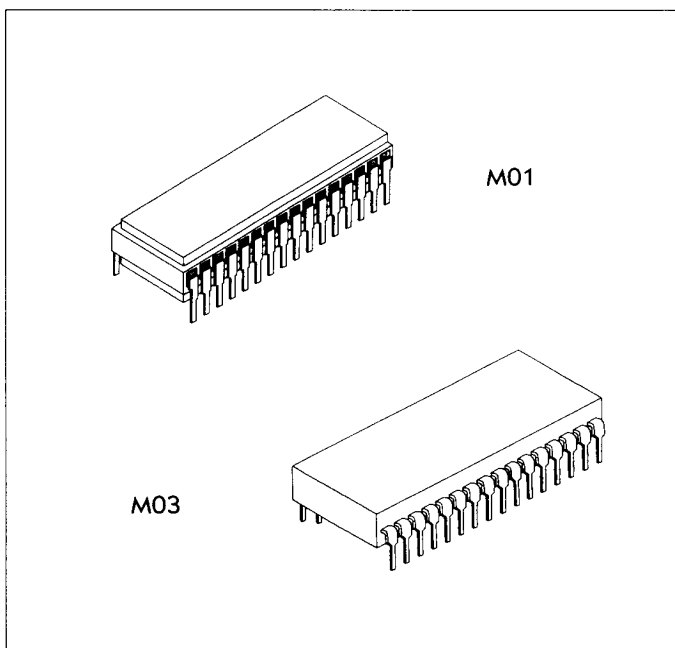


DESCRIPTION

The ELMO EMC04MS08 is a 524,288-word x 8-bit high speed CMOS static RAM module suitable for use in low power and high speed applications. It is available in several package and speed options, and operates from a single +5V supply.

FEATURES

- ❖ 524,288-word x 8-bit Organization
- ❖ Access Times of 45, 55, 70 or 100 ns
- ❖ Low Power Operation:
 - Standby: 15mW (Typ.)
 - Operating: 325mW (Typ.)
- ❖ Single +5V ($\pm 10\%$) Power Supply
- ❖ TTL Compatible Inputs and Outputs
- ❖ Fully Static Operation
- ❖ Available in MIL (-55 to +125°C) or Commercial (0 to +70°C) Temp. Range
- ❖ Package Styles:
 - 32 Pin 600-mil Sidebrazed DIP (JEDEC)
 - 32 Pin 600-mil Plastic DIP (JEDEC)



PACKAGE/SPEED OPTIONS

Package: 32 Pin 600-mil Sidebrazed DIP Module

Part Number	Speed
EMC04MS08M01-045D	45ns
-055D	55ns
-070D	70ns
-100D	100ns

Package: 32 Pin 600-mil Plastic DIP Module

Part Number	Speed
EMC04MS08M03-045C	45ns
-055C	55ns
-070C	70ns
-100C	100ns

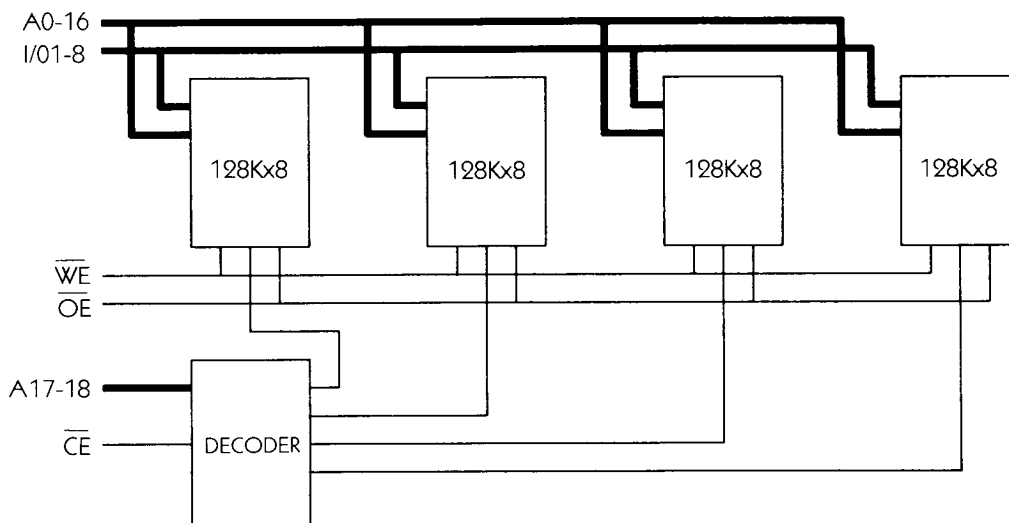
PIN CONFIGURATION

A18	1	32	VCC
A16	2	31	A15
A14	3	30	A17
A12	4	29	WE
A7	5	28	A13
A6	6	27	A8
A5	7	26	A9
A4	8	25	A11
A3	9	24	OE
A2	10	23	A10
A1	11	22	CE
A0	12	21	I/O8
I/O1	13	20	I/O7
I/O2	14	19	I/O6
I/O3	15	18	I/O5
GND	16	17	I/O4

PIN NAMES

A0 to A18	Address Input
I/O1 to I/O8	Data Input/Output
CE	Chip Enable
WE	Write Enable
OE	Output Enable
VCC	+5V Power Supply
GND	Ground
NC	No Connect

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage	Vcc	-0.5 to +7.0	V
Input Voltage	Vin	-0.5 to Vcc+0.5	V
Input and Output Voltage	Vi/o	-0.5 to Vcc+0.5	V
Allowable Power Dissipation	Pd	1.0	W
Operating Temperature: Mil	Topr	-55 to +125	°C
Comm.		0 to +70	°C
Storage Temperature	Tstg	-65 to +150	°C

TRUTH TABLE

CE	OE	WE	Mode	I/O1-8	Vcc Current
H	X	X	Not Selected	High Z	ISB1, 1SB2
L	H	H	Output Disable	High Z	ICC
L	L	H	Read	Data Out	ICC
L	X	L	Write	Data In	ICC

DC OPERATING CONDITIONS (Ta=Topr.)

Item	Symbol	Min	Typ.	Max.	Unit
Supply Voltage	Vcc	4.5	5.0	5.5	V
Input High Voltage	VIH	2.2		Vcc+0.3	V
Input Low Voltage	VIL	-0.3		0.8	V

DC OPERATING CHARACTERISTICS (V_{CC}= 5V±10%, T_a=Topr.)

Item	Symbol	Test Condition	Min.	Typ.	Max..	Unit
Input Leakage Current	IIL	V _{IN} =GND or V _{CC}	-10		10	uA
Output Leakage Current	IOL	V _{I/O} =GND or V _{CC} , $\overline{CE}$ =V _{IH} or $\overline{OE}$ =V _{IH} or $\overline{WE}$ =V _{IL}	-10		10	uA
Average Operating Current	ICC	Min. Cycle, I _{out} =0mA		65	140	mA
Standby Current	ISB1	$\overline{CE}$ ≥V _{CC} -0.2V, V _{IN} ≥V _{CC} -0.2V or V _{IN} ≤0.2V		3	5	mA
	ISB2	$\overline{CE}$ =V _{IH} , V _{IN} =V _{IL} or V _{IH}			40	mA
Output High Voltage	VOH	I _{OH} =-4.0mA	2.4			V
Output Low Voltage	VOL	I _{OL} = 8.0mA			0.4	V

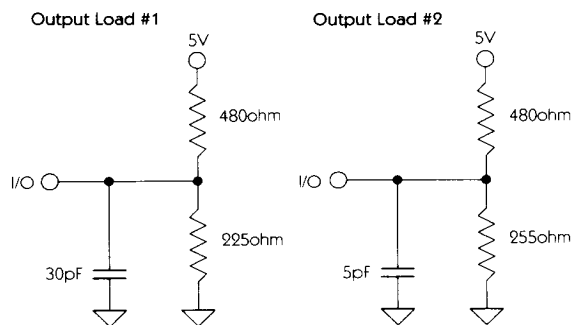
I/O CAPACITANCE (T_a=25°C, f=1MHz)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input Capacitance	C _{IN}	V _{IN} =0V		35	50	pF
I/O Capacitance	C _{I/O}	V _{I/O} =0V		35	50	pF

AC CHARACTERISTICS

AC Test Conditions (V_{CC}=5V±10%, T_a=Topr.)

Item	Condition
Input Pulse High Level	V _{IH} =3.0V
Input Pulse Low Level	V _{IL} =0V
Input Pulse Rise Time	t _r =5ns
Input Pulse Fall Time	t _f =5ns
Input and Output Timing Reference Level	1.5V
Output Load	Fig.1



Note: Load capacitance includes scope and jig capacitances.

Figure1

READ CYCLE

Item	Symbol	-45		-55		-70		-100		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Read Cycle Time	TAVAV	45		55		70		100		ns
Address Access tTime	TAVQV		45		55		70		100	ns
Chip Enable Access Time	TELQV		45		55		70		100	ns
Output Enable to Output Valid	TGLQV		25		30		45		50	ns
Chip Enable to Output in High Z (1)	TEHQZ		20		25		30		35	ns
Chip Enable to Output in Low Z (1)	TELQX	15		15		15		20		ns
Chip Disable to Output in High Z (1)	TGHQZ		20		25		30		35	ns
Output Enable to Output in Low Z (1)	TGLQX	5		5		5		5		ns
Output Hold from Address Change	TAVQX	5		5		5		15		ns

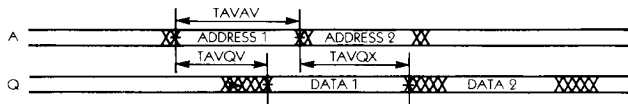
WRITE CYCLE

Item	Symbol	-45		-55		-70		-100		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Write Cycle Time	TAVAV	45		55		70		100		ns
Address Valid to End of Write	TAVWH	40		50		60		70		ns
Chip Enable to End of Write	TELWH	40		50		60		70		ns
	TWLEH	40		50		60		70		ns
Data to Write Time Overlap	TDVWH	20		25		30		35		ns
	TDVEH	20		25		30		35		ns
Data Hold Time from Write	TWHDX	0		0		0		0		ns
	TEHDX	10		10		15		20		ns
Write Pulse Width	TWLWH	35		40		55		70		ns
	TELEH	35		40		55		70		ns
Address Set-Up Time	TAVWL	10		10		10		10		ns
	TAVEL	0		0		0		0		ns
Write Recovery Time	TWHAX	5		5		5		5		ns
	TEHAX	5		5		5		5		ns
Write to Output in High Z (1)	TWHQX		20		20		30		30	ns
Output Active from End of Write	TWHQX	5		5		10		10		ns

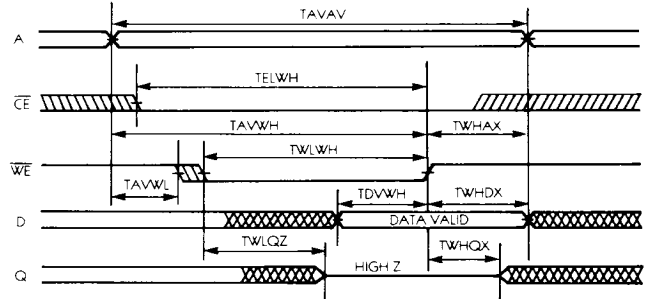
Note 1: Parameters tested on a sample basis only.

TIMING WAVEFORM

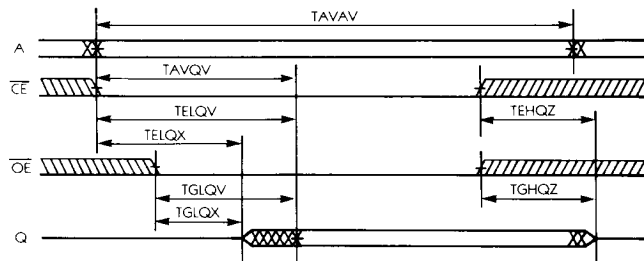
❖ Read Cycle (1): $\overline{CE}=\overline{OE}=V_{IL}$, $\overline{WE}=V_{IH}$



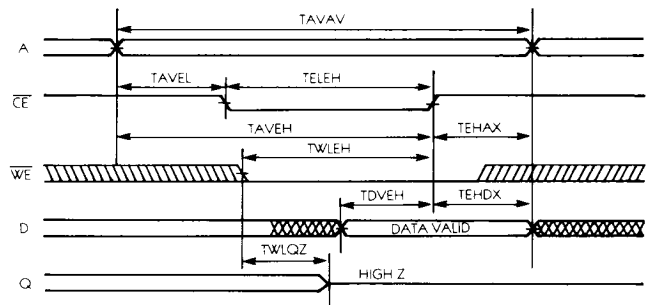
❖ Write Cycle (1): $\overline{WE}$ control



❖ Read Cycle (2): $\overline{WE}=V_{IH}$

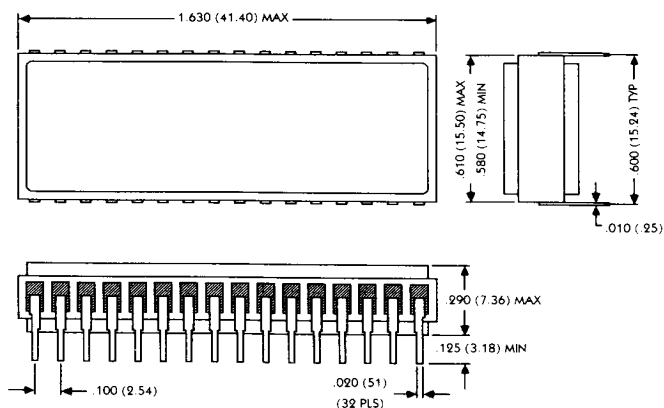


❖ Write Cycle (2): $\overline{CE}$ control

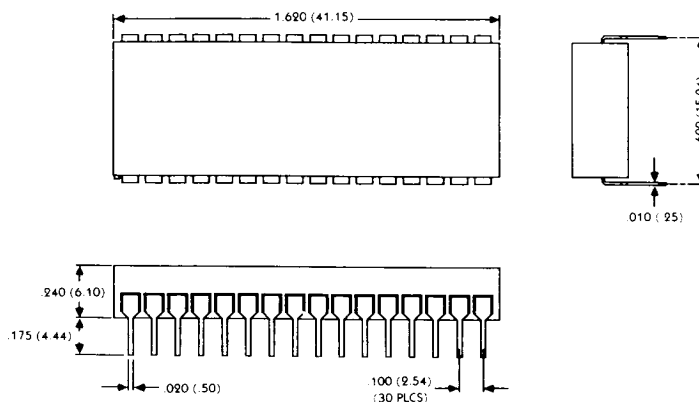


PACKAGE OUTLINE

Dimensions in Inches (Millimeters)



Package Type MO1, 32 Lead .600" Sidebrazed DIP



Package Type MO3, 32 Lead .600" Plastic DIP

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