

FAST RECOVERY DIODES

Hockey Puk Version

Features

- High power FAST rectifier diode series
- 5.0 μ s recovery time
- High voltage ratings up to 4500V
- 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-200AC (K-PUK)
- Maximum junction temperature 125°C

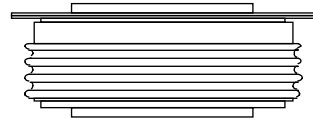
Typical Applications

- Snubber diode for GTO
- High voltage free-wheeling diode
- Fast recovery rectifier applications

Major Ratings and Characteristics

Parameters	SD853C..S50K	Units
$I_{F(AV)}$	990	A
@ T_{hs}	55	°C
$I_{F(RMS)}$	1800	A
@ T_{hs}	25	°C
I_{FSM}	@ 50Hz	19000
	@ 60Hz	19900
I^2t	@ 50Hz	1810
	@ 60Hz	1652
V_{RRM} range	3000 to 4500	V
t_{rr}	5.0	μ s
@ T_J	25	°C
T_J	- 40 to 125	°C

990A



case style DO-200AC (K-PUK)

SD853C..S50K Series

Bulletin I2093 rev.C 04/00

International
IR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

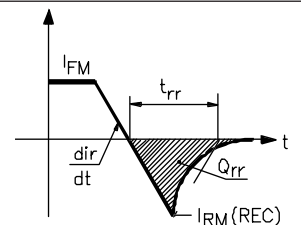
Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ $T_J = 125^\circ\text{C}$ mA
SD853C..S50K	30	3000	3100	100
	36	3600	3700	
	40	4000	4100	
	45	4500	4600	

Forward Conduction

Parameter	SD853C..S50K	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Heatsink temperature	990 (420)	A	180° conduction, half sine wave
	55 (85)	°C	Double side (single side) cooled
$I_{F(RMS)}$ Max. RMS forward current	1800	A	@ 25°C heatsink temperature double side cooled
I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current	19000	A	t = 10ms No voltage
	19900		t = 8.3ms reapplied
	16000		t = 10ms 50% V_{RRM}
	16750		t = 8.3ms reapplied
I^2t Maximum I^2t for fusing	1805	KA ² s	t = 10ms No voltage
	1645		t = 8.3ms reapplied
	1280		t = 10ms 50% V_{RRM}
	1165		t = 8.3ms reapplied
I^2/t Maximum I^2/t for fusing	18050	KA ² /s	t = 0.1 to 10ms, no voltage reapplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.50	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}), T_J = T_J \text{ max.}$
$V_{F(TO)2}$ High level value of threshold voltage	1.67		$(I > \pi \times I_{F(AV)}), T_J = T_J \text{ max.}$
r_{f1} Low level value of forward slope resistance	0.70	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}), T_J = T_J \text{ max.}$
r_{f2} High level value of forward slope resistance	0.65		$(I > \pi \times I_{F(AV)}), T_J = T_J \text{ max.}$
V_{FM} Max. forward voltage drop	2.90	V	$I_{pk} = 2000\text{A}, T_J = 125^\circ\text{C}, t_p = 10\text{ms}$ sinusoidal wave

Recovery Characteristics

Code	$T_J = 25^\circ\text{C}$ typical t_{rr} @ 25% I_{RRM} (μs)	Test conditions			Max. values @ $T_J = 125^\circ\text{C}$		
		I_{pk} Square Pulse (A)	di/dt (*) (A/μs)	V_r (V)	t_{rr} @ 25% I_{RRM} (μs)	Q_{rr} (μC)	I_{rr} (A)
S50	5.0	1000	100	-50	6.5	1000	270



Thermal and Mechanical Specifications

Parameter	SD853C..S50K	Units	Conditions
T_J Max. junction operating temperature range	-40 to 125	°C	
T_{stg} Max. storage temperature range	-40 to 150		
R_{thJ-hs} Max. thermal resistance, junction to heatsink	0.04 0.02	K/W	DC operation single side cooled DC operation double side cooled
F Mounting force, $\pm 10\%$	22250 (2250)	N (Kg)	
wt Approximate weight	425	g	
Case style	DO-200AC (K-PUK)		See outline table

ΔR_{thJ-hs} Conduction

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

Conduction angle	Sinusoidal conduction		Rectangular conduction		Units	Conditions
	Single Side	Double Side	Single Side	Double Side		
180°	0.0017	0.0019	0.0012	0.0012	K/W	$T_J = T_{J \text{ max.}}$
120°	0.0021	0.0021	0.0021	0.0021		
90°	0.0026	0.0027	0.0029	0.0029		
60°	0.0039	0.0039	0.0041	0.0041		
30°	0.0067	0.0067	0.0068	0.0068		

Ordering Information Table

Device Code						
	SD	85	3	C	45	S50 K
	(1)	(2)	(3)	(4)	(5)	(6) (7)
1	- Diode					
2	- Essential part number					
3	- 3 = Fast recovery					
4	- C = Ceramic Puk					
5	- Voltage code: Code x 100 = V_{RRM} (See Voltage Ratings table)					
6	- t_{rr} code					
7	- K = Puk Case DO-200AC (K-PUK)					

SD853C..S50K Series

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Outline Table

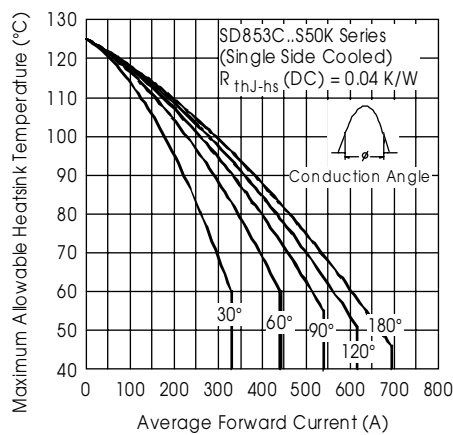
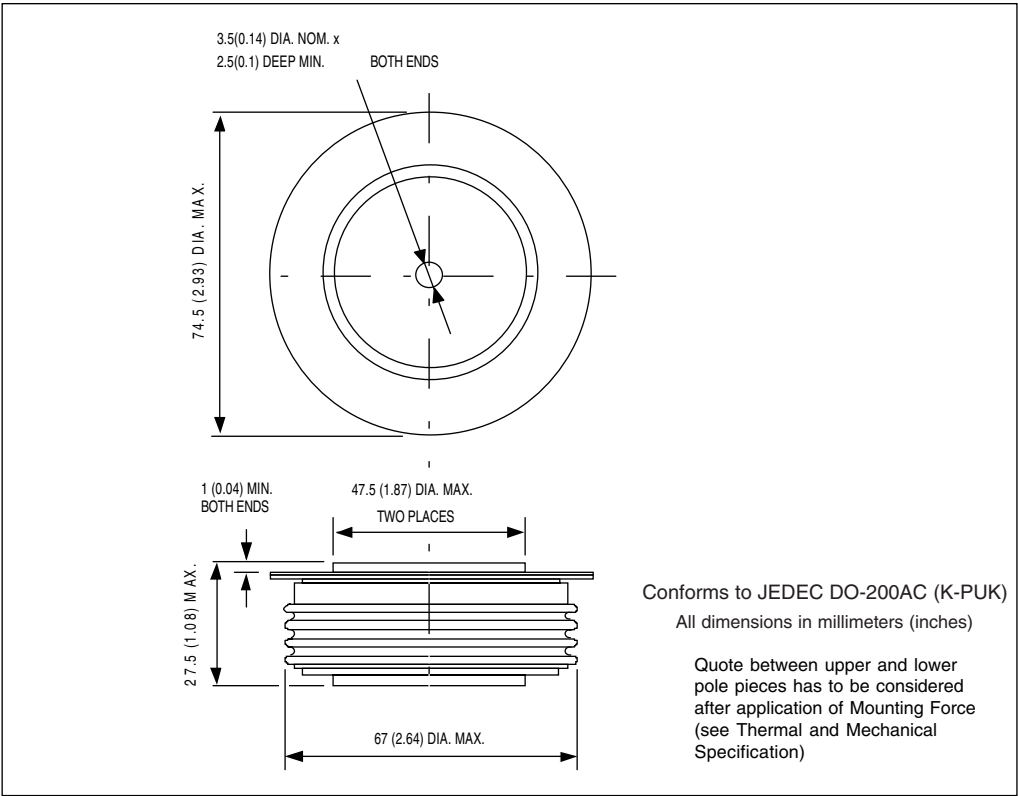


Fig. 1 - Current Ratings Characteristics

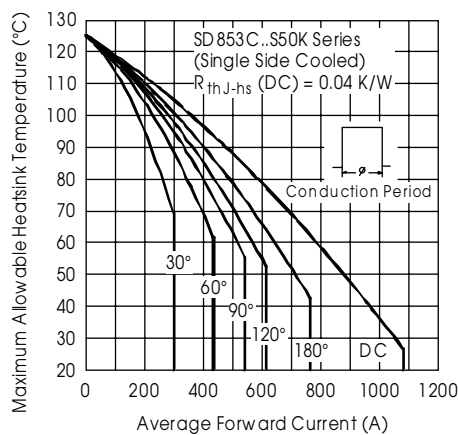


Fig. 2 - Current Ratings Characteristics

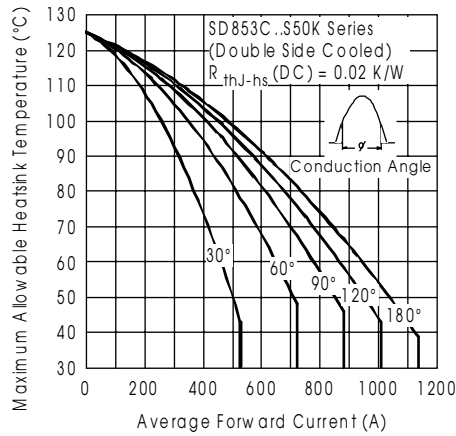


Fig. 3 - Current Ratings Characteristics

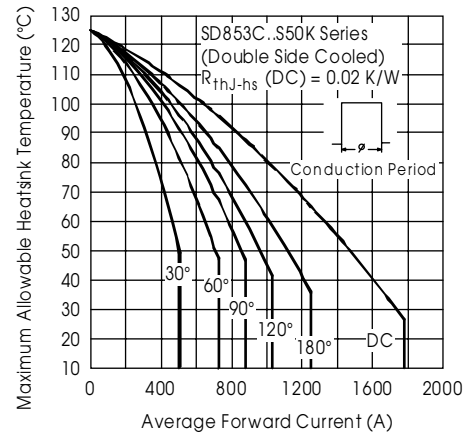


Fig. 4 - Current Ratings Characteristics

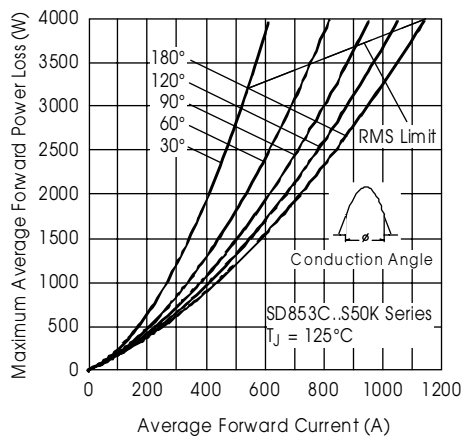


Fig. 5 - Forward Power Loss Characteristics

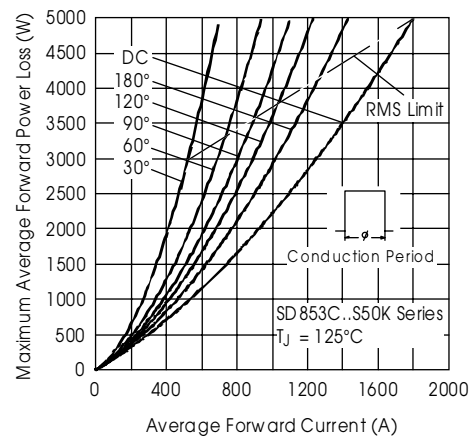


Fig. 6 - Forward Power Loss Characteristics

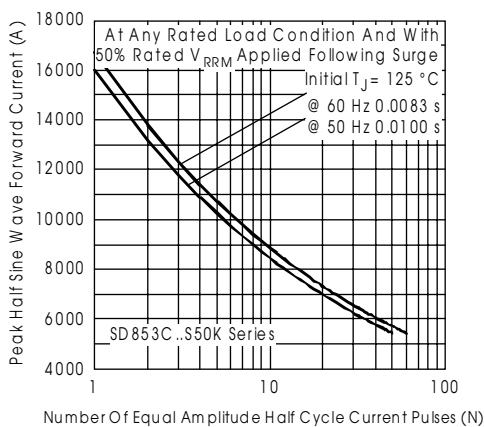


Fig. 7 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

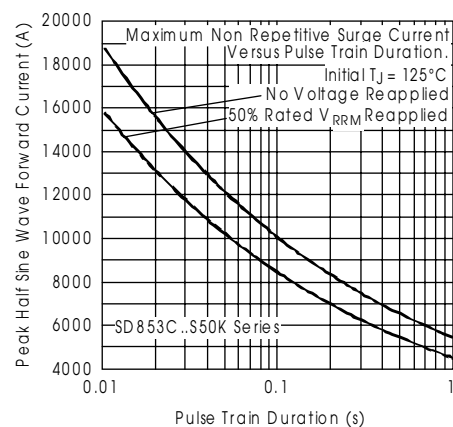


Fig. 8 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

SD853C..S50K Series

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International
IR Rectifier

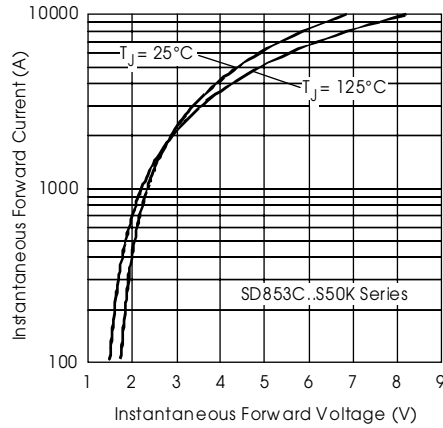


Fig. 9 - Forward Voltage Drop Characteristics

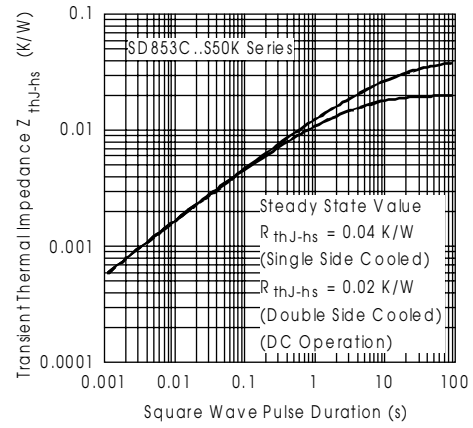


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristic

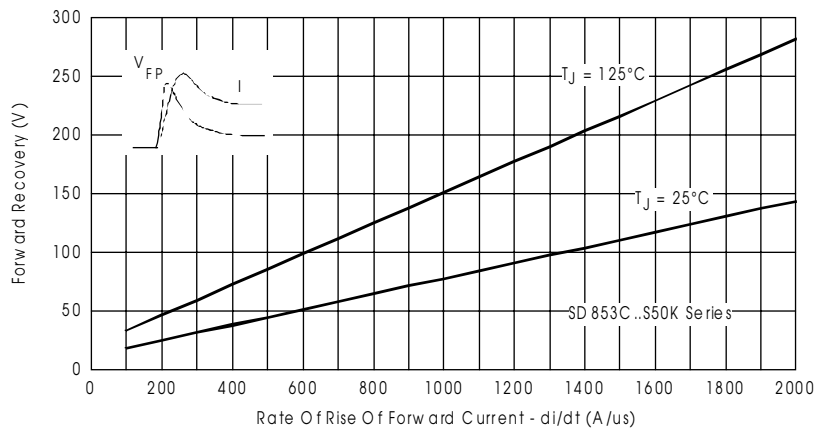


Fig. 11 - Typical Forward Recovery Characteristics

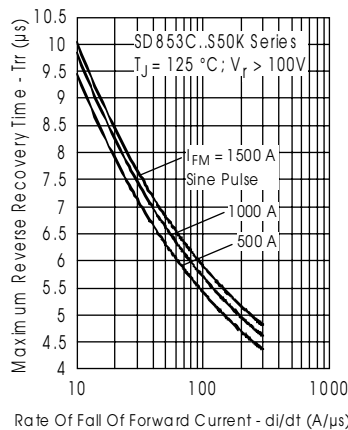


Fig. 12 - Recovery Time Characteristics

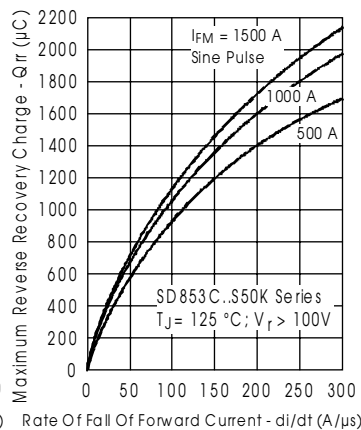


Fig. 13 - Recovery Charge Characteristics

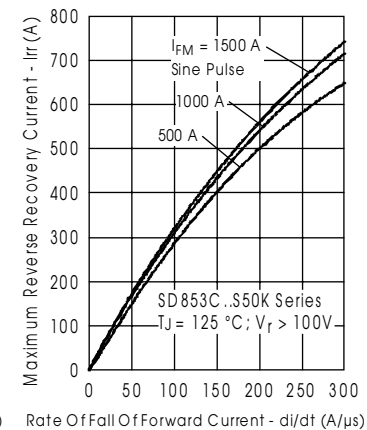


Fig. 14 - Recovery Current Characteristics

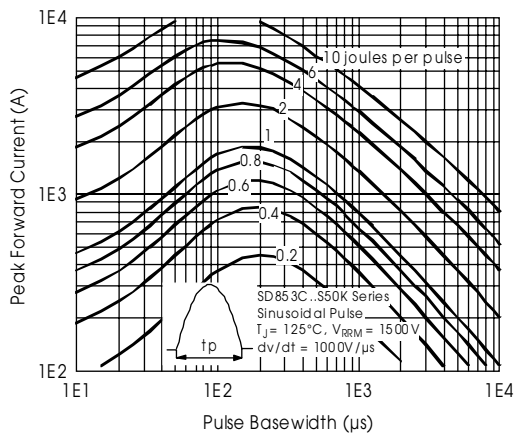


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

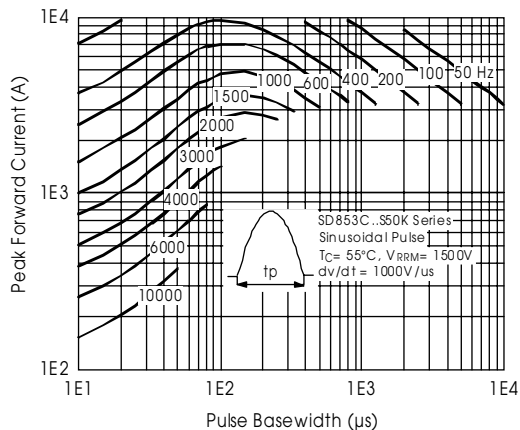


Fig. 16 - Frequency Characteristics

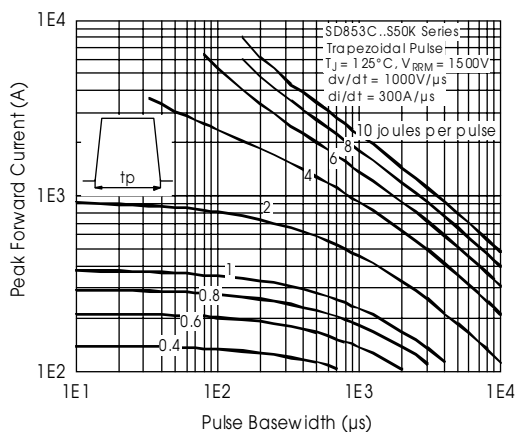


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

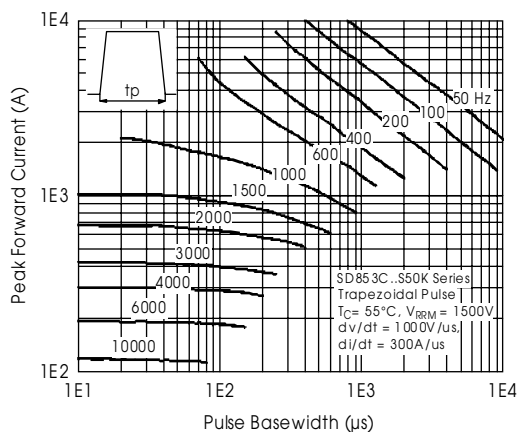


Fig. 18 - Frequency Characteristics

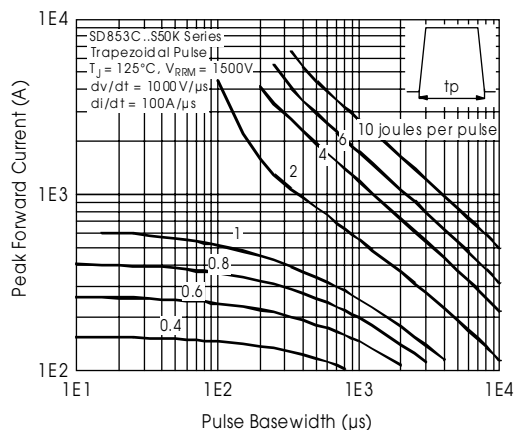


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

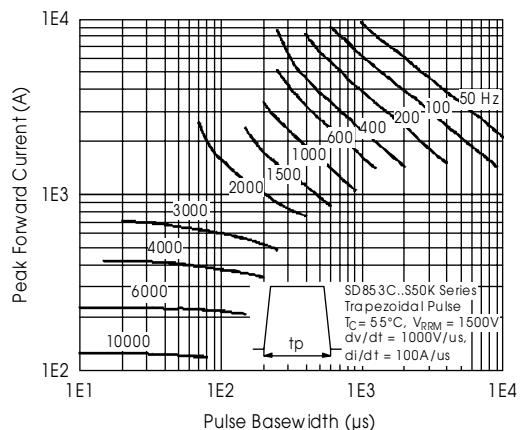


Fig. 20 - Frequency Characteristics