

# MR27T12800L

## 8M-Word × 16-Bit or 16M-Word × 8-Bit P2ROM

### FEATURES

- 8,388,608-word × 16-bit / 16,777,216-word × 8-bit electrically switchable configuration
- Access time  
2.7 V to 3.6 V power supply 90 ns MAX
- Operating current 25 mA MAX(5MHz)
- Standby current 10 μA MAX
- Input/Output TTL compatible
- Three-state output

### PACKAGES

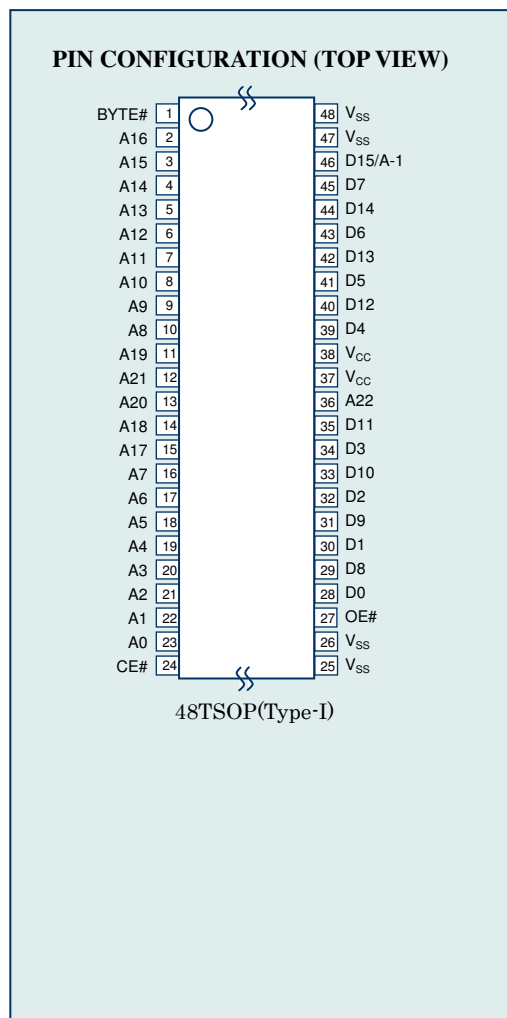
- MR27T12800L-xxxTN  
48-pin plastic TSOP (TSOP I 48-P-1220-0.50-1K)

### P2ROM ADVANCED TECHNOLOGY

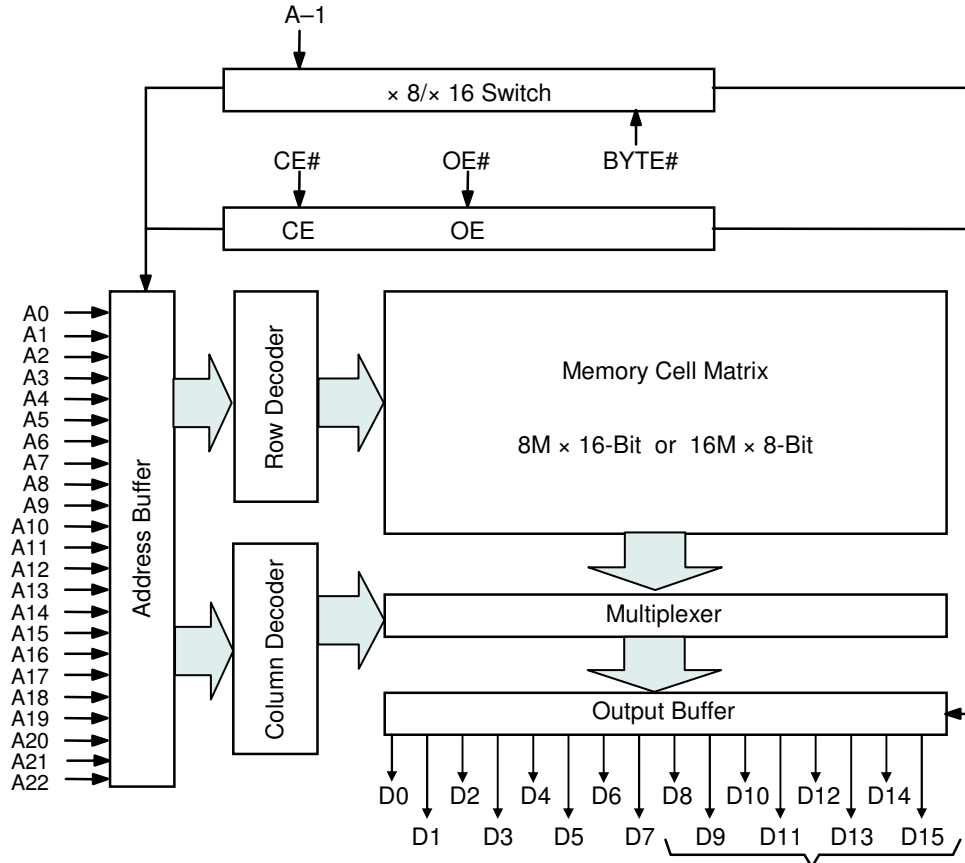
P2ROM stands for Production Programmed ROM. This exclusive LAPIS Semiconductor technology utilizes factory test equipment for programming the customers code into the P2ROM prior to final production testing.

Advancements in this technology allows production costs to be equivalent to MASKROM and has many advantages and added benefits over the other non-volatile technologies, which include the following;

- **Short lead time**, since the P2ROM is programmed at the final stage of the production process, a large P2ROM inventory "bank system" of un-programmed packaged products are maintained to provide an aggressive lead-time and minimize liability as a custom product.
- **No mask charge**, since P2ROMs do not utilize a custom mask for storing customer code, no mask charges apply.
- **No additional programming charge**, unlike Flash and OTP that require additional programming and handling costs, the P2ROM already has the code loaded at the factory with minimal effect on the production throughput. The cost is included in the unit price.
- **Custom Marking is** available at no additional charge.
- **Pin Compatible with Mask ROM.**



**BLOCK DIAGRAM**



In 8-bit output mode, these pins are placed in a high-Z state and pin D15 functions as the A-1 address pin.

**PIN DESCRIPTIONS**

| Pin name        | Functions                   |
|-----------------|-----------------------------|
| D15 / A-1       | Data output / Address input |
| A0 to A22       | Address inputs              |
| D0 to D14       | Data outputs                |
| CE#             | Chip enable input           |
| OE#             | Output enable input         |
| BYTE#           | Word / Byte select input    |
| V <sub>CC</sub> | Power supply voltage        |
| V <sub>SS</sub> | Ground                      |

## FUNCTION TABLE

| Mode           | CE# | OE# | BYTE# | V <sub>CC</sub>      | D0 to D7         | D8 to D14 | D15/A-1 |
|----------------|-----|-----|-------|----------------------|------------------|-----------|---------|
| Read (16-Bit)  | L   | L   | H     | 2.7 V<br>to<br>3.6 V | D <sub>OUT</sub> |           |         |
| Read (8-Bit)   | L   | L   | L     |                      | D <sub>OUT</sub> | Hi-Z      | L/H     |
| Output disable | L   | H   | H     |                      | Hi-Z             |           | *       |
|                |     |     | L     |                      |                  |           |         |
| Standby        | H   | *   | H     |                      | Hi-Z             |           | *       |
|                |     |     | L     |                      |                  |           |         |

\*: Don't Care (H or L)

## ABSOLUTE MAXIMUM RATINGS

| Parameter                        | Symbol           | Condition                   | Value                        | Unit |
|----------------------------------|------------------|-----------------------------|------------------------------|------|
| Operating temperature under bias | T <sub>a</sub>   | —                           | 0 to 70                      | °C   |
| Storage temperature              | T <sub>stg</sub> |                             | -55 to 125                   | °C   |
| Input voltage                    | V <sub>I</sub>   | relative to V <sub>SS</sub> | -0.5 to V <sub>CC</sub> +0.5 | V    |
| Output voltage                   | V <sub>O</sub>   |                             | -0.5 to V <sub>CC</sub> +0.5 | V    |
| Power supply voltage             | V <sub>CC</sub>  |                             | -0.5 to 5                    | V    |
| Power dissipation per package    | P <sub>D</sub>   | T <sub>a</sub> = 25°C       | 1.0                          | W    |
| Output short circuit current     | I <sub>OS</sub>  | —                           | 10                           | mA   |

## RECOMMENDED OPERATING CONDITIONS

(T<sub>a</sub> = 0 to 70°C)

| Parameter                            | Symbol          | Condition                      | Min.   | Typ. | Max.                  | Unit |
|--------------------------------------|-----------------|--------------------------------|--------|------|-----------------------|------|
| V <sub>CC</sub> power supply voltage | V <sub>CC</sub> | V <sub>CC</sub> = 2.7 to 3.6 V | 2.7    | —    | 3.6                   | V    |
| Input "H" level                      | V <sub>IH</sub> |                                | 2.2    | —    | V <sub>CC</sub> +0.5* | V    |
| Input "L" level                      | V <sub>IL</sub> |                                | -0.5** | —    | 0.6                   | V    |

Voltage is relative to V<sub>SS</sub>.\* : V<sub>CC</sub>+1.5V (Max.) when pulse width of overshoot is less than 10ns.

\*\* : -1.5V (Min.) when pulse width of undershoot is less than 10ns.

## PIN CAPACITANCE

(V<sub>CC</sub> = 3.0 V, T<sub>a</sub> = 25°C, f = 1 MHz)

| Parameter | Symbol           | Condition            | Min. | Typ. | Max. | Unit |
|-----------|------------------|----------------------|------|------|------|------|
| Input     | C <sub>IN1</sub> | V <sub>I</sub> = 0 V | —    | —    | 10   | pF   |
| BYTE#     | C <sub>IN2</sub> |                      | —    | —    | 200  |      |
| Output    | C <sub>OUT</sub> | V <sub>O</sub> = 0 V | —    | —    | 10   |      |

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

| Parameter   | Symbol            | Condition   | Min.   | Typ. | Max.                  | Unit |
|---|-------------------|---|--------|------|-----------------------|------|
| Input leakage current                             | I <sub>LI</sub>   | V <sub>I</sub> = 0 to V <sub>CC</sub>                   | —      | —    | 10                    | μA   |
| Output leakage current                            | I <sub>LO</sub>   | V <sub>O</sub> = 0 to V <sub>CC</sub>                   | —      | —    | 10                    | μA   |
| V <sub>CC</sub> power supply current<br>(Standby) | I <sub>CCSC</sub> | CE# = V <sub>CC</sub>                                   | —      | —    | 10                    | μA   |
|   | I <sub>CCST</sub> | CE# = V <sub>IH</sub>                                   | —      | —    | 1                     | mA   |
| V <sub>CC</sub> power supply current<br>(Read)    | I <sub>CCA</sub>  | CE# = V <sub>IL</sub> , OE# = V <sub>IH</sub><br>f=5MHz | —      | —    | 25                    | mA   |
| Input "H" level                                   | V <sub>IH</sub>   | —   | 2.2    | —    | V <sub>CC</sub> +0.5* | V    |
| Input "L" level                                   | V <sub>IL</sub>   | —   | -0.5** | —    | 0.6                   | V    |
| Output "H" level                                  | V <sub>OH</sub>   | I <sub>OH</sub> = -1 mA                                 | 2.4    | —    | —                     | V    |
| Output "L" level                                  | V <sub>OL</sub>   | I <sub>OL</sub> = 2 mA                                  | —      | —    | 0.4                   | V    |

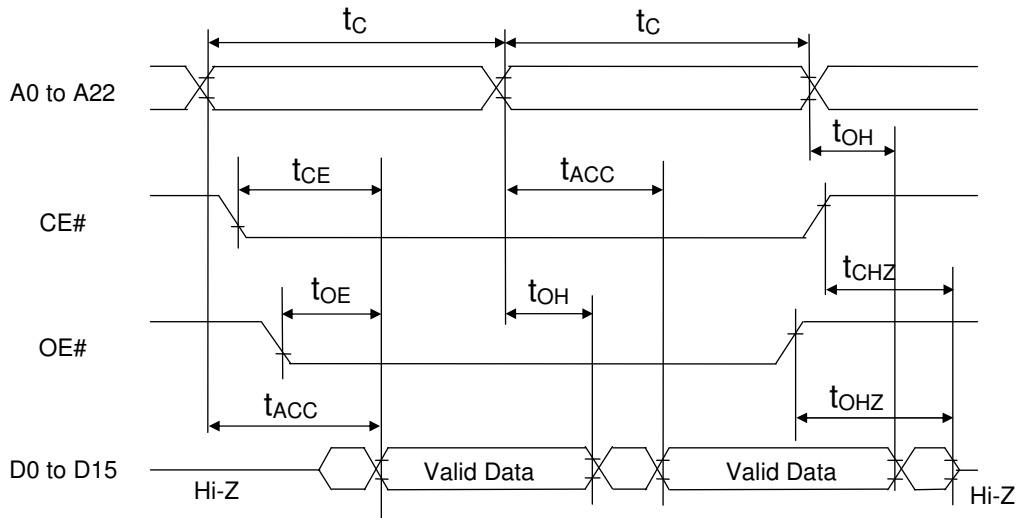
Voltage is relative to V<sub>SS</sub>.\* : V<sub>CC</sub>+1.5V (Max.) when pulse width of overshoot is less than 10ns.

\*\* : -1.5V (Min.) when pulse width of undershoot is less than 10ns.

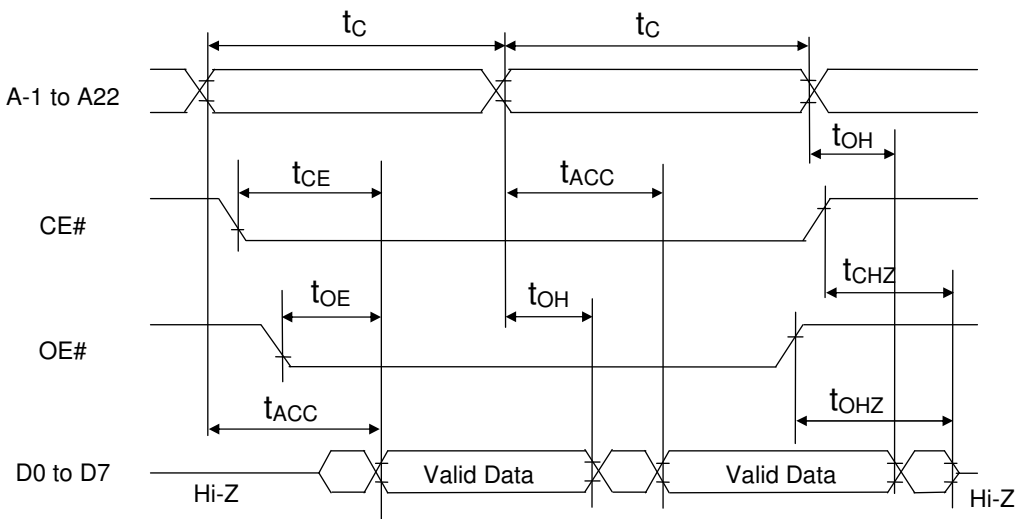


**TIMING CHART (READ CYCLE)**

**16-BIT READ MODE (BYTE# = V<sub>IH</sub>)**

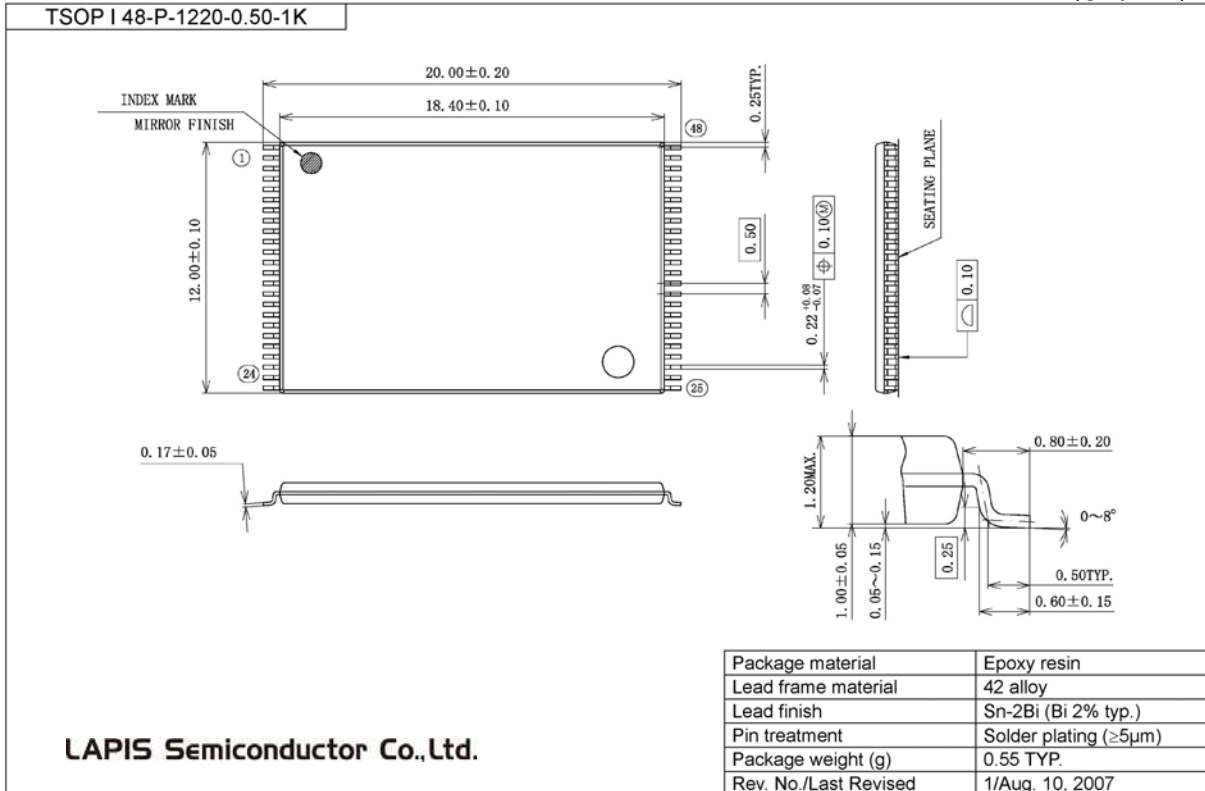


**8-BIT READ MODE (BYTE# = V<sub>IL</sub>)**



**PACKAGE DIMENSIONS**

(Unit: mm)



**Notes for Mounting the Surface Mount Type Package**

The surface mount type packages are very susceptible to heat in reflow mounting and humidity absorbed in storage. Therefore, before you perform reflow mounting, contact ROHM's responsible sales person for the product name, package name, pin number, package code and desired mounting conditions (reflow method, temperature and times).

**REVISION HISTORY**

| Document No.         | Date          | Page             |                 | Description  |
|----------------------|---------------|------------------|-----------------|--|
|                      |               | Previous Edition | Current Edition |  |
| FEDR27T12800L-02-01  | Jun. 13, 2005 | –                | –               | Final edition 1  |
| FEDR27T12800L-02-02  | March 1, 2006 | 1                | 1               | Added access time at $V_{CC} = 3.0\text{ V}$ to 3.6 V to FEATURES  |
|                      |               | 4                | 5               | Added AC Characteristics at $V_{CC} = 3.0\text{ V}$ to 3.6 V   |
| FEDR27T12800L-002-03 | Jan.06, 2009  | 1, 5             | 1, 5            | Changed $t_C$ , $t_{ACC}$ , $t_{CE}$ ( $V_{CC}=2.7\text{V}$ to 3.6V) to 90ns.<br>Deleted AC CHARACTERISTICS table of $V_{CC}=3.0\text{V}$ to 3.6V. |
|                      |               | 5                | 5               | Changed Input signal level from "0V/3V" to "0V/ $V_{CC}$ ".  |
|                      |               | –                | –               | Changed company logo and name to OKI SEMICONDUCTOR   |

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