



# MX23C3211

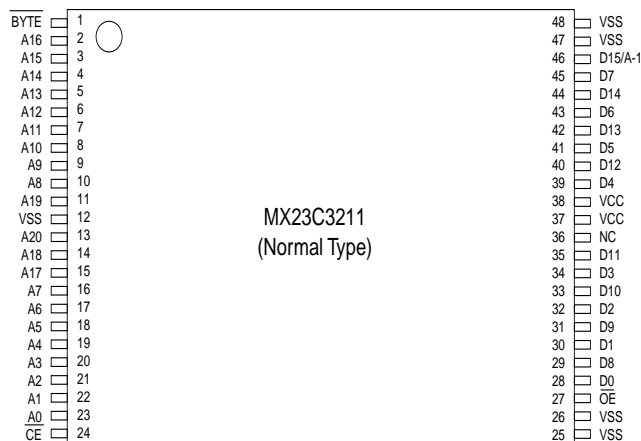
## 5 Volt 32-Mbit (4M x 8/2M x 16) Mask ROM with Page Mode

### FEATURES

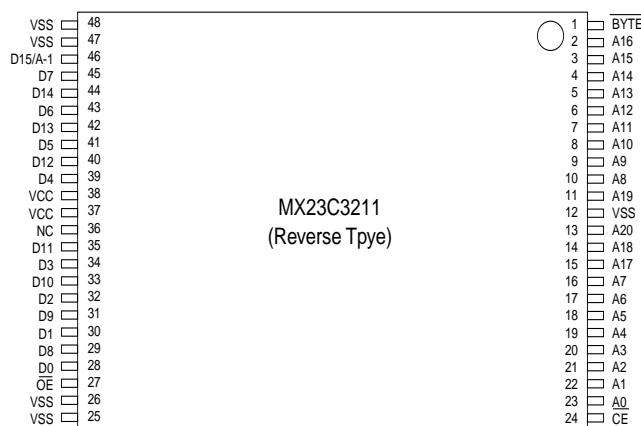
- Bit organization
  - 4M x 8 (byte mode)
  - 2M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.)
  - Page access: 30ns (max.)
- Page Size
  - 8 words per page
- Current
  - Operating: 60mA
  - Standby: 50uA
- Supply voltage
  - 5V±10%
- Package
  - 44 pin SOP (500mil)
  - 48 pin TSOP (12mm x 20mm)

### PIN CONFIGURATION

#### 48 TSOP (Normal Type)



#### 48 TSOP (Reverse Type)



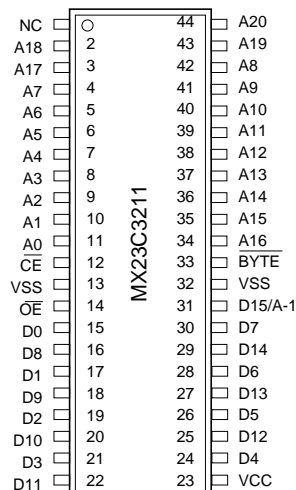
### ORDER INFORMATION

Part No.	Access Page Access		Package
	Time	Time	
MX23C3211MC-10	100ns	30ns	44 pin SOP
MX23C3211MC-12	120ns	50ns	44 pin SOP
MX23C3211TC-10	100ns	30ns	48 pin TSOP
MX23C3211TC-12	120ns	50ns	48 pin TSOP
MX23C3211RC-10	100ns	30ns	48 pin TSOP (Reverse type)
MX23C3211RC-12	120ns	50ns	48 pin TSOP (Reverse type)

### PIN DESCRIPTION

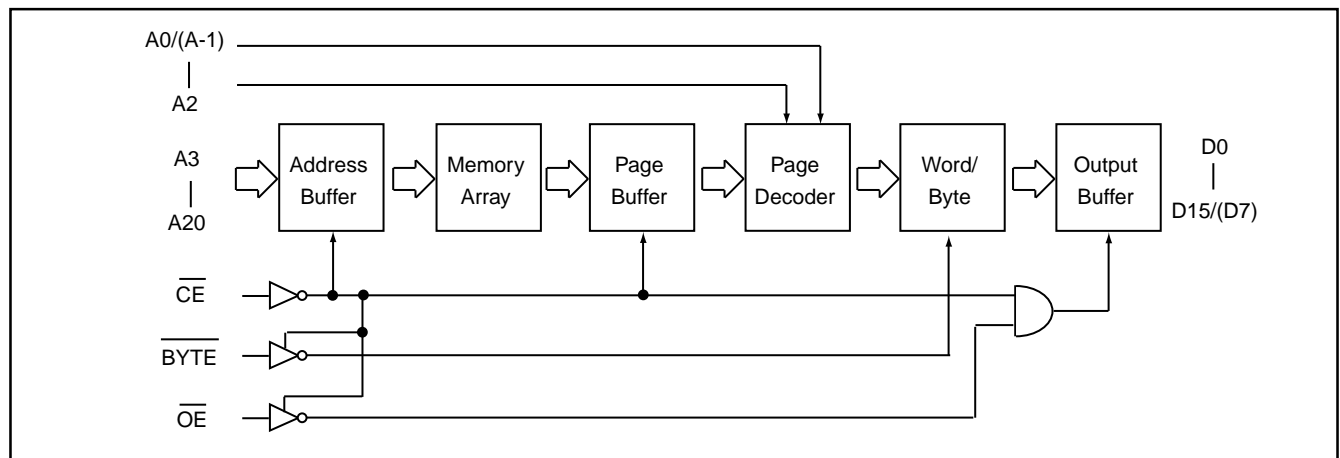
Symbol	Pin Function
A0~A20	Address Inputs
D0~D14	Data Outputs
D15/A-1	D15 (Word Mode)/ LSB Address (Byte Mode)
CE	Chip Enable Input
OE	Output Enable Input
Byte	Word/ Byte Mode Selection
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

#### 44 SOP



**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	-1.3V 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 -1.3V 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	-	60mA	tRC = 100ns, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ = VIH
Standby Current (CMOS)	ISTB2	-	50uA	$\overline{CE}$ > VCC-0.2V
Input Capacitance	CIN	-	10pF	Ta = 25°C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25°C, f = 1MHZ

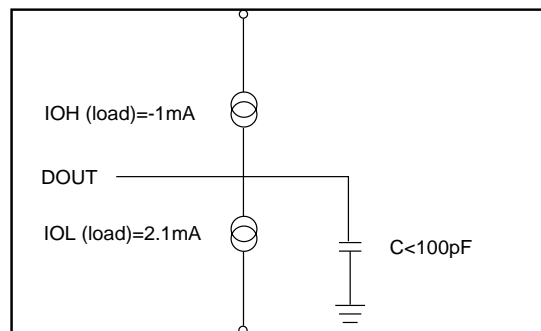
## AC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 5V±10%)

Item	Symbol	23C3211-10		23C3211-12	
		MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	100ns	-	120ns	-
Address Access Time	tAA	-	100ns	-	120ns
Chip Enable Access Time	tACE	-	100ns	-	120ns
Page Mode Access Time	tPA	-	30ns	-	50ns
Output Enable Time	tOE	-	30ns	-	50ns
Output Hold After Address	tOH	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	20ns

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

## AC Test Conditions

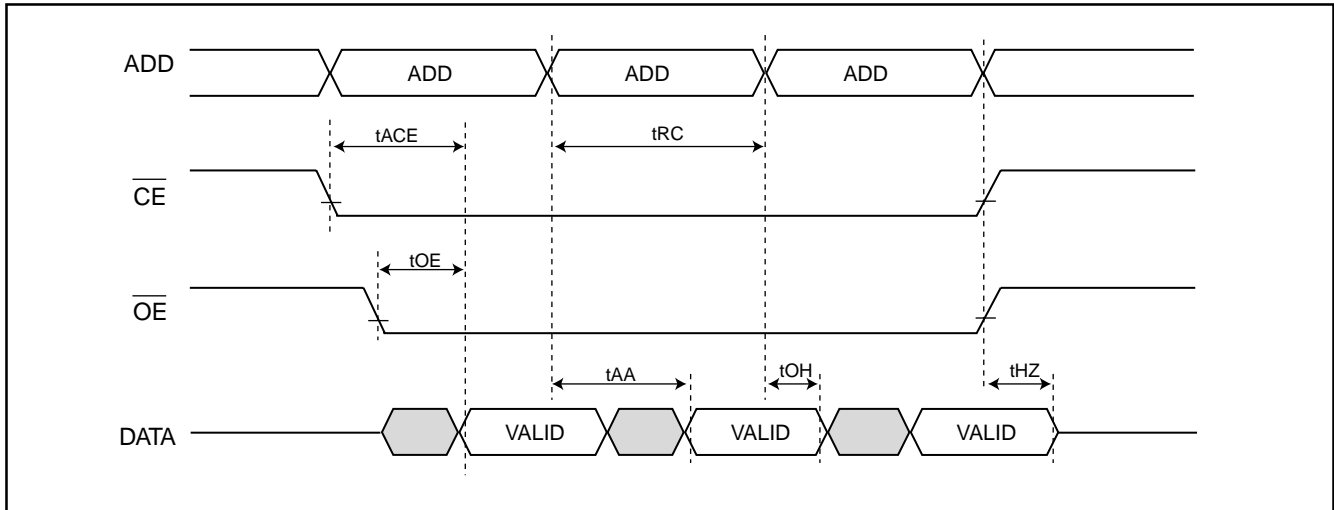
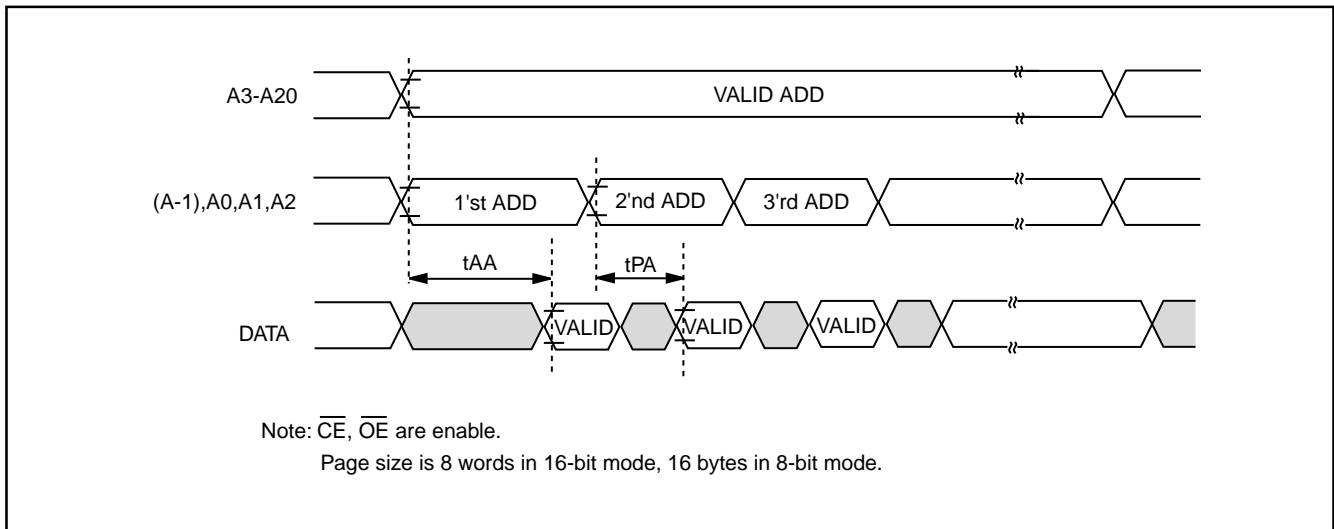
Input Pulse Levels	0.4V~ 3.3V
Input Rise and Fall Times	10ns
Input Timing Level	1.5V
Output Timing Level	0.8V and 2.0V
Output Load	See Figure



Note: No output loading is present in tester load board.

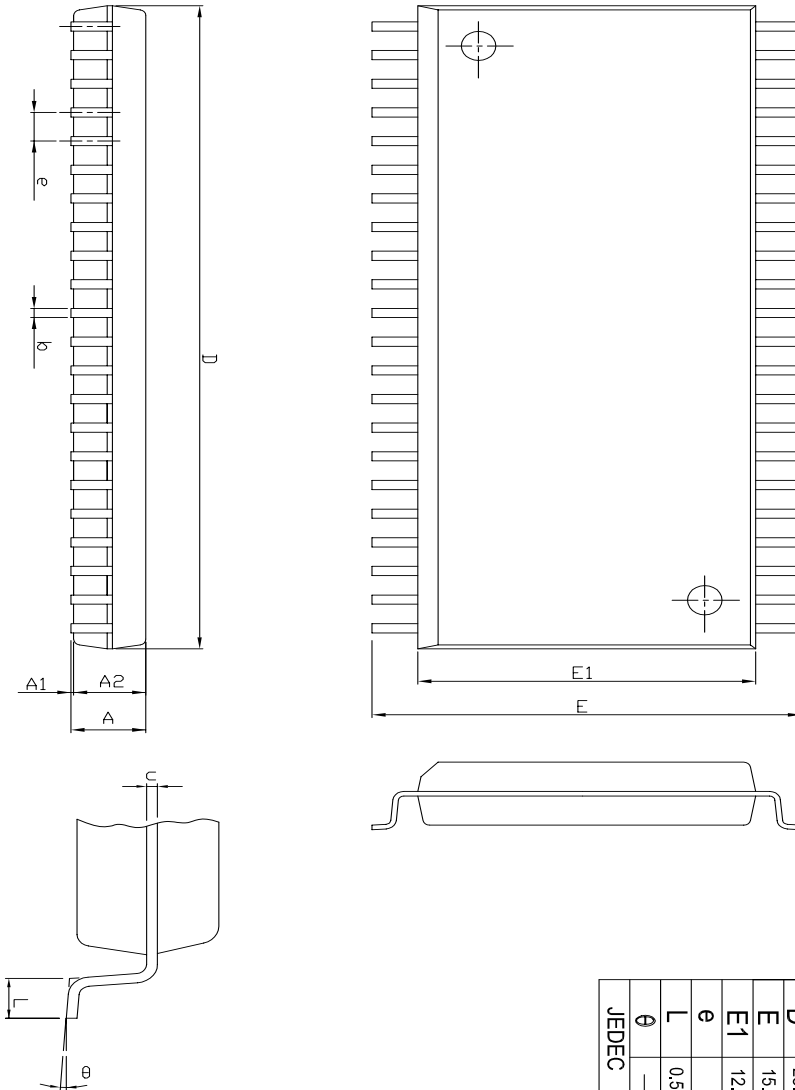
Active loading is used and under software programming control.

Output loading capacitance includes load board's and all stray capacitance.

**TIMING DIAGRAM**
**RANDOM READ**

**PAGE READ**


## PACKAGE INFORMATION

### 44-PIN PLASTIC SOP

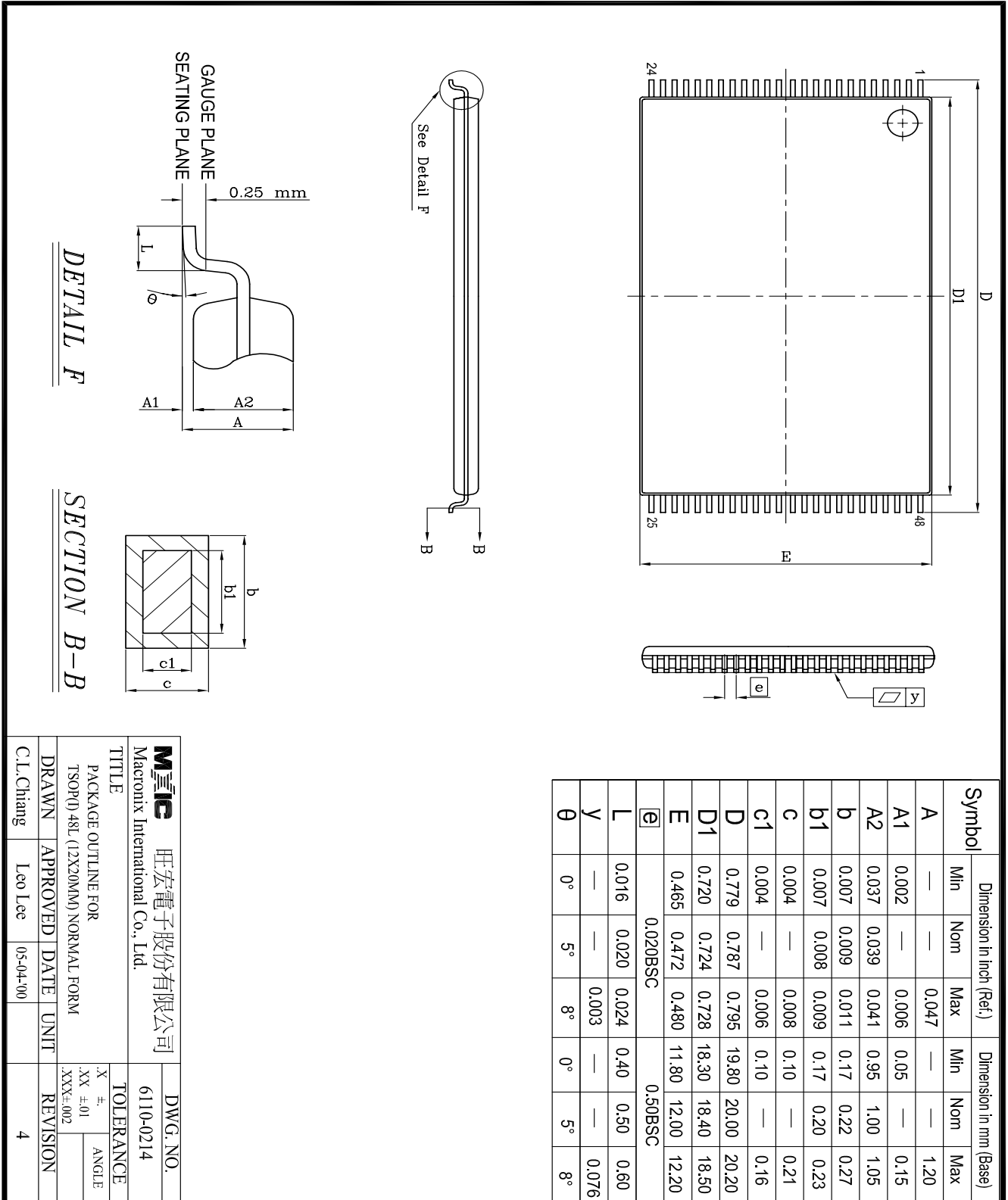


Symbol	Dimension in mm (Base)			Dimension in inch (Ref.)		
	Min	Nom	Max	Min	Nom	Max
A	—	—	3.00	—	—	0.118
A1	0.10	—	—	0.004	—	—
A2	2.57	2.69	2.82	0.101	0.106	0.111
b	0.41REF			0.016REF		
C	0.20 REF			0.008 REF		
D	28.37	28.50	28.63	1.117	1.122	1.127
E	15.77	16.03	16.28	0.621	0.631	0.641
E1	12.47	12.60	12.73	0.491	0.496	0.501
e	1.27 REF			0.050 REF		
L	0.58	0.79	0.99	0.023	0.031	0.039
θ	—	5°	—	—	5°	—

JEDEC

<b>MIIIC</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)		TOLERANCE .X ± XX ±.01 .XXX±.002	
DRAWN C.L.Chiang	APPROVED Dennis Chang	DATE 05-03-01	UNIT INCH
		REVISION 2	

## 48-PIN PLASTIC TSOP



**DETAIL F**

**SECTION B-B**

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



**REVISION HISTORY**

<b>Revision</b>	<b>Description</b>	<b>Page</b>	<b>Date</b>
2.7	AC Characteristics: tOH : 10ns --> 0ns	P3	FEB/01/1999
2.8	Typing error correction	P1,2	JAN/18/2000
2.9	Add AC Characteristics-- tPA	P3	OCT/03/2000
	Modify AC Characteristics-- tACE	P3	
3.0	Modify Package Information	P5,6	JUL/17/2001



**MX23C3211**

---

---

## **MACRONIX INTERNATIONAL Co., LTD.**

**HEADQUARTERS:**

TEL:+886-3-578-6688

FAX:+886-3-563-2888

**EUROPE OFFICE:**

TEL:+32-2-456-8020

FAX:+32-2-456-8021

**JAPAN OFFICE:**

TEL:+81-44-246-9100

FAX:+81-44-246-9105

**SINGAPORE OFFICE:**

TEL:+65-348-8385

FAX:+65-348-8096

**TAIPEI OFFICE:**

TEL:+886-2-2509-3300

FAX:+886-2-2509-2200

**MACRONIX AMERICA, INC.**

TEL:+1-408-453-8088

FAX:+1-408-453-8488

**CHICAGO OFFICE:**

TEL:+1-847-963-1900

FAX:+1-847-963-1909

**[http : //www.macronix.com](http://www.macronix.com)**