Bulletin I2069/A

International
IOR Rectifier

SD803C..C SERIES

FAST RECOVERY DIODES

Hockey Puk Version

845A

Features

- High power FAST recovery diode series
- 1.0 to 1.5 µs recovery time
- High voltage ratings up to 1600V
- 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

case style B-43

Typical Applications

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

Major Ratings and Characteristics

Parameters		SD803C..C	Units
$I_{F(AV)}$		845	A
	@ T_{hs}	55	°C
$I_{F(RMS)}$		1326	A
	@ T_{hs}	25	°C
I_{FSM}	@ 50Hz	11295	A
	@ 60Hz	11830	A
I^2t	@ 50Hz	640	KA^2s
	@ 60Hz	583	KA^2s
V_{RRM} range		400 to 1600	V
t_{rr} range		1.0 to 1.5	µs
	@ T_J	25	°C
T_J		- 40 to 125	°C

ELECTRICAL SPECIFICATIONS

Voltage Ratings

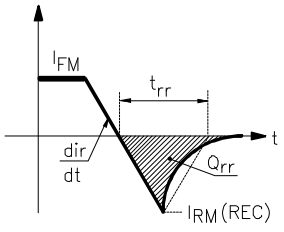
Type number	Voltage Code	V_{RRM} max. repetitive peak and off-state voltage V	V_{RSM}, maximum non-repetitive peak voltage V	I_{RRM} max. T_J = 125°C mA
SD803C..S10C	04	400	500	45
	08	800	900	
	10	1000	1100	
SD803C..S15C	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

Forward Conduction

	Parameter	SD803C..C	Units	Conditions		
$I_{F(AV)}$	Max. average forward current	845(420)	A	180° conduction, half sine wave.		
	@ Heatsink temperature	55(75)	°C	Double side (single side) cooled		
$I_{F(RMS)}$	Max. RMS current	1326	A	@ 25°C heatsink temperature double side cooled		
I_{FSM}	Max. peak, one-cycle non-repetitive forward current	11295	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial T_J = T_J max.
		11830		t = 8.3ms		
		9500		t = 10ms	100% V_{RRM} reapplied	
		9945		t = 8.3ms		
I^2t	Maximum I^2t for fusing	640	KA^2s	t = 10ms	No voltage reapplied	
		583		t = 8.3ms		
		451		t = 10ms	100% V_{RRM} reapplied	
		412		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	6400	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level of threshold voltage	1.02	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J = T_J max.		
$V_{F(TO)2}$	High level of threshold voltage	1.32		(I > π x $I_{F(AV)}$), T_J = T_J max.		
r_{f1}	Low level of forward slope resistance	0.38	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), T_J = T_J max.		
r_{f2}	High level of forward slope resistance	0.28		(I > π x $I_{F(AV)}$), T_J = T_J max.		
V_{FM}	Max. forward voltage	1.89	V	I_{pk}= 2655A, T_J = 25°C, t_p = 10ms sinusoidal wave		

Recovery Characteristics

Code	T_J = 25°C typical t_{rr} @ 25% I_{RRM} (µs)	Test conditions			Max. values @ T_J = 125°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)
S10	1.0	1000	25	-30	2.0	45	34
S15	1.5				3.2	87	51



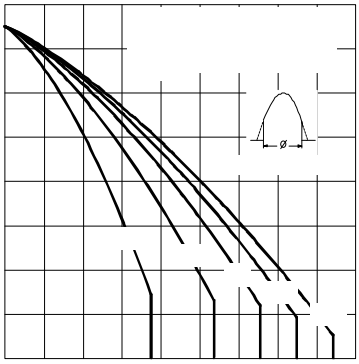


Fig. 3 - Current Ratings Characteristics

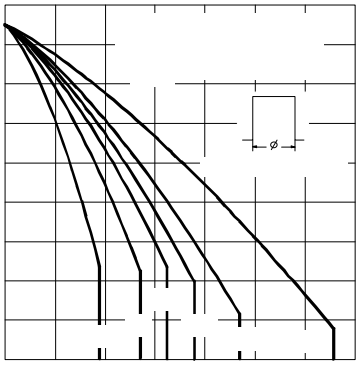


Fig. 4 - Current Ratings Characteristics

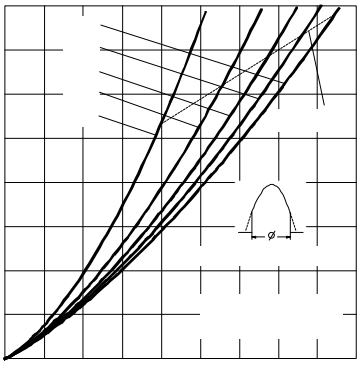


Fig. 5 - Forward Power Loss Characteristics

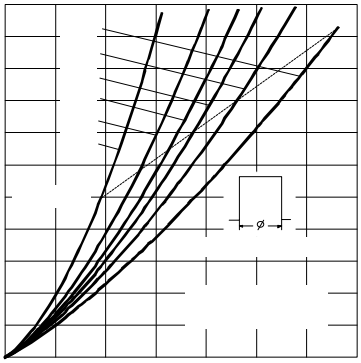


Fig. 6 - Forward Power Loss Characteristics

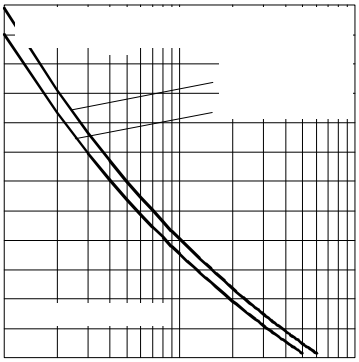


Fig. 7 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

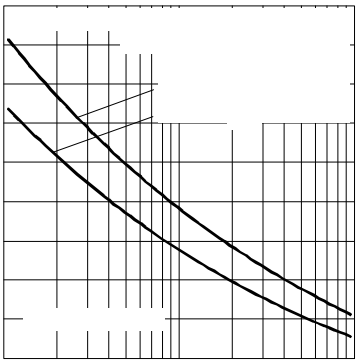


Fig. 8 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

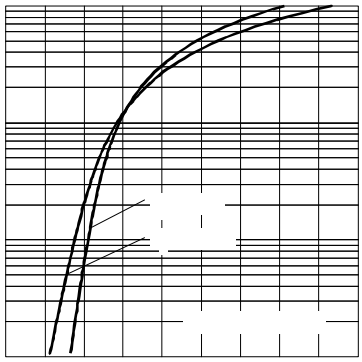


Fig. 9 - Forward Voltage Drop Characteristics

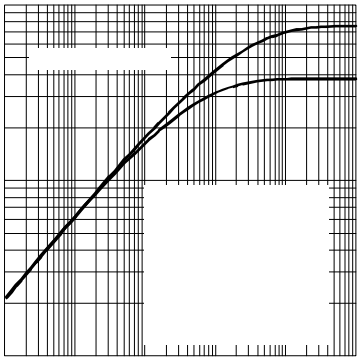


Fig. 10 - Thermal Impedance $Z_{thJ\text{-}hs}$ Characteristic

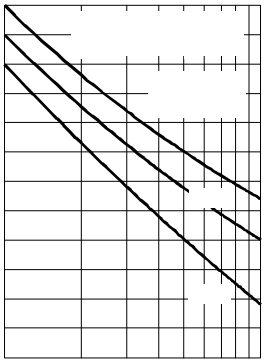


Fig. 11 - Recovery Time Characteristics

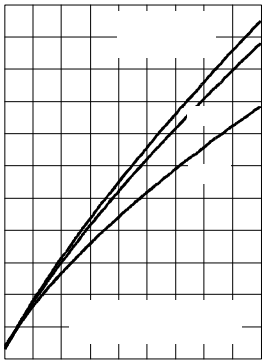


Fig. 12 - Recovery Charge Characteristics

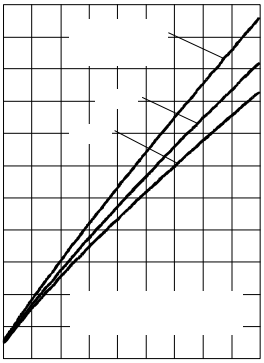


Fig. 13 - Recovery Current Characteristics

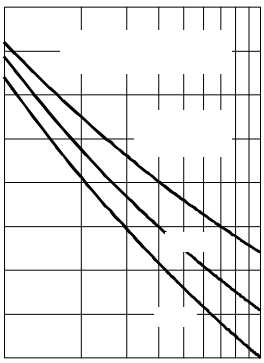


Fig. 14 - Recovery Time Characteristics

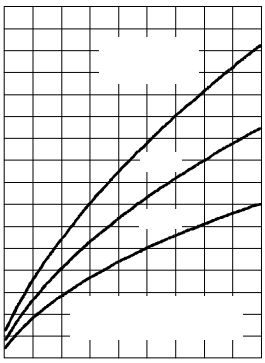


Fig. 15 - Recovery Charge Characteristics

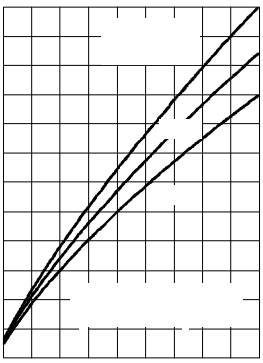


Fig. 16 - Recovery Current Characteristics

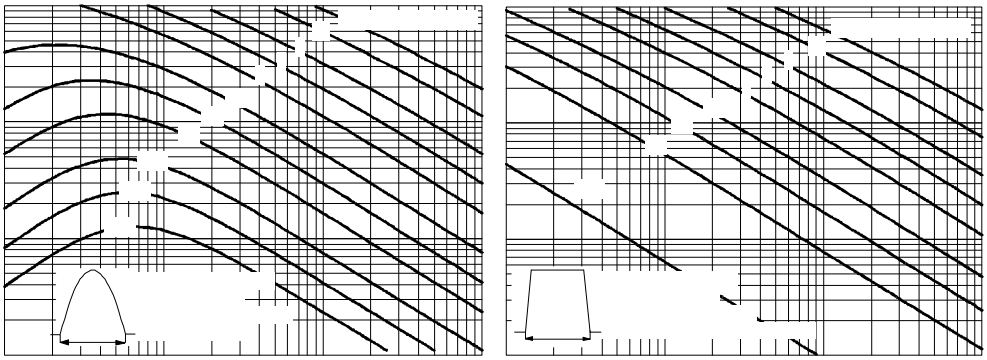


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

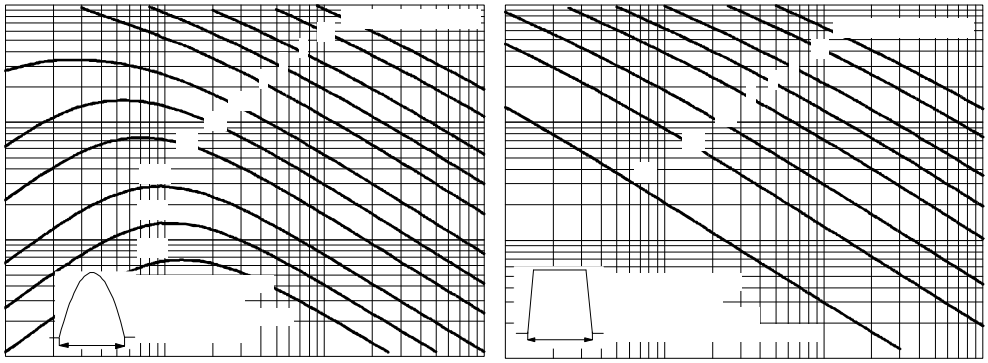


Fig. 18 - Maximum Total Energy Loss Per Pulse Characteristics

Thermal and Mechanical Specifications

	Parameter	SD803C..C	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	°C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJ-hs}	Max. thermal resistance,	0.076	K/W	DC operation single side cooled
	junction to heatsink	0.038		DC operation double side cooled
F	Mounting force, ± 10%	9800 (1000)	N (Kg)	
wt	Approximate weight	83	g	
	Case style	B-43		See Outline Table

ΔR_{thJ-hs} Conduction

(The following table shows the increment of thermal resistence 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°	0.006	0.007	0.005	0.005	K/W	$T_J = T_J$ max.
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		

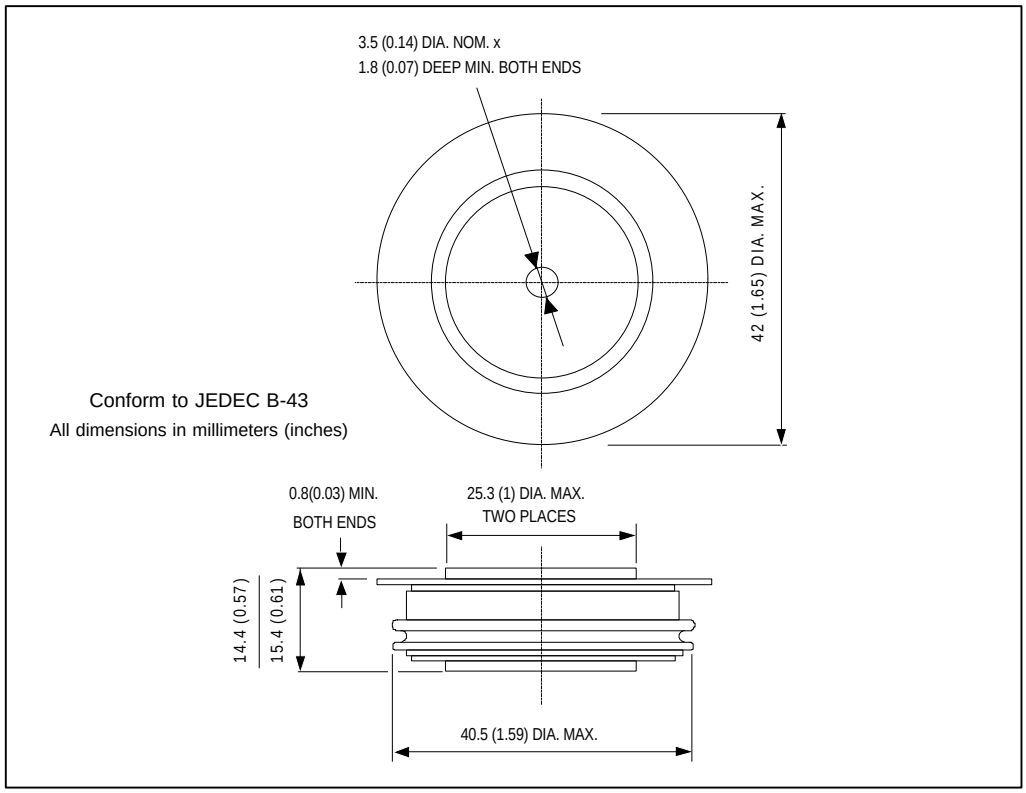
Ordering Information Table

Device Code

SD	80	3	C	16	S15	C
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 (see Recovery Characteristics table)
7 - C = Puk Case B-43

Outline Table



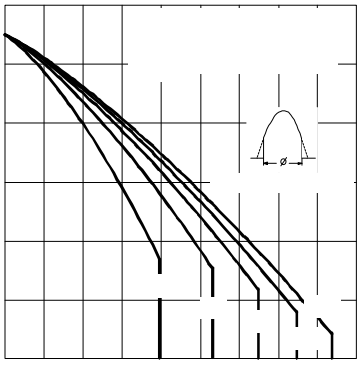


Fig. 1 - Current Ratings Characteristics

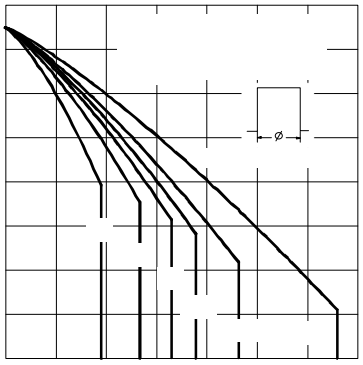


Fig. 2 - Current Ratings Characteristics