Fig. 10 Typical I-V$_g$ transfer characteristic measured at 300 (a), 140 (b), 80 (c), and 8.5 K (d), respectively (with V$_{sd}$ = 2 V for (a)-(c); V$_{sd}$ = 50 mV for (d)). (a) A counterclockwise hysteresis loop occurs at room temperature due to a charge-store effect. (b) At 80 K, a clockwise hysteresis loop is opened, indicating a nonvolatile memory operation. (c) A competition between the ferroelectric effect and the charge-storage effect essentially closes the memory window at 140 K. (d) At 8.5 K, a ferroelectric-modulated SET behaviour is observed. The two red circles represent a bistable state. The sharp increase at a gate voltage of -6 V is due to the leakage current.