



Application brief

EXCELON™ Ultra F-RAM memory

Performance, reliability, and instant nonvolatility in low-pin-count memory

Industrial systems require memories to continuously log and instantly capture system state information and sensor data in the event of power loss. Next-generation factory automation and control systems will add to compute and storage demands, especially on the edge of the network. Harsh operating environments and demanding requirements for cycling endurance and data retention require the most-robust performance possible, while supporting efficient low-pin-count, high-speed interfaces. EXCELON™ Ultra mission-critical memories support a 108 MHz low-pin-count QSPI interface with 100 trillion cycle write endurance, fast writes and instant nonvolatility.

EXCELON™ F-RAM advantages

EXCELON™ F-RAM memories combine nonvolatile data storage with the fast speed of RAM.

F-RAM has three distinct advantages over traditional nonvolatile memories:

- › Fast write speed with NoWrite delay
- › Virtually unlimited endurance
- › Industry's most energy-efficient NVRAM

EXCELON™ F-RAM operates with the same host processor interfaces and timing as other memories such as SRAM, EEPROM, and serial Flash, but takes advantage of its fast write speed to eliminate write delays due to “soak time” or page/sector buffering required of other technologies. Instant writes eliminate “data at risk” resulting from unexpected power loss.

Applications

Infineon's EXCELON™ Ultra F-RAM is an ideal solution for a variety of industrial applications, including:

- › Industrial automation
- › Data logging
- › Point-of-sale
- › Programmable logic controllers
- › Test and measurement
- › Motor controls
- › Smart meters

Key features

High performance

- › 50 MHz SPI and 108 MHz SDR QSPI interfaces
- › NoWrite delay
- › 10 mA active current @ 108 MHz SPI SDR
- › True RAM performance; no data polling before writes

Reliable

- › 100 trillion (10^{14}) cycle endurance
- › No wear-leveling required
- › 100+ year data retention
- › No battery or capacitor required
- › Instant nonvolatility

Additional product features

- › -40 to +85°C industrial grade
- › Hardware protection with write protect pin
- › Software block protection
- › Embedded ECC



Industrial automation systems



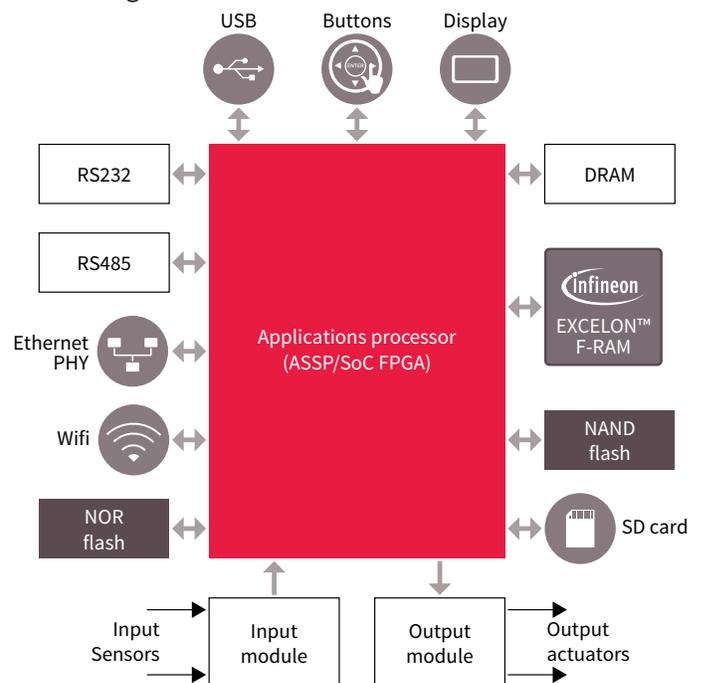
Problem

My factory automation systems require high-performance, reliable data-logging memories at control-level in case of power disruption. Industrial IoT sensors collecting data at field-level need to continuously log it either in a nonvolatile RAM (NVRAM), or in a volatile RAM first, and then transfer to a nonvolatile memory (NVM) on power disruption. Systems that transfer the data logs from the volatile RAM to a NVM require high write throughput to complete the transfer using a limited backup power source, ensuring every sample is secure reliably stored. These systems need to operate in harsh, high-temperature environments and last 20 years.

Solution

EXCELON™ Ultra offers a low pin-count, 108-MHz QSPI interface to meet performance requirements with NoDelay writes to instantly and reliably capture data on power loss. Reliability is assured with 100-trillion write cycles at 85°C.

Block diagram



Published by
Infineon Technologies AG
81726 Munich, Germany

© 2021 Infineon Technologies AG.
All Rights Reserved.

Please note!

This Document is for information purposes only and any information given herein shall in no event be regarded as a warranty, guarantee or description of any functionality, conditions and/or quality of our products or any suitability for a particular purpose. With regard to the technical specifications of our products, we kindly ask you to refer to the relevant product data sheets provided by us. Our customers and their technical departments are required to evaluate the suitability of our products for the intended application.

We reserve the right to change this document and/or the information given herein at any time.

Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.