Supplemental Material

High-Performance Radio Frequency Transistors Based on Diameter-Separated Semiconducting Carbon Nanotubes

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Open and short structures for the de-embedding process

Fig. S1 shows the open and short structures for the de-embedding process. The as-shown de-embedding structures remove the parasitic effects from the bonding pads and the fringe capacitances associated with the gate, and provide the upper-limit of the performance for the carbon nanotubes with a refined average diameter of ~1.6 nm.

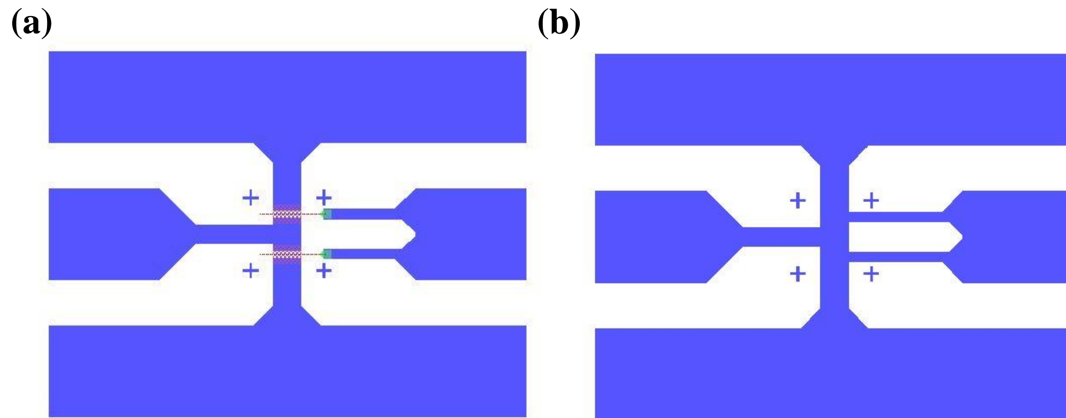

FIG. S1 (a) Open structure for the de-embedding process. (b) Short structure for the de-embedding process.

Detailed comparisons of this work with reference 11 and 12 in the manuscript

SI: comparisons of nanotube transistors with the same T-shaped gate device structure

reference	diameter separation?	semiconducting purity	device structure	channel length (nm)	g_m (μS/μm)	r_o (kΩ•μm)	extrinsic f_t (GHz)	extrinsic f_{max} (GHz)
this work	Yes, 1.6 nm in average	99%	T-gate	120	55	100	23	20
11	No, 1.4 nm in average	99.99%	T-gate	120	40	200	22	19
12	No, 1.4 nm in average	98%	T-gate	140	20	60	12	8

11. Y. Cao, Y. Che, H. Gui, X. Cao, and C. Zhou, Nano Res. **9** (2), 363 (2016).

12. Y. Che, A. Badmaev, A. Jooyaie, T. Wu, J. Zhang, C. Wang, K. Galatsis, H. A. Enaya, and C. Zhou, ACS Nano **6** (8), 6936 (2012).