



# MX23L4000

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

### FEATURES

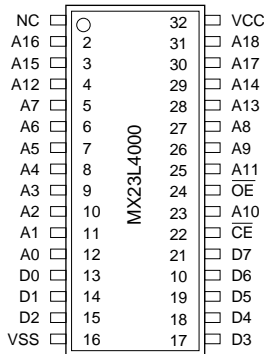
- Bit organization
  - 512Kb x 8 (byte mode)
- Fast access time
  - Random access: 150ns (max.) for 2.7~3.6V
- Current
  - Operating: 20mA
  - Standby: 20uA
- Supply voltage
  - 2.7V~3.6V
- Package
  - 32 pin SOP (450mil)
  - 32 pin TSOP (8mm x 20mm)

### ORDER INFORMATION

Part No.	Access Time	Package
MX23L4000MI-15	150ns	32 pin SOP (Industrial)
MX23L4000MI-20	200ns	32 pin SOP (Industrial)
MX23L4000TC-15	150ns	32 pin TSOP
MX23L4000TC-20	200ns	32 pin TSOP
MX23L4000TI-15	150ns	32 pin TSOP (Industrial)
MX23L4000TI-20	200ns	32 pin TSOP (Industrial)

### PIN CONFIGURATION

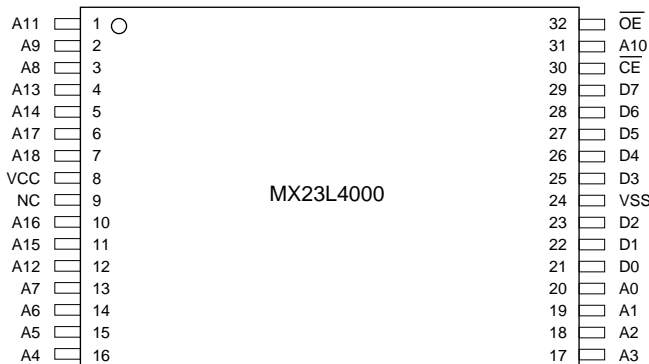
#### 32 SOP



### 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 TSOP



**ABSOLUTE MAXIMUM RATINGS**

Item	Symbol	Ratings
Voltage on any Pin Relative to VSS	VIN	-0.3V to 3.9V
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 = 2.7V~3.6V)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	VCC-0.2V	-	IOH = -0.4mA
Output Low Voltage	VOL	-	0.2V	IOL = 1.6mA
Input High Voltage	VIH	2.1V	VCC+0.3V	
Input Low Voltage	VIL	-0.3V	0.4V	
Input Leakage Current	ILI	-	10uA	0V, VCC
Output Leakage Current	ILO	-	10uA	0V, VCC
Operating Current	ICC1	-	20mA	f=5MHz, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ =VIH
Standby Current (CMOS)	ISTB2	-	20uA	$\overline{CE}$ > VCC - 0.2V
Input Capacitance	CIN	-	10pF	Ta = 25°C, f = 1MHZ
Output Capacitance	COUT	-	10pF	Ta = 25°C, f = 1MHZ

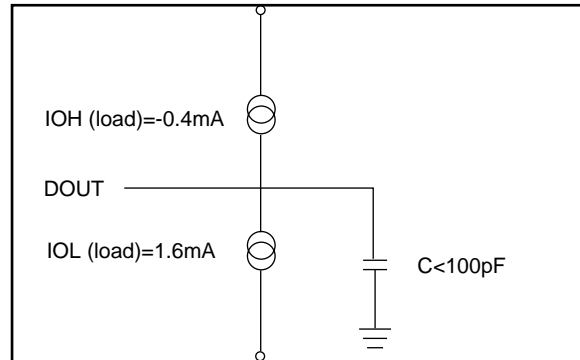
**AC CHARACTERISTICS** (Ta = -40°C ~ 85°C, VCC = 2.7V~3.6V)

Item	Symbol	23L4000-15		23L4000-20	
		MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	150ns	-	200ns	-
Address Access Time	tAA	-	150ns	-	200ns
Chip Enable Access Time	tACE	-	150ns	-	200ns
Output Enable Time	tOE	-	70ns	-	100ns
Output Hold After Address	tOH	0ns	-	0ns	-
Output High Z Delay	tHZ	-	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

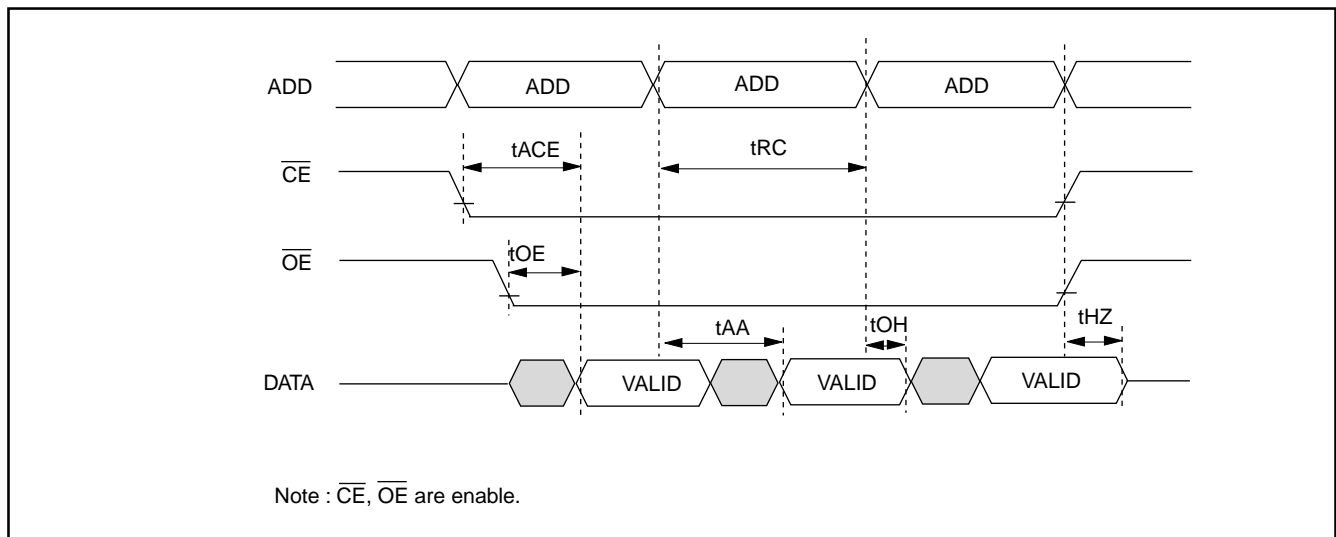
Input Pulse Levels	0.4V~2.4V
Input Rise and Fall Times	10ns
Input Timing Level	1.4V
Output Timing Level	1.4V
Output Load	See Figure



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

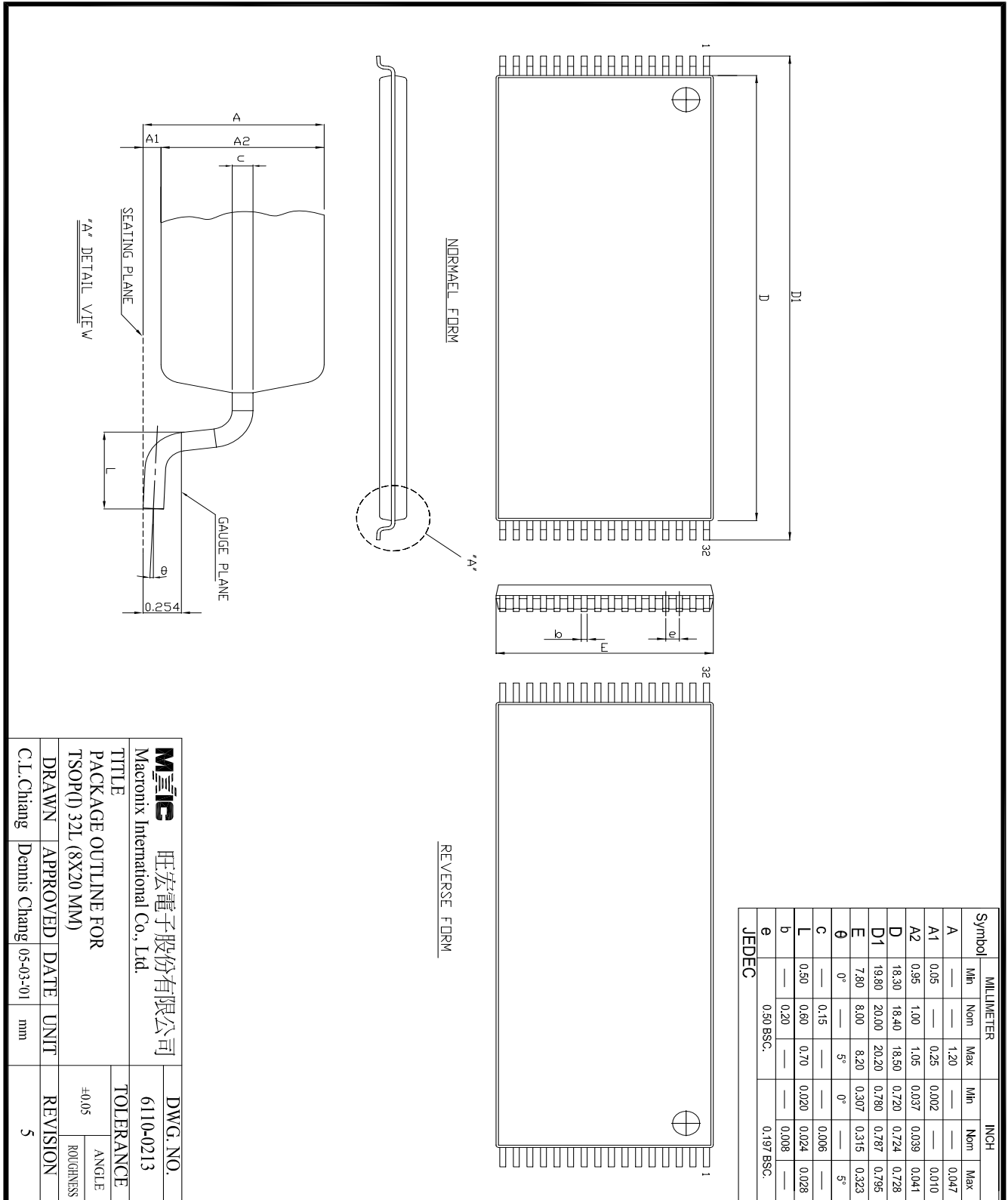
### 32-PIN PLASTIC SOP (450 mil)

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	20.32	20.45	20.57	0.800	0.805	0.810
E	13.87	14.12	14.38	0.546	0.556	0.566
E1	11.18	11.30	11.43	0.440	0.445	0.450
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.	6110-0206
Macronix International Co., Ltd.			
TITLE PACKAGE OUTLINE FOR SOP 32L (450 MIL)			
DRAWN	C.L.Chang	APPROVED	Dennis Chang
DATE	05-03-01	UNIT	INCH
REVISION	2		
TOLERANCE			
X #	±		
XX	±.01	ANGLE	
.XXX±.002		ROUGHNESS	

## 32-PIN PLASTIC TSOP



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



**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>PAGE</b>	<b>DATE</b>
1.4	AC CHARACTERISTICS tOH 25ns-->0ns	P3	FEB/01/1999
1.5	1.To modify Absolute Maximum Ratings 2.To modify DC Characteristics 3.To modify Package Information	P2 P2 P4,5	JUN/19/2001



**MX23L4000**

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**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)**