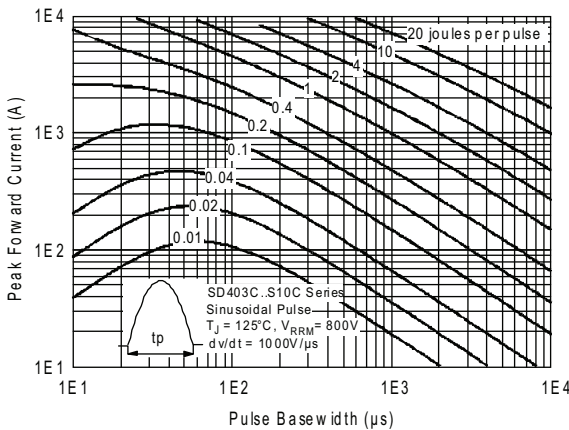


Fig. 16 - Maximum Total Energy Loss Per Pulse Characteristics

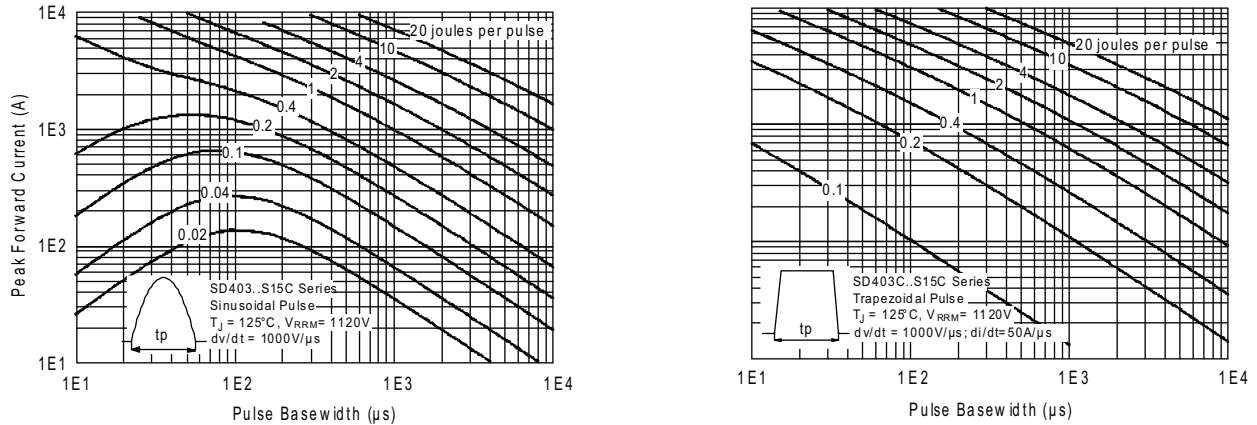


Fig. 17 - Maximum Total Energy Per Pulse Characteristics

ORDERING INFORMATION TABLE

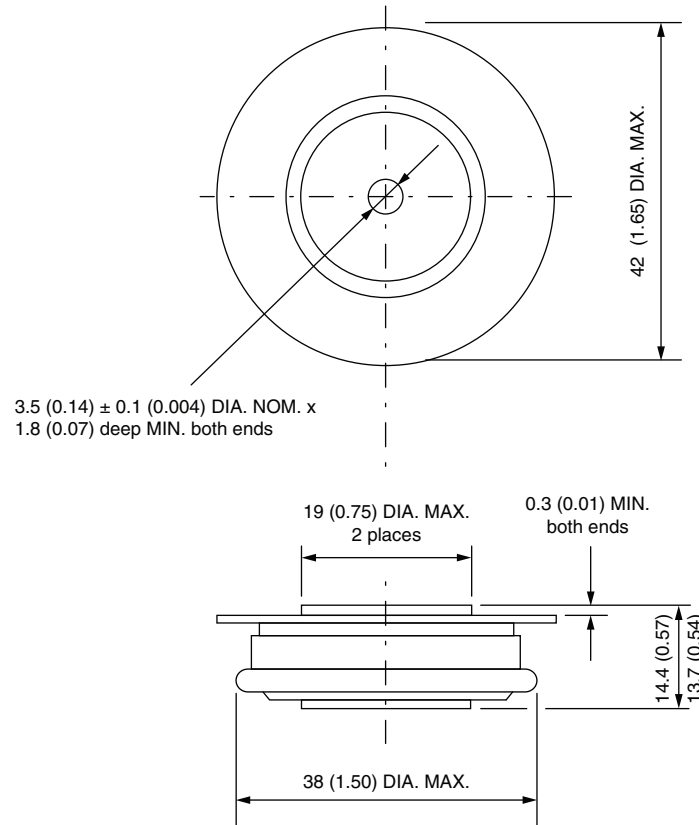
Device code	VS-	SD	40	3	C	16	S15	C
	1	2	3	4	5	6	7	8

- 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 DO-200AA

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95248

DO-200AA

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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