

Development of a 124mm long silicon strip sensor for the CBM STS*

D. Soyk^{†1}, C.J. Schmidt¹, the CBM collaboration¹, and the FAIR@GSI RBDL¹

¹GSI, Darmstadt, Germany

The new segmentation of the CBM STS ladders [1] requires to design and produce a silicon strip sensor with 62mm width and 124mm height. This new long sensor will replace the 2 daisy-chained 62mm sensors.

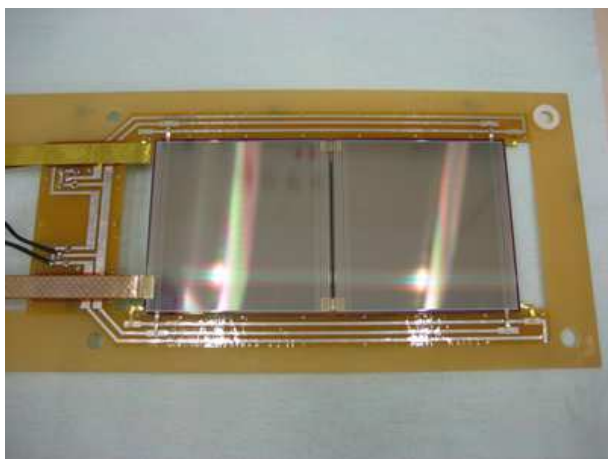


Figure 1: 2 daisy-chained 62mm sensors

In figure [1] a technological prototype, produced by LTU LED Technologies of Ukraine ltd, Kharkov, Ukraine, is shown. Between the 2 sensors 2 short daisy-chain-cables are shown. That serve to connect the strips from one sensor to the next. In the final version, all strips of the sensors must be connected. Therefore a daisy-chain-cable with the full width must be produced and bonded onto the sensors. Every sensor also needs a cross connection on the p-side that links inclined strips ending on one lateral side to a corresponding strip on the other lateral side. It is not yet finally resolved, whether such connection should be realised on an additional metal layer or with a separate microcable. If the sensor is single-metal, additionally for each sensor a interstrip-connection-cable must be bonded on the p-side of the sensor. Together with the research institute CiS Forschungsinstitut für Mikrosensorik und Photovoltaik GmbH, Jena, Germany the plan was developed to produce a single 124mm x 62mm sensor in double-side and double-metal technology on a 6 inch wafer. If it is possible to solve all technological challenges, the production of a module with 124mm sensorheight would become much simpler. The production and assembly of 2 interstrip cables and the production and assembly of one daisy-chain-cable could be made unnecessary. Also the bonding process of

* Work supported by FAIR@GSI PSP code: 1.1.1

[†] d.soyk@gsi.de

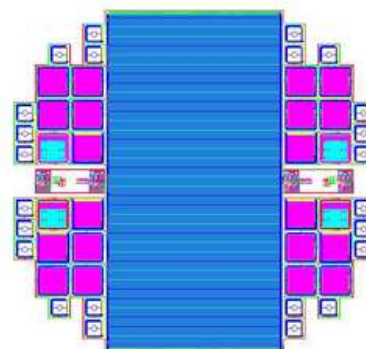


Figure 2: Layout of the 6 inch wafer with the 124mm x 62mm STSsensor in the middle, around the sensor CBM baby sensors and test features.

these 3 cables will be avoided. This reduction of fabrication and manufacturing steps will increase reliability and yield. Additionally the replacement of the daisy-chained sensor by one sensor will reduce the assembly effort because the daisy-chained module must be installed on a special frame before it is mounted on the ladder. In figure [2] the layout of the wafer is shown.

At the moment the design of the 124mm sensor is finished and the production of masks has already started. The design of the AC- pads will follow the classification of pad layout, described in [2].

References

- [1] J. Heuser et al., Technical Design Report for the CBM Silicon Tracking System, GSI Report 2013-4, Darmstadt, ISSN 0171-4546
- [2] D. Soyk et al., "Silicon strip sensor layout for the CBM Silicon Tracking System", editors: V. Frieze and C. Sturm, CBM Progress Report 2013, Darmstadt, ISBN 978-3-9815227-1-6