

## FAST RECOVERY DIODES

### Hockey Puk Version

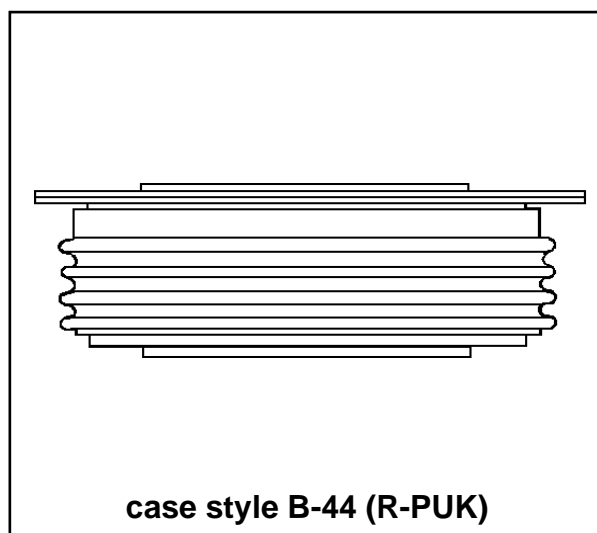
### Features

- High power FAST rectifier diode series
- 5.0  $\mu$ 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 <sup>2</sup> s
	@ 60Hz	4197	KA <sup>2</sup> s
$I^2\sqrt{t}$		45000	KA <sup>2</sup> $\sqrt{s}$
$V_{DRM}/V_{RRM}$ range	3200 to 4500	V	
$t_{rr}$	5.0	$\mu$ 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 <sup>2</sup> 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 <sup>2</sup> √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	N	
	(4000)	(Kg)	
wt Approximate weight	1590	g	
Case style	B-44 (R-PUK)		See outline table

 $\Delta R_{thJC}$  Conduction

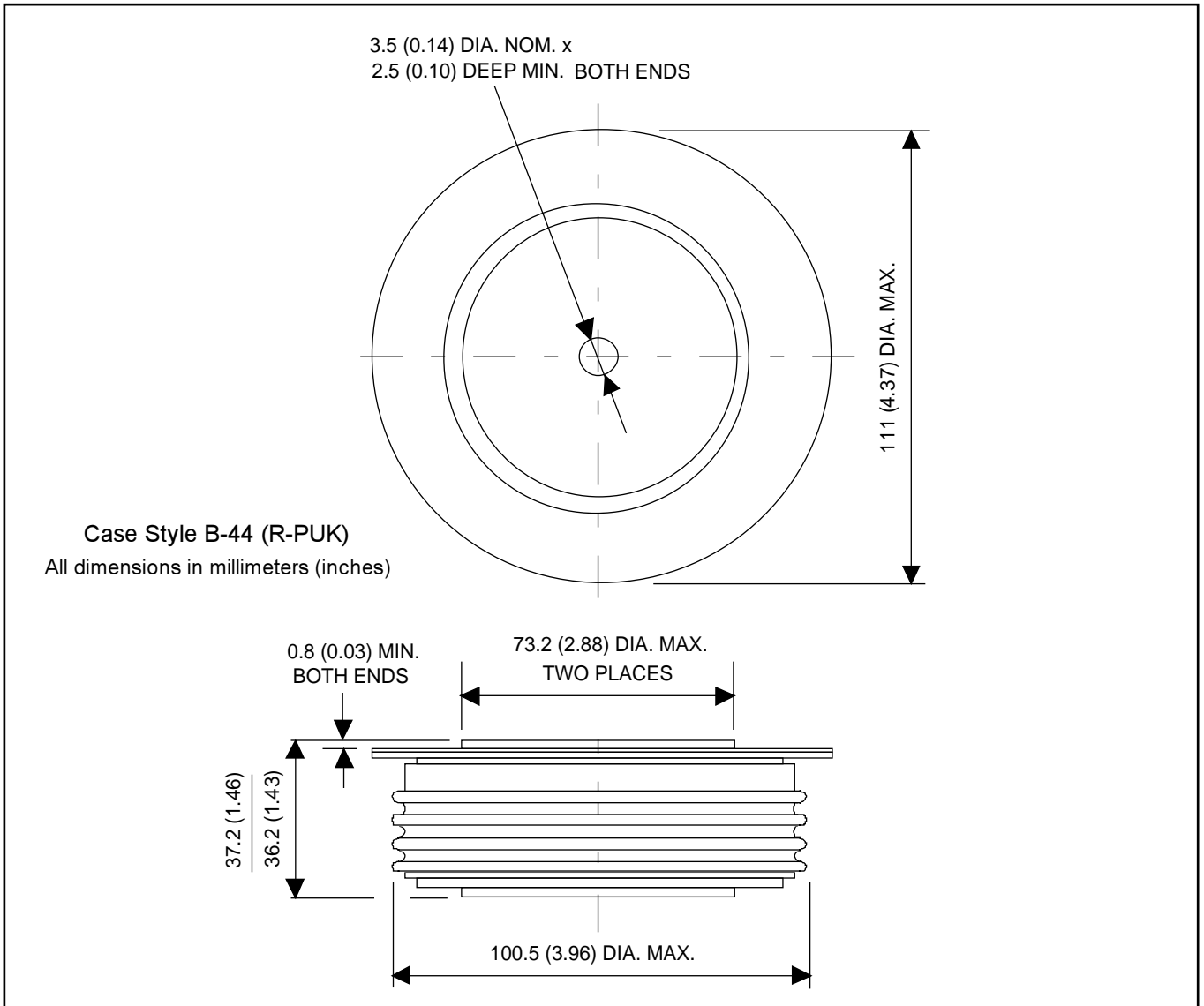
(The following table shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC)

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							
<b>SD</b>	<b>205</b>	<b>3</b>	<b>C</b>	<b>45</b>	<b>S50</b>	<b>R</b>	
①	②	③	④	⑤	⑥	⑦	
<b>1</b>	- Diode	<b>2</b>	- Essential part number	<b>3</b>	- 3 = Fast recovery	<b>4</b>	- C = Ceramic Puk
<b>5</b>	- Voltage code: Code x 100 = $V_{RRM}$ (See Voltage Ratings Table)						
<b>6</b>	- $t_{rr}$ code (See Recovery Characteristics Table)						
<b>7</b>	- K = Puk Case B-44 (R-PUK)						

Outline Table



Data subject to change without notice.