

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

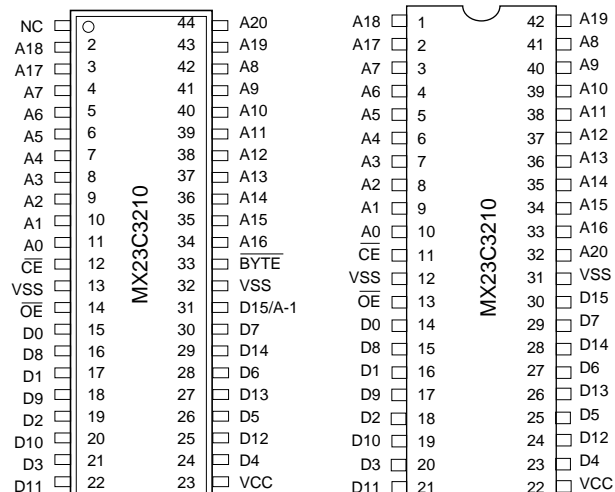
### FEATURES

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

### PIN CONFIGURATION

#### 44 SOP/44 TSOP

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



### 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
MX23C3210YC-10	100ns	44 pin TSOP
MX23C3210YC-12	120ns	44 pin TSOP
MX23C3210YC-15	150ns	44 pin TSOP
MX23C3210TI-10*	100ns	48 pin TSOP
MX23C3210TI-12*	120ns	48 pin TSOP

\*Note: Temperature: -40°C~85°C

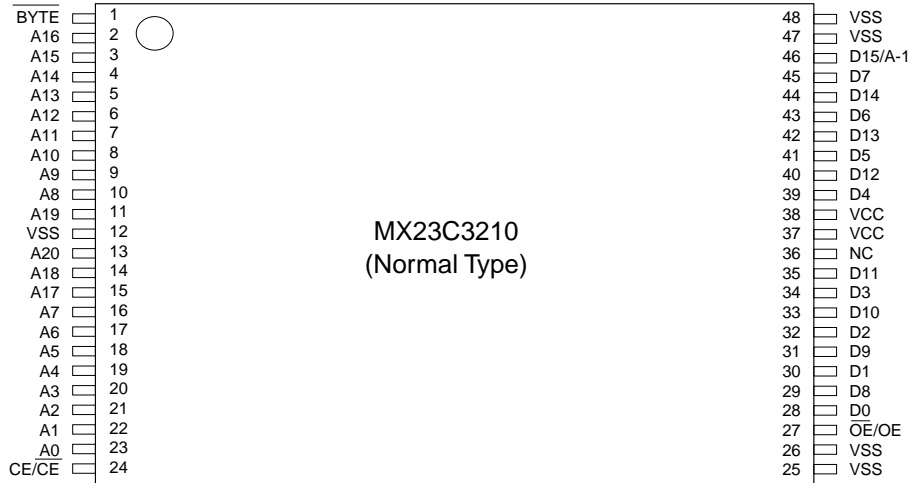
### PIN DESCRIPTION

Symbol	Pin Function
A0~A20	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

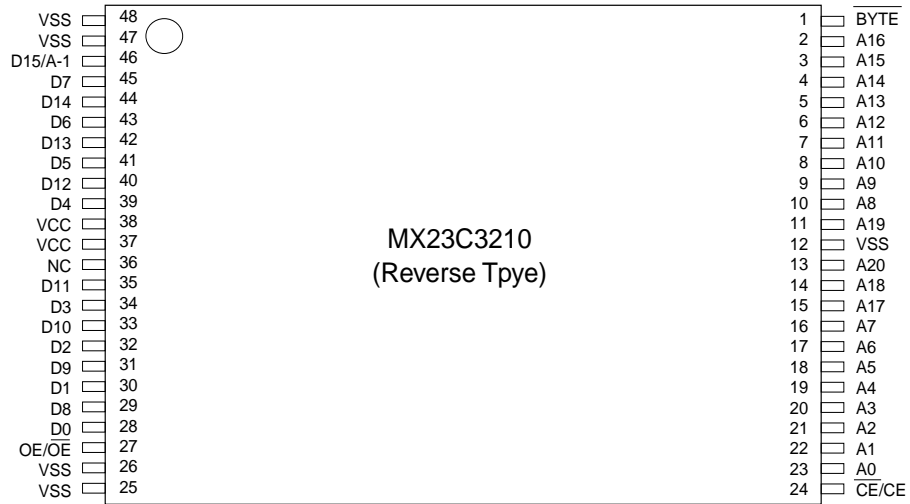
### MODE SELECTION

$\overline{CE}$	$\overline{OE}$	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

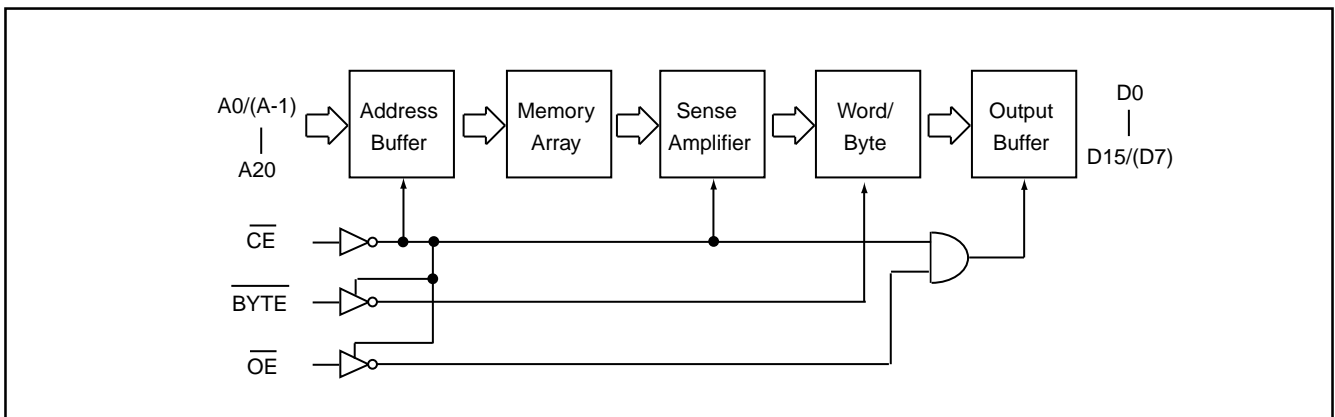
## 48 TSOP (Normal Type)



## 48TSOP (Reverse Type)



## BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-0.5V to 7.0V
Ambient Operating Temperature	Topr	-40°C to 85°C
Storage Temperature	Tstg	-65°C to 125°C

**DC CHARACTERISTICS** (Ta = -40°C ~ 85°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

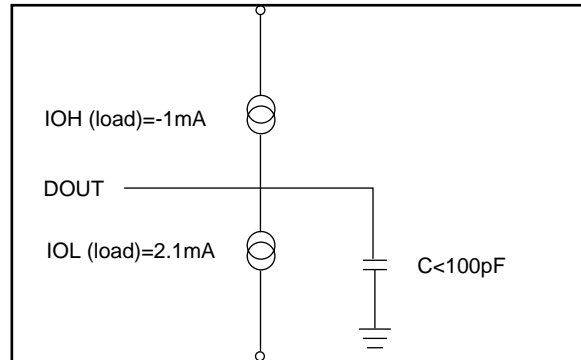
**AC CHARACTERISTICS** (Ta = -40°C ~ 85°C, VCC = 5V±10%)

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:

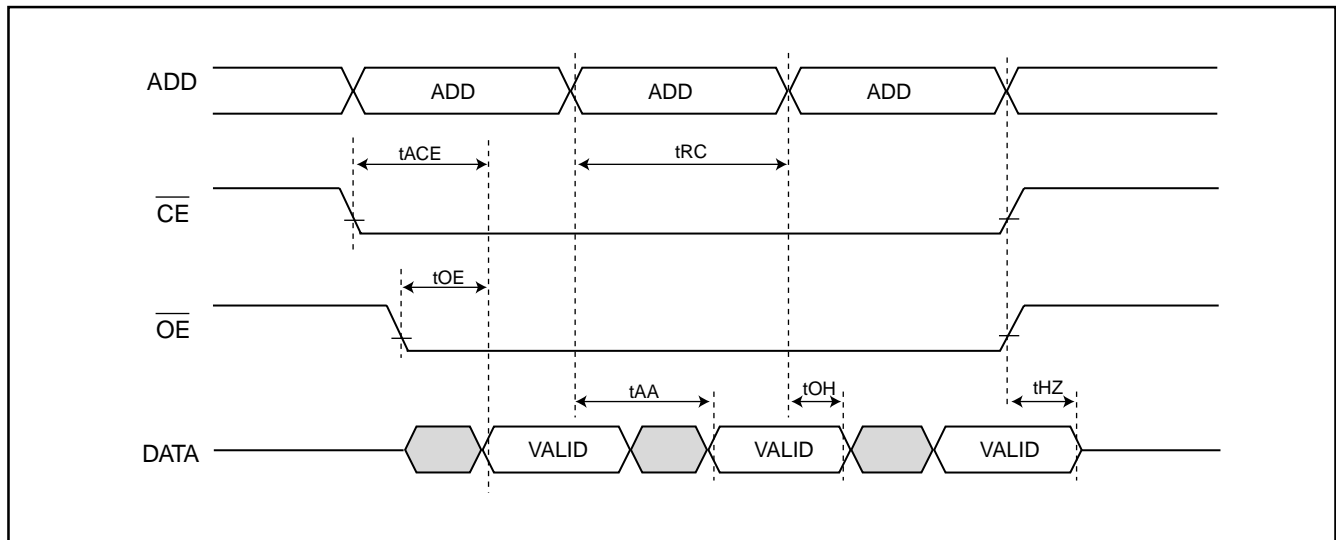
No output loading is present in tester load board.

Active loading is used and under software programming control.

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

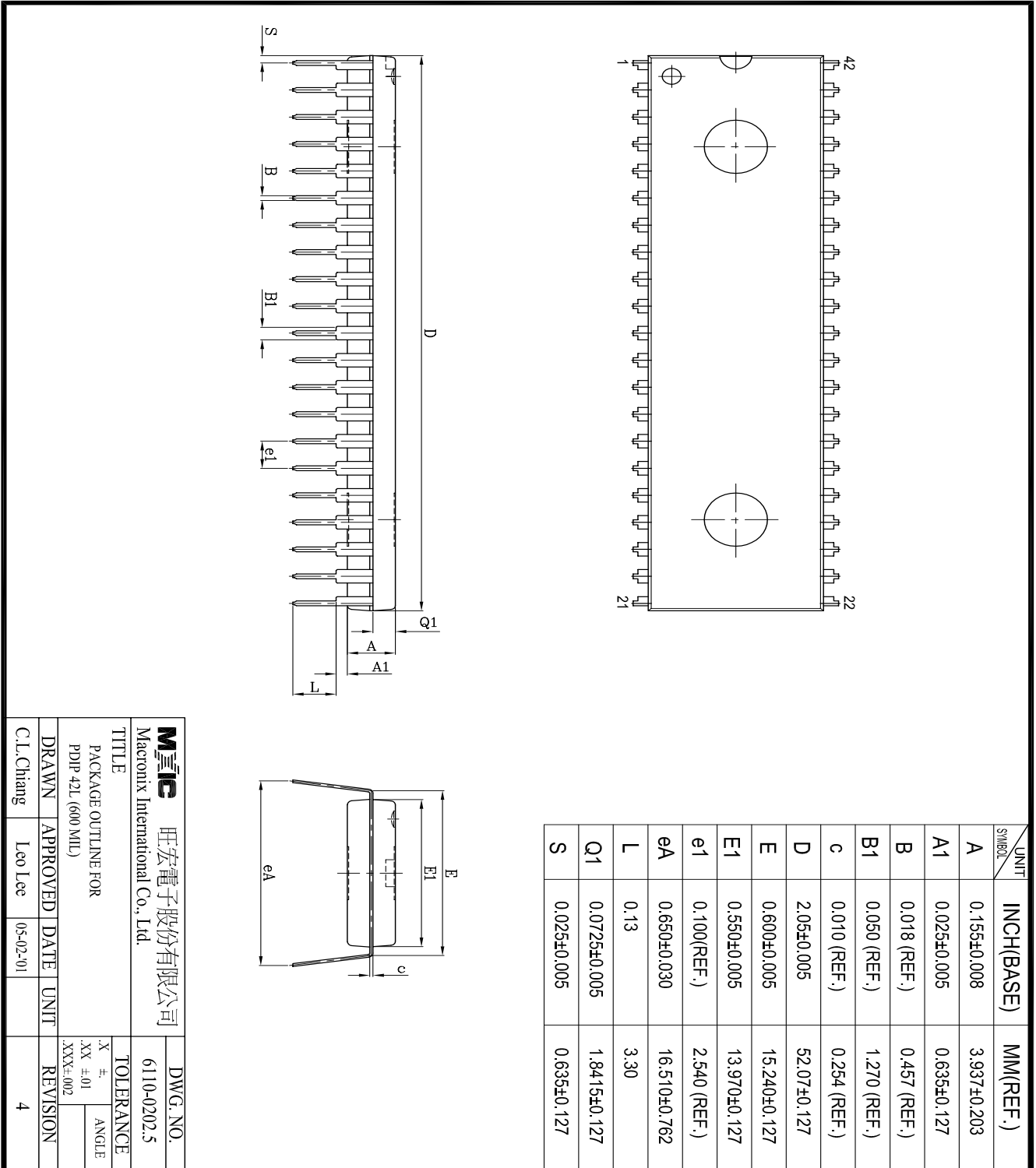
## TIMING DIAGRAM

### RANDOM READ



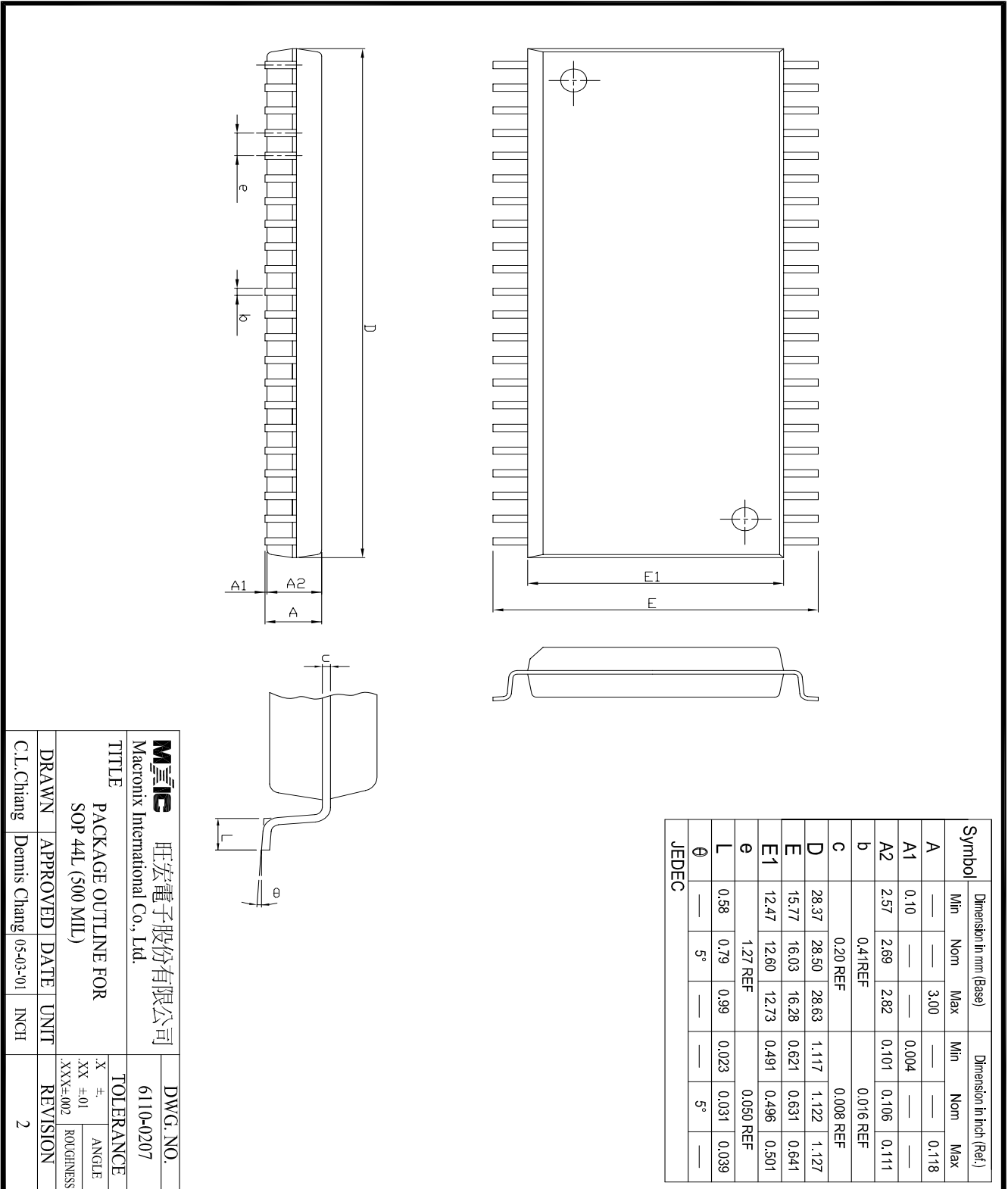
## PACKAGE INFORMATION

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



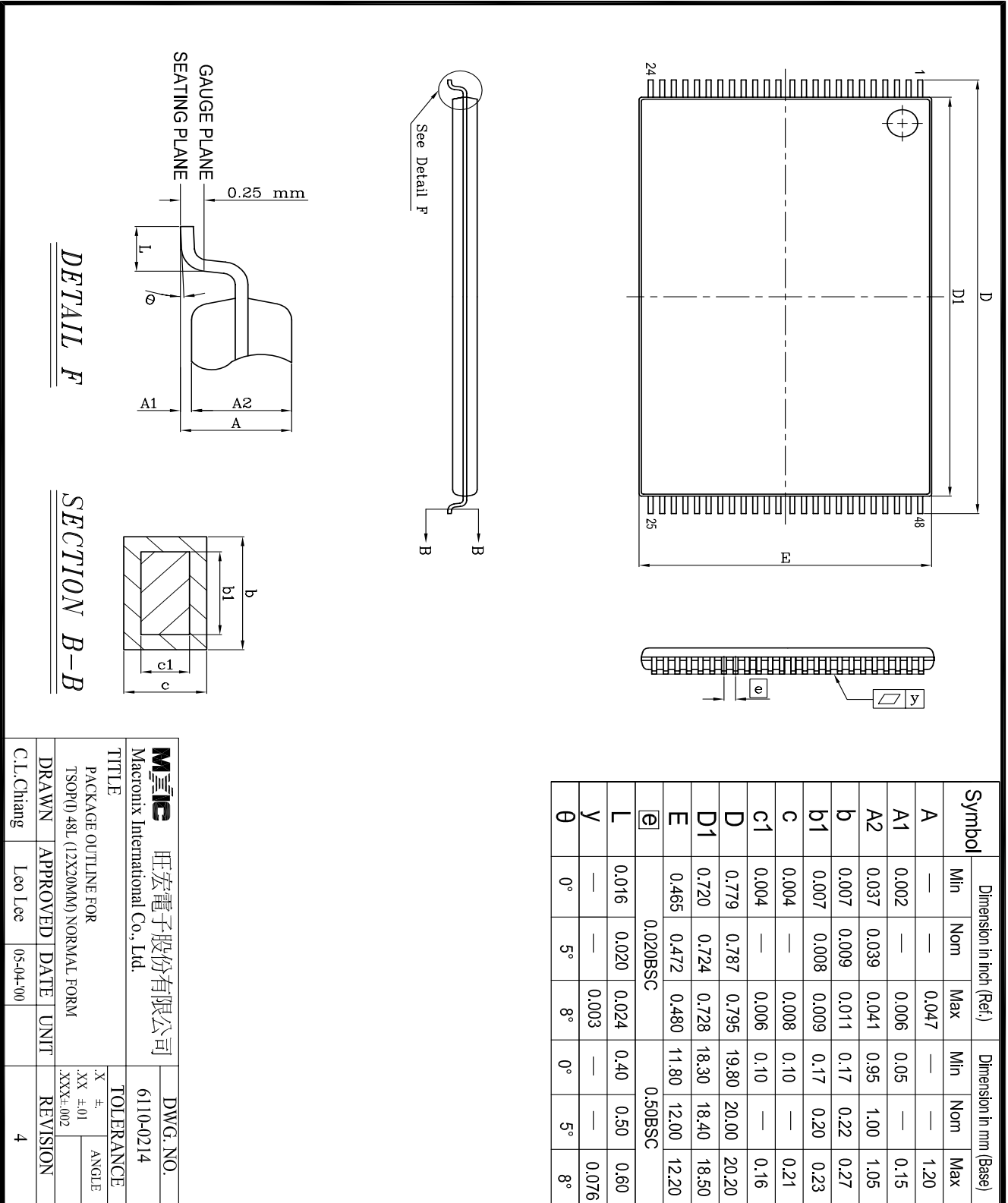
<b>旺宏電子股份有限公司</b> Macromix International Co., Ltd.		DWG. NO. 6110-0202.5	
TITLE PACKAGE OUTLINE FOR PDIP 42L (600 MIL)			
TOLERANCE X #. XX ±.01 .XXX±.002	ANGLE		
DRAWN C.L.Chang	APPROVED Leo Lee	DATE 05-02-01	REVISION 4

## 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.I. Chiang	APPROVED Dennis Chang	DATE 05-03-01	UNIT INCH
TOLERANCE X ± XX ±01 .XXX±.002		REVISION R01/GHNESS 2	

## 48-PIN PLASTIC TSOP

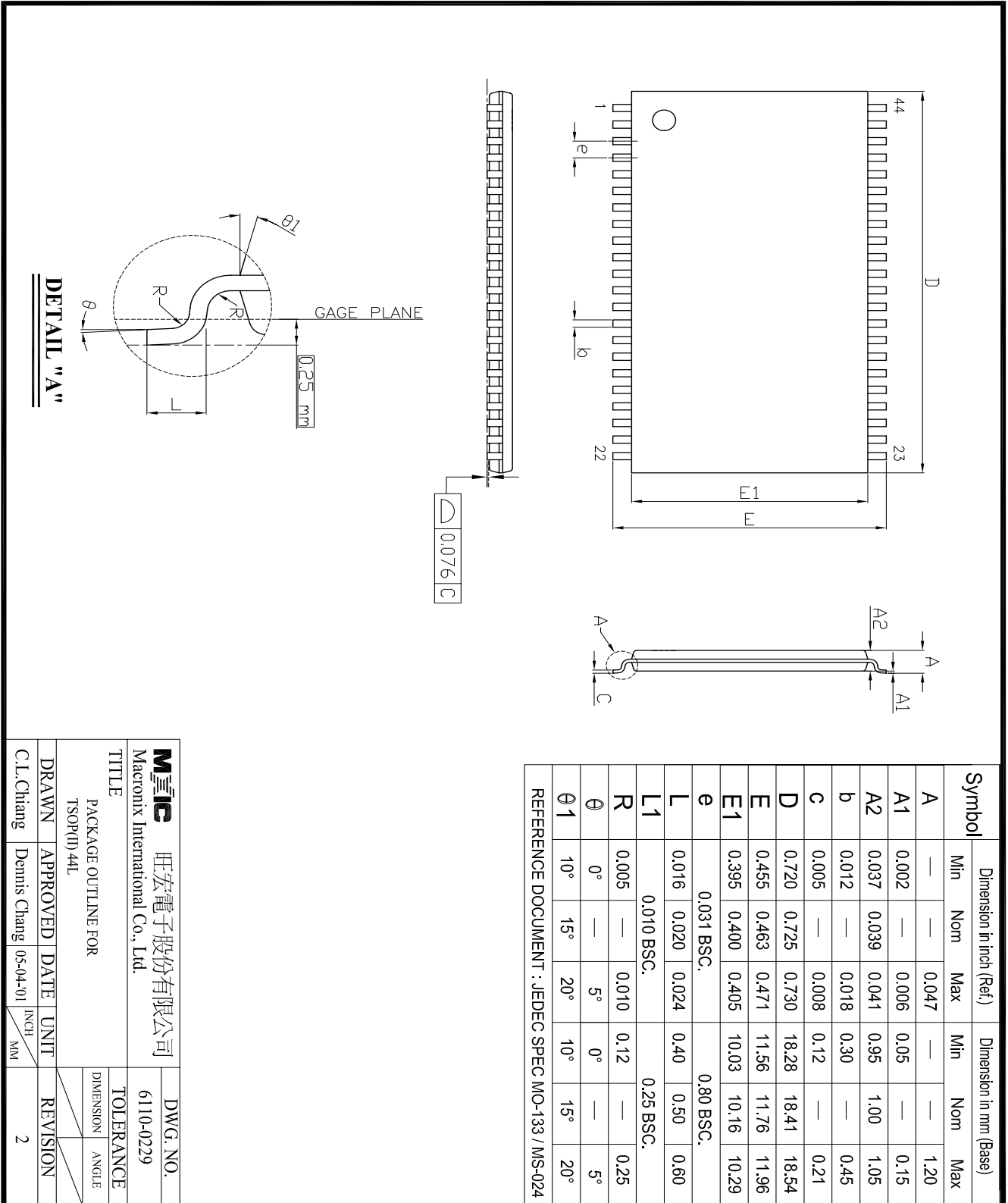


**DETAIL F**

**SECTION B-B**

<b>旺宏電子股份有限公司</b> Macronix International Co., Ltd.		<b>DWG. NO.</b> 61110-0214	
<b>TITLE</b> PACKAGE OUTLINE FOR TSOP(0) 48L (12X20MM) NORMAL FORM			
<b>TOLERANCE</b> .XX ±.01 .XXX±.002		<b>ANGLE</b>	
<b>DRAWN</b> C.L.Chiang	<b>APPROVED</b> Leo Lee	<b>DATE</b> 05-04-00	<b>UNIT</b> REVISION 4

## 44-PINTSOP (Type II)



<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 61110-0229	
TITLE PACKAGE OUTLINE FOR TSOP(II) 44L			
DRAWN C.L.Chang	APPROVED Dennis Chang	DATE 05-04-01	UNIT INCH MM
REVISION 2		TOLERANCE DIMENSION ANGLE	



**REVISION HISTORY**

<b>Revision</b>	<b>Description</b>	<b>Page</b>	<b>Date</b>
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
2.9	Typing error correction	P1	JAN/18/2000
3.0	Modify Package Information Added 44-pin TSOP(Type II) Package	P5~7 P1,8	JUL/17/2001
3.1	Added MX23C3210TI-10 & MX23C3210TI-12 in Order Information	P1	JUL/31/2001
3.2	Change Ambient Operating Temperature:0°C to 70°C-->-40°C to 85°C	P3	SEP/04/2001



**MX23C3210**

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