



CBM04-FSD01

Current status of Sensors

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Outline

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 - Sensors for Annealing
- Current status
 - Irradiated Sensors
 - Good Sensors (not Irradiated)
 - Sensors sent to MSU
 - Discarded Sensors

1.1. Sensors as delivered

General properties:

- 256 strips per side
- 50 μm pitch
- 20 μm strip width
- 4 AC pads + 1 DC pad

Substrate material:

- N-type
- $\langle 111 \rangle$ orientation
- 285 μm thickness
- 3.5÷5.5 $\text{k}\Omega\cdot\text{cm}$

Structure	Schottky contact width	Width of poly resistor	Guard rings	Biasing	Passivation on Schottky	
Bo5tb	21	no	single side	punch	open	13x
Bo4pr	no	5	double side	poly		13x
Bo4pa	18	5	double side	poly		9x
Bo4pw	18	5	single side	poly		none
Bo4nx	18	5	single side	punch+poly	open	10x

Total count: 45 sensors from 14 wafers.

1.2 Sensors sent to MSU

- These detectors were sent to MSU to testing

Structure	Schottky contact width	Width of poly resistor	Guard rings	Biasing	Passivation on Schottky	
Bo4nx	18	5	single side	Punch + poly	open	3x
Bo4pa	18	5	double side	Poly		3x

Total count: 6 sensors.

2.1. Overview: Irradiated Sensors

- 20 samples were chosen after visual inspection and I-V / C-V scans
- 4 data points (5 detectors per data point)
- Fluences: $1\text{e}12$, $1\text{e}13$, $3\text{e}13$, $1\text{e}14$ $n_{\text{eq}}/\text{cm}^2$

F = 1e12:

1 × bo5tb
2 × bo4pr
2 × bo4pa

F = 1e13:

1 × bo5tb
2 × bo4pr
2 × bo4pa

F = 3e13:

1 × bo5tb
2 × bo4pr
2 × bo4pa

F = 1e14:

1 × bo5tb
2 × bo4pr
2 × bo4pa

Total count: 20 sensors.

2.2. Overview: COSY Beam Time

- 5 samples were chosen after visual inspection and I-V / C-V scans
- 5 data points (1 detectors per data point)
- Fluences: 0, 1e12, 1e13, 3e13, 1e14 n_{eq}/cm²

F = Zero:

Wafer # 09

1 × bo4pr

F = 1e12:

Wafer # 24

1 × bo4pr

F = 1e13:

Wafer # 6

1 × bo4pr

F = 3e13:

Wafer # 22

1 × bo4pa

F = 1e14:

Wafer # 08

1 × bo4pa

Total count: 5 sensors.

2.3. Overview: Annealing Studies

- 10 samples were chosen after visual inspection and I-V / C-V scans
- 10 data points (1 detectors per data point)
- Fluences: 0, $1e12$, $1e13$, $3e13$, $1e14$ n_{eq}/cm^2
- 2 detectors per fluence

F = Zero:

Wafer # 13

1 × bo4pr

Wafer # 13

1 × bo5tb

F = $1e12$:

Wafer # 10

1 × bo4pr

Wafer # 09

1 × bo5tb

F = $1e13$:

Wafer # 23

1 × bo4pr

Wafer # 06

1 × bo5tb

F = $3e13$:

Wafer # 12

1 × bo4pr

Wafer # 22

1 × bo5tb

F = $1e14$:

Wafer # 06

1 × bo4pr

Wafer # 23

1 × bo5tb

Total count: 10 sensors.

3.1. Irradiated and Zero Fluence

	Description of Sensor			Status	Temprature Condition	Mouting Condition	Pakaging Condition	Cosy
	Wafer #	Structure	Fluence	Used/Not Used	Freezer/Room	Boarded/Not Boarded	Gelpack/Bluebox/NitrogenBox	Beamtime
BOX 1	7	bo4pa	1.00E+12	Not Used	Freezer	Not Boarded	Gelpack	No
	9	bo5tb	1.00E+12	Used	Freezer	Boarded Green	Bluebox	No
	24*	bo4pr	1.00E+12	Used	Freezer	Boarded Green	Bluebox	Yes
	10	bo4pr	1.00E+12	Used	Freezer	Boarded Yellow	Bluebox	No
	9	bo4pa	1.00E+12	Used	Freezer	Boarded Yellow	Bluebox	No
BOX 2	22	bo5tb	3.00E+13	Used	Freezer	Boarded Green	Bluebox	No
	12	bo4pr	3.00E+13	Used	Freezer	Boarded Yellow	Bluebox	No
	7	bo4pr	3.00E+13	Not Used	Freezer	Not Boarded	Gelpack	No
	1	bo4pa	3.00E+13	Used	Freezer	Boarded Green	Bluebox	Yes
	12	bo4pa	3.00E+13	Used	Freezer	Boarded Yellow	Bluebox	No
BOX 3	23	bo5tb	1.00E+14	Used	Freezer	Boarded Green	Bluebox	No
	6	bo4pr	1.00E+14	Used	Freezer	Boarded Yellow	Bluebox	No
	4	bo4pr	1.00E+14	Not Used	Freezer	Not Boarded	Gelpack	No
	22	bo4pa	1.00E+14	Not Used	Freezer	Not Boarded	Gelpack	No
	8	bo4pa	1.00E+14	Used	Freezer	Boarded Green	Bluebox	Yes
BOX 4	6	bo5tb	1.00E+13	Used	Freezer	Boarded Green	Bluebox	No
	3	bo4pr	1.00E+13	Used	Freezer	Boarded Green	Bluebox	Yes
	23	bo4pr	1.00E+13	Used	Freezer	Boarded Yellow	Bluebox	No
	23	bo4pa	1.00E+13	Not Used	Freezer	Not Boarded	Gelpack	No
	24	bo4pa	1.00E+13	Used	Freezer	Boarded Yellow	Bluebox	No
BOX 0	9	bo4pr	0.00E+00	Used	Not Found	Not found	Not Found	Yes
	13	bo5tb	0.00E+00	Used	Room	Boarded Green	Bluebox	No
	13	bo4pr	0.00E+00	Used	Room	Boarded Yellow	Bluebox	No
	2**	bo5tb	0.00E+00	Used	Room	Boarded Yellow	Bluebox	No
	5**	bo4pr	0.00E+00	Used	Room	Boarded Yellow	Bluebox	No

Total count: 20 + 5 = 25 sensors.

3.2. Good Sensors (not irradiated)

Description of Sensor			Status	Temprature Condition	Mouting Condition	Pakaging Condition
Wafer #	Structure	Fluence	Used/Not Used	Freezer/Room	Boarded/Not Boarded	Gelpack/Bluebox/NitrogenBox
10	bo4pa	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
8	bo4pr	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
1	bo4pr	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
2	bo4pr	0.00E+00	Used	Room	Boarded Yellow	NitrogenBox
7	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
10	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
6	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
1	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
12	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
13	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
9	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
22	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
23	bo4nx	0.00E+00	Used	Room	Boarded Green	Blue-NitrogenBox

Total count: 13 sensors.

3.3. Sensors sent to MSU

- Following sensors were sent to MSU

Wafer 02

- Bo4pa
- Bo4nx

Wafer 03

- Bo4pa
- Bo4nx

Wafer 04

- Bo4pa
- Bo4nx

Total count: 6 sensors.

3.4. Discarded Sensors\$

Description of Sensor			Status	Temprature Condition	Mouting Condition	Pakaging Condition
Wafer #	Structure	Fluence	Used/Not Used	Freezer/Room	Boarded/Not Boarded	Gelpack/Bluebox/NitrogenBox
1	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
3	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
5	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
7	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
10	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
12	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
24	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
8	bo5tb	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox
8	bo4nx	0.00E+00	Not Used	Room	Not Boarded	NitrogenBox

\$: These sensors were declared bad and discarded for further investigation after Anton's Investigation

Total count: 9 sensors.