
Company webinar

November 2022

Authorized for release by the Board

4DS
memory



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The opportunity

- ✓ 4DS Memory is focused on the Standalone-Memory Market
 - In 2022 this market is ~\$200B
 - Standalone-Memory Market - a continually growing opportunity
- ✓ 4DS Memory is targeting the DRAM applications
 - DRAM is the single biggest market opportunity: ~\$110B in 2022
 - DRAM's scaling is starting to run out of steam
 - DRAM solutions beyond 10 nm are unclear
 - 3D NAND path is clear: going toward 800+ layers
 - Embedded-Memory market is small compared to the DRAM and NAND market
 - Embedded-Memory is a licensing play: a small percentage of the ~\$25B microcontroller market



Lack of innovation continues to provide opportunities for new emerging technologies

Memory market: a growing opportunity

- ✓ Standalone-Memory market is dominated by DRAM and NAND
 - Third biggest segment is NOR at less than \$3B in 2022

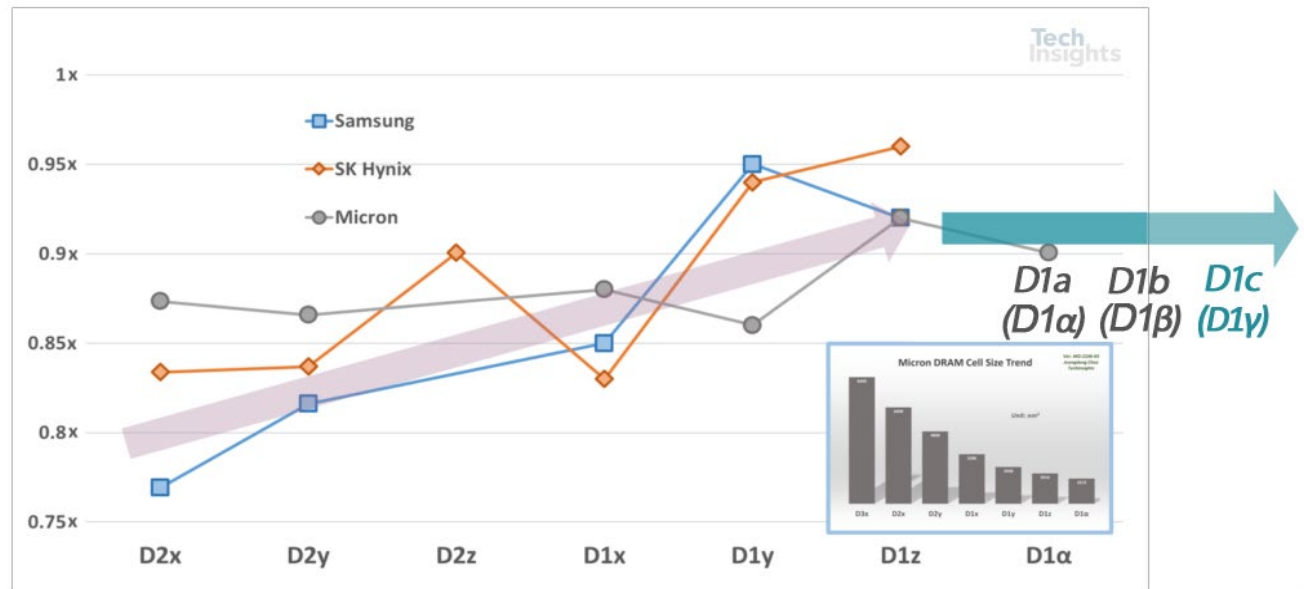
Annual DRAM and NAND Revenue
(source Yole Development)



4DS memory opportunity: DRAM is no longer scaling. Computing & cell phones need a new solution.

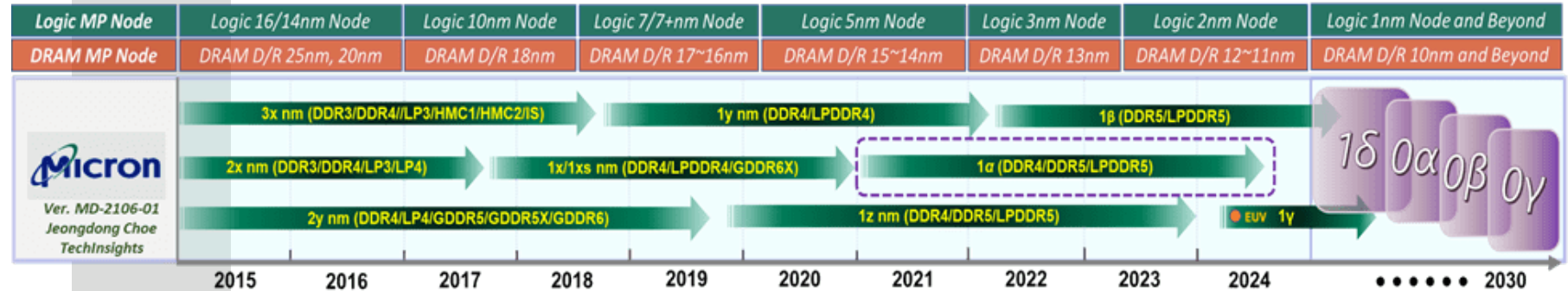
- ✓ DRAM's scaling is starting to run out of steam
 - Historically the shrink factor was 0.5. Now it is >0.9

DRAM Cell D/R Shrink Ratio Trends



4DS memory opportunity: DRAM is no longer scaling. Computing & cell phones need a new solution.

- ✓ DRAM solutions beyond 10 nm are unclear
 - 10 nm DRAM node is equivalent to 1 nm Logic node



The future

- ✓ Emerging-memory market size predicted to be US\$44 billion by 2032*
- ✓ Emerging memories will displace DRAM, SRAM and NOR Flash
- ✓ Likely replacements:
 - **ReRAM**
 - MRAM (focused on embedded market at 28 nm and beyond)
 - FeRAM (SRAM replacement?)
 - PCM (Intel Optane, NAND focus)

4DS snapshot



Today's Market Cap*
~A\$40 million
(@A\$0.026)

- ✓ ReRAM based on bulk switching (non-filamentary)
 - Scalable to small dimensions
- ✓ Simple 2D two terminal device in a 1T1R cell
 - Low cost, ideally suited to potentially replace complex 3D capacitor in a DRAM 1T1C cell
 - Path to 3D
- ✓ DRAM-like Read speed demonstrated
- ✓ Developed new bottom and top electrodes in 2022
 - Tighter memory cell distribution
 - Improved endurance
- ✓ Write speed and Endurance to be determined using next imec Platform Lot
 - Requires the imec megabit array test chip
- ✓ Strategic collaboration with imec recently extended into mid 2023
- ✓ Western Digital / HGST JDA extended till 30 June 2023
- ✓ Additional US patents granted – now 33 US patents issued
- ✓ Fully funded for near term activities

World leader and 4DS's long term partner

The imec logo consists of a small blue square above the lowercase letters 'imec' in a bold, black, sans-serif font.

- ✓ imec is the world's #1 independent semiconductor development institute
- ✓ In 2021 total revenue of 732 million euro
- ✓ Unique infrastructure that includes a 2.5 billion euro 300mm semiconductor pilot line
- ✓ More than 5000 expert scientists from over 95 countries
- ✓ Collaborates with the who is who of electronic products and systems – over 600 world leading industry players and a global academic network
- ✓ Collaborates with makers of high-volume high-density memories
- ✓ Uses the same tools as the industry uses for high-volume production of high-density memories
- ✓ Has a proven memory platform to fast-track development of Gigabit memories, using a Megabit memory test chip

9 year partnership with HSGT

HGST: a subsidiary of Western Digital Corporation (a US\$ 12.5 billion market cap company), one of the largest global leaders in digital storage

- ✓ Strategic innovator in emerging high growth technologies
- ✓ Commenced Joint Development Agreement in 2014 –
Renewed in 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022
- ✓ Provides Insight into what is important in a data-centric world



Collaboration objectives 2023

The imec logo is displayed in a large, bold, black font, centered horizontally in the lower half of the slide. The background of the slide is a blue-tinted image of a semiconductor manufacturing facility with workers in cleanroom suits.

In progress

Patterning process optimization in Q4 2022 and Q1 2023

Commence

Commence Platform Lot manufacturing in Q1 2023

Deliver

Platform Lot delivered to 4DS mid Q2 2023

End Goal

Demonstrate Endurance and Write speed required for DRAM applications

Board and management



Drs. Wilbert van den Hoek
Executive Chairman

- Served as CEO and Board member of Silicon Valley companies
- Previously CTO /EVP at Novellus Systems, was a long time board member of Cypress semiconductor



Ting Yen
Chief Technology Officer

- 30 years experience in commercializing memory technologies
- Various roles at Integrated Memory, Netlogic, Integrated Device, Cypress, Paradigm and Philips Research



Dr Guido Arnout
Non-Executive Director

- 30+ years in commercialising electronics technology
- Successes include, Power-Escape, CoWare, CrossCheck Technology and Silver-Liso



Global expertise in founding and building high-tech companies.



Howard Digby
Non-Executive Director

- Former senior roles at IBM, Adobe, Gartner and the Economist Group
- Director of Cirralto Ltd, Elsie Ltd and Singular Health Ltd
- Advisor to a number of technology companies



David McAuliffe
Executive Director

- Experienced company director
- Involved in numerous capital raisings and in-licensing of technologies
- Founder of several companies in Australia, France and the UK, many of which are now ASX listed. Non-Executive Director of Invex Therapeutics Ltd

Capital structure

ASX Code	4DS
Market Cap (Fully Diluted)	A\$ ~37 million*
Ordinary Shares on Issue	1,479,765,442
Unlisted Options	61,410,000
Cash	~A\$ 4.3 million – September 2022

* From closing price on 28/11/22 – AUS\$0.025

Company overview



INTERFACE
SWITCHING
ReRAM

World-leading
Silicon Valley
based Interface
Switching ReRAM
developer

4DS has the most
advanced Interface
Switching ReRAM

Focused on
augmenting DRAM
with in-house and
imec based
development work

Joint development
agreement with
Western Digital
subsidiary HGST
since 2014

Strategic
collaboration with
imec since 2017

33 granted US
patents wholly
owned (4 non-core
patents dropped)



**Board and management have the requisite skills
to create value**

Thank you



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ASX Code: 4DS
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