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

<table>
<thead>
<tr>
<th>reference</th>
<th>diameter separation?</th>
<th>semiconducting purity</th>
<th>device structure</th>
<th>channel length (nm)</th>
<th>$g_m$ ($\mu$S/$\mu$m)</th>
<th>$r_o$ (kΩ·μm)</th>
<th>extrinsic $f_t$(GHz)</th>
<th>extrinsic $f_{max}$(GHz)</th>
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<tbody>
<tr>
<td>this work</td>
<td>Yes, 1.6 nm in average</td>
<td>99%</td>
<td>T-gate</td>
<td>120</td>
<td>55</td>
<td>100</td>
<td>23</td>
<td>20</td>
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<td>No, 1.4 nm in average</td>
<td>99.99%</td>
<td>T-gate</td>
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<td>200</td>
<td>22</td>
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<td>No, 1.4 nm in average</td>
<td>98%</td>
<td>T-gate</td>
<td>140</td>
<td>20</td>
<td>60</td>
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