V61C518256
32K X 8 HIGH SPEED STATIC RAM

PRELIMINARY

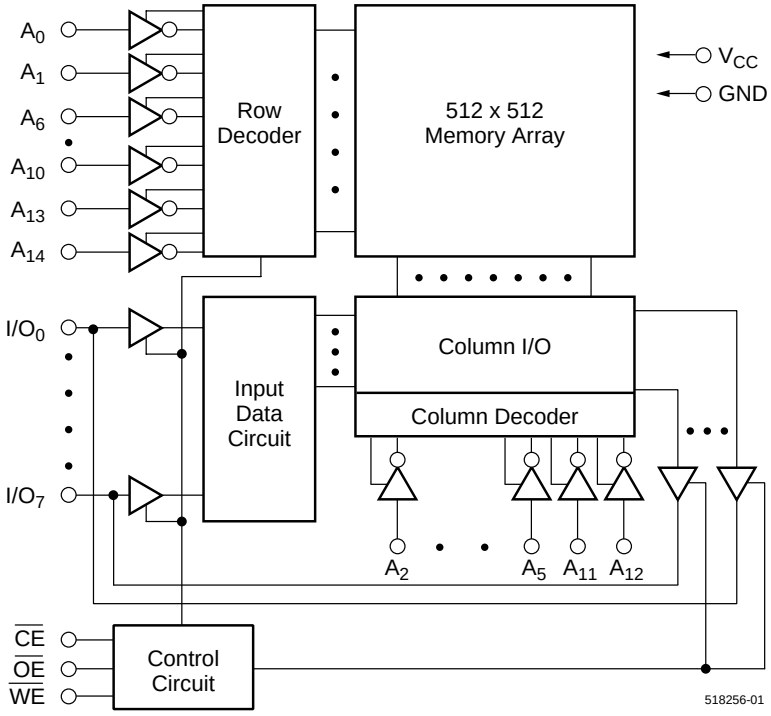
Features

- High-speed: 10, 12, 15 ns
- Low Power Dissipation:
  - CMOS Standby: 0.5 mA (Max.)
- Fully static operation
- All inputs and outputs directly compatible
- Three state outputs
- Ultra low data retention current (V_{CC} = 2V)
- Single 5V ± 10% Power Supply
- Packages
  - 28-pin TSOP (Standard)
  - 28-pin 300 mil SOJ

Description

The V61C518256 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)			Temperature Mark
	T	N	R	10	12	15	
0°C to 70 °C	•	•	•	•	•	•	Blank

Pin Descriptions

A_0–A_{14} Address Inputs
These 15 address inputs select one of the 32,768 x 8 bit segments in the RAM.

$\overline{CE}$ Chip Enable Inputs
$\overline{CE}$ 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.

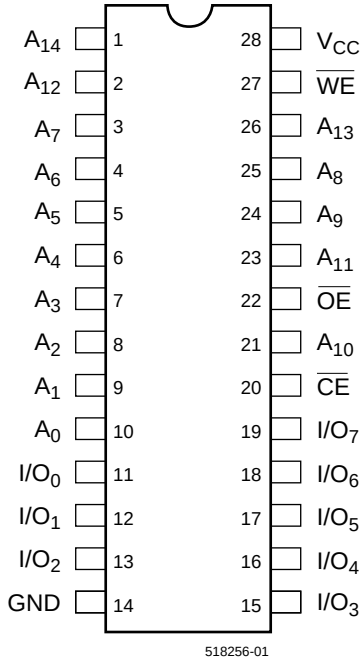
I/O_0–I/O_7 Data Input and Data Output Ports
These 8 bidirectional ports are used to read data from and write data into the RAM.

V_{CC} Power Supply

GND Ground

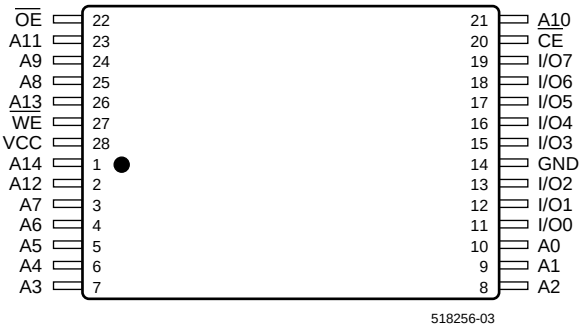
Pin Configurations (Top View)

28-Pin SOJ



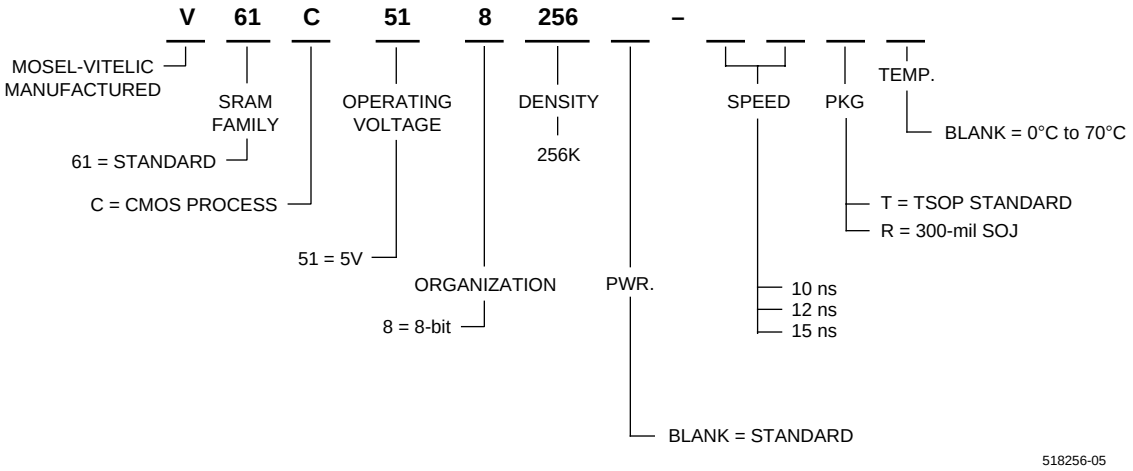
518256-01

28-Pin TSOP (Standard)



518256-03

Part Number Information



Absolute Maximum Ratings (1)

Symbol	Parameter	Commercial	Units
V_{CC}	Supply Voltage	-0.5 to +7	V
V_N	Input Voltage	-0.5 to +7	V
V_{DQ}	Input/Output Voltage Applied	V_{CC} + 0.5	V
T_{BIAS}	Temperature Under Bias	-55 to +85	°C
T_{STG}	Storage Temperature	-55 to +125	°C

NOTE:
1. 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*

T_A = 25°C, f = 1.0MHz

Symbol	Parameter	Conditions	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	6	pF
C_{OUT}	Output Capacitance	$V_{I/O}$ = 0V	8	pF

NOTE:
* This parameter is guaranteed by design and not tested.

Truth Table

Mode	$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	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 ± 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} = Max, V_{IN} = 0V to V_{CC}	-5	—	5	µA
I_{OL}	Output Leakage Current	V_{CC} = Max, $\overline{CE}$ = V_{IH}, V_{OUT} = 0V to V_{CC}	-5	—	5	µA
V_{OL}	Output LOW Voltage	V_{CC} = Min, I_{OL} = 8mA	—	—	0.4	V
V_{OH}	Output HIGH Voltage	V_{CC} = Min, I_{OH} = -4mA	2.4	—	—	V

Symbol	Parameter	Com.(4)	Ind.	Units
I_{CC1}	Average Operating Current, $\overline{CE}$ ≤ V_{IL} Output Open, V_{CC} = Max., f = f_{MAX}(3)	110	130	mA
I_{SB}	TTL Standby Current $\overline{CE}$ ≥ V_{IH}, V_{CC} = Max.	25	40	mA
I_{SB1}	CMOS Standby Current, $\overline{CE}$ ≥ V_{CC} – 0.2V, V_{IN} ≥ V_{CC} – 0.2V or V_{IN} ≤ 0.2V, V_{CC} = Max.	1	2	mA

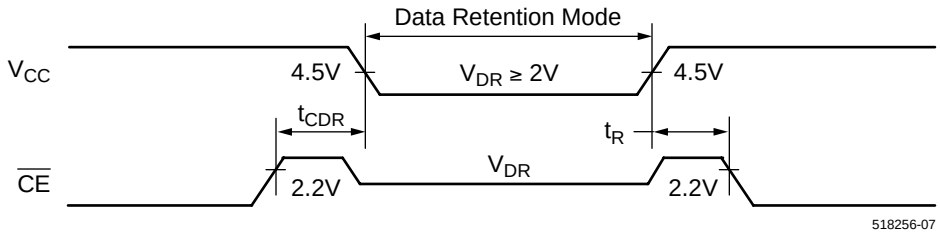
NOTES:
1. These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.
2. V_{IL} (Min.) = -3.0V for pulse width < 20ns.
3. $f_{MAX} = 1/t_{RC}$.
4. Maximum values.

Data Retention Characteristics

Symbol	Parameter		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	—	—	150	µA
		Ind.	—	—	200	
t_{CDR}	Chip Deselect to Data Retention Time		0	—	—	ns
t_R	Operation Recovery Time (see Retention Waveform)		t_{RC}(1)	—	—	ns

NOTES:
1. t_{RC} = Read Cycle Time
2. T_A = +25°C.

Low V_{CC} Data Retention Waveform



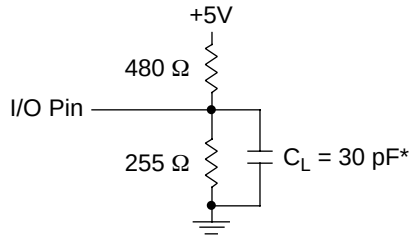
AC Test Conditions

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

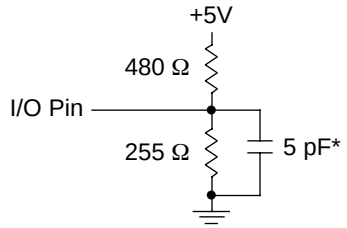
Key to Switching Waveforms

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



Output load for t_{CLZ}, t_{CHZ}, t_{OHZ}, t_{OLZ}, t_{WZ}, t_{OW}

518256-06

AC Electrical Characteristics

(over all temperature ranges)

Read Cycle

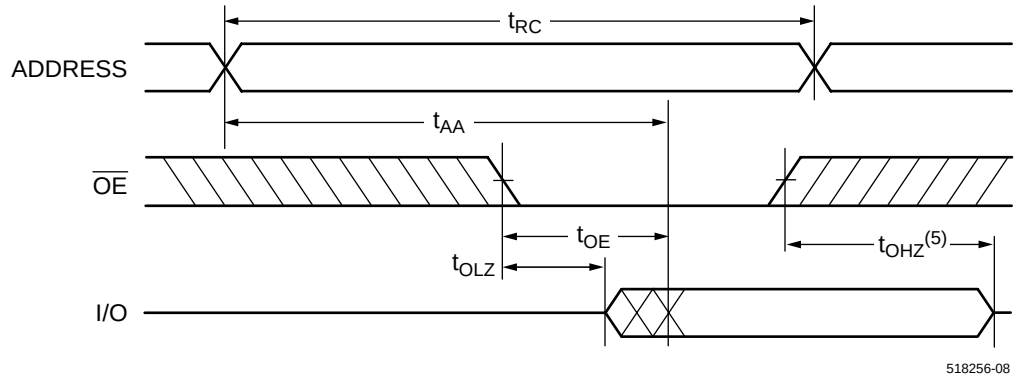
Parameter Name	Parameter	-10		-12		-15		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t_{RC}	Read Cycle Time	10	—	12	—	15	—	ns
t_{AA}	Address Access Time	—	10	—	12	—	15	ns
t_{ACS}	Chip Enable Access Time	—	10	—	12	—	15	ns
t_{OE}	Output Enable to Output Valid	—	5	—	6	—	7	ns
t_{CLZ}	Chip Enable to Output in Low Z	2	—	3	—	3	—	ns
t_{OLZ}	Output Enable to Output in Low Z	0	—	0	—	0	—	ns
t_{CHZ}	Chip Disable to Output in High Z	0	2	0	3	0	4	ns
t_{OHZ}	Output Disable to Output in High Z	0	2	0	3	0	4	ns
t_{OH}	Output Hold from Address Change	2	—	3	—	3	—	ns

Write Cycle

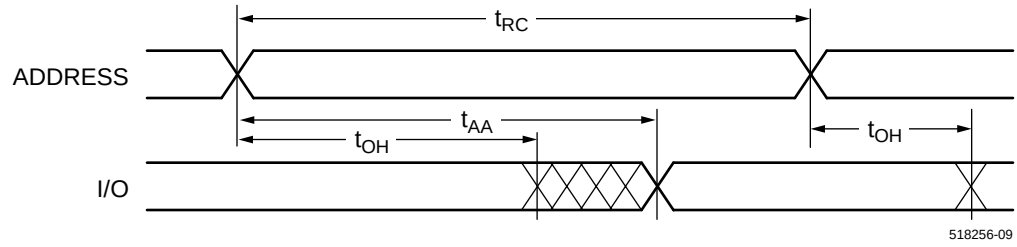
Parameter Name	Parameter	-10		-12		-15		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t_{WC}	Write Cycle Time	10	—	12	—	15	—	ns
t_{CW}	Chip Enable to End of Write	9	—	10	—	12	—	ns
t_{AS}	Address Setup Time	0	—	0	—	0	—	ns
t_{AW}	Address Valid to End of Write	9	—	10	—	12	—	ns
t_{WP}	Write Pulse Width	8	—	9	—	11	—	ns
t_{AH}	Address Hold from End of Write	—	0.5	—	0.5	—	0.5	ns
t_{WHZ}	Write to Output High-Z	0	5	0	5	0	5	ns
t_{DW}	Data Setup to End of Write	6	—	7	—	8	—	ns
t_{DH}	Data Hold from End of Write	0	—	0	—	0	—	ns
t_{OW}	Output Active from End of Write	3	—	3	—	3	—	ns

Switching Waveforms (Read Cycle)

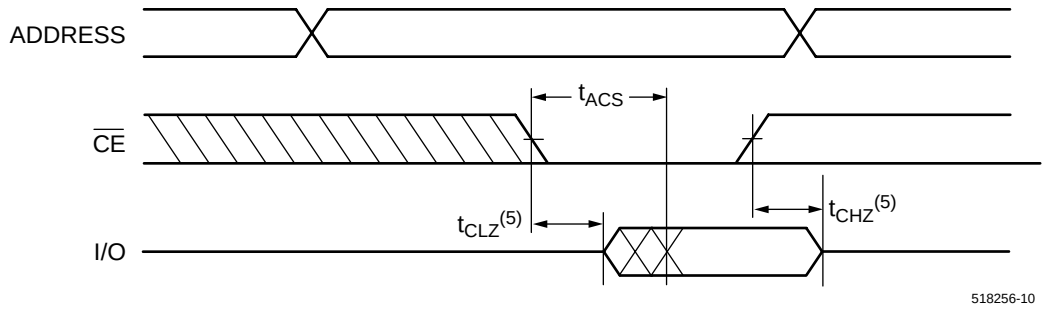
Read Cycle 1(1, 2)



Read Cycle 2(1, 2, 4)



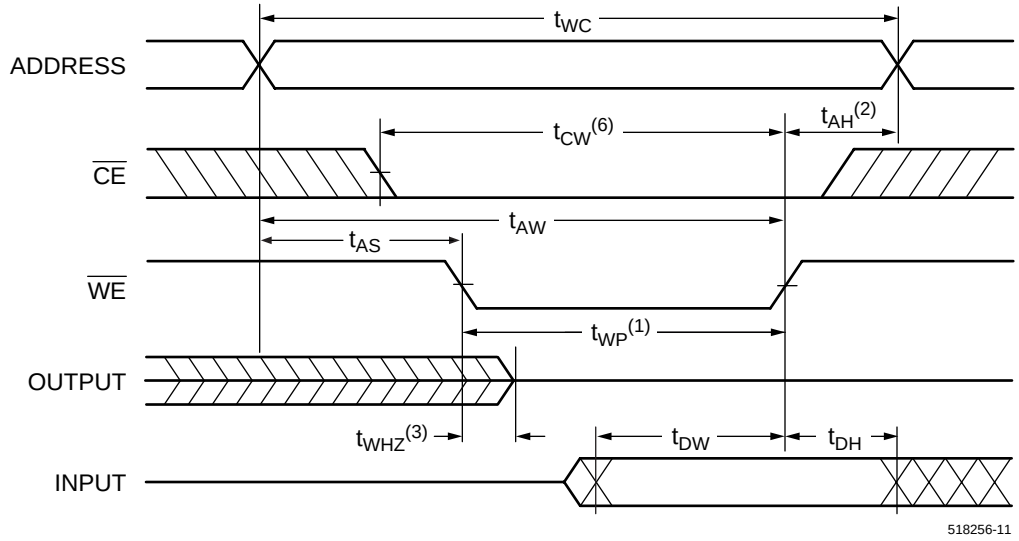
Read Cycle 3(1, 3, 4)



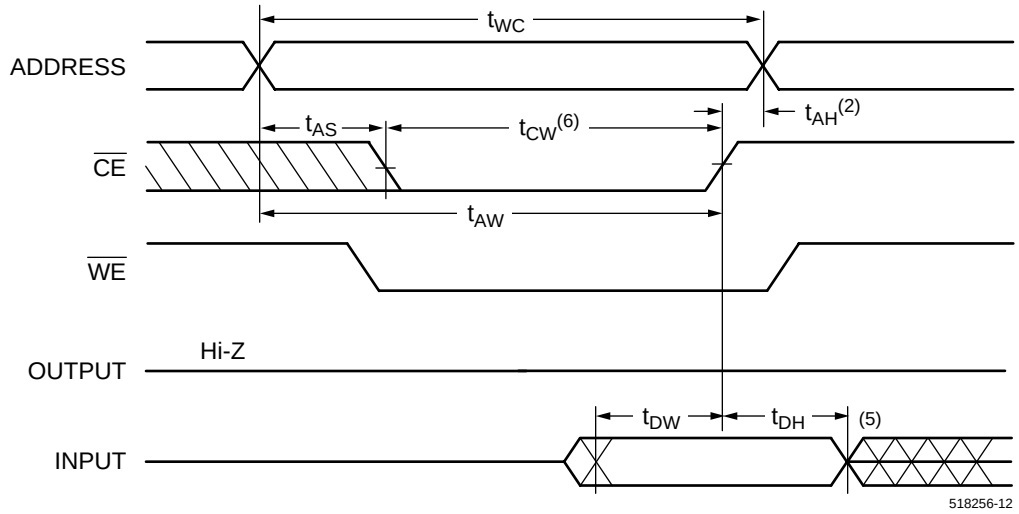
NOTES:
1. $\overline{WE}$ = V_{IH}.
2. $\overline{CE}$ = V_{IL}.
3. Address valid prior to or coincident with $\overline{CE}$ transition LOW.
4. $\overline{OE}$ = V_{IL}.
5. Transition is measured ±500mV from steady state with C_L = 5pF. This parameter is guaranteed and not 100% tested.

Switching Waveforms (Write Cycle)

Write Cycle 1 ($\overline{WE}$ Controlled)(4)



Write Cycle 2 ($\overline{CE}$ Controlled)(4)

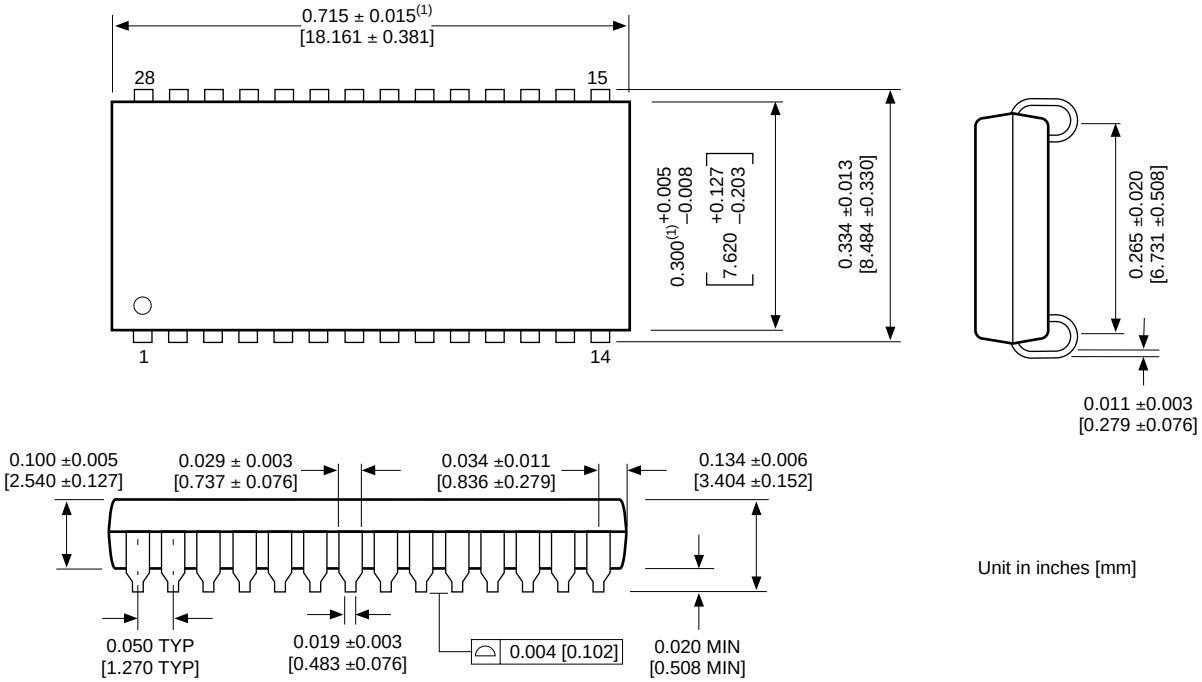


NOTES:

1. The internal write time of the memory is defined by the overlap of $\overline{CE}$ 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_{AH} 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 contention.
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 Diagrams

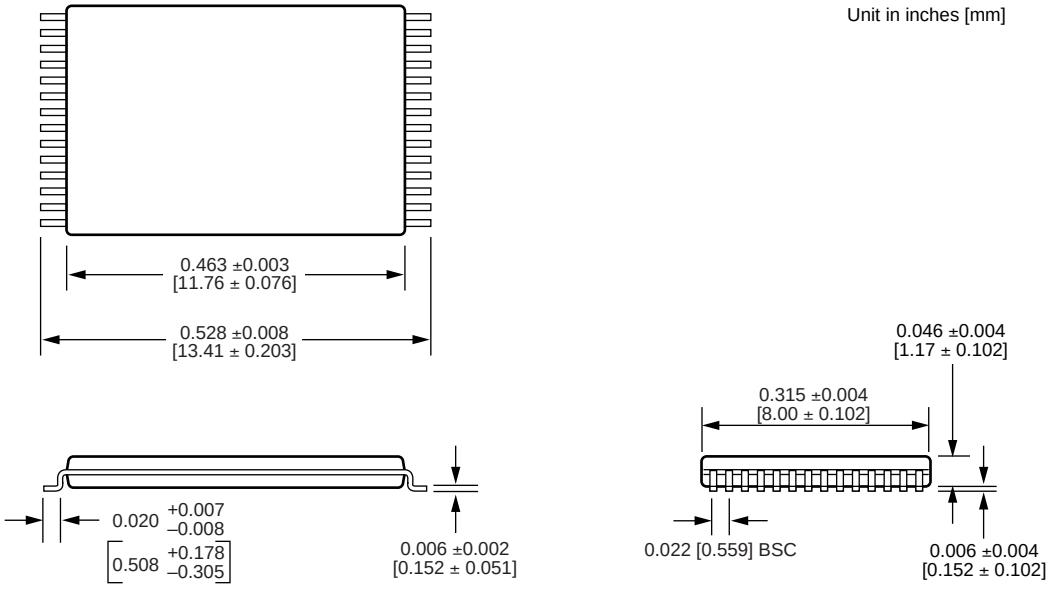
28-pin 300 mil SOJ



Unit in inches [mm]

(1) Does not include mold flash protrusion and should be measured from the bottom of the package.

28-Pin TSOP



Unit in inches [mm]

Notes

Notes

U.S.A.
3910 NORTH FIRST STREET
SAN JOSE, CA 95134
PHONE: 408-433-6000
FAX: 408-433-0185

HONG KONG
19 DAI FU STREET
TAIPO INDUSTRIAL ESTATE
TAIPO, NT, HONG KONG
PHONE: 011-852-665-4883
FAX: 011-852-664-7535

TAIWAN
7F, NO. 102
MIN-CHUAN E. ROAD, SEC. 3
TAIPEI
PHONE: 011-886-2-545-1213
FAX: 011-886-2-545-1209

1 CREATION ROAD I
SCIENCE BASED IND. PARK
HSIN CHU, TAIWAN, R.O.C.
PHONE: 011-886-35-783344
FAX: 011-886-35-792838

JAPAN
WBG MARINE WEST 25F
6, NAKASE 2-CHOME
MIHAMA-KU, CHIBA-SHI
CHIBA 261-71
PHONE: 011-81-43-299-6000
FAX: 011-81-43-299-6555

U.S. SALES OFFICES

NORTHWESTERN
3910 NORTH FIRST STREET
SAN JOSE, CA 95134
PHONE: 408-433-6000
FAX: 408-433-0185

NORTHEASTERN
SUITE 436
20 TRAFALGAR SQUARE
NASHUA, NH 03063
PHONE: 603-889-4393
FAX: 603-889-9347

SOUTHWESTERN
SUITE 200
5150 E. PACIFIC COAST HWY.
LONG BEACH, CA 90804
PHONE: 562-498-3314
FAX: 562-597-2174

CENTRAL & SOUTHEASTERN
604 FIELDWOOD CIRCLE
RICHARDSON, TX 75081
PHONE: 972-690-1402
FAX: 972-690-0341

7/98
Printed in U.S.A.