

FAST RECOVERY DIODES

Hockey Puk Version

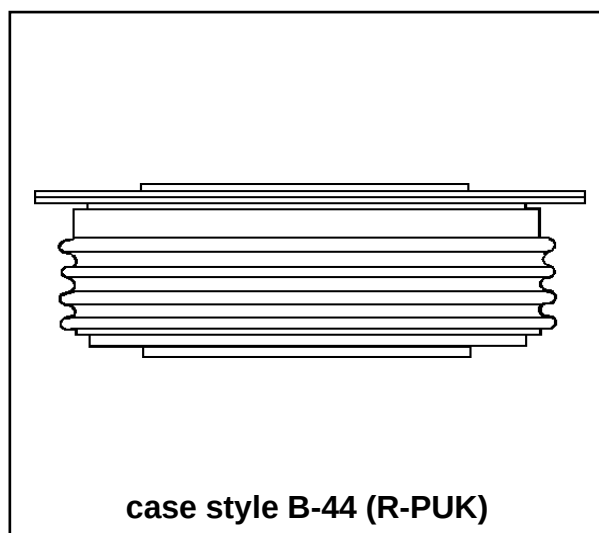
Features

- High power FAST rectifier diode series
- 5.0 μ s recovery time
- High voltage ratings up to 4500 V
- High current capability
- Optimized turn on and turn off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press-puk encapsulation
- Case style B-44 (R-PUK)
- Maximum junction temperature 125°C

2000 A

Typical Applications

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



Major Ratings and Characteristics

Parameters	SD2053C..S50R	Units
$I_{F(AV)}$	2000	A
@ T_{hs}	55	°C
$I_{F(RMS)}$	4000	A
@ T_{hs}	25	°C
I_{FSM}	@ 50Hz	30 KA
	@ 60Hz	31.8 KA
I^2t	@ 50Hz	4500 KA ² s
	@ 60Hz	4197 KA ² s
$I^2\sqrt{t}$		45000 KA ² $\sqrt{s}$
V_{DRM}/V_{RRM} range	3200 to 4500	V
t_{rr}	5.0	μ s
@ T_J	25	°C
T_J range	-40 to 125	°C

ELECTRICAL SPECIFICATIONS

Voltage Ratings

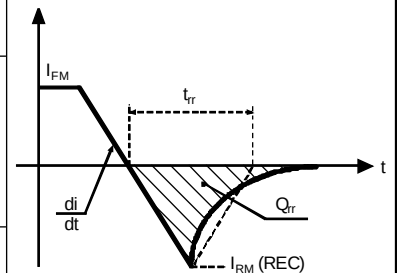
Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ $T_J = 125^\circ\text{C}$ mA
SD2053C..S50R	32	3200	3300	100
	36	3600	3700	
	40	4000	4100	
	45	4500	4600	

Forward Conduction

Parameter	SD2053C..R	Units	Conditions
$I_{F(AV)}$ Maximum average forward current @ Heatsink temperature	2000 (1300)	A	180° conduction, half sine wave
	55 (85)	°C	Double side (single side) cooled
$I_{F(RMS)}$ Maximum RMS forward current	4000	A	@ 25°C heatsink temp. double side cooled
I_{FSM} Maximum peak, one-cycle forward, non-repetitive surge current	30	KA	t = 10ms No voltage
	31.8		t = 8.3ms reappplied
	25.6		t = 10ms 50% V_{RRM}
	27.1		t = 8.3ms reappplied
I^2t Maximum I^2t for fusing	4500	KA ² s	t = 10ms No voltage
	4197		t = 8.3ms reappplied
	3277		t = 10ms 50% V_{RRM}
	3048		t = 8.3ms reappplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	45000	KA ² √s	t = 0.1 to 10ms, no voltage reappplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.453	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	1.600		$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
r_{f1} Low level value of forward slope resistance	0.341	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	0.318		$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
V_{FM} Maximum forward voltage drop	3.50	V	$T_J = 125^\circ\text{C}$, $I_{FM} = 6000\text{A}$

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	6.0	1000	350



Thermal and Mechanical Specifications

Parameter	SD2053C..R	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	0.02	K/W	DC operation single side cooled
	0.01		DC operation double side cooled
F Mounting force, $\pm 10\%$	39200 (4000)	N (Kg)	
wt Approximate weight	1590	g	
Case style	B-44 (R-PUK)		See outline table

 ΔR_{thJC} Conduction

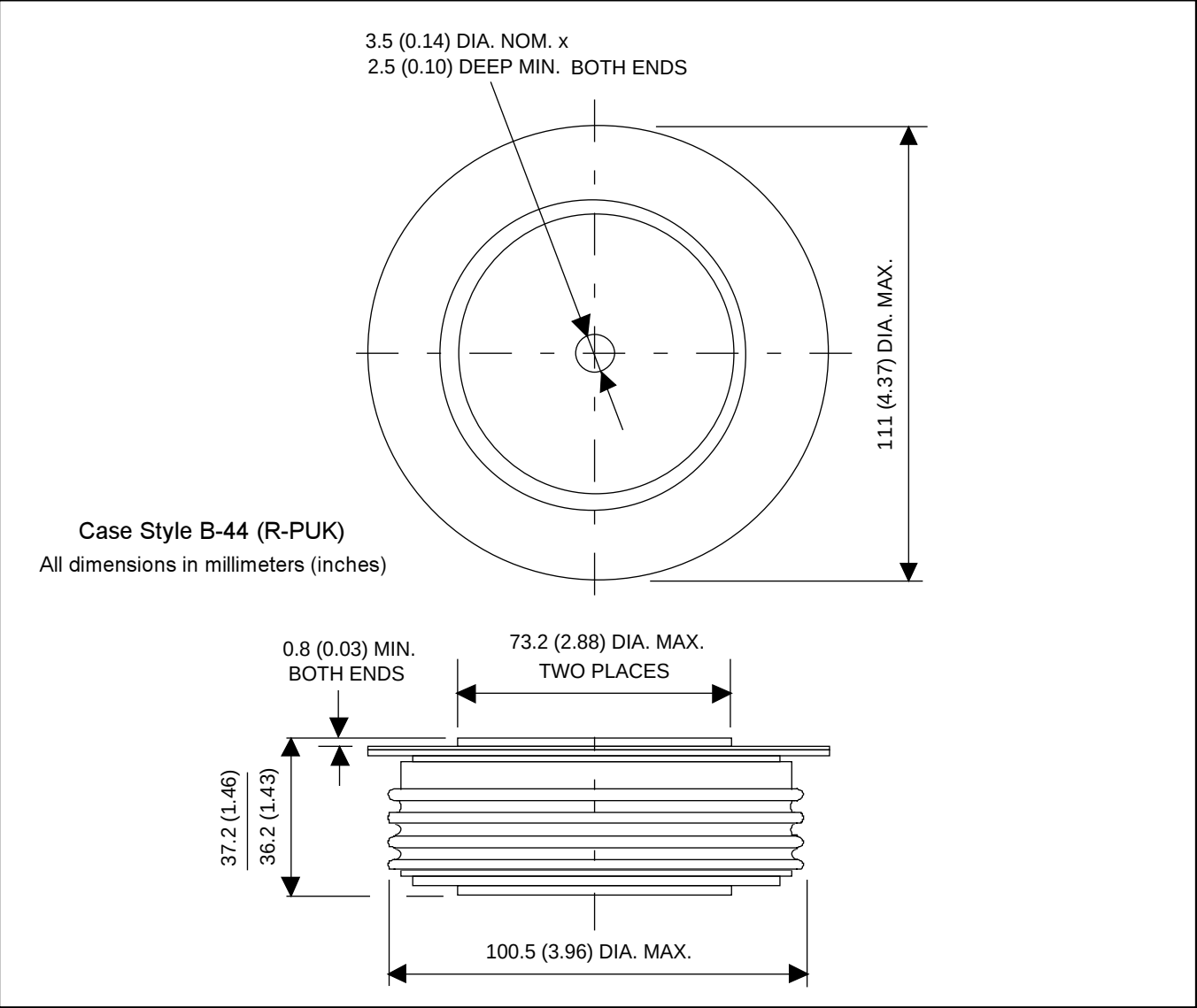
(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction		Rectangular conduction		Units	Conditions
	Single Side	Double Side	Single Side	Double Side		
180°	0.0009	0.0010	0.0006	0.0006	K/W	$T_J = T_J \text{ max.}$
120°	0.0010	0.0011	0.0010	0.0010		
90°	0.0013	0.0013	0.0014	0.0014		
60°	0.0019	0.0019	0.0020	0.0020		
30°	0.0033	0.0033	0.0034	0.0034		

Ordering Information Table

Device Code						
SD	205	3	C	45	S50	R
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	- K = Puk Case B-44 (R-PUK)					

Outline Table



Data subject to change without notice.