High Performance 25nm FDSOI Devices with Extremely Thin Silicon Channel

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We achieve, for the first time, high performance FDSOI devices down to the 25nm with silicon channel thickness between 7 and 10nm. We use metal gate with undoped channel and raised source/drain with 12nm spacer. We report the highest PMOS drive current for a single-gate device (I_{on}=789μA/μm and I_{off}=27nA/μm for V_{gs}-V_t=1.25V). We report that thinner channels degrade mobility and excellent hot carrier and gate dielectric reliability.