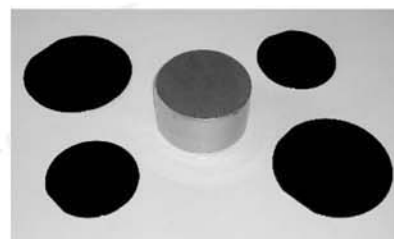


Silicon Wafers and GaAs Wafers



FZ Single Crystal Silicon Ingot (1)

Kind	Type	Orientation	Diameter mm	Resistivity Ω cm
Intrinsic FZ	N	<111> <100>	Φ 50~150	300~30000
	P			
NTD FZ	N	<111> <100>	Φ 50~125	30~600
CFZ	N	<111> <100>	Φ 50~125	5~50
Gas Doping FZ	N	<111> <100>	Φ 50~125	0.001~100
	P			
Applications	Power semiconductor,high reverse voltage device,microelectron device,IC,solar cell etc.			

CZ Single Crystal Silicon Ingot

Kind	Type	Orientation	Diameter mm	Resistivity Ω cm
CZ	N	<111> <100>	Φ 50~200	0.001~100
	P			0.001~50
Applications	Semiconductor device,epitaxial growth,IC etc			

CZ Single Crystal Silicon Wafer for Solar Cell

Kind	Type	Thickness μ m	Orientation	Diameter mm	Resistivity Ω cm
CZ	P	400	<111> <100>	Φ 50.8~150	0.01~10
		420			
		500			

NTD (Neutron Transmutation Doped)

TYPE		N		
Dopant		Phosphorus		
Diameter mm		Φ 50.8~ Φ 125 < Φ 50.8 upon special request > Φ 125 upon special request		
Resistivity Range Ω .cm	Tolerance (min)	RV (max)	Lifetime (μ s)	
	%	%	min.	typ.
5~200	± 5	3	100	300
200~600	± 5	5	300	600
600~1000	± 7	7	300	750

FZ Single Crystal Silicon Ingot (2)

Diameter (mm)	$\Phi 50.8 \sim \Phi 125$ $< \Phi 50.8$ upon special request $> \Phi 125$ upon special request				
Type	Orientation	Resistivity Range $\Omega \cdot \text{cm}$	Tolerance (min) %	RV(max) %	Lifetime (min.) μs
N N	$\langle 111 \rangle$ $\langle 111 \rangle$	1~100 100~1000	± 18 ± 20	30 30	200 1000
N N	$\langle 100 \rangle$ $\langle 100 \rangle$	1~100 100~1000	± 15 ± 20	15 17	200 1000
P P	$\langle 111 \rangle$ $\langle 111 \rangle$	1~100 100~1000	$\pm 20/12$ $\pm 25/15$	12 15	100 200
P P	$\langle 100 \rangle$ $\langle 100 \rangle$	1~100 100~1000	$\pm 20/12$ $\pm 25/12$	12 15	100 200

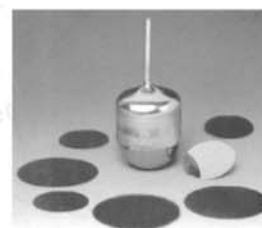
As Cut Waters

Diameter (mm)	$< \Phi 50.8$ upon special request $> \Phi 125$ upon special request			
	$\Phi 50.8$	$\Phi 76.2$	$\Phi 100$	$\Phi 125$
Thickness(μm) std. min.	260 180	300 210	320 240	380 300
Thickness std. Tolerance(μm) min.	± 15 ± 10			
TTV (μm) std. typ.	10 5	10 7	15 10	25 15
Bow(μm) max. (distressed)	10	15	20	40
Special options	Great variety of edge Profiles available ingot off orientation max. $\pm 7^\circ$			

As Lapped Wafers

Diameter (mm)	$< \Phi 50.8$ upon special request $> \Phi 125$ upon special request			
	$\Phi 50.8$	$\Phi 76.2$	$\Phi 100$	$\Phi 125$
Thickness(μm) std. min.	280 190	320 200	340 265	400 340
Thickness std. tolerance(μm) min.	± 10 ± 8			
TTV (μm) max.	2	2	3	6
Bow (μm) max.	10	15	20	40
Special options	Two different lapping compounds available			

GaAs Single Crystal (ingot, polished wafer)



Type	Dopant	Orientation	Diameter mm	Consistency cm ⁻³	Resistivity Ω cm	Mobility cm ² /Vs	Dislocation Density 1/cm ²
LEC-50	—	<100>	Φ 50.8	————	≥1×10 ⁷	≥5000	≤50000
LEC-50Cr	Cr						
LEC-76	—	<100>	Φ 76.2	————	≥1×10 ⁷	≥5000	≤50000
LEC-76Cr	Cr						
LEC-76Si	Si	<100>	Φ 76.2	≥1×10 ¹⁸	————	≥1500	≤10000
LEC-76Cr	Cr			≥(5—40)×10 ¹⁷	————		
HB-50Si	Si	<100>	Φ 50.8	≥1×10 ¹⁸	————	≥1300	≤1000
HB-50Cr	Cr			————	≥5×10 ⁷	≥1500	≤5000
Applications	Ultra high speed IC , gate array micro wave device ,photoelectric device etc						



Molybdenum Disc

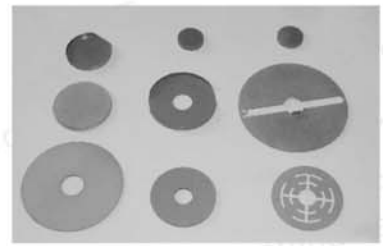
Applications: Be made to the thyristor silicon parts and its electric parts supporting base material.

Characteristics: They have smooth and clean surface, their flat roughness is down to Ra 1.6. They have good conduction, small linear expansion coefficient and good heat-resistance.

Specifications: We can produce according to the demands of our customers.

Diameter range is from 7 to 100 mm, thickness range is from 0.8 to 4.0 mm. square piece 4~25mm², thickness 0.5~1.5mm.

Parameters: Density: 10.15g/cm³ Linear expansion coefficient: $4.0 \times 10^{-6} \text{K}^{-1} \sim 6.4 \times 10^{-6} \text{K}^{-1}$
Resistivity: Less than $6.26 \times 10^{-6} \Omega \cdot \text{cm}$.



Main Impurity Contents, No More Than %									
Fe	Ni	Al	Si	Ca	Mg	P	C	O	N
0.006	0.003	0.002	0.003	0.002	0.002	0.001	0.010	0.006	0.003

specifications

unit:mm

NO.	O . DIA (ΦA)	I.DIA (ΦB)	THICKNESS (T)	PARALLELISM (II)	FLATNESS (□)
1	23.5±0.05	7.2~7.3	0.5±0.05	0.25	0.015
2	38±0.05		2.05~1.75		0.01
3	63.5±0.05		2.25~2.55		0.01
4	49.7±0.05		2.25~2.55		0.01
5	29.7±0.05		1.3±0.05		0.01
6	77.45±0.05		3.2±0.08		0.01
7	19.06±0.05		1~0.8		0.015
8	23.82±0.05		1.05~0.95		0.015
9	94±0.05	10.5~10.6	3.0~0.1	0.01	0.008
10	5~150		0.2~60		

Molybdenum Disc with Rhodium Plated

Material: Molybdenum 99.95% produced from rolled Mo-sheet.

The disc shall be plated with 0.3~0.4 μm rhodium. No cracks from punching or other operations are allowed.

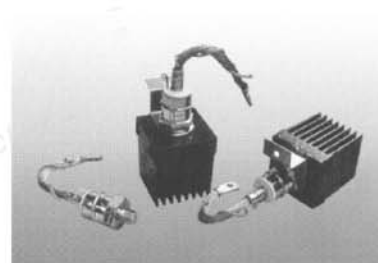
All edges absolute free from burrs. The faces must be free from spots, pip marks, scratches etc.

The coating must not show flaws or flake off when testing the adhesion with adhesive tape.

Article No.	Description	ΦA±0.05	T ^{+0.1} ₀	B±0.1
5SXC96-0052	Mo-disc(A)YST 35F	64.6	2	1.5
5SXC96-0053	Mo-disc(A)YST 45F	78.1	2.5	2
5SXC96-0054	Mo-disc(A)YST 60F	89	3	2.5
5SXC96-0059	Mo-disc(A)YST 90F	108	3.5	3

Note: The drawing is Fig.M1 of page 31.

Heatsinks

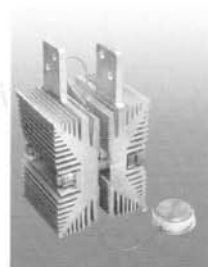


SZ Series Heatsinks (For Stud Type)

unit: mm

TYPE	outside dimensions			mounting dimensions				
	L	D	H	R	dxh	d1xh1	d1	L1
SZ13	45	22	25	8	M6×12	M6×10		
SZ14	60	32	33	12	M6×12	M6×12		
SZ14B	60	32	33	13	M10×14	M6×12		
SZ15A	70	36	40	13	M10×14	M10×12		
SZ16	76	46	48	16	M10×16	M10×15		
SL16	76	46	48	16	M12×16	M12×15		
SZ17	74	74	77	18	M10×15	M10×15		
SL17	68	72	90	18	M12×18		12	50
SL17B	68	72	90	18	M16×18		12	50
SL18	90	88	112	23	M20×20		15	60
SL19	130	130	110	28	M24×25		19	80

Note: The drawings are Fig.E1~E4 of page 40.



unit: mm

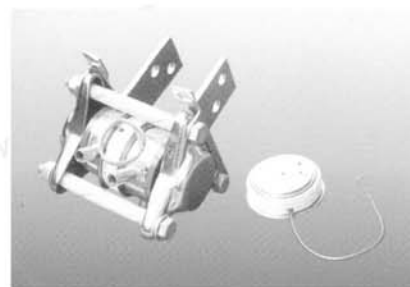
SF Series Air-Cooling Heatsinks (For Disc Type)

TYPE	outside dimensions			conductor plate dimensions			mounting dimensions					
	L	D	H	L1	D1	H1	L2	D2	H2	H3	d	d3
SF11	170	110	125	60	40	8	33	80	15	22	2hole-13	M3
XSF11	185	100	80	40	40	8		80	15	22	2hole-13	M3
SF12	200	110	125	60	40	8	33	80	15	22	2hole-13	M3
SF13	220	120	130	60	40	8	38	90	15	45	2hole-13	M3
SF14	250	140	145	80	50	10	38	105	15	45	4hole-11	M3
SF15	280	140	165	80	60	12	38	105	15	50	4hole-13	M3
SF16	280	180	205	80	60	12	34	130	20	71	4hole-13	M3
SF17	300	200	220	80	60	12	34	150	20	78	4hole-13	M3
SF17A	300	200	224	80	60	12	34	150	24	82	4hole-13	M3

TYPE	mounting dimensions									
	d1×h1	d2×h2	a	b	c	i	j	k	g	e
SF11	2 Screw-eye M6-6H-20	M10×120	20		20	6	20		30	55
XSF11		M10×120	20		20	6	20		30	55
SF12		M10×120	20		20	6	20		30	55
SF13		M10×120	20		20	6	20		53	64
SF14	4 screw-eye M6-6H-20	M12×140	12.5	25	12.5	8	20	25	55	40
SF15	4screw-eye M8-6H-20	M12×150	17.5	25	15	8	20	25	62	40
SF16		M12×180	17.5	25	15	8	20	25	83	30
SF17		M12×180	17.5	25	15	8	20	25	90	40
SF17A		M12×190	17.5	25	15	8	20	25	94	40

Note: 1. Tolerances of H2, H3, g are $\begin{matrix} +3 \\ -1 \end{matrix}$, $\begin{matrix} +4 \\ -1 \end{matrix}$, $\begin{matrix} +5 \\ -2 \end{matrix}$ respectively
2. The drawing is Fig.E5 of page 40.

SS-model Water-cooling heatsinks (For Disc Type)



unit: mm

TYPE	outside dimensions			conductor plate dimensions			mounting dimensions					
	L	D	H	L1	H1	D1	D2	H2	H3	H4	d	d2
SS11	140	135	145.5	53	4	30	112	64	105	18	2hole-9	M3
SS12	190	160	152	78	5	40	140	64	105	21	2hole-11	M3
SS13	190	160	152	78	6	50	140	64	105	21	4hole-13	M3
SS14	220	195	188	85	6	55	165	74	130	25.5	4hole-13	M3
SS15	220	195	200	85	8	80	165	90	130	34	8hole-16	

TYPE	mounting dimensions										
	d1×h1	d3	d4	d5	a	b	c	e	f	g	α
SS11	M8×140	2hole-10×14	13	9	15		20	35	6		45°
SS12	M12×145	2hole-12×15	13	9	20		20	60	8		45°
SS13	M12×145	2hole-12×15	13	9	15	20	15	60	8	20	45°
SS14	M12×160 M12×180	2hole-12×20	13	9	17.5	20	20	65	10	20	45°
SS15	M12×210	2hole-12×20	18	15	20	40	40			40	45°

Note: Tolerances of L, L1, D2, H2, H3, α are ± 2 , ± 2 , ± 0.5 , ± 3 , ± 3 ° respectively.
2. The drawing is Fig.E6 of page 37.

Heat-Pipe Heatsinks

Applications:

Petroleum

Chemical engineering

Metallurgy

Mechanical engineering

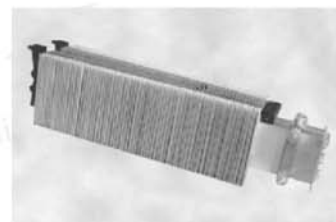
Electric power

Semiconductor device

Railway

Automobile

Communication



Features:

Remarkable heat-transfer capability

Good uniform temperature characteristic

Fast heat response

Separable cold source and heat source

Light and miniature

Reliable performance and no noise

Long life and no need for maintenance

Various kinds and wide applications

Products Introduction

RM series heat pipe heatsinks of natural cooling for modules with dissipation power 80~500W

RMGD series heat pipe heatsinks of natural cooling for modules with dissipation power 200~2000W

RK series heat pipe heatsinks of air cooling for modules with dissipation power 400~800W

RKGD series heat pipe heatsinks of air cooling for modules with dissipation power 1~12kW

RE series heat pipe heatsinks of natural cooling for thyristors with dissipation power 150~1500W

REGD series heat pipe heatsinks for thyristors/rectifiers assemblies with dissipation power 200~2000W

ZD/RZD series heat pipe heatsinks of natural cooling for voltage drop silicon assemblies with current 20~500A

RT series heat pipe heatsinks (or transfers) for special purpose