



# A61L73081 Series

## 128K X 8 BIT HIGH SPEED CMOS SRAM

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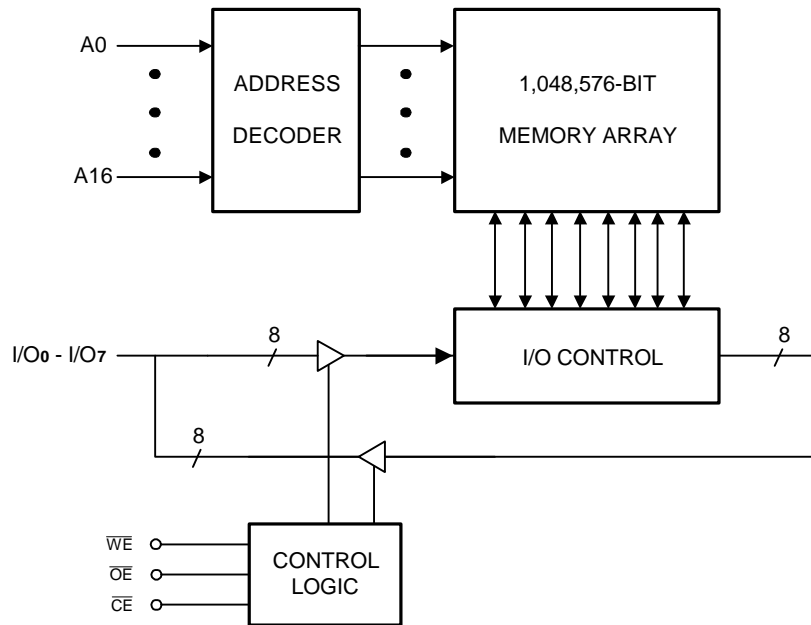
### Document Title

128K X 8 BIT HIGH SPEED CMOS SRAM

### Revision History

<u>Rev. No.</u>	<u>History</u>	<u>Issue Date</u>	<u>Remark</u>
0.0	Initial issue	July 14, 2000	Preliminary
1.0	Change $I_{CC1}$ from 120mA to 220mA 100mA to 210mA Change $I_{SB1}$ from 8mA to 12mA Change $I_{CDR}$ from 1mA to 5mA Final spec. release	April 26, 2001	Final



**Block Diagram**

**Pin Descriptions – SOJ**

Pin No.	Symbol	Description
1-4, 13-21, 29-32	A0 - A16	Address Inputs
6-7, 10-11, 22-23, 26-27	I/O <sub>0</sub> - I/O <sub>7</sub>	Data Inputs/Outputs
5	$\overline{CE}$	Chip Enable
28	$\overline{OE}$	Output Enable
12	$\overline{WE}$	Write Enable
8, 24	VCC	Power Supply
9, 25	GND	Ground

**Recommended DC Operating Conditions**

 (T<sub>A</sub> = 0°C to +70°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
VCC	Supply Voltage	3.0	3.3	3.6	V
GND	Ground	0	0	0	V
V <sub>IH</sub>	Input High Voltage	2.2	-	VCC + 0.5	V
V <sub>IL</sub>	Input Low (1) Voltage	-0.5	0	+0.8	V
C <sub>L</sub>	Output Load	-	-	30	pF

**Absolute Maximum Ratings\***

VCC to GND . . . . . -0.5V to +4.6V  
 IN, IN/OUT Volt to GND . . . . . -0.5V to VCC +0.5V  
 Operating Temperature, T<sub>opr</sub> . . . . . 0°C to +70°C  
 Storage Temperature, T<sub>stg</sub> . . . . . -55°C to +125°C  
 Temperature Under Bias, T<sub>bias</sub> . . . . . -10°C to +85°C  
 Power Dissipation, P<sub>r</sub> . . . . . 0.7W

**\*Comments**

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to this device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied or intended. Exposure to the absolute maximum rating conditions for extended periods may affect device reliability.

**DC Electrical Characteristics** (T<sub>A</sub> = 0°C to +70°C, VCC = 3.3V ± 10%, GND = 0V)

Symbol	Parameter	A61L73081-12		A61L73081-15		Unit	Conditions
		Min.	Max.	Min.	Max.		
I <sub>LI</sub>	Input Leakage	-	2	-	2	μA	V <sub>IN</sub> = GND to VCC
I <sub>LO</sub>	Output Leakage	-	2	-	2	μA	$\overline{CE} = V_{IH}, \overline{OE} = V_{IH}$ V <sub>I/O</sub> = GND to VCC
I <sub>CC1</sub> (2)	Dynamic Operating Current	-	220	-	210	mA	$\overline{CE} = V_{IL}, I_{I/O} = 0$ mA Min. Cycle, Duty = 100%
I <sub>SB</sub>	Standby Power Supply Current	-	25	-	25	mA	$\overline{CE} = V_{IH}$
I <sub>SB1</sub>		-	12	-	12	mA	$\overline{CE} \geq VCC - 0.2V,$ V <sub>IN</sub> ≥ VCC - 0.2V or V <sub>IN</sub> ≤ 0.2V
V <sub>OL</sub>	Output Low Voltage	-	0.4	-	0.4	V	I <sub>OL</sub> = 8 mA
V <sub>OH</sub>	Output High Voltage	2.4	-	2.4	-	V	I <sub>OH</sub> = -4 mA

- Notes: 1. V<sub>IL</sub> = -3.0V for pulses less than 20 ns.  
 2. I<sub>CC1</sub> is dependent on output loading, cycle rates, and Read/Write patterns.



**Truth Table**

Mode	$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	I/O Operation	Supply Current
Standby	H	X	X	High Z	$I_{SB}, I_{SB1}$
Output Disable	L	H	H	High Z	$I_{CC1}$
Read	L	L	H	Dout	$I_{CC1}$
Write	L	X	L	Din	$I_{CC1}$

Note: X = H or L

**Capacitance** ( $T_A = 25^\circ\text{C}$ ,  $f = 1.0\text{MHz}$ )

Symbol	Parameter	Min.	Max.	Unit	Conditions
$C_{IN}^*$	Input Capacitance	-	8	pF	$V_{IN} = 0V$
$C_{IO}^*$	Input/Output Capacitance	-	8	pF	$V_{IO} = 0V$

\* These parameters are sampled and not 100% tested.

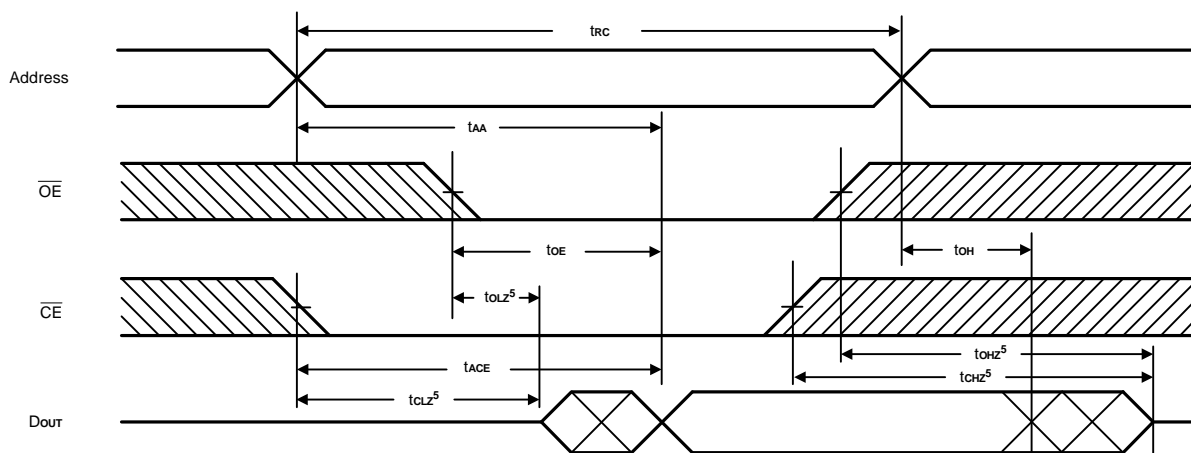
**AC Characteristics** ( $T_A = 0^\circ\text{C}$  to  $+70^\circ\text{C}$ ,  $V_{CC} = 3.3V \pm 10\%$ )

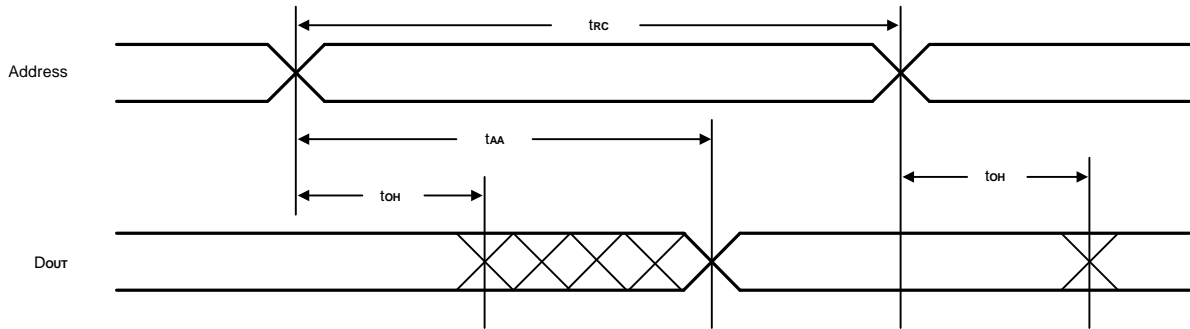
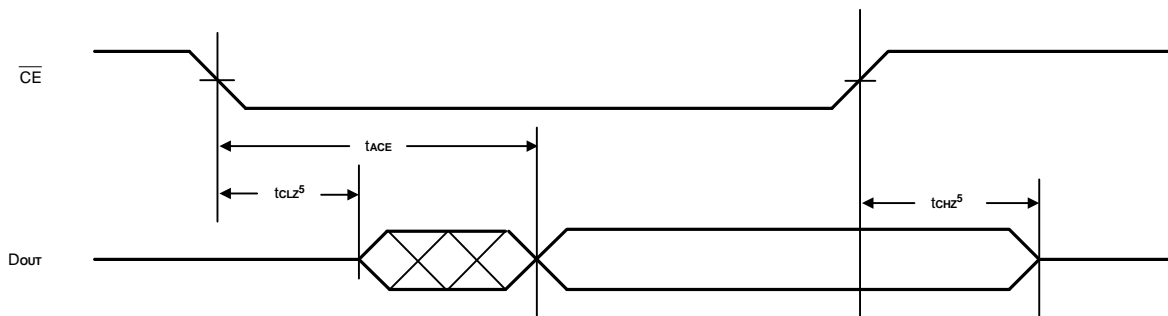
Symbol	Parameter	A61L73081-12		A61L73081-15		Unit
		Min.	Max.	Min.	Max.	
Read Cycle						
$t_{RC}$	Read Cycle Time	12	-	15	-	ns
$t_{AA}$	Address Access Time	-	12	-	15	ns
$t_{ACE}$	Chip Enable Access Time	-	12	-	15	ns
$t_{OE}$	Output Enable to Output Valid	-	6	-	8	ns
$t_{CLZ}$	Chip Enable to Output in Low Z	3	-	3	-	ns
$t_{OLZ}$	Output Enable to Output in Low Z	0	-	0	-	ns
$t_{CHZ}$	Chip Disable Output in High Z	0	6	-	8	ns
$t_{OHZ}$	Output Disable to Output in High Z	0	6	0	8	ns
$t_{OH}$	Output Hold from Address Change	3	-	3	-	ns

**AC Characteristics (continued)**

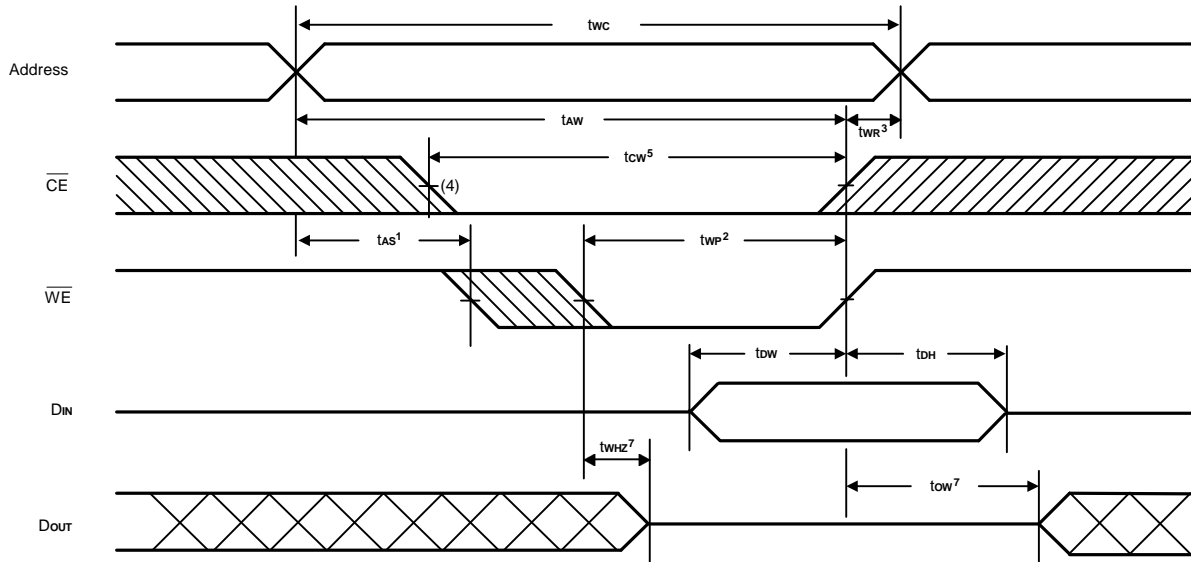
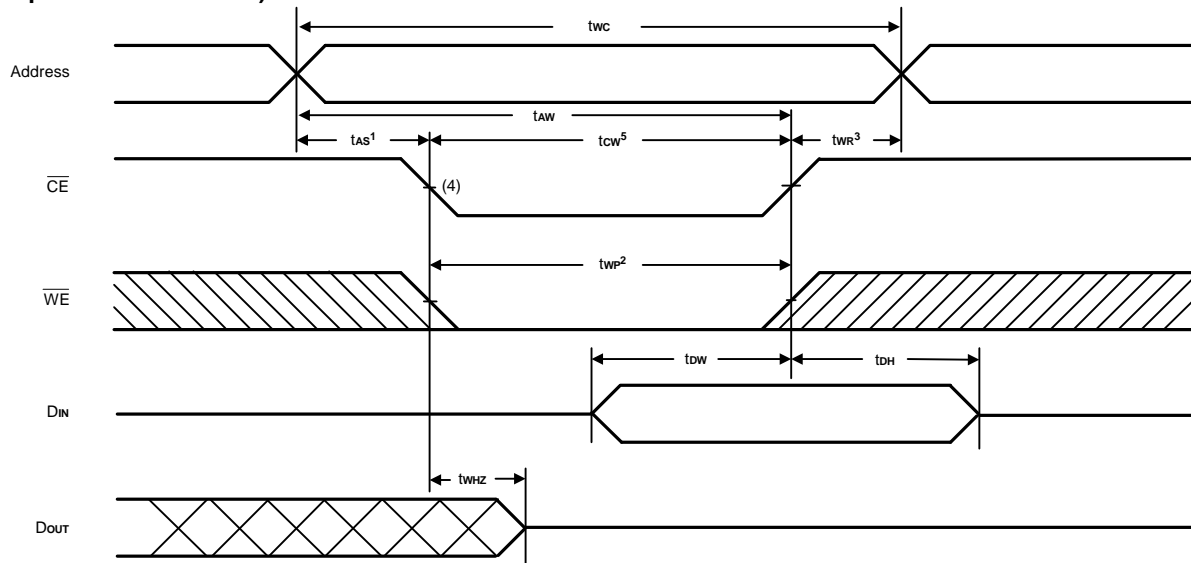
Symbol	Parameter	A61L73081-12		A61L73081-15		Unit
		Min.	Max.	Min.	Max.	
Write Cycle						
t <sub>wc</sub>	Write Cycle Time	12	-	15	-	ns
t <sub>cw</sub>	Chip Enable to End of Write	10	-	12	-	ns
t <sub>as</sub>	Address Setup Time of Write	0	-	0	-	ns
t <sub>aw</sub>	Address Valid to End of Write	10	-	12	-	ns
t <sub>wp</sub>	Write Pulse Width	10	-	12	-	ns
t <sub>wr</sub>	Write Recovery Time	0	-	0	-	ns
t <sub>whz</sub>	Write to Output in High Z	0	6	0	8	ns
t <sub>dw</sub>	Data to Write Time Overlap	6	-	7	-	ns
t <sub>dh</sub>	Data Hold from Write Time	0	-	0	-	ns
t <sub>ow</sub>	Output Active from End of Write	3	-	3	-	ns

Notes: t<sub>chz</sub>, t<sub>ohz</sub> and t<sub>whz</sub> are defined as the time at which the outputs achieve the open circuit condition and are not referred to output voltage levels.

**Timing Waveforms**
**Read Cycle 1<sup>(1)</sup>**


**Timing Waveforms (continued)**
**Read Cycle 2<sup>(1, 2, 4)</sup>**

**Read Cycle 3<sup>(1, 3, 4)</sup>**


- Notes: 1.  $\overline{WE}$  is high for Read Cycle.  
 2. Device is continuously enabled,  $\overline{CE} = V_{IL}$ .  
 3. Address valid prior to or coincident with  $\overline{CE}$  transition low.  
 4.  $\overline{OE} = V_{IL}$ .  
 5. Transition is measured  $\pm 200\text{mV}$  from steady state. This parameter is sampled and not 100% tested.

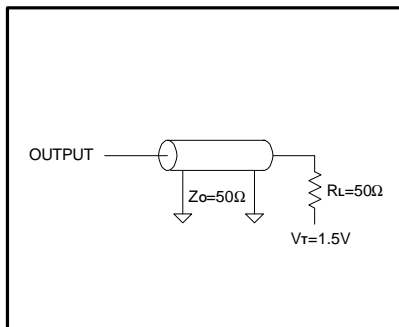
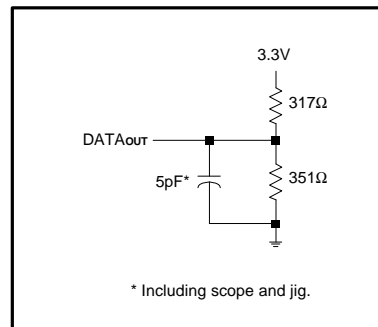
**Timing Waveforms (continued)**
**Write Cycle 1<sup>(6)</sup>  
(Write Enable Controlled)**

**Write Cycle 2  
(Chip Enable Controlled)**


- Notes:
1.  $t_{AS}$  is measured from the address valid to the beginning of Write.
  2. A Write occurs during the overlap ( $t_{WP}$ ) of a low  $\overline{CE}$  and a low  $\overline{WE}$ .
  3.  $t_{WR}$  is measured from the earliest of  $\overline{CE}$  or  $\overline{WE}$  going high to the end of the Write cycle
  4. If the CE low transition occurs simultaneously with the  $\overline{WE}$  low transition or after the  $\overline{WE}$  transition, outputs remain in a high impedance state.
  5.  $t_{CW}$  is measured from the later of  $\overline{CE}$  going low to the end of Write.
  6.  $\overline{OE}$  is continuously low. ( $\overline{OE} = V_{IL}$ )
  7. Transition is measured  $\pm 200\text{mV}$  from steady state. This parameter is sampled and not 100% tested.



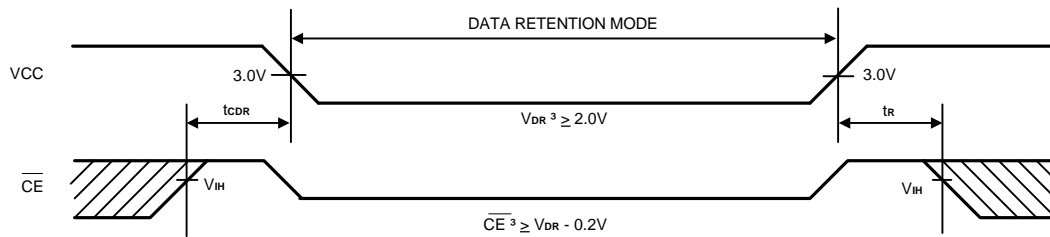
**AC Test Conditions**

Input Pulse Levels	0V to 3.0V
Input Rise and Fall Time	3 ns
Input and Output Timing Reference Levels	1.5V
Output Load	See Figures 1 and 2


**Figure 1. Output Load**

**Figure 2. Output Load for  $t_{CLZ}$ ,  $t_{OLZ}$ ,  $t_{CHZ}$ ,  $t_{OHZ}$ ,  $t_{WHZ}$ , and  $t_{OW}$** 
**Data Retention Characteristics** ( $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$ )

Symbol	Parameter	Min.	Max.	Unit	Conditions
$V_{DR}$	VCC for Data Retention	2	3.6	V	$\overline{CE} \geq VCC - 0.2V$
$I_{CCDR}$	Data Retention Current	-	5	mA	$VCC = 2.0V$ $\overline{CE} \geq VCC - 0.2V$ $V_{IN} \geq VCC - 0.2V$ or $V_{IN} \leq 0.2V$
$t_{CDR}$	Chip Disable to Data Retention Time	0	-	ns	See Retention Waveform
$t_R$	Operation Recovery Time	$T_{RC}^*$	-	ms	

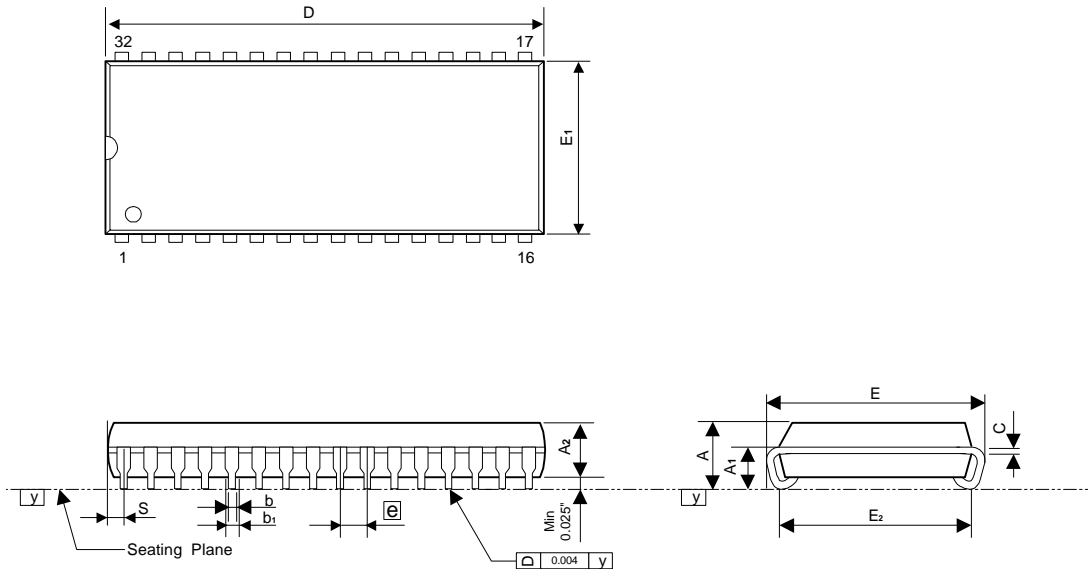
 $t_{RC}$  = Read Cycle Time

**Low VCC Data Retention Waveform**

**Ordering Information**

Part No.	Access Time (ns)	Operating Current Max. (mA)	CMOS Standby Max. (mA)	Package
A61L73081S-12	12	220	12	32L 300mil SOJ
A61L73081SW-12				32L 400mil SOJ
A61L73081S-15	15	210	12	32L 300mil SOJ
A61L73081SW-15				32L 400mil SOJ

**Package Information**
**SOJ 32L(300mil) Outline Dimensions**

unit: inches/mm



Symbol	Dimensions in inches			Dimensions in mm		
	Min	Nom	Max	Min	Nom	Max
A	0.128	0.132	0.140	3.25	3.35	3.56
A1	0.052	-	-	2.08	-	-
A2	0.095	0.100	0.105	2.41	2.54	2.67
b	0.016	0.018	0.020	0.41	0.46	0.51
b1	0.026	0.028	0.032	0.66	0.71	0.81
C	0.006	0.008	0.012	0.15	0.20	0.30
D	0.820	0.825	0.830	20.83	20.96	21.08
E	0.330	0.335	0.340	8.39	8.51	8.63
E1	0.295	0.300	0.305	7.49	7.62	7.75
E2	0.260	0.267	0.274	6.61	6.78	6.96
e	-	0.050	-	-	1.27	-
S	-	-	0.048	-	-	1.22
y	-	-	0.004	-	-	0.10

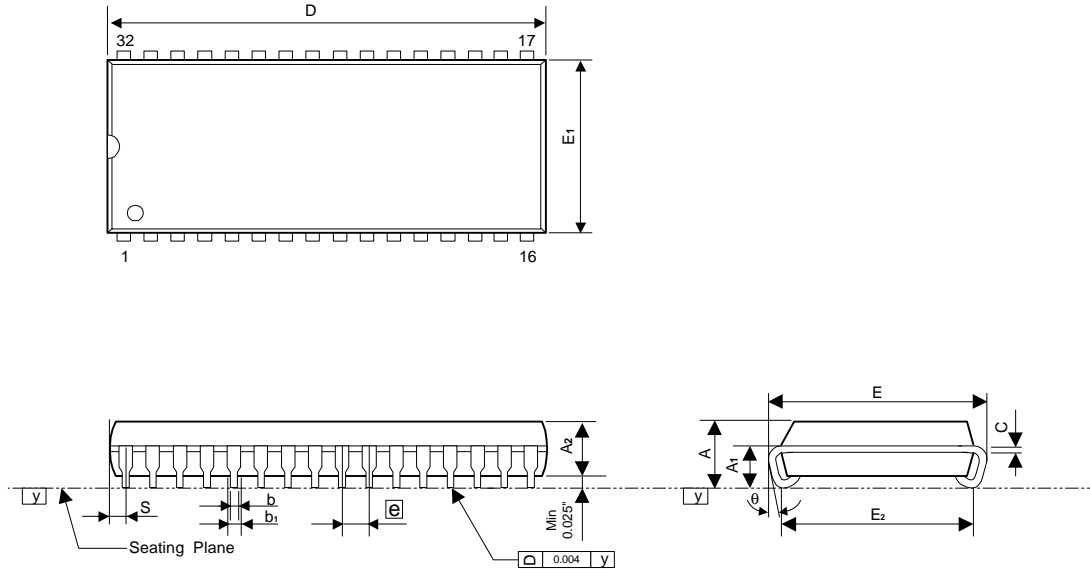
**Notes:**

1. The maximum value of dimension D includes end flash.
2. Dimension E does not include resin fins.
3. Dimension E1 is for PC Board surface mount pad pitch design reference only.
4. Dimension S includes end flash.

**Package Information**

**SOJ 32L (400mil) Outline Dimensions**

unit: inches/mm



Symbol	Dimensions in inches			Dimensions in mm		
	Min	Nom	Max	Min	Nom	Max
A	0.131	0.138	0.145	3.33	3.51	3.68
A1	0.082	-	-	2.08	-	-
A2	0.105	0.110	0.115	2.67	2.79	2.91
b	0.016	0.018	0.020	0.41	0.46	0.51
b1	0.026	0.028	0.032	0.66	0.71	0.81
C	0.006	0.008	0.011	0.15	0.20	0.28
D	0.820	0.825	0.830	20.83	20.96	21.08
E	0.435	0.440	0.445	11.05	11.18	11.31
E1	0.395	0.400	0.405	10.03	10.16	10.29
E2	0.360	0.370	0.380	9.15	9.40	9.65
e	-	0.050	-	-	1.27	-
S	-	-	0.045	-	-	1.14
y	-	-	0.004	-	-	0.10
θ	-5°	2°	6°	-5°	2°	6°

**Notes:**

1. The maximum value of dimension D includes end flash.
2. Dimension E does not include resin fins.
3. Dimension E1 is for PC Board surface mount pad pitch design reference only.
4. Dimension S includes end flash.