



## Application brief

# EXCELON™ LP F-RAM memory

Ultra-low power, instantly nonvolatile, and reliable data-logging memory

Latest-generation portable medical, wearable, and IoT devices need nonvolatile memories to log an increasing amount of user and sensor data continuously and at the lowest power consumption to maximize battery life. EXCELON™ LP enables this with instant write capabilities, unlimited endurance and ultra-low-power modes. These devices also need memories with the smallest package footprint provided by the newest and smallest GQFN package offering with EXCELON™ LP.

### 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
- › 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™ LP F-RAM is an ideal solution for a variety of power-sensitive applications, including:

- › Neuromodulators
- › Infusion pumps
- › Pacemakers
- › Defibrillators
- › Health watches
- › Activity trackers
- › IoT sensors
- › Portable test equipment

### Key features

#### High performance, low power

- › 20, 40 and 50 MHz SPI interfaces
- › NoWrite delay
- › Ultra-low (0.10  $\mu$ A) hibernate
- › True RAM performance; no data polling before writes

#### Reliable

- › 1,000 trillion ( $10^{15}$ ) 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
- › 0 to +70°C Commercial Grade
- › Small footprint GQFN
- › Hardware protection with write protect pin
- › Software block protection
- › Embedded ECC



## Portable medical and wearable devices

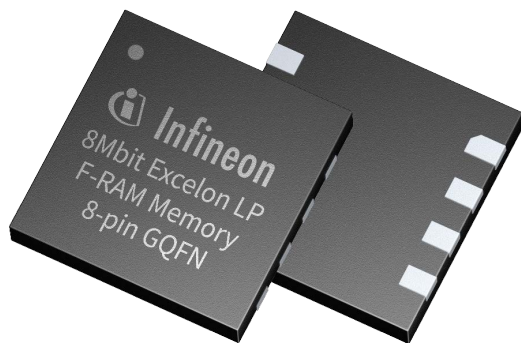


### Problem

I'm developing a high-end wearable that has to maximize battery life while logging extensive data at a rapid duty cycle. The memory must operate at low power and be highly reliable while fitting in a small form factor.

### Solution

EXCELON™ LP uses 200 times less energy than EEPROM and 3,000 times less energy than NOR Flash, with endurance for 1,000 trillion write cycles to reliably log data every millisecond for more than 3,000 years. It comes in a small footprint GQFN package.



## IoT sensors



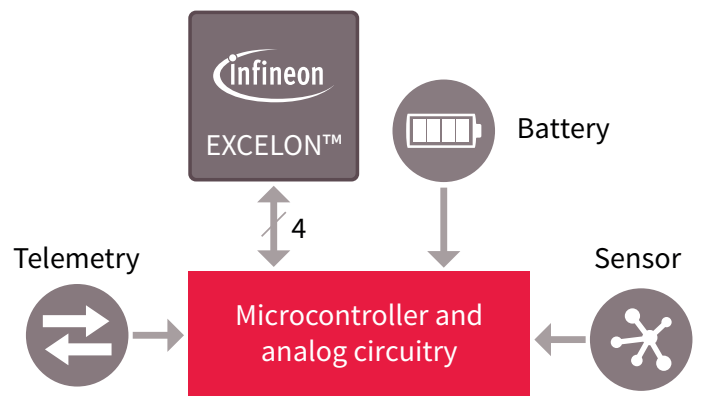
### Problem

I have to reliably accumulate sensor inputs and be prepared to uplink the data on command all while operating in harsh environments at low power.

### Solution

EXCELON™ LP offers high performance SPI interfaces, matching sensor data throughput requirements, while supporting easily accessed byte-addressable memory locations on demand. All of this, with F-RAM reliability.

### EXCELON™ F-RAM data-logger block diagram



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