



UTRON

Rev. 1.1

UT62W256C  
32K X 8 BIT LOW POWER CMOS SRAM

## REVISION HISTORY

REVISION	DESCRIPTION	Draft Date
Rev. 1.0	Original.	Aug.13. 2001
Rev. 1.1	1.Add Extended temperature : -20 ~85 2.Add order information for lead free product	Apr. 21. 2003



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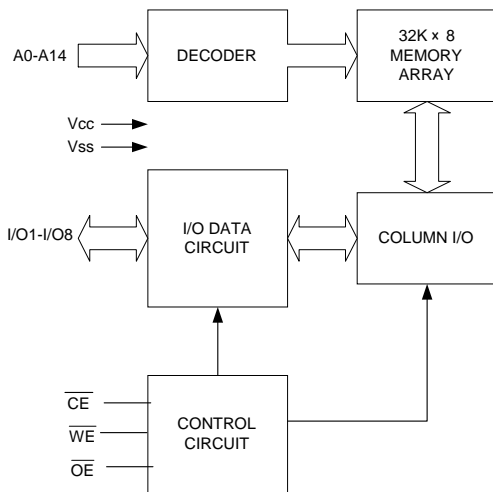
# UT62W256C

## 32K X 8 BIT LOW POWER CMOS SRAM

### FEATURES

- Fast access time : 35/70ns
- Low power consumption:
  - Operation : 40/20 mA (max.) ( $V_{CC}$  3.6V)
  - 50/40 mA (max.) ( $V_{CC}$  5.5V)
  - Standby : -L / -LL version
  - 1 / 0.5uA (typical)  $V_{CC}=2.7\sim3.6V$
  - 2 / 1uA (typical)  $V_{CC}=4.5\sim5.5V$
- Wide Range power supply: 2.7V~5.5V
- Operating temperature :
  - Commercial temperature : 0 ~70
  - Extended temperature : -20 ~85
- All inputs and outputs are TTL compatible
- Fully static operation
- Three state outputs
- Data retention voltage : 1.5V (min.)
- Package : 28-pin 600 mil PDIP
- 28-pin 330 mil SOP
- 28-pin 8x13.4mm STSOP

### FUNCTIONAL BLOCK DIAGRAM



### PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A14	Address Inputs
I/O1 - I/O8	Data Inputs/Outputs
$\overline{CE}$	Chip Enable Input
$\overline{WE}$	Write Enable Input
$\overline{OE}$	Output Enable Input
$V_{CC}$	Power Supply
$V_{SS}$	Ground

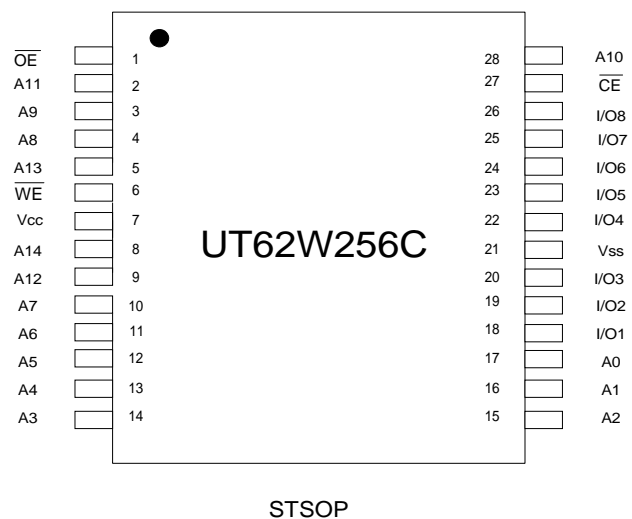
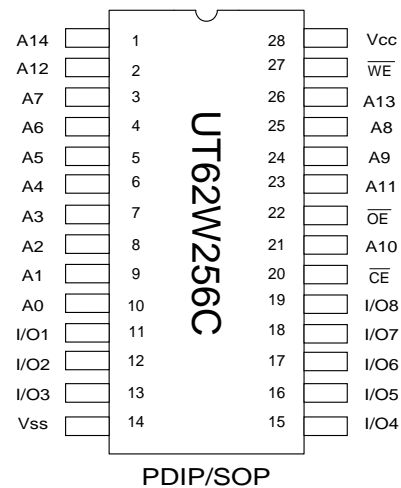
### GENERAL DESCRIPTION

The UT62W256C is a 262,144-bit low power CMOS static random access memory organized as 32,768 words by 8 bits. It is fabricated using high performance, high reliability CMOS technology. its standby current is stable within the range of operating temperature.

The UT62W256C is designed for low power application. It is particularly well suited for battery back-up nonvolatile memory application.

The UT62W256C operates with wide range power supply and all inputs and outputs are fully TTL compatible

### PIN CONFIGURATION





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## ABSOLUTE MAXIMUM RATINGS\*

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to $V_{SS}$	$V_{TERM}$	-0.5 to 7.0	V
Operation Temperature	Commercial	$T_A$	0 to 70
	Extended	$T_A$	-20 to 85
Storage Temperature	$T_{STG}$	-65 to 150	
Power Dissipation	$P_D$	1	W
DC Output Current	$I_{OUT}$	50	mA
Soldering Temperature (under 10 sec)	$T_{solder}$	260	

\*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	$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	High - Z	$I_{SB}, I_{SB1}$
Output Disable	L	H	H	High - Z	$I_{CC}, I_{CC1}, I_{CC2}$
Read	L	L	H	$D_{OUT}$	$I_{CC}, I_{CC1}, I_{CC2}$
Write	L	X	L	$D_{IN}$	$I_{CC}, I_{CC1}, I_{CC2}$

Note: H =  $V_{IH}$ , L =  $V_{IL}$ , X = Don't care.

DC ELECTRICAL CHARACTERISTICS ( $T_A = 0$  to 70 / -20 to 85 (E))

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	UNIT
Power Supply Voltage	$V_{CC}$		2.7~3.6			4.5~5.5			V
Input High Voltage	$V_{IH}^{*1}$		2.0	-	$V_{CC}+0.5$	2.2	-	$V_{CC}+0.5$	V
Input Low Voltage	$V_{IL}^{*2}$		-0.5	-	0.6	-0.5	-	0.8	V
Input Leakage Current	$I_{LI}$	$V_{SS} \quad V_{IN} \quad V_{CC}$	-1	-	1	-1	-	1	$\mu A$
Output Leakage Current	$I_{LO}$	$V_{SS} \quad V_{I/O} \quad V_{CC},$ $\overline{CE} = V_{IH} \text{ or } \overline{OE} = V_{IH}$ or $\overline{WE} = V_{IL}$	-1	-	1	-1	-	1	$\mu A$
Output High Voltage	$V_{OH}$	$I_{OH} = -1mA$	2.2	-	-	2.4	-	-	V
Output Low Voltage	$V_{OL}$	$I_{OL} = 4mA$	-	-	0.4	-	-	0.4	V
Operation Power Supply Current	$I_{CC}$	$\overline{CE} = V_{IL}, I_{I/O} = 0mA, \text{Cycle} = \text{Min.}$	-35	-	40	-	40	50	mA
			-70	-	20	-	30	40	mA
	$I_{CC1}$	Cycle=1 $\mu s$ $\overline{CE} = 0.2V$ ; $I_{I/O} = 0mA$ other pins at 0.2V or $V_{CC}-0.2V$	-	-	6	-	-	10	mA
	$I_{CC2}$	Cycle=500ns $\overline{CE} = 0.2V$ ; $I_{I/O} = 0mA$ other pins at 0.2V or $V_{CC}-0.2V$	-	-	12	-	-	20	mA
Standby Power Supply Current	$I_{SB}$	$\overline{CE} = V_{IH}$	-	-	3	-	-	3	mA
	$I_{SB1}$	$\overline{CE} \quad V_{CC}-0.2V$	-L	-	1	-	2	100	$\mu A$
			-LL	-	0.5	-	1	50	$\mu A$

Notes:

1. Overshoot :  $V_{CC}+2.0v$  for pulse width less than 10ns.
2. Undershoot :  $V_{SS}-2.0v$  for pulse width less than 10ns.
3. Overshoot and Undershoot are sampled, not 100% tested.



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## CAPACITANCE ( $T_A=25$ , $f=1.0\text{MHz}$ )

PARAMETER	SYMBOL	MIN.	MAX	UNIT
Input Capacitance	$C_{IN}$	-	8	pF
Input/Output Capacitance	$C_{I/O}$	-	10	pF

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

## AC TEST CONDITIONS

Input Pulse Levels	0V to 3.0V
Input Rise and Fall Times	5ns
Input and Output Timing Reference Levels	1.5V
Output Load	$C_L = 100\text{Pf}+1\text{TTL}$ , $I_{OH}/I_{OL} = -1\text{mA}/4\text{mA}$

## AC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 2.7\text{V}\sim 5.5\text{V}$ , $T_A = 0$ to 70 / -20 to 85 (E))

### (1) READ CYCLE

PARAMETER	SYMBOL	UT62W256C-35		UT62W256C-70		UNIT
		MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	$t_{RC}$	35	-	70	-	ns
Address Access Time	$t_{AA}$	-	35	-	70	ns
Chip Enable Access Time	$t_{ACE}$	-	35	-	70	ns
Output Enable Access Time	$t_{OE}$	-	25	-	35	ns
Chip Enable to Output in Low Z	$t_{CLZ^*}$	10	-	10	-	ns
Output Enable to Output in Low Z	$t_{OLZ^*}$	5	-	5	-	ns
Chip Disable to Output in High Z	$t_{CHZ^*}$	-	25	-	35	ns
Output Disable to Output in High Z	$t_{OHZ^*}$	-	25	-	35	ns
Output Hold from Address Change	$t_{OH}$	5	-	5	-	ns

### (2) WRITE CYCLE

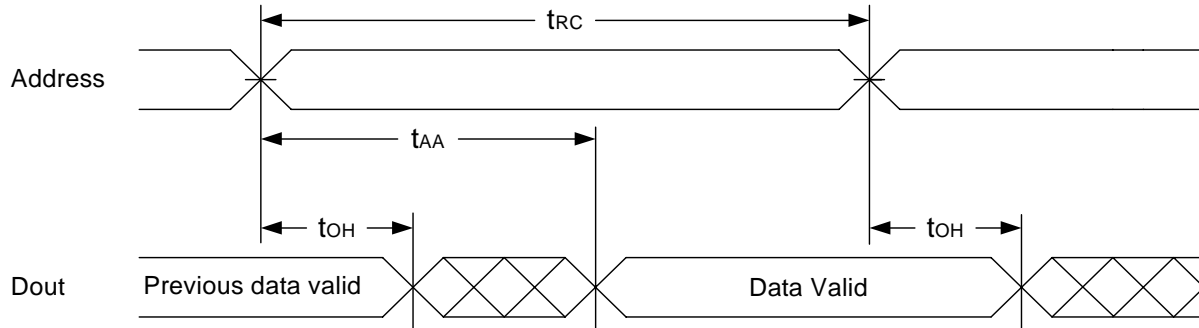
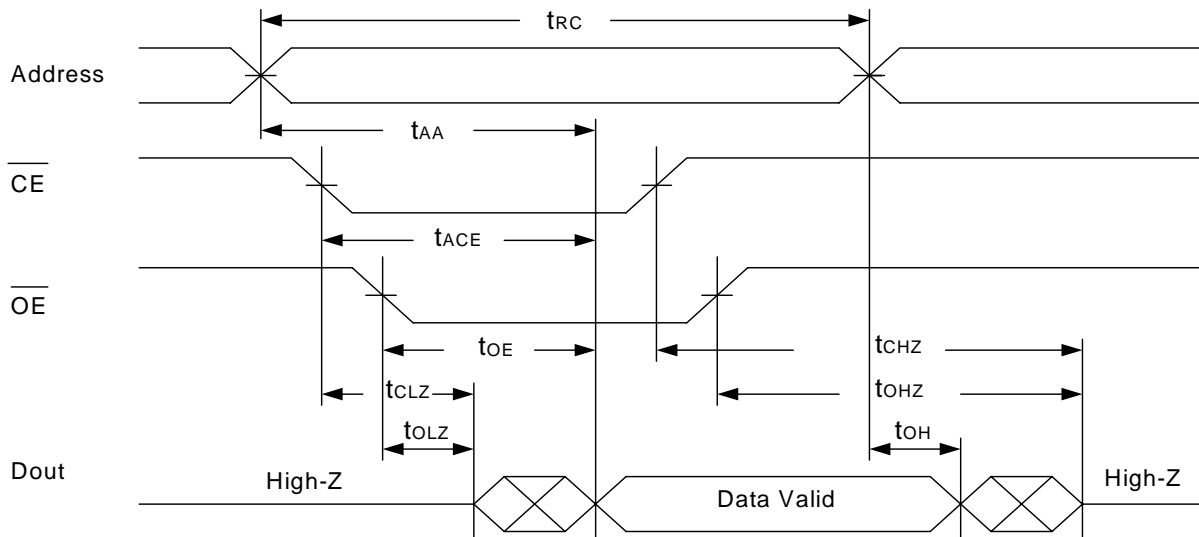
PARAMETER	SYMBOL	UT62W256C-35		UT62W256C-70		UNIT
		MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	$t_{WC}$	35	-	70	-	ns
Address Valid to End of Write	$t_{AW}$	30	-	60	-	ns
Chip Enable to End of Write	$t_{CW}$	30	-	60	-	ns
Address Set-up Time	$t_{AS}$	0	-	0	-	ns
Write Pulse Width	$t_{WP}$	25	-	50	-	ns
Write Recovery Time	$t_{WR}$	0	-	0	-	ns
Data to Write Time Overlap	$t_{DW}$	20	-	30	-	ns
Data Hold from End of Write Time	$t_{DH}$	0	-	0	-	ns
Output Active from End of Write	$t_{OW^*}$	5	-	5	-	ns
Write to Output in High Z	$t_{WHZ^*}$	-	15	-	25	ns

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



## TIMING WAVEFORMS

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

READ CYCLE 2 ( $\overline{CE}$  and  $\overline{OE}$  Controlled) (1,3,4,5)

## Notes :

1.  $\overline{WE}$  is high for read cycle.
2. Device is continuously selected  $\overline{OE} = \text{low}$ ,  $\overline{CE} = \text{low}$ .
3. Address must be valid prior to or coincident with  $\overline{CE} = \text{low}$ ; otherwise  $t_{AA}$  is the limiting parameter.
4.  $t_{CLZ}$ ,  $t_{OLZ}$ ,  $t_{CHZ}$  and  $t_{OHZ}$  are specified with  $C_L = 5\text{pF}$ . Transition is measured  $\pm 500\text{mV}$  from steady state.
5. At any given temperature and voltage condition,  $t_{CHZ}$  is less than  $t_{CLZ}$ ,  $t_{OHZ}$  is less than  $t_{OLZ}$ .



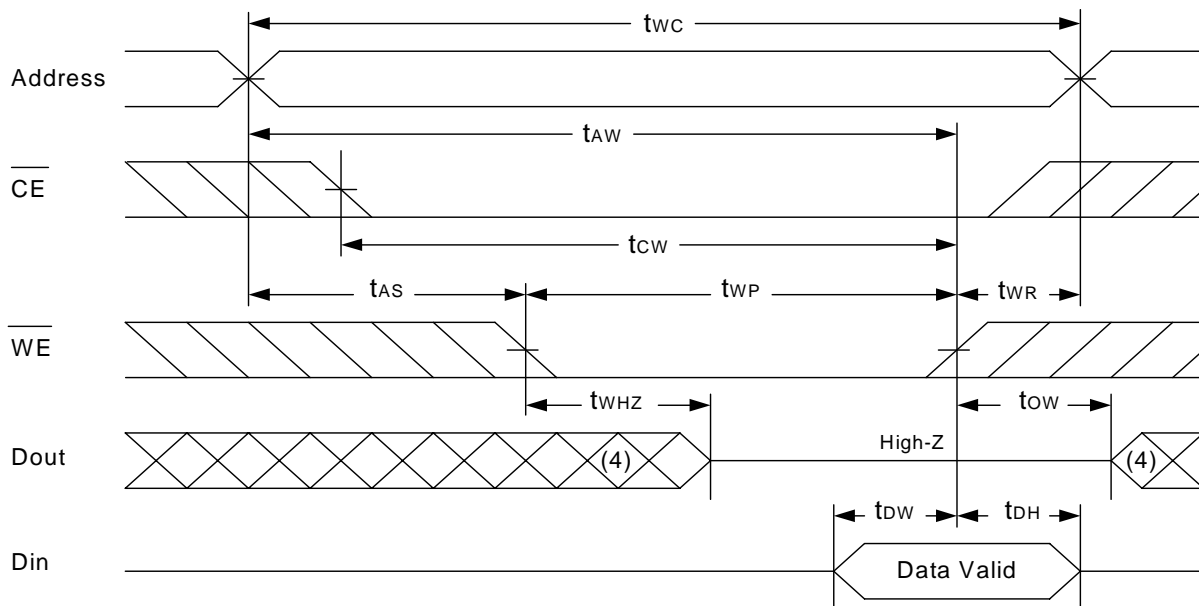
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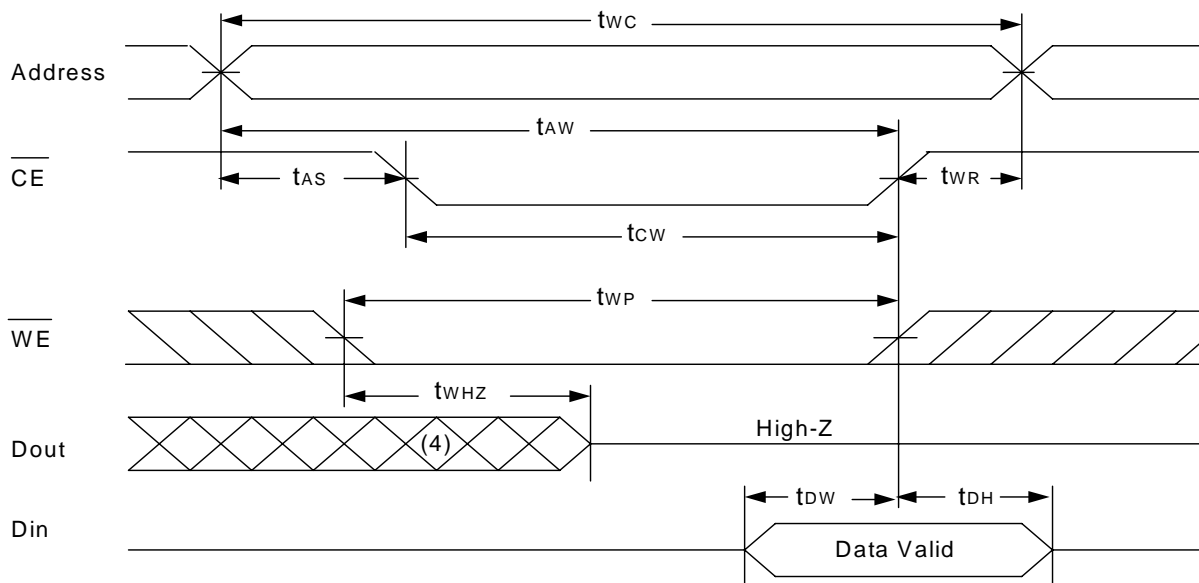
# UT62W256C

32K X 8 BIT LOW POWER CMOS SRAM

## WRITE CYCLE 1 ( $\overline{WE}$ Controlled) (1,2,3,5,6)



## WRITE CYCLE 2 ( $\overline{CE}$ Controlled) (1,2,5,6)





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Notes :

1.  $\overline{WE}$ ,  $\overline{CE}$  must be high during all address transitions.
2. A write occurs during the overlap of a low  $\overline{CE}$ , low  $\overline{WE}$ .
3. During a  $\overline{WE}$  controlled write cycle with  $\overline{OE}$  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  $\overline{CE}$  low transition occurs simultaneously with or after  $\overline{WE}$  low transition, the outputs remain in a high impedance state.
6.  $t_{OW}$  and  $t_{WHZ}$  are specified with  $C_L = 5pF$ . Transition is measured  $\pm 500mV$  from steady state.

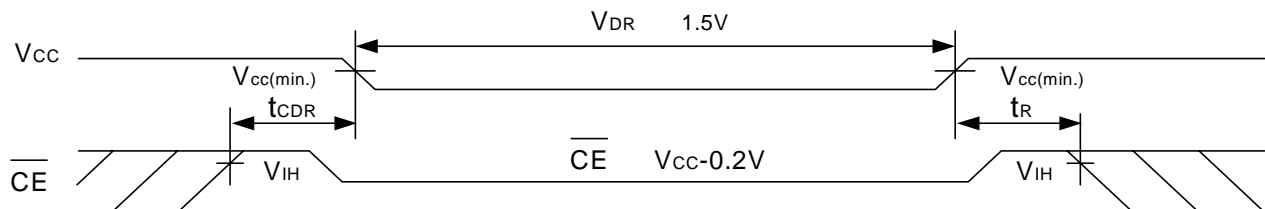
### DATA RETENTION CHARACTERISTICS ( $T_A = 0$ to $70$ / $-20$ to $85$ (E))

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vcc for Data Retention	$V_{DR}$	$\overline{CE}$ $V_{CC}-0.2V$	1.5	-	5.5	V
Data Retention Current	$I_{DR}$	$V_{CC}=1.5V$ $\overline{CE}$ $V_{CC}-0.2V$ - L	-	1	20	$\mu A$
		- LL	-	0.5	10	$\mu A$
Chip Disable to Data Retention Time	$t_{CDR}$	See Data Retention Waveforms (below)	0	-	-	ns
Recovery Time	$t_R$		$t_{RC}^*$	-	-	ns

$t_{RC}^*$  = Read Cycle Time

### DATA RETENTION WAVEFORM

Low Vcc Data Retention Waveform ( $\overline{CE}$  controlled)





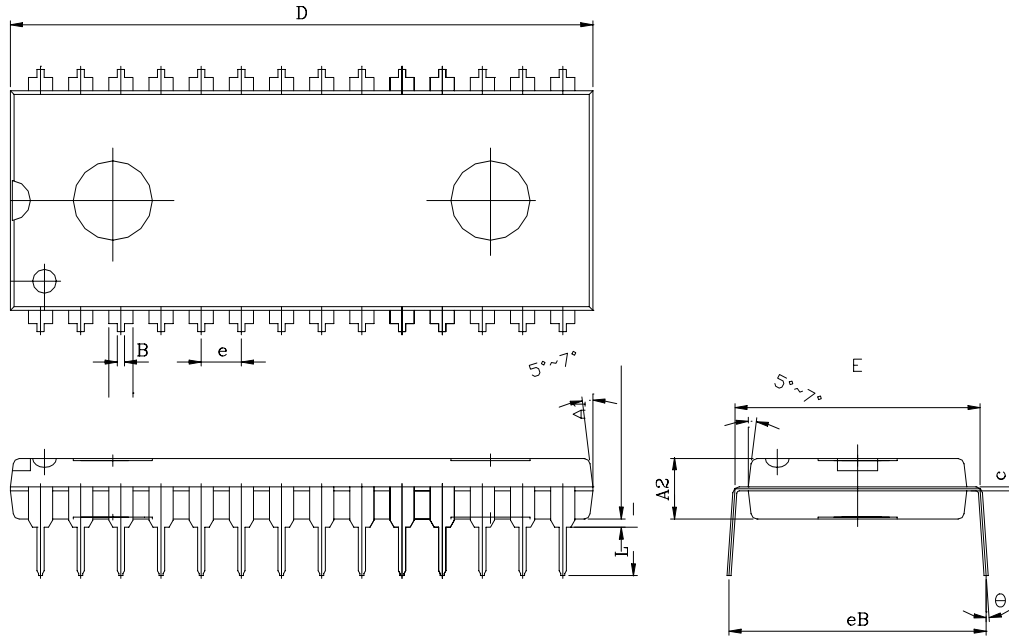
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## PACKAGE OUTLINE DIMENSION

### 28 pin 600 mil PDIP PACKAGE OUTLINE DIMENSION



SYMBOL \ UNIT	INCH(BASE)	MM(REF)
A1	0.010(MIN)	0.254(MIN)
A2	0.150±0.001	3.810±0.254
B	0.018±0.005	0.457±0.127
c	0.010±0.004	0.254±0.102
D	1.460±0.005	37.084±0.127
E	0.600±0.010	15.240±0.254
e	0.100 (TYP)	2.540(TYP)
eB	0.640±0.03	16.256±0.762
L	0.130±0.010	3.302±0.254
	0°~15°	0°~15°



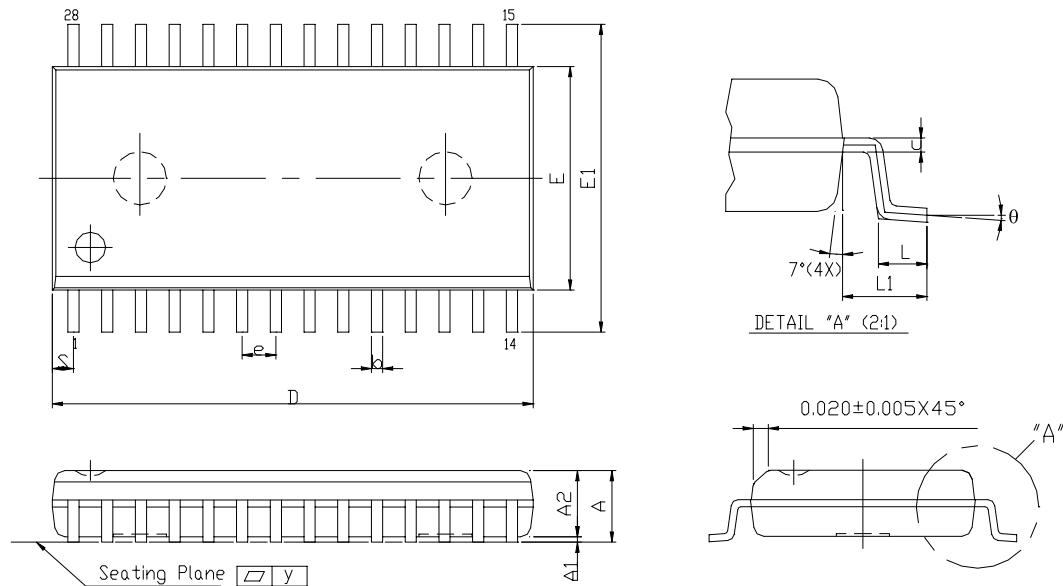


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## UT62W256C 32K X 8 BIT LOW POWER CMOS SRAM

### 28 pin 330 mil SOP PACKAGE OUTLINE DIMENSION



SYMBOL \ UNIT	INCH(BASE)	MM(REF)
A	0.112 (MAX)	2.845 (MAX)
A1	0.004(MIN)	0.102(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	0.713±0.005	18.110±0.127
E	0.331±0.005	8.407±0.127
E1	0.465±0.012	11.811±0.305
e	0.050 (TYP)	1.270(TYP)
L	0.0404±0.008	1.0255±0.203
L1	0.067±0.008	1.702 ±0.203
S	0.047 (MAX)	1.194 (MAX)
y	0.003(MAX)	0.076(MAX)
	0° 10°	0° 10°



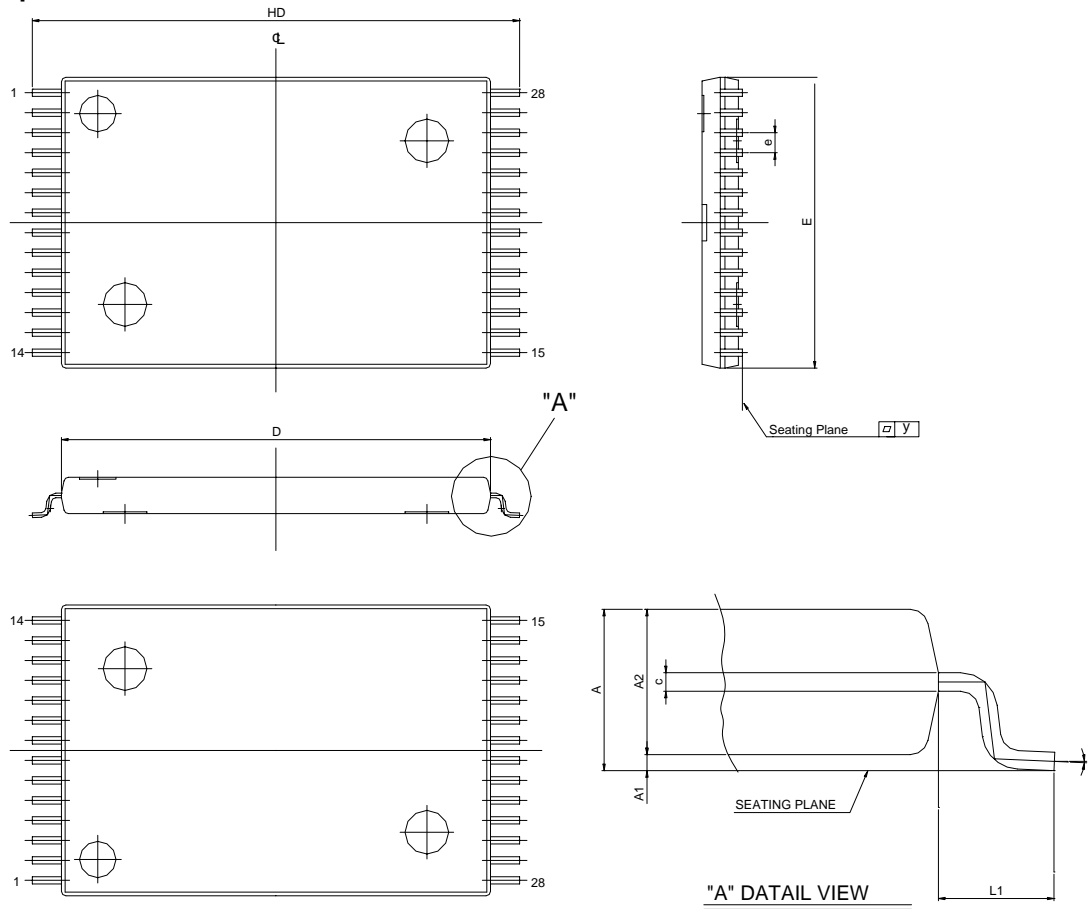
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## 32K X 8 BIT LOW POWER CMOS SRAM

### 28 pin 8x13.4mm STSOP PACKAGE OUTLINE DIMENSION



SYMBOL \ 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
D	0.465 ±0.004	11.800 ±0.100
E	0.315 ±0.004	8.000 ±0.100
e	0.022 (TYP)	0.55 (TYP)
HD	0.528 ±0.008	13.40 ±0.20.
L1	0.0315 ±0.004	0.80 ±0.10
y	0.003 (MAX)	0.076 (MAX)
	0° 5°	0° 5°

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**UT62W256C**  
**32K X 8 BIT LOW POWER CMOS SRAM****ORDERING INFORMATION**

Commercial temperature :

<b>PART NO.</b>	<b>ACCESS TIME (ns)</b>	<b>STANDBY CURRENT (<math>\mu</math>A) max.</b>	<b>PACKAGE</b>
UT62W256CPC-35L	35	100 $\mu$ A	28PIN PDIP
UT62W256CPC-35LL	35	50 $\mu$ A	28PIN PDIP
UT62W256CPC-70L	70	100 $\mu$ A	28PIN PDIP
UT62W256CPC-70LL	70	50 $\mu$ A	28PIN PDIP
UT62W256CSC-35L	35	100 $\mu$ A	28PIN SOP
UT62W256CSC-35LL	35	50 $\mu$ A	28PIN SOP
UT62W256CSC-70L	70	100 $\mu$ A	28PIN SOP
UT62W256CSC-70LL	70	50 $\mu$ A	28PIN SOP
UT62W256CLS-35L	35	100 $\mu$ A	28PIN STSOP
UT62W256CLS-35LL	35	50 $\mu$ A	28PIN STSOP
UT62W256CLS-70L	70	100 $\mu$ A	28PIN STSOP
UT62W256CLS-70LL	70	50 $\mu$ A	28PIN STSOP

Extended temperature :

<b>PART NO.</b>	<b>ACCESS TIME (ns)</b>	<b>STANDBY CURRENT (<math>\mu</math>A) max.</b>	<b>PACKAGE</b>
UT62W256CPC-35LE	35	100 $\mu$ A	28PIN PDIP
UT62W256CPC-35LLE	35	50 $\mu$ A	28PIN PDIP
UT62W256CPC-70LE	70	100 $\mu$ A	28PIN PDIP
UT62W256CPC-70LLE	70	50 $\mu$ A	28PIN PDIP
UT62W256CSC-35LE	35	100 $\mu$ A	28PIN SOP
UT62W256CSC-35LLE	35	50 $\mu$ A	28PIN SOP
UT62W256CSC-70LE	70	100 $\mu$ A	28PIN SOP
UT62W256CSC-70LLE	70	50 $\mu$ A	28PIN SOP
UT62W256CLS-35LE	35	100 $\mu$ A	28PIN STSOP
UT62W256CLS-35LLE	35	50 $\mu$ A	28PIN STSOP
UT62W256CLS-70LE	70	100 $\mu$ A	28PIN STSOP
UT62W256CLS-70LLE	70	50 $\mu$ A	28PIN STSOP

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**UT62W256C****32K X 8 BIT LOW POWER CMOS SRAM****ORDERING INFORMATION (for lead free product)**

Commercial temperature :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) max.	PACKAGE
UT62W256CPCL-35L	35	100 $\mu$ A	28PIN PDIP
UT62W256CPCL-35LL	35	50 $\mu$ A	28PIN PDIP
UT62W256CPCL-70L	70	100 $\mu$ A	28PIN PDIP
UT62W256CPCL-70LL	70	50 $\mu$ A	28PIN PDIP
UT62W256CSCL-35L	35	100 $\mu$ A	28PIN SOP
UT62W256CSCL-35LL	35	50 $\mu$ A	28PIN SOP
UT62W256CSCL-70L	70	100 $\mu$ A	28PIN SOP
UT62W256CSCL-70LL	70	50 $\mu$ A	28PIN SOP
UT62W256CLSL-35L	35	100 $\mu$ A	28PIN STSOP
UT62W256CLSL-35LL	35	50 $\mu$ A	28PIN STSOP
UT62W256CLSL-70L	70	100 $\mu$ A	28PIN STSOP
UT62W256CLSL-70LL	70	50 $\mu$ A	28PIN STSOP

Extended temperature :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) max.	PACKAGE
UT62W256CPCL-35LE	35	100 $\mu$ A	28PIN PDIP
UT62W256CPCL-35LLE	35	50 $\mu$ A	28PIN PDIP
UT62W256CPCL-70LE	70	100 $\mu$ A	28PIN PDIP
UT62W256CPCL-70LLE	70	50 $\mu$ A	28PIN PDIP
UT62W256CSCL-35LE	35	100 $\mu$ A	28PIN SOP
UT62W256CSCL-35LLE	35	50 $\mu$ A	28PIN SOP
UT62W256CSCL-70LE	70	100 $\mu$ A	28PIN SOP
UT62W256CSCL-70LLE	70	50 $\mu$ A	28PIN SOP
UT62W256CLSL-35LE	35	100 $\mu$ A	28PIN STSOP
UT62W256CLSL-35LLE	35	50 $\mu$ A	28PIN STSOP
UT62W256CLSL-70LE	70	100 $\mu$ A	28PIN STSOP
UT62W256CLSL-70LLE	70	50 $\mu$ A	28PIN STSOP



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