



# MX23C6410

64M-BIT Mask ROM (8/16 Bit Output)  
For SOP and TSOP Packages

## FEATURES

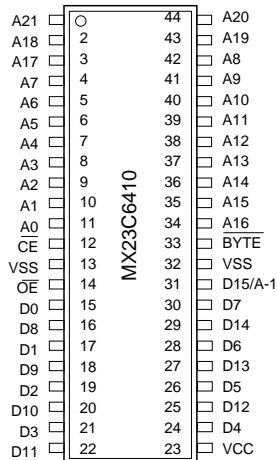
- Bit organization
  - 8M x 8 (byte mode)
  - 4M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.)
- Current
  - Operating: 70mA
  - Standby: 100uA (max.)
- Supply voltage
  - 5V±10%
- Package
  - 44 pin SOP (500 mil)
  - 48 pin TSOP (12mm x 20mm)

## ORDER INFORMATION

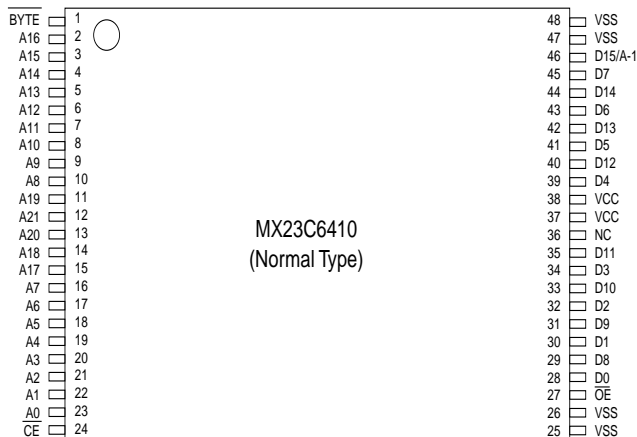
Part No.	Access Time	Package
MX23C6410MC-10	100ns	44 pin SOP
MX23C6410MC-12	120ns	44 pin SOP
MX23C6410MC-15	150ns	44 pin SOP
MX23C6410TC-10	100ns	48 pin TSOP
MX23C6410TC-12	120ns	48 pin TSOP
MX23C6410TC-15	150ns	48 pin TSOP
MX23C6410RC-10	100ns	48 pin TSOP (Reverse type)
MX23C6410RC-12	120ns	48 pin TSOP (Reverse type)
MX23C6410RC-15	150ns	48 pin TSOP (Reverse type)

## PIN CONFIGURATION

### 44 SOP



### 48 TSOP (NORMAL TYPE)



### 48 TSOP (REVERSE TYPE)

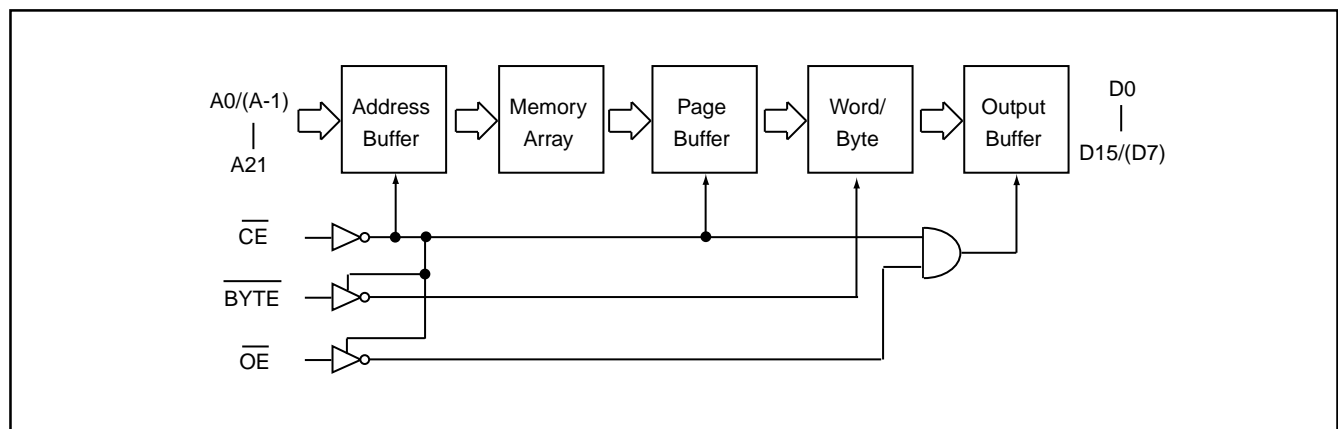


**PIN DESCRIPTION**

Symbol	Pin Function
A0~A21	Address Inputs
D0~D14	Data Outputs
D15/A-1	D15 (Word Mode) / LSB Address (Byte Mode)
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
Byte	Word / Byte Mode Selection
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

**MODE SELECTION**

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

**BLOCK DIAGRAM**




## ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-0.8V to VCC+2.0V (Note)
Ambient Operating Temperature	Topr	0°C to 70°C
Storage Temperature	Tstg	-65°C to 125°C

Note: Minimum DC voltage on input or I/O pins is -0.5V. During voltage transitions, inputs may undershoot VSS to -0.8V for periods of up to 20ns. Maximum DC voltage on input or I/O pins is VCC+0.5V. During voltage transitions, input may overshoot VCC to VCC+2.0V for periods of up to 20ns.

## 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	-	70mA	f=5MHz, all output open
Standby Current (TTL)	ISTB1	-	1mA	CE = VIH
Standby Current (cmos)	ISTB2	-	100uA	CE>VCC-0.2V
Input Capacitance	CIN	-	10pF	Ta = 25°C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25°C, f = 1MHZ

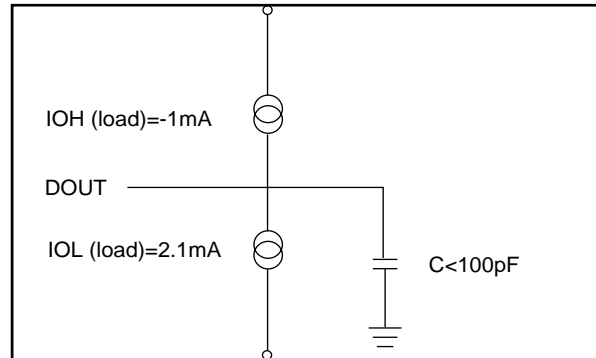
## AC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 5V±10%)

Item	Symbol	23C6410-10		23C6410-12		23C6410-15	
		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 or CE going high, and this parameter guaranteed by design over the full voltage and temperature operating range - not tested.

## AC Test Conditions

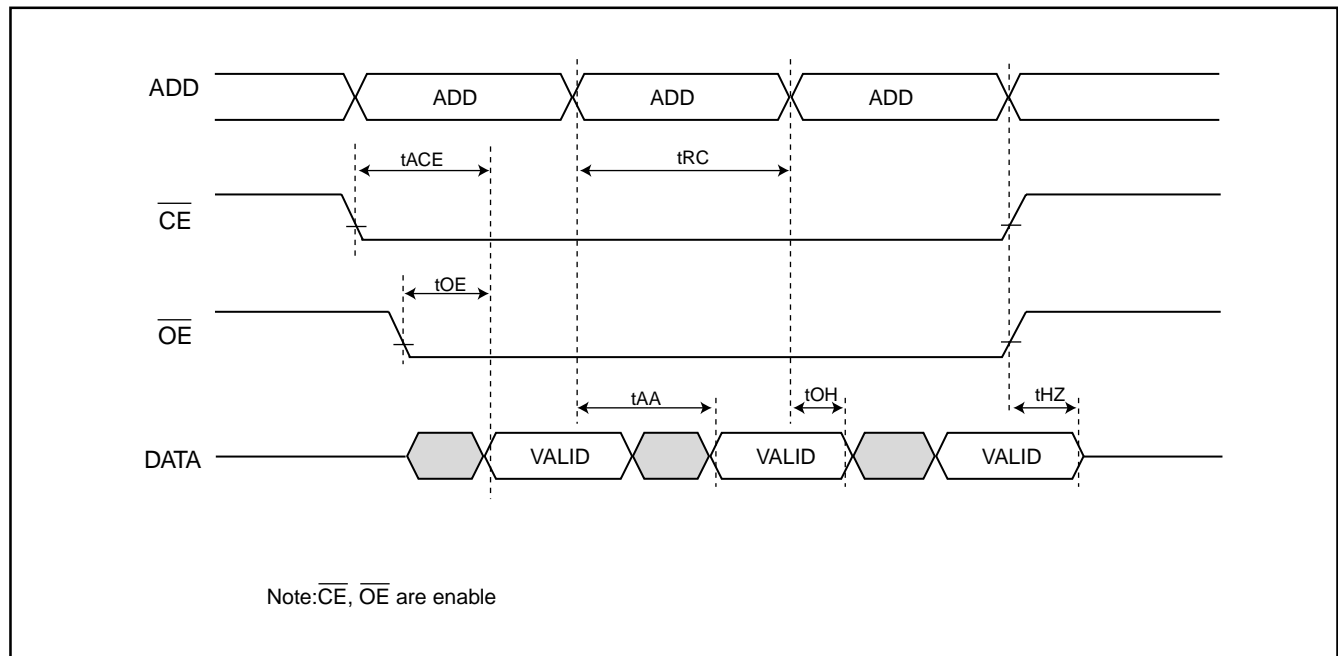
Input Pulse Levels	0.4V~ 2.4V
Input Rise and Fall Times	10ns
Input Timing Level	1.4V
Output Timing Level	0.8V and 2.0V
Output Load	See Figure



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.

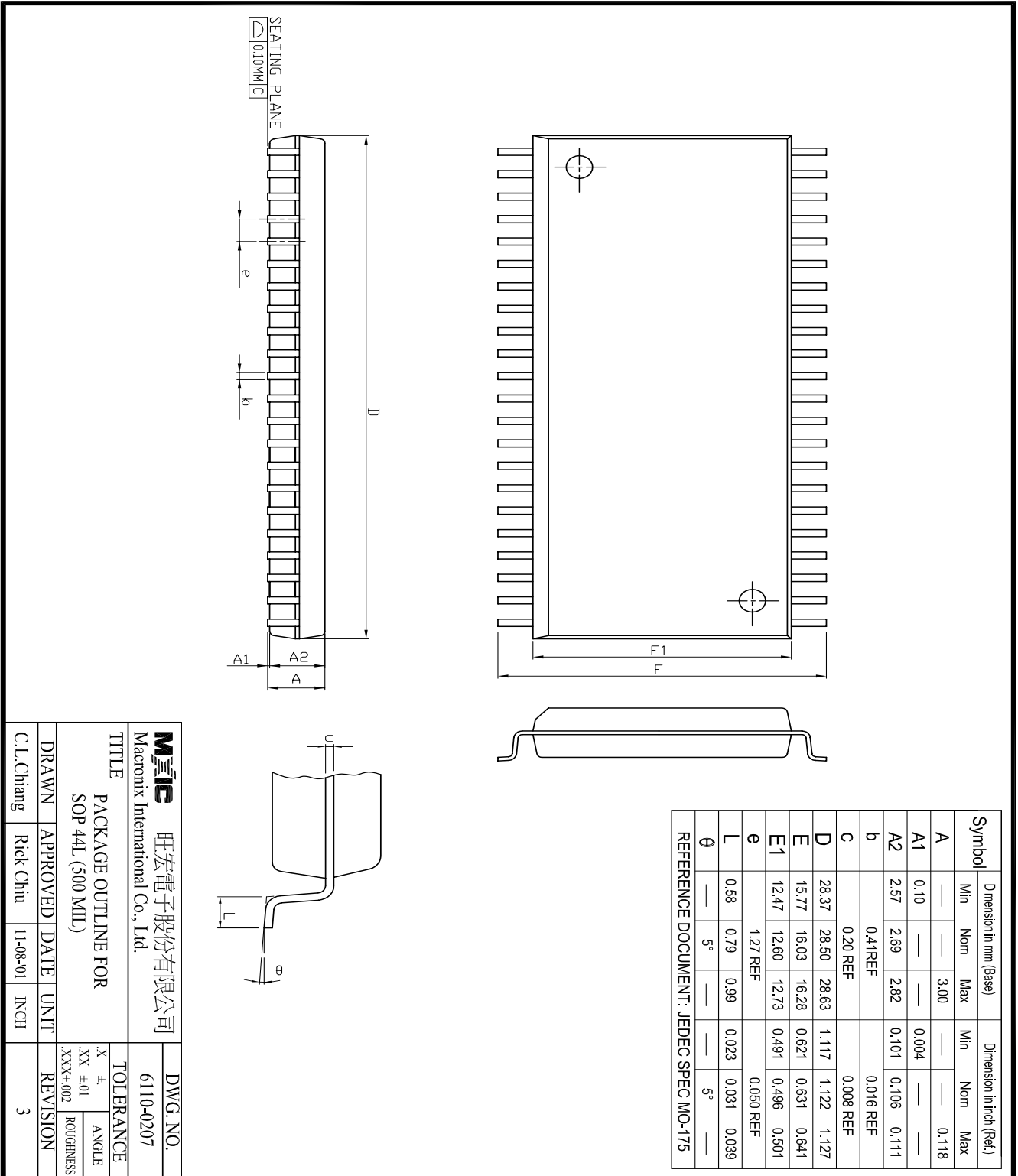
## TIMING DIAGRAM

### RANDOM READ



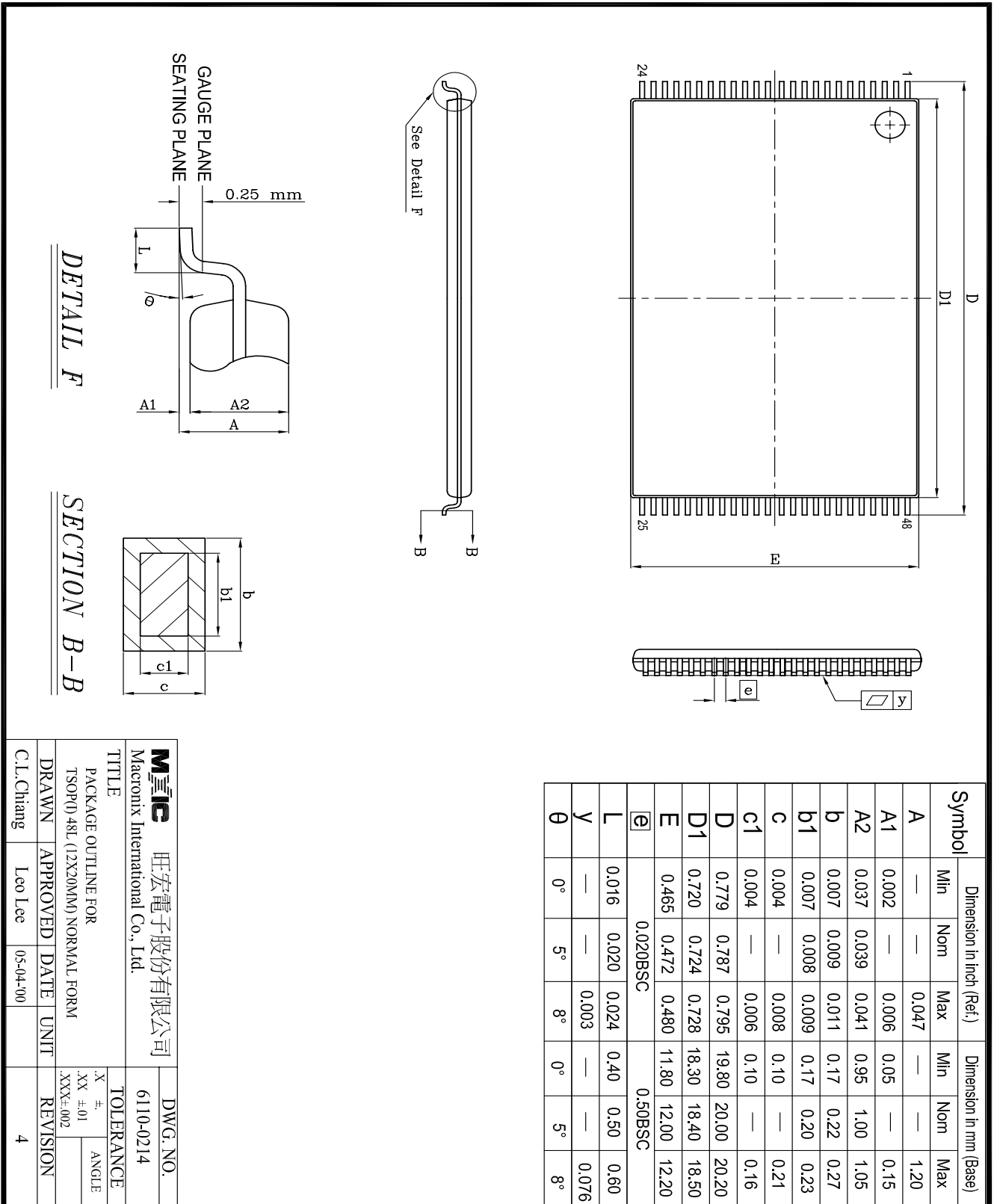
## PACKAGE INFORMATION

### 44-PIN PLASTIC SOP



<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 6110-0207	
TITLE PACKAGE OUTLINE FOR SOP 44L (500 MIL)			
DRAWN C.L. Chiang	APPROVED Rick Chiu	DATE 11-08-01	UNIT INCH
TOLERANCE		REVISION	
.X ±		1	
XX ±01		2	
.XXX±.002		3	
ROUGNESS			

## 48-PIN PLASTIC TSOP



**DETAIL F**

**SECTION B-B**

<b>旺宏電子股份有限公司</b> Macronix International Co., Ltd.		DWG. NO. 6110-0214	
TITLE PACKAGE OUTLINE FOR TSOP(D) 48L (12X20MM) NORMAL FORM			
TOLERANCE .X # .XX ±.01 .XXX±.002	ANGLE		
DRAWN C.L.Chiang	APPROVED Leo Lee	DATE 05-04-00	UNIT REVISION 4



**REVISION HISTORY**

<b>Revision</b>	<b>Description</b>	<b>Page</b>	<b>Date</b>
2.1	AC Characteristics: tOH 10ns --> 0ns	P3	FEB/01/1999
2.2	Add Order Information--Note:MX23C6410PC-10 only applies to supply voltage 5V±5%	P1	OCT/02/2000
2.3	Modify Package Information	P5,6,7	OCT/09/2000
2.4	Modify Operating Current:100mA-->70mA	P1,3	JAN/15/2001
2.5	Modify Package Information Added 44-pin TSOP package	P5~7 P1,8	JUL/17/2001
2.6	Move 42-pin PDIP Package to another new data sheet	P1,5	JUL/20/2001
2.7	Removed 44-pin TSOP Package	P1,7	JAN/15/2002



**MX23C6410**

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