

# RAMTRON FRAM Memory



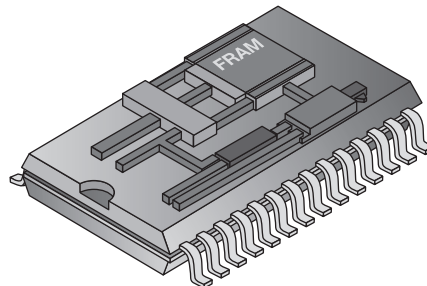
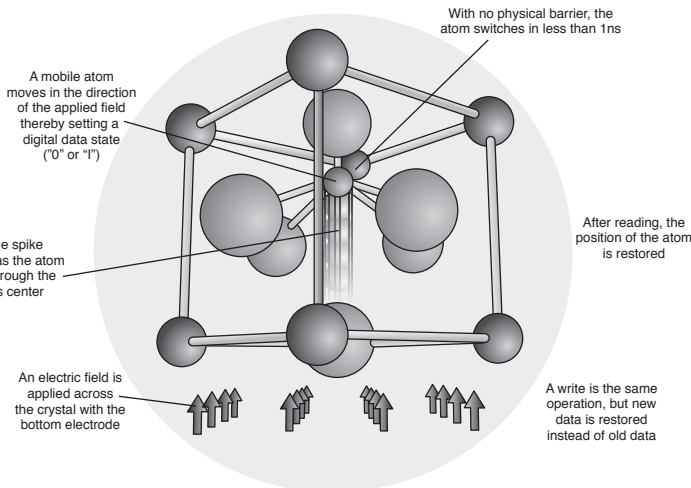
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## RAMTRON FRAM (FERROELECTRIC RANDOM ACCESS MEMORY) MEMORY

FRAM offers a unique set of features relative to other semiconductor technologies. Traditional mainstream semiconductor memories can be divided into two primary categories -- volatile and nonvolatile. Volatile memories include SRAM (static random access memory) and DRAM (dynamic random access memory). SRAMs and DRAMs lose their contents after power is removed from the electronic system. RAM type devices are very easy to use, and are high performing, but they share the annoying quirk of losing their mind when the lights go out.

Non-volatile memories do not lose their contents when power is removed. However all of the mainstream non-volatile memories share a common ancestry that derives from ROM (read only memory) technology. As you might guess, something called read only memory is not easy to write, in fact it's impossible. All of its descendants make it very difficult to write new information into them. They include technologies EPROM (almost obsolete now), EEPROM, and Flash. ROM based technologies are very slow to write, wear out after being written a small number of times, and use a large amount of power to write. FRAM offers features consistent with a RAM technology, but is non-volatile like a ROM technology. FRAM bridges the gap between the two categories and creates something completely new -- a non-volatile RAM.

When an electric field is applied to a ferroelectric crystal, the central atom moves in the direction of the field. As the atom moves within the crystal, it passes through an energy barrier, causing a charge spike. Internal circuits sense the charge spike and set the memory. If the electric field is removed from the crystal, the central atom stays in position, preserving the state of the memory. Therefore, the FRAM memory needs no periodic refresh and when power fails, FRAM memory retains its data. It's fast, and doesn't wear out!



### Serial FRAM

The 2-wire interface is a widely used Master, multi-slave protocol using a serial clock (SCL) and a serial data line (SDA). Multiple memory devices can reside on the 2-wire bus by using the device select pins A0-A2 on selected parts. The 2-wire protocol is designed for multi-drop applications as well.

### Features:

- Industry standard protocol (2-wire & SPI)
- Low standby current
- Low power consumption
- High Endurance Read/Writes
- NoDelay™ Writes
- Direct hardware replacement for EEPROM



RoHS Compliant



LEAD-FREE

◆ Surface Mount Device

For quantities of 1000 and up, call for quote.

MOUSER STOCK NO.	Ramtron Part No.	Case Type	Density	Organization	Max. Bus Speed (MHz)	Temperature Range (°C)	Supply Voltage (V)	Price Each			
								1	25	100	500
<b>2-Wire Interface</b>											
◆ 877-FM24C04A-G	FM24C04A-G	SOIC-8	4K	512 x 8	1	-40 to +85	5	1.19	1.13	1.03	.97
◆ 877-FM24CL04-G	FM24CL04-G	SOIC-8	4K	512 x 8	1	-40 to +85	2.7 - 3.6	1.19	1.13	1.03	.97
◆ 877-FM24C16A-G	FM24C16A-G	SOIC-8	16K	2K x 8	1	-40 to +85	5	1.52	1.45	1.31	1.24
◆ 877-FM24CL16-G	FM24CL16-G	SOIC-8	16K	2K x 8	1	-40 to +85	2.7 - 3.6	1.52	1.45	1.31	1.24
◆ 877-FM24CL16-DG	FM24CL16-DG	DFN-8	16K	2K x 8	1	-40 to +85	2.7 - 3.6	1.78	1.70	1.54	1.46
◆ 877-FM24C64-G	FM24C64-G	SOIC-8	64K	8K x 8	1	-40 to +85	5	3.06	2.92	2.64	2.50
◆ 877-FM24CL64-G	FM24CL64-G	SOIC-8	64K	8K x 8	1	-40 to +85	2.7 - 3.6	3.06	2.92	2.64	2.50
◆ 877-FM24CL64-DG	FM24CL64-DG	DFN-8	64K	8K x 8	1	-40 to +85	2.7 - 3.6	3.34	3.19	2.89	2.74
◆ 877-FM24C256-G	FM24C256-G	SOIC-8	256K	32K x 8	1	-40 to +85	5	6.69	6.38	5.78	5.47
<b>SPI Interface</b>											
◆ 877-FM25L04-G	FM25L04-G	SOIC-8	4K	512 x 8	14	-40 to +85	2.7 - 3.6	1.23	1.18	1.06	1.01
◆ 877-FM25040A-G	FM25040A-G	SOIC-8	4K	512 x 8	20	-40 to +85	5	1.08	1.03	.93	.88
◆ 877-FM25L16-G	FM25L16-G	SOIC-8	16K	2K x 8	18	-40 to +85	2.7 - 3.6	1.85	1.76	1.60	1.51
◆ 877-FM25L16-DG	FM25L16-DG	DFN-8	16K	2K x 8	18	-40 to +85	2.7 - 3.6	2.11	2.02	1.82	1.73
◆ 877-FM25C160-G	FM25C160-G	SOIC-8	16K	2K x 8	20	-40 to +85	5	1.85	1.76	1.60	1.51
◆ 877-FM25640-G	FM25640-G	SOIC-8	64K	8K x 8	5	-40 to +85	5	3.54	3.38	3.06	2.90
◆ 877-FM25CL64-G	FM25CL64-G	SOIC-8	64K	8K x 8	20	-40 to +85	2.7 - 3.6	3.06	2.92	2.64	2.50
◆ 877-FM25CL64-DG	FM25CL64-DG	DFN-8	64K	8K x 8	20	-40 to +85	2.7 - 3.6	3.34	3.19	2.89	2.74
◆ 877-FM25256-G	FM25256-G	SOIC-8	256K	32K x 8	15	-40 to +85	5	6.27	5.99	5.42	5.13
◆ 877-FM25L256-G	FM25L256-G	SOIC-8	256K	32K x 8	25	-40 to +85	2.7 - 3.6	6.27	5.99	5.42	5.13
◆ 877-FM25L256-GC	FM25L256-GC	SOIC-8	256K	32K x 8	25	0 to +70	2.7 - 3.6	6.27	5.99	5.42	5.13
◆ 877-FM25L256-DG	FM25L256-DG	DFN-8	256K	32K x 8	25	-40 to +85	2.7 - 3.6	6.53	6.24	5.64	5.35
◆ 877-FM25L256-DGC	FM25L256-DGC	DFN-8	256K	32K x 8	25	0 to +70	2.7 - 3.6	6.53	6.24	5.64	5.35
◆ 877-FM25L512-DG	FM25L512-DG	DFN-8	512K	32K x 8	25	-40 to +85	2.7 - 3.6	12.68	12.05	11.41	10.37

### Parallel FRAM

Nonvolatile Parallel High performance reads and writes with true nonvolatility without the battery. All bitwise memories have standard SRAM pinouts. They operate like SRAMs and provide nonvolatile storage with no requirement for battery backup.

### Features:

- Industry standard SRAM/EEPROM pinout
- Read and write at bus speed
- Low standby current
- NoDelay™ Writes
- High Inductance
- Low power consumption, High Endurance



RoHS Compliant



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MOUSER STOCK NO.	Ramtron Part No.	Case Type	Density	Organization	Access Time (ns)	Temperature Range (°C)	Supply Voltage (V)	Price Each			
								1	25	100	500
◆ 877-FM1608-120-SG	FM1608-120-SG	SOIC-28	64K	8K x 8	120	-40 to +85	5	5.08	4.85	4.39	4.16
◆ 877-FM1608-120-PG	FM1608-120-PG	PDIP-28	64K	8K x 8	120	-40 to +85	5	5.08	4.85	4.39	4.16
◆ 877-FM18L08-70-SG	FM18L08-70-SG	SOIC-28	256K	32K x 8	70	-40 to +85	3.0 - 3.6	9.97	9.51	8.61	8.15
◆ 877-FM18L08-70-PG	FM18L08-70-PG	PDIP-28	256K	32K x 8	70	-40 to +85	3.0 - 3.6	9.97	9.51	8.61	8.15
◆ 877-FM1808-70-SG	FM1808-70-SG	SOIC-28	256K	32K x 8	70	-40 to +85	5	10.58	10.10	9.14	8.66
◆ 877-FM1808-70-PG	FM1808-70-PG	PDIP-28	256K	32K x 8	70	-40 to +85	5	10.58	10.10	9.14	8.66
◆ 877-FM20L08-60-TG	FM20L08-60-TG	TSOP-32	1M	128K x 8	60	-40 to +85	3.3	22.29	21.27	19.25	18.23
◆ 877-FM20L08-60-TGC	FM20L08-60-TGC	TSOP-32	1M	128K x 8	60	0 to +70	3.3	22.29	21.27	19.25	18.23



Memory

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