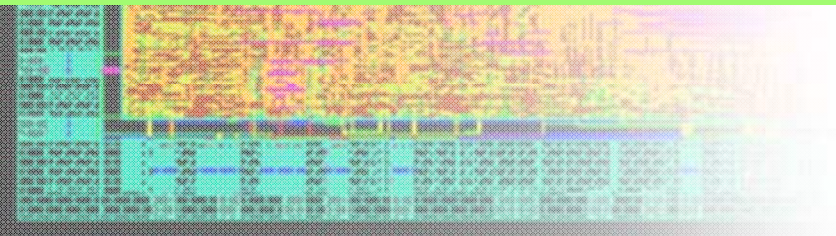


**Sidense**  
The Future of Logic NVM™

Jim Lipman  
Director of Marketing



**ChipEstimate.com™**

# Who We Are



- Sidense Corp.
  - Private company founded in 2004
  - Leading embedded, field-programmable OTP memory IP provider
  - Only reliable Single Transistor Antifuse Bit Cell in production
  - Proven technology from 180nm to 55nm and scalable to 32nm and below
  - Over 50 patents approved/pending/applied
  - Available at many popular top-tier foundries and IDMs
  - More than 50 customer designs



# Embedded OTP Market Drivers



- Need for low-cost and secure digital content
  - Consumer electronics (CE) devices – communications and entertainment
  - Secure storage of encryption keys (such as for HDCP) and boot code
- Calibration and trimming
  - For analog/mixed-signal circuits and sensor interfaces
- Higher silicon costs
  - Increasing mask costs and shrinking time-to-market schedules
  - Need flexibility to make software changes without mask re-spins
  - Firmware updates by programming the OTP – no new tapeout



# Target Markets for Sidense OTP

- Digital Consumer Electronics
- Mobile and Wireless
- Medical – Hearing Aids and Implantable Devices
- DSP and Microcontroller Firmware/Code Storage
- Automotive and Industrial Applications
- Configurable Processors and Logic
- RFID tags
- Analog Circuits - Tuners, A/D, D/A
- LCD Panels



# The Sidense Edge

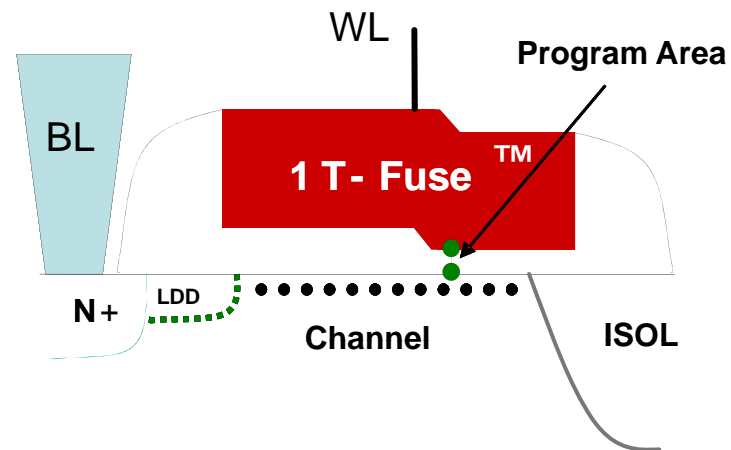
- Smallest bit cell
- Broad foundry and process node support
- Configurable options – eMTP, mask ROM, differential read
- Highly secure
- Most reliable bit-cell architecture



# Smallest Bit Cell – 1T Split-Channel



- Patented antifuse-based bit-cell
- Programming through non-reversible oxide breakdown
- Scalable to 32/28nm and below



# Broad Silicon Availability

- Highly scalable / very portable between foundries
  - No additional masks or process steps
- Broad foundry support
- Available from 180nm down to 55nm



# Flexible Architecture

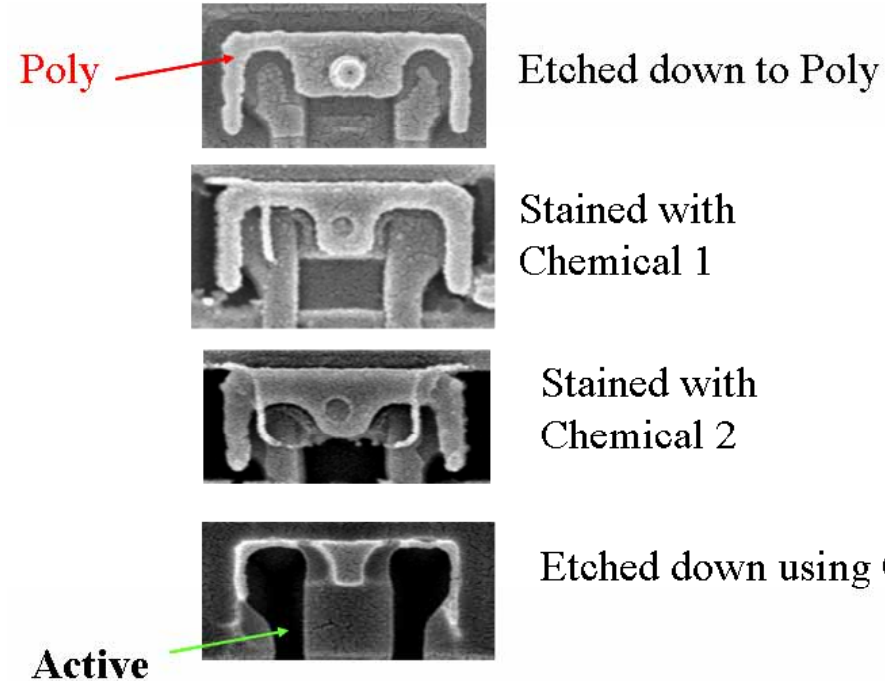


- ROM option
  - Combine field-programmable OTP and mask-programmable ROM
  - Flexible partitioning between OTP and ROM
  - Conversion to mask ROM with a diffusion mask
  - Multiple applications using one macro
- Differential option for faster read access
  - Wider voltage and temperature margins
- Emulated MTP (eMTP) operation
  - Small bit cell → system-level MTP operation



# Highly Secure

- Very difficult to reverse engineer
- One bit is programmed, the other isn't
- Can you tell the difference?



# Reliability/Qualification Tests

- Compliant to TSMC's IP9000
- High temperature
  - HTOL
  - HTS
- TDDDB testing
  - Exceeds 20 years retention
- Electrostatic Discharge (ESD)
- Latchup



# Summary



- Embedded NVM for standard-logic CMOS processes
  - No additional masks or process steps
- Industry leader
  - Smallest cell
  - Broad foundry and process node support
  - Configurable options
  - Highly secure
  - High Reliability
- Available from 180nm to 55nm at many popular top-tier foundries



# Thank you

- Explore Sidense NVM IP at [ChipEstimate.com](http://ChipEstimate.com)
- Use Sidense IP to plan your next chip!
- Please stay and talk with Sidense

