

**FM1808***256Kb Byte-wide FRAM Memory***Features****256K bit Ferroelectric Nonvolatile RAM**

- Organized as 32,768 x 8 bits
- High endurance 10 Billion ( $10^{10}$ ) read/writes
- 10 year data retention at 85° C
- NoDelay™ write
- Advanced high-reliability ferroelectric process

**Superior to BBSRAM Modules**

- No battery concerns
- Monolithic reliability
- True surface mount solution, no rework steps
- Superior for moisture, shock, and vibration
- Resistant to negative voltage undershoots

**SRAM & EEPROM Compatible**

- JEDEC 32Kx8 SRAM & EEPROM pinout
- 70 ns access time
- 130 ns cycle time
- Equal access & cycle time for reads and writes

**Low Power Operation**

- 25 mA active current
- 20  $\mu$ A standby current

**Industry Standard Configuration**

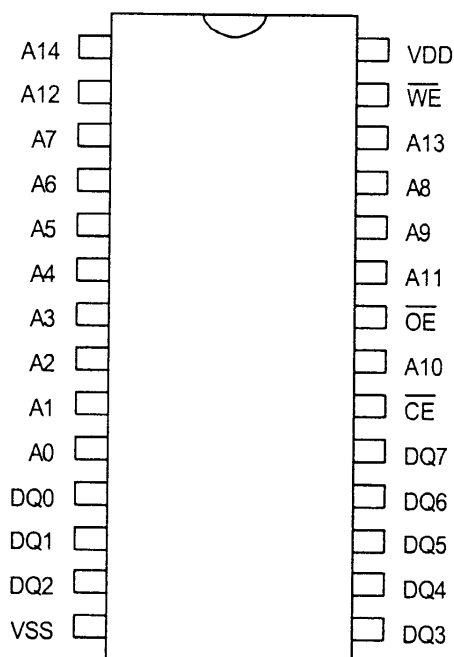
- Industrial temperature -40° C to +85° C
- 28-pin SOP or DIP

**Description**

The FM1808 is a 256-kilobit nonvolatile memory employing an advanced ferroelectric process. A ferroelectric random access memory or FRAM is nonvolatile but operates in other respects as a RAM. It provides data retention for 10 years while eliminating the reliability concerns, functional disadvantages and system design complexities of battery-backed SRAM. It's fast write and high write endurance makes it superior to other types of nonvolatile memory.

In-system operation of the FM1808 is very similar to other RAM based devices. Memory read- and write-cycles require equal times. The FRAM memory, however, is nonvolatile due to its unique ferroelectric memory process. Unlike BBSRAM, the FM1808 is a truly monolithic nonvolatile memory. It provides the same functional benefits of a fast write without the serious disadvantages associated with modules and batteries or hybrid memory solutions.

These capabilities make the FM1808 ideal for nonvolatile memory applications requiring frequent or rapid writes in a byte-wide environment. The availability of a true surface-mount package improves the manufacturability of new designs, while the DIP package facilitates simple design retrofits. The FM1808 offers guaranteed operation over an industrial temperature range of -40°C to +85°C.

**Pin Configuration****Ordering Information**

FM1808-70-P	70 ns access, 28-pin plastic DIP
FM1808-70-S	70 ns access, 28-pin SOP
FM1808-120-P	120 ns access, 28-pin plastic DIP
FM1808-120-S	120 ns access, 28-pin SOP

This data sheet contains design specifications for product development.  
These specifications may change in any manner without notice.

**Ramtron International Corporation**  
1850 Ramtron Drive, Colorado Springs, CO 80921  
(800) 545-FRAM, (719) 481-7000, Fax (719) 481-7058  
[www.ramtron.com](http://www.ramtron.com)

## Electrical Specifications

### Absolute Maximum Ratings

Description	Ratings
Ambient storage or operating temperature	-40°C to +85°C
Voltage on any pin with respect to ground	-1.0V to +7.0V
Lead temperature (Soldering, 10 seconds)	300° C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only, and the functional operation of the device at these or any other conditions above those listed in the operational section of this specification is not implied. Exposure to absolute maximum ratings conditions for extended periods may affect device reliability

**DC Operating Conditions** TA = -40° C to +85° C, VDD = 4.5V to 5.5V unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Units	Notes
VDD	Power Supply	4.5	5.0	5.5	V	1
IDD	VDD Supply Current 180 ns cycle		7	15	mA	2
IDD	VDD Supply Current 120 ns cycle		12	25	mA	2
ISB	Standby Current - TTL			400	μA	3
ISB	Standby Current - CMOS		7	20	μA	4
ILI	Input Leakage Current			10	μA	5
ILO	Output Leakage Current			10	μA	5
VIL	Input Low Voltage	-1.0		0.8	V	1
VIH	Input High Voltage	2.0		VDD + 1.0	V	1
VOL	Output Low Voltage			0.4	V	1,6
VOH	Output High Voltage	2.4V			V	1,7

### Notes

1. Referenced to VSS.
2. VDD = 5.5V, /CE cycling at minimum cycle time, 130 ns for -70 and 180 ns for -120. All inputs at CMOS levels, all outputs unloaded.
3. VDD = 5.5V, /CE at VIH, All inputs at TTL levels, all outputs unloaded.
4. VDD = 5.5V, /CE at VIH, All inputs at CMOS levels, all outputs unloaded.
5. VIN, VOUT between VDD and VSS.
6. IOL = 4.2 mA
7. IOH = -2.0 mA