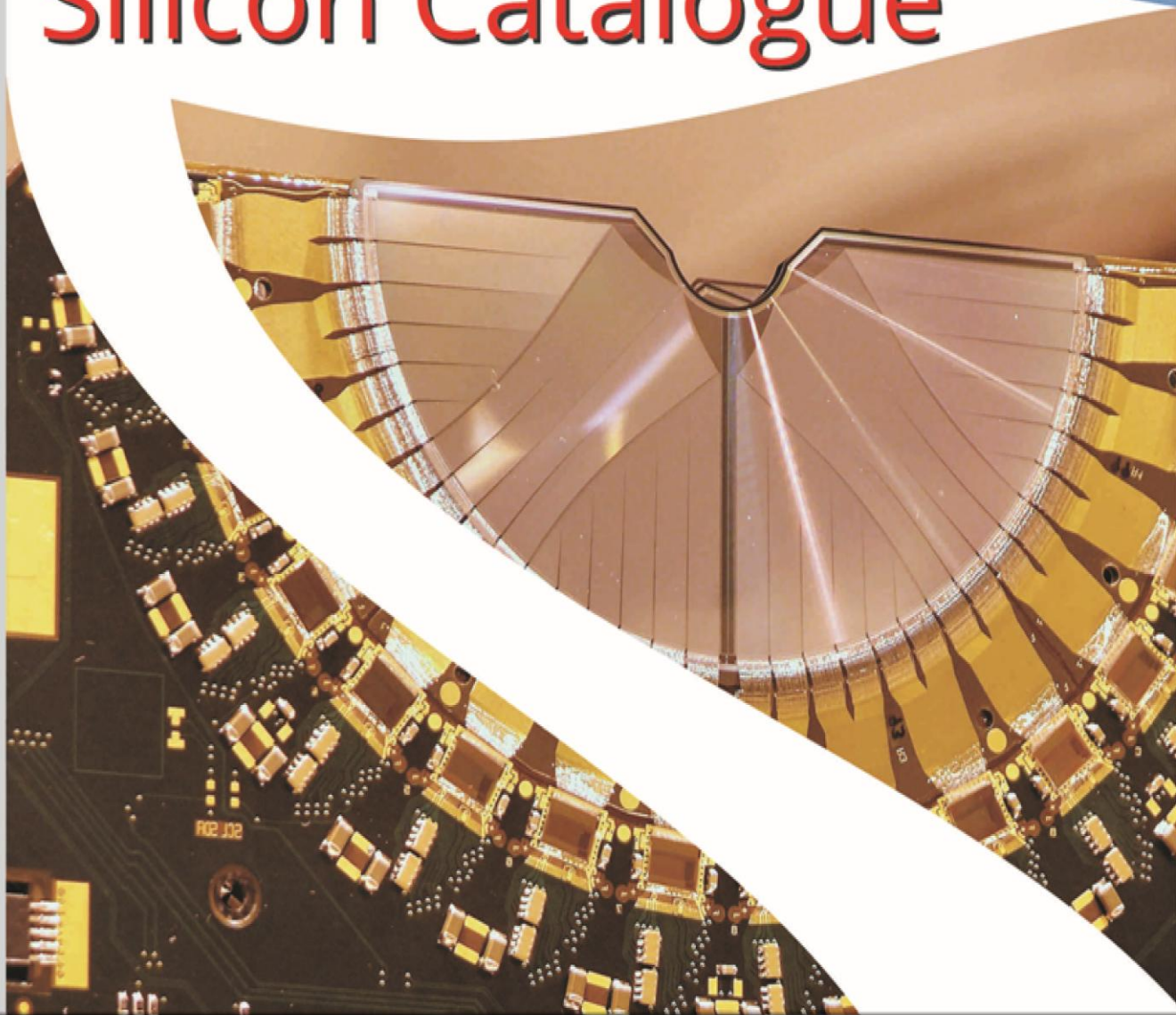
2017

MICRON SEMICONDUCTOR LIMITED

Silicon Catalogue



Shortform

Table of Contents

PRODUCT CHOICE

SILICON SENSOR OPTIONS

Silicon Type

N-Type

The majority of devices are fabricated on n-type float zone material with a crystal orientation of <100>. This material has a high resistivity typically in the range 3 – 10 KΩ cm.

P-Type

P-type silicon processing can be offered on all designs where segmentation isolation is possible.

NTD

Neutron transmutation doped n-type silicon is offered for applications where low resistivity variation across the wafer is required. This material has a much higher depletion voltage than regular high resistivity n-type material.

Silicon Wafer Size and Thickness

The wafer size corresponds to the standard* silicon thicknesses that the device can be processed on.

WAFER SIZE	STANDARD SILICON THICKNESSES (µm)
4-inch	20, 30, 40, 50, 65, 80, 100, 140, 250, 300, 500, 1000, 1500
6-inch	150, 200, 300, 400, 500, 675, 1000

*Other non standard and R&D silicon thicknesses are available on request.

Junction and Ohmic Window Type

Implant Type

The range of dead layer windows available with the in-house Varian 300 XP ion implanter are listed below. Window types refer to the junction of a device, but can also be achieved on the ohmic side upon request.

WINDOW TYPE	DEAD LAYER (µm)	MINIMUM ENERGY THRESHOLD	
		Electron (KeV)	Proton (KeV)
2	0.5	4	90
7	0.3	2	70
9	0.1	1	20
9.5	0.05	0.5	10
10	0.01	0.1	1
PSD	0.03	0.3	5

Metallisation Coverage Type

The coverage of the metal over the active area can be suited to the sensors application and to compliment the dead layer of the implant. The metal coverage refers to both the junction side and ohmic sides

METAL COVERAGE	DESCRIPTION
M	A continuous metal coverage of standard thickness over the whole active area region.
G	Grid coverage, typically 3 %, of standard thickness metallisation over the whole active area and contact pads for wire bonding.
P	A periphery metal band, typically 30 µm wide, around the edge of the active areas and contact pads for wire bonding. The majority of the active area has no dead layer contribution from the metal.
T	A standard periphery coverage, as described above, for good electrical contact, and a thin metal coverage typically 0.1 - 0.3 mm over the majority of the active area.
D	A double metal process used to track readout signal in a direction different to the active area elements.
E	An equipotential metal band array used on PSD devices.

Metallisation Type

The standard metallisation scheme is 100 % sputtered aluminium of thickness 0.5 µm for good ultra sonic wire bonding connections.

The evaporated metal system Ti/Ni/Au is also available on request. Gold ohmic contacts are used for high operating temperature detectors +55^{o} to +120^{o} required for military applications

SENSOR PACKAGE

The silicon chips can be delivered as chip only or assembled in a standard or custom package.

The majority of packages are made from standard FR4 material. Black FR4 material can be offered where light transmission through the package needs to be minimised.

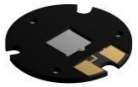
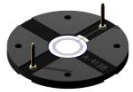
Many of the designs currently offered on FR4 material can be modified and transferred onto ceramic 96% alumina or aluminium nitride for operation in ultra high vacuum environments. Other package materials such as polyamide and kapton for high density readouts with limited space have been utilised for many applications.

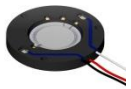
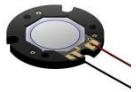
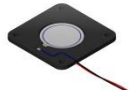
The connector type (straight or 90 degree) and orientation (exiting the junction or ohmic side) can also be changed to suit the experimental arrangement. Where a common pitch is used it may also be possible to request an alternative connector on an existing package.

SINGLE AREA DETECTORS

Circular Active Area Designs

Single sided single area circular active area with circular, square or multi faceted outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA DIAMETER (mm)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	MSD003	3.00	5.00 x 5.00	2	M	2	M	4	Chip Only
	MSD003810	3.810	∅ 8.69	2/7/9	M/T/P	2	M	4	Chip Only
	MSD004	4.00	∅ 8.00	2/7/9	M/T/P	2	M	4	Black FR4
	MSD004572	4.572	∅ 6.912	2/7/9	M/T/P	2	M	4	Chip Only
	MSD005	5.00	7.00 x 7.00	2/7/9	M/T/P	2	M	4	Black FR4
	MSD062	6.20	8.20 x 8.20	2/7/9	M/T/P	2	M	4	Chip Only
	MSD007	7.00	10.00 x 10.00	2/7/9	M/T/P	2	M	3 & 4	Range of Black FR4 Designs
	MSD007	7.00	∅ 11 .00	2/7/9	M	2	M	4	Black FR4
	MSD008	8.00	10.0 x 10.0	2/7/9	M/T/P	2	M	4	Black FR4
	MSD008	8.00	∅ 12.00	2/7/9	M	2	M	4	Black FR4
	MSD009	9.00	11.00 x 11.00	2	M	2	M	4	Chip Only

	MSD010	10.00	13.00 x 13.00	2/7/9	M/T/P	2	M	4	Chip Only
	MSD011	10.00	12.00 Flat-To-Flat (8 Sides)	2	M	2	M	6	Ceramic
	MSD012	12.00	∅ 16.00	2/7/9	M/T/P	2	M	6	Black FR4
	MSD017	16.80	∅ 20.80	2/7/9	M	2	M	4	Black FR4
	MSD018	18.00	21.00 Flat-To-Flat (8 Sides)	2/7/9	M/T/P	2	M	4	Black FR4
	MSD020	20.00	22.00 x 22.00	2	M	2	M	6	Chip Only
	MSD020	20.00	∅ 24.00	2/7/9	T/P	2	M	4	Range of Black FR4 Designs
	MSD022	21.70	∅ 25.70	2/7/9	M	2	M	4	Black FR4
	MSD023	23.00 – 31.00	∅ 27.00 – 35.00	2/7/9	T/P	2	M	4	Black FR4
	MSD024	24.50	28.76 Flat-To-Flat (16 Sides)	2	M	2	M	6	Housed in a metal case
	MSD026	26.00	∅ 30.00	2/7/9	M	2	M	4	Black FR4

	MSD028	28.14	30.91 Flat-To-Flat (16 Sides)	2	M	2	M	6	Housed in a metal case
	MSD030	30.00	32.00 x 32.00	2	M	2	M	4	Chip Only
	MSD032	32.00	∅ 36.00	2/7/9	M	2	M	4	Black FR4
	MSD035	35.00	39.00 Flat-To-Flat	2/7/9	G	2	M	4	Range of Black FR4 Designs
	MSD040	40.00	44.00 Flat-To-Flat (16 Sides)	2	M	2	M	4	Flexi Rigid Package
	MSD050	50.00	54.66 Flat-To-Flat (16 Sides)	2		2	M	6	Housed in a metal case
	MSD085	85.00	90.00 Flat-To-Flat (16 Sides)	2/7/9	M/T/P	2	M	4	Black FR4

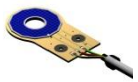
Elliptical Active Area Designs

Single sided elliptical active area with elliptical outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA DIAMETER (mm)		CHIP DIMENSIONS (mm)		JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		Major	Minor	Major	Minor	Implant	Metal	Implant	Metal		
	MSE 1	36.95	32.00	40.95	36.95	2/7/9	M	2	M	4	Black FR4

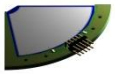
Donut Active Area Designs

Single sided single area circular active area with central hole and multi faceted outer chip dimensions.

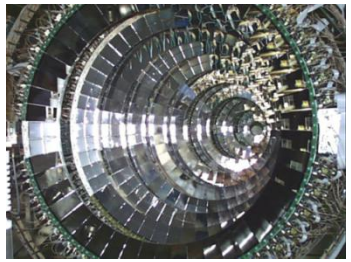
ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm)		CHIP DIMENSIONS (mm^2)	HOLE ∅ (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		Inner	Outer			Implant	Metal	Implant	Metal		
	LL21	∅ 6.60	14.068 Flat-To-Flat (12 Sides)	15.068 x 15.068 Flat-To-Flat (12 Sides)	5.60	2/7/9	G	2	M	6	Standard FR4

Sector Active Area Designs

Single sided sector active area with multiple assemblies completing almost 360° coverage.

ASSEMBLY EXAMPLES	DESIGN	SECTOR COVERAGE	ACTIVE AREA DIAMETER (mm)		CHIP DIMENSIONS (mm)		JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			Inner	Outer	Inner	Outer	Implant	Metal	Implant	Metal		
	QQQ1	82°	18.00	100.00	11.50	103.00	2	M	2	M	4	Standard FR4

Trapezoids Active Area Designs



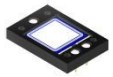
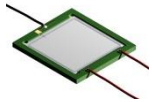
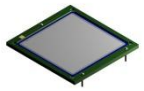
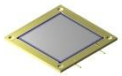
Single sided trapezoid active area with multiple assemblies completing almost 360° coverage. These assemblies have been installed in the 4π detector CHIMERA at the Superconductive Cyclotron at INFN-Laboratori Nazionali del Sud in Catania.

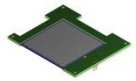
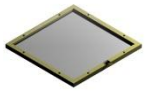
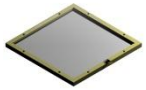
ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	TOTAL ACTIVE AREA (mm)			CHIP DIMENSIONS (mm)			JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			Length (mm)	Width 1 (mm)	Width 2 (mm)	Length (mm)	Width 1 (mm)	Width 2 (mm)	Implant	Metal	Implant	Metal		
	RRR-10	1	54.45	46.90	37.78	55.65	48.20	38.88	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-11	1	54.45	55.20	46.99	55.65	56.50	48.10	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-12	1	54.45	62.48	55.28	55.65	63.60	56.40	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-13	1	55.45	68.21	62.37	55.65	69.48	63.61	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-14	1	55.45	72.73	68.27	55.65	73.98	69.42	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-15	1	55.45	75.84	72.76	55.65	77.07	73.93	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-16	1	55.45	77.34	75.86	55.65	78.56	77.04	2/7/9	M/P/T	2	M	6	Rigid Flexi

	RRR-17	1	54.45	77.35	77.35	55.65	78.55	78.55	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-25	1	90.60	77.80	44.72	91.80	78.38	45.70	2/7/9	M/P/T	2	M	6	Rigid Flexi
	RRR-26	1	90.54	83.03	20.44	91.75	84.36	21.25	2/7/9	M/P/T	2	M	6	Rigid Flexi

Square Active Area Designs

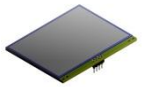
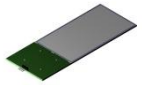
Single sided single area square active area with square outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	MSX03	10.00 x 10.00	13.00 x 13.00	2/7/9	M/T/P	2	M	4 & 6	Range of FR4 and Ceramics designs
	MSX04	20.00 x 20.00	22.95 x 22.95	2	M	2	M	4	Standard FR4
	MSX077	7.50 x 7.50	10.50 x 10.50	2	M	2	M	4	Chip Only
	MSX09	30.00 x 30.00	33.00 x 33.00	2	M	2	M	4	Standard FR4
	MSX25	50.00 x 50.00	55.00 x 55.00	2/7/9	M/G	2	M	4	Range of FR4 and Ceramics designs

	MSX40	63.975 x 63.975	67.975 x 67.975	2	M	2	M	4	Range of FR4 Designs
	MSX100-1	97.22 x 97.22	102.00 x 102.00	2	M	2	M	6	Standard FR4
	MSX100	100.0 x 100.0	102.00 x 102.00	2	M	2	M	6	Standard FR4

Rectangular Active Area Designs

Single sided single area rectangular active area with rectangular outer chip dimensions.

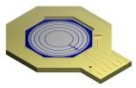
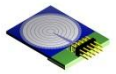
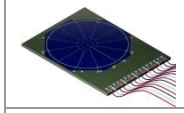
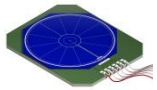
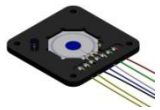
ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	MSX02	5.25 x 2.75	6.05 x 3.30	2	M	2	M		T05
	MSX060	40.00 x 15.00	43.00 x 18.00	2/7/9	M/T/P	2	M	4	Chip Only
	MSX07	7.00 x 3.00	7.74 x 3.74	2	M	2	M	4	Chip Only
	MSX35	50.00 x 70.00	52.00 x 72.00	2	M/G	2	M	4	Range of FR4 Designs
	MSX7200	65.00 x 120.00	69.99 x 124.00	2	M	2	M	6	Standard FR4

MULTI ELEMENT DETECTORS

Single Sided

Circular Designs without a Central Hole

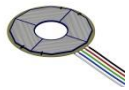
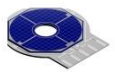
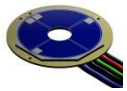
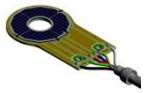
Single sided multi element circular active areas with circular or multi faceted outer chip dimensions.

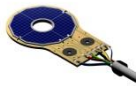
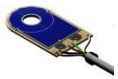
ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	OUTER ACTIVE AREA DIAMETER (mm)	CHIP DIMENSIONS (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
					Implant	Metal	Implant	Metal		
	LL7	4, Annular	16.00	19.00 Flat-to-Flat (8 Sided)	2	M	2	M		Standard FR4
	LL8	7, Annular	28.00	31.60 Flat-to-Flat (4 Sided)	2	M	2	M		Standard FR4
	LL10	15 Elements	20.00	21.00 Flat-to-Flat (8 Sided)	2/7/9	G	2	M		Ceramic
	LL11	5, Annular	19.90	21.00 Flat-to-Flat (8 Sided)	2	G	2	M	4	Ceramic
	MSA002/018	2, Annular	18.00	22.00 Flat-to-Flat Nº Sides = 8	2 & 7/9	P & M	2	M	6	Black FR4
	MSA002/020	2, Annular	20.00	24.00 Flat-to-Flat Nº Sides = 16	2/7/9	M	2	M	4	Chip Only
	MSA003/016	3 Elements	16.00	18.15 Flat-to-Flat Nº Sides = 8	2/7/9	M	2	M	4	Chip Only

	MSA016	15 Annular Quadrants	49.50	Ø 53.30	2	DM	2	M	6	Chip Only

Circular Designs with a Central Hole

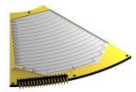
Single sided multi element circular active areas with central hole and circular or multi faceted outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	ACTIVE AREA DIAMETER (mm)		CHIP DIMENSIONS (mm)	HOLE Ø (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			Inner	Outer			Implant	Metal	Implant	Metal		
	LL1	4 Quadrants	15.995	33.80	34.80 Flat-to-Flat (12 Sided)	14.0	2/7/9	M	2	M		Standard FR4
	LL2	4 Quadrants	6.858	24.13	25.35 Flat-to-Flat (8 Sided)	5.600	2/7/9	M	2	M		Standard FR4
	LL3	4 Quadrants	6.75	18.05	18.60 Flat-to-Flat (8 Sided)	4.90	2/7/9	M/G/ P/T	2	M		Ceramic
	LL4	4 Quadrants	4.25	10.05	10.60 Flat-to-Flat (8 Sided)	3.30	2/7/9	M/G	2	M		Standard FR4
	LL13	4 Quadrants	5.85	FLAT = 18.00	19.00 Flat-to-Flat (8 Sided)	4.90	2/7/9	G/P	2	M	6	Ceramic
	LL14	4 Quadrants	4.22	FLAT = 10.08	10.60 Flat-to-Flat (8 Sided)	3.30	2/7/9	G	2	M	6	Standard FR4
	LL20	4 Quadrants	6.60	FLAT = 14.068	15.068 Flat-to-Flat (12 Sided)	5.60	2/7/9	G	2	M	4	Standard FR4

	LL22	4 Quadrants	6.60	FLAT = 14.138	18.288 Flat-to-Flat (12 Sided)	5.60	2/7/9	G	2	M	6	Standard FR4
	LL23	3 Elements	6.60	FLAT = 14.138	15.068 Flat-to-Flat (8 Sided Special)	5.60	2/7/9	G	2	M	6	Standard FR4
	LL31	4 Quadrants	6.40	10.00	10.75 Flat-to-Flat (8 Sided)	5.40	2/7/9	M/G	2	M		Standard FR4
	MSA003/044	24 Elements	20.00	44.60	∅ 50.60	17.00	2	DM	2	M	6	Chip Only
	MSA127	127 Elements	4.00	134.65	136.472 Flat-to-Flat (8 Sided Special)	2.00	2	M	2	M	6	Ceramic Flip chip mounted

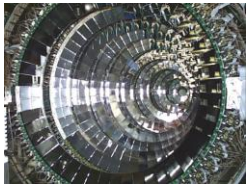
Multi Element Sector Designs

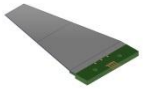
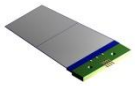
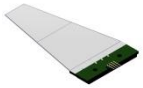
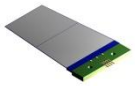
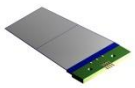
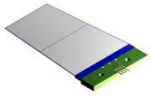
Single sided multi element active area with multiple assemblies completing almost 360° coverage.

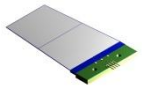
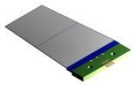
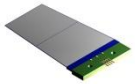
ASSEMBLY EXAMPLES	DESIGN	JUNCTION		TOTAL SECTOR COVERAGE	ACTIVE AREA DIAMETER (mm)		CHIP DIAMETER (mm)		JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	PITCH (µm)		Inner	Outer	Inner	Outer	Implant	Metal	Implant	Metal		
	YY1	16	5000	42°	100.00	259.80	89.95	264.00	2/7/9	M/T/P	2	M	4	Standard FR4

Multi Element Trapezoids Designs

Single sided trapezoid active areas with multiple assemblies completing almost 360° coverage. These assemblies have been installed in the 4π detector CHIMERA at the Superconductive Cyclotron at INFN-Laboratori Nazionali del Sud in Catania.

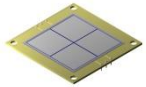


ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	TOTAL ACTIVE AREA (mm)			CHIP DIMENSIONS (mm)			JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			Length (mm)	Width 1 (mm)	Width 2 (mm)	Length (mm)	Width 1 (mm)	Width 2 (mm)	Implant	Metal	Implant	Metal		
	RRR-1	2	99.10	62.25	22.85	106.60	63.20	23.70	2/7/9	M/T	2	M	6	Standard FR4
	RRR-2	2	104.15	62.10	34.70	111.65	63.10	35.60	2/7/9	M/T	2	M	6	Standard FR4
	RRR-3	2	103.90	58.60	38.25	111.40	59.60	39.15	2/7/9	M/T	2	M	6	Standard FR4
	RRR-4	2	108.10	55.50	38.65	115.60	56.50	39.60	2/7/9	M/T	2	M	6	Standard FR4
	RRR-5	2	93.35	61.95	47.55	100.85	62.95	48.45	2/7/9	M/T	2	M	6	Standard FR4
	RRR-6	2	81.90	55.85	45.45	89.40	56.85	46.40	2/7/9	M/T	2	M	6	Standard FR4

	RRR-7	2	95.80	60.80	48.85	103.30	61.80	49.80	2/7/9	M/T	2	M	6	Standard FR4
	RRR-8	2	81.85	61.95	52.00	89.35	62.95	52.90	2/7/9	M/T	2	M	6	Standard FR4
	RRR-9	2	105.15	63.80	51.55	112.65	64.80	52.45	2/7/9	M/T	2	M	6	Standard FR4

Square Designs without a Central Hole

Single sided multi element square active areas with square outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
					Implant	Metal	Implant	Metal		
	MSQ25	4 Quadrants	24.975 x 24.975	57.02 x 57.02 maximum	2	M	2	M	4	Range of FR4 designs

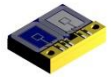
Square Designs with a Central Hole

Single sided multi element square active areas with a central hole and square outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	ACTIVE AREA (mm)		CHIP DIMENSIONS (mm)	HOLE ∅ (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			Inner	Outer			Implant	Metal	Implant	Metal		
	LL16	4 Quadrants	∅ 2.00	12.00 x 12.00	14.00 Flat-to-Flat (4 Sided)	1.05	2/7/9	G	2	M	6	Standard FR4

Rectangular Designs (without a Central Hole)

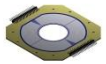
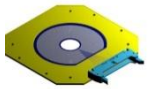
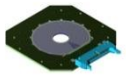
Single sided multi element rectangular active areas with rectangular outer chip dimensions.

ASSEMBLY EXAMPLES	DESIGN	NUMBER OF ELEMENTS	TOTAL ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
					Implant	Metal	Implant	Metal		
	XXX3	4	6.34 x 12.712	8.50 x 14.70	2 & 7/9	M & P	2	M	4	Standard FR4
	XXX4	2	26.50 x 57.50	29.50 x 60.50	2	M	2	M	4	Chip Only

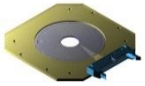
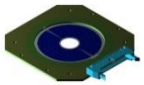
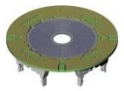
Double Sided

Circular Designs with a Central Hole

Double sided multi element active area with central hole. A single assembly completing almost 360° coverage. All double sided devices can be fabricated as single sided devices using either the double sided junction or ohmic side[1].

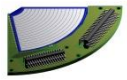
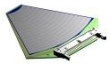
ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		ACTIVE AREA Ø (mm)		CHIP DIMENSIONS Ø (mm)		JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	PITCH (µm)	ELEMENTS	PITCH (µm)	Inner	Outer	Inner	Outer	Implant	Metal	Implant	Metal		
	S1	64 Incomplete Rings	1505	16 Sectors	22.5°	48.00	96.00	46.00	100.00	2	M	2	M	4	Range of FR4 Designs
	S2	48 Incomplete Rings	491	16 Sectors	22.5°	22.00	70.00	20.00	76.00	2	M	2	M	4	Standard FR4
	S2_1500	45 Incomplete Rings	491	16 Sectors	22.5°	26.01	70.00	20.00	76.00	2	M	2	M	6	Standard FR4

[1] Some modifications may be necessary to the detector package.

	S3	24 Complete Rings	886	32 Sectors	11.25°	22.00	70.00	20.00	76.00	2	DM	2	M	4	Standard FR4
	S4	128 Sectors	2.8125°	256 Complete Rings	215	15.00	124.98	10.00	130.10	2/7/9	P	2	M	6	Range of FR4 Designs
	S5	24 Incomplete Rings	Varies	16 Sectors	22.5°	22.96	70.09	20.00	76.00	2/7/9	P	2/7/9	P	4	Standard FR4
	S7	45 Complete Rings	493	16 Sectors	22.5°	25.92	70.09	20.00	76.00	2	DM	2	M	4	Standard FR4

Sector Circular Designs

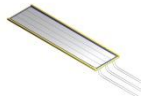
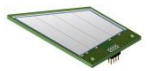
Double sided multi element active area of sectors and annular strips with central hole. Multiple assemblies completing almost 360° coverage.

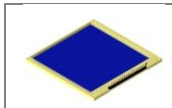
ASSEMBLY EXAMPLES	DESIGN	SECTOR COVERAGE	JUNCTION		OHMIC		ACTIVE AREA DIAMETER (mm)		CHIP DIAMETER (mm)		JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
			ELEMENTS	PITCH (µm)	ELEMENTS	PITCH (°)	Inner	Outer	Inner	Outer	Implant	Metal	Implant	Metal		
	QQQ2	82°	16	2000	24	3.75	18.00	82.00	11.50	85.00.	2/7/9	M/P	2	M	4	Standard FR4
	QQQ3	90°	16	3057	16	5.625	100.20	198.00	96.20	200.20	2/7/9	M/T/P	2	M	6	Standard FR4
	QQQ5	90°	32	2550	4	22.5	50.50	163.90	46.40	168.00	2/7/9	P	2	M	6	Flexi Rigid
	MMM	60°	16	6410	8	6.80	65.20	270.20	55.26	272.20	2	M	2	M	6	Standard FR4

STRIP DETECTORS

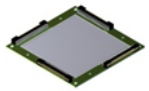
Single Sided

DC Strip Detectors without Bias Resistors

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	PITCH (µm)			Implant	Metal	Implant	Metal		
	ZZZ	20	1000	7.00 x 19.90	11.00 x 24.00	2	M	2	M	4	Standard FR4
	EE2	40	500	20.00 x 50.00	22.40 x 52.40	2	M	2	M	4	Standard FR4
	EE1	96	650	20 .00 x 62.40	22.90 x 65.00	2	M	2	M	4	Standard FR4
	BB9	4	7000	27.90 x 94.80	30.00 x 96.88	2	M	2	M	6	Standard FR4
	BB10	8	4944	39.45 x 74.15	43.30 x 78.00	2	M	2	M	4	Standard FR4
	BB16	4	11600	46.30 x 70.40 Trapezoid Left & Right	50.40 x 75.56 Trapezoid Left & Right	2	M	2	M	4	Standard FR4
	BB19	64	1200	50.00 x 76.77	53.50 x 80.32	2/7/9	P	2	M	4	Ceramic

	TTT12	20	4850	96.95 x 96.95	101.00 x 101.00	2/7/9	P	2	M	6	Standard FR4

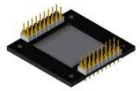
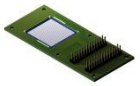
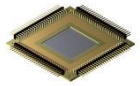
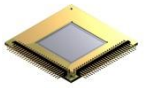
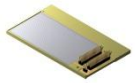
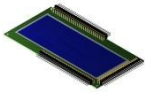
DC Strip Detectors with Bias Resistors

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	PITCH (µm)			Implant	Metal	Implant	Metal		
	BB18	128	560	71.63 x 71.63	75.60 x 75.60	2	M	2	M	4	Standard FR4

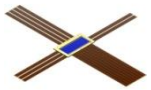
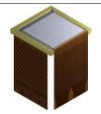
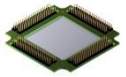
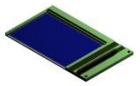
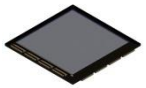
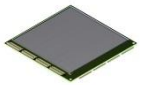
Double Sided

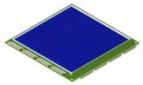
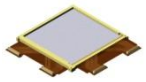
DC Strip Detectors without Bias Resistors

All double sided devices can be fabricated as single sided devices using either the double sided junction or ohmic side[2].

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		STRIPS	PITCH (µm)	STRIPS	PITCH (µm)			Implant	Metal	Implant	Metal		
	BB8	16	1250	16	1250	20.00 x 20.00	22.90 x 22.90	2/7/9	M/P/T	2/7/9	M/P/T	4	Range of designs in different materials.
	BB21	128	950	11	2000	21.90 x 121.50	25.00 x 125.00	2/7/9	M/P/T	2/7/9	M/P/T	6	Chip Only
	BB2	24	1000	24	1000	24.00 x 24.00	26.00 x 26.00	2	M	2	M	4	Standard FR4
	BB5	80	400	80	400	31.95 x 31.95	37.60 x 37.60	2	M	2	M	4	Standard FR4
	BB1	40	1000	40	1000	39.90 x 39.90	45.52 x 45.52 max	2	M	2	M	4	Standard FR4
	BB15	64	1172.5	4	10087.5	40.3 x 75.00	43.30 x 78.00	2	M	2	M	4	Standard FR4
	BB17	48	1000	128	1000	47.97 x 127.97	52.00 x 132.00	2/7/9	P	2	M	6	Standard FR4

[2] Some modifications may be necessary to the detector package.

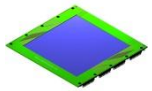
	BB20	192	670	72	670	48.21 x 128.61	52.21 x 132.61	2/7/9	P	2	M	6	Rigid Flexi
	W1	16	3100	16	3100	49.50 x 49.50	53.78 x 53.78	2/7/9	M/G/P/T	2	M	4	Range of designs in different materials.
	W2	100	500	100	500	49.95 x 49.95	53.00 x 53.00	2	M	2	M	4	Chip Only
	BB13	128	485	128	485	62.03 x 62.03	64.00 x 64.00	2	M	2	M	4	Flexi Rigid
	BB12	160	390	160	390	62.35 x 62.35	66.35 x 66.35	2	M	2	M	4	Standard FR4
	BB7	32	2000	32	2000	63.96 x 63.96	67.975 x 67.975	2/7/9	M/P/T	2	M	4	Range of designs in different materials.
	BB4	64	1000	64	1000	63.96 x 63.96	66.75 x 66.75	2	M	2	M	4	
	BB11	24	3000	48	1000	71.90 x 47.90	76.00 x 52.00	2/7/9	G	2/7/9	G	4	Standard FR4
	TTT6	64	1470	64	1470	93.20 x 93.20	99.20 x 99.20	2	M	2	M	6	Chip Only
	TTT2	128	760	128	760	97.22 x 97.22	100.42 x 100.42	2	M	2	M	6	Range of designs in different materials.
	TTT3	128	760	128	760	97.22 x 97.22	100.42 x 100.42	7/9	G/P/T	2	M	6	Standard FR4

	TTT4	128	760	128	760	97.22 x 97.22	100.42 x 100.42	2/7/9	M/G/P/T	2	M	6	Standard FR4
	TTT5	128	760	128	760	97.22 x 97.22	100.42 x 100.42	2/7/9	G	2	M	6	Standard FR4
	TTT10	32	3000	32	3000	95.97 x 95.97	100.00 x 100.00	2	M	2	M	6	Standard FR4
	TTT11	128	717	128	742	91.716 x 94.916	95.75 x 98.75	2	M	2	M	6	Standard FR4

DC Strip Detectors with Bias Resistors

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		STRIPS	PITCH (µm)	STRIPS	PITCH (µm)			Implant	Metal	Implant	Metal		
	BB14	256	227	128	875	58.06 x 111.95	61.00 x 115.00	2	M	2	M	6	Chip Only

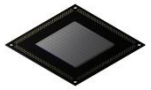
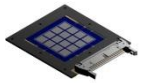
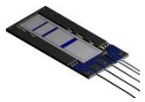
AC Strip Detectors-

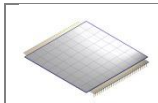
ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		STRIPS	PITCH (µm)	STRIPS	PITCH (µm)			Implant	Metal	Implant	Metal		
	TTT1	128	758	128	758	96.97 x 96.97	98.95 x 98.95	2	G	2	G	6	Standard FR4

PAD DETECTORS

Single Sided

DC Pad Detectors (without Bias Resistors)

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		PIXEL ARRAY	PITCH ARRAY (µm)			Implant	Metal	Implant	Metal		
	MSPX 1x1	1 x 1	1000 x 1000	1.00 x 1.00	4.00 x 20.50	2	M	2	M	4 & 6	Stackable Standard FR4
	MSPX 1x16	1 x 16	1000 x 1000	1.00 x 17.50	4.00 x 20.50	2	M	2	M	4 & 6	Stackable Standard FR4
	MSPX 16x16	16 x16	1140 x 1408	17.88 x 22.11	18.10 x 22.33	2	M	2	M	6	Chip Only
	MSPX 10x10	10 x 10	2000 x 2000	19.90 x 19.90	25.90 x 25.90	2	M	2	M	6	Chip Only
	MSPX 4x4	4 x 4	4950 x 4950	19.95 x 19.95	24.00 x 24.00	2	DM	2	M	6	Chip Only
	MSPX 12x12	12 x 12	4950 x 4950	59.95 x 59.95	64.00 x 64.00	2	DM	2	M	6	Range of designs in different materials.
	MSPAD 1x9	1 x 9	Variable	6.00 x 54.00	10.00 x 58.90	2/7/9	M	2	M	4	Black FR4
	MSPX 042	4 x 4	10 000 x 10 000	46.00 x 46.00	60.00 x 60.00	2	M	2	M	4	Black FR4
	MSPAD 1x4-1	1 x 4	Variable	12.00 x 48.00	16.00 x 52.00	2	M	2	M	4	Black FR4

	MSPX 080	8 x 8	12 075 x 12 075	96.95 x 96.95	99.00 x 99.00	2	DM	2	M	6	Ceramic
	MSPAD 1x4-2	1 x 4	Variable	16.00 x 50.00	20.00 x 54.00	2	M	2	M	4	Black FR4
	MSPX 128	128 Total	Hexagon Flat to-Flat 8910	∅ 117.15	∅ 123.15	2/7/9	G	2	M	6	Ceramic

Double Sided

DC Pad Detectors (without a Central Hole.)

All double sided devices can be fabricated as single sided devices using either the double sided junction or ohmic side[3].

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		TOTAL ACTIVE AREA (mm)	CHIP DIMENSIONS (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	PITCH (µm)	ELEMENTS	PITCH (µm)			Implant	Metal	Implant	Metal		
	MSPAD 1x5	5	Variable	5	Variable	10.00 x 40.80	16.00 x 46.80	2	M	2	M	4	Black FR4

[3] Some modifications may be necessary to the detector package.

MICROSTRIP DETECTORS

Single Sided

AC Microstrip Detectors

DESIGN	JUNCTION		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
	ELEMENTS	PITCH (µm)			Implant	Metal	Implant	Metal		
OOO	256	25	6.40 x 77.33	8.44 x 78.40	2	M	2	M	6	Chip Only

Double Sided

Orthogonal AC Microstrip Detectors (with Bias Resistors)

All double sided devices can be fabricated as single sided devices using either the double sided junction or ohmic side[4].

DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
	STRIPS	PITCH (µm)	STRIPS	PITCH (µm)			Implant	Metal	Implant	Metal		
BBB1	799	50	821	50	39.95 x 41.05	41.25 x 42.35	2	M	2	M	4	Chip Only
BBB2	874	55	881	50	48.07 x 44.05	49.36 x 45.35	2	M	2	M	4	Chip Only
BBB3	1275	55	859	50	70.12 x 42.50	71.42 x 43.85	2	M	2	M	4	Chip Only
BBB4	1023	50	631	105	51.15 x 66.26	54.45 x 67.50	2	M	2	M	4	Chip Only
BBB5	1023	50	525	100	51.15 x 52.50	53.85 x 54.45	2	M	2	M	4	Chip Only
DDD5	384	50	768	153.5	19.20 x 117.89.00	21.20 x 120.125	2	M	2	DM	6	Chip Only

[4] Some modifications may be necessary to the detector package.

Stereo AC Microstrip Detectors (with Bias Resistors)

DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
	STRIPS	PITCH (µm)	STRIPS	PITCH (µm)			Implant	Metal	Implant	Metal		
GGG	640	50	512	62.5 (2^o)	32.00 x 58.27	34.00 x 60.00	2	M	2	M	4	Chip Only
BBB6	1023	50 - 41	667	105	51.13 x 41.93 x 66.57	52.78 x 43.28 x 67.95 (Wedge)	2	M	2	M	4	Chip Only
EEE	512	112	512	112 (1.2^o)		59.30 x 74.70.	2	M	2	M	6	Chip Only
FFF	1024	50	768	62.5		79.21 x 59.21 x 16.73 (Wedge)	2	M	2	M	4	Chip Only
FFF2	128	715	130	750	~104.39 x 25.20 x 91.45	106.50 x 26.73 x 91.45 (Wedge)	2	M	2	M	4	Chip Only
FFF2	767	74.5	511	120	~123.11 x 38.37 x 57.54	~125.94 x 41.00 x 60.61 (Wedge)	2	M	2	M	4	Chip Only
HHH	516	160	516	160		115.90 x 23.20 x 85.40 (Wedge)	2	M	2	M	6	Chip Only

PIXEL DETECTORS

Single Sided

DC Pad Detectors

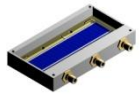
DESIGN	JUNCTION		ACTIVE AREA (mm)	CHIP DIMENSIONS (mm)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
	PIXEL ARRAY	PITCH ARRAY (µm)			Implant	Metal	Implant	Metal		
MSPX 96x128	96 x 128	150.00 x 150.00	14.35 x 19.15	17.35 x 22.15	2	M	2	M	6	Chip Only
MSPX 80 x 335	80 x 335	50.00 x 252.5	17.18 x 19.985	18.15 x 20.95	2	M	2	M	6	Chip Only
MSPX 256 x 256-1	256 x 256	55.00 x 55.00	14.06 x 14.06	15.90 x 15.90	2	M	2	M	6	Chip Only
MSPX 256 x 256-2	256 x 256	55.00 x 55.00	14.06 x 14.06	15.90 x 16.10	2	M	2	M	6	Chip Only

POSITION SENSITIVE DETECTORS

Single Sided

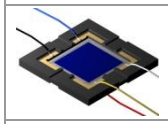
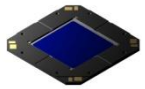
Single Area Devices

Single area devices with readout along two ends of the active area and the rear of the device.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	T	50.00 x 10.00	52.00 x 12.00	PSD	E	2	M	4	Standard FR4 with metal housing

Single Area Tetra-Lateral Devices

Single area devices with readout on all four corners of the active area and the rear of the device.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	MSPSD TL 50	5.00 x 5.00	15.356 x 15.356	PSD	E	2	M	4	Chip Only
	MSPSD TL 07	7.00 x 7.00	10.00 x 10.00	PSD	E	2	M	4	Chip Only
	MSPSD TL 20	20.00 x 20.00	24.00 x 24.00	PSD	E	2	M	4	Black FR4
	MSPSD TL 63	63.00 x 63.00	66.00 x 66.00	PSD	E	2	M	4	Black FR4

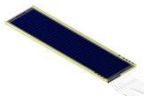
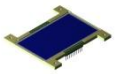
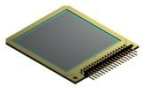
Multi Element Area Devices

Single sided multi element area devices with readout along two ends of the active area and the rear of the device.

	DESIGN	JUNCTION		TOTAL ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	ELEMENT ACTIVE AREA (mm^2)			Implant	Metal	Implant	Metal		
	TT	2	90.00 x 10.00	180.00 x 10.00	91.00 x 12.00	PSD	E	2	M	4	Standard FR4

Strip Devices

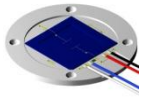
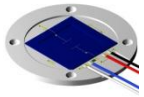
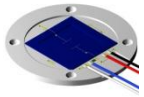
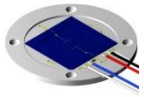
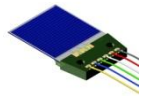
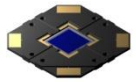
Single sided strip devices with readout along two ends of each strip and the rear of the device.

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		TOTAL ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		ELEMENTS	ELEMENT ACTIVE AREA (mm^2)			Implant	Metal	Implant	Metal		
	X2	4	5.55 x 94.80	22.20 x 94.80	24.6 x 96.80	PSD	E	PSD	E	6	Standard FR4
	X3	4	10.00 x 75.00	40.30 x 75.00	43.3 x 78.00	PSD	E	PSD	E	4	Standard FR4
	X4	8	5.10 x 75.00	41.50 x 75.00	45.60 x 79.00	PSD	E	PSD	E	4	Standard FR4
	X1	16	3.00 x 50.00	50.00 x 50.00	52.10 x 52.10	PSD	E	PSD	E	4	Standard FR4

Double Sided

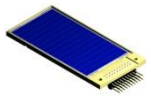
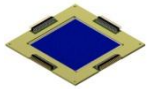
Single Area Duo-Lateral Devices

Double sided single area devices with readout along two opposite edges on the front of the devices and orthogonal readout edge on the rear of the device.

ASSEMBLY EXAMPLES	DESIGN	ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
				Implant	Metal	Implant	Metal		
	MSPSD DL 010	1.00 x 1.00	3.00 x 3.00	PSD	E	PSD	E	4	Chip Only
	MSPSD DL 011	1.00 x 1.00	15.356 x 15.356	PSD	E	PSD	E	4	Ceramic
	MSPSD DL 030	3.00 x 3.00	5.00 x 5.00	PSD	E	PSD	E	4	Chip Only
	MSPSD DL 031	3.00 x 3.00	15.356 x 15.356	PSD	E	PSD	E	4	Ceramic
	MSPSD DL 050	5.00 x 5.00	7.00 x 7.00	PSD	E	PSD	E	4	Chip Only
	MSPSD DL 051	5.00 x 5.00	15.356 x 15.356	PSD	E	PSD	E	4	Ceramic
	MSPSD DL 03	10.00 x 10.00	12.00 x 12.00	PSD	E	2	M	4	Chip Only
	MSPSD DL 0311	10.00 x 10.00	15.356 x 15.356	PSD	E	2	M	4	Ceramic
	MSPSD DL 04	20.00 x 20.00	21.00 x 23.00	PSD	E	2	M	4	Standard FR4
	MSPSD DL 041	20.00 x 20.00	24.00 x 24.00	PSD	E	2	M	4	Black FR4
	MSPSD DL 63	63.00 x 63.00	66.00 x 66.00	PSD	E	2	M	4	Chip Only

Strip Devices

Double sided strip devices with readout along two ends of each strip front and rear of the device. All double sided devices can be fabricated as single sided devices using either the double sided junction or ohmic side[5].

ASSEMBLY EXAMPLES	DESIGN	JUNCTION		OHMIC		ACTIVE AREA (mm^2)	CHIP DIMENSIONS (mm^2)	JUNCTION WINDOW		OHMIC WINDOW		WAFER SIZE (inch)	PACKAGE
		STRIPS	ELEMENT ACTIVE AREA (mm^2)	STRIPS	ELEMENT ACTIVE AREA (mm^2)			Implant	Metal	Implant	Metal		
	Super X3	4	10.00 x 75.00	4	18.675 x 40.30	40.30 x 75.00	43.30 x 78.00	PSD	E	PSD	E	4	Standard FR4
	X5	32	2.97 x 95.97	32	2.97 x 95.97	95.97 x 95.97	100.00 x 100.00	PSD	E	PSD	E	6	Standard FR4

[5] Some modifications may be necessary to the detector package.

Index

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