



# MX23L3210

## 32M-BIT (4M x 8 / 2M x 16) Mask ROM

### FEATURES

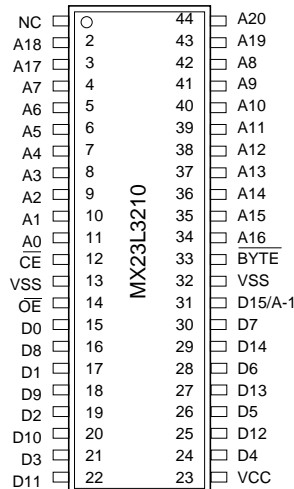
- Bit organization
  - 4M x 8 (byte mode)
  - 2M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.) for 3.0V~3.6V
  - 150ns (max.) for 2.7V~3.6V
- Current
  - Operating: 40mA
  - Standby: 15uA
- Supply voltage
  - 2.7V~3.6V
- Package
  - 44 pin SOP (500mil)
  - 48 pin TSOP (12mm x 20mm)
  - 44 pin TSOP (Type II)

### ORDER INFORMATION

Part No.	Access Time	Package
MX23L3210MC-10	100ns	44 pin SOP
MX23L3210MC-12	120ns	44 pin SOP
MX23L3210MC-15	150ns	44 pin SOP
MX23L3210TC-10	100ns	48 pin TSOP
MX23L3210TC-12	120ns	48 pin TSOP
MX23L3210TC-15	150ns	48 pin TSOP
MX23L3210RC-10	100ns	48 pin TSOP (Reverse type)
MX23L3210RC-12	120ns	48 pin TSOP (Reverse type)
MX23L3210RC-15	150ns	48 pin TSOP (Reverse type)
MX23L3210YC-10	100ns	44 pin TSOP
MX23L3210YC-12	120ns	44 pin TSOP

### PIN CONFIGURATION

#### 44 SOP/ 44 TSOP



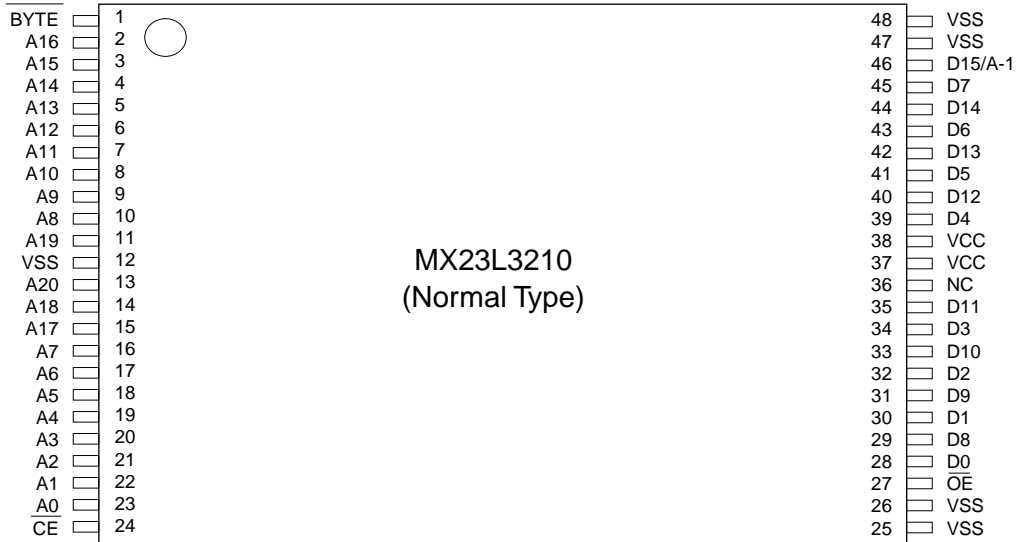
### PIN DESCRIPTION

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

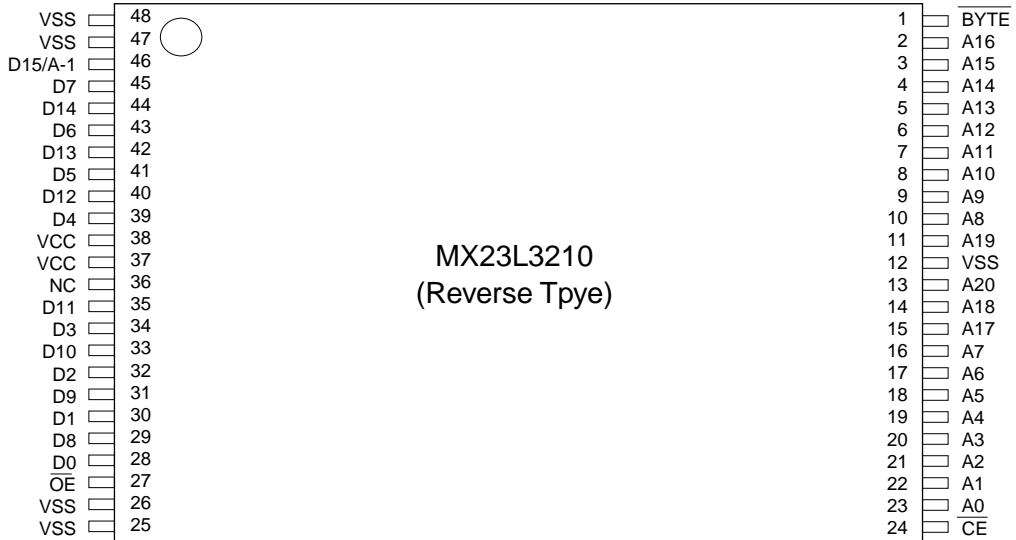
### MODE SELECTION

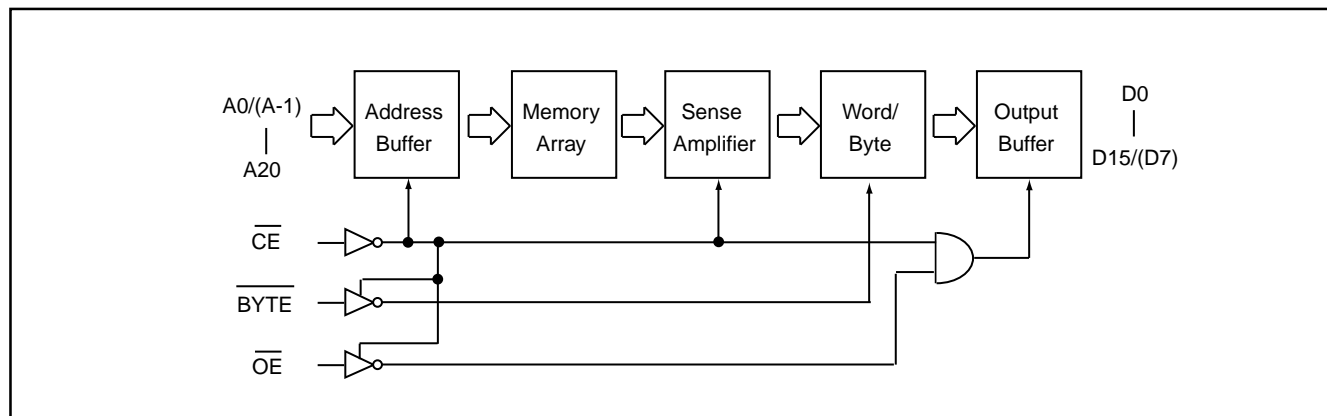
CE	OE	Byte	D15/A-1	D0~D7	D8~D15	Mode	Power
H	X	X	X	High Z	High Z	-	Stand-by
L	H	X	X	High Z	High Z	-	Active
L	L	H	Output	D0~D7	D8~D15	Word	Active
L	L	L	Input	D0~D7	High Z	Byte	Active

## 48 TSOP (Normal Type)



## 48 TSOP (Reverse Type)



**BLOCK DIAGRAM**

**ABSOLUTE MAXIMUM RATINGS**

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-0.3V to 3.9V
Ambient Operating Temperature	Topr	0°C to 70°C
Storage Temperature	Tstg	-65°C to 125°C

**DC CHARACTERISTICS** (Ta = 0°C ~ 70°C, VCC = 2.7V~3.6V)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	2.3V	-	IOH = -0.4mA
Output Low Voltage	VOL	-	0.4V	IOL = 1.6mA
Input High Voltage	VIH	2.1V	VCC+0.3V	
Input Low Voltage	VIL	-0.3V	0.2xVCC	
Input Leakage Current	ILI	-	5uA	0V, VCC
Output Leakage Current	ILO	-	5uA	0V, VCC
Operating Current	ICC1	-	40mA	tRC = 120ns, all output open
Standby Current (TTL)	ISTB1	-	1mA	CE = VIH
Standby Current (CMOS)	ISTB2	-	15uA	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 = 2.7V~3.6V)

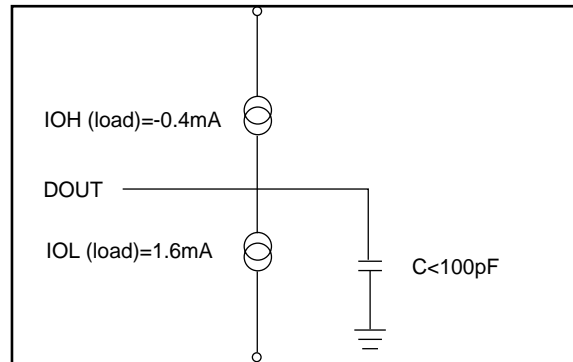
Item	Symbol	23L3210-10*		23L3210-12*		23L3210-15	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	100ns	-	120ns	-	150ns	-
Address Access Time	tAA	-	100ns	-	120ns	-	150ns
Chip Enable Access Time	tACE	-	100ns	-	120ns	-	150ns
Output Enable Time	tOE	-	50ns	-	60ns	-	70ns
Output Hold After Address	tOH	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.

\* 100/120ns for 3.0V~3.6V

### AC Test Conditions

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



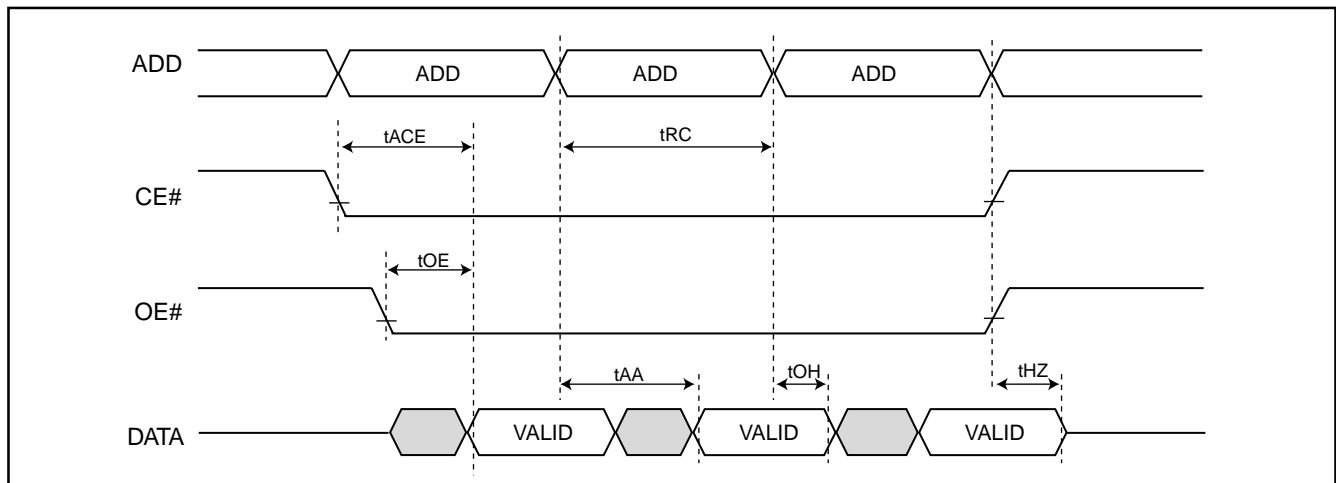
Note: No output loading is present in tester load board.

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

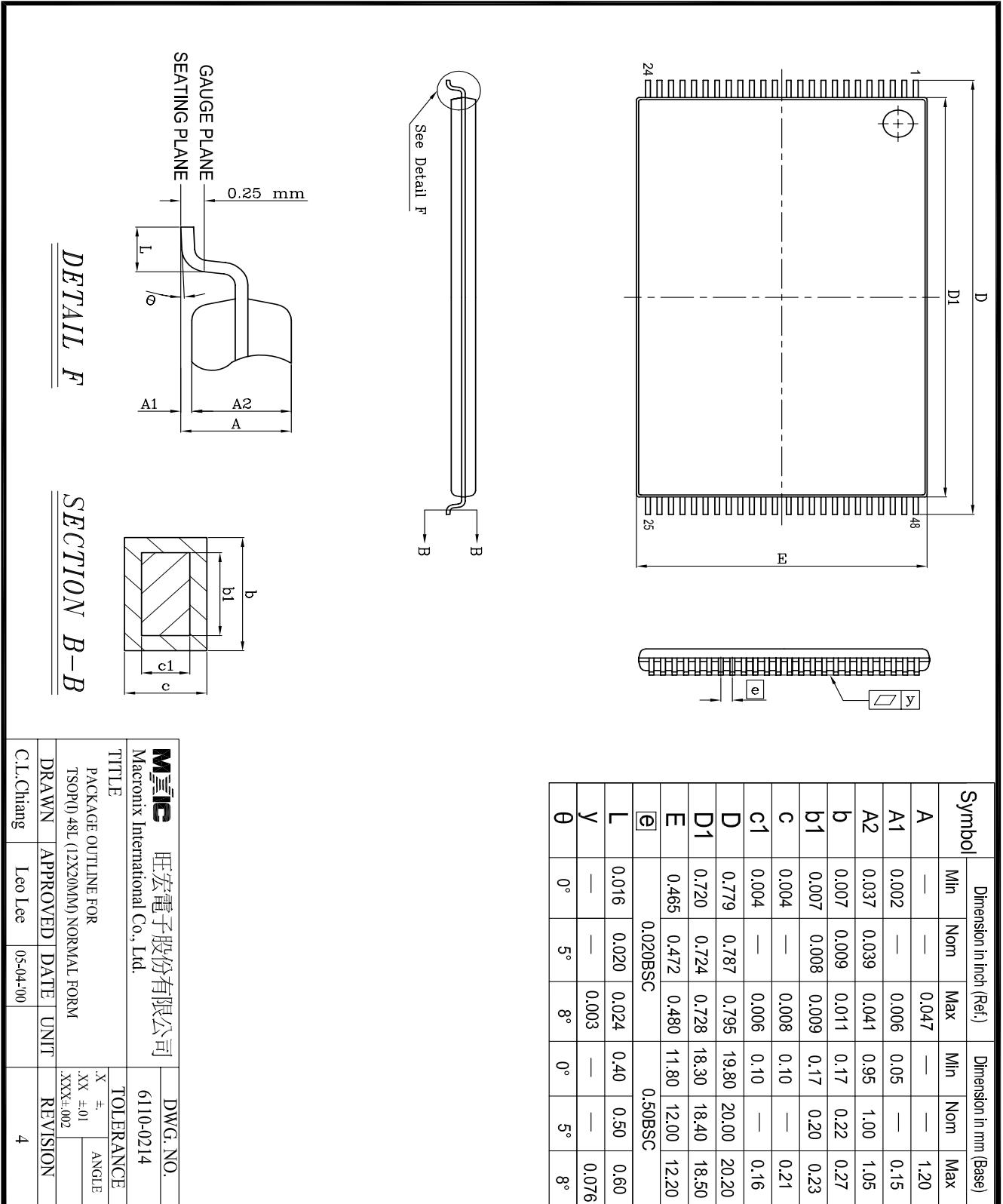
### 44-PIN PLASTIC SOP

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	—	0.41 REF	—	—	0.016 REF	—
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>Mxic</b> 旺宏電子股份有限公司				DWG. NO.	
Macronix International Co., Ltd.				6110-0207	
TITLE PACKAGE OUTLINE FOR SOP 44L (500 MIL)				TOLERANCE	
DRAWN C.L.Chang				.X ±.01 ANGLE	
APPROVED Dennis Chang				.XX ±.01	
DATE 05-03-01				.XXX±.002 ROUGHNESS	
UNIT INCH				REVISION	
				2	

## 48-PIN PLASTIC TSOP

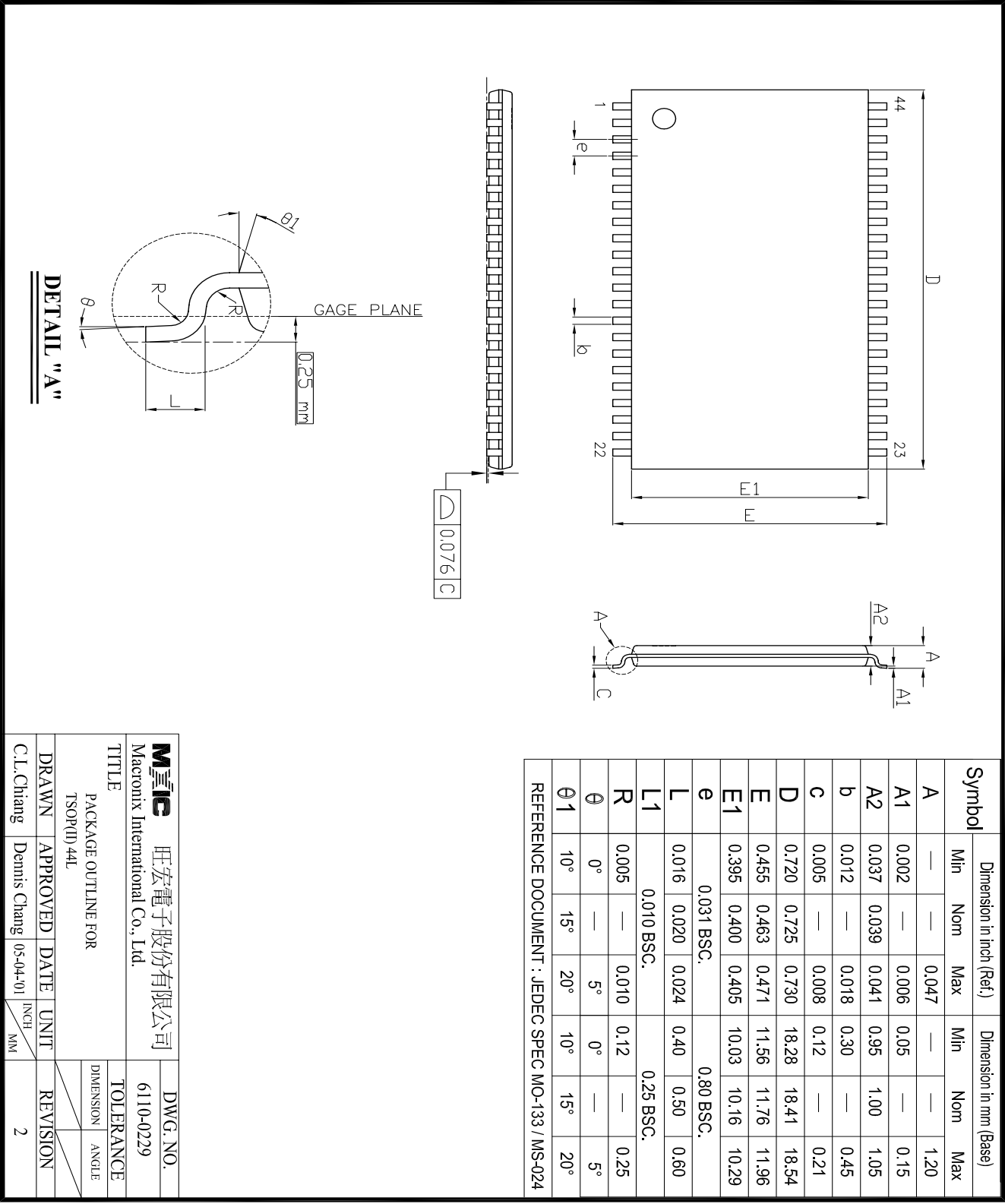


**DETAIL F**

**SECTION B-B**

<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 6110-0214	
TITLE PACKAGE OUTLINE FOR TSOP(D) 48L (12X20MM) NORMAL FORM			
DRAWN C.L.Chang		APPROVED Leo Lee	
DATE 05-04-100		UNIT 4	
REVISION		REVISION	
TOLERANCE .X ±.01 .XX ±.01 .XXX±.002		ANGLE	

## 44-PIN TSOP (Type II)



**DETAIL "A"**

<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 6110-0229	
TITLE PACKAGE OUTLINE FOR TSOP(II) 44L			
DRAWN	APPROVED	DATE	UNIT
C.L.Chang	Dennis Chang	05-04-01	INCH MM
REVISION		2	
TOLERANCE		ANGLE	
DIMENSION		ANGLE	



**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>PAGE</b>	<b>DATE</b>
2.5	AC CHARACTERISTICS tOH 10ns-->0ns	P4	JAN/29/1999
2.6	Add 120ns (max.) for 3.0V~3.6V ; 150ns(max.) for 2.7V~3.6V DC characteristics Standby current (ISTB2):5uA-->15uA AC characteristics 120ns for 3.0V~3.6V	P1, P1,3 P4	Dec/24/1999
2.7	1.Added access time:100ns 2.Modify Package Information	P1,4 P5,6	JUN/28/2001
2.8	1.Added 44-pin TSOP(II)	P1,7	JUL/17/2001





**MX23L3210**

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