# Supporting Information

# Ultrathin Sub-5nm Gate-All-Around SiGe Nanowire Transistors with Near-Ideal Subthreshold Swing

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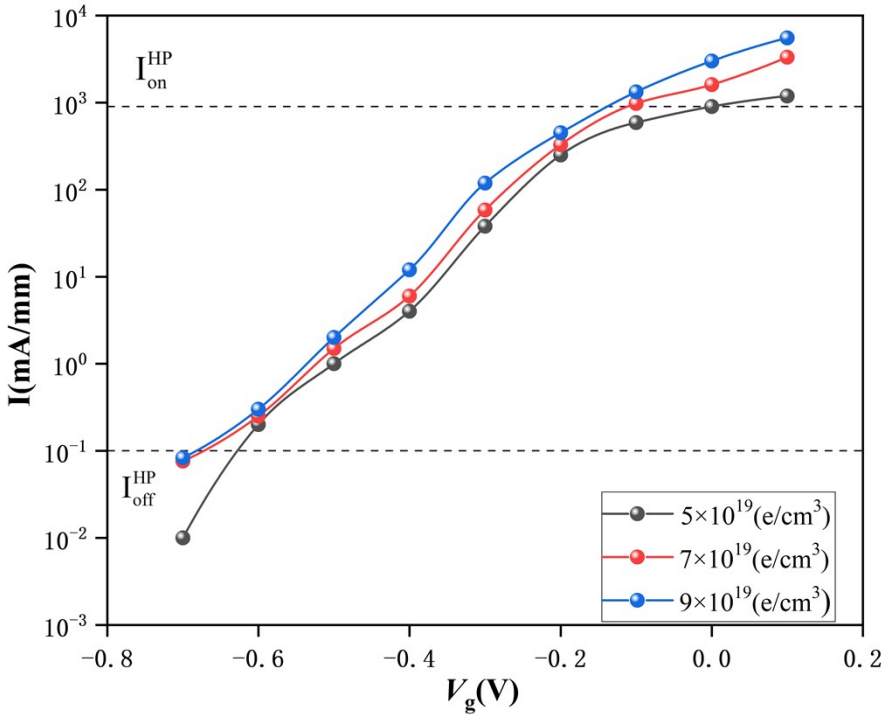


**Figure S1.** Transfer characteristics of the *n*-type GAA SiGe NW FETs with different electron doping concentrations ($5\times10^{19}$, $7\times10^{19}$, and $9\times10^{19}$ $e$/cm$^3$).

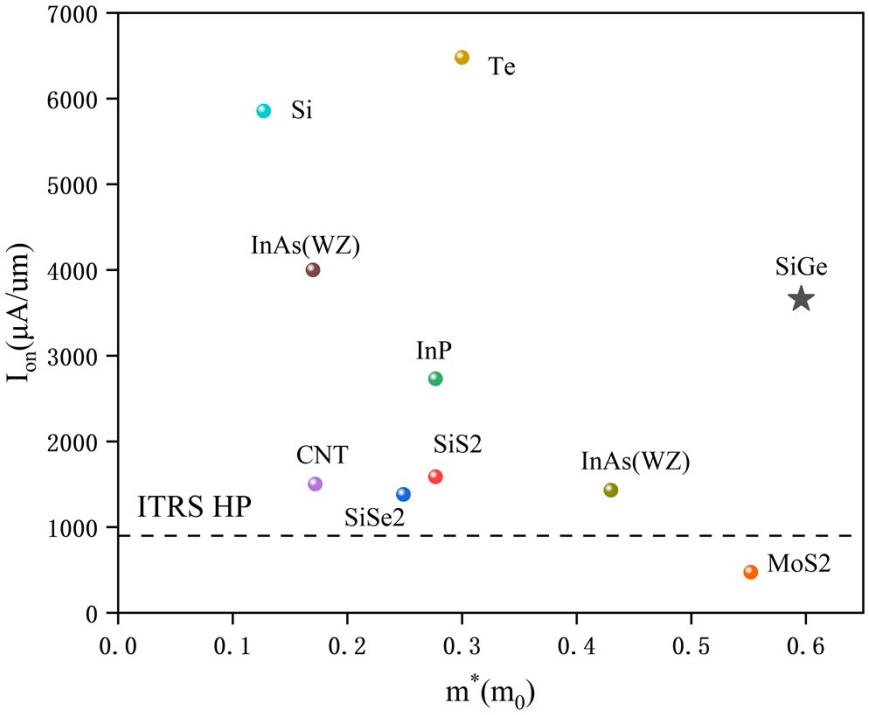


**Figure S2.** HP $I_{on}$ of the low-dimensional material FETs at $L_g$ = 5nm against $m$* of the low-dimensional material.

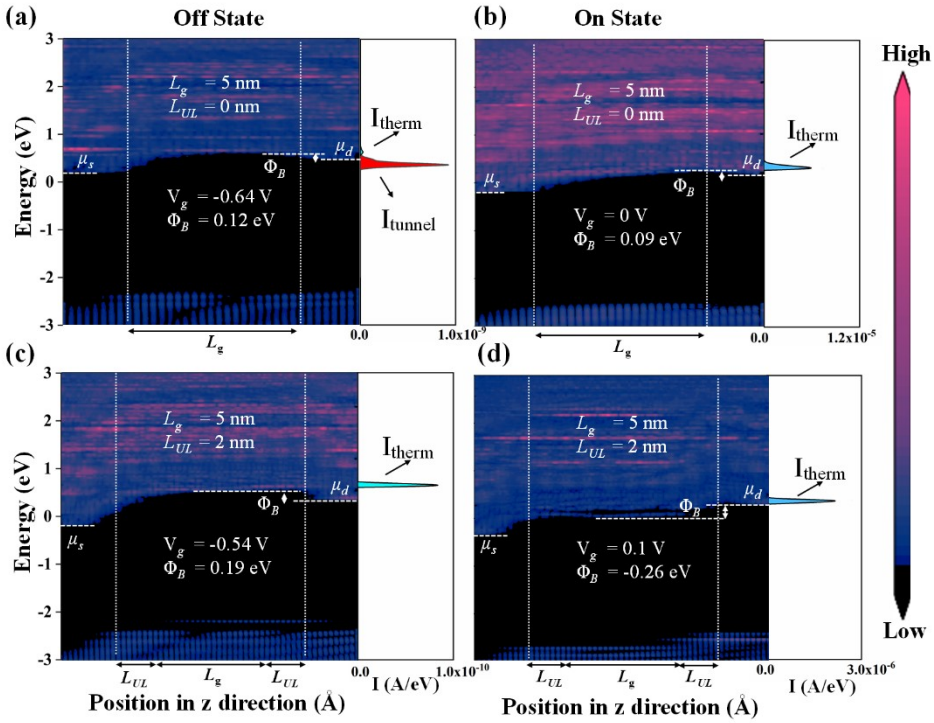


**Figure S3.** (a-d) Resolved LDDOS and the spectral current in the channel region of the 5 nm $L_g$ *n*-type GAA SiGe NW FETs with $L_{UL}$ = 0 and 2 nm at the off and on states for the HP applications. $\mu_s$ and $\mu_d$ are the chemical potential of the source and drain, respectively. The maximum hole barrier height $\Phi_B$ is labeled.

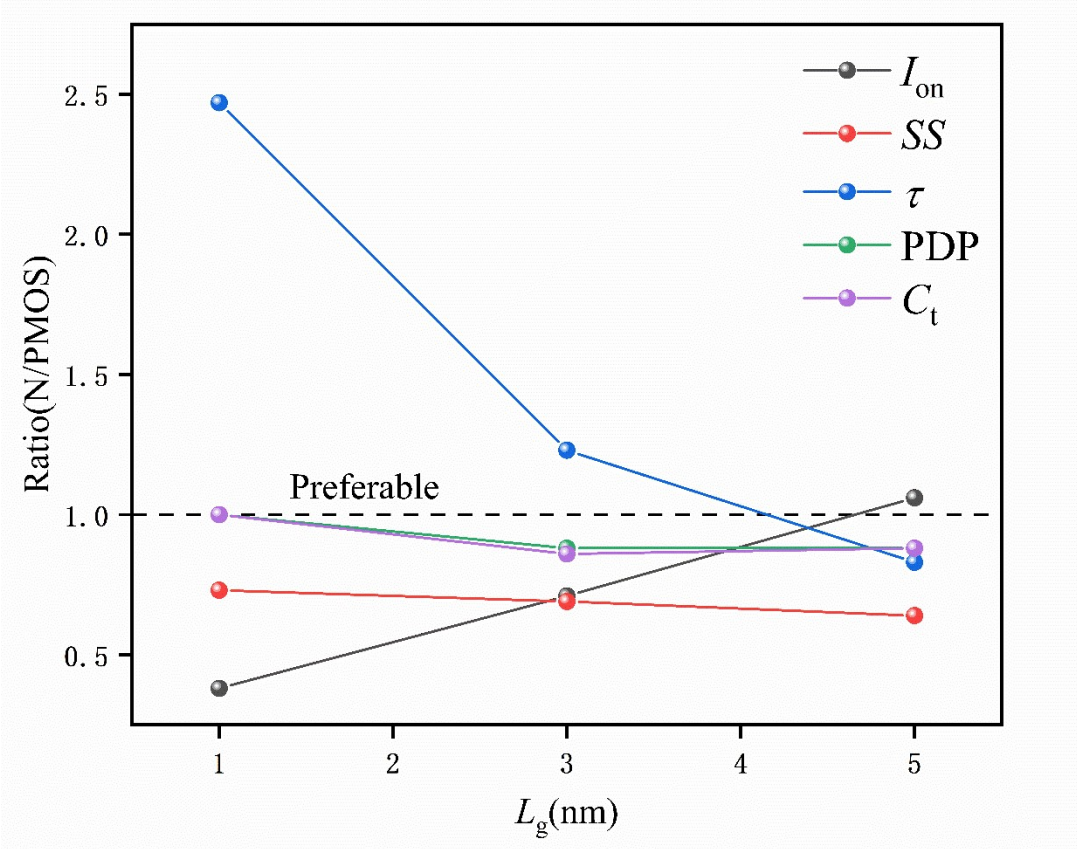


**Figure S4.** Ratios of $I_{on}$, SS, $\tau$, PDP, and $C_t$ for NMOS and PMOS at $L_g$ = 1, 3, and 5 nm.