4x512Kx16 Static RAM CMOS, Module

Features

4x512Kx16 bit CMOS Static

Random Access Memory

- Access Times 70 thru 100ns
- Data Retention Function (EDI9F416512LP)
- TTL Compatible Inputs and Outputs
- Fully Static, No Clocks

High Density Packaging

- 80 Pin SIMM, No. 372

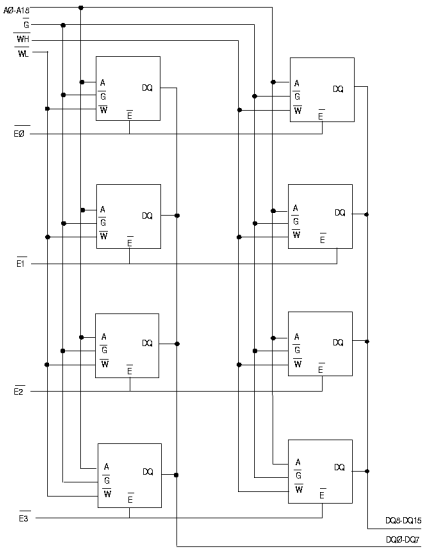
Single +5V (±10%) Supply Operation

The EDI9F416512C is a 32Megabit CMOS Static RAM based on eight 512Kx8 Static RAMs mounted on a multi-layered epoxy laminate (FR-4) substrate.
A low power version with data retention (EDI9F416512LP) is also available.
All inputs and outputs are TTL compatible and operate from a single +5V supply. Fully asynchronous, the EDI9F416512C requires no clocks or refreshing for operation.

Pin Configurations and Block Diagram

VSS	1			A11	41
VCC	2			A10	42
NC	3			A9	43
$\overline{G}$	4			A8	44
$\overline{WH}$	5			A7	45
$\overline{WL}$	6			A6	46
NC	7			A5	47
NC	8			A6	48
NC	9			A3	49
NC	10			A2	50
NC	11			A1	51
NC	12			AØ	52
NC	13			VSS	53
NC	14			VSS	54
NC	15			DQ15	55
NC	16			DQ14	56
NC	17			DQ13	57
NC	18			DQ12	58
NC	19			DQ11	59
NC	20			DQ10	60
$\overline{E3}$	21			DQ9	61
$\overline{E2}$	22			DQ8	62
$\overline{E1}$	23			DQ7	63
$\overline{EO}$	24			DQ6	64
VSS	25			DQ5	65
NC	26			DQ4	66
NC	27			DQ3	67
NC	28			DQ2	68
NC	29			DQ1	69
NC	30			DQØ	70
NC	31			NC	71
NC	32			VCC	72
NC	33			NC	73
A18	34			VSS	74
A17	35			NC	75
A16	36			VSS	76
A15	37			VSS	77
A14	38			NC	78
A13	39			NC	79
A12	40			VSS	80

AØ-A18	Address Inputs
$\overline{E}$Ø-$\overline{E3}$	Chip Enable
$\overline{G}$	Output Enables
$\overline{WH}$-$\overline{WL}$	Write Enables
DQØ-DQ15	Data Input/Output
VCC	Supply 5 Volts
VSS	Ground
NC	No Connect



Absolute Maximum Ratings*

Voltage on any pin relative to VSS	-0.5V to 7.0V
Operating Temperature TA (Ambient)	
Commercial	0°C to +70°C
Industrial	-40°C to +85°C
Storage Temperature	
Plastic	-55°C to +125°C
Power Dissipation	1 Watt
Output Current.	20 mA

*Stress greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions greater than those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended DC Operating Conditions

Parameter	Sym	Min	Typ	Max	Units
Supply Voltage	VCC	4.5	5.0	5.5	V
Supply Voltage	VSS	0	0	0	V
Input High Voltage	VIH	2.2	--	6.0	V
Input Low Voltage	VIL	-0.3	--	0.8	V

AC Test Conditions

Input Pulse Levels	VSS to 3.0V
Input Rise and Fall Times	5ns
Input and Output Timing Levels	1.5V
Output Load 70ns	1TTL = 30pF
85-120ns	1TTL, CL =100pF

(note: For TEHQZ,TGHQZ and TWLQZ, CL = 5pF)

DC Electrical Characteristics

Parameter	Sym	Conditions		Min	Typ*	Max	Units
Operating Power Supply Current	ICC1	$\overline{W}$, $\overline{E}$ = VIL, II/O = 0mA, Min Cycle		--	100	158	mA
Standby (TTL) Power Supply Current	ICC2	$\overline{E} \geq$ VIH, VIN $\leq$ VIL VIN $\geq$ VIH		--	5	35	mA
Full Standby Power Supply Current CMOS	ICC3	$\overline{E} \geq$ VCC-0.2V VIN $\geq$ VCC-0.2V or VIN $\leq$ 0.2V	C	--		25	mA
			LP	--		150	µA
Input Leakage Current	ILI	VIN = 0V to VCC		--	--	±10	µA
Output Leakage Current	ILO	V I/O = 0V to VCC		--	--	±10	µA
Output High Voltage	VOH	IOH =-1.0mA		2.4	--	--	V
Output Low Voltage	VOL	IOL = 2.1mA		--	--	0.4	V

Truth Table

$\overline{G}$	$\overline{E}$	$\overline{W}$	Mode	Output	Power
X	H	X	Standby	High Z	ICC2, ICC3
H	L	H	Output Deselect	High Z	ICC1
L	L	H	Read	DOUT	ICC1
X	L	L	Write	DIN	ICC1

Capacitance

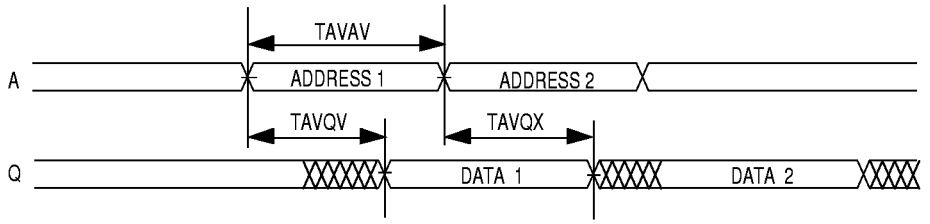
(f=1.0MHz, VIN=VCC or VSS)

Parameter	Sym	Max	Unit
Address Lines	CI	60	pF
Data Lines	CD/Q	50	pF
Chip Enable Line	CC	25	pF
Write and Output Enable Lines	CW	60	pF

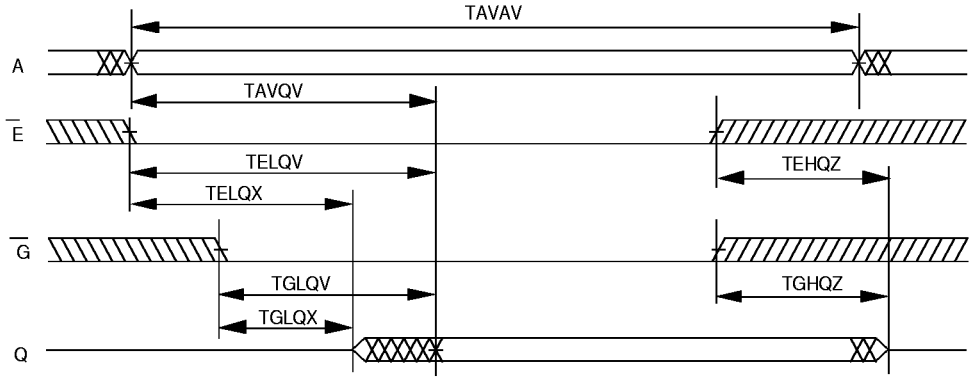
AC Characteristics Read Cycle

	Symbol		70ns		85ns		100ns		
Parameter	JEDEC	Alt.	Min	Max	Min	Max	Min	Max	Units
Read Cycle Time	TAVAV	TRC	70		85		100		ns
Address Access Time	TAVQV	TAA		70		85		100	ns
Chip Enable Access Time	TELQV	TACS		70		85		100	ns
Chip Enable to Output in Low Z (1)	TELQX	TCLZ	5		5		5		ns
Chip Disable to Output in High Z (1)	TEHQZ	TCHZ		30		35		40	ns
Output Hold from Address Change	TAVQX	TOH	3		3		3		ns
Output Enable to Output Valid	TGLQV	TOE		40		45		50	ns
Output Enable to Output in Low Z (1)	TGLQX	TOLZ	0		0		0		ns
Output Disable to Output in High Z(1)	TGHQZ	TOHZ		30		35		40	ns

Read Cycle 1 - $\overline{W}$ High, $\overline{G}$, $\overline{E}$ Low



Read Cycle 2 - $\overline{W}$ High

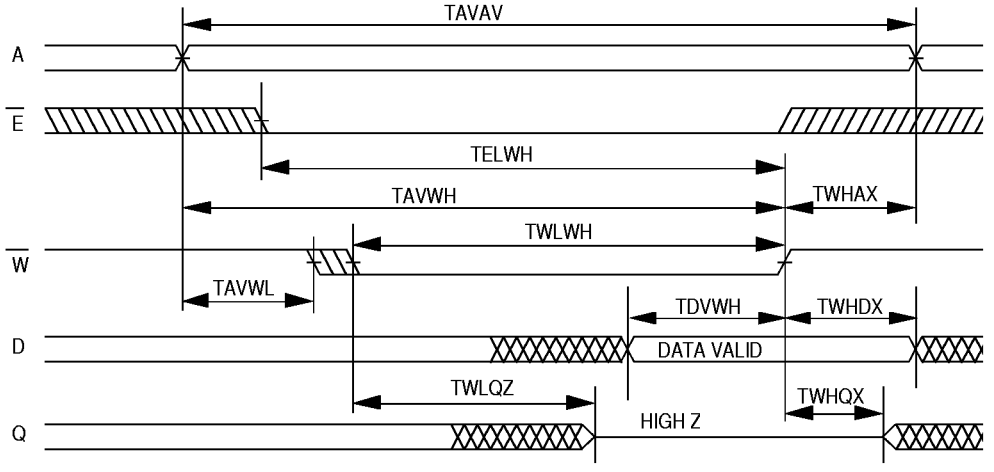


AC Characteristics Write Cycle

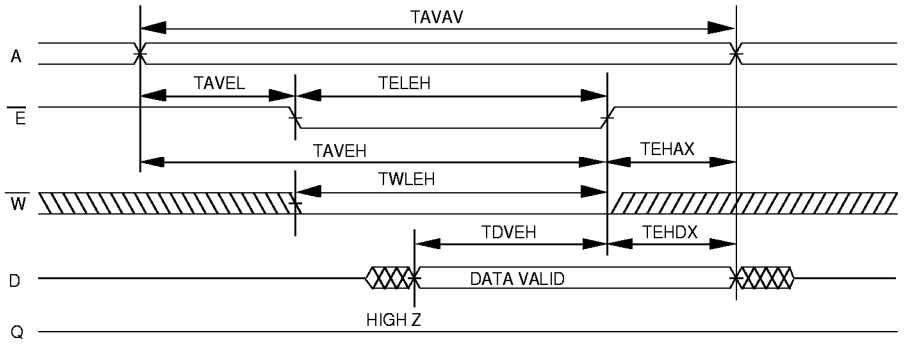
Parameter	Symbol JEDEC	Symbol Alt.	70ns Min	70ns Max	85ns Min	85ns Max	100ns Min	100ns Max	Units
Write Cycle Time	TAVAV	TWC	70		85		100		ns
Chip Enable to End of Write	TELWH	TCW	65		70		80		ns
	TELEH	TCW	65		70		80		ns
Address Setup Time	TAVWL	TAS	0		0		0		ns
	TAVEL	TAS	0		0		0		ns
Address Valid to End of Write	TAVWH	TAW	65		70		80		ns
	TAVEH	TAW	65		70		80		ns
Write Pulse Width	TWLWH	TWP	65		70		80		ns
	TWLEH	TWP	65		70		80		ns
Write Recovery Time	TWHAX	TWR	0		0		0		ns
	TEHAX	TWR	0		0		0		ns
Data Hold Time	TWHDX	TDH	0		0		0		ns
	TEHDX	TDH	0		0		0		ns
Write to Output in High Z (1)	TWLQZ	TWHZ	0	30	0	35	0	40	ns
Data to Write Time	TDVWH	TDW	30		35		40		ns
	TDVEH	TDW	30		35		40		ns
Output Active from End of Write (1)	TWHQX	TWLZ	5		5		5		ns

Note 1: Parameter guaranteed, but not tested. *Advance Information

Write Cycle 1 - $\overline{W}$ Controlled



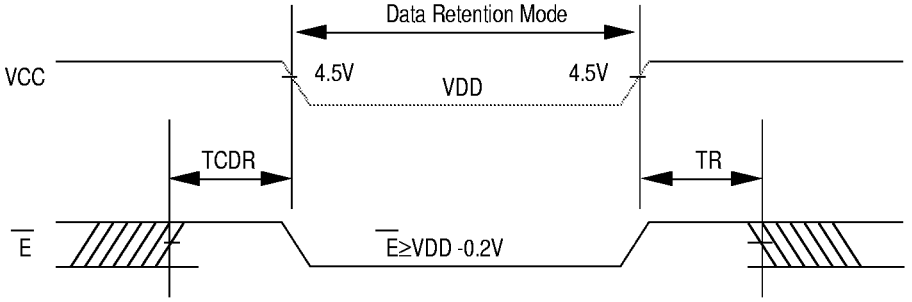
Write Cycle 2 - $\overline{E}$ Controlled



Data Retention Characteristics

Characteristic	Sym	Test Conditions	VDD	Min	Typ	Max	Unit
Data Retention Voltage	VDD	VDD = 0.2V		2	--		V
Data Retention Quiescent Current	ICCDR	E ≥ VDD -0.2V					
		VIN ≥ VDD -0.2V	3V	--	8	100	µA
Chip Disable to Data Retention Time(1)	TCDR	or VIN ≤ 0.2V		0	--	--	ns
Operation Recovery Time (1)	TR			5	--	--	ms

Data Retention - $\overline{E}$ Controlled



Ordering Information

Part Number	Speed (ns)	Package No.
Standard Power		
EDI9F416512C70BNC	70	372
EDI9F416512C85BNC	85	372
EDI9F416512C100BNC	100	372
Low Power		
EDI9F416512LP70BNC	70	372
EDI9F416512LP85BNC	85	372
EDI9F416512LP100BNC	100	372

Note: To order an Industrial grade product substitute the letter C in the Suffix with the letter I, eg. EDI9F416512C70BNC becomes EDI9F416512C70BNI.

Package Description

Package No. 372
80 Lead SIMM Angled