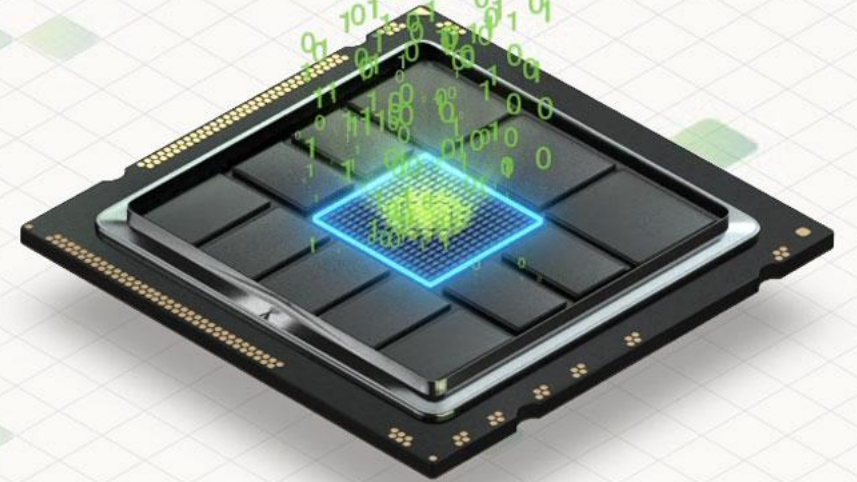


# ReRAM: Emerging as the New Embedded NVM Standard

Amir Regev, VP Quality and Reliability



*the* **Future of Memory and Storage**



# ReRAM: A Cost-Effective NVM



- ❖ **Fab-friendly materials**

- ◆ No contamination risk, special handling, etc.

- ❖ **Using existing deposition techniques and tools**

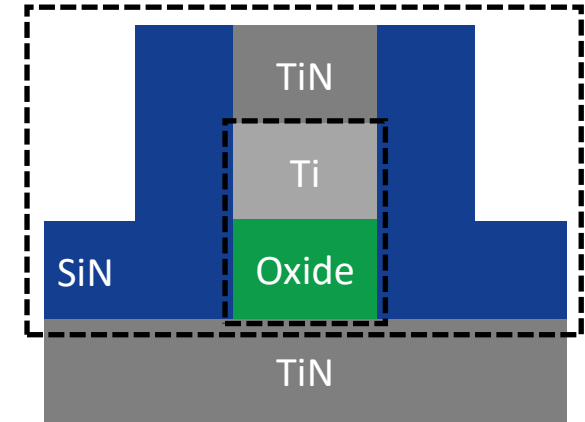
- ◆ Easy to integrate into any CMOS fab

- ❖ **2-mask adder**

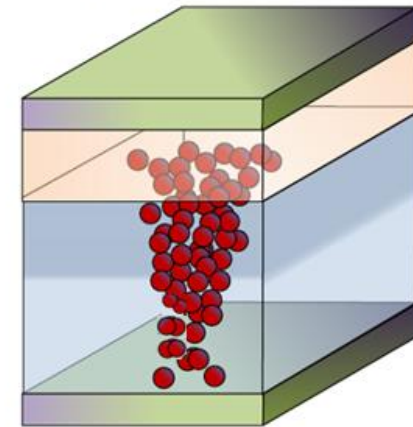
- ◆ Very few added steps

- ❖ **BEOL technology**

- ◆ Stack between any 2 metal layers
- ◆ No interference with FEOL
- ◆ Easy to scale from one process variation to another



Oxygen Vacancy Filament



# State of Weebit ReRAM Today



## Modules proven for toughest industrial & automotive mission profiles

- ❖ Retention at 175°C for automotive Grade 0 operation
- ❖ Completed AEC-Q100 qualification (150°C and 100K cycles)

## Technology demonstrated on multiple process nodes

- ❖ From 130nm to 22nm, Al / Cu, 200mm / 300mm
- ❖ Analyzed & developed on 20+ PDKs; 130nm down to FinFET nodes

**onsemi:** Technology transfer underway

**DB HiTek:** Qualification starting; available for selected licensees

**SkyWater:** ReRAM module qualified and available for production

Aug 2025:  
Proven 175°C  
Retention

April 2025:  
Demo 1Mb  
ReRAM of DB  
HiTek silicon

Mar 2025:  
Completed  
AEC-Q100 150°C  
qualification

Mar 2025:  
Demo ReRAM  
for edge AI

Jan 2025:  
License ReRAM  
to onsemi for its  
Treo™ platform

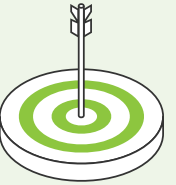
# The ReRAM Difference



ReRAM is the Emerging Memory Best Positioned to Lead the Next NVM Wave

		eFlash	MRAM	PCM	ReRAM
Performance	Low power consumption				
	Fast programming				
	High endurance				
Cost	Low cost to manufacture				
	Small die size				
Reliability	High-temp reliability				
	EMI immunity				
Scalability	Scalable to advanced nodes				
Integration	Ease of fab integration				
Maturity	Mature technology				

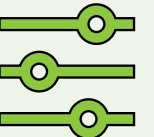
Weebit is the only independent provider of qualified ReRAM



We can license our technology to any fab\*



We can customize Weebit ReRAM per customer requirements



\* Except US blacklisted

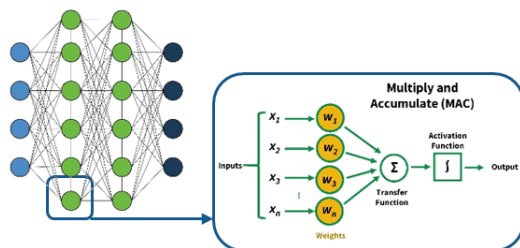
# ReRAM for AI



ReRAM perfectly fits in brain inspired systems, in a timely manner:

Embedded, Edge AI

Short  
Term



ReRAM used as eNVM to store synaptic weights of the NN

In-Memory Compute:  
AI and ML

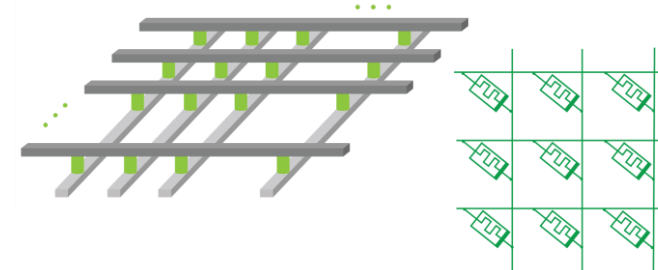
Mid Term



Computing is done within the ReRAM array itself

MAC Operations

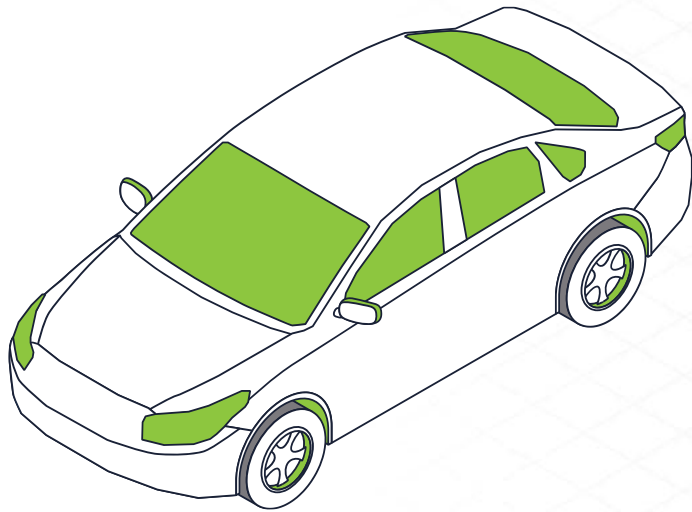
Longer  
Term



Large ReRAM arrays for  
Vector Matrix  
Multiplication



# | Embedded NVM for Automotive



## APPLICATIONS

Motor control, power management, microcontrollers  
NVM for code storage, data tables, data logging, configuration



## TREND: SCALING TO ADVANCED NODES

Increasing number of semiconductors per car, performance requirements increasing; NVM must effectively scale <28nm



## REQUIREMENTS

High-temp reliability (150°C), high endurance (100K), high density (2-32MB), EMI immunity, fast switching speed, secure



## ALTERNATIVES

eFlash can no longer scale <28nm  
MRAM (not immune to EMI, high complexity and cost)  
ReRAM (EMI immunity, high-temp stability)

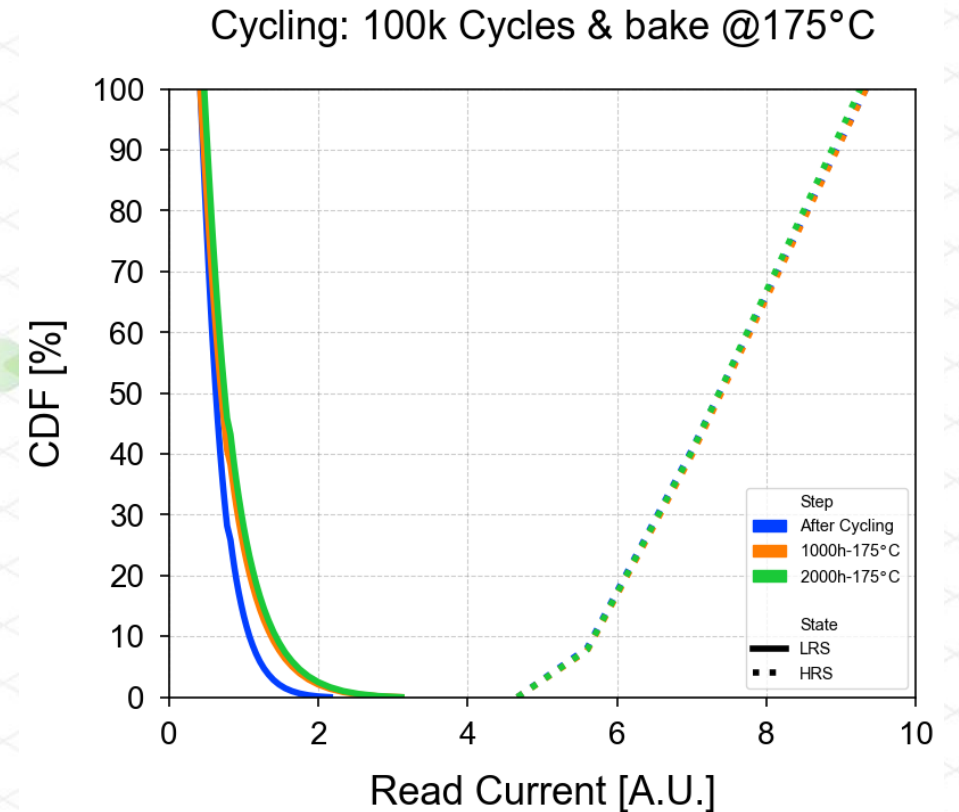
*\* Flash equivalent*

**Weebit ReRAM is qualified for AEC-Q100 150°C operation for up to 100K endurance cycles**

# Addressing Demanding Automotive Mission Profiles



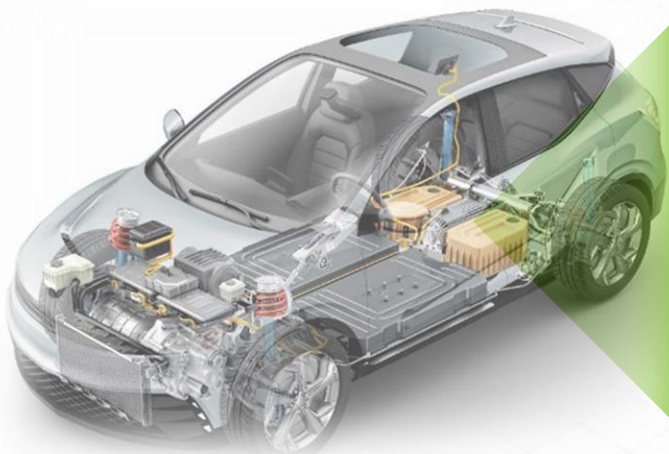
- ❖ Many automotive electronics operate in **extreme thermal environments**
  - ◆ Powertrain control units, Engine control units (ECUs), EV inverters, under-the-hood sensors, battery management systems (BMS)
- ❖ Weebit ReRAM – high stability in 175°C retention
  - ◆ Supports **AEC-Q100 Grade 0** and beyond
  - ◆ Aligns with next-gen vehicle requirements
- ❖ ELFR (Early Life Failure Rate) data:
  - ◆ Total samples (2,400) to claim very low failure rates confidently (often 0 DPPM to single-digit DPPM)
    - Lot 1 - 0/800
    - Lot 2 – 0/800
    - Lot 3 - 0/800
  - ✓ Covering **lot-to-lot variations** to show process consistency
  - ✓ Aligned with AEC-Q100 guidelines



# Completed AEC-Q100 Operation Qualification for Automotive



Confirms quality & reliability of Weebit ReRAM for high-temp automotive applications



## AEC-Q100: Key to Getting Designed Into Automotive MCUs & Other Components

- ❖ Demonstrated **stability at 150°C operation for up to 100K endurance cycles**, including cycling and post-cycling high-temp data retention at **175°C**
- ❖ Completed qual in SkyWater S130 using module with **1T1R cell architecture**
- ❖ Parameters of Weebit ReRAM align with automaker specifications

Test Name	Test Description	Stress Conditions	Sample Size	Results
NVCE	High Temp Cycling Endurance	100K cycles @ $T_{\text{Cycling}} = 150^{\circ}\text{C}$	3 lots; 77 units from each lot	0 fails
PCHTDR	High Temp Post Cycle Data Retention	100K cycles @ $T_{\text{Cycling}} = 150^{\circ}\text{C}$ $T_{\text{Bake}} = 175^{\circ}\text{C}$ for 2000h	3 lots; 77 units from each lot	0 fails
HTOL	High Temperature Operating Life	Post 100K cycles @ $T_{\text{Cycling}} = 150^{\circ}\text{C}$ Read @ 150°C for 1000 hours	3 lots; 77 units from each lot	0 fails
ELFR	Early Life Failing Rate	48h Bake at 150°C	3 lots; 800 units from each lot	0 fails



# Conclusions



- ❖ Weebit completed AEC-Q100 qualification targeting automotive applications
  - ◆ Retention up to 175°C
  - ◆ 100K endurance cycles
- ❖ Weebit ReRAM is in various engagement stages with commercial fabs
  - ◆ DB HiTek qualification starting
  - ◆ onsemi technology transfer underway
- ❖ Various AI architectures are being developed for edge applications
  - ◆ 2 live demonstrations available, running on Weebit ReRAM in silicon



# Weebit: Leading Licensor of ReRAM IP



Leading developer of innovative next-generation memory technologies for the global semiconductor industry

We are enabling a leap forward in memory technology for a new era of connected devices



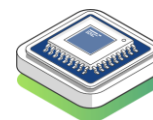
## **Founded: 2015**

Located in Israel & France  
ASX: WBT



## **R&D partner**

CEA-Leti, leading micro-electronics research institute



## **Silicon-proven technology**

Volume production expected 2026  
Proven in multiple production-fab lots



## **World-leading team**

>50 personnel (90% engineers/ scientists)



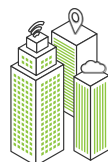
## **Signed multiple commercial deals**

Engaged with most top-tier foundries, IDMs and customers



## **Qualified for 85°C, 125°C, 150°C**

Fully qualified per JEDEC  
Fully qualified per AEC-Q100 150°C  
Available for chip designers



## **Financial strength**

>A\$100m cash end of 2024  
Well-funded going forward



## **Current business model**

Product & IP licensing to semiconductor companies & fabs



## **Process nodes**

130nm, 65nm, 28nm, 22nm and below  
Bulk, BCD, FD-SOI, FinFET

# Thank You!

[www.weebit-nano.com](http://www.weebit-nano.com)



 **Weebitnano**  
THE NEXT NVM IS HERE