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***DISCRETE POWER DIODES and THYRISTORS***  
***DATA BOOK***

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**FAST RECOVERY DIODES**
**Hockey Puk Version**
**Features**

- High power FAST recovery diode series
- 6.0  $\mu$ 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-200AB (B-PUK)
- Maximum junction temperature 125°C

**Typical Applications**

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

**560A**


case style DO-200AB (B-PUK)

**Major Ratings and Characteristics**

Parameters	SD553C..S50L	Units
$I_{F(AV)}$	560	A
@ $T_{hs}$	55	°C
$I_{F(RMS)}$	1120	A
@ $T_{hs}$	25	°C
$I_{FSM}$	@ 50Hz	12000
	@ 60Hz	12570
$I^2t$	@ 50Hz	721
	@ 60Hz	658
$V_{RRM}$ range	3000 to 4500	V
$t_{rr}$	6.0	$\mu$ s
@ $T_J$	125	°C
$T_J$	- 40 to 125	°C

## SD553C..S50L Series

### 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
SD553C..S50L	30	3000	3100	75
	36	3600	3700	
	40	4000	4100	
	45	4500	4600	

#### Forward Conduction

Parameter	SD553C..S50L	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Heatsink temperature	560 (210)	A	180° conduction, half sine wave
	55 (85)	$^\circ\text{C}$	Double side (single side) cooled
$I_{F(RMS)}$ Max. RMS forward current	1120	A	@ 25°C heatsink temperature double side cooled
$I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current	12000	A	t = 10ms No voltage reappplied
	12570		t = 8.3ms 50% $V_{RRM}$ reappplied
	10100		t = 10ms 50% $V_{RRM}$ reappplied
	10570		t = 8.3ms 50% $V_{RRM}$ reappplied
$I^2t$ Maximum $I^2t$ for fusing	721	KA <sup>2</sup> s	t = 10ms No voltage reappplied
	658		t = 8.3ms 50% $V_{RRM}$ reappplied
	510		t = 10ms 50% $V_{RRM}$ reappplied
	466		t = 8.3ms 50% $V_{RRM}$ reappplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	7210	KA <sup>2</sup> $\sqrt{s}$	t = 0.1 to 10ms, no voltage reappplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.77	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$V_{F(TO)2}$ High level value of threshold voltage	1.95		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$r_{f1}$ Low level value of forward slope resistance	0.98	m $\Omega$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$r_{f2}$ High level value of forward slope resistance	0.89		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$V_{FM}$ Max. forward voltage drop	3.24	V	$I_{pk} = 1500\text{A}$ , $T_J = 125^\circ\text{C}$ , $t_p = 10\text{ms}$ sinusoidal wave

#### Recovery Characteristics

Code	$T_J = 25^\circ\text{C}$ Typical $t_{rr}$ @ 25% $I_{RRM}$ ( $\mu\text{s}$ )	Test conditions			Max. values @ $T_J = 125^\circ\text{C}$			
		$I_{pk}$ Square Pulse (A)	$di/dt$ (A/ $\mu\text{s}$ )	$V_r$ (V)	$t_{rr}$ @ 25% $I_{RRM}$ ( $\mu\text{s}$ )	$Q_{rr}$ ( $\mu\text{C}$ )	$I_{rr}$ (A)	
S50	5.0	1000	100	-50	6.0	900	250	

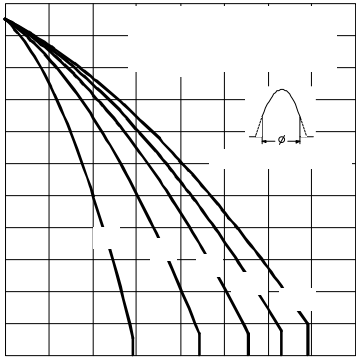


Fig. 3 - Current Ratings Characteristics

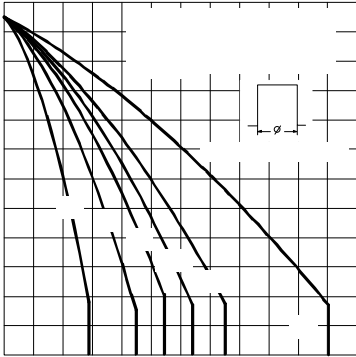


Fig. 4 - Current Ratings Characteristics

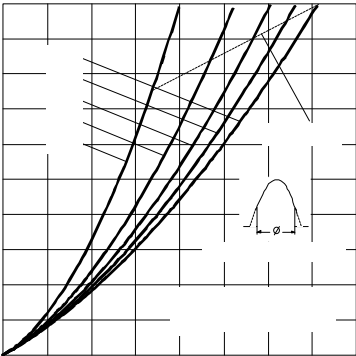


Fig. 5 - Forward Power Loss Characteristics

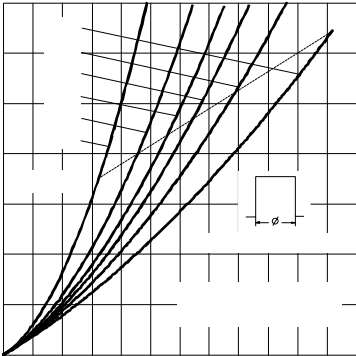


Fig. 6 - Forward Power Loss Characteristics

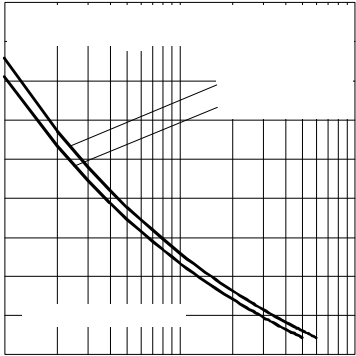


Fig. 7 - Maximum Non-repetitive Surge Current  
Single and Double Side Cooled

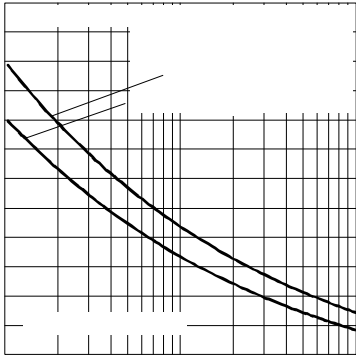


Fig. 8 - Maximum Non-repetitive Surge Current  
Single and Double Side Cooled

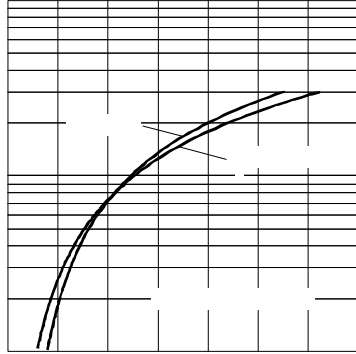


Fig. 9 - Forward Voltage Drop Characteristics

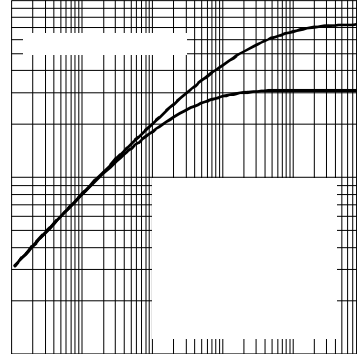


Fig. 10 - Thermal Impedance  $Z_{th(j-hs)}$  Characteristic

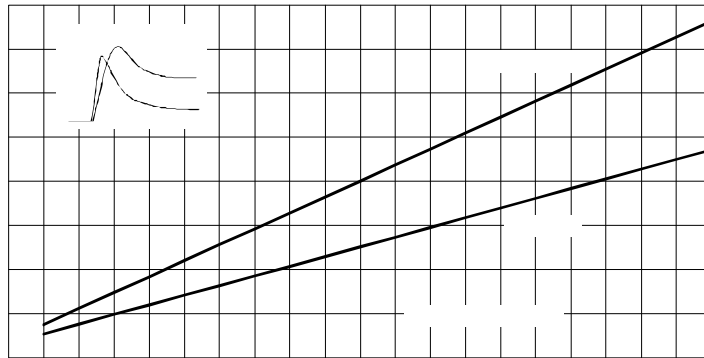


Fig. 11 - Typical Forward Recovery Characteristics

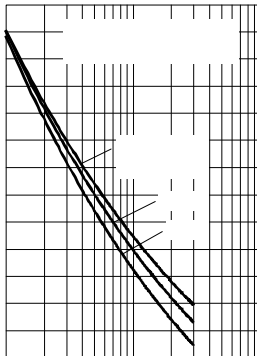


Fig. 12 - Recovery Time Characteristics



Fig. 13 - Recovery Charge Characteristics

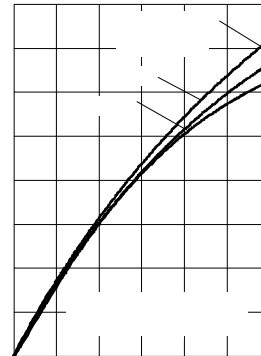


Fig. 14 - Recovery Current Characteristics

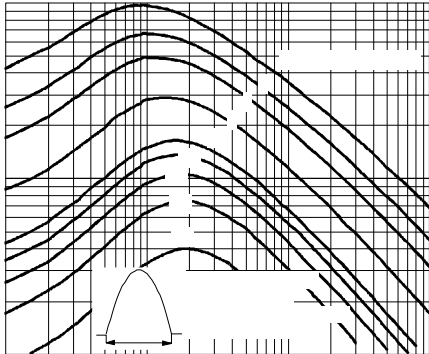


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

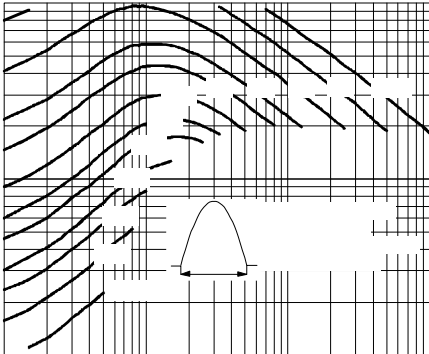


Fig. 16 - Frequency Characteristics

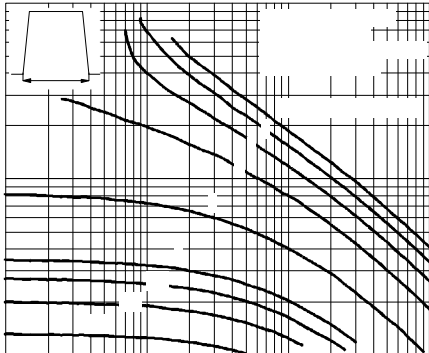


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

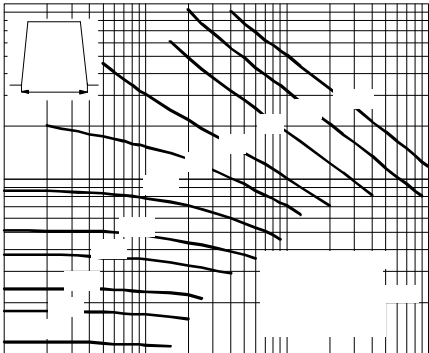


Fig. 18 - Frequency Characteristics

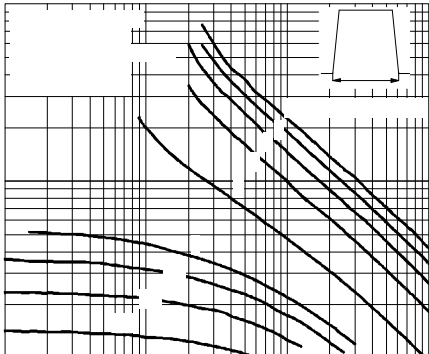


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

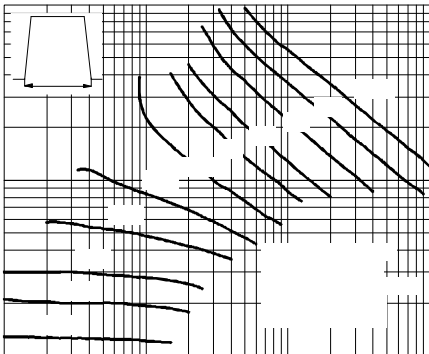


Fig. 20 - Frequency Characteristics

## Thermal and Mechanical Specifications

Parameter	SD553C..S50L	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	0.073 0.031	K/W	DC operation single side cooled DC operation double side cooled
F Mounting force, $\pm 10\%$	14700 (1500)	N (Kg)	
wt Approximate weight	255	g	
Case style	DO-200AB (B-PUK)		Conforms to JEDEC

 $\Delta R_{thJ-hs}$  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°	0.009	0.009	0.006	0.006	K/W	$T_J = T_J \text{ max.}$
120°	0.011	0.011	0.011	0.011		
90°	0.014	0.014	0.015	0.015		
60°	0.020	0.020	0.021	0.021		
30°	0.036	0.036	0.036	0.036		

## Ordering Information Table

Device Code	
	<b>SD 55 3 C 45 S50 L</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
<b>7</b>	- L = Puk Case DO-200AB (B-PUK)

SD553C..S50L Series

Outline Table

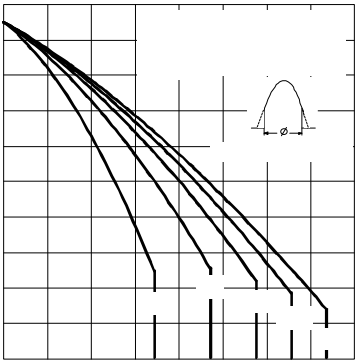
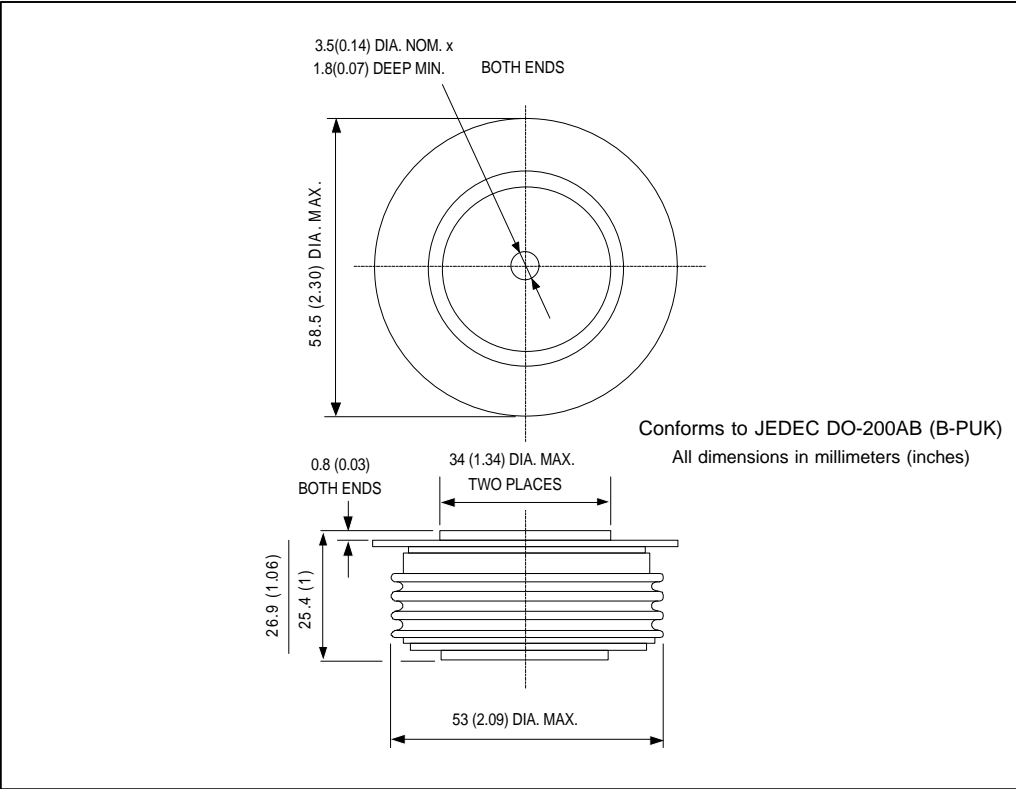


Fig. 1 - Current Ratings Characteristics

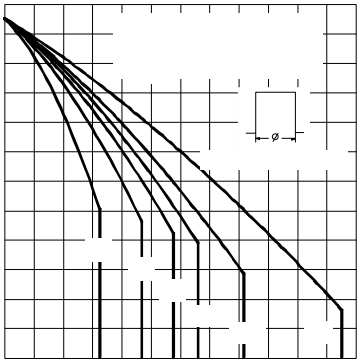


Fig. 2 - Current Ratings Characteristics