

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

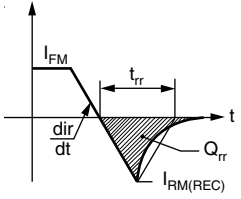
VOLTAGE RATINGS

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 Double side (single side) cooled				430 (210)	A
						55 (75)	°C
Maximum RMS current	I _{F(RMS)}	25 °C heatsink temperature double side cooled				675	A
Maximum peak, one-cycle , non-repetitive forward current	I _{FSM}	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial T _J = T _J maximum	6180		
		t = 8.3 ms			6470		
		t = 10 ms	100 % V _{RRM} reapplied		5200		
		t = 8.3 ms			5445		
Maximum I ² t for fusing	I ² t	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 /t for fusing	I ² /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 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum				1.00	V
High level value of threshold voltage	V _{F(TO)2}	(I > π × I _{F(AV)}), T _J = T _J maximum				1.20	
Low level of forward slope resistance	r _{f1}	(16.7 % × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J maximum				0.56	mΩ
High level of forward slope resistance	r _{f2}	(I > π × 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

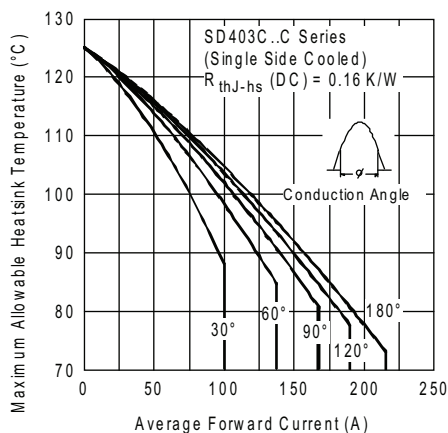


Fig. 1 - Current Ratings Characteristics

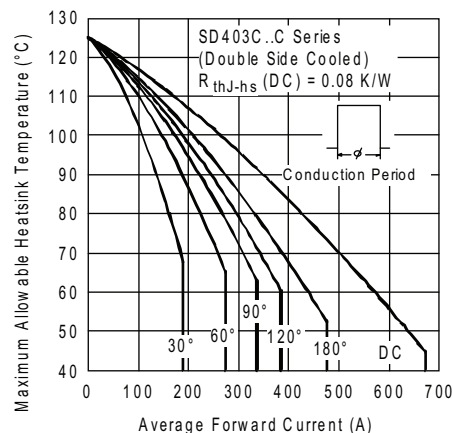


Fig. 4 - Current Ratings Characteristics

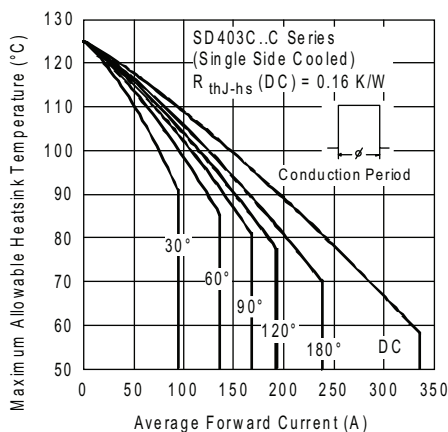


Fig. 2 - Current Ratings Characteristics

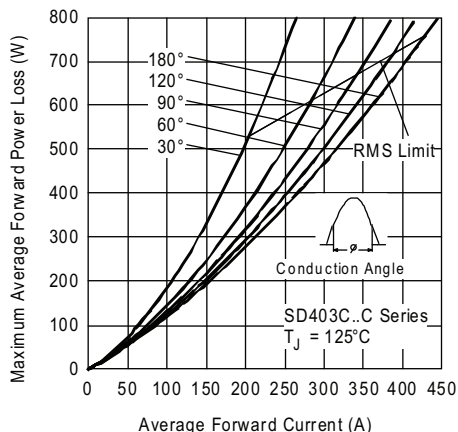


Fig. 5 - Forward Power Loss Characteristics

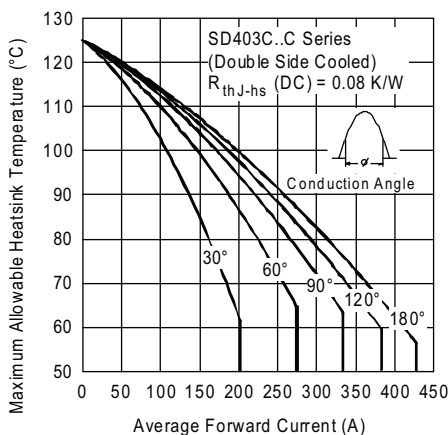


Fig. 3 - Current Ratings Characteristics

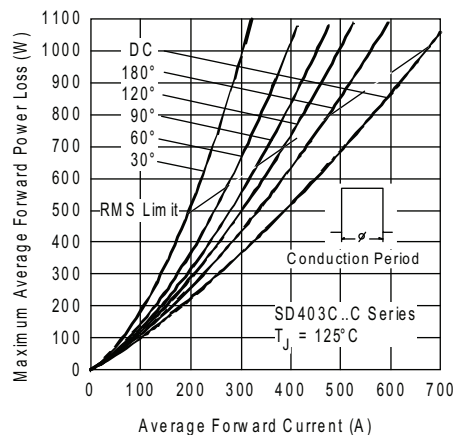


Fig. 6 - Forward Power Loss Characteristics

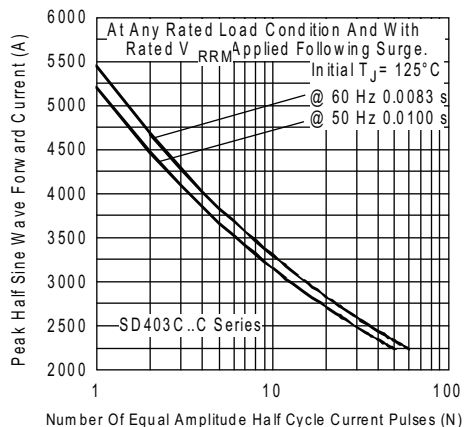


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

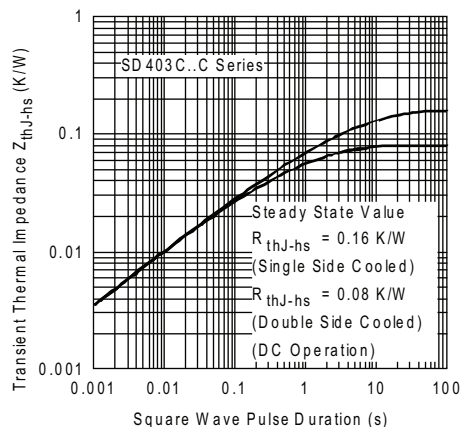


Fig. 1 - Thermal Impedance Z_{thJ-hs} Characteristics

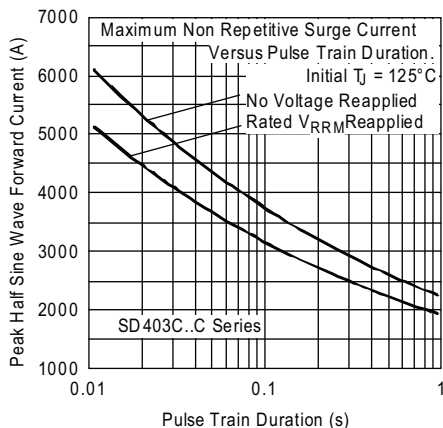


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

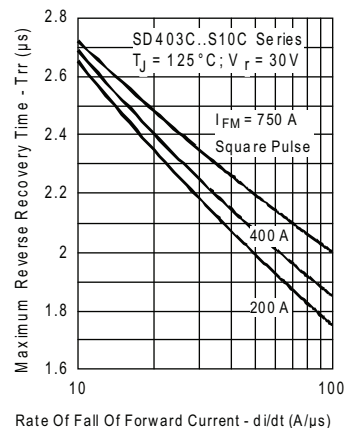


Fig. 10 - Recovery Time Characteristics

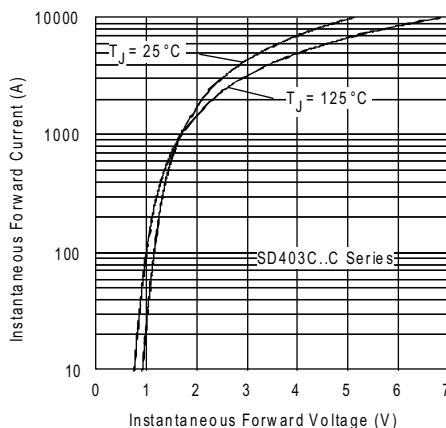


Fig. 9 - Forward Voltage Drop Characteristics

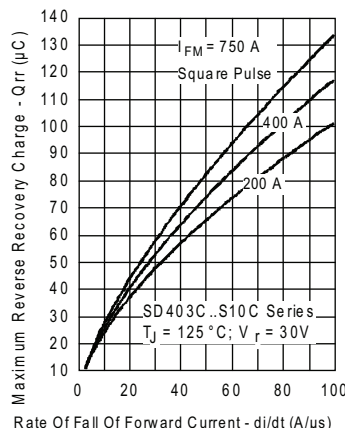


Fig. 11 - Recovery Charge Characteristics

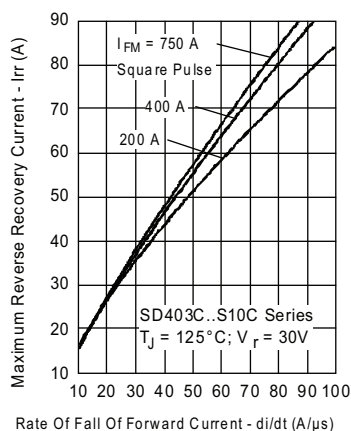


Fig. 12 - Recovery Current Characteristics

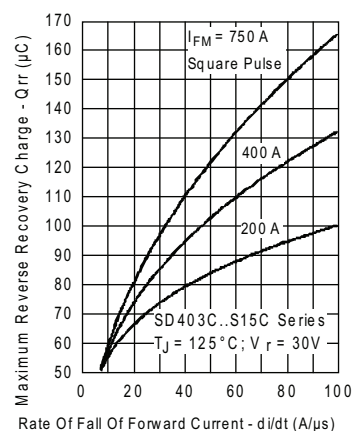


Fig. 14 - Recovery Charge Characteristics

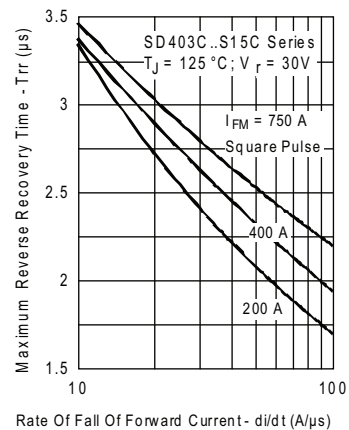


Fig. 13 - Recovery Time Characteristics

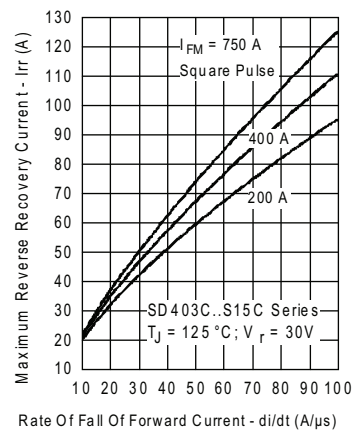


Fig. 15 - Recovery Current Characteristics

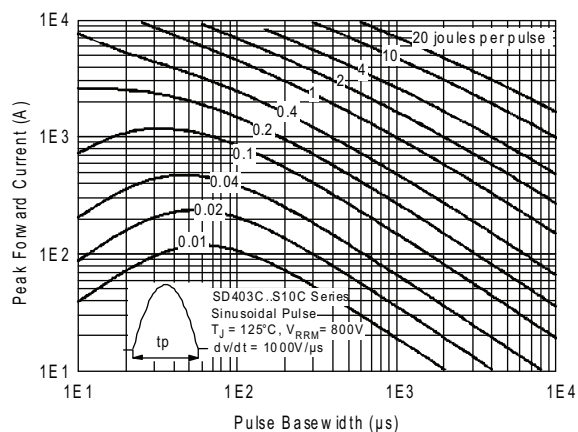
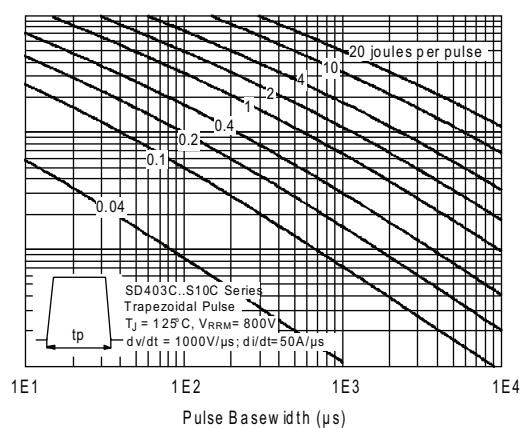


Fig. 16 - Maximum Total Energy Loss Per Pulse Characteristics



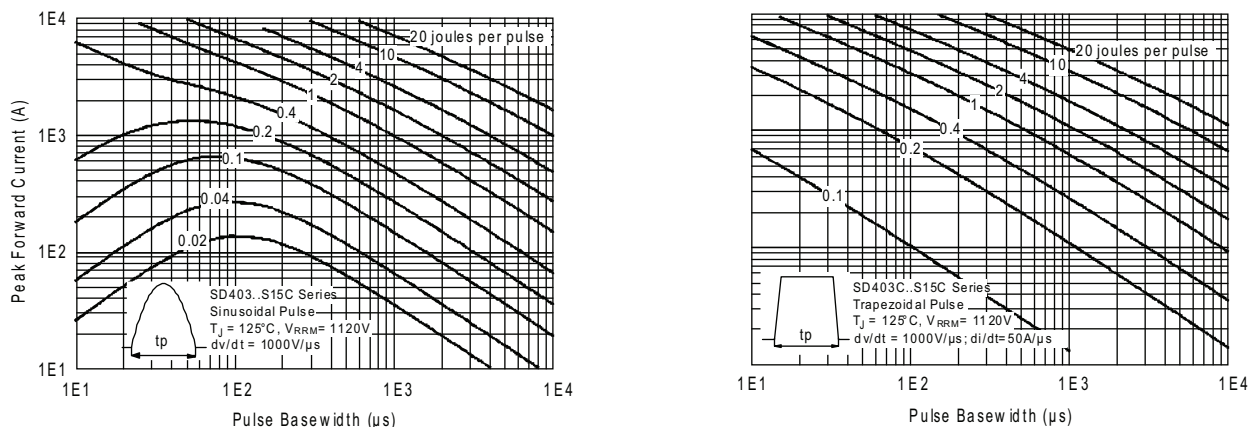


Fig. 17 - Maximum Total Energy Per Pulse Characteristics

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 |

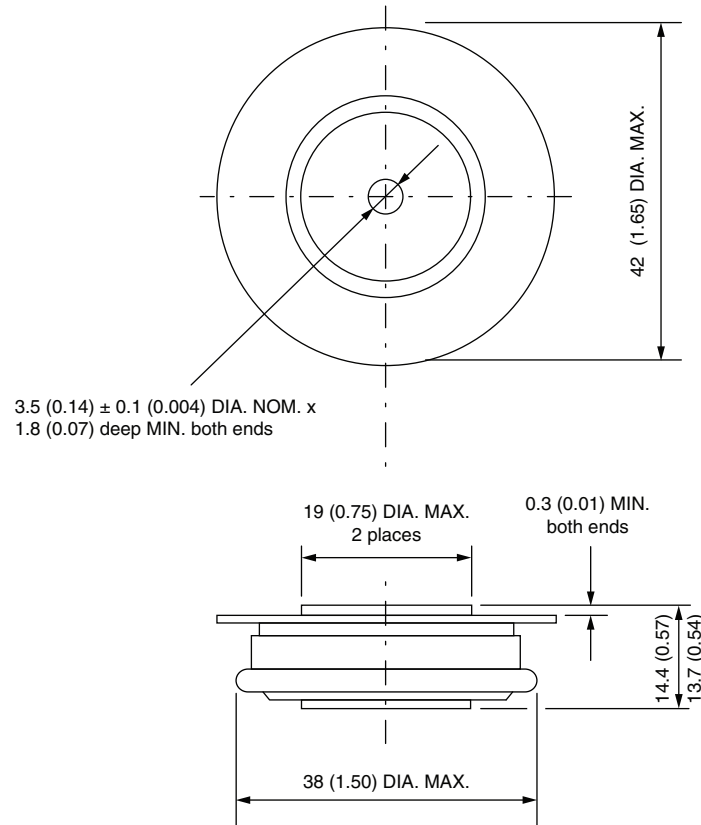
LINKS TO RELATED DOCUMENTS

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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