



# MX23C4000

## 4M-BIT MASK ROM (8 BIT OUTPUT)

### FEATURES

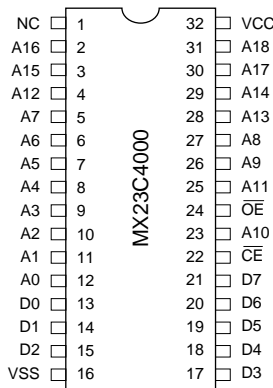
- Bit organization
  - 512K x 8 (byte mode)
- Fast access time
  - Random access: 90ns (max.)
- Current
  - Operating: 35mA
  - Standby: 100uA
- Supply voltage
  - 5V ± 10%
- Package
  - 32 pin PDIP (600 mil)
  - 32 pin PLCC
  - 32 pin SOP (450 mil)
  - 32 pin TSOP (8mm x 20mm)

### ORDER INFORMATION

Part No.	Access Time	Package
MX23C4000PC-90	90ns	32 pin PDIP
MX23C4000PC-10	100ns	32 pin PDIP
MX23C4000PC-12	120ns	32 pin PDIP
MX23C4000PC-15	150ns	32 pin PDIP
MX23C4000QC-10	100ns	32 pin PLCC
MX23C4000QC-12	120ns	32 pin PLCC
MX23C4000QC-15	150ns	32 pin PLCC
MX23C4000MC-90	90ns	32 pin SOP
MX23C4000MC-10	100ns	32 pin SOP
MX23C4000MC-12	120ns	32 pin SOP
MX23C4000MC-15	150ns	32 pin SOP
MX23C4000TC-10	100ns	32 pin TSOP
MX23C4000TC-12	120ns	32 pin TSOP
MX23C4000TC-15	150ns	32 pin TSOP

### PIN CONFIGURATION

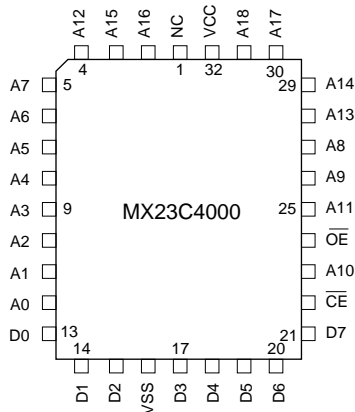
#### 32 PDIP / 32 SOP



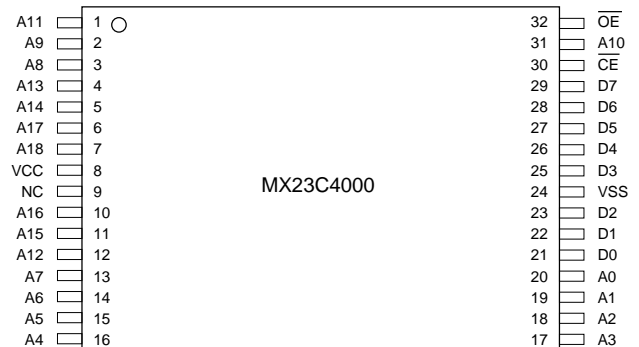
### PIN DESCRIPTION

Symbol	Pin Function
A0~A18	Address Inputs
D0~D7	Data Outputs
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
VCC	Power Supply Pin
VSS	Ground Pin
NC	No Connection

#### 32 PLCC



#### 32 TSOP





## ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings
Power Supply Voltage	VCC	-0.5V to 7.0V
Input Voltage	VI	-0.5V to VCC + 0.5V
Output Voltage	VO	-0.5V to VCC + 0.5V
Ambient Operating Temperature	Topr	-10°C to 70°C
Storage Temperature	Tstg	-65°C to 125°C

## DC CHARACTERISTICS (Ta = -10°C ~ 70°C, VCC = 5.0V ± 10%)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	0.8VCC	-	IOH = -100uA
Output Low Voltage	VOL	-	0.4V	IOL = 2.1mA
Input High Voltage	VIH	2.2V	VCC+0.5V	
Input Low Voltage	VIL	-0.3V	0.8V	
Input Leakage Current	ILI	-	10uA	0V, VCC
Output Leakage Current	ILO	-	10uA	0V, VCC
Operating Current	ICC1	-	35mA	tRC = 100ns, 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

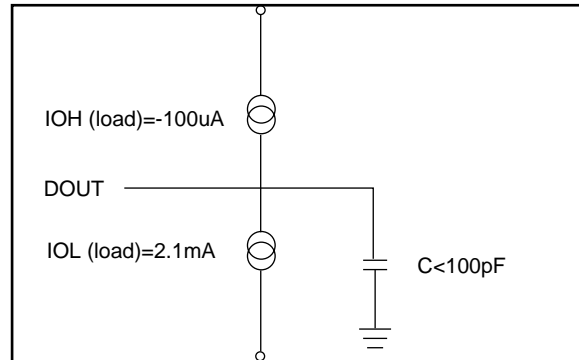
## AC CHARACTERISTICS (Ta = -10°C ~ 70°C, VCC = 5.0V ± 10%)

Item	Symbol	23C4000-90		23C4000-10		23C4000-12		23C4000-15	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	90ns	-	100ns	-	120ns	-	150ns	-
Address Access Time	tAA	-	90ns	-	100ns	-	120ns	-	150ns
Chip Enable Access Time	tACE	-	90ns	-	100ns	-	120ns	-	150ns
Output Enable Time	tOE	-	45ns	-	50ns	-	60ns	-	70ns
Output Hold After Address	tOH	0ns	-	0ns	-	0ns	-	0ns	-
Output High Z Delay	tHZ	-	20ns	-	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 : 1.5V
- Output Timing Level : 0.8V and 2.0V
- Output Load : See Figure



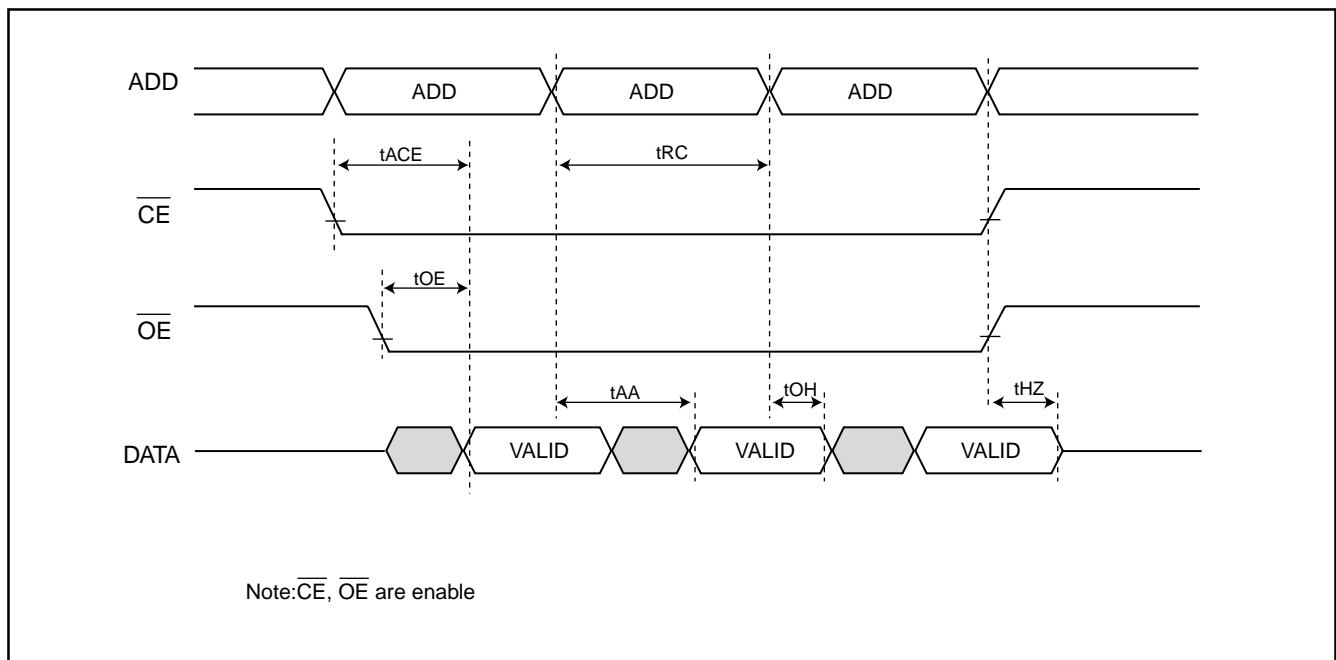
Note: No output loading is present in tester load board.

Active loading is used and under software programming control.

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

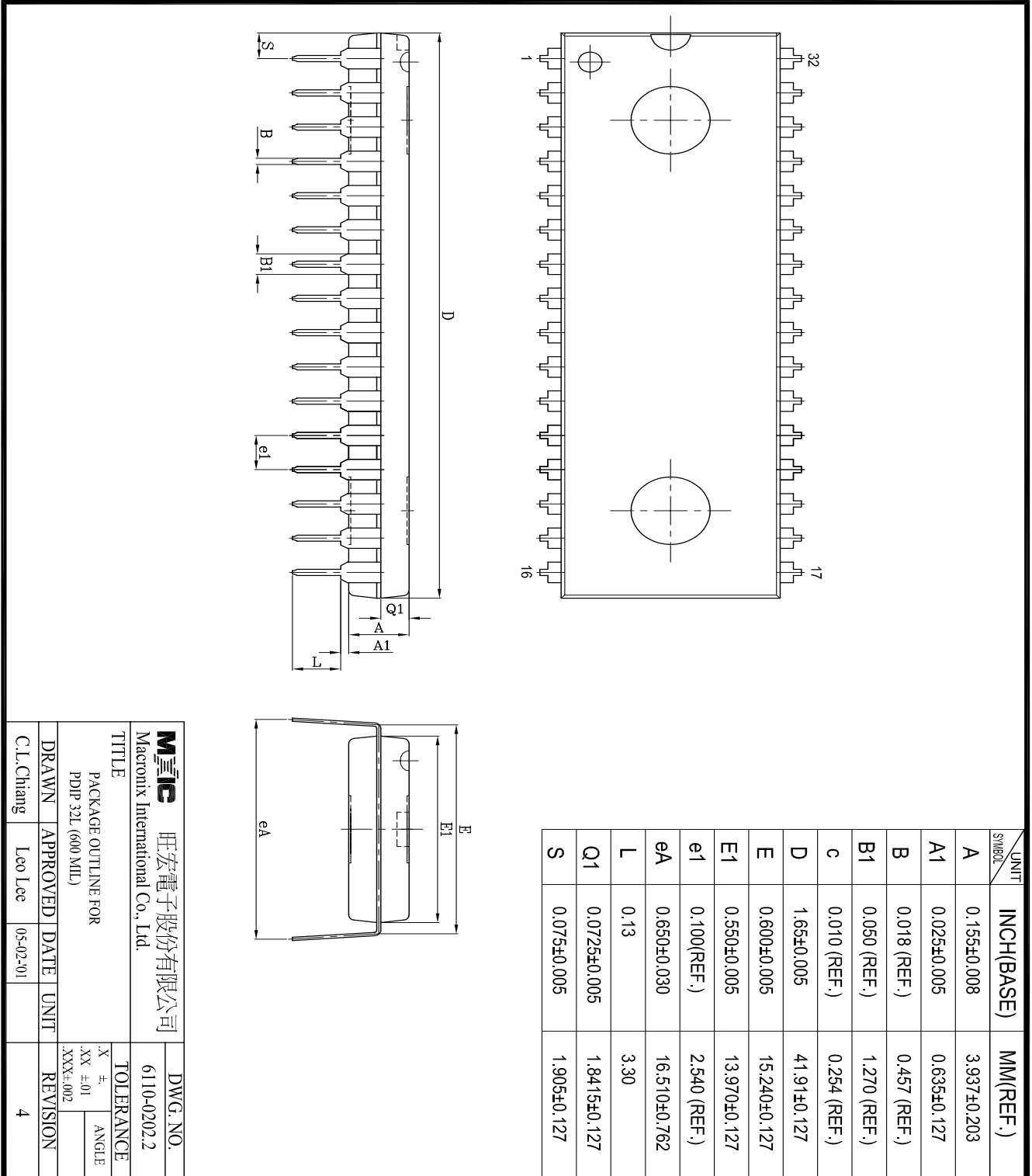
### TIMING DIAGRAM

#### RANDOM READ



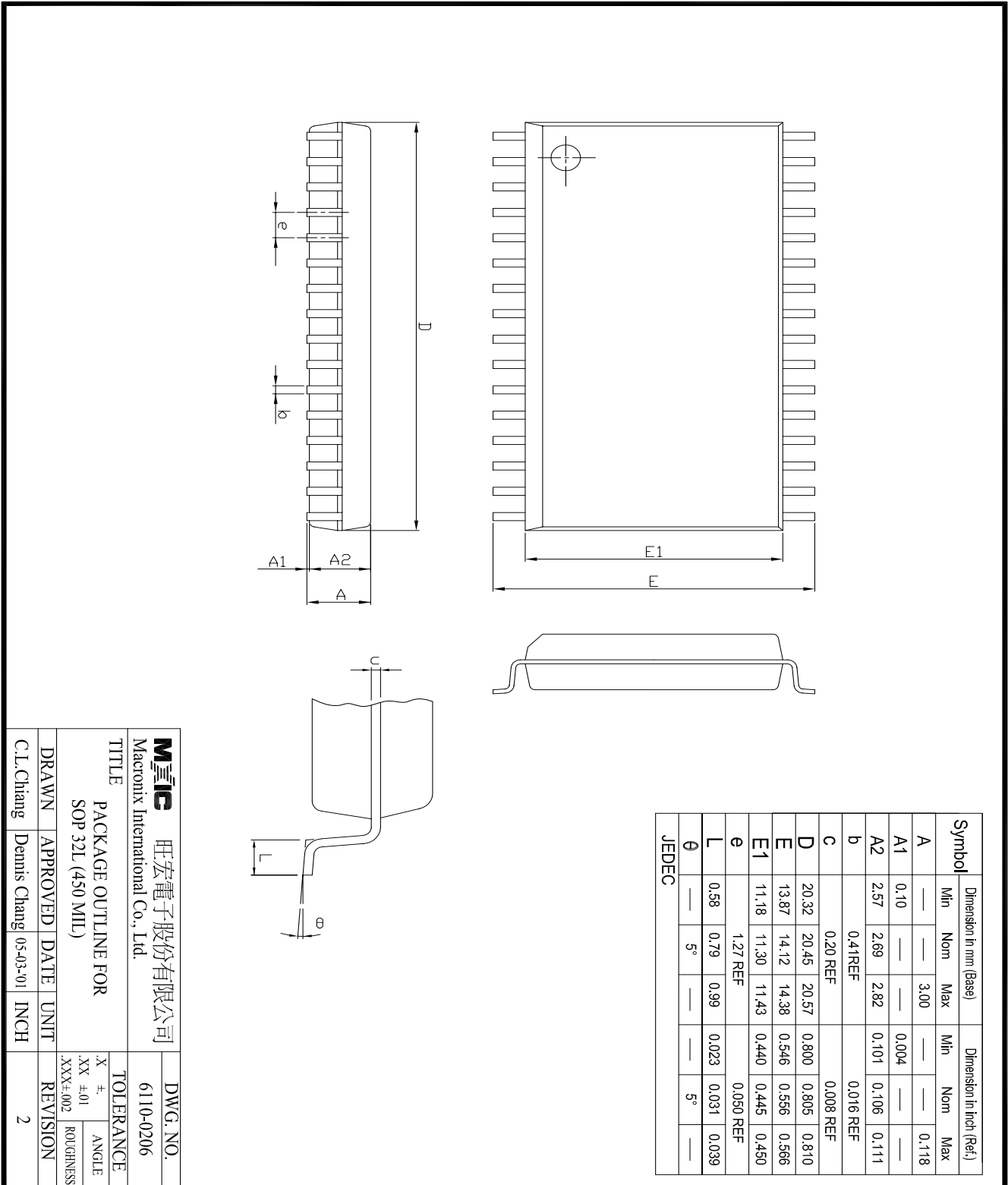
## PACKAGE INFORMATION

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



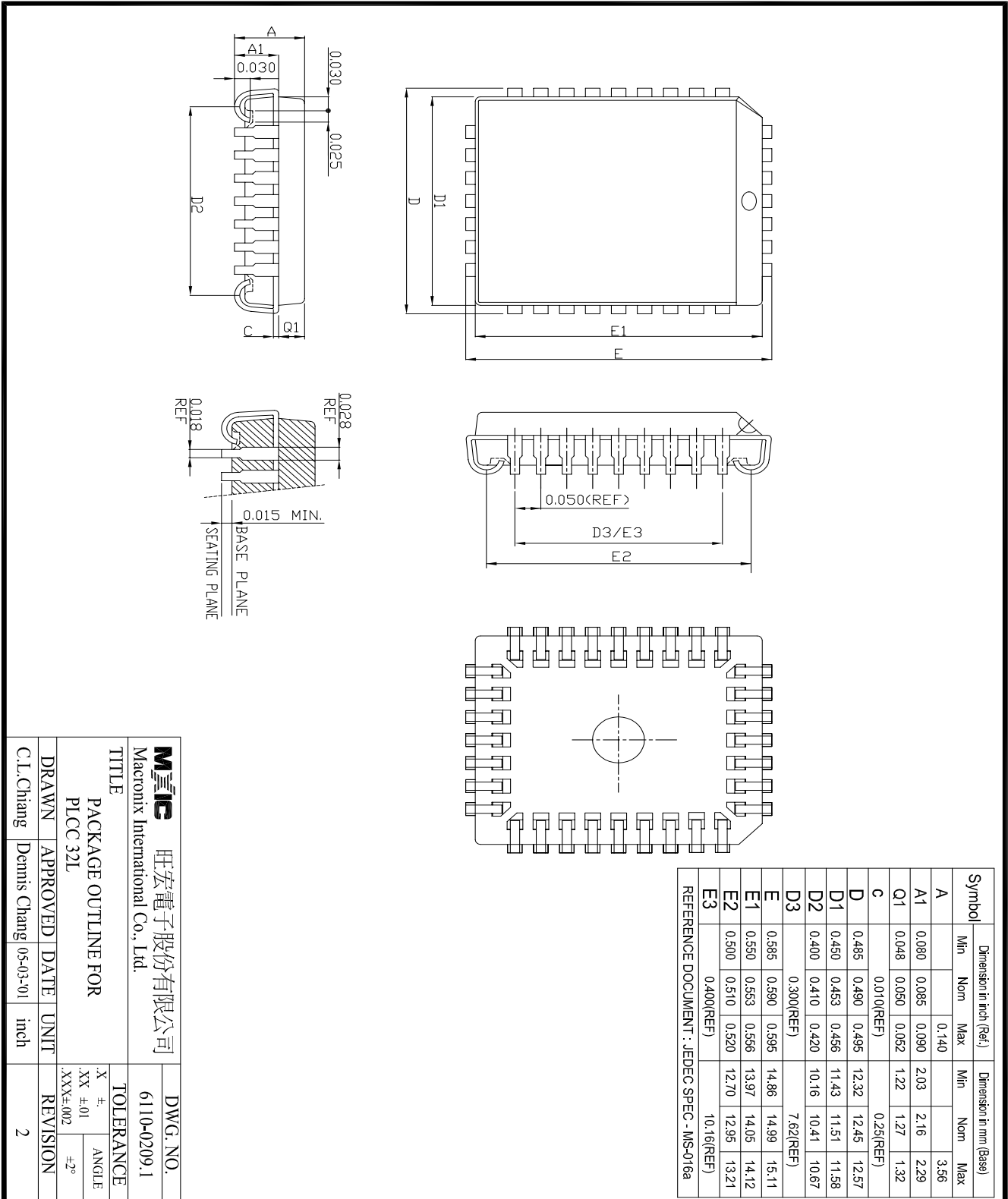
<b>MIIIC</b> 旺宏電子股份有限公司		DWG. NO.	
Macronix International Co., Ltd.		6110-0202.2	
TITLE			
PACKAGE OUTLINE FOR		TOLERANCE	
PDP 32L (600 MIL)		.X ±.01	
		.XX ±.01	
		.XXX±.002	
DRAWN	APPROVED	DATE	UNIT
C.L.Chang	Leo Lee	05-02-01	
REVISION			4

## 32-PIN PLASTIC SOP (450 mil)



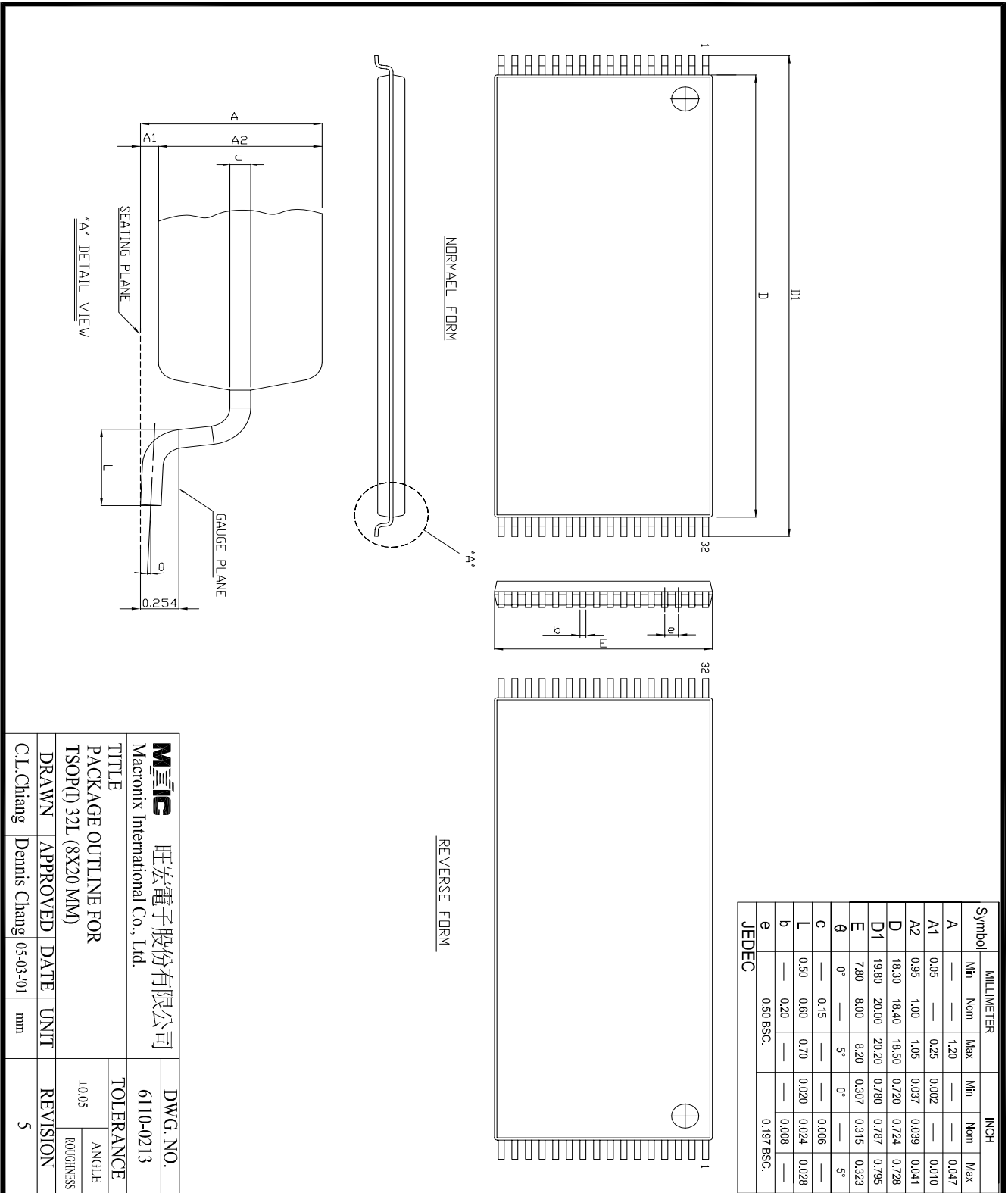
<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 6110-0206	
TITLE PACKAGE OUTLINE FOR SOP 32L (450 MIL)			
DRAWN	APPROVED	DATE	UNIT
C.L.Chiang	Dennis Chang	05-03-01	INCH
TOLERANCE		REVISION	
X ±.	XX ±.01	ANGLE	
XXX±.002	ROUGHNESS		
2		2	

## 32-PIN PLASTIC LEADED CHIP CARRIER (PLCC)



<b>MIIIC</b> 旺宏電子股份有限公司		DWG. NO.	
Macronix International Co., Ltd.		6110-0209.1	
TITLE			
PACKAGE OUTLINE FOR		TOLERANCE	
PLCC 32L		.X ±.	
DRAWN		APPROVED	
C.L.Chang		Dennis Chang	
DATE		05-03-01	
UNIT		inch	
REVISION		2	
ANGLE		±2°	
XXX±.002			

## 32-PIN PLASTIC TSOP



<b>Mxic</b> 旺宏電子股份有限公司 Macronix International Co., Ltd.		DWG. NO. 6110-0213	
TITLE PACKAGE OUTLINE FOR TSOP(D) 32L (8X20 MM)		TOLERANCE ±0.05	
DRAWN C.L. Chiang	APPROVED Dennis Chang	DATE 05-03-01	UNIT mm
REVISION 5		REVISION 5	



**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>PAGE</b>	<b>DATE</b>
3.7	AC Characteristics: tOH 10ns --> 0ns	P3	JAN/29/1999
3.8	Add 4000PC-90 32 pin PDIP	P1	JUN/02/1999
3.9	Modify DC Characteristics:ILI/ILO:5uA-->10uA; ISTB2:100mA-->100uA	P2	OCT/17/2000
4.0	Modify Package Information	P4~7	JUL/16/2001





**MX23C4000**

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