



Flash Memory Summit

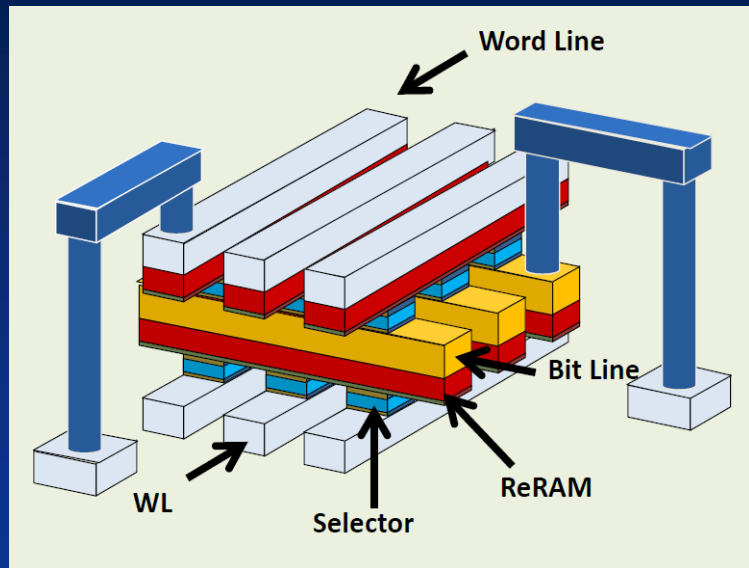
Update XP ReRAM Technology

Amigo Tsutsui

Sony Semiconductor Solutions Corp



Cross Point ReRAM



ReRAM

- Mechanism : Conductive Bridge type
- Program : 50uA
- On/Off state : LRS Low R State ~10kohm
: HRS High R State >10Mohm
- Endurance : 1M cyc
- Retention : >10 yrs @55C
- Scaling : Confirmed down to 10nm

Selector

- Mechanism : OTS (Ovonic Threshold Switch)
- On/Off current : 50uA / ~5nA@75% bias
- Endurance : 100M cyc
- Scaling : Confirmed down to 10nm



Flash Memory Summit

Memory Cell IV-Curve

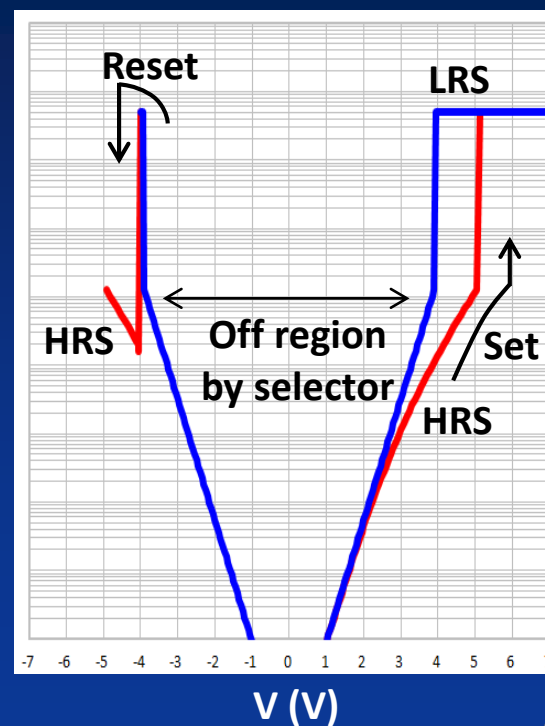
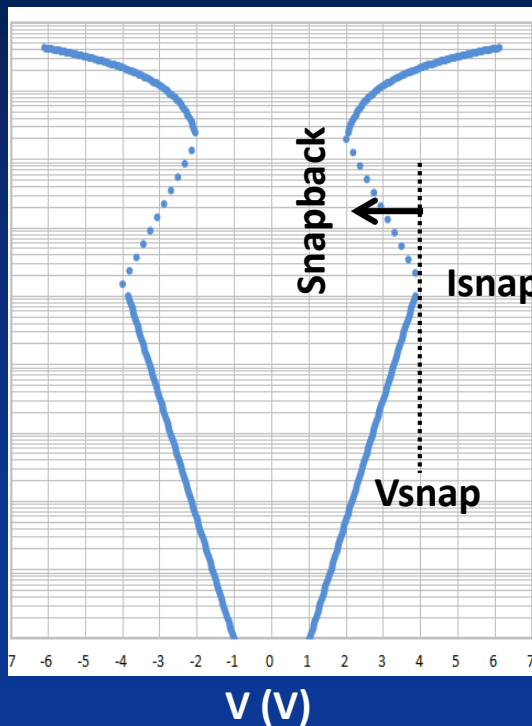
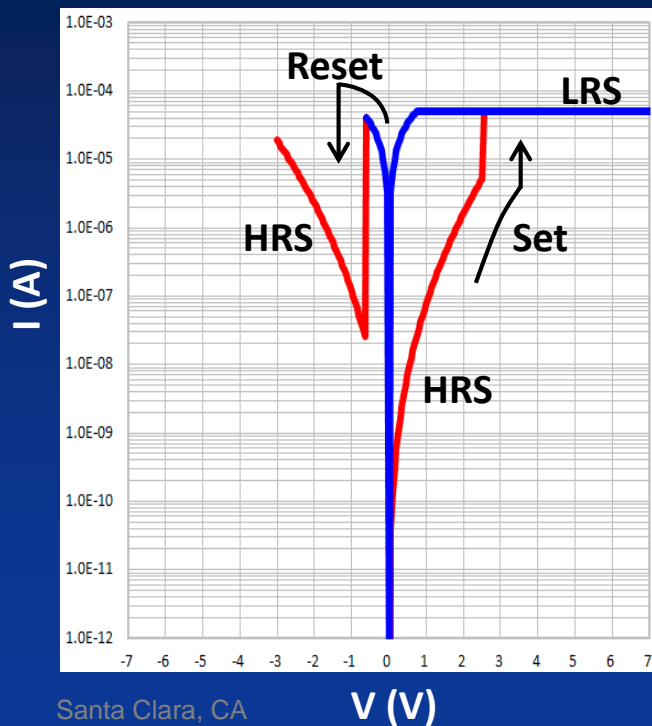
ReRAM

+

Selector

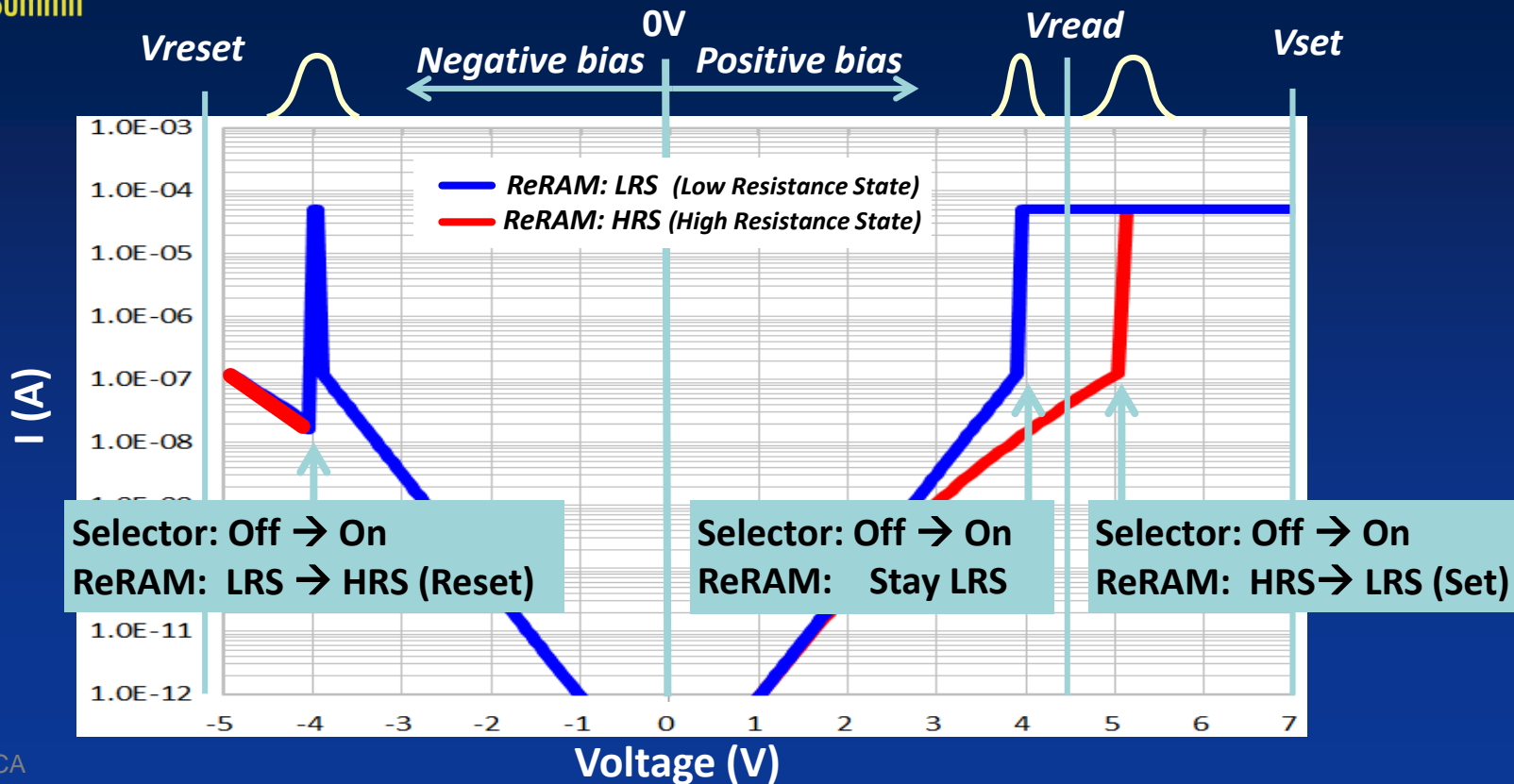
=

1S1R



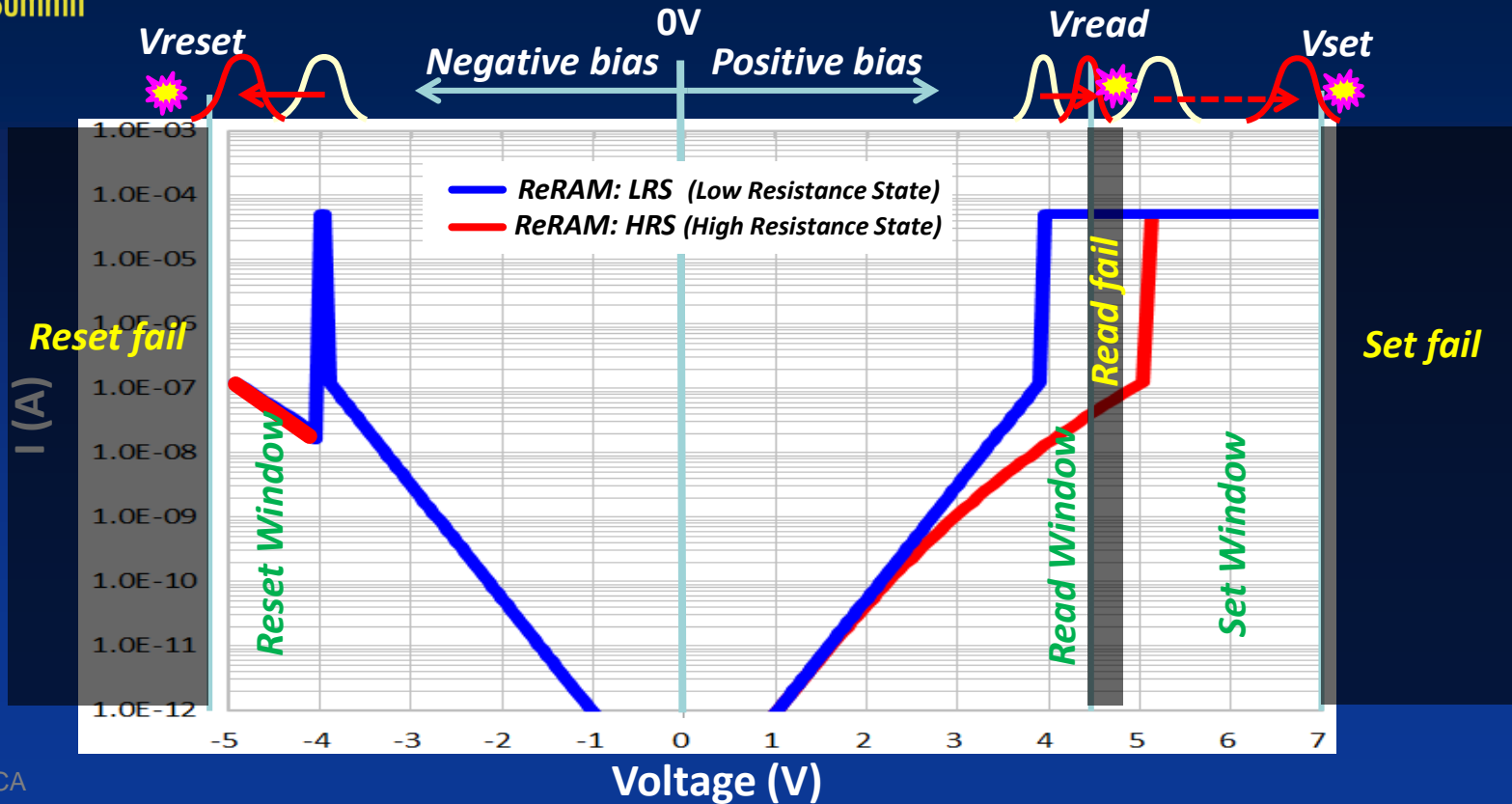


Memory Cell Operation



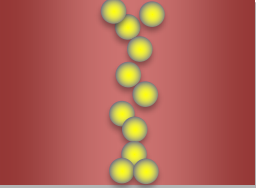
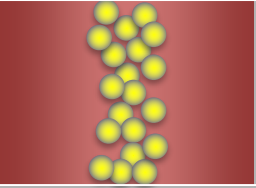
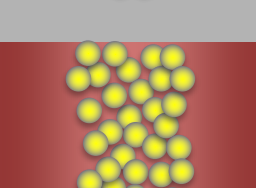


Care for Drift on Margins



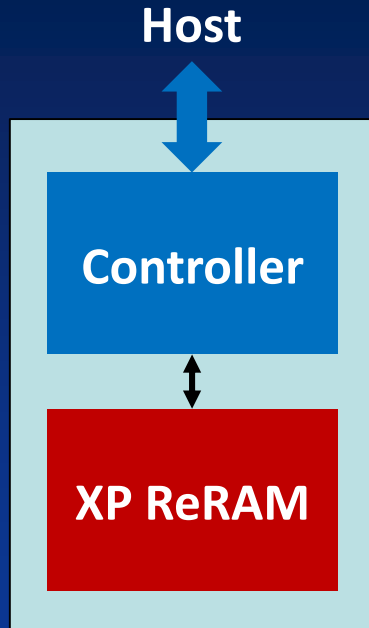


Read-induced Overset

ReRAM LRS		Data	Effect
	Weak Set ~100Kohm	0 or 1	Somewhere in between HRS and LRS due to poor set. This failure can be detected by voltage sense amp.
	Normal Set ~10Kohm	1	
	Overset ~Kohm	1	Deeply overset by multiple read stress which lead to Reset failure. Prevention scheme such as “Reset and Set after multiple read” is needed.



Summary



- Need a special controller technology
 - Selector Drift
 - Read-induced overset