

# S51232FVRH:

## 512K x 32-Bit Radiation-Tolerant Static RAM

Product Feature Sheet

### Features

- Fabricated in 90 nm process technology using custom EPI wafers
- Total dose: 300 krads(Si)
- Prompt dose: No burn out and latch-up; dose rate ranging from 1.0 E9 to 1.8 E11rad/second
- Not susceptible to SEL latch-up or SEFI to LET >106 MeV-cm<sup>2</sup>
- SEU upset rate is 3.8.0 E-8 upset/cell-day (geo orbit using CHEME 96)
- Proton: No latch-up up to proton energy, 198 MeV
- High speed,  $t_{AA} \leq 12$  ns
- Supply voltage 3.3 VDC  $\pm$  10%
- Low active power
- TTL compatible inputs and outputs
- Operating temperature: -55 °C to 125 °C
- Manufacturing, test, screening and qualification according to the equivalent requirements of MIL-PRF-38535, Class V

### Packaging

- 84-Lead Ceramic Flat Pack (27.94 x 22.86 x 3.81mm)

### Terminal Identification:

Pin Name	Pin Function
A0 - A18	Address Inputs
$\overline{WE}$	Write Enable
$\overline{CS0} - \overline{CS3}$	Chip Select
$\overline{OE}$	Output Enable
I/O0 - I/O31	Data Input/Output
Vcc	Power (3.3 Vdc)
Vss	Ground
NC	No Connection



### Device Overview

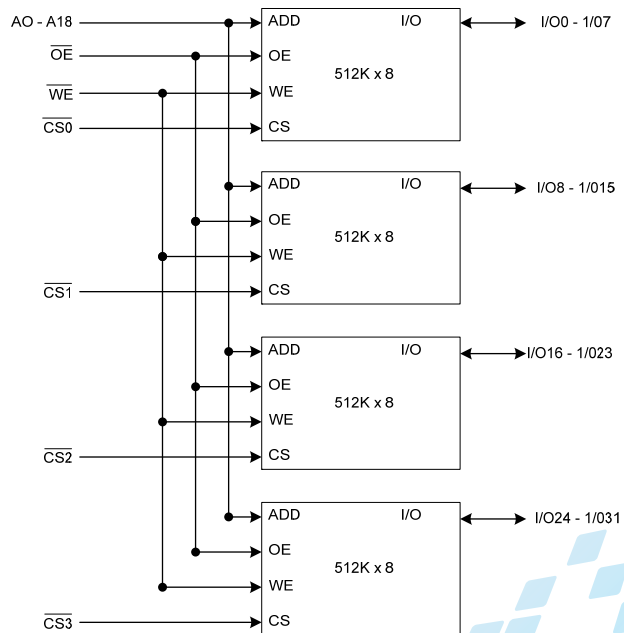
The S51232FVRH is a 3.3 V, 16-Mb radiation-tolerant asynchronous high-speed static RAM memory module organized as 512K x 32 bits in a 84-lead hermetic ceramic flat package.

The SRAM module is configured with four SRAM dice assembled in an integrated ceramic package to provide the smallest form factor available in the current hi-rel market. The dice are fabricated in 90 nm CMOS process on custom EPI wafers and have been tested and characterized for various radiation effects.

High speed data throughput is achieved by interconnecting four 8-bit wide fast SRAMs in parallel with a common output enable. The individual chip select signals for the four chips are routed to external lead connections. This scheme dramatically reduces pin count, allows versatility and supports future system upgrades utilizing the same pin-out.

The SRAM module is designed to have a low thermal resistance and exhibits less than a 9 °C internal temperature gradient during operation.

### Functional Diagram



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### Absolute Maximum Ratings:

DC Supply Voltage	-0.5 V to 4.6 V
Voltage on any Input Pin	-0.5 V to 4.6 V
Voltage on any Output Pin	-0.5 V to $V_{CC} + 0.5 V$
Short Circuit Output Current	50 mA
Lead Temperature (Soldering, 10 sec.)	+300 °C
Storage Temperature TSTG	-65 °C to + 150 °C
Junction Temperature	+160 °C
Thermal Resistance, Junction to Case	3.0 °C/W
Power Dissipation	3.0 W
Weight, Maximum (with led frame)	8.0 grams
ESD Voltage $\geq$	> 2000 V

### Recommended Operating Conditions:

Symbol	Parameter	Limits
$V_{CC}$	Positive Supply Voltage	+3.0 V to +3.6 V
$V_{SS}$	Negative Supply Voltage	0 V
$T_A$	Operating Ambient Temperature	-55 °C to 125 °C
$V_{IH}$	High Level Input Voltage	+2.0 V to $V_{CC} + 0.3 V$
$V_{IL}$	Low Level Input Voltage	-0.3 to + 0.8 V

### Truth Table:

CS	OE	WE	IO0-IO31	Mode	Power
H	X	X	High-Z	Power Down	Standby ( $I_{SB}$ , $I_{SB1}$ )
L	L	H	Data Out	Read	Active ( $I_{CC}$ )
L	X	L	Data In	Write	Active ( $I_{CC}$ )
L	H	H	High-Z	Selected, Output Disabled	Active ( $I_{CC}$ )