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Study of Solder Ball Bump Bonded Hybrid Silicon Pixel Detectors

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For the connection of front-end read-out chips to a silicon sensor of a hybrid pixel detector an in-house flip-chip bump bonding process using precision tin-silver solder balls has been developed at DESY. The electrical testing of the bump connections follows immediately using an automated probe station by sensing a capacitively induced charge. The bump bonding quality and results from thermal stress testing will be reported. The pixel detector modules have been evaluated in the DESY electron test beam in terms of noise, cross talk, efficiency and position resolution which will be summarized.

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