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Measurements of room temperature I-V characteristics in low threshold MOSFETs from the open source Skywater 130 nanometer Process Design Kit

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We present the room temperature I-V characterization of the MOSFETs embedded in a device fabricated from the open source Skywater 130 nanometer (SKY130) Process Design Kit (PDK). Using a vibration isolated device in a class 100 clean room we are able to obtain the output characteristics, transfer characteristics and gate capacitance of MOSFETs over a wide range of device sizes (lengths and widths). We validated the measurements against the PDK behavior at room temperature. The devices fabricated are aimed to be used as part of a cryogenic charge readout for liquid noble detectors. We will present plans for the next phase of I-V characterization as a function of temperature up to liquid argon temperatures. The aim of the cryo-measurements is to produce accurate cryo-models that are presently unavailable in the range of temperatures of interest. These measurements will to guide the optimization of the Sky130-Caravel chip for future detector applications and will contribute valuable data to the open-source Skywater community, fostering further advancements in this technology.

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