How RRAM is Changing the Landscape of Wearable and IoT applications
Corporate Overview

Adesto Technologies Develops and Markets Differentiated Application-Specific Code and Data Memory Solutions
Targeted for Integrated, Connected, Low Power Applications

- Founded in 2007
- Privately Held
- 100+ Employees

Value Added Code & Data Storage Solutions
00100111
10100011
11100111
00110001
00101101

Business Focus

Revenue $50M+
Profitable
Discrete Products

Business Highlights

CBRAM
DataFlash

Proprietary Technologies

Low Power
Reliable

Consumer
Mobile
Security

Industrial
IoT
Growth Markets

Reinventing Memory for Things™
Adesto Technologies: Leading CBRAM Commercialization

Adesto is Shipping the World’s First Discrete RRAM Device

PRESS RELEASE
June 18, 2014, 2:11 p.m. EDT

Adesto Technologies Announces CBRAM® One Million Unit Shipment Milestone
Disruptive, ultra-low power semiconductor technology establishes presence in memory applications

CBRAM Advantage Over Today’s Solutions

Faster Storage + Low Power Consumption
CBRAM Basics

Cell Structure: 1T1R
T = Std Logic Transistor
R = CBRAM Resistive Storage Element

Current Product Highlights
- Over 50,000 Write Endurance Cycles (at die level)
- 10x faster Byte Write than today’s ETOX based Flash
- VPP < 2V (no high voltage requirement)
- Solder Reflow Process Compatible (high temp reliable)
- Guarantee 10 years retention at 85°C

• Bit Addressable (Read/Write) Serial NVM Device (32Kb to 1Mb)
• Integrated on industry standard Logic CMOS Technology: Embedded Memory Solution
• Porting to sub 55 nm to enable higher density products

NOT SINGLE CELLS ONLY, THESE ARE PRODUCT LEVEL SPECS
Low Power Sensors: Powered by Battery/Energy Harvesting

Intelligence in Things = Adesto CBRAM®

Sports and Fitness:

Home Automation:

Medical Sensors:
Blood Pressure
Glucose Monitor
Pancreatic Monitor
Muscle Activity
Electrocardiogram
... and more
Side-by-Side Energy Consumption: CBRAM vs EEPROM

Heart Rate Monitor:
Recording of Heart Rate on a Serial NVM Device Using a Finite Reservoir of Energy

Adesto’s CBRAM
Low Write Energy Allows Longer Operational Life

Industry Standard EEPROM
Write Operation has depleted the energy source

Adesto CBRAM®
EEPROM #1
EEPROM #2

Reinventing Memory for Things™
CBRAM: World’s **Lowest Energy Non-Volatile Memory Technology** Ever Demonstrated
Adesto Technologies Demonstrates Non Volatile Memory Operating at sub 1V in a Body Sensor Chip
- *VLSI Symposium 2013*

**SENSOR CHIP with embedded CBRAM OPERATING by ENERGY HARVESTING**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Adesto's CBRAM</th>
<th>Today's Flash</th>
<th>Improvements</th>
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<tbody>
<tr>
<td>Core Read Voltage (V)</td>
<td>0.35</td>
<td>1</td>
<td>60% Lower</td>
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<tr>
<td>Read Energy Per Bit (fJ)</td>
<td>50</td>
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<td>10x Lower</td>
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<tr>
<td>Core Write Voltage (V)</td>
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<tr>
<td>Write Energy Per Bit (pJ)</td>
<td>1</td>
<td>100</td>
<td>100x Lower</td>
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Application
Storage of code and data in medical equipment and health care:

*Examples: Orthopedics, Blood Bags, Catheters, Glucose Meters, Wireless Patient Monitoring*

Problem
Today’s Flash memories are not compatible with medical sterilization

*Methods of Sterilization include Irradiation, Thermal, Chemical.*

Solution
CBRAM technology is proven to maintain data integrity after sterilization processes.

CBRAM’s Demonstrated Immunity to Standard Sterilization Processes

Data Integrity of Serial Non-Volatile Memory Devices After Gamma and e-Beam Irradiation

<table>
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<tr>
<th>DOSE (kGy)</th>
<th>Adesto CBRAM(1)</th>
<th>Traditional FLASH(2)</th>
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<tr>
<td>200</td>
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</table>

*Tests Performed by leading medical companies and*
Adesto Technologies

Re-inventing Memory for Things™