

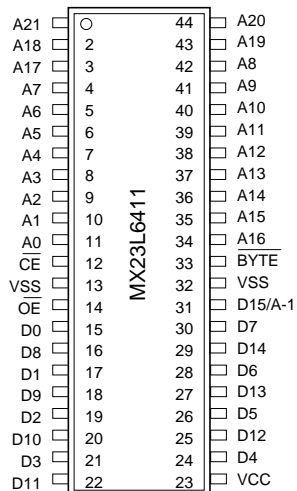
## 64M-BIT (8M x 8 / 4M x 16) Mask ROM with Page Mode

### FEATURES

- Bit organization
  - 8M x 8 (byte mode)
  - 4M x 16 (word mode)
- Fast access time
  - Random access: 100ns (max.)
  - Page access: 30ns (max.)
- Page Size
  - 8 words per page
- Current
  - Operating: 50mA
  - Standby: 15uA (max.)
- Supply voltage
  - 2.7V~3.3V
- Package
  - 44 pin SOP (500 mil)
  - 48 pin TSOP (12mm x 20mm)

### PIN CONFIGURATION

#### 44 SOP



### ORDER INFORMATION

| Part No.       | Access | Page Access | Package                       |
|----------------|--------|-------------|-------------------------------|
|                | Time   | Time        |                               |
| MX23L6411MC-12 | 120ns  | 50ns        | 44 pin SOP                    |
| MX23L6411TC-12 | 120ns  | 50ns        | 48 pin TSOP                   |
| MX23L6411RC-12 | 120ns  | 50ns        | 48 pin TSOP<br>(Reverse type) |
| MX23L6411MC-10 | 100ns  | 30ns        | 44 pin SOP                    |
| MX23L6411TC-10 | 100ns  | 30ns        | 48 pin TSOP                   |
| MX23L6411RC-10 | 100ns  | 30ns        | 48 pin TSOP<br>(Reverse type) |

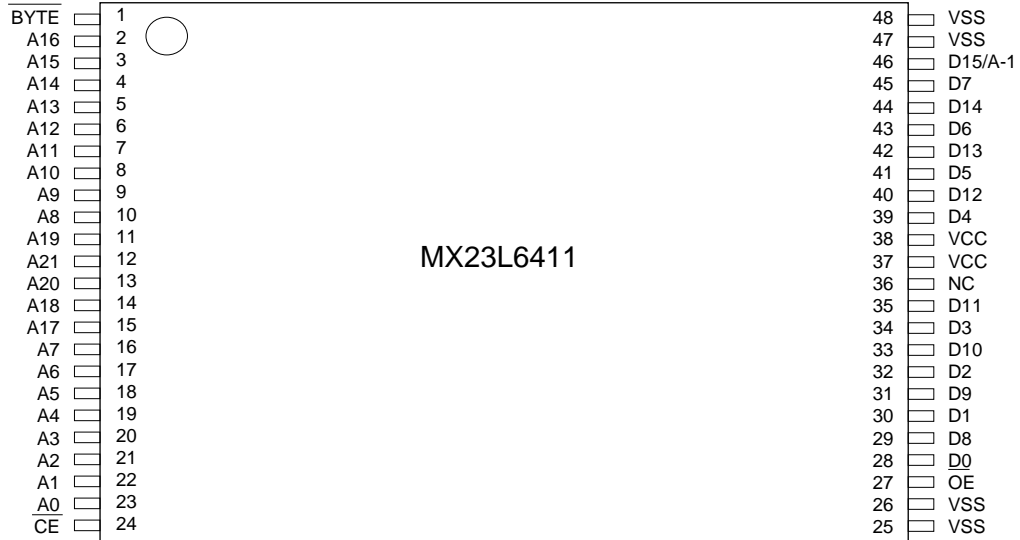
### PIN DESCRIPTION

| Symbol          | Pin Function                              |
|-----------------|---|
| A0~A21          | 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                             |

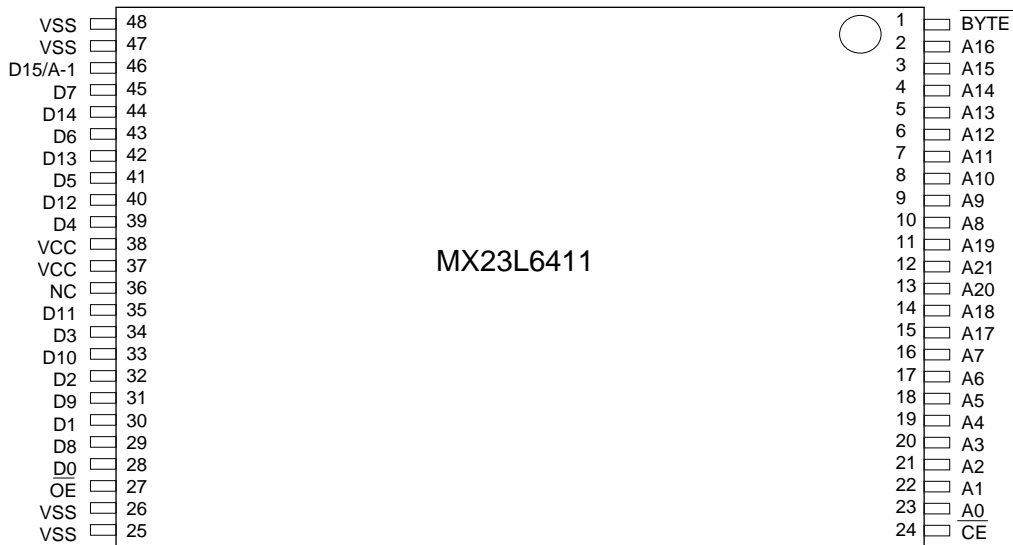
### MODE SELECTION

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

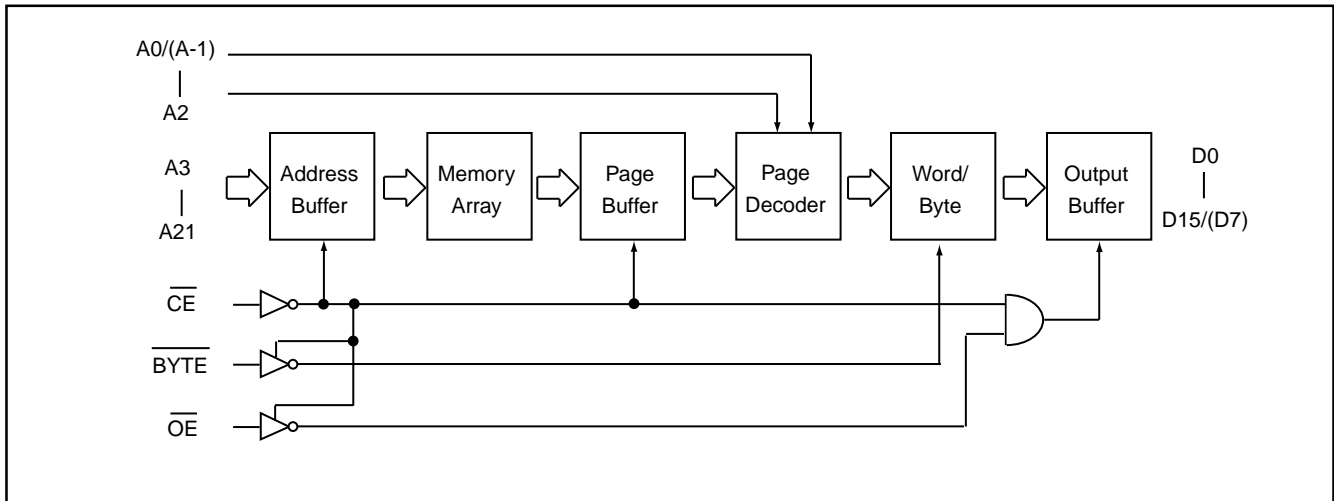
## 48 TSOP (NORMAL TYPE)



## 48 TSOP (REVERSE TYPE)



## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Item                               | Symbol           | Ratings        |
|------------------------------------|------------------|----------------|
| Voltage on any Pin Relative to VSS | VIN              | -1.3V to 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 |

Note: Minimum DC voltage on input or I/O pins is -0.5V. During voltage transitions, inputs may undershoot VSS to -1.3V for periods of up to 20ns. Maximum DC voltage on input or I/O pins is VCC+0.5V. During voltage transitions, input may overshoot VCC to VCC+2.0V for periods of up to 20ns.



## DC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 2.7V~3.3V)

| Item                   | Symbol | MIN.  | MAX.     | Conditions              |
|------------------------|--------|-------|----------|-------------------------|
| Output High Voltage    | VOH    | 2.4V  | -        | IOH = -0.4mA            |
| Output Low Voltage     | VOL    | -     | 0.4V     | IOL = 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   | -     | 50mA     | f=5MHz, 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     |

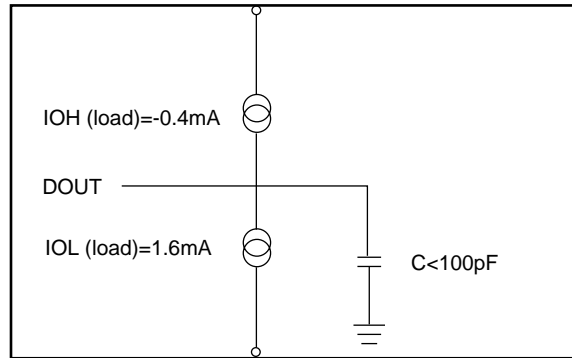
## AC CHARACTERISTICS (Ta = 0°C ~ 70°C, VCC = 2.7V~3.3V)

| Item                      | Symbol | 23L6411-10 |       | 23L6411-12 |       |
|---------------------------|--------|------------|-------|------------|-------|
|                           |        | MIN.       | MAX.  | MIN.       | MAX.  |
| Read Cycle Time           | tRC    | 100ns      | -     | 120ns      | -     |
| Address Access Time       | tAA    | -          | 100ns | -          | 120ns |
| Chip Enable Access Time   | tACE   | -          | 100ns | -          | 120ns |
| Page Mode Access Time     | tPA    | -          | 30ns  | -          | 50ns  |
| Output Enable Time        | tOE    | -          | 30ns  | -          | 50ns  |
| 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 |



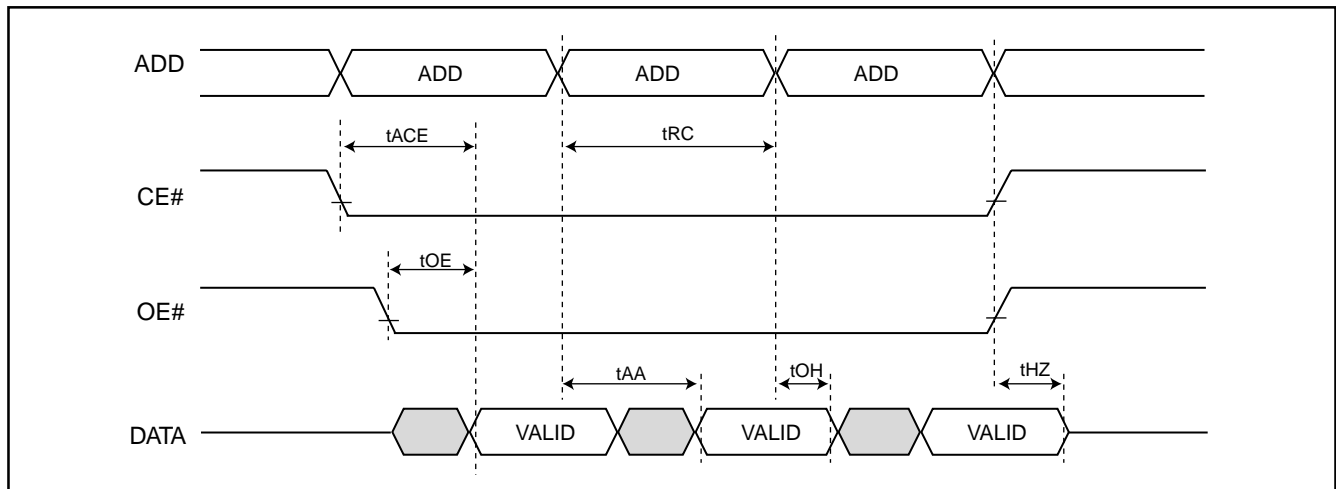
Note: No output loading is present in tester load board.

Active loading is used and under software programming control.

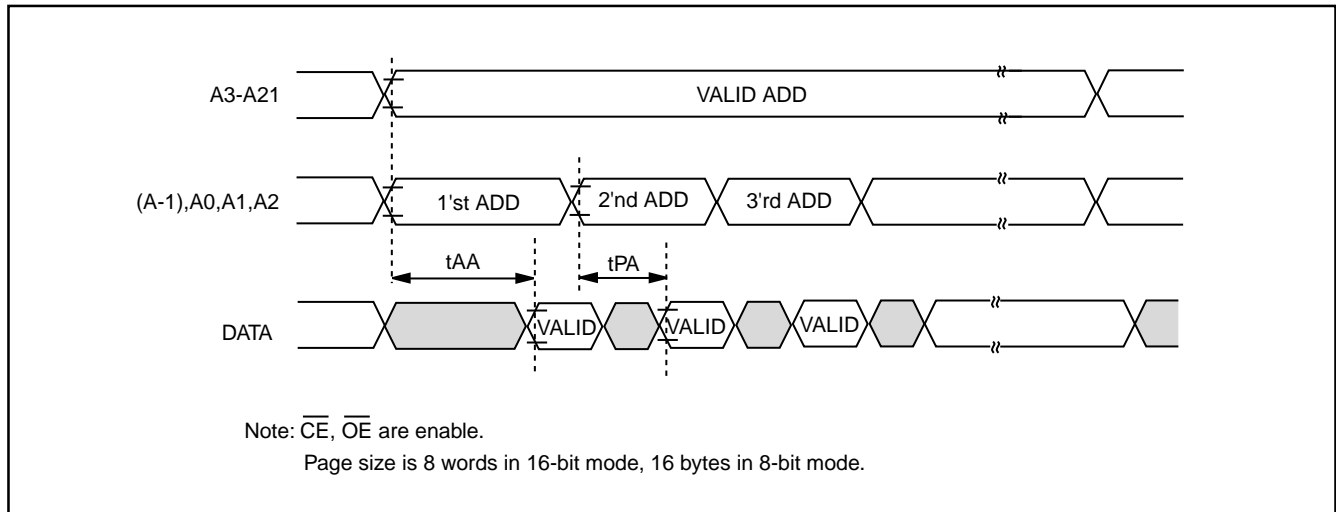
Output loading capacitance includes load board's and all stray capacitance.

## TIMING DIAGRAM

### RANDOM READ

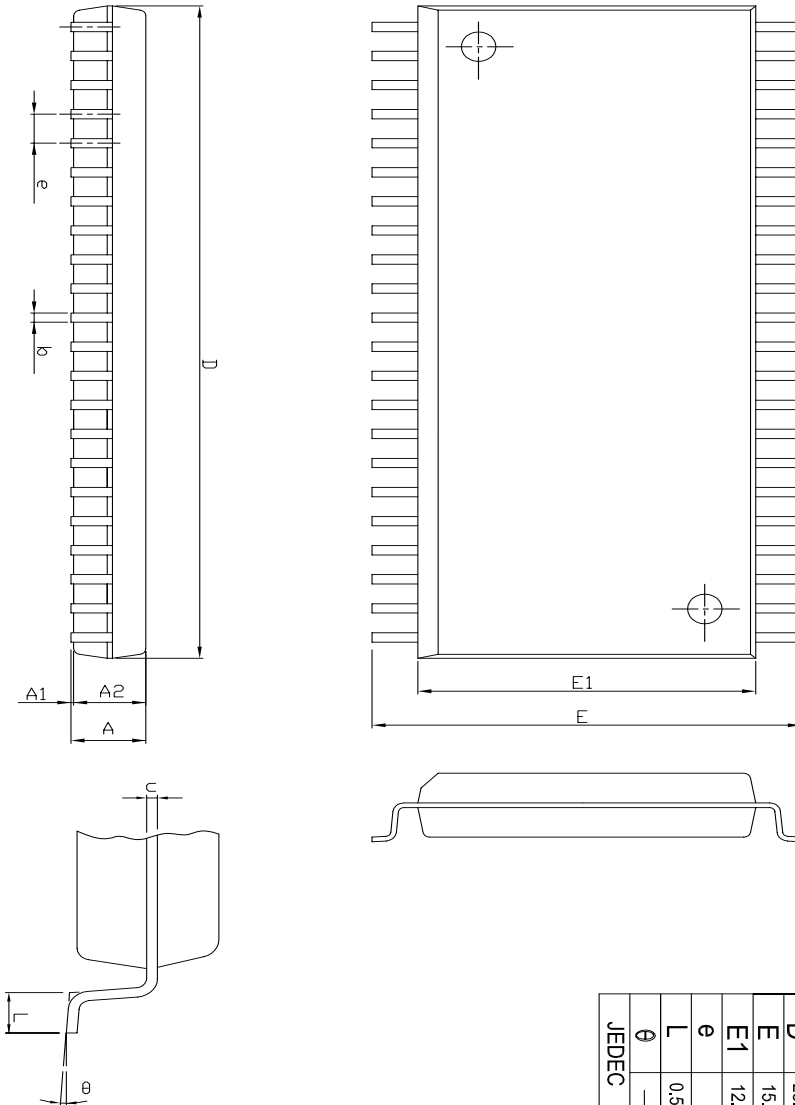


### PAGE READ



## PACKAGE INFORMATION

### 44-PIN PLASTIC SOP

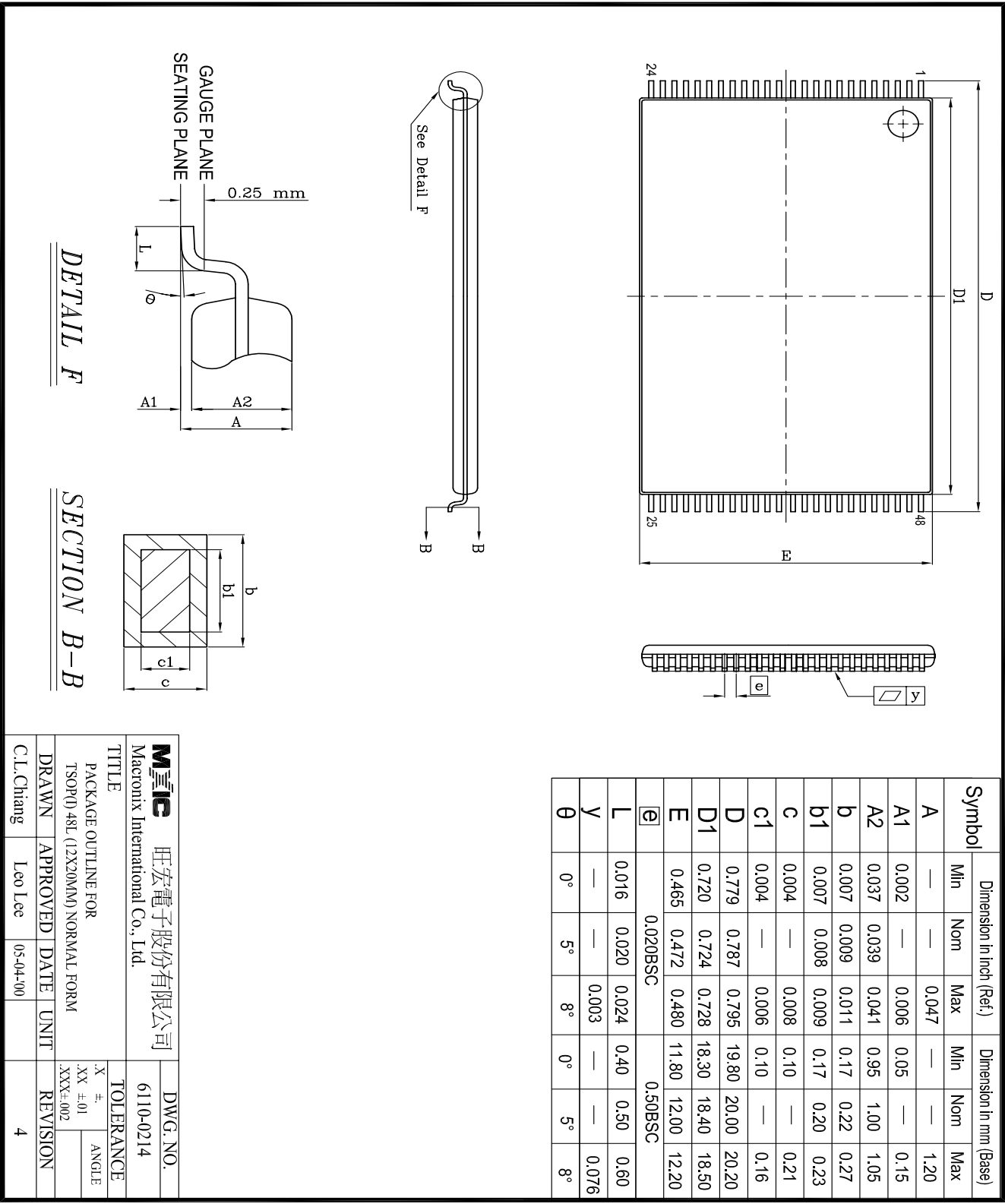


| Symbol | Dimension in mm (Base) |          |       | Dimension in inch (Ref.) |           |       |
|--------|------------------------|----------|-------|--------------------------|-----------|-------|
|        | Min                    | Nom      | Max   | Min                      | Nom       | Max   |
| A      | —                      | —        | 3.00  | —                        | —         | 0.118 |
| A1     | 0.10                   | —        | —     | 0.004                    | —         | —     |
| A2     | 2.57                   | 2.69     | 2.82  | 0.101                    | 0.106     | 0.111 |
| b      | —                      | 0.41REF  | —     | —                        | 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<br>Macromix International Co., Ltd. |              | DWG. NO.<br>6110-0207 |      |
| TITLE<br>PACKAGE OUTLINE FOR<br>SOP 44L (500 MIL)          |              |                       |      |
| DRAWN  | APPROVED     | DATE                  | UNIT |
| C.L.Chang  | Dennis Chang | 05-03-01              | INCH |
| TOLERANCE  |              | REVISION              |      |
| X ±  |              | 1                     |      |
| XX ±01   |              | ANGLE                 |      |
| .XXX±.002  |              | ROUGNESS              |      |
|  |              | 2                     |      |

## 48-PIN PLASTIC TSOP



**DETAIL F**

**SECTION B-B**

|   |                     |                       |               |
|---|---------------------|-----------------------|---------------|
| <b>旺宏電子股份有限公司</b><br>Macronix International Co., Ltd.             |                     | DWG. NO.<br>6110-0214 |               |
| TITLE<br>PACKAGE OUTLINE FOR<br>TSOP(0) 48L (12X20MM) NORMAL FORM |                     |                       |               |
| TOLERANCE<br>.X =<br>XX ±.01<br>.XXX±.002                         |                     | ANGLE                 |               |
| DRAWN<br>C.L. Chiang  | APPROVED<br>Leo Lee | DATE<br>05-04-00      | REVISION<br>4 |

**REVISION HISTORY**

| <b>REVISION</b> | <b>DESCRIPTION</b>   | <b>PAGE</b> | <b>DATE</b> |
|-----------------|--|-------------|-------------|
| 2.1             | AC CHARACTERISTICS tOH 10ns-->0ns                          | P4          | JAN/29/1999 |
| 2.2             | DC CHARACTERISTICS ISTB2 5uA-->15uA                        | P4          | SEP/03/1999 |
| 2.3             | DC Characteristics voltage range VCC=2.9V~3.6V-->3.0V~3.6V | P3          | DEC/24/1999 |
| 2.4             | Add 100ns speed grade                                      | P1,4        | JUL/02/2000 |
| 2.5             | Modify Operating Current:60mA-->50mA                       | P1,4        | DEC/29/2000 |
| 2.6             | Modify Package Information                                 | P6,7        | JUL/17/2001 |
| 2.7             | Change VCC from 3.0~3.6V to 2.7~3.3V                       | P1,3        | AUG/03/2001 |





**MX23L6411**

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