Electronic Supplementary Information

Exploring and Suppressing Kink Effect of Black Phosphorus Field-Effect Transistors Operating in Saturation Regime

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Fig. S1 Transfer characteristics ($I_{DS}$—$V_{GS}$) of the BP FETs at $V_{DS} = -1.0$ V, with various BP thicknesses of ~5, ~9, ~11 and 19 nm and fixed channel length $L$ of 3 μm.
Fig. S2 Leakage current characteristics ($I_{GS}-V_{DS}$) of the BP FETs at $V_{GS} = -5.0$ V, with various BP thicknesses of ~5, ~9, ~11 and ~19 nm and fixed channel length $L$ of 3 μm.
Fig. S3 The transfer (at $V_{GS} = -1.0$ V) and output (at $V_{DS}$ of 20 ~ 20 V) curves of the BP FETs using a 100 nm-thick SiO$_2$ layer as gate dielectric and with channel length $L$ of 3 μm.
Fig. S4 Transfer ($I_{DS}$–$V_{GS}$) curves of the BP FETs at (a) $V_{DS} = -1.0$ V and (b) $V_{DS} = -0.1$ V with channel length of 0.3, 3 and 10 μm.
Fig. S5 Transfer characteristics ($I_{DS}$–$V_{GS}$) of the BP FETs under different $N_2$ plasma treatment duration (0, 5, 10, 15 and 20 s) at $V_{DS} = -1.0$ V