

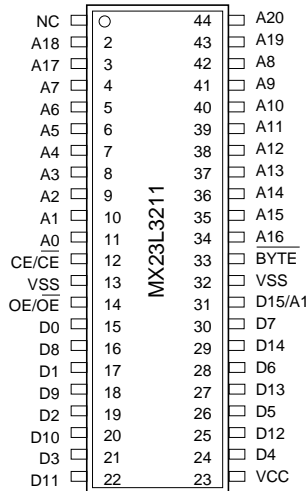
## 32M-BIT MASK ROM (8/16-BIT OUTPUT)

### FEATURES

- Bit organization
  - 4M x 8 (byte mode)
  - 2M x 16 (word mode)
- Fast access time
  - Random access: 70ns (max.)
  - Page access: 25ns (max.)
- Page Size
  - 8 words per page
- Current
  - Operating: 40mA
  - Standby: 5uA
- Supply voltage
  - 3.0V ~ 3.6V for 90ns and 70ns speed grades
  - 2.7V ~ 3.6V for 100ns and 120ns speed grades
- Package
  - 44 pin SOP (500mil)
  - 48 pin TSOP (12mm x 20mm)

### PIN CONFIGURATION

#### 44 SOP



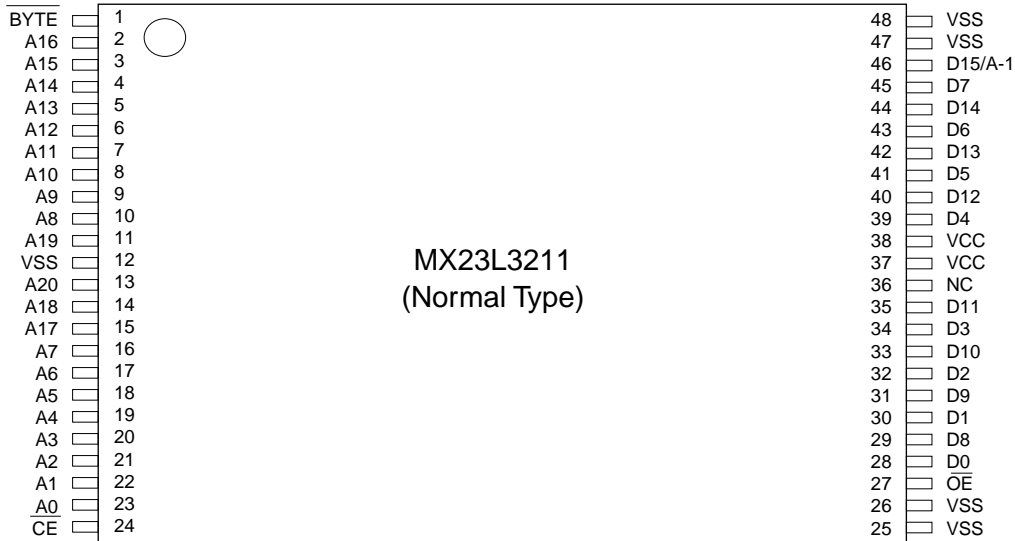
### PIN DESCRIPTION

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

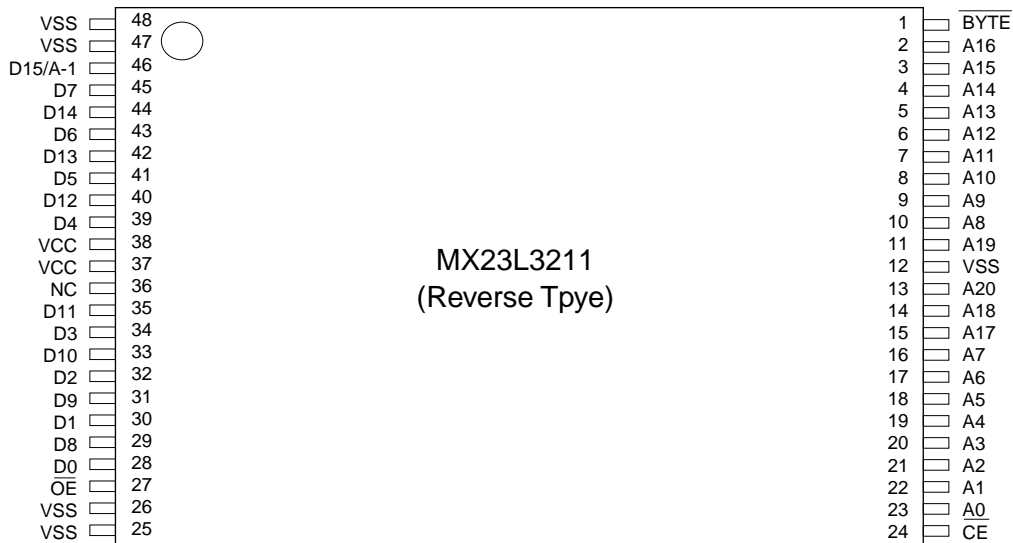
### ORDER INFORMATION

Part No.	Access Time	Page Access Time	Package	Remark
MX23L3211MC-70	70ns	25ns	44 pin SOP	
MX23L3211MC-90	90ns	25ns	44 pin SOP	
MX23L3211MC-10	100ns	30ns	44 pin SOP	
MX23L3211MC-12	120ns	50ns	44 pin SOP	
MX23L3211MC-10G	100ns	30ns	44 pin SOP	Pb-free
MX23L3211MC-12G	120ns	50ns	44 pin SOP	Pb-free
MX23L3211TC-90	90ns	25ns	48 pin TSOP	
MX23L3211TC-10	100ns	30ns	48 pin TSOP	
MX23L3211TC-12	120ns	50ns	48 pin TSOP	
MX23L3211TC-10G	100ns	30ns	48 pin TSOP	Pb-free
MX23L3211TC-12G	120ns	50ns	48 pin TSOP	Pb-free
MX23L3211RC-90	90ns	25ns	48 pin TSOP(Reverse type)	
MX23L3211RC-10	100ns	30ns	48 pin TSOP(Reverse type)	
MX23L3211RC-12	120ns	50ns	48 pin TSOP(Reverse type)	

## 48 TSOP (Normal Type)

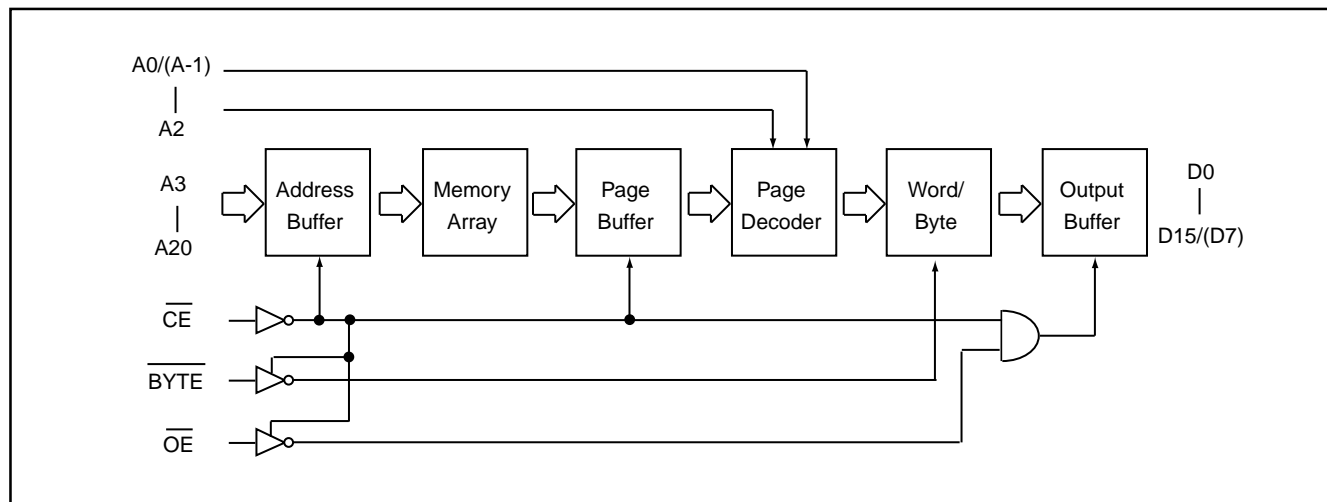


## 48 TSOP (Reverse Type)



## MODE SELECTION

$\overline{\text{CE}}$	$\overline{\text{OE}}$	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
Supply Voltage Relative to VSS	VCC	-0.3V to 4.3V
Voltage on any Pin Relative to VSS	VIN	-0.5V to VCC + 2.0V
Ambient Operating Temperature	T <sub>opr</sub>	0° C to 70° C
Storage Temperature	T <sub>stg</sub>	-65° C to 125° C

**DC CHARACTERISTICS** (T<sub>a</sub> = 0° C ~ 70° C, VCC = 2.7V~3.6V)

Item	Symbol	MIN.	MAX.	Conditions
Output High Voltage	VOH	2.4V	-	I <sub>OH</sub> = -400uA
Output Low Voltage	VOL	-	0.4V	I <sub>OL</sub> = 1.6mA
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	-	40mA	t <sub>RC</sub> = 100ns, all output open
Standby Current (TTL)	ISTB1	-	1mA	$\overline{CE}$ = VIH
Standby Current (CMOS)	ISTB2	-	5uA	$\overline{CE}$ > VCC-0.2V
Input Capacitance	CIN	-	10pF	T <sub>a</sub> = 25° C, f = 1MHZ
Output Capacitance	COUT	-	10pF	T <sub>a</sub> = 25° C, f = 1MHZ

## AC CHARACTERISTICS (Ta = 0° C ~ 70° C, VCC = 2.7V~3.6V)

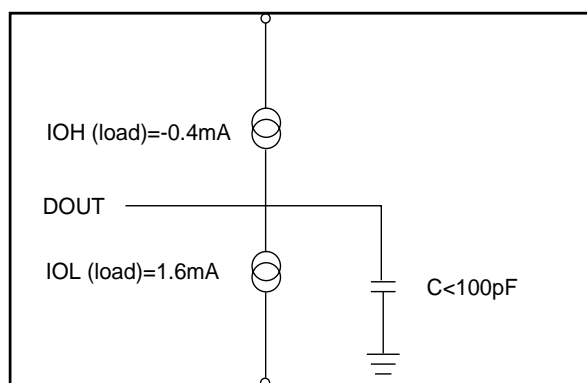
Item	Symbol	23L3211-70*		23L3211-90		23L3211-10		23L3211-12	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Read Cycle Time	tRC	70ns	-	90ns	-	100ns	-	120ns	-
Address Access Time	tAA	-	70ns	-	90ns	-	100ns	-	120ns
Chip Enable Access Time	tACE	-	70ns	-	90ns	-	100ns	-	120ns
Page Mode Access Time	tPA	-	25ns	-	25ns	-	30ns	-	50ns
Output Enable Time	tOE	-	25ns	-	25ns	-	30ns	-	50ns
Output Hold After Address	tOH	0ns	-	0ns	-	0ns	-	0ns	-
Output High Z Delay	tHZ*	-	20ns	-	20ns	-	20ns	-	20ns

**Note:**

1. 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.
2. For 70ns speed grade, the VCC range is 3.0~3.6V, operating temperature 0~55° C, and output load is 30pF.

## AC Test Conditions

Input Pulse Levels	0.4V~ 2.6V
Input Rise and Fall Times	10ns
Input Timing Level	1.4V
Output Timing Level	1.4V
Output Load	See Figure

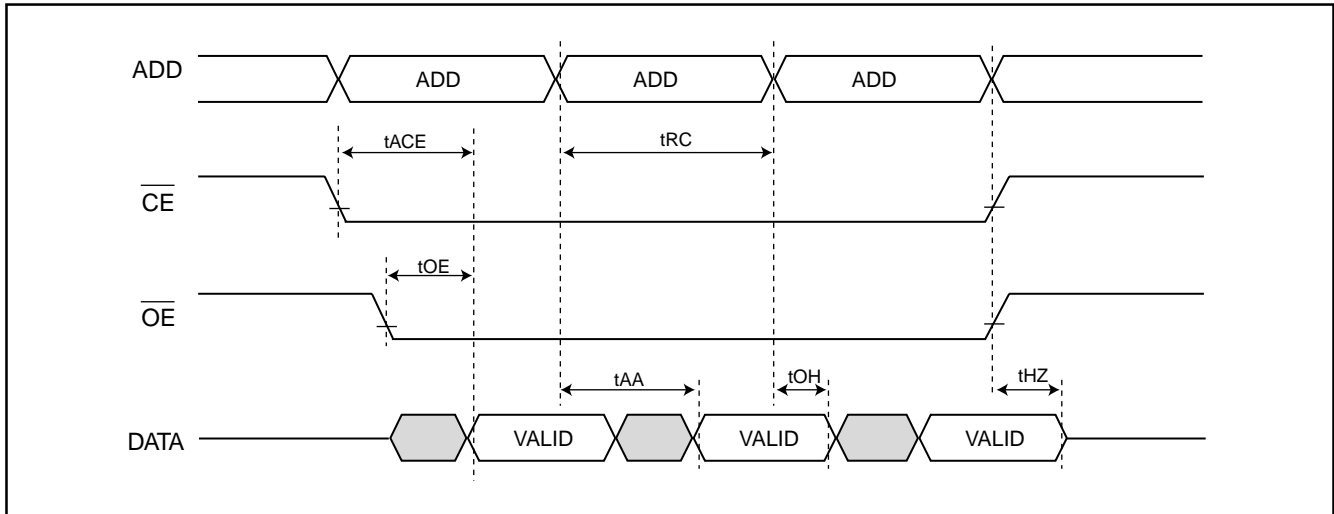


**Note:**

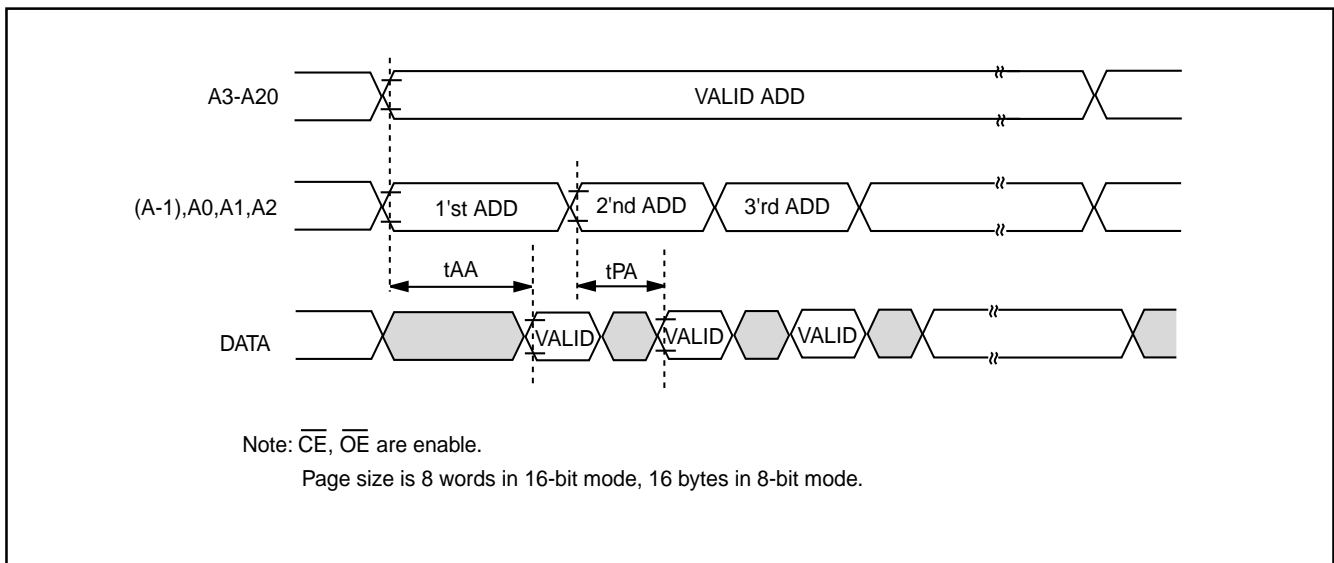
- No output loading is present in tester load board.
- Active loading is used and under software programming control.
- Output loading capacitance includes load board's and all stray capacitance.

## TIMING DIAGRAM

### RANDOM READ

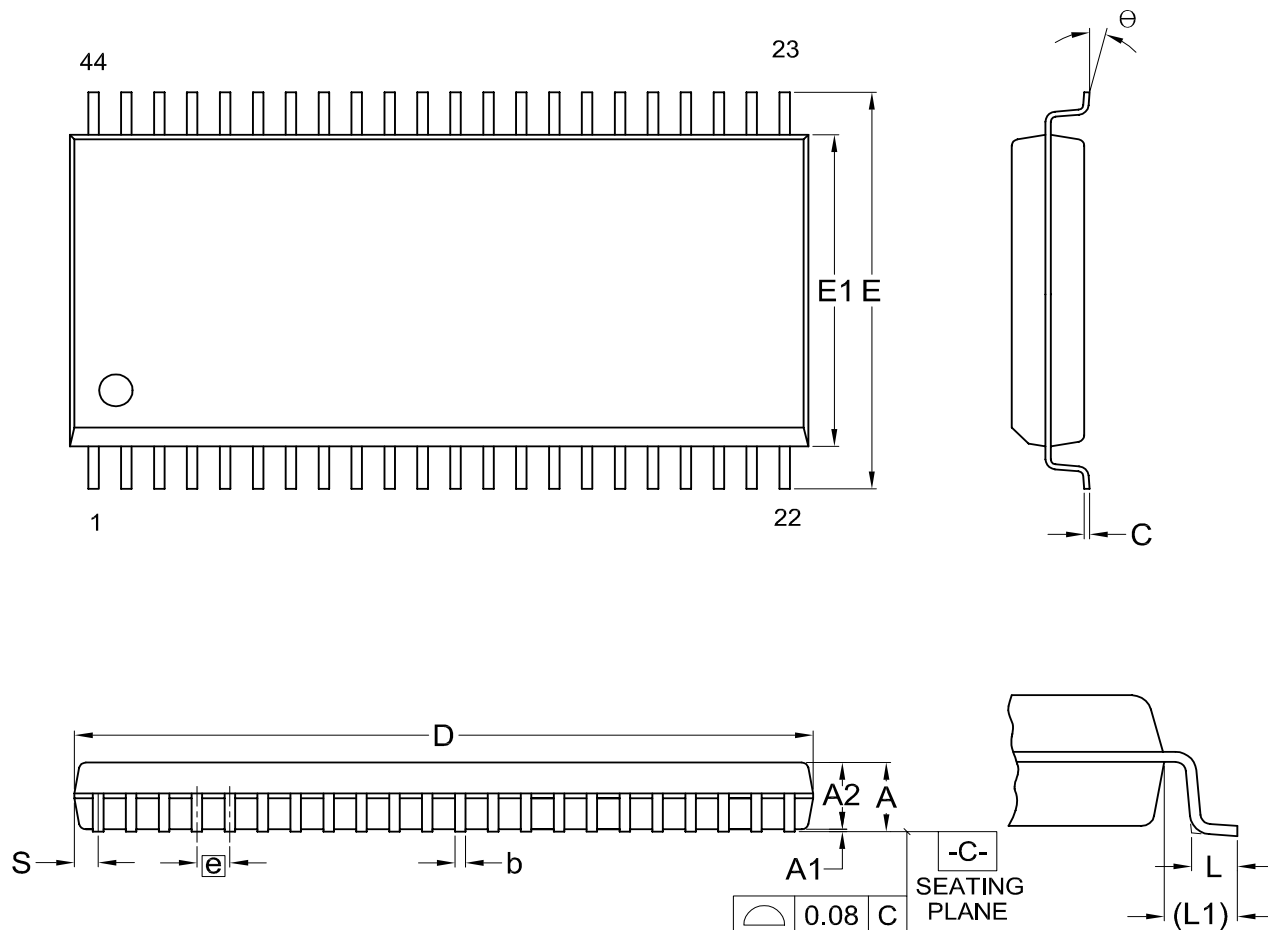


### PAGE READ



## PACKAGE INFORMATION

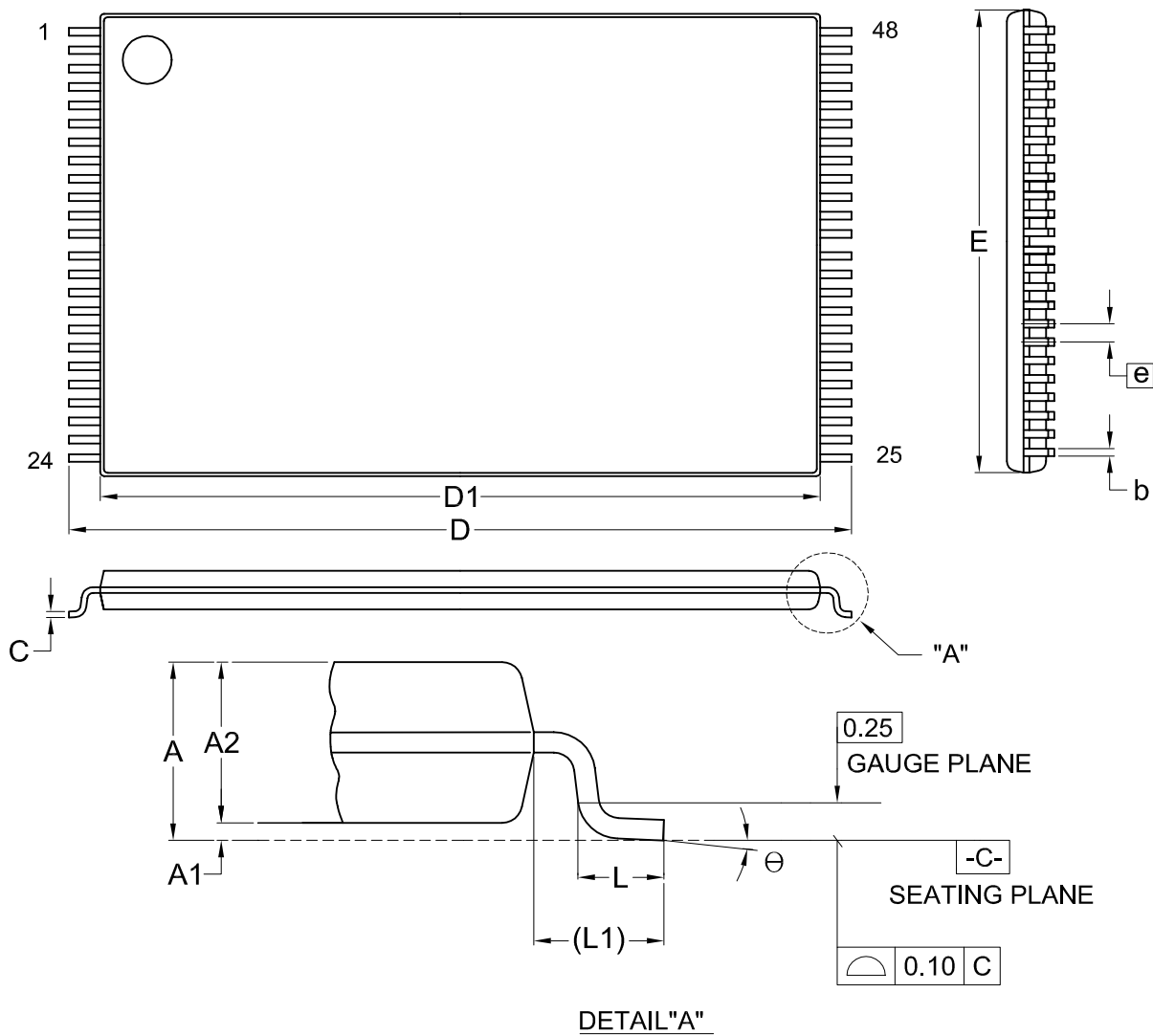
Title: Package Outline for SOP 44L (500MIL)



Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	C	D	E	E1	e	L	L1	S	$\theta$
UNIT														
mm	Min.	---	0.10	2.59	0.36	0.15	28.37	15.83	12.47		0.56	1.51	0.78	0
	Nom.	---	0.15	2.69	0.41	0.20	28.50	16.03	12.60	1.27	0.76	1.71	0.91	5
	Max.	3.00	0.20	2.80	0.51	0.25	28.63	16.23	12.73		0.96	1.91	1.04	10
Inch	Min.	---	0.004	0.102	0.014	0.006	1.117	0.623	0.491		0.022	0.059	0.031	0
	Nom.	---	0.006	0.106	0.016	0.008	1.122	0.631	0.496	0.050	0.030	0.067	0.036	5
	Max.	0.118	0.008	0.110	0.020	0.010	1.127	0.639	0.501		0.038	0.075	0.041	10

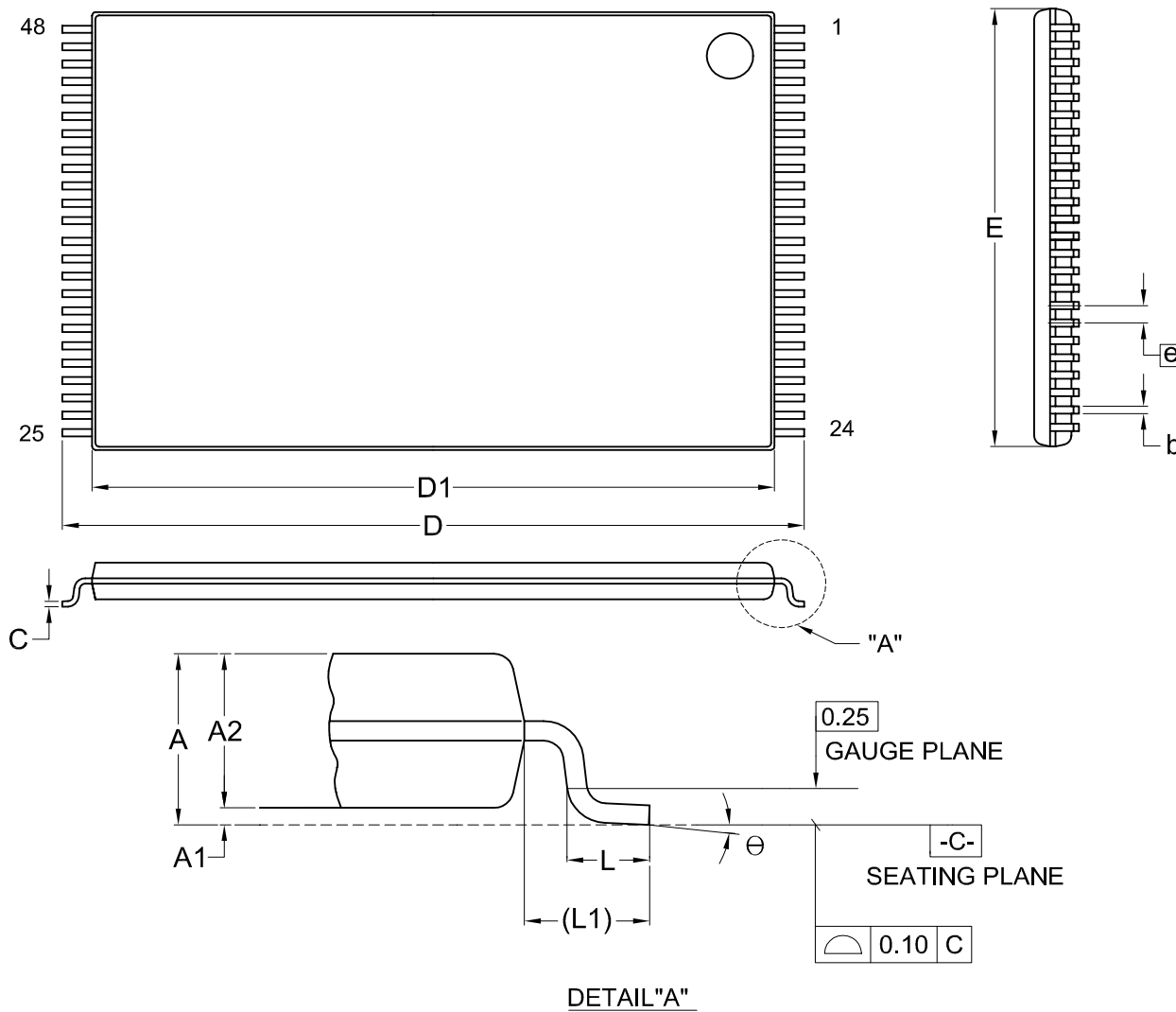
DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1405	6	MO-175			11-26-'03

**Title: Package Outline for TSOP(I) 48L (12X20mm)NORMAL FORM**


Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	C	D	D1	E	e	L	L1	θ
UNIT													
mm	Min.	---	0.05	0.95	0.17	0.10	19.80	18.30	11.90		0.50	0.70	0
	Nom.	---	0.10	1.00	0.20	0.13	20.00	18.40	12.00	0.50	0.60	0.80	5
	Max.	1.20	0.15	1.05	0.27	0.21	20.20	18.50	12.10		0.70	0.90	8
Inch	Min.	---	0.002	0.037	0.007	0.004	0.780	0.720	0.469		0.020	0.028	0
	Nom.	---	0.004	0.039	0.008	0.005	0.787	0.724	0.472	0.020	0.024	0.031	5
	Max.	0.047	0.006	0.041	0.011	0.008	0.795	0.728	0.476		0.028	0.035	8

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1607	7	MO-142			12-01-'03

**Title: Package Outline for TSOP(I) 48L (12X20mm)REVERSE FORM**

DETAIL "A"

Dimensions (inch dimensions are derived from the original mm dimensions)

SYMBOL		A	A1	A2	b	C	D	D1	E	e	L	L1	θ
UNIT													
mm	Min.	---	0.05	0.95	0.17	0.10	19.80	18.30	11.90		0.50	0.70	0
	Nom.	---	0.10	1.00	0.20	0.13	20.00	18.40	12.00	0.50	0.60	0.80	5
	Max.	1.20	0.15	1.05	0.27	0.21	20.20	18.50	12.10		0.70	0.90	8
Inch	Min.	---	0.002	0.037	0.007	0.004	0.780	0.720	0.469		0.020	0.028	0
	Nom.	---	0.004	0.039	0.008	0.005	0.787	0.724	0.472	0.020	0.024	0.031	5
	Max.	0.047	0.006	0.041	0.011	0.008	0.795	0.728	0.476		0.028	0.035	8

DWG.NO.	REVISION	REFERENCE			ISSUE DATE
		JEDEC	EIAJ		
6110-1607.1	7	MO-142			12-01-'03





**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>PAGE</b>	<b>DATE</b>
2.0	Output hold after address (tOH) spec is revised as 0ns(min.) 120ns speed grade's voltage range is revised as 2.7V~3.6V	P4 P1	JAN/22/1999
2.1	Modify Package Information	P6~7	JUL/17/2001
2.2	1. Add supply voltage relative to VSS 2. Change voltage on any pin relative to VSS:-0.5V to VCC+2.0	P3 P3	JUL/25/2002
2.3	1. Supply voltage change to 2.7V ~ 3.6V	P1	JUL/26/2002
2.4	1. Modify VIN : -0.5V to VCC + 2V --> -0.5V to VCC + 2.0V 2. Add 48-TSOP reverse type package information	P3 P8	AUG/21/2002
2.5	To modify Package Information	P6~8	NOV/21/2002
2.6	1. Add access time:70ns, 90ns	P1,4	JAN/20/2003
2.7	1. Add MX23L3211MC-90 in Order Information	P1	JAN/22/2003
2.8	1. Modify Timing Diagram--Page Read	P5	JAN/23/2003
2.9	1. Add Pb-free package in order information	P1	MAY/11/2004



**MX23L3211**

---

---

**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

**Hong Kong Office :**

TEL:+86-755-834-335-79

FAX:+86-755-834-380-78

**Japan Office :**

**Kawasaki Office :**

TEL:+81-44-246-9100

FAX:+81-44-246-9105

**Osaka Office :**

TEL:+81-6-4807-5460

FAX:+81-6-4807-5461

**Singapore Office :**

TEL:+65-6346-5505

FAX:+65-6348-8096

**Taipei Office :**

TEL:+886-2-2509-3300

FAX:+886-2-2509-2200

**MACRONIX AMERICA, INC.**

TEL:+1-408-262-8887

FAX:+1-408-262-8810

*<http://www.macronix.com>*

---