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Space-Grade QED MRAM

Product Line Overview

QED space-grade MRAM utilizes spin-torque transfer (STT) magneto-resistive random-access memory in a plastic BGA, qualified to NASA/Goddard Space EEE-INST-002, Level 2 PEM. STT-MRAM provides true random read/write access and inherently high resistance to magnetic flux & radiation.

KEY FEATURES

Technology

- pMTJ STT-MRAM (Perpendicular Magnetic Tunnel Junction)
- Inherently Rad-Tolerant
- 16Mb / 64Mb Products Based on Gen-2, 40nm
- 1Gb / 4Gb Parallel Based on Gen-3, 22nm

Performance

- Up to 8Gb of Spin-Torque Persistent MRAM in a Single, Small Footprint & Low-Profile Package
- Density Organization: 16Mb (1M x 16), 64Mb (4M x 16), 1Gb (32M x 32), 4Gb (128M x 32), 2/4/8Gb (1Gb x 2, 2Gb x 2, 4Gb x 2, DQSPI)
- Advanced ECC with Configuration Register
- Asynchronous Page Mode Feature
- Access Performance
  - Parallel: 45ns
  - Dual QSPI: 108MHz

Operating & Environmental Specifications

- Quality Flows
  - Qualified Encapsulated Device (QED) to NASA EEE-INST-002, Sec. M4, Level-2 PEM
- Irradiation Effects Performance: VCC ≤ 3.0V
  - Rad-Tolerant (RT): 100K RAD TID
  - Non-Rad
- Excellent Single Event Effect (SEE) Performance: VCC ≤ 3.0V
  - SEE ≥ 72.4 MeV cm^2/mg
- Operating Voltage Range: VCC: 2.70V - 3.60V
- Temperature Range: -55°C +125°C

BENEFITS

Optimal Design

- Smallest Plastic Rad-Tolerant MRAM Package Available
- Spin-Torque Transfer Technology MRAM is Highly Resistant to Magnetic Flux, Mitigating the Need for Radiation Shielding
- Spin-Torque Transfer Technology has Near Infinite Endurance and Data Retention Greater than 10 years
- MRAM Memory Offers the Fastest Access Time of Non-Volatile Memories
- Best Power Profile of All Non-Volatile Memories

Package Options

- Plastic BGA: Qualified Encapsulated Device (QED)

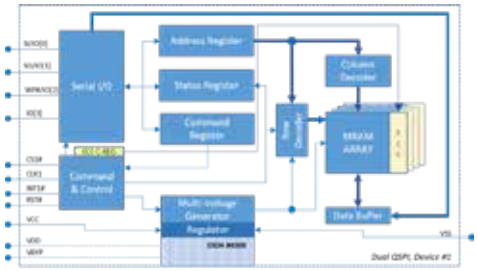
APPLICATIONS

- Space Grade Processor Based Systems and FPGA Boards
- LEO, MEO, GEO, and HEO Space Missions
- Satellites
- Launch Vehicles
- Space Systems and Vehicles
- Aerospace Systems

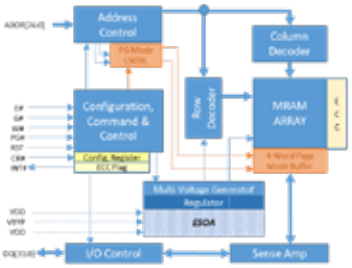
Smallest & Lowest Power Hi-Rel Non-Volatile Memory

Micross' qualified encapsulated space-grade MRAM utilizing Avalanche Technologies STT-MRAM, is a plastic encapsulated microcircuit screened and qualified to NASA's electrical, electronic and electromechanical Instructions. The 1Gb QED MRAM offers true random read/write access while being inherently highly resistant to magnetic flux & radiation, mitigating the need for radiation shielding while providing near infinite endurance and best-in-class non-volatile data retention. This MRAM device architecture is analogous to Flash technology with an SRAM compatible read/write interface with ECC and a Asynchronous Page Mode feature for enhanced performance.

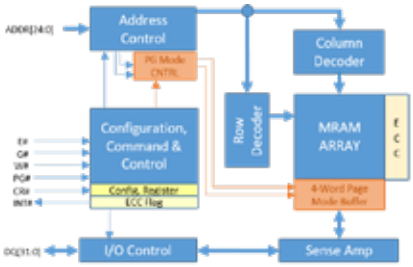
MRAM BLOCK DIAGRAMS



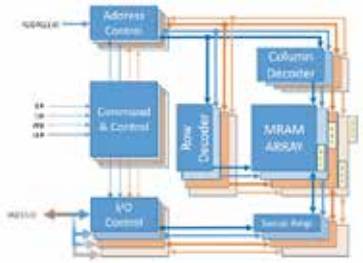
2/4/8Gb, Dual QSPI



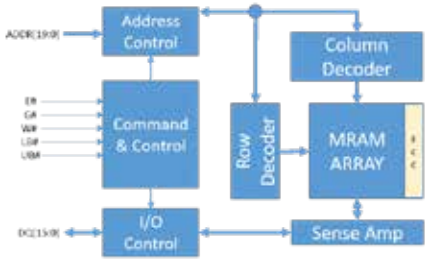
4Gb, 128M x 32



1Gb, 32M x 32



64Mb, 4M x 16



16Mb, 1M x 16

PROGRAM PARTICIPATION

- Cassini
- NPOESS
- AEHF1-6
- Milstar
- Astrolink
- Gallileo
- Aerion
- SWARM
- Sentinel
- Earthcare
- Metop 2nd Generation
- TerraSAR-X

SPACE QUALIFICATION CAPABILITIES

- ANSI/ESD-S20.20:2014
- AS9100:2016/ISO 9001:2015
- MIL-PRF-38534, Class H
- MIL-PRF-38535, Class Q & V
- MIL-STD-750, Laboratory Suitability
- MIL-STD-883, Laboratory Suitability
- EEE-INST-002

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