Hamamatsu ATLAS98 variants

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KEK

ATLAS98 baseline

ATLAS98 Wide-metal

ATLAS98 Wide-polysilicon

Baseline design = “Narrow metal”

- “Narrow metal” is for reducing the influence of (positive) potential of the metal in order to suppress the microdischarge at the edge of the implant

- The use of ATLAS, i.e., the same potential in the implant and the metal, the “narrow metal” is not a necessary design rule

- The “narrow metal” does not have the function of suppressing the microdischarge at the edge of the implant

ATLAS98 variants

1st variant = “Wide metal”

- “Wide metal”, because of its “field effect”, it acts to reduce the edge field, in turn the microdischarge

2nd variant = “Wide polysilicon”

- Polysilicon is being used to make the bias resistor, and being used to reinforce the bonding area, mainly mechanically (but not all along the strip)

- The baseline design has the AC coupling dielectrics, SiO_2 and SiN, in order to prevent “punchthrough” in the SiO_2

- Insight of the “punchthrough” is the migration of Aluminium into the defects in the SiO_2, which is prevented with the SiN which still has chance to grow the trace of SiO2 defects inside

- Here, the polysilicon will work to prevent the migration of Al, and elimination of the SiN process improves the yield and the cost, Hamamatsu says.

- The “wide electrode” for the suppression of edge field can be made with the polysilicon, not increasing the number of process but with the change in the masks (which is done and samples have been produced)

- In combination, “Wide polysilicon” makes the detectors better and cheaper

PROJECTION

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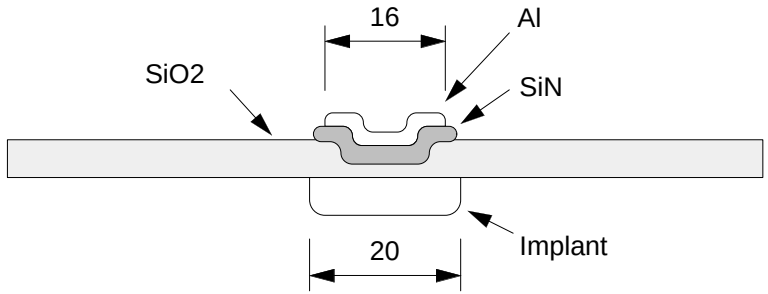
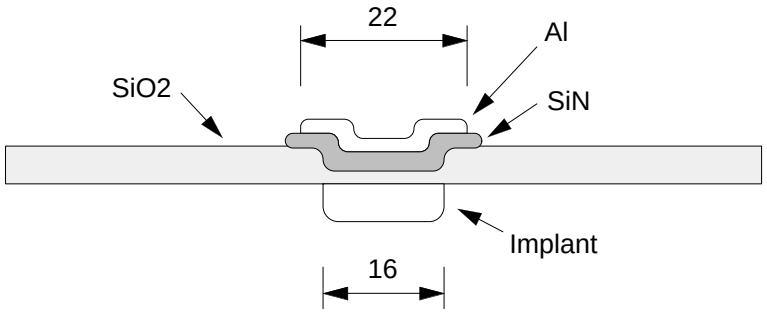
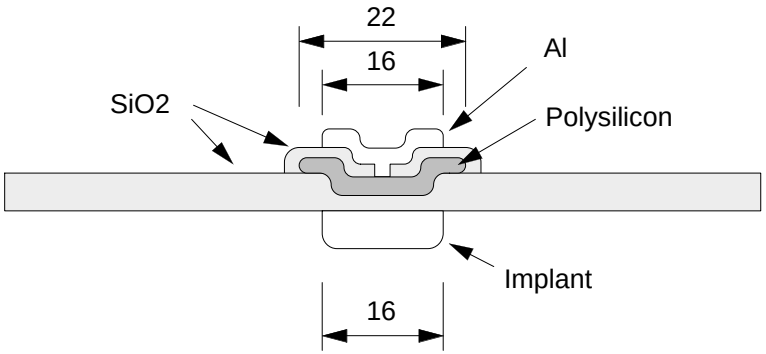


ATLAS98 baseline



ATLAS98 wide-metal



ATLAS98 wide-polysilicon

Note: All dimensions are of mask (not of finish)
Passivation layer is excluded

ITEM NO.	TITLE	MATERIAL	QUANTITY	REMARKS

DESIGNED	SCALE	TITLE	ATLAS98 variants
DRAWN Y. Unno			
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Qualification

- 10 samples of the 1st and the 2nd variants will be put in the irradiation program, on the same base as the baseline

- 4 of each have been irradiated in the Nov. 98 and Apr. 99 irradiations, in total

- 6 of each will be in the Jun 99 irradiation

- Same qualification measurements will be done to the variants

- Out of several concerns, the interstrip capacitance is, in the zero-th order, the same because the width of the "widest" electrode is the same in three variants. Higher order perturbation will be measured with the irradiated samples

- Concerns will and shall be resolved with the qualification measurements