DRAM Chip combines integrated Cyber Security with new Error Correction Code

DRAM ICs of recent generations starting with DDR3 are becoming ever more susceptible to bit-flip errors due to shrinking chip structures and have longer been available with extra integrated rowhammer protection circuits that prevent remote spying of operating-system-protected data such as passwords or cryptokeys via contact with contaminated websites, allowing sophisticated hackers to sabotage systems and hijack entire networks without leaving traces in the hardware and thus bypass software-based protections such as AV apps, OS patches or firewalls undetected. However, sporadic rare bit-flip errors can cause systems to crash, which is why critical cloud servers, clients, gateways, routers and IIoT edge devices are usually equipped with error-correcting ECC DRAMs, but these have not been shown yet to be immune to the rowhammer attacks of sophisticated hackers. This security gap is now closed by Zentel's new 4Gb DDR3 DRAM ICs, which also feature a novel signal output that can warn the controller just in time if more than one correctable bit-flip error is detected, so that the system can still react before any further harm is done.

Under part numbers A3T4GF30CBF-HP (8-bit I/O) and A3T4GF40CBF-HP (16-bit I/O), these double-protected versions will be JEDEC-compliant and thus footprint-compatible also for replacing less protected DRAM ICs of existing systems in standard FBGA packages and are expected to become available as customer samples by January 2023.

"The development of these Row-Hammer-free and now also ECC-protected DRAM ICs goes back to requests of leading HDD/SSD manufacturers who use these DRAM ICs in the cache." explains Hans W. Diesing, responsible for marketing and sales in the EMEA region: "Currently increasing cyber security risks, especially in critical infrastructures, demand such resilient hardware security solutions urgently, after academic researchers have been pointing out security problems caused by ineffectively protected majority of DRAM ICs with alarming test results for eight years in the meantime since discovery."

Zentel was established 20 years ago as a Japanese DRAM design center by Taiwan-based wafer foundry Powerchip, from where it later began manufacturing and selling its packaged DRAM chips globally. Since then, DRAM IC series ranging from 64 megabits to 8 gigabits have been introduced.