Next HPK Production for EIC - Strip Sensors

<u>Assume (require) yield > 50%, produce</u>

- Four wafers: 30 um, E-type, 600 pF/cm^2
- Four wafers: 50 um, E-type, 600 pF/cm^2

with the layout in EIC_STRIPE_WAFER_LAYOUT_20240207.gds

- each wafer include four 3.2*1, six 3.2*2, three 3.2*4 cm^2 sensors with 4 regions with different pitch/width on a sensor, namely
  - 12xN(=1,2,4) strips with 500 um pitch, 1 cm length, 40 um width
  - 12xN strips with 500 um pitch, 1 cm length, 50 um width
  - 12xN strips with 750 um pitch, 1 cm length, 50 um width
  - 11xN strips with 1000 um pitch, 1 cm length, 50 um width

Add a few single pad DC test devices on the side of wafer (*** if it introduces no delay to the production): PINs and DC-LGADs 4 sizes (0.5, 1, 1.5, 2 mm)

Make the guard ring bonding pads longer along the ring direction (100x100 ->100x150 um).

Make the strip bonding pads wider perpendicular to strip direction (200x75->200x150 um)

Wafer layout plan

32mm x 10mm 2pcs

32mm x 20mm 6pcs

32mm x 40mm 3pcs

32mm x 10mm 2pcs
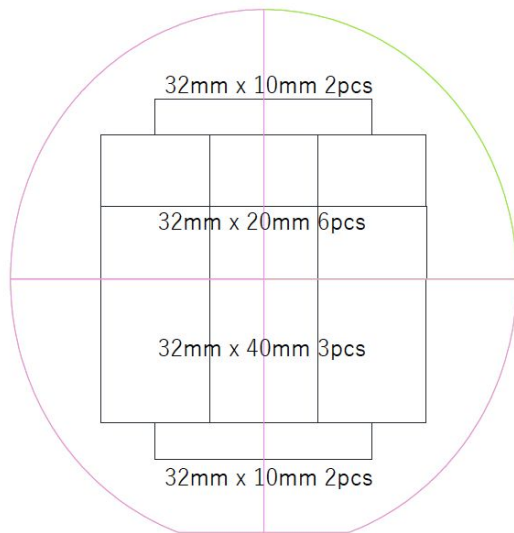
Strip Sensors
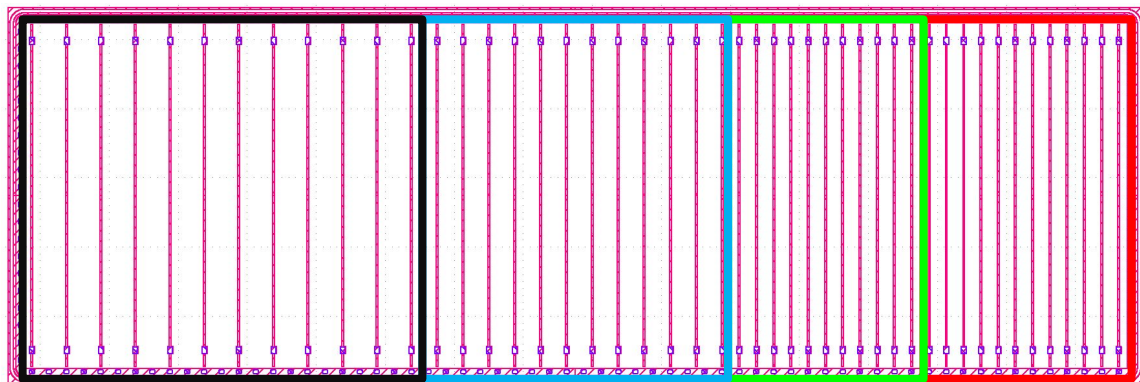
Make the strip sensors with

- 12xN strips with 500 um pitch, 1 cm length, 40 um width

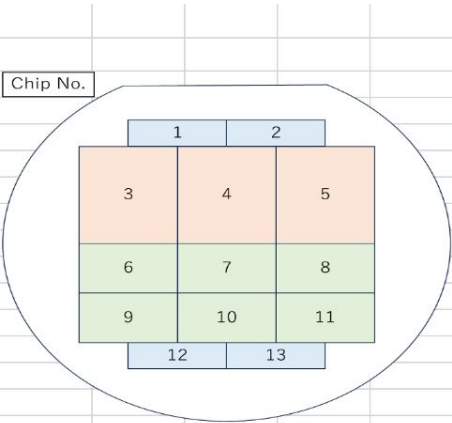 12xN strips with 500 um pitch, 1 cm length, 50 um width

  12xN strips with 750 um pitch, 1 cm length, 50 um width

  12xN strips with 1000 um pitch, 1 cm length, 50 um width

while the sensor area will still be 3.2*1, 3.2*2 or 3.2*4 cm^2

Strip Sensors - Batch 1

Type	50um											
W/No.	2			6			11			12		
Chip No.	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG
1	195	3.79.E-07	OK	194	5.90.E-07	OK	40	-	NG	194	7.65.E-06	OK
2	193	1.02.E-06	OK	193	6.53.E-06	OK	192	7.54.E-06	OK	59	-	NG
3	50	-	NG	40	-	NG	53	-	NG	50	-	NG
4	40	-	NG	50	-	NG	183	1.91.E-05	NG	61	-	NG
5	67	-	NG	123	6.64.E-05	NG	116	6.68.E-05	NG	181	3.90.E-05	NG
6	30	-	NG	54	-	NG	51	-	NG	20	-	NG
7	80	-	NG	40	-	NG	183	2.54.E-05	NG	185	5.13.E-06	OK
8	160	5.96.E-05	NG	140	6.00.E-05	NG	40	-	NG	174	4.54.E-05	NG
9	10	-	NG	10	-	NG	10	-	NG	10	-	NG
10	54	-	NG	191	1.73.E-05	NG	192	8.57.E-06	OK	191	3.94.E-06	OK
11	50	-	NG	30	-	NG	50	-	NG	40	-	NG
12	199	3.63.E-06	OK	199	3.85.E-07	OK	198	5.72.E-06	OK	198	2.19.E-05	NG
13	198	3.57.E-06	OK	84	-	NG	191	6.84.E-05	NG	197	3.04.E-05	NG

Type	30um											
W/No.	13			15			22			23		
Chip No.	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG	VB (V)	ID@VB-35V (A)	OK or NG
1	188	9.57.E-09	OK	183	8.95.E-09	OK	186	8.65.E-09	OK			OK
2	188	1.00.E-08	OK	185	9.46.E-09	OK	182	7.71.E-09			8.99.E-09	OK
3	40	-	NG	50	-	NG	58	-	NG	180	3.45.E-08	OK
4	185	3.56.E-08	OK	178	2.92.E-08	OK	156	3.70.E-05	NG	182	3.47.E-08	OK
5	182	2.91.E-08	OK	180	3.24.E-08	OK	177	2.93.E-08	OK	184	3.70.E-08	OK
6	185	1.96.E-08	OK	178	1.63.E-08	OK	183	1.83.E-08	OK	183	1.86.E-08	OK
7	186	1.93.E-08	OK	178	1.49.E-08	OK	181	1.55.E-08	OK	183	1.83.E-08	OK
8	183	1.86.E-08	NG	180	1.72.E-08	OK	177	1.45.E-08	OK	185	1.94.E-08	OK
9	10	-	NG	10	-	NG	20	-	NG	10	-	NG
10	188	1.90.E-08	OK	182	1.61.E-08	OK	183	1.58.E-08	OK	185	3.11.E-08	OK
11	185	1.87.E-08	OK	182	1.77.E-08	OK	179	1.44.E-08	OK	187	1.91.E-08	OK
12	190	1.05.E-08	OK	186	9.34.E-09	OK	186	8.52.E-09	OK	189	9.82.E-09	OK
13	124	2.55.E-09	NG	184	8.95.E-09	OK	182	7.53.E-09	OK	188	9.61.E-09	OK

Chip No.

1	2

3	4	5

6	7	8

9	10	11

12	13

BTOF (Half-)Stave Assembly
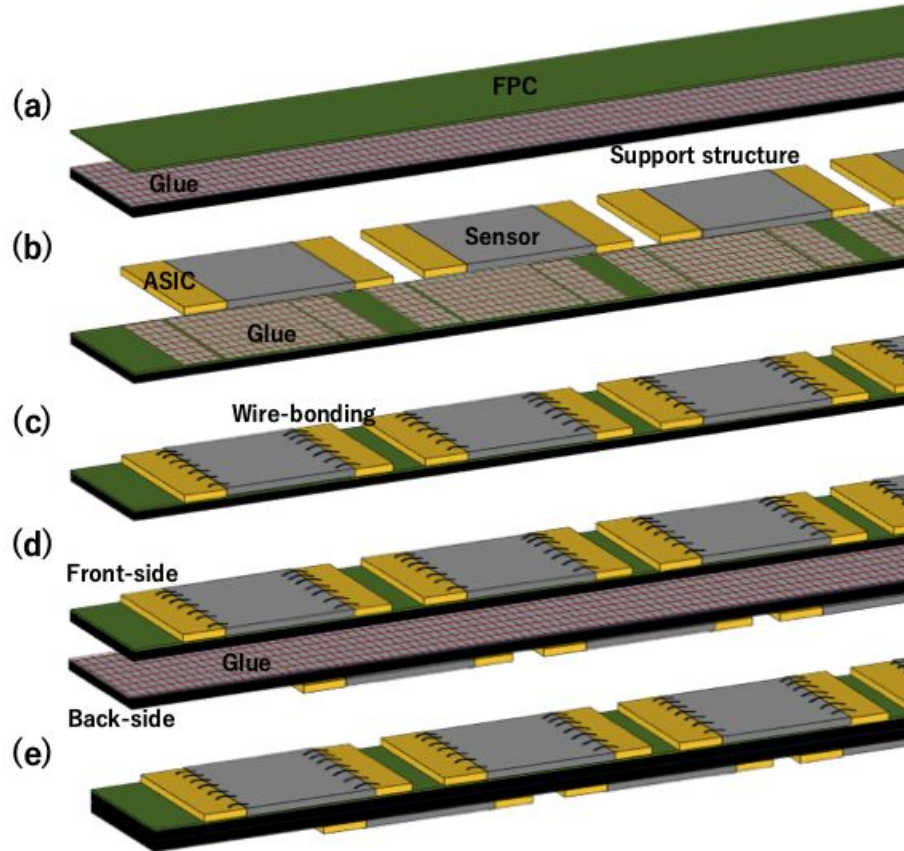
Assuming 3.2x2 cm2 sensors
- 64 sensors for a 128 cm half-stave

Assuming 2 ASICs per sensor
- 128 ASICs for a half-stave

Assuming 1 ASIC per 2 half-sensors
- 64 ASICs for a half-stave