FRONTGRADE



18GB DDR4 DRAM Memory Module

Ultra-High Density, Radiation-Tolerant Solution Delivering Space-Grade Reliability for Critical Space Applications

For space missions requiring ultra-high memory density, throughput, and reliability, Frontgrade delivers the industry-leading 18GB DDR4 DRAM memory module. Engineered for next-generation spacecraft and satellite systems, the DDR4 combines exceptional performance with proven space-grade assurances.

This multi-chip module offers an impressive 18GB single-rank ECC UDIMM capability in a compact 20mm x 15mm footprint, making it ideal for applications with strict size, weight, and power constraints. With a 2G addressing depth, 64-bit data bus, and 8-bit ECC interface, the device supports data transfer rates up to 2400 MT/s, enabling demanding payloads and mission-critical operations.

Radiation tolerance is central to the design, with features including Single Error Correction and Double Error Detection (SECDED) protection, die-level dedicated RESET signals. For SEFI recovery modes to maximize system availability. The module can also be configured for enhanced fault protection with a 48-bit data bus plus 24-bit Reed-Solomon EDAC. Additional features include CA parity, data bus inversion, maximum power savings mode, low-power auto-refresh, and thermally enhanced packaging for high-reliability operation in harsh environments. Operating at 1.2V VDD/VDDQ and 2.5V VPP, the module balances power efficiency with robust performance. A full radiation effects characterization report is available upon request, ensuring mission designers can confidently deploy this memory module in the most demanding space applications.

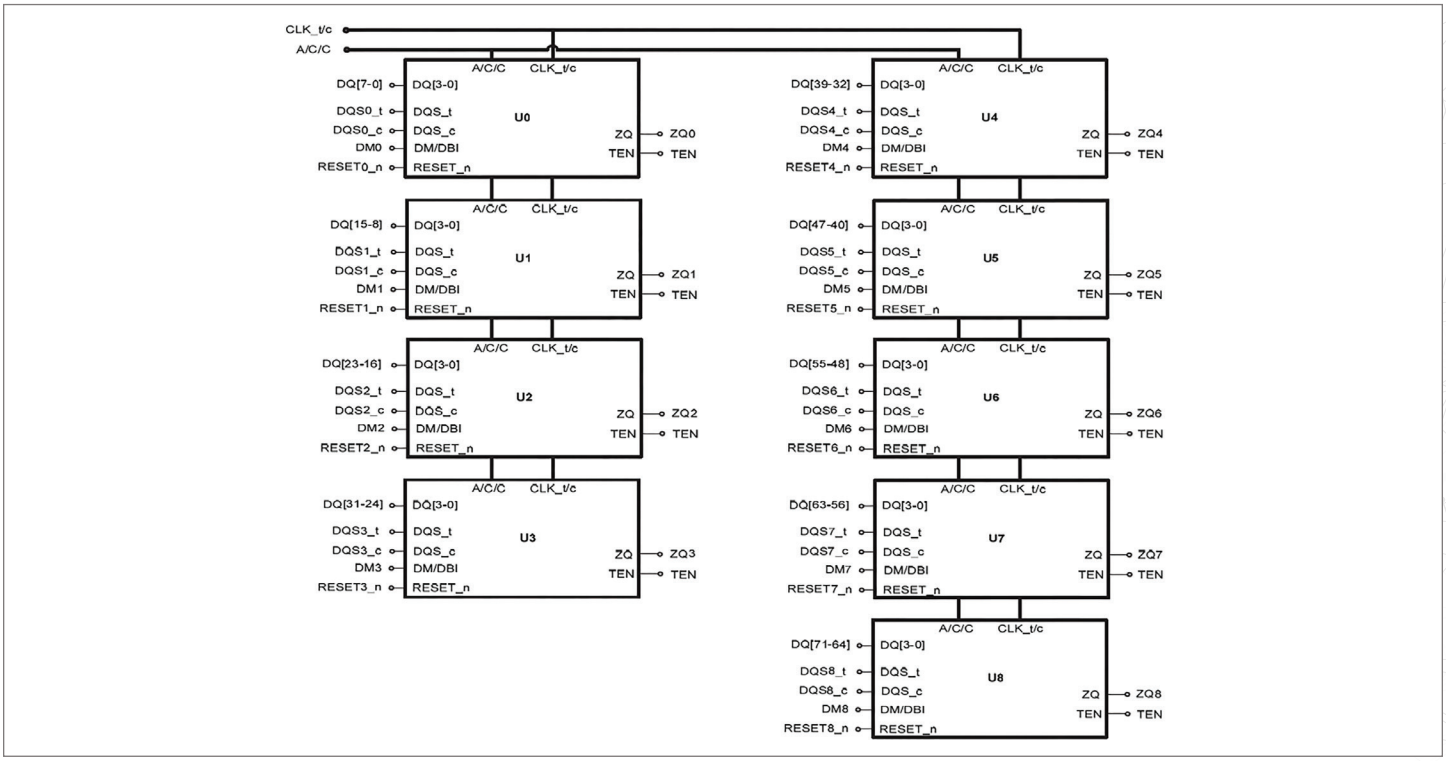
Features

- High Density: 18GB (16GB + 2GB ECC)
- 72 bit bus; 2,400 MT/s
- Single Power supply (1.2V nominal)
- SEFI/SEU characterized
- Individual reset signals to each die
- 1.0mm Ball Spacing BGA Package: for high-reliability assembly & thermal management
- Low-Latency Configurations: for real-time GN&C & deterministic mission operations.

Applications

- AI & Machine Learning
- High Speed Performance Processing
- Data buffering for Solid State Drives
- Data-Intense storage & sensor processing
- Scientific Payloads & Space Telescopes, supports high-bandwidth data capture and preprocessing

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Specifications

Operational Environment	▪ Temperature Range: -55°C to +125°C; Total Dose: 50krad (Si) at 3.9 us refresh rate ▪ SEL : 40,000 yrs MTTF GEO: 1,500,000 yrs MTTF ISS LEO; -Part characterized from 37 to 82 LET ▪ SEU (ISS LEO): 8.93E-12 errors/bit-day (Single bit errors) ▪ SEFI (ISS LEO): High current (Static) –1.04E-4 events/device-day; dynamic –5.87E-4 events/device-day ƒ *Adam's 90%, 100mil Al
Physical	▪ 266-Ball PBGA unleaded (SAC305) or leaded (63Sn 37Pb) ▪ 15mm x 20mm x 1.9mm; 1 mm ball pitch
Power	▪ 200mW burst read/write power per die; VCC/VCCQ: 1.26-1.14V
Qualifications	▪ Frontgrade's Space PEM L2 Manufacturing and Qualification Flows– based on NASA-PEM-INST-001

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