Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

High Performance Si Nanowire Field-Effect-Transistors Based on a CMOS Inverter with Tunable Threshold Voltage

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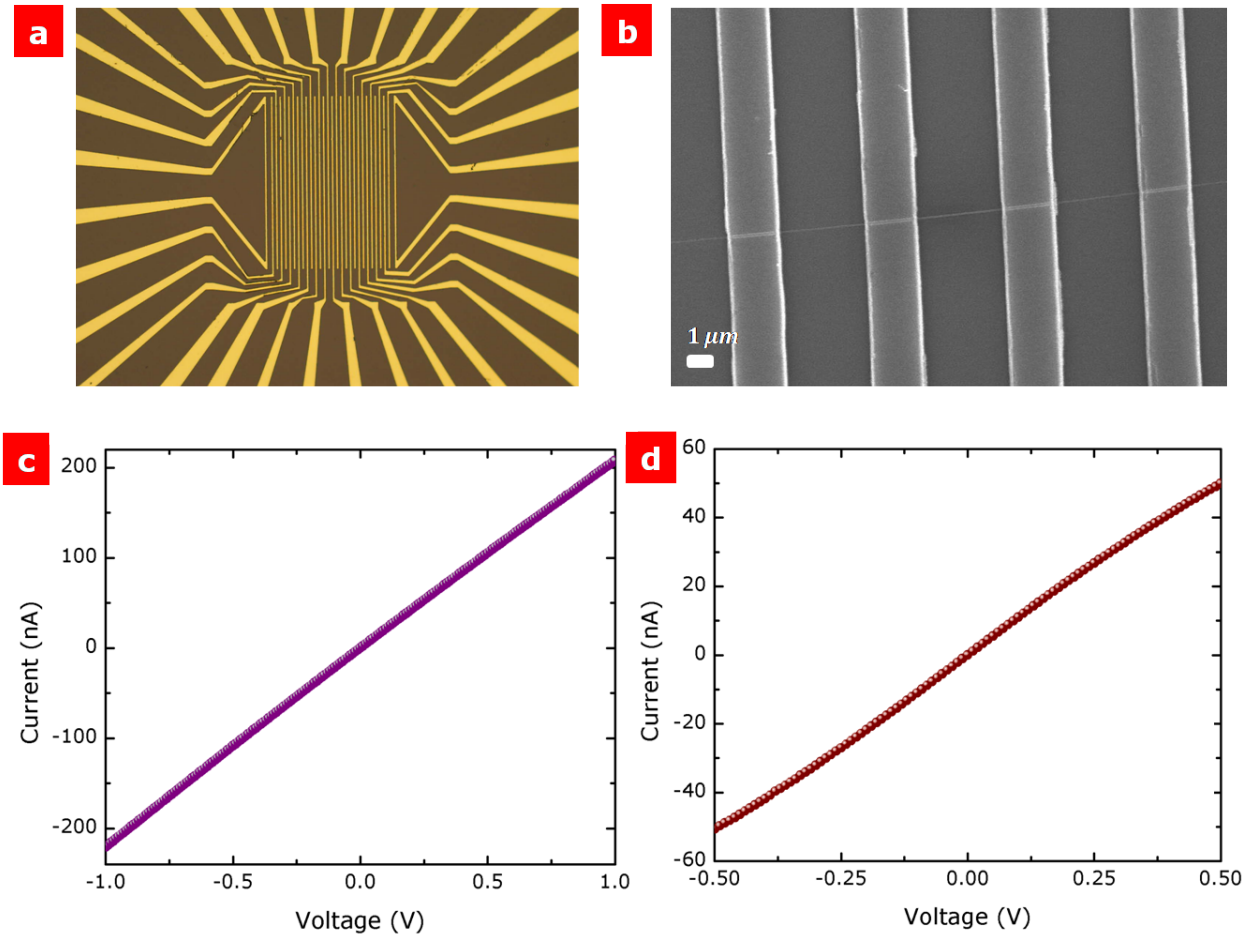

Fig. S1. (a) Optical and (b) FE-SEM images of Si NWFET devices; four probe measurements of n-type (c) and p-type (d) Si NWs; The n-type Si NW resistance (R) of 4.63×10^6 Ω was extrapolated from the linear region of the current-voltage curve of four probe measurements. The resistivity ρ = 0.22 Ωcm was calculated according to $\rho = RA/L$, where $A = \pi r^2$ is the Si NW cross section, L is the conducting channel length of the nanowire (~5 μm), and r is the radius of the nanowire (~27.5 nm). The resistance, $R = 10^7$ Ω, and resistivity, ρ = 0.48 Ωcm, were calculated for p-type Si NWs from Fig. S1.d.

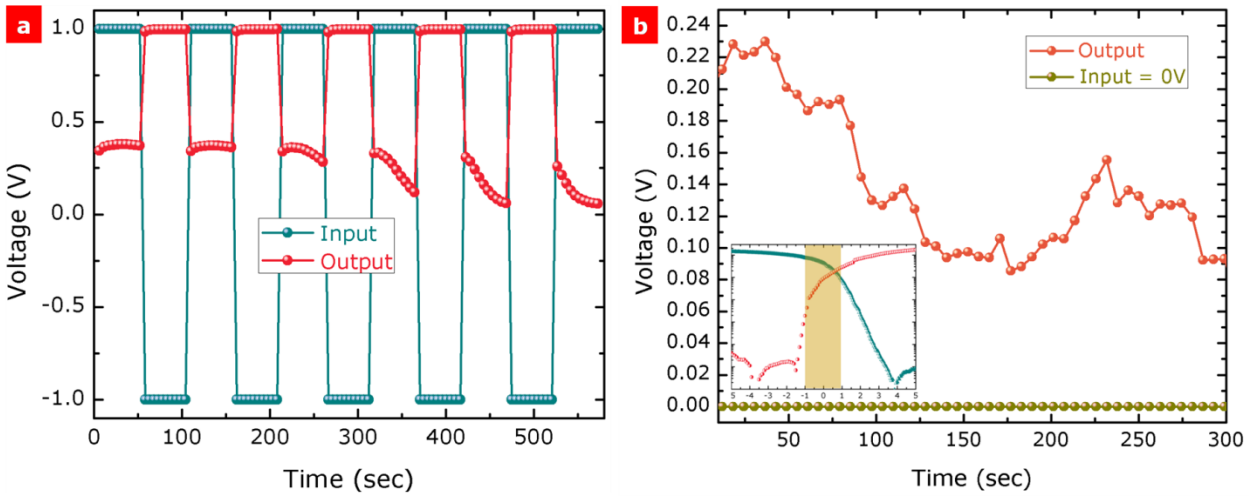

Fig. S2. (a) The dynamic response of the inverter to square wave input pulses of ±1 V and (b) Output voltage at an input gate voltage of 0 V with V_{dd} set at 1 V

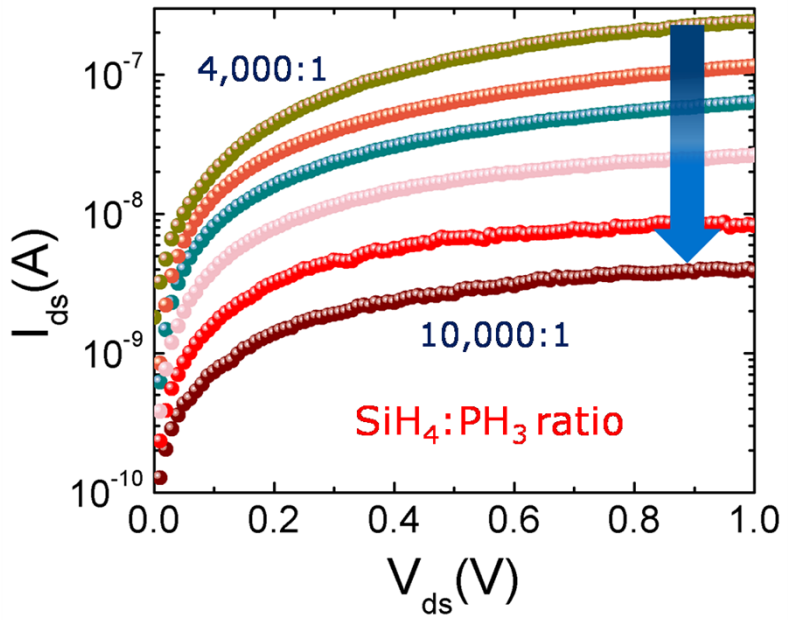

Fig. S3. The output characteristics (I_{ds}-V_{ds}) of n-type Si NWFETs at different doping concentrations of Silane (SiH_4)/ Phosphine (PH_3) gas ratios of 4,000:1 to 10,000:1. Gate voltage of 5 V.

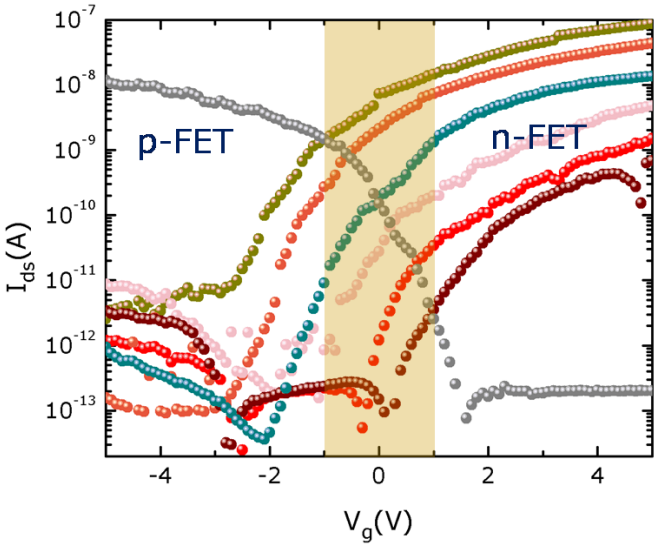

Fig. S4. (a) I_{ds}-V_g transfer characteristics of n-type Si NWFETs at different doping concentrations of Silane (SiH_4)/ Phosphine (PH_3) gas ratios of 4,000:1 to 10,000:1 and p-type Si NWFET at doping concentration of Silane (SiH_4)/Diborane (B_2H_6) gas ratio of 5,000:1