



## 32K X 8 BIT LOW POWER CMOS SRAM

### FEATURES

- Access time : 55ns
- Low power consumption:
  - Operation current : 15mA (TYP.),  $V_{CC} = 3.0V$
  - Standby current :  $1\mu A$  (TYP.),  $V_{CC} = 3.0V$
- Wide range power supply : 2.7 ~ 5.5V
- Fully Compatible with all Competitors 5V product
- Fully Compatible with all Competitors 3.3V product
- All inputs and outputs TTL compatible
- Fully static operation
- Tri-state output
- Data retention voltage : 2.0V (MIN.)
- **All products ROHS Compliant**
- Package : 28-pin 600 mil PDIP  
28-pin 330 mil SOP  
28-pin 8mm x 13.4mm sTSOP

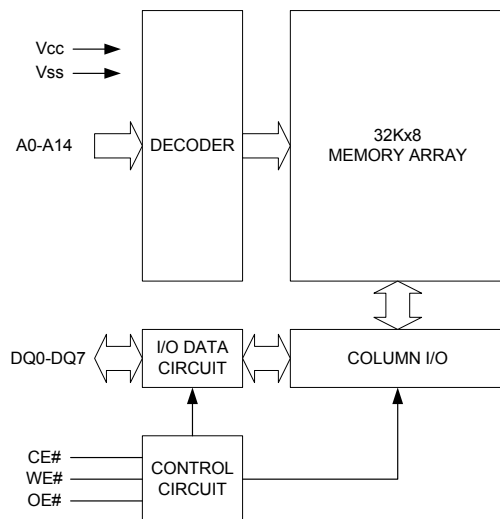
### GENERAL DESCRIPTION

The AS6C62256 is a 262,144-bit low power CMOS static random access memory organized as 32,768 words by 8 bits. It is fabricated using very high performance, high reliability CMOS technology. Its standby current is stable within the range of operating temperature.

The AS6C62256 is well designed for low power application, and particularly well suited for battery back-up nonvolatile memory application.

The AS6C62256 operates with wide range power supply 2.7 ~ 5.5V

### FUNCTIONAL BLOCK DIAGRAM

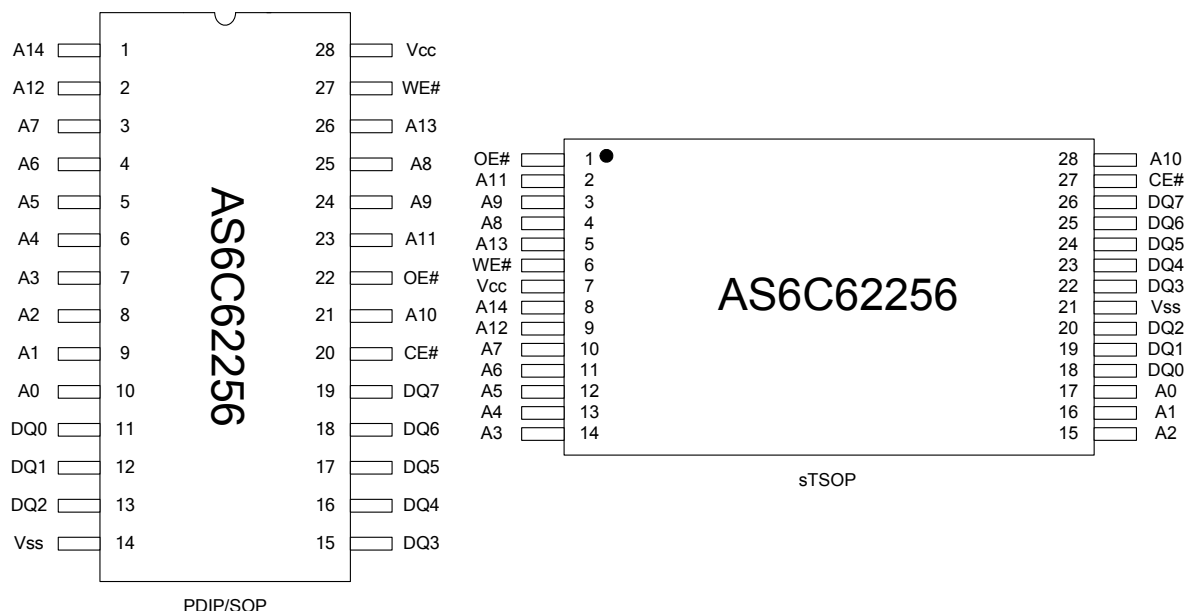


### PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A14	Address Inputs
DQ0 - DQ7	Data Inputs/Outputs
CE#	Chip Enable Input
WE#	Write Enable Input
OE#	Output Enable Input
Vcc	Power Supply
Vss	Ground



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**PIN CONFIGURATION****ABSOLUTE MAXIMUM RATINGS\***

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to Vss	V <sub>TERM</sub>	-0.5 to 7.0	V
Operating Temperature	T <sub>A</sub>	0 to 70(C grade)	°C
		-40 to 85(I grade)	°C
Storage Temperature	T <sub>STG</sub>	-65 to 150	
Power Dissipation	P <sub>D</sub>	1	W
DC Output Current	I <sub>OUT</sub>	50	mA
Soldering Temperature (under 10 sec)	T <sub>SOLDER</sub>	260	°C

\*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 or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to the absolute maximum rating conditions for extended period may affect device reliability.

**TRUTH TABLE**

MODE	CE#	OE#	WE#	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	High-Z	I <sub>SB</sub> , I <sub>SB1</sub>
Output Disable	L	H	H	High-Z	I <sub>CC</sub> , I <sub>CC1</sub>
Read	L	L	H	D <sub>OUT</sub>	I <sub>CC</sub> , I <sub>CC1</sub>
Write	L	X	L	D <sub>IN</sub>	I <sub>CC</sub> , I <sub>CC1</sub>

Note: H = V<sub>IH</sub>, L = V<sub>IL</sub>, X = Don't care.



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### DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP. <sup>5</sup>	MAX.	UNIT
Supply Voltage	V <sub>CC</sub>		2.7	3.3	5.5	V
Input High Voltage	V <sub>IH</sub> <sup>1</sup>		2.4 V	-	V <sub>CC</sub> +0.5	V
Input Low Voltage	V <sub>IL</sub> <sup>2</sup>		- 0.5	-	0.6	V
Input Leakage Current	I <sub>LI</sub>	V <sub>CC</sub> ≥ V <sub>IN</sub> ≥ V <sub>SS</sub>	- 1	-	1	μA
Output Leakage Current	I <sub>LO</sub>	V <sub>CC</sub> ≥ V <sub>OUT</sub> ≥ V <sub>SS</sub> , Output Disabled	- 1	-	1	μA
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -1mA	2.4	3.0	-	V
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 2mA	-	-	0.4	V
Average Operating Power supply Current	I <sub>CC</sub>	Cycle time = Min. CE# = V <sub>IL</sub> , I <sub>I/O</sub> = 0mA	-55	15	45	mA
	I <sub>CC1</sub>	Cycle time = 1μs CE# ≤ 0.2V and I <sub>I/O</sub> = 0mA other pins at 0.2V or V <sub>CC</sub> -0.2V	-	3	10	mA
Standby Power Supply Current	I <sub>SB</sub>	CE# = V <sub>IH</sub>	-	1	3	mA
	I <sub>SB1</sub>	CE# ≥ V <sub>CC</sub> - 0.2V	-C	-	1	50 <sup>4</sup>
-I			-	1	80 <sup>4</sup>	μA

Notes: C = Commercial Temperature I = Industrial Temperature

1. V<sub>IH</sub>(max) = V<sub>CC</sub> + 3.0V for pulse width less than 10ns.

2. V<sub>IL</sub>(min) = V<sub>SS</sub> - 3.0V for pulse width less than 10ns.

3. Over/Undershoot specifications are characterized, not 100% tested.

4. 10μA for special request

5. Typical values are included for reference only and are not guaranteed or tested.

Typical values are measured at V<sub>CC</sub> = V<sub>CC</sub>(TYP.) and T<sub>A</sub> = 25°C

### CAPACITANCE (T<sub>A</sub> = 25°C, f = 1.0MHz)

PARAMETER	SYMBOL	MIN.	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	-	6	pF
Input/Output Capacitance	C <sub>I/O</sub>	-	8	pF

Note : These parameters are guaranteed by device characterization, but not production tested.

### AC TEST CONDITIONS

Input Pulse Levels	0.2V to V <sub>CC</sub> - 0.2V
Input Rise and Fall Times	3ns
Input and Output Timing Reference Levels	1.5V
Output Load	C <sub>L</sub> = 50pF + 1TTL, I <sub>OH</sub> /I <sub>OL</sub> = -1mA/2mA



## 32K X 8 BIT LOW POWER CMOS SRAM

### AC ELECTRICAL CHARACTERISTICS

#### (1) READ CYCLE

PARAMETER	SYM	AS6C62256-55				UNIT
			MIN.	MAX.		
Read Cycle Time	t <sub>RC</sub>		55	-		ns
Address Access Time	t <sub>AA</sub>		-	55		ns
Chip Enable Access Time	t <sub>ACE</sub>		-	55		ns
Output Enable Access Time	t <sub>OE</sub>		-	30		ns
Chip Enable to Output in Low-Z	t <sub>CLZ</sub> *		10	-		ns
Output Enable to Output in Low-Z	t <sub>OLZ</sub> *		5	-		ns
Chip Disable to Output in High-Z	t <sub>CHZ</sub> *		-	20		ns
Output Disable to Output in High-Z	t <sub>OHZ</sub> *		-	20		ns
Output Hold from Address Change	t <sub>OH</sub>		10	-		ns

#### (2) WRITE CYCLE

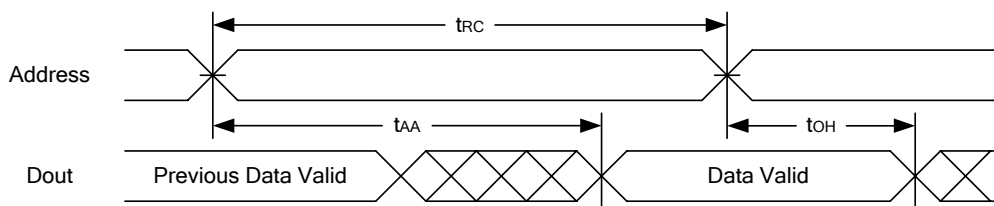
PARAMETER	SYM	AS6C62256-55				UNIT
			MIN.	MAX.		
Write Cycle Time	t <sub>WC</sub>		55	-		ns
Address Valid to End of Write	t <sub>AW</sub>		50	-		ns
Chip Enable to End of Write	t <sub>CW</sub>		50	-		ns
Address Set-up Time	t <sub>AS</sub>		0	-		ns
Write Pulse Width	t <sub>WP</sub>		45	-		ns
Write Recovery Time	t <sub>WR</sub>		0	-		ns
Data to Write Time Overlap	t <sub>DW</sub>		25	-		ns
Data Hold from End of Write Time	t <sub>DH</sub>		0	-		ns
Output Active from End of Write	t <sub>OW</sub> *		5	-		ns
Write to Output in High-Z	t <sub>WHZ</sub> *		-	20		ns

\*These parameters are guaranteed by device characterization, but not production tested.

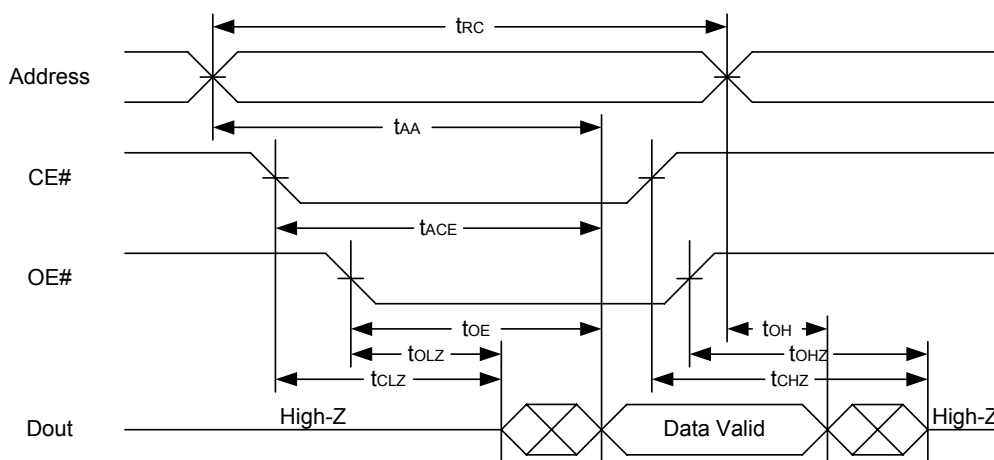


## TIMING WAVEFORMS

### READ CYCLE 1 (Address Controlled) (1,2)



### READ CYCLE 2 (CE# and OE# Controlled) (1,3,4,5)



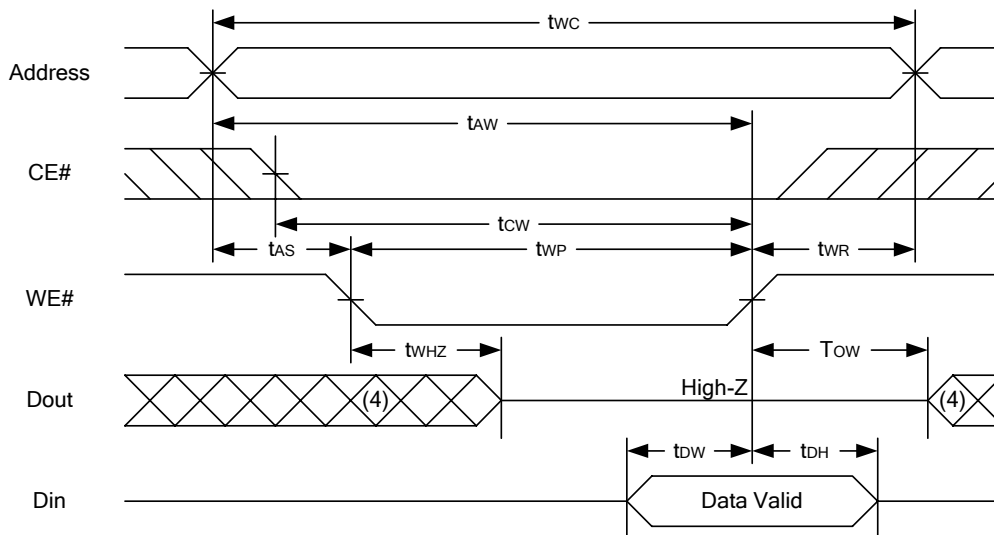
#### Notes :

1. WE# is high for read cycle.
2. Device is continuously selected OE# = low, CE# = low.
3. Address must be valid prior to or coincident with CE# = low.; otherwise tAA is the limiting parameter.
4. tCLZ, tOLZ, tCHZ and tOHZ are specified with CL = 5pF. Transition is measured ±500mV from steady state.
5. At any given temperature and voltage condition, tCHZ is less than tCLZ, tOHZ is less than tOLZ.

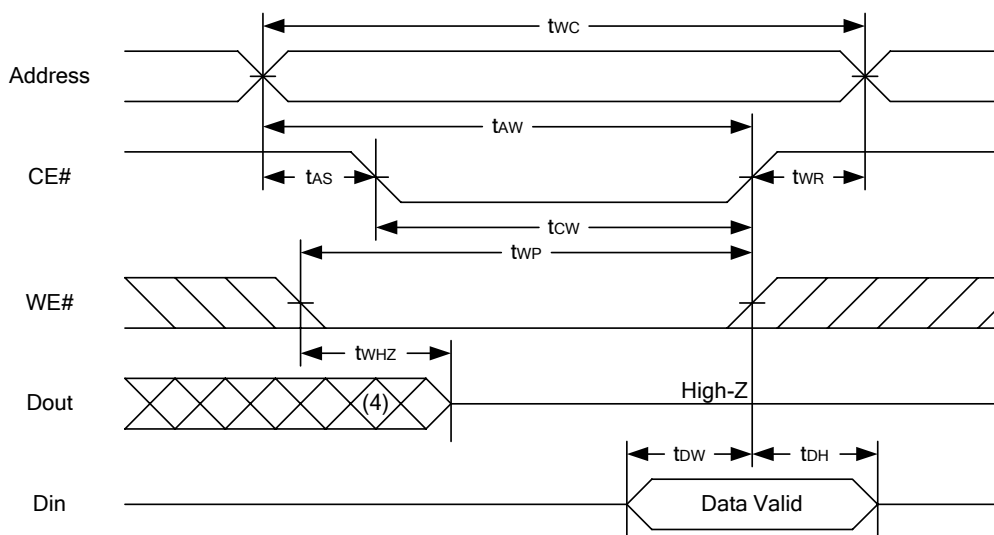


## 32K X 8 BIT LOW POWER CMOS SRAM

## WRITE CYCLE 1 (WE# Controlled) (1,2,3,5,6)



## WRITE CYCLE 2 (CE# Controlled) (1,2,5,6)



## Notes :

1. WE#, CE# must be high during all address transitions.
2. A write occurs during the overlap of a low CE#, low WE#.
3. During a WE# controlled write cycle with OE# low,  $t_{wp}$  must be greater than  $t_{whz} + t_{dw}$  to allow the drivers to turn off and data to be placed on the bus.
4. During this period, I/O pins are in the output state, and input signals must not be applied.
5. If the CE# low transition occurs simultaneously with or after WE# low transition, the outputs remain in a high impedance state.
6.  $t_{ow}$  and  $t_{whz}$  are specified with  $C_L = 5\text{pF}$ . Transition is measured  $\pm 500\text{mV}$  from steady state.



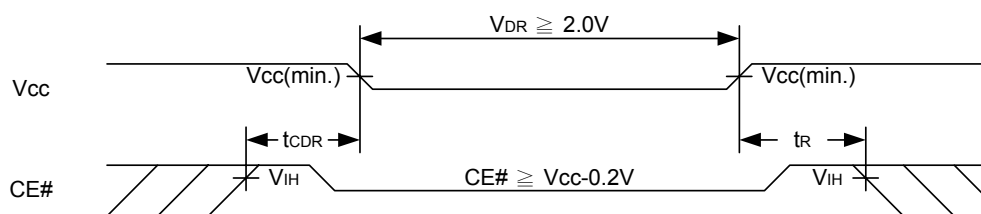
## 32K X 8 BIT LOW POWER CMOS SRAM

### DATA RETENTION CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
V <sub>CC</sub> for Data Retention	V <sub>DR</sub>	CE# $\geq$ V <sub>CC</sub> - 0.2V	2.0	-	5.5	V
Data Retention Current	I <sub>DR</sub>	V <sub>CC</sub> = 2.0V CE# $\geq$ V <sub>CC</sub> - 0.2V	-	0.5	20	$\mu$ A
Chip Disable to Data Retention Time	t <sub>CDR</sub>	See Data Retention Waveforms (below)	0	-	-	ns
Recovery Time	t <sub>R</sub>		t <sub>RC</sub> *	-	-	ns

t<sub>RC</sub>\* = Read Cycle Time

### DATA RETENTION WAVEFORM

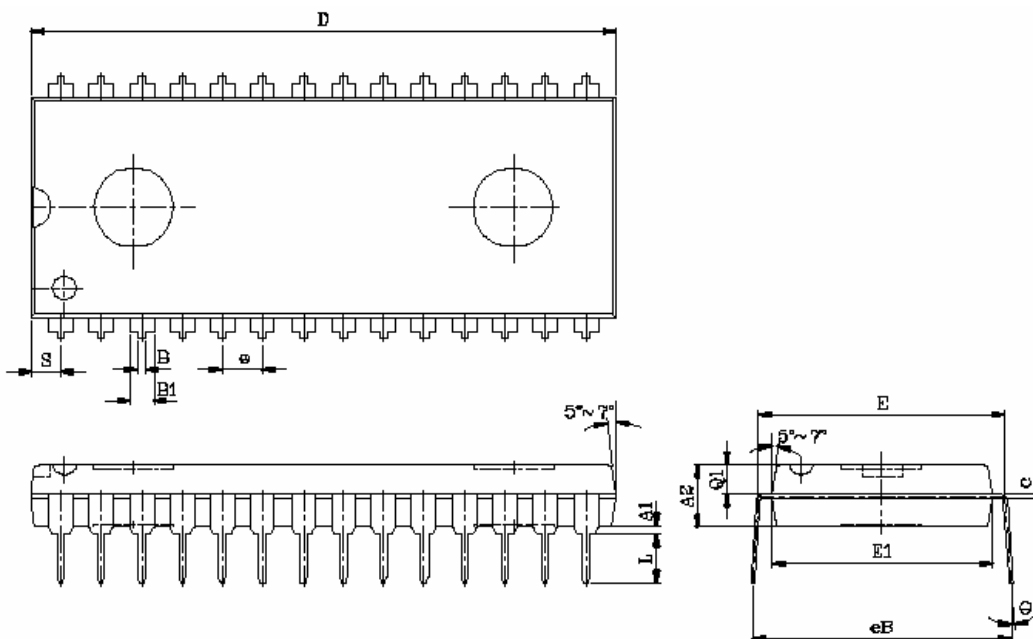




**32K X 8 BIT LOW POWER CMOS SRAM**

**PACKAGE OUTLINE DIMENSION**

28 pin 600 mil PDIP Package Outline Dimension



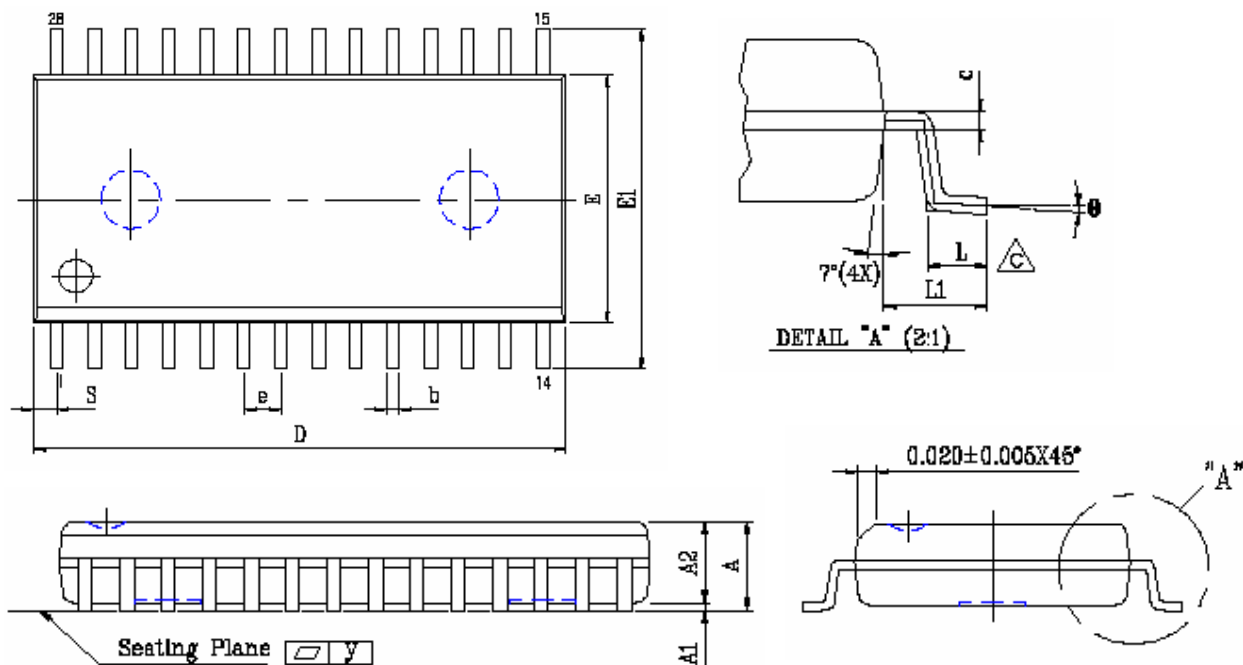
SYM.	UNIT	INCH.(BASE)	MM(REF)
A1		0.010 (MIN)	0.254 (MIN)
A2		0.150±0.005	3.810±0.127
B		0.020 (MAX)	0.508(MAX)
B1		0.055 (MAX)	1.397(MAX)
c		0.012 (MAX)	0.304 (MAX)
D		1.430 (MAX)	36.322 (MAX)
E		0.6 (TYP)	15.24 (TYP)
E1		0.52 (MAX)	13.208 (MAX)
e		0.100 (TYP)	2.540(TYP)
eB		0.625 (MAX)	15.87 (MAX)
L		0.180(MAX)	4.572(MAX)
S		0.06 (MAX)	1.524 (MAX)
Q1		0.08(MAX)	2.032(MAX)
θ		15°(MAX)	15°(MAX)





32K X 8 BIT LOW POWER CMOS SRAM

28 pin 330 mil SOP Package Outline Dimension

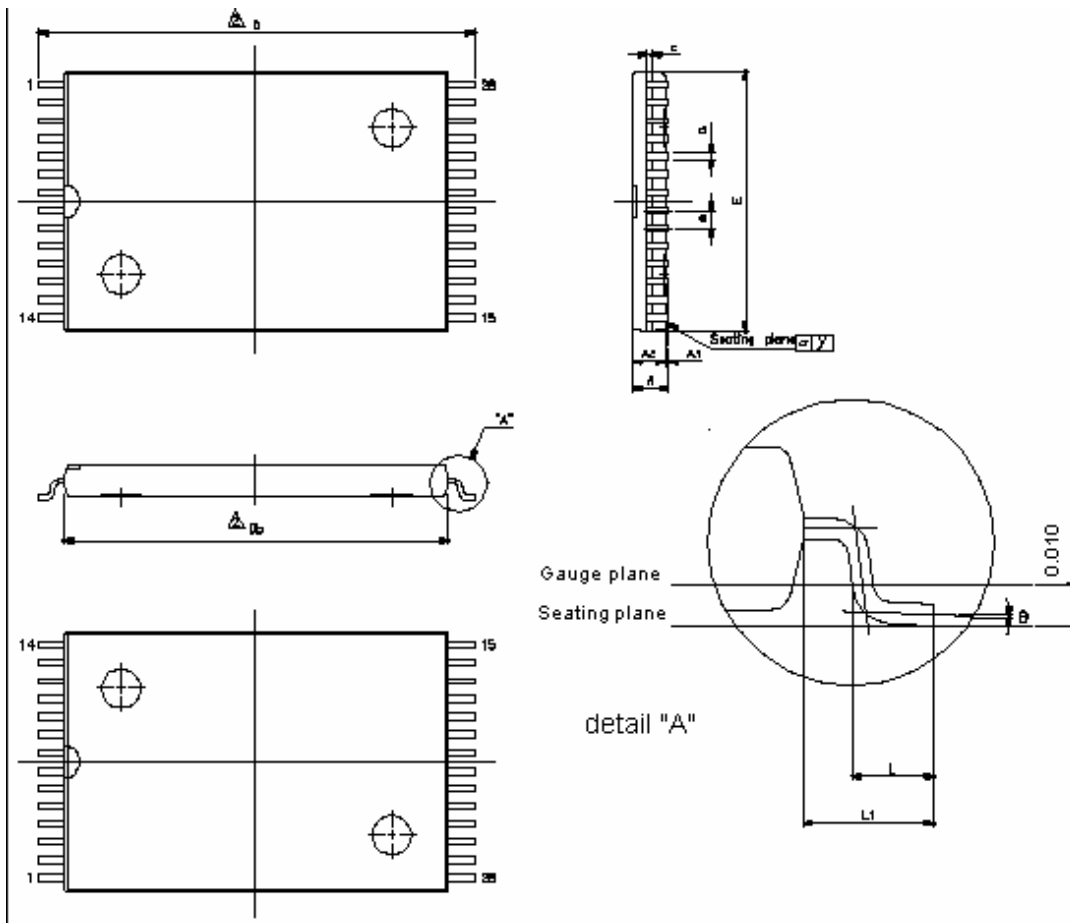


SYM.	UNIT	INCH(BASE)	MM(REF)
A		0.120 (MAX)	3.048 (MAX)
A1		0.002(MIN)	0.05(MIN)
A2		0.098±0.005	2.489±0.127
b		0.016 (TYP)	0.406(TYP)
c		0.010 (TYP)	0.254(TYP)
D		0.728 (MAX)	18.491 (MAX)
E		0.340 (MAX)	8.636 (MAX)
E1		0.465±0.012	11.811±0.305
e		0.050 (TYP)	1.270(TYP)
L		0.05 (MAX)	1.270 (MAX)
L1		0.067±0.008	1.702 ±0.203
S		0.047 (MAX)	1.194 (MAX)
y		0.003(MAX)	0.076(MAX)
θ		0°~10°	0°~10°



32K X 8 BIT LOW POWER CMOS SRAM

28 pin 8mm x 13.4mm sTSP Package Outline Dimension



SYM.	UNIT	INCH(BASE)	MM(REF)
A		0.047 (MAX)	1.20 (MAX)
A1		0.004±0.002	0.10±0.05
A2		0.039±0.002	1.00±0.05
b		0.006 (TYP)	0.15(TYP)
c		0.010 (TYP)	0.254(TYP)
Db		0.465±0.004	11.80±0.10
E		0.315±0.004	8.00±0.10
e		0.022 (TYP)	0.55(TYP)
D		0.528±0.008	13.40±0.20
L		0.020±0.004	0.50±0.10
L1		0.0315±0.004	0.80±0.10
y		0.08(MAX)	0.003(MAX)
θ		0°~5°	0°~5°

Note : E dimension is not including end flash. The total of both sides' end flash is not above 0.3mm.



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### ORDERING INFORMATION

#### Ordering Codes

Alliance	Organization	VCC range	Package	Operating Temp	Speed ns
AS6C62256-55PCN	32k x 8	2.7-5.5V	28pin 600mil PDIP	Commercial ~ 0° C to 70° C	55
AS6C62256-55SCN	32k x 8	2.7-5.5V	28pin 330mil SOP	Commercial ~ 0° C to 70° C	55
AS6C62256-55SIN	32k x 8	2.7-5.5V	28pin 330mil SOP	Industrial ~ -40° C to 85° C	55
AS6C62256-55STCN	32k x 8	2.7-5.5V	28pin sT SOP (8 x 13.4 mm)	Commercial ~ 0° C to 70° C	55
AS6C62256-55STIN	32k x 8	2.7-5.5V	28pin sT SOP (8 x 13.4 mm)	Industrial ~ -40° C to 85° C	55

#### Part numbering system

AS6C	62256	- 55	X	X	N
low power SRAM prefix	Device Number 62256	Access Time	Package Options: P = 28 pin 600 mil P-DIP S = 28 pin 330 mil SOP ST = 28 pin sT SOP (8mm x 13.4 mm)	Temperature Range: C = Commercial (0° C to +70° C) I = Industrial (-40° to +85° C)	N = Lead Free ROHS Compliant Part

Rev 1



Alliance Memory, Inc.  
1116 South Amphlett, #2,  
San Mateo, CA 94402  
Tel: 650-525-3737  
Fax: 650-525-0449  
[www.alliancememory.com](http://www.alliancememory.com)

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