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Who We Are

- **Founded in 2004**
- **Privately held, backed by Venture Capital from Japan, Canada, US and Israel**
- **Leading one-time programmable (OTP) memory IP provider**
- **Proven technology in 180,130,110,90 and 65nm**
- **Patented *Split Channel Anti-fuse cell***
 - *Over 40 patents, granted, pending, and applied for.*
- **Volume Production in 130 and 90nm**
- **Foundry Friendly**
 - **7 foundry engagements including TSMC, UMC, Chartered, SMIC and Tower**
- **40+ employees in Canada, USA, Japan, Israel, China, Korea and France**
- **25+ customer design wins**



Embedded OTP Market Drivers

- **Need for low-cost, secure digital content**
 - Consumer electronics (CE) devices such as HD DVD players, set-top boxes, iPhone
- **Data encryption protects this digital content**
 - Encryption keys (such as HDCP keys) are securely stored in embedded OTP memory
- **Applications are more sophisticated and compute-intensive**
 - Need large amounts of code storage
 - Need good power and area budgets
 - Need high -density, area-efficient, low-power, and fast access time NVM
- **Increasing need for inventory control**
 - ID and Die Manufacturing information - to track inventory
- **Calibration and trimming**
 - Audio applications, display drivers, power management, and timing solutions
- **Cost- and Area-efficient embedded OTP is ideal for these purposes**



SiPROM/SLP Target Markets

- **Digital Consumer**

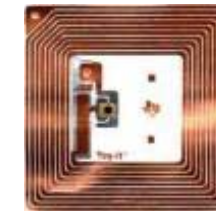


- DVD Recorders , Digital Set-Top Boxes, HDTV, SD Flash Cards, HDCP Keys for HDMI
- Secure embedded encryption keys

- **Mobile and Wireless**

- RFID, Multi-Media Devices, Handheld Video Games

- **Chip ID and Inventory Management**



- **Timing Solutions, Analog Trim and Calibration**

- **Medical - Hearing Aids and Implantable Devices**



- **DSP and Microcontroller Firmware/Code Storage**

- **Automotive and Industrial Applications**



- **Configurable Processors and Logic**



General Features

- **Small bit Cell** – *1 transistor per bit cell*
- **No additional masks or process steps** – *'0' Mask adder*
- **One-Time Programmable (OTP)**
- **Emulated multi-time programmable (eMTP)**
- **Secure** – *cannot be reverse engineered*
- **Fast Access Times** – *read access to below 10ns*
- **Field Programmable** – *on wafer, in package or in the field*
- **Low Programming current** – *in 100's of μA*
- **Programming Voltage** –
 - *5V @ 65nm - 8.5V @ 180nm*
 - *optional charge pump for field programming*
- **Fully testable** – *before and after programming*



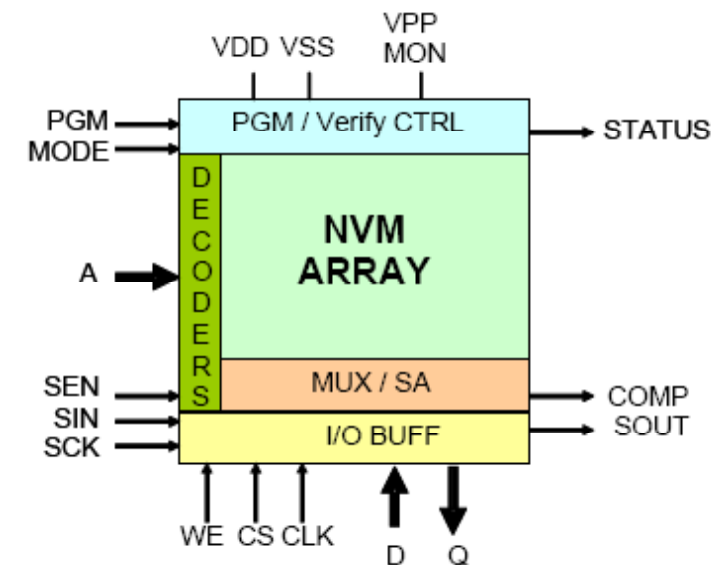
General Features

- **Highly reliable programmability** – *built-in redundancy for bit repairs*
- **Short programming times** – *up to Mbits in seconds in parallel mode*
- **Differential read option**
 - *for better read margin*
 - *Higher density with single ended*
- **Modular architecture** –
 - *expandable to 8 Mbits*
 - *Can power-down and mask program individual sectors*
- **Mask ROM Option** –
 - *single mask layer change;*
 - *can combine Mask ROM and field programmable memory*
- **Wide Temperature and Voltage Operation Range** – *Good for automotive applications*
- **Long Retention** – *> 20 years*



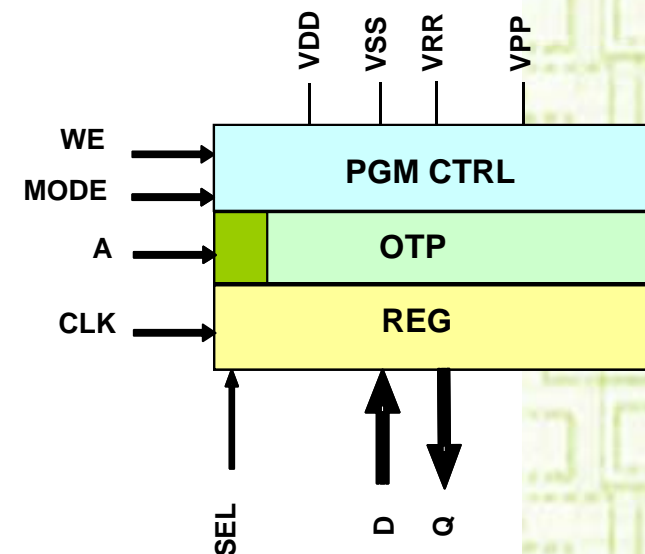
Sidense SiPROM Overview

- **High Density Embedded Logic NVM IP**
 - **Small footprint:**
 - 8K (< 0.1mm²) to 512Kbits (<0.5mm²) @ 90nm
 - **Densities from 1 Kbit to 8 Mbits**
 - **Built-in Redundancy Option – for higher yield**
 - **High-Security Features including Program Lock Option**
 - **Wide I/O bus – 4 bits to 512 bits**
 - **Proven at 180nm to 65nm process nodes at multiple foundries**
 - Scalable to 45nm and below
 - **Targeted to SOCs requiring High-Density NVM storage**
 - EEPROM/FLASH replacement
 - Code storage
 - Mask ROM replacement



SLP (Sidense Low Power) Overview

- Low power Embedded Logic NVM IP
 - **Up to 80% lower power**
 - Low active and standby power
 - $I_{RR} = 0.25\mu\text{A}/\text{MHz}/\text{bit}$
 - $I_{DD} = 0.5\mu\text{A}/\text{MHz}/\text{bit}$ (typical – 256Kbit macro)
 - **Small footprint: 256 Kbits < 0.5mm² @ 180nm**
 - **Densities from 128 bits to 256 Kbits**
 - Can combine up to 4 Mbits
 - **Wide I/O Bus – 1 bit to 128 bits**
 - **Programming Voltage – 8 to 8.5 V @ 180nm**
 - on-chip programming option available
 - **Targeted at ultra low power designs such as:**
 - Medical implantable
 - RFID
 - Wireless



NVM Technologies - Comparison

	Standard Logic CMOS	Scalable < 90nm	Scalable < 3.3V	High Density	Field Prog.	Low cost	Read Access <10ns	Highly Secure
Sidense	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electrical Fuse	Yes	Yes	Yes	No	No	No	No	No - optical readout
Masked ROM	Yes	Yes	Yes	Yes	No	No* - Respin Cost	Yes	No - optical read
Single Poly Floating Gate NVM	Yes	No	No	No	Yes	Yes	No	No - scanable, erasable
Embedded or discrete FLASH	No	No	No	Yes	Yes	No	No	No - scanable, erasable
Other Antifuse	Yes	Yes ?	Yes	No	Yes	Yes	No	??



Thank you for your attention

- Explore Sidense SiPROM and SLP at ChipEstimate.com
- Use Sidense IP to plan your next chip!
- Please stay and talk with us