

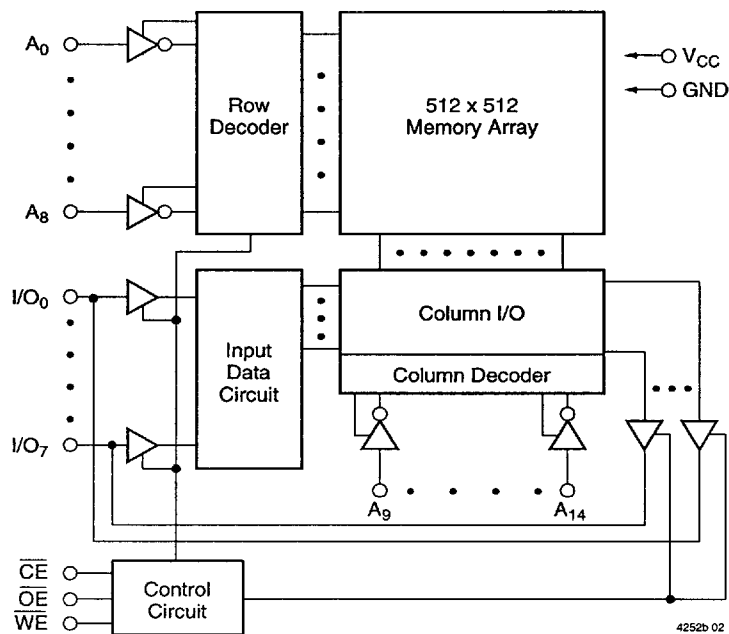
Features

- High-speed: 35, 45, 55, 70 ns
- Ultra low DC operating current of 5mA (Max.)
- Low Power dissipation:
 TTL Standby: 3mA (Max.)
 CMOS Standby: 20µA (Max.)
- Fully static operation
- All inputs and outputs directly TTL compatible
- Three state outputs
- Ultra low data retention current ($V_{CC} = 2V$)
- Single 5V \pm 10% Power Supply
- Packages
 - 28-pin TSOP (Standard)
 - 28-pin TSOP (Reverse)
 - 28-pin 600 mil PDIP
 - 28-pin 330 mil SOP (450 mil pin-to-pin)

Description

The V62C518256 is a 262,144-bit static random access memory organized as 32,768 words by 8 bits. It is built with MOSEL VITELIC's high performance CMOS process. Inputs and three state outputs are TTL compatible and allow for direct interfacing with common system bus structures.

Functional Block Diagram



Device Usage Chart

| Operating Temperature Range | Package Outline | | | | Access Time (ns) | | | | Power | | Temperature Mark |
|-----------------------------|-----------------|---|---|---|------------------|----|----|----|-------|----|------------------|
| | T | V | P | F | 35 | 45 | 55 | 70 | L | LL | |
| 0°C to 70°C | • | • | • | • | • | • | • | • | • | • | Blank |
| -40°C to +85°C | • | • | • | • | • | • | • | • | • | • | I |
| -40°C to +125°C | • | • | • | • | • | • | • | • | • | • | E |

Pin Descriptions

A₀-A₁₄ Address Inputs

These 15 address inputs select one of the 32,768 x 8-bit words in the RAM.

\overline{CE} Chip Enable Input

\overline{CE} is an active LOW input. Chip Enable must be LOW when reading from or writing to the device. When HIGH, the device is in standby mode with I/O pins in the high impedance state.

\overline{OE} Output Enable Input

The Output Enable input is active LOW. When \overline{OE} is LOW with \overline{CE} LOW and \overline{WE} HIGH, data of the selected memory location will be available on the I/O pins. When \overline{OE} is HIGH, the I/O pins will be in the high impedance state.

\overline{WE} Write Enable Input

An active LOW input, \overline{WE} input controls read and write operations. When \overline{CE} and \overline{WE} inputs are both LOW, the data present on the I/O pins will be written into the selected memory location.

I/O₀-I/O₇ Data Input/Output Ports

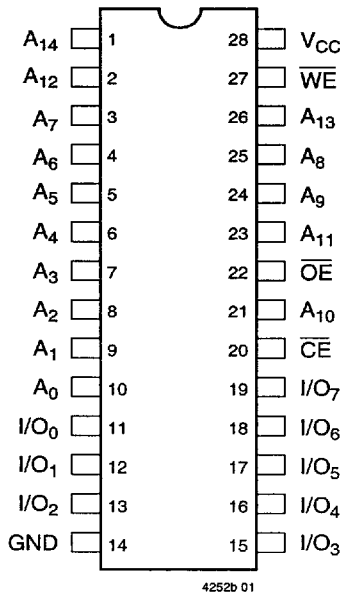
These 8 bidirectional ports are used to read data from or write data into the RAM.

V_{CC} Power Supply

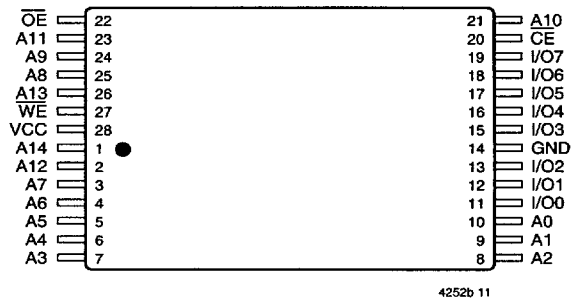
GND Ground

Pin Configurations

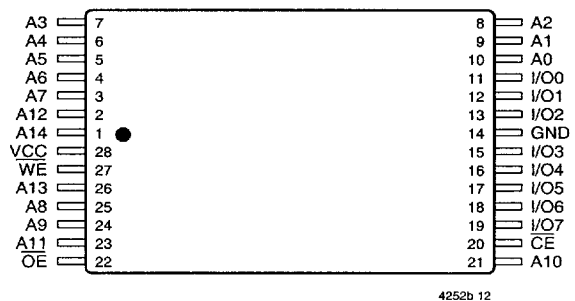
28-Pin Plastic DIP/SOP Top View



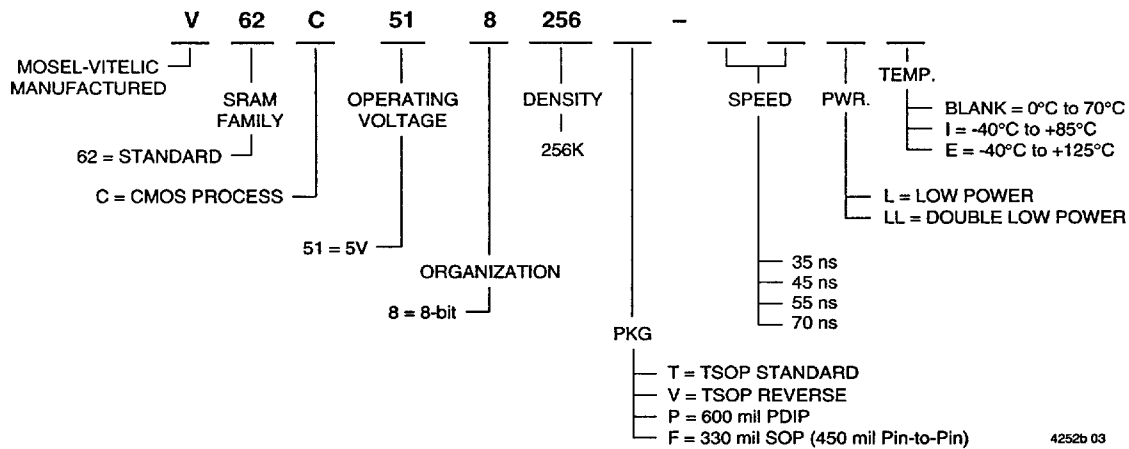
28-Pin TSOP (Standard) Top View



28-Pin TSOP (Reverse) Top View



Part Number Information



Absolute Maximum Ratings (1)

| Symbol | Parameter | Commercial | Extended | Units |
|-------------------|------------------------------|-----------------------|-----------------------|-------|
| V _{CC} | Supply Voltage | -0.5 to +7 | -0.5 to +7 | V |
| V _N | Input Voltage | -0.5 to +7 | -0.5 to +7 | V |
| V _{DQ} | Input/Output Voltage Applied | V _{CC} + 0.5 | V _{CC} + 0.5 | V |
| T _{BIAS} | Temperature Under Bias | -10 to +125 | -65 to +135 | °C |
| T _{STG} | Storage Temperature | -55 to +125 | -65 to +150 | °C |

NOTE:

- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Capacitance (1) T_A = 25°C, f = 1.0MHz

| Symbol | Parameter | Conditions | Max. | Unit |
|------------------|-------------------|-----------------------|------|------|
| C _{IN} | Input Capacitance | V _{IN} = 0V | 6 | pF |
| C _{I/O} | I/O Capacitance | V _{I/O} = 0V | 8 | pF |

NOTE:

- This parameter is guaranteed and not tested.

Truth Table

| Mode | CE | OE | WE | I/O Operation |
|---------|----|----|----|------------------|
| Standby | H | X | X | High Z |
| Read | L | L | H | D _{OUT} |
| Read | L | H | H | High Z |
| Write | L | X | L | D _{IN} |

NOTE:

X = Don't Care, L = LOW, H = HIGH

DC Electrical Characteristics

(over all temperature ranges, $V_{CC} = 5V \pm 10\%$)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|----------|------------------------------------|--|------|------|------|---------|
| V_{IL} | Input LOW Voltage ^(1,2) | | -0.5 | — | 0.8 | V |
| V_{IH} | Input HIGH Voltage ⁽¹⁾ | | 2.2 | — | 6 | V |
| I_{IL} | Input Leakage Current | $V_{CC} = \text{Max}, V_{IN} = 0V \text{ to } V_{CC}$ | -5 | — | 5 | μA |
| I_{OL} | Output Leakage Current | $V_{CC} = \text{Max}, \overline{CE} = V_{IH}, V_{OUT} = 0V \text{ to } V_{CC}$ | -5 | — | 5 | μA |
| V_{OL} | Output LOW Voltage | $V_{CC} = \text{Min}, I_{OL} = 2.1mA$ | — | — | 0.4 | V |
| V_{OH} | Output HIGH Voltage | $V_{CC} = \text{Min}, I_{OH} = -1mA$ | 2.4 | — | — | V |

| Symbol | Parameter | Power | Com. ⁽⁴⁾ | Ext. ⁽⁴⁾ | Units | |
|-----------|---|-------|---------------------|---------------------|---------|----|
| I_{CC} | Operating Power Supply Current, $\overline{CE} = V_{IL}$ Output Open, $V_{CC} = \text{Max.}, f = 0$ | READ | L | 5 | 8 | mA |
| | | | LL | 4 | 6 | |
| | | WRITE | L | 50 | 60 | |
| | | | LL | 40 | 50 | |
| I_{CC1} | Average Operating Current, $\overline{CE} \leq V_{IL}$, Output Open $V_{CC} = \text{Max.}, f = f_{MAX}^{(3)}$ | | 60 | 80 | mA | |
| I_{SB} | TTL Standby Current $\overline{CE} \geq V_{IH}, V_{CC} = \text{Max.}$ | L | 4 | 6 | mA | |
| | | LL | 3 | 8 | | |
| I_{SB1} | CMOS Standby Current, $\overline{CE} \geq V_{CC} - 0.2V$, $V_{IN} \geq V_{CC} - 0.2V$ or $V_{IN} \leq 0.2V, V_{CC} = \text{Max.}$ | L | 100 | 150 | μA | |
| | | LL | 20 | 30 | | |

NOTES:

1. These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.
2. V_{IL} (Min.) = -3.0V for pulse width < 20ns.
3. $f_{MAX} = 1/t_{RC}$.
4. Maximum values.

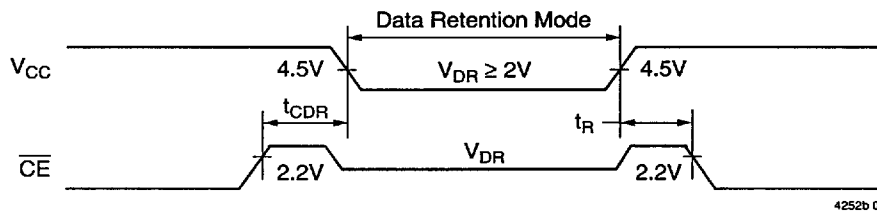
Data Retention Characteristics

| Symbol | Parameter | Power | Min. | Typ. ⁽²⁾ | Max. | Units | |
|------------|---|-------|----------------|---------------------|------|-------|---------|
| V_{DR} | V_{CC} for Data Retention $\overline{CE} \geq V_{CC} - 0.2V$ | | 2.0 | — | 5.5 | V | |
| I_{CCDR} | Data Retention Current $V_{DR} = 3.0V, \overline{CE} \geq V_{DR} - 0.2V$ | Com'l | L | — | 1 | 50 | μA |
| | | | LL | — | 0.5 | 10 | |
| | | Ext. | L | — | — | 75 | |
| | | | LL | — | — | 15 | |
| t_{CDR} | Chip Deselect to Data Retention Time | | 0 | — | — | ns | |
| t_R | Operation Recovery Time (see Retention Waveform) | | $t_{RC}^{(1)}$ | — | — | ns | |

NOTES:

- t_{RC} = Read Cycle Time
- $T_A = +25^\circ C$.

Low V_{CC} Data Retention Waveform



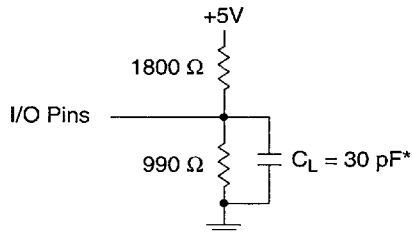
AC Test Conditions

| | |
|---------------------------|-----------|
| Input Pulse Levels | 0 to 3V |
| Input Rise and Fall Times | 5 ns |
| Timing Reference Levels | 1.5V |
| Output Load | see below |

Key to Switching Waveforms

| WAVEFORM | INPUTS | OUTPUTS |
|----------|----------------------------------|---|
| | MUST BE STEADY | WILL BE STEADY |
| | MAY CHANGE FROM H TO L | WILL BE CHANGING FROM H TO L |
| | MAY CHANGE FROM L TO H | WILL BE CHANGING FROM L TO H |
| | DON'T CARE: ANY CHANGE PERMITTED | CHANGING: STATE UNKNOWN |
| | DOES NOT APPLY | CENTER LINE IS HIGH IMPEDANCE "OFF" STATE |

AC Test Loads and Waveforms



* Includes scope and jig capacitance

4252b 05

AC Electrical Characteristics

(over all temperature ranges)

Read Cycle

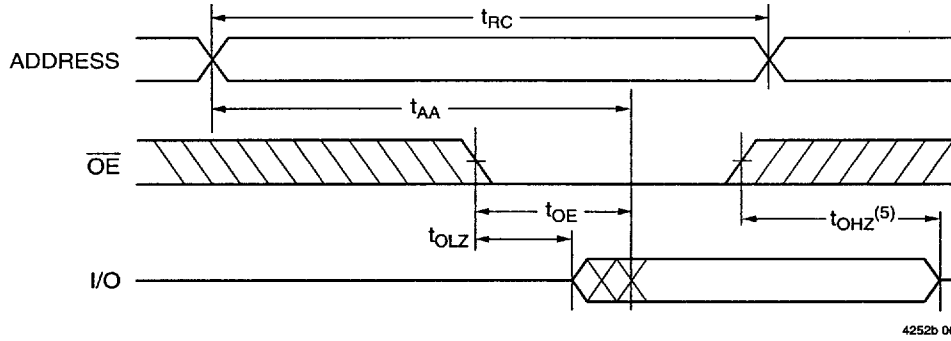
| Parameter Name | Parameter | -35 | | -45 | | -55 | | -70 | | Unit |
|----------------|------------------------------------|------|------|------|------|------|------|------|------|------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| t_{RC} | Read Cycle Time | 35 | — | 45 | — | 55 | — | 70 | — | ns |
| t_{AA} | Address Access Time | — | 35 | — | 45 | — | 55 | — | 70 | ns |
| t_{ACS} | Chip Enable Access Time | — | 35 | — | 45 | — | 55 | — | 70 | ns |
| t_{OE} | Output Enable to Output Valid | — | 15 | — | 20 | — | 25 | — | 30 | ns |
| t_{CLZ} | Chip Enable to Output in Low Z | 5 | — | 5 | — | 5 | — | 5 | — | ns |
| t_{OLZ} | Output Enable to Output in Low Z | 5 | — | 5 | — | 5 | — | 5 | — | ns |
| t_{CHZ} | Chip Disable to Output in High Z | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | ns |
| t_{OHZ} | Output Disable to Output in High Z | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | ns |
| t_{OH} | Output Hold from Address Change | 5 | — | 5 | — | 5 | — | 5 | — | ns |

Write Cycle

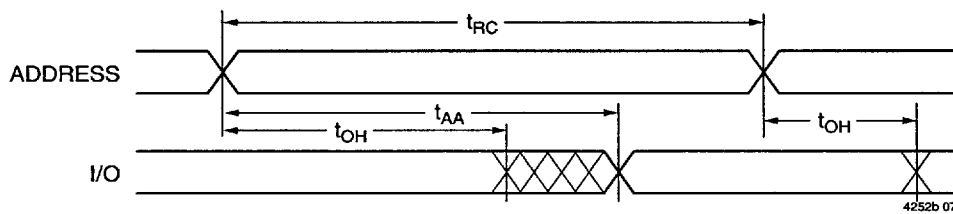
| Parameter Name | Parameter | -35 | | -45 | | -55 | | -70 | | Unit |
|----------------|------------------------------------|------|------|------|------|------|------|------|------|------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| t_{WC} | Write Cycle Time | 35 | — | 45 | — | 55 | — | 70 | — | ns |
| t_{CW} | Chip Enable to End of Write | 35 | — | 45 | — | 55 | — | 70 | — | ns |
| t_{AS} | Address Setup Time | 0 | — | 0 | — | 0 | — | 0 | — | ns |
| t_{AW} | Address Valid to End of Write | 35 | — | 45 | — | 55 | — | 70 | — | ns |
| t_{WP} | Write Pulse Width | 25 | — | 35 | — | 40 | — | 50 | — | ns |
| t_{WR} | Write Recovery Time | 0 | — | 0 | — | 0 | — | 0 | — | ns |
| t_{WHZ} | Write to Output High-Z | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 25 | ns |
| t_{DW} | Data Valid to End of Write | 25 | — | 25 | — | 25 | — | 30 | — | ns |
| t_{DH} | Data Hold from Write Time | 0 | — | 0 | — | 0 | — | 0 | — | ns |
| t_{OHZ} | Output Disable to Output in High Z | 0 | 25 | 0 | 25 | 0 | 25 | 0 | 30 | ns |
| t_{OW} | Output Active from End of Write | 5 | — | 5 | — | 5 | — | 5 | — | ns |

Switching Waveforms (Read Cycle)

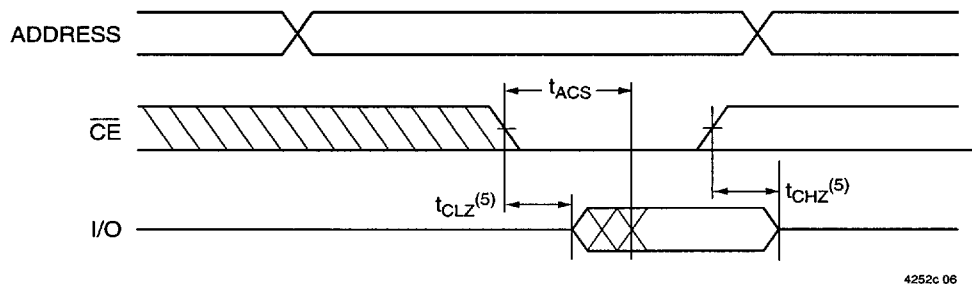
READ CYCLE 1(1,2)



READ CYCLE 2(1, 2, 4)



READ CYCLE 3(1, 3, 4)

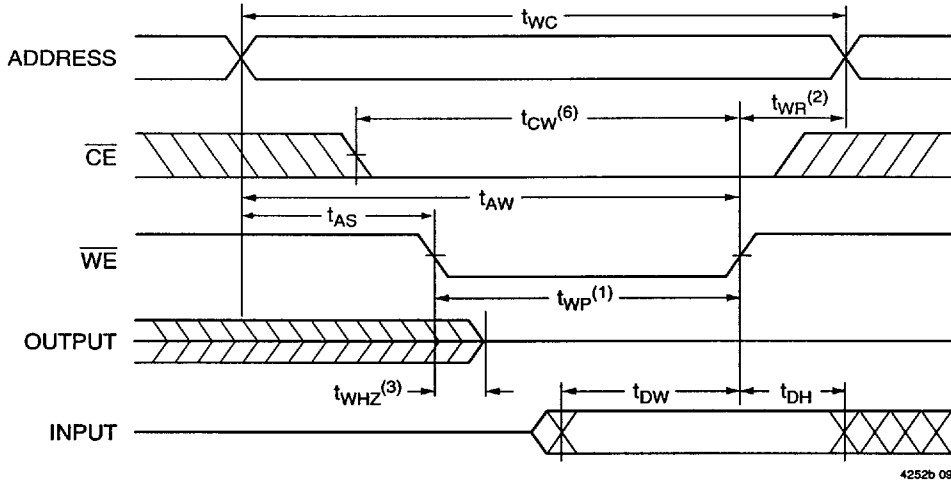


NOTES:

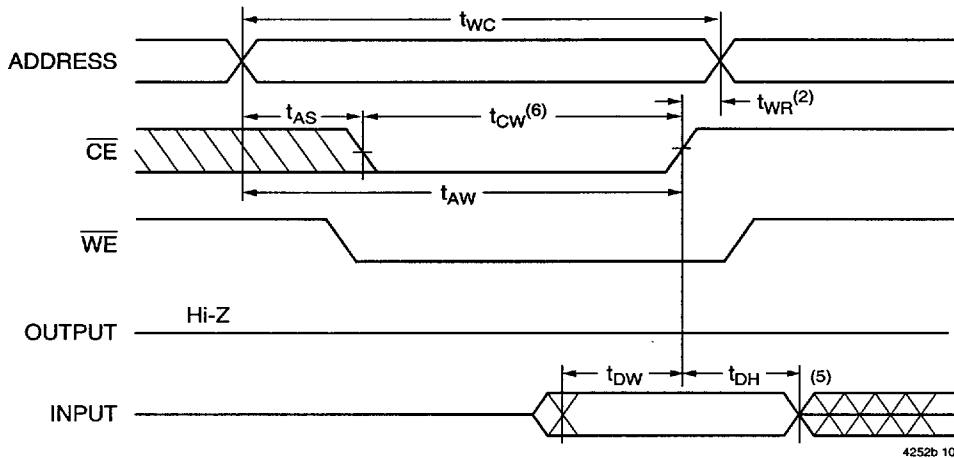
1. $\overline{WE} = V_{IH}$.
2. $\overline{CE} = V_{IL}$.
3. Address valid prior to or coincident with \overline{CE} transition LOW.
4. $\overline{OE} = V_{IL}$.
5. Transition is measured $\pm 500mV$ from steady state with $C_L = 5pF$. This parameter is guaranteed and not 100% tested.

Switching Waveforms (Write Cycle)

WRITE CYCLE 1 (\overline{WE} Controlled)⁽⁴⁾



WRITE CYCLE 2 (\overline{CE} Controlled)⁽⁴⁾



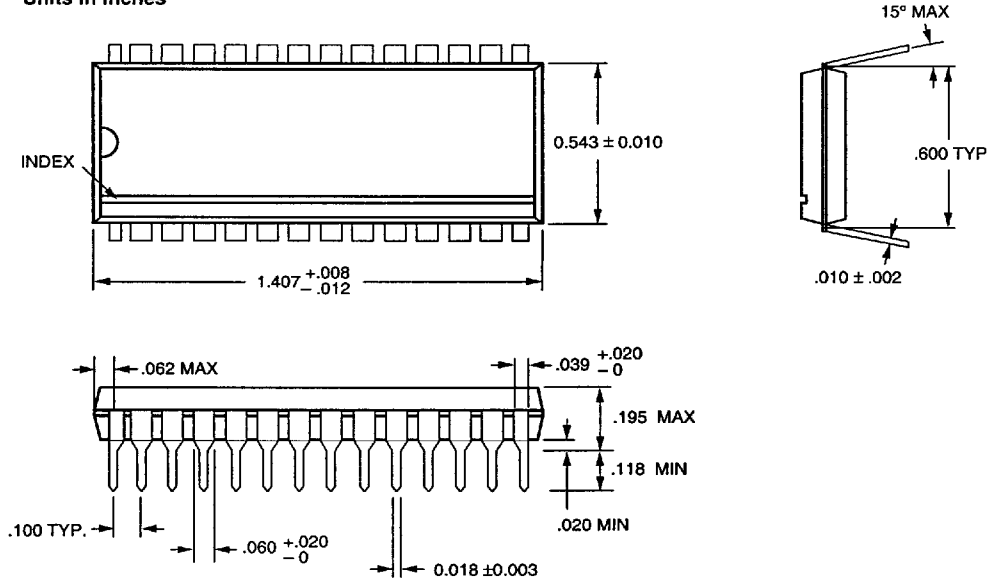
NOTES:

1. The internal write time of the memory is defined by the overlap \overline{CE} active and \overline{WE} low. Both signals must be active to initiate and any one signal can terminate a write by going inactive. The data input setup and hold timing should be referenced to the second transition edge of the signal that terminates the write.
2. t_{WR} is measured from the earlier of \overline{CE} or \overline{WE} going HIGH.
3. During this period, I/O pins are in the output state so that the input signals of opposite phase to the outputs must not be applied
4. $\overline{OE} = V_{IL}$ or V_{IH} . However it is recommended to keep \overline{OE} at V_{IH} during write cycle to avoid bus conditions.
5. If \overline{CE} is low during this period, I/O pins are in the output state. Then the data input signals of opposite phase to the outputs must not be applied to them.
6. t_{CW} is measured from \overline{CE} going LOW to the end of write.

Package Dimensions

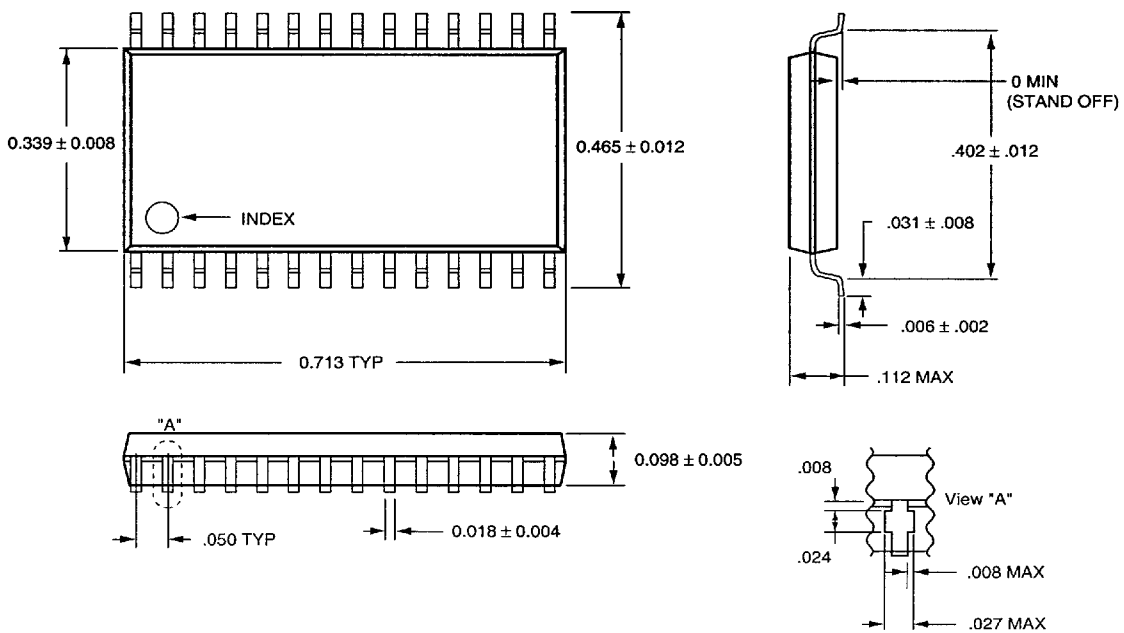
28-Pin 600 mil Plastic DIP

Units in inches



28-Pin 330 mil SOP

Units in inches



Package Dimensions

28-Pin TSOP

Units In Inches

