

UCSC QA Tests

on 4 GLAST Hamamatsu Prototype Sensor

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1 Mechanical Dimension

1.1 ID numbers have not been applied to the 4 sample detectors.
The scratch pad available for marking detectors has been left blank
They have to be labeled later. Hamamatsu # 35483 -4,6,8,9.

1.2 Visual inspection shows detectors to be in good condition.
There are very few scratches or edge defects.

1.3 Mechanical dimensions compared to specifications.

1.3.1 Accuracy of mask placement:

better than the ± 1 (μm) quoted in the specifications.

Deviations in rotation of mask within edge cut:

< 20 microns across the detector.

Outside dimension: < 20 microns from specs

Internal dimensions (strip length, pitch, probe pads, etc):

agree with specifications to within micron.

2 Bulk electrical properties

2.1 I-V measurements show uniform I-V curves, **(Figure I-V)**

about 9nA/cm^2 at 100 volts, $< 50\text{nA/cm}$ specs,

one detector was raised to 450V with no breakdown exceeding the >200 V specs.

- 2.2 C-V measurements
 - depletion of the 4: 80-95V, within the specs of 70-125V(**Fig. C-V, Fig. 1/C**)
 - above depletion: capacitance value uniform to 5%,
 - => variation of depletion voltage due to wafer resistivity, not thickness.
 - body capacitance 0.5pF/cm per strip, as expected.
- 3 Electrical Measurements on all strips
 - (measurements will be performed with probe card.)
 - 3.1 Leakage current per strip: NY
 - 3.2 Coupling capacitor integrity: NY
- 4 Electrical Measurements on few strips
 - 4.1 Interstrip capacitance CI as a function of Frequency (**Fig CI**) at 90V bias.
 - (Capacitance to 4 neighbors on each side.)
 - Central strips (no bypass strip neighbors) (#222) : CI = 4.22pf @ 10kHz
 - Side strips (floating neighboring bypass strips) (#315): CI = 4.25pf @ 10kHz
 - Bypass strip (one implant neighbor floating) : CI = 3.56pF@ 10kHz
 - 4.2 Interstrip isolation: > 10 GΩ
 - (spec of 30MΩ is too small !).
 - 4.3 Coupling capacitance: NY
 - 4.4 Bias resistors (**Fig R**)
 - 63-64MΩ across detector on each of 4 sensors.
 - This value is on the desirable high side of the 30-80MΩ specs
 - variation across detector well within +/-10 % specs.
 - 4.5 Resistance of Al: NY
 - 4.6 Resistance of Al bypass NY