

Figure 1: (a) Time-dependent polarization-voltage measurements taken on a $30\ \mu\text{m}$ radius device every 2^n seconds from $n=0$ to $n=11$, showing a $+V_c$ shift. (b) Time-dependent $0.4\ \text{V}$ read measurements following a $-1.4\ \text{V}$ high resistance state (HRS) (red) write pulse and $1.3\ \text{V}$ write for the low resistance state (LRS) (blue) along with calculated time-dependent memory window between resistance states (yellow).

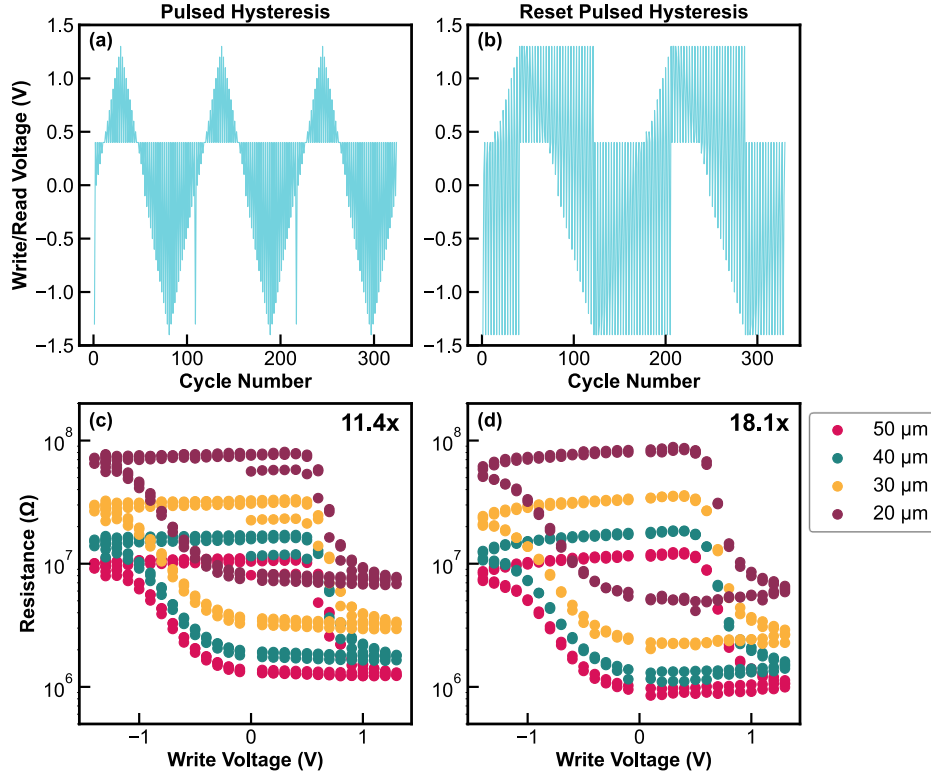


Figure 2: $5\ \text{ms}$ pulse width pulsing schemes used in (a) pulsed hysteresis measurement with $-1.4\ \text{V}$ write pulse before switching pulses increasing to $1.3\ \text{V}$ by $0.1\ \text{V}$ increments followed by a $0.4\ \text{V}$ read pulse, and (b) reset pulsed hysteresis measurement with a $-1.4\ \text{V}$ reset pulse prior to a switching pulse increasing to $1.3\ \text{V}$ and $0.4\ \text{V}$ read pulse until $1.3\ \text{V}$ is reached. A $1.3\ \text{V}$ reset pulse is then used as the switching pulse decreases to $-1.4\ \text{V}$. Read resistance versus write voltage (c) measurement using pulsing scheme (a), showing a resistance ratio of $11.4\times$ between high and low resistance states. Read resistance versus write voltage (d) measurement using pulsing scheme (b), showing a resistance ratio of $18.1\times$ between high and low resistance states.