Revision history

Rev. No.	Approved date	History	Remark (purpose)
A	Sep 10 2001	Initial issue	Preliminary

Features

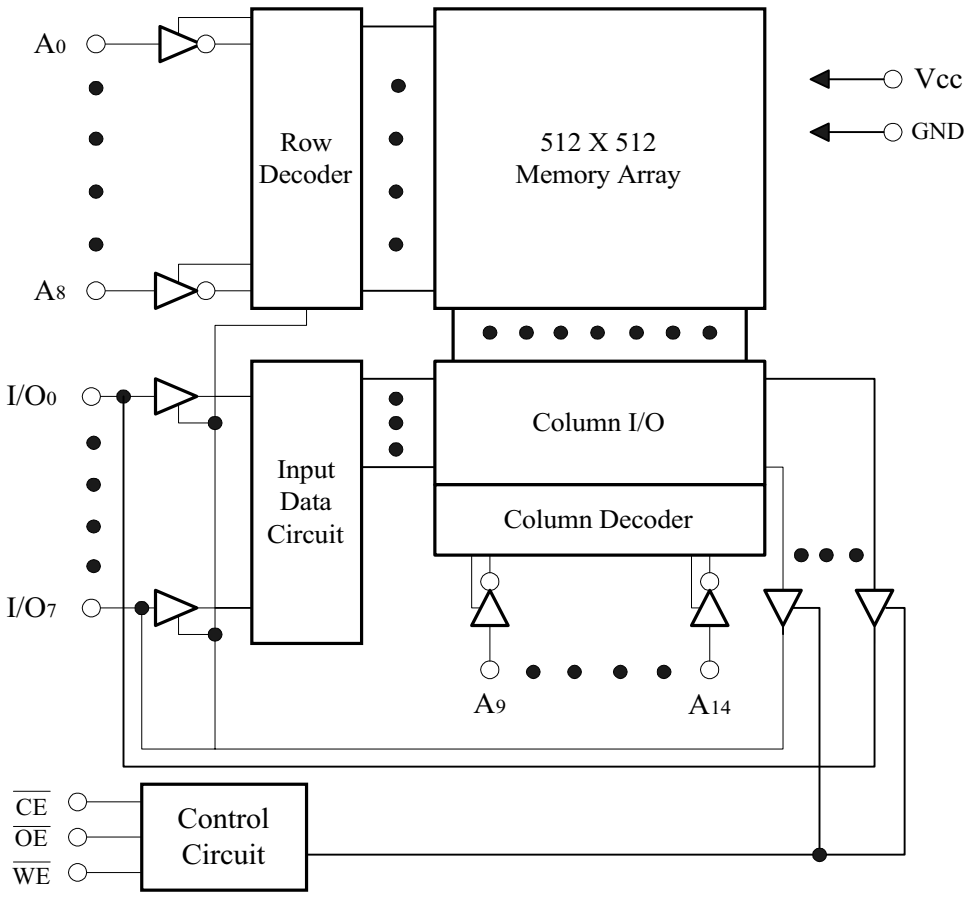
- High-speed: 70 ns
- Low DC operating current of 15mA
- Low Power Dissipation:
  -TTL Standby: 3 mA (Max.)
  -CMOS Standby: 20 μ A (Max.)
- Fully static operation
- All inputs and outputs directly compatible
- Three-state outputs
- Ultra low data retention current (V_{CC}= 2V)
- Single 5V $\pm$10% Power Supply
- Packages
  -28-pin 600 mil PDIP
  -28-pin 300 mil SOP
  -28-pin 330 mil SOP
  -28-pin TSOP(standard)

Description

The LST62832 is a 262,144-bit static random access memory organized as 32,768 words by 8 bits. It is built with LinkSmart's high performance CMOS process. Inputs and three- state outputs are TTL compatible and allow for direct interfacing with common system bus structures.

Pin Configurations (Top View)

Functional Block Diagram



Pin Descriptions

A_0-A_{14} Address Inputs

These 15 pins address inputs select one of the 32,768× 8 bit segments data I/O 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.

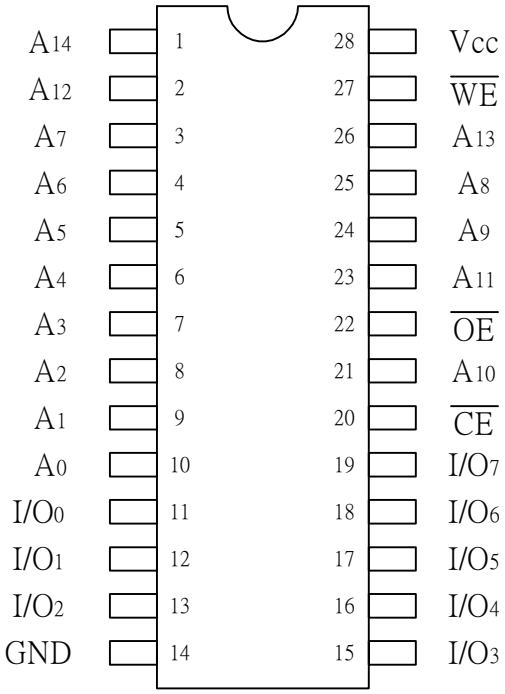
I/O_0-I/O_7 Data Input and Data Output Ports

These 8 bi-directional ports are used to read data from and write data into the RAM.

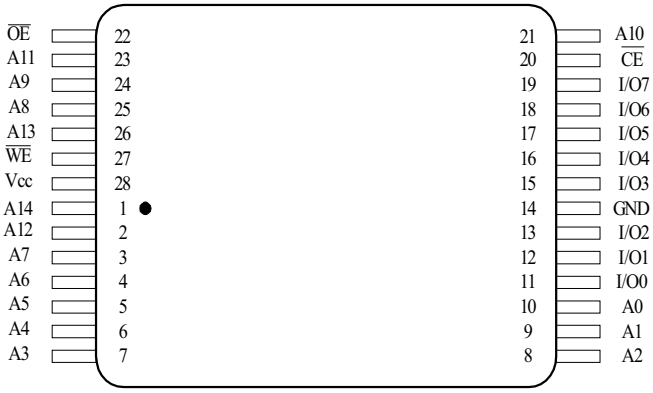
V_{CC} Power Supply

GND Ground

28-Pin PDIP/SOP



28-Pin TSOP(Standard)



Absolute Maximum Ratings (1)

Symbol	Parameter	Commercial	Industrial	Units
V_{CC}	Supply Voltage	-0.5 to +7	-0.5 to +7	V
V_{IN}	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 +1 35	℃
T_{STG}	Storage Temperature	-65 to +150	-65 to +1 50	℃

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

TA = 25℃, 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	×	×	High-Z
Read	L	L	H	DOUT
Read	L	H	H	High-Z
Write	L	×	L	D_{IN}

NOTE: ×=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}	-2	-	2	µA
I_{OL}	Output Leakage Current	V_{CC}= Max, $\overline{CE}$ =V_{IH}, V_{OUT} = 0V to V_{CC}	-2	-	2	µA
V_{OL}	Output LOW Voltage	V_{CC} = Min, I_{OL} = 2.1mA	-	-	0.4	V
V_{OH}	Output HIGH Voltage	V_{CC}= Min, I_{OH} = -1mA	2.4	-	-	V

DC Electrical Characteristics, continued

Symbol	Parameter		Power	Com.(4)	Ind.(4)	Units
I_{CC}	Average Operating Current, $\overline{CE}$ =V_{IL}	READ	-	15	16	mA
	Output Open, V_{CC} = Max., f = 0	WRITE	-	40	50	
I_{CC1}	Average Operating Current, $\overline{CE} \leq V_{IL}$ Output Open, V_{CC} = Max., f =f_{MAX} (3)		-	60	70	mA
I_{SB}	TTL Standby Current $\overline{CE} \geq V_{IH}$, V_{CC}= Max.		LL	3	4	mA
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}= Max.		L	60	70	µA
			LL	20	30	

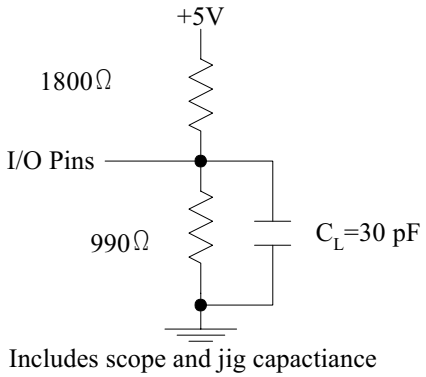
NOTES:

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 <20 ns.
3. f_{MAX}= 1/trc.
4. Maximum values.

AC Test Conditions

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

AC Test Loads and Waveforms



Includes scope and jig capactiance

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 unknow
	Don't not apply	Center line is high impedance "OFF"state

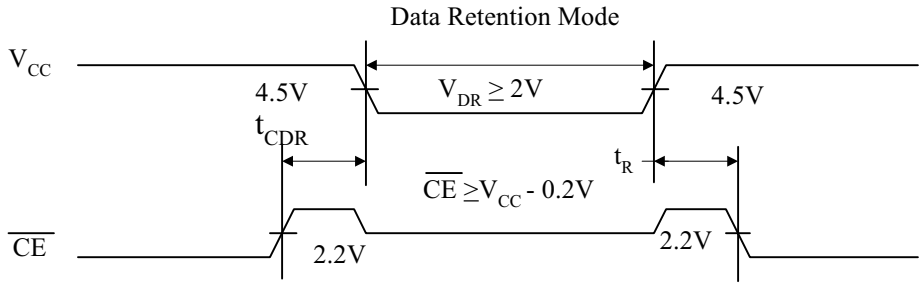
Data Retention Characteristics

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	Com'I	-	0.5	2	µA
	V_{DR}=3.0V, $\overline{CE} \geq V_{DR}$-0.2V	Ind.	-	-	2	
t_{CDR}	Chip Deselect to Data Retention Time		0	-	-	ns
t_R	Operation Recovery Time (see Retention Mode)		t_{RC}(1)	-	-	ns

Note: 1.t_{RC}= Read Cycle Time

2.T_A= +25℃

Low V_{CC} Data Retention Waveform



AC Electrical Characteristics

(Over all temperature ranges)

Read Cycle

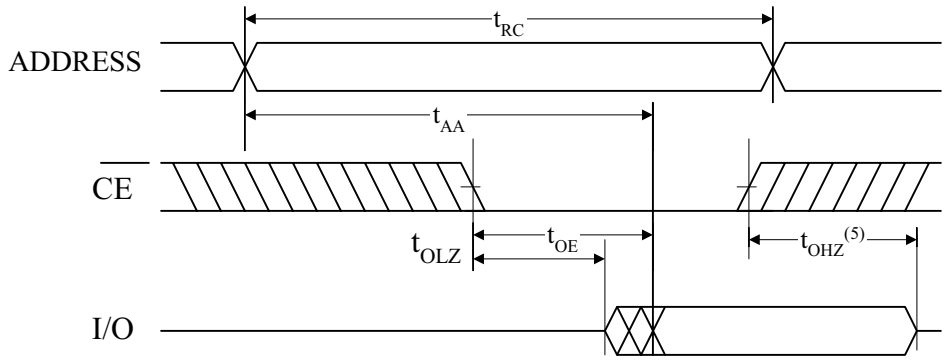
Parameter Name	Parameter	Min.	Max.	Unit
t_{RC}	Read Cycle Time	70	-	ns
t_{AA}	Address Access Time	-	70	ns
t_{ACS}	Chip Enable Access Time	-	70	ns
t_{OE}	Output Enable to Output Valid	-	30	ns
t_{CLZ}	Chip Enable to Output in Low Z	5	-	ns
t_{OLZ}	Output Enable to Output in Low Z	5	-	ns
t_{CHZ}	Chip Disable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

Write Cycle

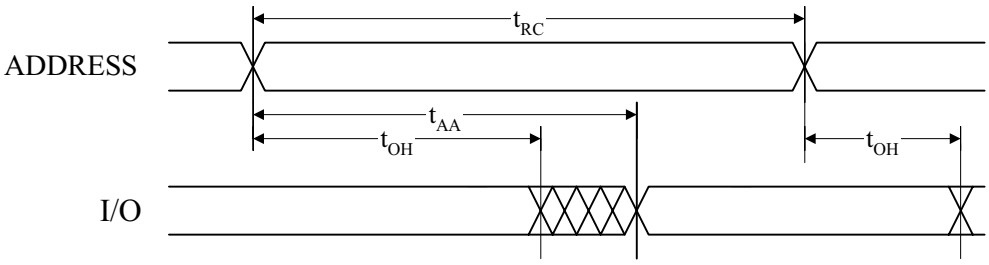
Parameter Name	Parameter	Min.	Max.	Unit
t_{WC}	Write Cycle Time	70	-	ns
t_{CW}	Chip Enable to End of Write	60	-	ns
t_{AS}	Address Setup Time	0	-	ns
t_{AW}	Address Valid to End of Write	60	-	ns
t_{WP}	Write Pulse Width	50	-	ns
t_{WR}	Write Recovery Time	0	-	ns
t_{WHZ}	Write to Output High-Z	0	25	ns
t_{DW}	Data Setup to End of Write	30	-	ns
t_{DH}	Data Hold from End of Write	0	-	ns
t_{OHZ}	Output Disable to Output in High Z	0	30	ns
t_{OW}	Output Active from End of Write	5	-	ns

Switching Waveforms (read Cycle)

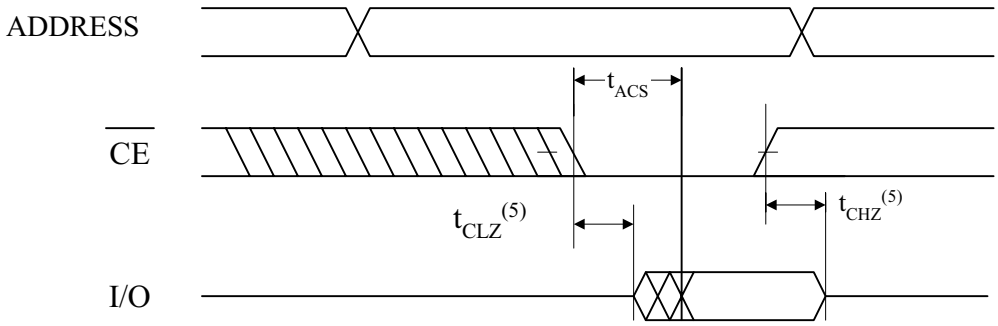
Read Cycle 1(1,2)



Read Cycle 2 (1,2,4)



Read Cycle 3 (1,3,4)

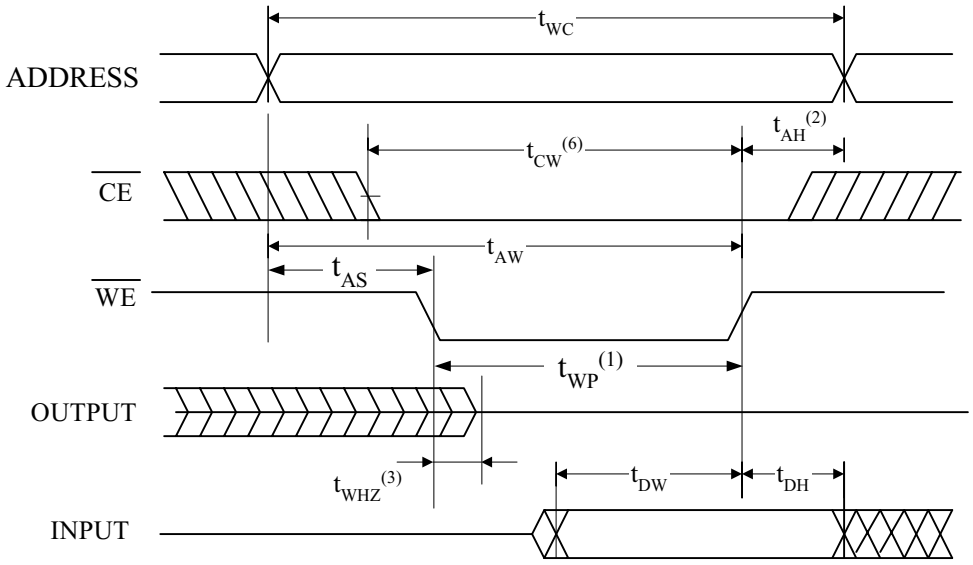


NOTES:

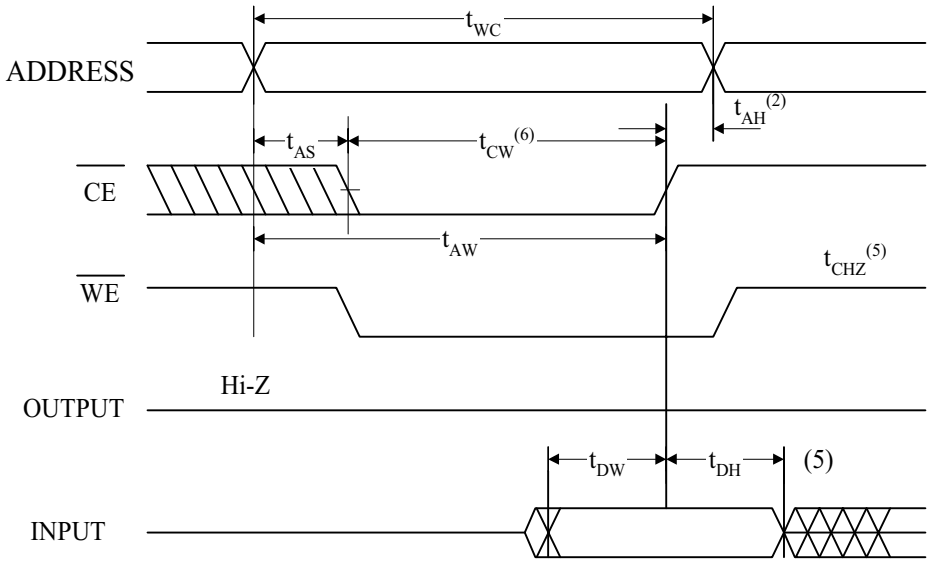
1. $\overline{WE}$ =V_{IH}.
2. $\overline{CE}$ =V_{IL}.
3. Address valid prior to or coincident with $\overline{CE}$ transition LOW.
4. $\overline{OE}$ =V_{IL}
5. Transition is measured ±500mV from steady state with C_L= 5pF. This parameter is guaranteed and not 100% tested.

Switching Waveforms (Write Cycle)

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



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

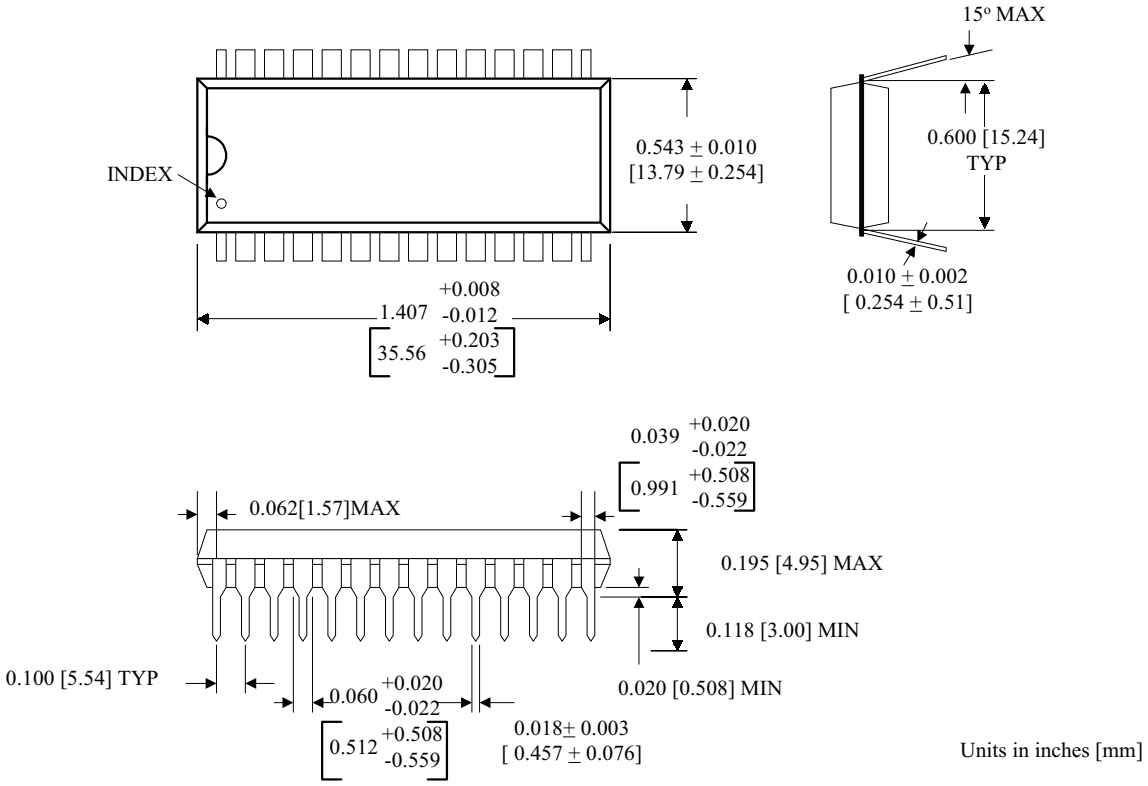


NOTES:

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_{WR} is measured from the earlier of $\overline{CE}$ f 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.

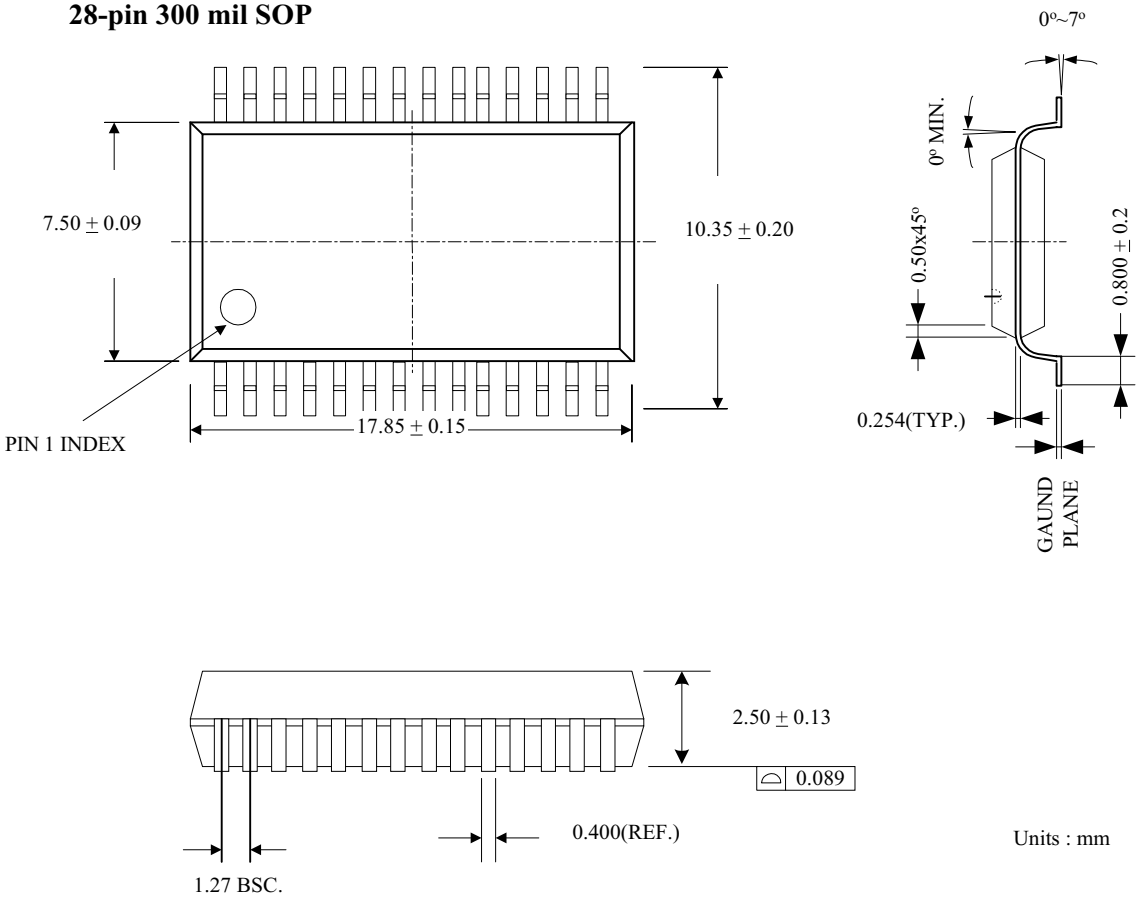
Package diagram

28-pin 600 mil Plastic DIP



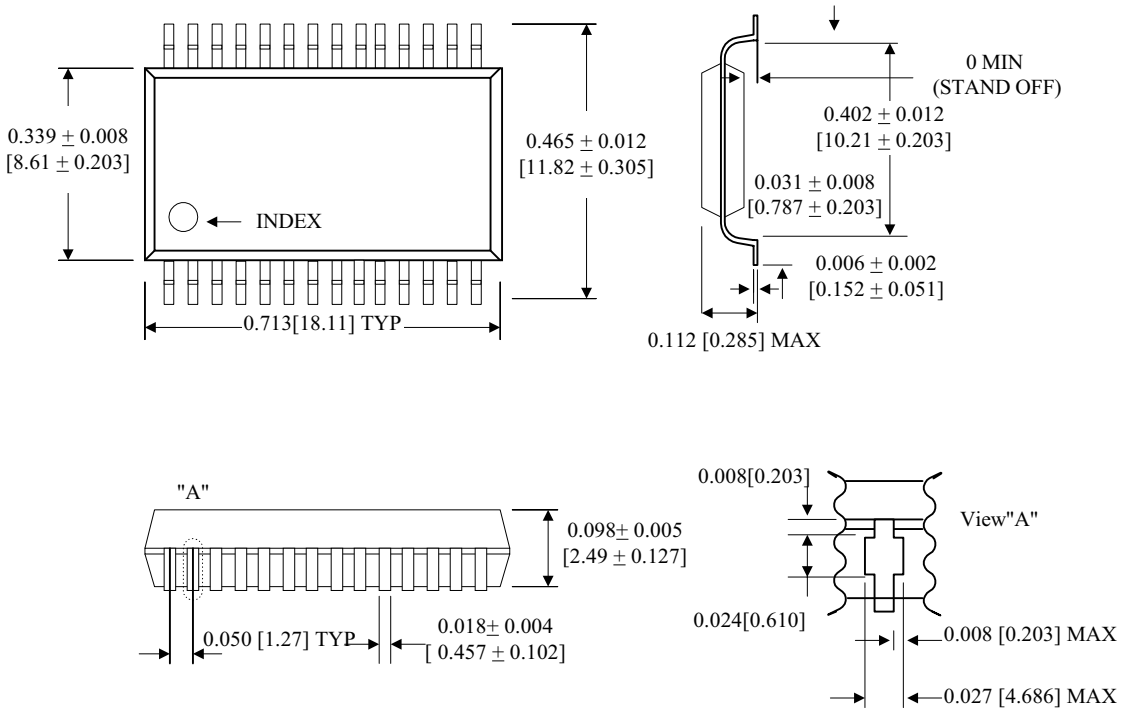
Units in inches [mm]

28-pin 300 mil SOP

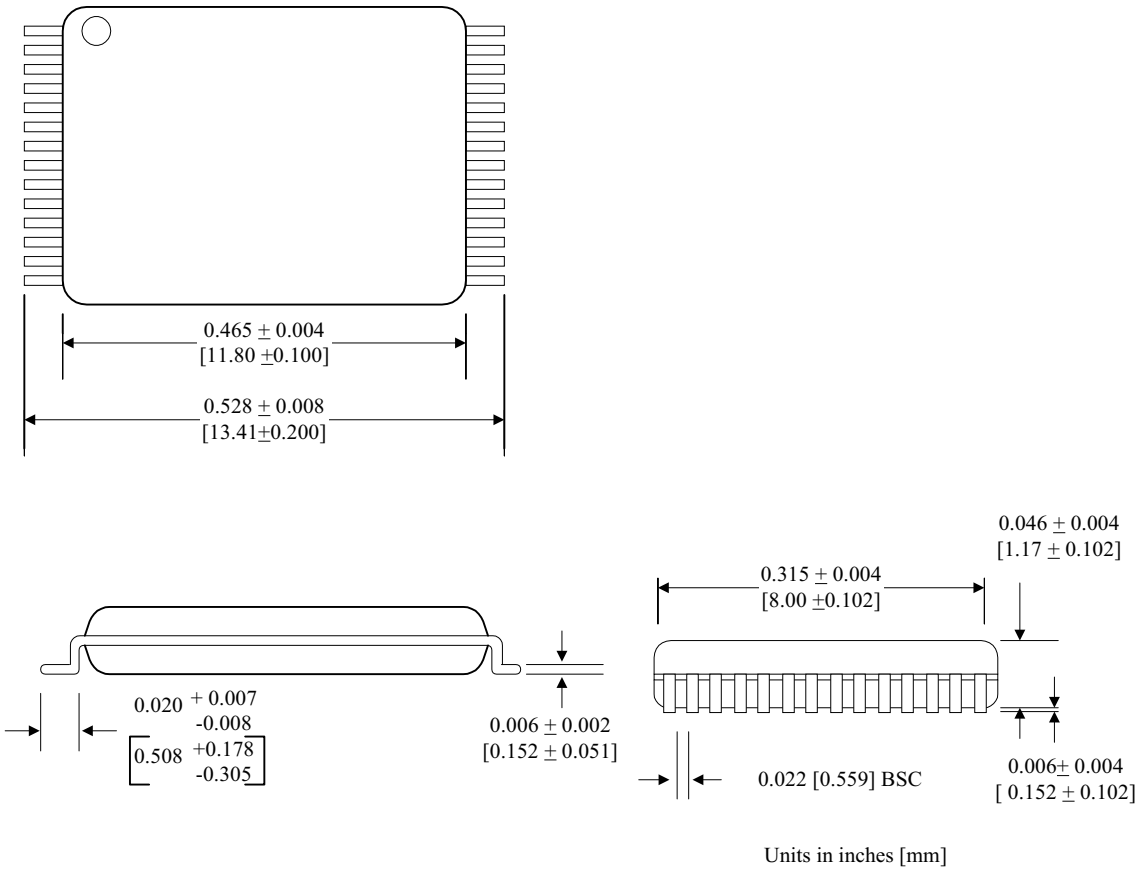


Units : mm

28-pin 330 mil SOP



28-Pin TSOP 8*13.4



Units in inches [mm]

Part Number Information