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Thermally Stable N-Metal Gate MOSFETs Using La-Incorporated HfSiO Dielectric

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Abstract

We report a thermally stable N-metal process in which surface passivation of HfSiO dielectric using thin layers of La_2O_3, deposited by either MBE or PVD, significantly shifts the metal gate effective work function toward the Si conduction band edge. Well-behaved transistors with Lg down to 70 nm have been fabricated with threshold voltage of 0.25V, mobility up to 92% of the universal SiO_2 mobility, and T_{inv} ~1.6 nm.