Problem Report   **Report Number: 2**

Project Name: TeraPixel APS for CALICE

Item: ASIC1 Sensor design: Sense amplifier bias

Problem

The sense amplifier bias chain includes some high-voltage tolerant transistors (thicker oxide) as the biasing requires a 3.3v power supply. The use of a general-purpose bias pad means there is a low voltage (LV) nmos transistor mirroring current into a high voltage (HV) nmos transistor. The current mirroring is therefore incorrect as the transistors have different threshold voltages.

Originator (Sign/Date)

Project Manager (Sign/Date)

Remedial Action

Simulation shows the bias current that was originally specified would have set a very low current in the sense amplifiers due to the mismatch in the bias circuits. By increasing the external current to 300uA (typical) the correct range of currents can be achieved in the sense amplifiers. This is well out of the original range of the bias DACs so resistor R84 on the sensor board must be changed to 7k5ohms giving a suitable range in the right region.

External bias current	Internal current if correct LV nmos had been used	Actual current with HV nmos in mirror circuit
65u	12.8u	0.5u
270u	53u	10.9u
300u	59u	15.1u
360u	70u	17.3u

DESIGN FIX: Change ISENSEBIAS reference transistor to HV type (thick oxide define layer)

Project Manager (Sign/Date)