

OKI Semiconductor

MSM538002E

524,288-Word x 16-Bit or 1,048,576-Word x 8-Bit MASKROM

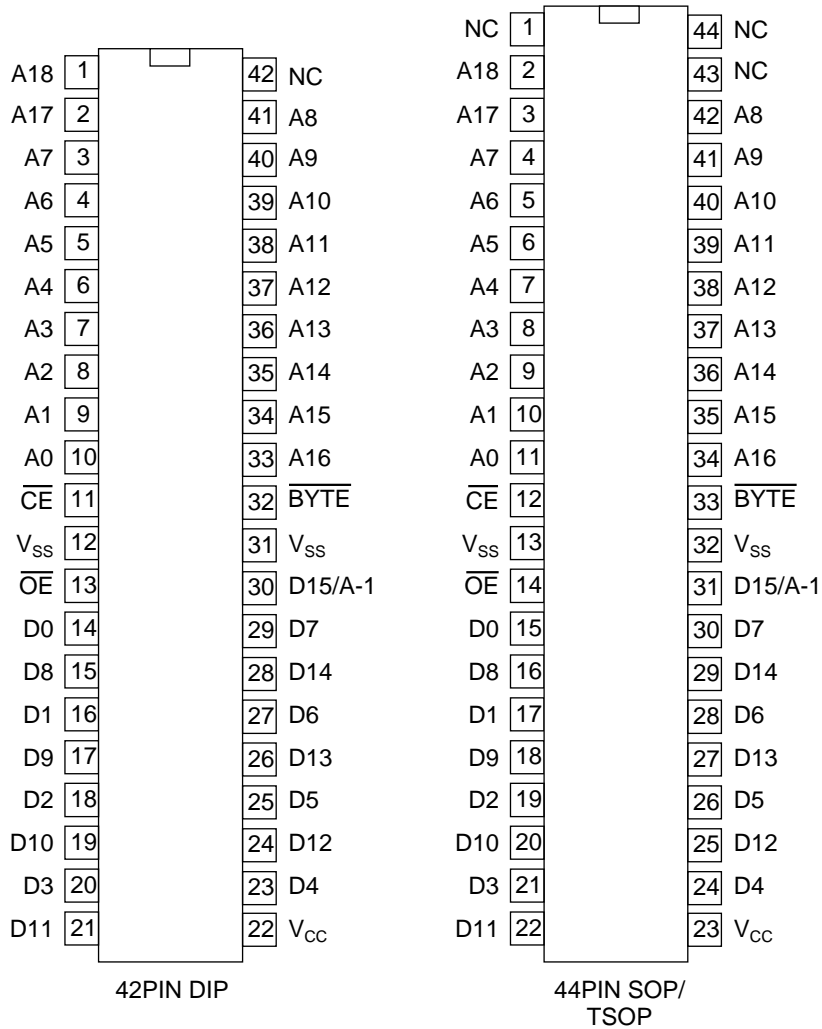
DESCRIPTION

The OKI MSM538002E is a high-speed CMOS Mask ROM that can electrically switch between 524,288-word x 16-bit or 1,048,576-word x 8-bit configurations. The MSM538002E Operates on a single 5.0V power supply and is TTL compatible. The chip's asynchronous I/O requires no external clock assuring easy operation. A power-down mode provides low power dissipation when the chip is not selected. The CE and OE pins are provided as control signals that permit three-stated output allowing easy memory expansion on a system bus. The MSM538002E is suited for use as large capacity fixed memory for microcomputers and data terminals.

FEATURES

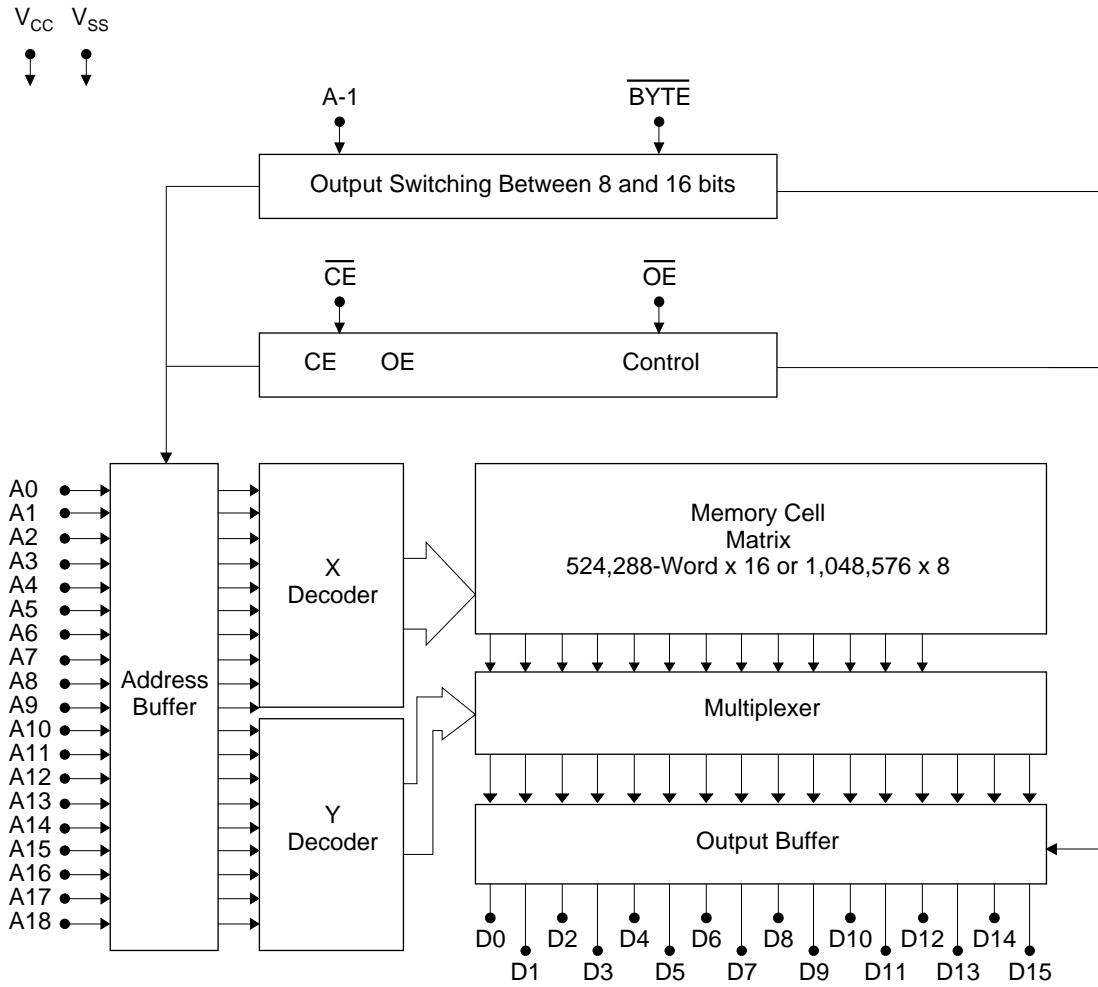
- Single 5.0V power supply
- 524,288-words x 16-bit / 1,048,576-words x 8-bit
- Access time
 - 100ns MAX
- Input/Output TTL compatible
- Tri-State output configurations
- Internal powerdown function
- Packages:
 - 42-PIN PLASTIC DIP (DIP42-P-600-2.54) (MSM538002E-xxRS)
 - 44-PIN PLASTIC SOP (SOP44-P-600-1.27-K) (MSM538002E-xxGS-K)
 - 44-PIN PLASTIC TSOP (TSOPII44-P-400-0.80-K) (MSM538002E-xxTS-AK)
- 8MEPROM (42-PIN) pin compatible

PIN CONFIGURATION



| Pin Name | Function |
|-------------------|-----------------------------|
| D15/A-1 | Data output / address input |
| A0 to A18 | Address input |
| D0 to D15 | Data output |
| \overline{CE} | Chip enable |
| \overline{OE} | Output enable |
| \overline{BYTE} | Mode switch |
| V_{CC}, V_{SS} | Power supply |

BLOCK DIAGRAM



FUNCTION TABLE

| $\overline{\text{CE}}$ | $\overline{\text{OE}}$ | $\overline{\text{BYTE}}$ | A-1/D15 | D0 to D7 | D8 to D15 | D _{OUT} Mode | LSB | MSB |
|------------------------|------------------------|--------------------------|-----------------------|-----------|-----------|-----------------------|-----|-----|
| H | X | X | X | Hi-Z | Hi-Z | Hi-Z | — | — |
| L | H | X | X | Hi-Z | Hi-Z | | — | — |
| L | L | H | Input Inhibited (D15) | D0 to D7 | D8 to D15 | 16 bit | A0 | A18 |
| L | L | L | L | D0 to D7 | Hi-Z | 8 bit | A-1 | A18 |
| L | L | L | H | D8 to D15 | Hi-Z | | | |

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

| Parameter | Symbol | Conditions | Rated Value | Unit |
|-----------------------|-----------|--|------------------------|------------------|
| Power Supply Voltage | V_{CC} | to V_{SS} | -0.3 to 7 | V |
| Input Voltage | V_I | | -0.3 to $V_{CC} + 0.5$ | V |
| Output Voltage | V_O | | -0.3 to $V_{CC} + 0.5$ | V |
| Power Dissipation | P_D | Per Package $T_{opr} = 25^\circ\text{C}$ | 1.0 | W |
| Operating Temperature | T_{opr} | — | 0 to 70 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | — | -55 to 150 | $^\circ\text{C}$ |

Recommended Operating Conditions

| Parameter | Symbol | Conditions | Rated Value | | | Unit |
|-----------------------|-----------|------------|-------------|------|----------------|------------------|
| | | | Min. | Typ. | Max. | |
| Power Supply Voltage | V_{CC} | — | 4.5 | 5.0 | 5.5 | V |
| | V_{SS} | — | 0.0 | 0.0 | 0.0 | V |
| "H" Input Voltage | V_{IH} | — | 2.2 | 5.0 | $V_{CC} + 0.5$ | V |
| "L" Input Voltage | V_{IL} | — | -0.3 | 0.0 | 0.8 | V |
| Operating Temperature | T_{opr} | — | 0 | — | 70 | $^\circ\text{C}$ |

DC Characteristics

($V_{CC} = 5V \pm 10\%$, $T_a = 0$ to 70°C)

| Parameter | Symbol | Conditions | Rated Value | | | Unit |
|----------------------------------|------------|--|-------------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| "H" Output Voltage | V_{OH} | $I_{OH} = -400\mu\text{A}$ | 2.4 | — | — | V |
| "L" Output Voltage | V_{OL} | $I_{OH} = 2.1\text{mA}$ | — | — | 0.4 | V |
| Input Leakage Current | I_{LI} | $V_I = 0$ to V_{CC} | -10 | — | 10 | μA |
| Output Leakage Current | I_{LO} | $V_O = 0$ to V_{CC} $\overline{CE} = V_{IH\text{MIN}}$ | -10 | — | 10 | μA |
| Power Supply Current (Operating) | I_{CC} | $\overline{CE} = V_{IL}, \overline{OE} = V_{IH}, t_C = 100\text{ns}$ | — | — | 50 | mA |
| Power Supply Current (Standby) | I_{CCS1} | $\overline{CE} = V_{CC} - 0.2\text{V}$ | — | — | 50 | μA |
| | I_{CCS} | $\overline{CE} = V_{IH\text{MIN}}$ | — | — | 500 | μA |

AC CHARACTERISTICS

Timing conditions

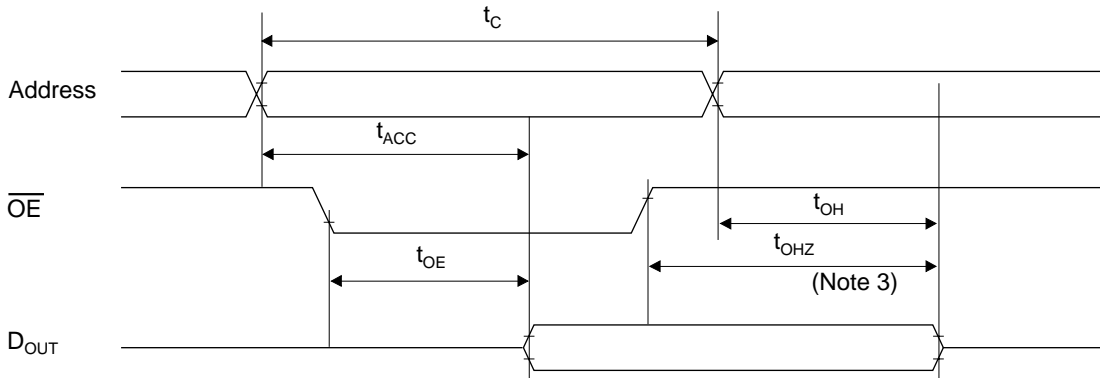
| Parameter | Conditions |
|------------------------|--|
| Input Signal Level | $V_{IH}=3.0V, V_{IL}=0.0V$ |
| Transition Time | $t_r=t_f=5ns$ |
| Timing Reference Level | Input Voltage=1.5V Output Voltage=0.8V&2.0V |
| Load Condition | $CL=100pF+1TTL$ |

Read Cycle

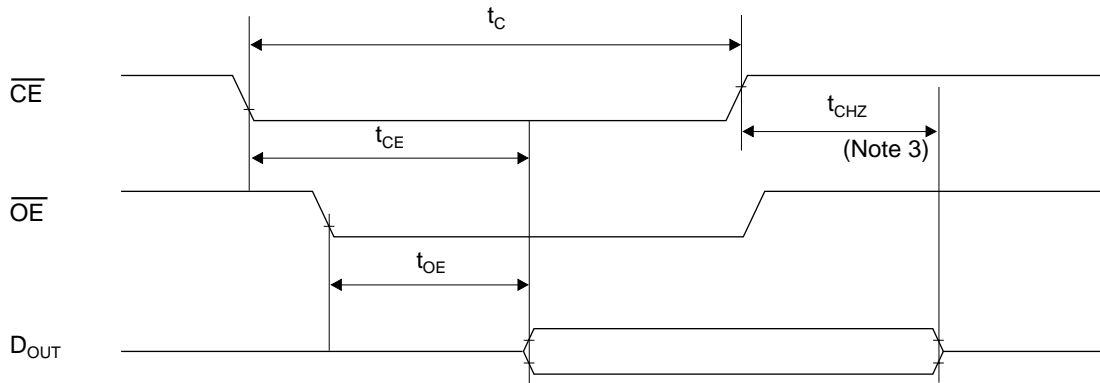
(Ta = 0 to 70°C)

| Parameter | Symbol | Conditions | Rated Value | | | Unit |
|-------------------------------------|-----------|------------|-------------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Cycle time | t_C | — | 100 | — | — | ns |
| Address Access time | t_{ACC} | — | — | — | 100 | ns |
| \overline{CE} Access time | t_{CE} | — | — | — | 100 | ns |
| \overline{OE} Access time | t_{OE} | — | — | — | 50 | ns |
| \overline{CE} Output Disable time | t_{CHZ} | — | 0 | — | 40 | ns |
| \overline{OE} Output Disable time | t_{OHZ} | — | 0 | — | 30 | ns |
| Output Hold time | t_{OH} | — | 0 | — | — | ns |

Read Cycle (Note 1)



Read Cycle (Note 2)



- Note)
1. \overline{CE} is low level.
 2. Address is fixed before or at the same time when \overline{CE} level falls.
 3. t_{CHZ} & t_{OHZ} indicate the time until floating. They are not determined by the output level.

I/O CAPACITANCE

| Parameter | Symbol | Conditions | Rated Value | | | Unit |
|--------------------|--------|------------|-------------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Input Capacitance | C_I | $V_I=0V$ | — | — | 8 | pF |
| Output Capacitance | C_O | $V_O=0V$ | — | — | 10 | pF |

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