



# MX23C3210

## 32M-BIT MASK ROM (8/16-BIT OUTPUT)

### FEATURES

- Bit organization
  - 4M x 8 (byte mode)
  - 2M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.)
- Current
  - Operating: 60mA
  - Standby: 100uA
- Supply voltage
  - 5V±10%
- Package
  - 44 pin SOP (500mil)
  - 48 pin TSOP (20mm x 12mm)
  - 42 pin DIP (600 mil) (word mode)

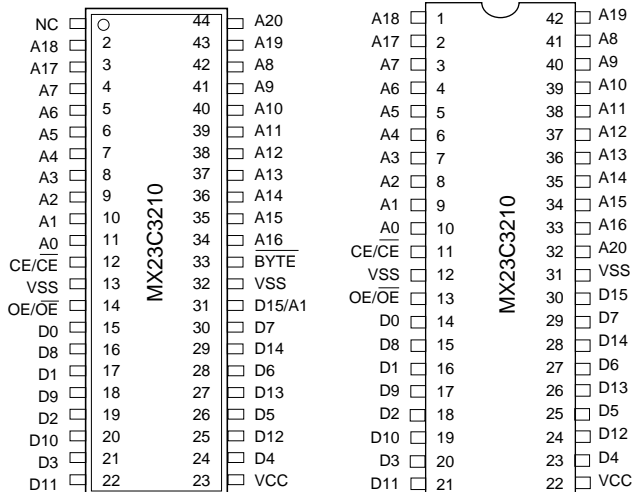
### ORDER INFORMATION

Part No.	Access Time	Package
MX23C3210MC-10	100ns	44 pin SOP
MX23C3210MC-12	120ns	44 pin SOP
MX23C3210MC-15	150ns	44 pin SOP
MX23C3210TC-10	100ns	48 pin TSOP
MX23C3210TC-12	120ns	48 pin TSOP
MX23C3210TC-15	150ns	48 pin TSOP
MX23C3210RC-10	100ns	48 pin TSOP (Reverse type)
MX23C3210RC-12	120ns	48 pin TSOP (Reverse type)
MX23C3210RC-15	150ns	48 pin TSOP (Reverse type)
MX23C3210PC-10	100ns	42 pin DIP
MX23C3210PC-12	120ns	42 pin DIP
MX23C3210PC-15	150ns	42 pin DIP

### PIN CONFIGURATION

#### 44 SOP

#### 42 DIP (For Word Mode Only)



### PIN DESCRIPTION

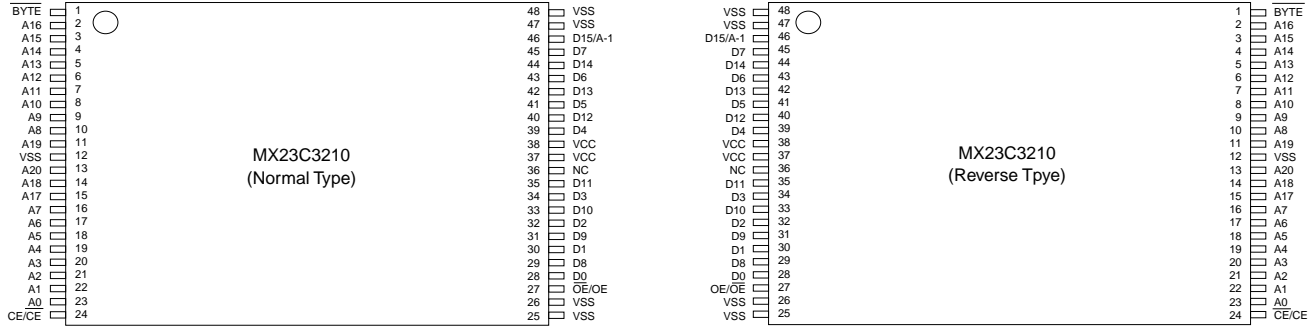
Symbol	Pin Function
A0~A20	Address Inputs
D0~D14	Data Outputs
D15/A-1	D15 (Word Mode)/ LSB Address (Byte Mode)
CE/CE	Chip Enable Input
OEOE	Output Enable Input
Byte	Word/ Byte Mode Selection
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

### MODE SELECTION

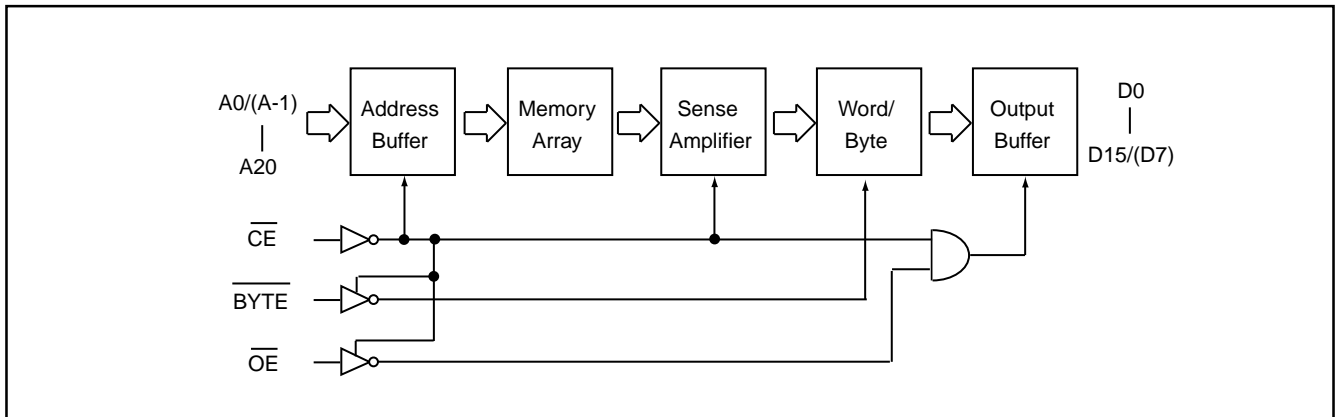
CE/CE	OE/OE	Byte	D15/A-1	D0~D7	D8~D15	Mode	Power
L/H	X	X	X	High Z	High Z	-	Stand-by
H/L	L/H	X	X	High Z	High Z	-	Active
H/L	H/L	H	Output	D0~D7	D8~D15	Word	Active
H/L	H/L	L	Input	D0~D7	High Z	Byte	Active

### 48 TSOP (Normal Type)

### 48 TSOP (Reverse Type)



### BLOCK DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	V <sub>IN</sub>	-0.5V to 7.0V
Ambient Operating Temperature	T <sub>opr</sub>	0°C to 70°C
Storage Temperature	T <sub>stg</sub>	-65°C to 125°C



## DC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 5V±10%)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	2.4V	-	IOH = -1.0mA
Output Low Voltage	VOL	-	0.4V	IOL = 2.1mA
Input High Voltage	VIH	2.2V	VCC+0.3V	
Input Low Voltage	VIL	-0.3V	0.8V	
Input Leakage Current	ILI	-	5uA	0V, VCC
Output Leakage Current	ILO	-	5uA	0V, VCC
Operating Current	ICC1	-	60mA	tRC = 100ns, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ = VIH
Standby Current (cmos)	ISTB2	-	100uA	$\overline{CE}$ > VCC-0.2V
Input Capacitance	CIN	-	10pF	Ta = 25°C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25°C, f = 1MHZ

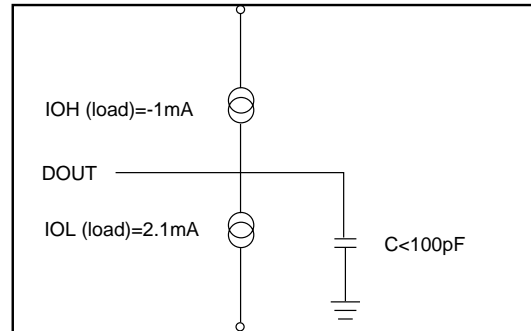
## AC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 5V±10%)

Item	Symbol	23C3210-10		23C3210-12		23C3210-15	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	100ns	-	120ns	-	150ns	-
Address Access Time	tAA	-	100ns	-	120ns	-	150ns
Chip Enable Access Time	tACE	-	100ns	-	120ns	-	150ns
Output Enable Time	tOE	-	50ns	-	60ns	-	70ns
Output Hold After Address	tOH	0ns	-	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	20ns	-	20ns

Note: Output high-impedance delay (tHZ) is measured from OE going high, and this parameter guaranteed by design over the full voltage and temperature operating range - not tested.

## AC Test Conditions

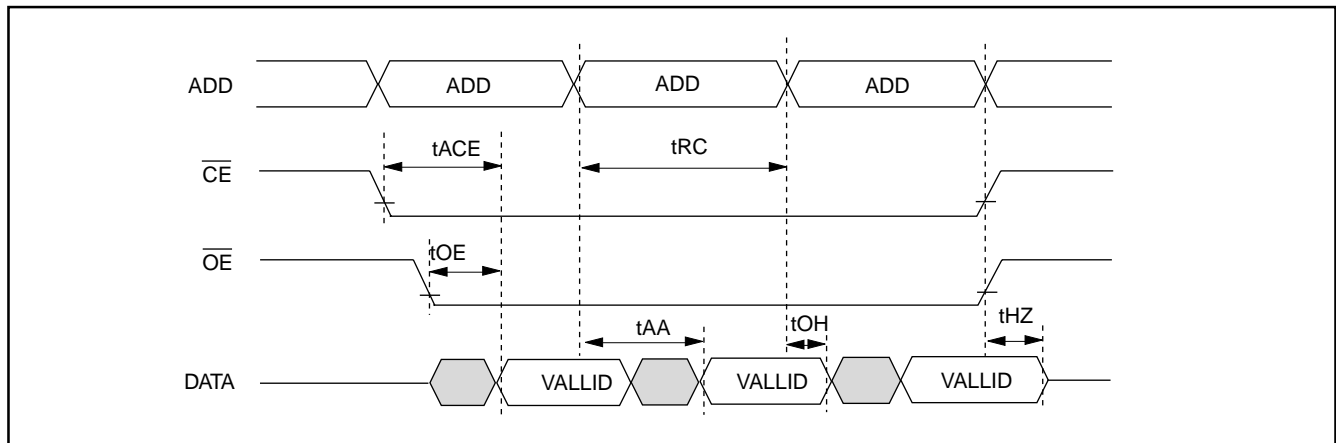
Input Pulse Levels	0.4V~2.4V
Input Rise and Fall Times	10ns
Input Timing Level	1.5V
Output Timing Level	0.8V and 2.0V
Output Load	See Figure



Note: No output loading is present in tester load board.  
 Active loading is used and under software programming control.  
 Output loading capacitance includes load board's and all stray capacitance.

## TIMING DIAGRAM

### RANDOM READ

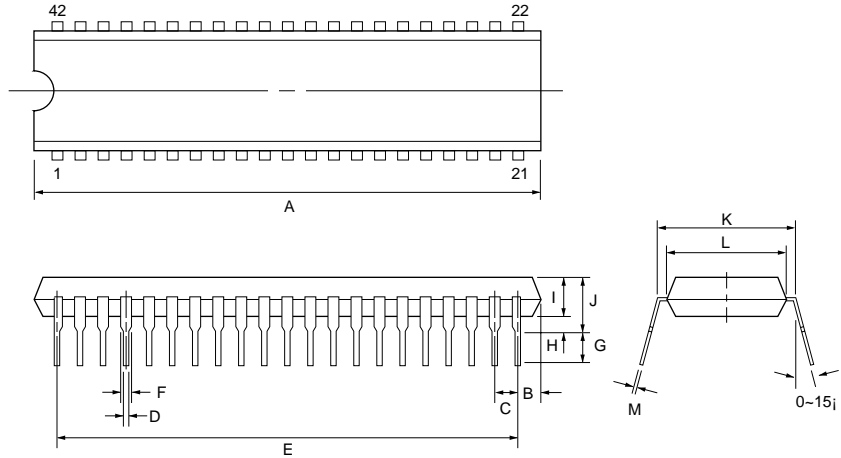


## PACKAGE INFORMATION

### 42-PIN PLASTIC DIP(600 mil)

ITEM	MILLIMETERS	INCHES
A	52.54 max.	2.070 max.
B	0.76 [REF]	.030 [REF]
C	2.54 [TP]	.100 [TP]
D	.46 [Typ.]	.018 [Typ.]
E	50.76	2.000
F	1.27 [Typ.]	.050 [Typ.]
G	3.30 ± .25	.130 ± .010
H	.51 [REF]	.020 [REF]
I	3.94 ± .25	.155 ± .010
J	5.33 max.	.210 max.
K	15.22 ± .25	.600 ± .010
L	13.97 ± .25	.550 ± .010
M	.25 [Typ.]	.010 [Typ.]

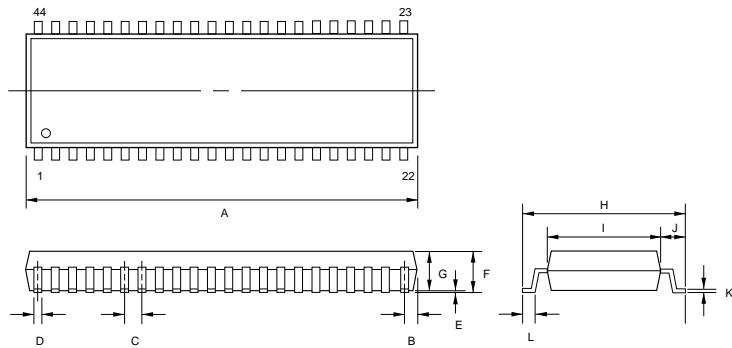
**NOTE:** Each lead centerline is located within .25 mm [.01 inch] of its true position [TP] at maximum material condition.



### 44-PIN PLASTIC SOP

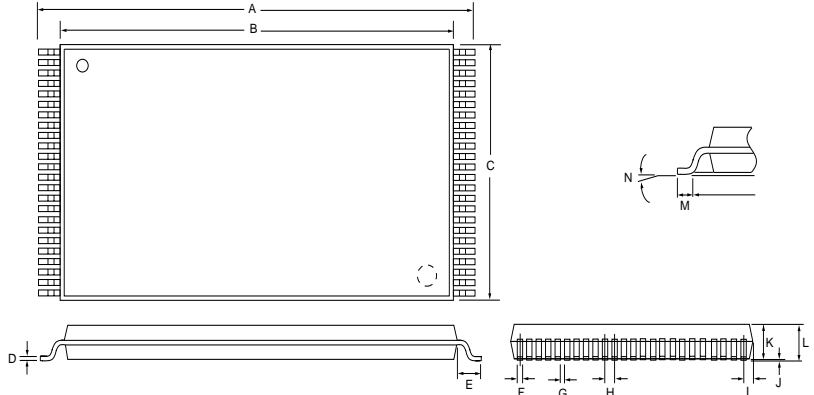
ITEM	MILLIMETERS	INCHES
A	28.70 max.	1.130 max.
B	1.10 [REF]	.043 [REF]
C	1.27 [TP]	.050 [TP]
D	.40 ± .10 [Typ.]	.016 ± .004 [Typ.]
E	.010 min.	.004 min.
F	3.00 max.	.118 max.
G	2.80 ± .13	.110 ± .005
H	16.04 ± .30	.631 ± .012
I	12.60	.496
J	1.72	.068
K	.15 ± .10 [Typ.]	.006 ± .004 [Typ.]
L	.80 ± .20	.031 ± .008

**NOTE:** Each lead centerline is located within .25 mm [.01 inch] of its true position [TP] at maximum material condition.



## 48-PIN PLASTIC TSOP

ITEM	MILLIMETERS	INCHES
A	20.0 ± .20	.787 ± .008
B	18.40 ± .10	.724 ± .004
C	12.20 max.	.480 max.
D	0.15 [Typ.]	.006 [Typ.]
E	.80 [Typ.]	.031 [Typ.]
F	.20 ± .10	.008 ± .004
G	.30 ± .10	.012 ± .004
H	.50 [Typ.]	.020 [Typ.]
I	.45 max.	.018 max.
J	0 ~ .20	0 ~ .008
K	1.00 ± .10	.039 ± .004
L	1.27 max.	.050 max.
M	.50	.020
N	0 ~ 5°	.500



**NOTE:** Each lead centerline is located within .25 mm [.01 inch] of its true position [TP] at maximum material condition.



**REVISION HISTORY**

Revision	Description	Page	Date
2.6	DC Characteristics: The input leakage current (ILI) is changed as 5uA instead of 10uA. The output leakage current (ILO) is changed as 5uA instead 10uA. The power down supply current (ISTB2) is changed as 100uA instead of 5uA.		
2.7	AC Characteristics: Added 100ns grade item, deleted 200ns grade item. The output enable time (tOE) is changed as 60ns instead of 70ns in 120ns grade item, and 70ns instead of 80ns grade item. The output high Z delay is changed as 20ns instead of 70ns.		MAR/25/1998
2.8	AC Characteristics: tOH 10ns --> 0ns	P3	FEB/01/1999



**MX23C3210**

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