



# MX23C2048 PRELIMINARY

## 262,144 x 8-Bit CMOS ROM

T-46-13-15

### FEATURES

- 262,144 x 8 organization
- Single +5V Supply
- Fast access time 250ns (max)
- Totally static operation
- Completely TTL compatible
- Operating current 60ma
- Standby current 200µa
- 32-Pin DIP Pinout
- Output enable function

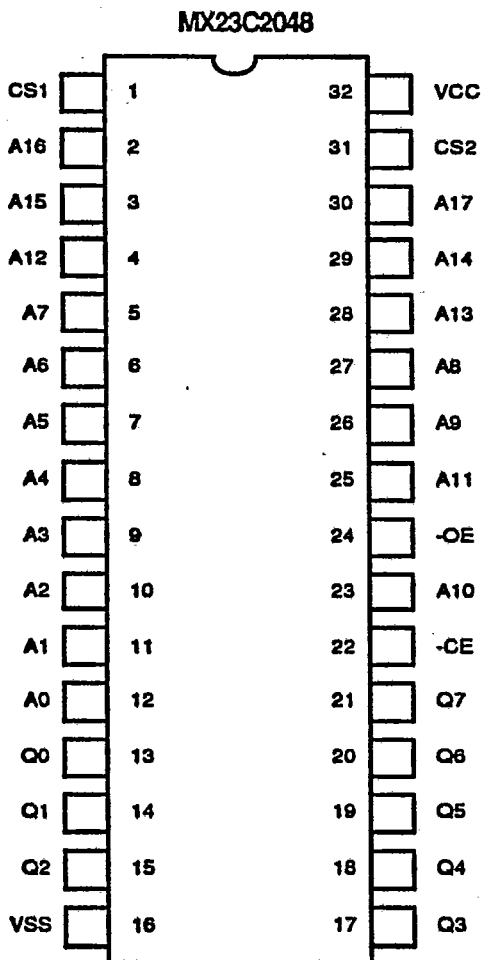
### DESCRIPTION

The MX23C2048 is a 5V only, 2,097,152-bit, Read Only Memory. It is organized as 262,144 words by 8 bits per word, operates from a single +5-volt supply, has a static standby mode, and has an access time of 250ns. It is designed to be compatible with all microprocessors and similar applications in which high performance, large bit storage and simple interfacing are important design considerations.

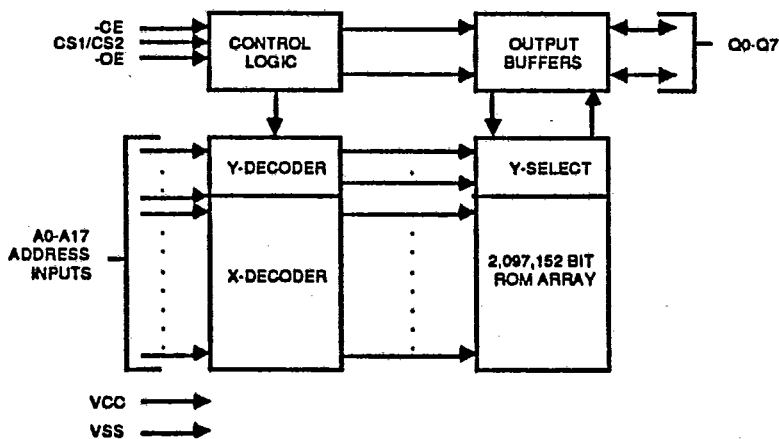
The MX23C2048 offers automatic power-down, with power-down controlled by the chip enable(-CE) Input. When -CE goes high, the device automatically powers down and remains in a low-power standby mode as long as -CE remains high.

Pin 1 may also be programmed either active HIGH or LOW in order to eliminate bus contention in multiple-bus microprocessor systems.

### PIN CONFIGURATIONS



### Block Diagram



8004-8454

# MX23C2048

## ABSOLUTE MAXIMUM RATINGS

RATING	VALUE
Ambient Operating Temperature	0°C to 70°C
Storage Temperature	-65°C to 125°C
Applied Input Voltage	-0.5V to 7.0V
Applied Output Voltage	-0.5V to 7.0V
VCC to Ground Potential	-0.5V to 7.0V
Power Dissipation	1.0W

**Note:**

Stresses 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 above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended period may affect reliability.

NOTICE: Specifications contained within the following tables are subject to change.

## DC CHARACTERISTICS: TA = 0°C to 70°C, VCC = 5V ± 10%

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT	CONDITIONS
VOH	Output High Voltage	2.4			V	IOH = -1.0mA
VOL	Output Low Voltage			0.4	V	IOL = 2.1mA
VIH	Input High Voltage	2.2		VCC+1	V	
VIL	Input Low Voltage	-0.1		0.8	V	
ILI	Input Leakage Current			10	μA	VIN = 0 TO 5.5V
ILO	Output Leakage Current			10	μA	VOUT = 0 TO 5.5V
ICC3	Power-Down Supply Current			200	μA	-CE = VCC ± 0.3V
ICC2	Standby Supply Current			1.5	mA	-CE = VIH
ICC1	Operating Supply Current			60	mA	Note 1

## CAPACITANCE TA = 25°C, f = 1.0 MHz (Note 2)

Symbol	Parameter	Min.	Max.	Units	Conditions
CIN	Input Capacitance		15	pF	VIN = 0V
COUT	Output Capacitance		25	pF	VOUT = 0V

**MX23C2048****AC CHARACTERISTICS:** TA = 0°C to 70°C, VCC = 5V ± 10%

Symbol	Parameter	23C2048		23C2048A		23C2048B		Units	Conditions
		Min.	Max.	Min.	Max.	Min.	Max.		
tCYC	Cycle Time	150		200		250		ns	
tAA	Address Access Time		150		200		250	ns	
tOH	Output Hold Time After Address Change	10		10		10		ns	
tACE	Chip Enable Access Time		150		200		250	ns	
tAOE	Output Enable/Chip Select Access Time		75		100		125	ns	
tLZ	Output Low Z Delay	10		10		10		ns	Note 3
tHZ	Output High Z Delay		85		110		140	ns	Note 4
tPU	Power-Up Time	0		0		0		ns	
tPD	Power-Down Time		85		110		140	ns	

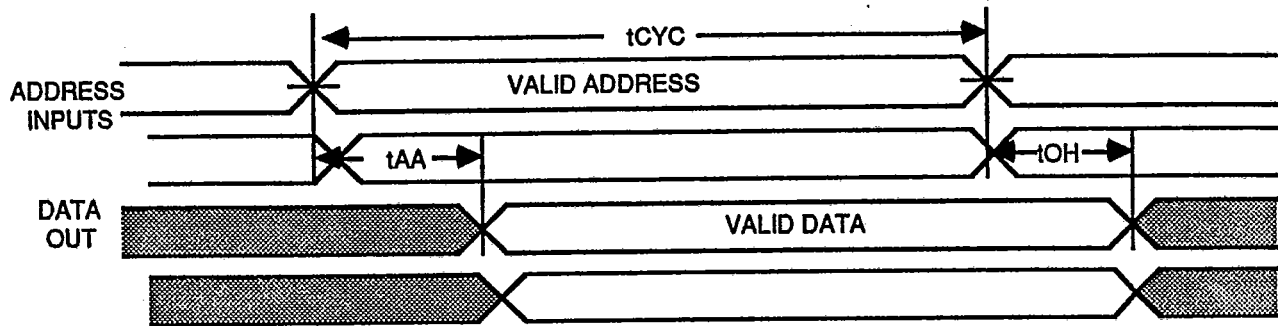
**Notes:**

1. Measured with device selected at f = 5 MHz and output unloaded.
2. This parameter is periodically sampled and is not 100% tested.
3. Output low-impedance delay (tLZ) is measured from -CE going low.
4. Output high-impedance delay (tHZ) is measured from -CE going high.

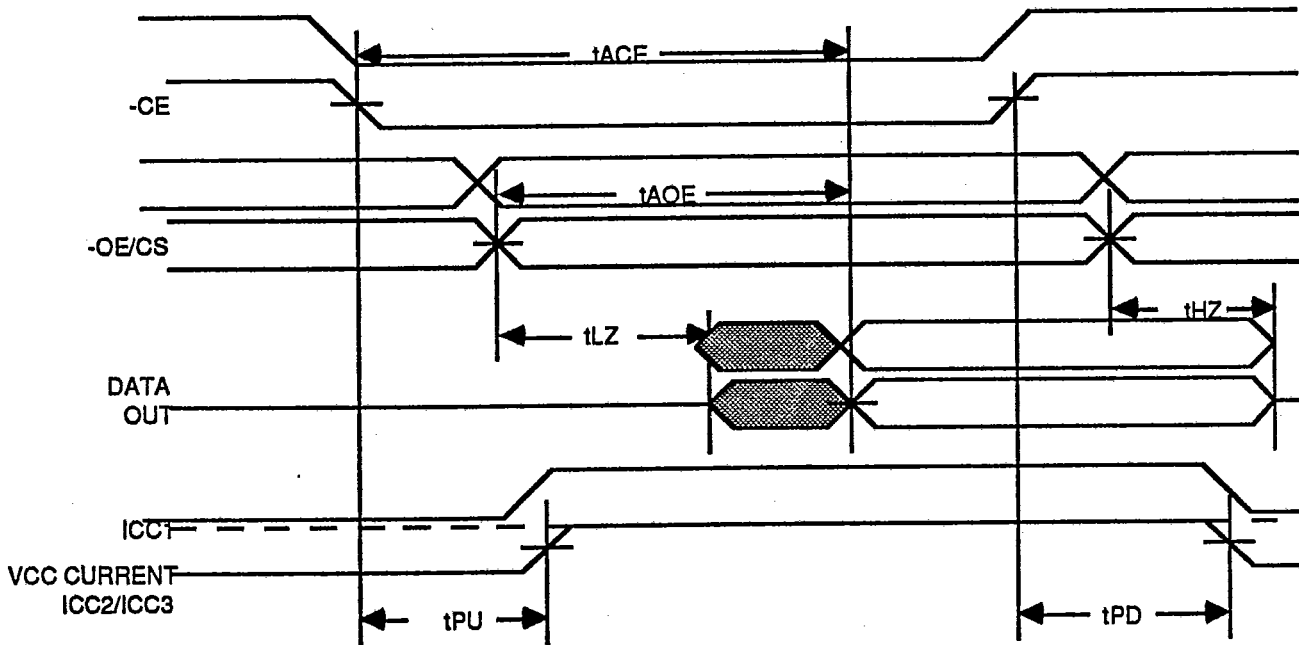
# MX23C2048

## TIMING DIAGRAMS

### PROPAGATION DELAY FROM ADDRESS (-CE/-OE/CS = ACTIVE)



### PROPAGATION DELAY FROM CHIP ENABLE (ADDRESS VALID)

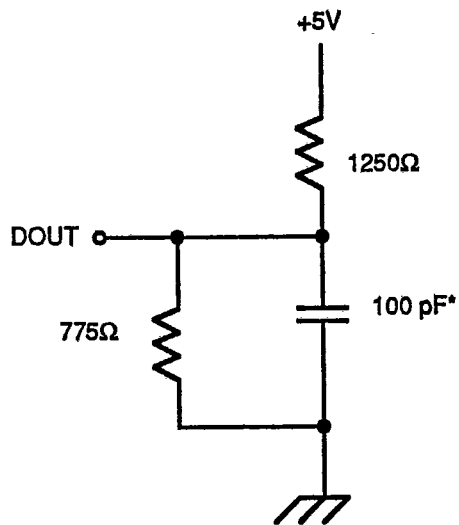


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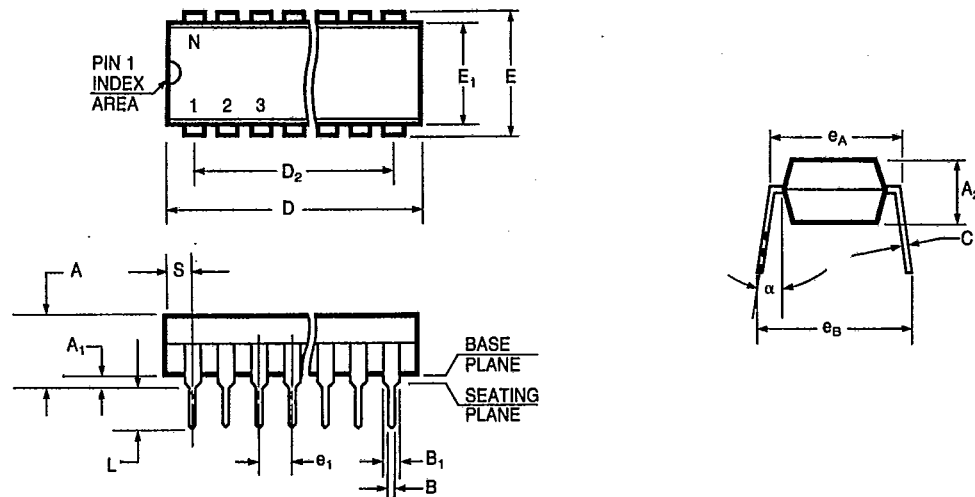
## AC TEST CONDITIONS

Input Pulse Levels	0.4 V to 2.4 V
Input Rise and Fall Times	10 ns
Input Timing Level	1.5 V
Output Timing Level	0.8 V and 2.0V
Output Load	See Figure 1

Figure 1. Output Load Circuit



\* Including scope and jig.



## PLASTIC DUAL-IN-LINE PACKAGES (PDIP)

16, 18, 20, 24, 28 LEAD 300 MIL WIDE AND 24, 28, 32, 40 LEAD 600 MIL WIDE

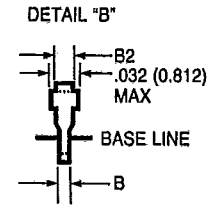
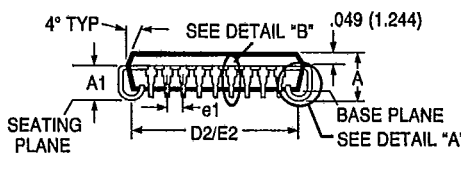
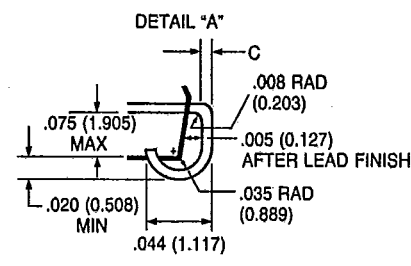
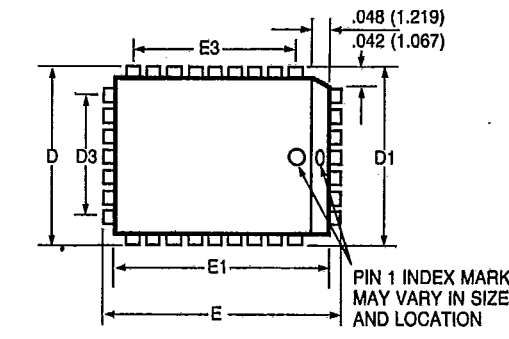
LEADS WIDTH	24 .300		24 .500		28 .300		28 .600		32 .600		40 .600	
SYMBOL	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
A	.150 (3.81)	.200 (5.08)	.150 (3.81)	.200 (5.08)	.150 (3.81)	.200 (5.08)	.150 (3.81)	.200 (5.08)	.150 (3.81)	.200 (5.08)	.150 (3.81)	.200 (5.08)
A1	.015 (.381)	.070 (1.78)	.015 (.381)	.070 (1.78)	.015 (.381)	.070 (1.78)	.015 (.381)	.070 (1.78)	.015 (.381)	.070 (1.78)	.015 (.381)	.070 (1.78)
A2	.125 (3.18)	.155 (3.94)	.135 (3.43)	.165 (4.19)	.125 (3.18)	.155 (3.94)	.135 (3.43)	.165 (4.19)	.135 (3.43)	.165 (4.19)	.135 (3.43)	.165 (4.19)
B	.015 (.381)	.023 (.584)	.015 (.381)	.023 (.584)	.015 (.381)	.023 (.584)	.015 (.381)	.023 (.584)	.015 (.381)	.023 (.584)	.015 (.381)	.023 (.584)
B1	.060 (1.52)	TYP	.060 (1.52)	TYP	.060 (1.52)	TYP	.060 (1.52)	TYP	.050 (1.27)	TYP	.060 (1.52)	TYP
C	.008 (.203)	.015 (.381)	.008 (.203)	.015 (.381)	.008 (.203)	.015 (.381)	.008 (.203)	.015 (.381)	.008 (.203)	.015 (.381)	.008 (.203)	.015 (.381)
D	1.230 (31.24)	1.270 (32.26)	1.230 (31.24)	1.280 (32.51)	1.345 (34.16)	1.355 (34.42)	1.390 (35.31)	1.470 (37.34)	1.640 (41.66)	1.660 (42.16)	2.030 (51.56)	2.080 (52.83)
D2	1.100 (27.94)	TYP	1.100 (27.94)	TYP	1.300 (33.02)	TYP	1.300 (33.02)	TYP	1.400 (35.56)	TYP	1.900 (48.26)	TYP
E	.300 (7.62)	.320 (8.13)	.600 (15.24)	.620 (15.75)	.300 (7.62)	.325 (8.26)	.600 (15.24)	.620 (15.75)	.600 (15.24)	.620 (15.75)	.600 (15.24)	.620 (15.75)
E1 (4)	.240 (6.10)	.280 (7.11)	.520 (13.21)	.560 (14.22)	.270 (6.86)	.290 (7.37)	.520 (13.21)	.560 (14.22)	.520 (13.21)	.560 (14.22)	.520 (13.21)	.560 (14.22)
e1 (3)	.100 (2.54)	TYP	.100 (2.54)	TYP	.100 (2.54)	TYP	.100 (2.54)	TYP	.100 (2.54)	TYP	.100 (2.54)	TYP
eA(3)	.300 (7.62)	TYP	.600 (15.24)	TYP	.300 (7.62)	TYP	.600 (15.24)	TYP	.600 (15.24)	TYP	.600 (15.24)	TYP
eB (3)	.350 (8.89)	TYP	.650 (16.51)	TYP	.350 (8.89)	TYP	.650 (16.51)	TYP	.650 (16.51)	TYP	.650 (16.51)	TYP
L	.120 (3.05)	.140 (3.56)	.120 (3.05)	.140 (3.56)	.120 (3.05)	.140 (3.56)	.120 (3.05)	.140 (3.56)	.120 (3.05)	.140 (3.56)	.120 (3.05)	.140 (3.56)
N	24		24		28		28		32		40	
S	.040 (1.02)	.085 (2.16)	.040 (1.02)	.085 (2.16)	.020 (.508)	.030 (.762)	.040 (1.02)	.085 (2.16)	.040 (1.02)	.085 (2.16)	.040 (1.02)	.090 (2.29)
α (5)	0	15	0	15	0	15	0	15	0	15	0	15
Theta JA Cu: (6)			55		50		55		45		45	
°C/Watt AL42: (6)			110		105		110		105		105	

**NOTES:**

1. Refer to applicable symbol glossary.
2. All dimensions are in inches (mm).
3. e1, eA and eB apply for installing on a PC board.
4. D and E1 do not include mold flash.
5. α In degrees applies to spread of leads.



6. The Thermal Resistance, Theta JA, in °C/Watt, quoted above is for a 10,000 sq. mil die in still air and shown for both copper and alloy-42 frames. Values are approximate.
7. Lead frame material: alloy 42 or copper.
8. Lead finish: Matte tin or Sn/Pb solder.
9. Note: Call Manufacturer for dimensional information on 16, 18, 20, 48 and 64 lead packages.



## PLASTIC LEADED CHIP CARRIERS (PLCC) 24, 32, 44, 68, AND 84 LEAD

LEADS 28 32 44 68 84

SYMBOL	28		32		44		68		84	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
A	.165 (4.19)	.180 (4.57)	.100 (2.54)	.140 (3.56)	.165 (4.19)	.180 (4.57)	.165 (4.19)	.200 (5.08)	.165 (4.19)	.200 (5.08)
A1	.090 (2.29)	.120 (3.05)	.060 (1.52)	.095 (2.41)	.090 (2.29)	.120 (3.05)	.090 (2.29)	.130 (3.30)	.090 (2.29)	.130 (3.30)
B	.013 (.330)	.021 (.533)	.013 (.330)	.021 (.533)	.013 (.330)	.021 (.533)	.013 (.330)	.021 (.533)	.013 (.330)	.021 (.533)
B2	.026 (.660)	.032 (.813)	.026 (.660)	.032 (.813)	.026 (.660)	.032 (.813)	.026 (.660)	.032 (.813)	.026 (.660)	.032 (.813)
C	.008 (.203)	.010 (.254)	.008 (.203)	.010 (.254)	.008 (.203)	.010 (.254)	.008 (.203)	.010 (.254)	.008 (.203)	.010 (.254)
D	.485 (12.32)	.495 (12.57)	.485 (12.32)	.495 (12.57)	.685 (17.40)	.695 (17.65)	.985 (25.02)	.995 (25.27)	1.185 (30.10)	1.195 (30.35)
D1	.450 (11.43)	.456 (11.58)	.447 (11.35)	.453 (11.51)	.650 (16.51)	.656 (16.66)	.950 (24.13)	.958 (24.33)	1.150 (29.21)	1.158 (29.41)
D2	.390 (9.91)	.430 (10.92)	.390 (9.91)	.430 (10.92)	.590 (14.99)	.630 (16.00)	.890 (22.61)	.930 (23.62)	1.090 (27.69)	1.130 (28.70)
D3	.300 (7.62)	REF	.300 (7.62)	REF	.500 (12.70)	REF	.800 (20.32)	REF	1.000 (25.40)	REF
E	.485 (12.32)	.495 (12.57)	.585 (14.86)	.595 (15.11)	.685 (17.40)	.695 (17.65)	.985 (25.02)	.995 (25.27)	1.185 (30.10)	1.195 (30.35)
E1	.450 (11.43)	.456 (11.58)	.547 (13.89)	.553 (14.05)	.650 (16.51)	.656 (16.66)	.950 (24.13)	.958 (24.33)	1.150 (29.21)	1.158 (29.41)
E2	.390 (9.91)	.430 (10.92)	.490 (12.45)	.530 (13.46)	.590 (14.99)	.630 (16.00)	.890 (22.61)	.930 (23.62)	1.090 (27.69)	1.130 (28.70)
E3	.300 (7.62)	REF	.400 (10.16)	REF	.500 (12.70)	REF	.800 (20.32)	REF	1.000 (25.40)	REF
e1	.050 (1.27)	TYP	.050 (1.27)	TYP	.050 (1.27)	TYP	.050 (1.27)	TYP	.050 (1.27)	TYP
N	28		32		44		68		84	
ND	7		7		11		17		21	
NE	7		9		11		17		21	
Theta JA (5) (°C/Watt)	45		45		45		45		45	

- NOTES:  
 1. Refer to applicable symbol glossary.  
 2. All dimensions are in inches (mm).  
 3. Controlling dimension Inch.  
 4. D1 and E1 do not include mold flash.



5. The Thermal Resistance, Theta JA, in °C/Watt, quoted above is for a 10,000 sq. mil die in still air with copper frame. Values are approximate.  
 6. Lead frame material: copper.  
 7. Lead finish: Matte tin or Sn/Pb solder dip.  
 8. Note: Call Manufacturer for dimensional information on 20, 52 and 84 lead packages.