4DS memory

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**ASX RELEASE** 

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## **COMPANY UPDATE**

4DS Memory Limited (ASX:4DS) (4DS) (the Company) today provides an update regarding the initial internal analysis of the Third Platform Lot.

### **Background**

The Company's stated objective is to develop an Interface Switching ReRAM specifically developed for Storage Class Memory applications that has DRAM-like read speed, has lower than DRAM cost per bit and is non-volatile.

During 2021 and 2022 the Company undertook several iterations on Non-Platform Lots and Platform Lots and established that the Interface Switching ReRAM displayed characteristics that potentially made it applicable to Storage Class Memory.

#### Third Platform Lot Initial Analysis

4DS undertook a memory stack etch mask change and further performed etch process optimization using a short loop, to seek to resolve the etch residue problem that had resulted in the partial failure of the Second Platform Lot as announced on 17 August 2021. On 29 April 2022, the Company informed shareholders that additional characterization of these short loop wafers confirmed the decision to release the modified etch process.

The Company communicated final verification of the efficacy of these process changes requires electrical testing, which can only be performed on the Third Platform Lot. This Third Platform Lot was designed with the purpose of enabling more precise measurements of endurance and retention at the higher currents that resulted from the process changes in the Third Non-Platform Lot.

As previously reported, the Third Platform Lot came out-of-fab in July 2022 and on 4 August 2022 the Company informed shareholders that the Third Platform Lot had successfully arrived at its facilities in Fremont, California and that extensive internal testing had commenced. As stated in the 11 April 2022 ASX announcement, "The final verification of the efficacy of these process improvements requires electrical testing, which can only be performed on this Third Platform Lot". The testing to date has successfully demonstrated that the reference memory cells on the Third Platform Lot perform similarly to the identical reference structures on the Third Non-Platform Lot, indicating that the Lot had been manufactured properly. However, testing of the memory cells used in the imec megabit memory array showed unexpected problems with scaling the memory cell to small dimensions suitable for Storage Class Memory potential applications. These results suggest that the memory stack etch mask modification and further optimization of the etch process utilizing this new mask appears to have created another problem, while having resolved the root cause of the electrical shorting of the memory devices in the Second Platform Lot.

The Company is now performing a Root Cause Corrective Action process which includes further electrical testing, Transmission Electron Microscopy and material analysis to identify the reason for the difference in results between the Second Platform Lot and the Third Platform Lot.

Until this issue is resolved, endurance and retention testing of the memory cells with imec access transistors, the primary goal of this Third Platform Lot, cannot be successfully completed.

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It is likely that this analysis of the root cause of the problem will result in having to perform further process modifications at imec. The Company intends to have extensive discussions with imec about 4DS Memory's ongoing activities at their facilities, including transferring process improvements demonstrated at the Stanford Nanofabrication Facility, as highlighted in the Company's ASX Announcement on 4 November 2021, to imec's manufacturing process.

Based on this analysis and its discussions with imec, the Company intends to create an updated strategic plan for the on-going development of the Interface Switching ReRAM to achieve its objectives. The Company believes that the recent results from the Third Platform Lot will likely cause a long-term delay in achieving its strategic goal of commercializing the Company's technology.

In light of this unexpected testing outcome, and to conserve the Company's existing cash reserves, the Board has implemented the following measures:

- The Board and its Managing Director Mr Ken Hurley have mutually agreed that Mr Ken Hurley will leave the Company effective immediately. Ken was engaged for the specific purpose of leading the Company's commercialization effort, but due to the delays foreshadowed above, the Company believes that his expertise would be more useful to the Company once the Company is further developed in the commercialisation of its technology. Ken has agreed to re-engage with the Company when it is ready to start the commercialization effort. The Board thanks Ken for his contributions over the past five months;
- Drs. Wilbert van den Hoek with take on an Executive Chairman role and defer all fees for three months;
- Executive Director David McAuliffe will defer all fees for three months; and
- All other Board members will also defer fees for three months.

The Company advises that it may seek shareholder approval to issue shares in lieu of deferred fees otherwise payable to directors as has previously been done on many occasions. The shares would be issued at the 4DS share price at close of business on 30 June 2023 which is consistent with previous share issues for accrued or deferred fees.

## **ENDS**

Authorised for release by the Board.

# **Contact information**

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### **About 4DS**

4DS Memory Limited (ASX: 4DS), with facilities located in Silicon Valley, is a semiconductor development company of non-volatile memory technology, pioneering Interface Switching ReRAM for next generation gigabyte storage in mobile and cloud. Established in 2007, 4DS owns a patented IP portfolio, comprising 32 USA patents granted (four of which have now expired) and 1 patent application, which have been developed in-house to create high-density Storage Class Memory. 4DS has a joint development agreement with Western Digital subsidiary HGST, a global storage leader, which accelerates the evolution of 4DS' technology. 4DS also collaborates with imec, a world-leading research and innovation hub in nanoelectronics and digital technologies. The combination of imec's widely acclaimed leadership in microchip technology and profound software and information and communication technology expertise makes them unique.



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#### Disclaimer

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