Figure S1. Specific contact resistance recorded at different temperature for a representative GaN/AlN/Al\textsubscript{0.25}Ga\textsubscript{0.75}N nanowire FET with Ti/Al/Ti/Au (20/80/20/30 nm) source-drain contacts using four-probe transport measurement. Inset: scanning electron microscopy image of GaN/AlN/AlGaN nanowire device. Probes 1 & 4 were annealed in nitrogen at 800 °C for 30 s, while probe 2 & 3 are not annealed. During measurement, bias voltage was applied between probe 1 & 4, and then measured the voltage drop between probe 2 & 3. The average specific contact resistance of the nanowire is 2.3 x 10\textsuperscript{-5} Ωcm\textsuperscript{2}, and it is ca. temperature independent. Scale bar is 1 μm.