



UTRON

UT62257C

Rev. 1.1

32K X 8 BIT LOW POWER CMOS SRAM

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**REVISION HISTORY**

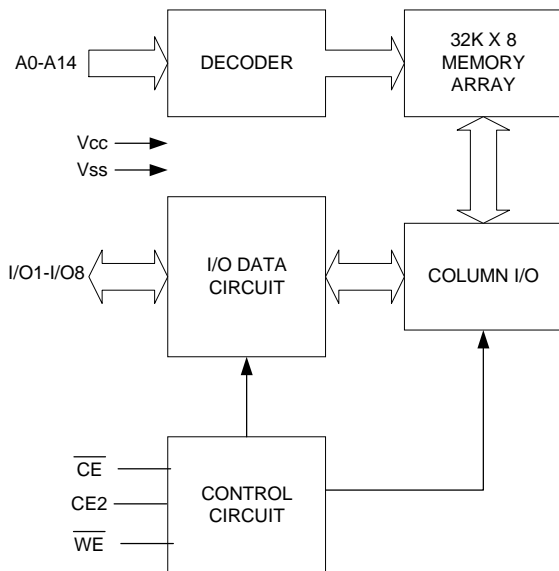
REVISION	DESCRIPTION	DATE
Preliminary Rev. 0.1	Original.	Jun 7,2001
Rev. 1.0	1.TRUTH TABLE 2.DC ELECTRICAL CHARACTERISTICS	Jul 19,2001
Rev. 1.1	Add order information for lead free product	May15,2003



FEATURES

- Access time : 35/70ns (max.)
- Low power consumption:  
Operating : 40 mA (typical.)  
Standby : 3mA (typical) normal  
2uA (typical) L-version  
1uA (typical) LL-version
- Single 5V power supply
- All inputs and outputs are TTL compatible
- Fully static operation
- Three state outputs
- Data retention voltage : 2V (min.)
- Package : 28-pin 600 mil PDIP  
28-pin 330 mil SOP  
28-pin 8mmx13.4mm STSOP

FUNCTIONAL BLOCK DIAGRAM



PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A14	Address Inputs
I/O1 - I/O8	Data Inputs/Outputs
$\overline{CE}$ , CE2	Chip Enable Inputs
$\overline{WE}$	Write Enable Input
V <sub>CC</sub>	Power Supply
V <sub>SS</sub>	Ground

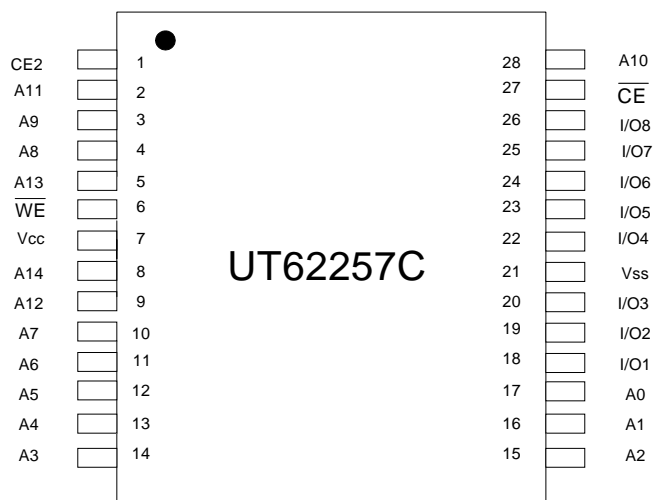
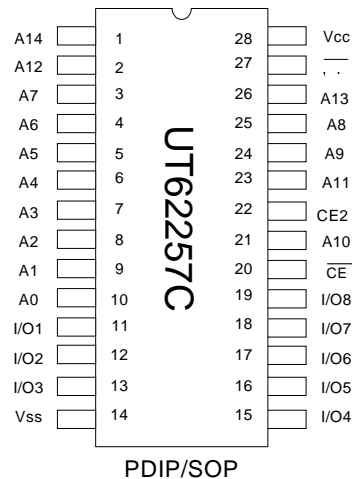
GENERAL DESCRIPTION

The UT62257C 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.

The UT62257C is designed for high-speed and low power application. With 2 chip controls ( $\overline{CE}$ , CE2), it is easy to design memory systems with power-down and capacity expansion in the application circuits. It is particularly well suited for battery back-up nonvolatile memory application.

The UT62257C operates from a single 5V power supply and all inputs and outputs are fully TTL compatible.

PIN CONFIGURATION



**ABSOLUTE MAXIMUM RATINGS\***

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to $V_{SS}$	$V_{TERM}$	-0.5 to +7.0	V
Operating Temperature	$T_A$	0 to +70	
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	CE	CE2	WE	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	High - Z	$I_{SB}, I_{SB1}$
	X	L	X	High - Z	$I_{SB}, I_{SB1}$
Read	L	H	H	$D_{OUT}$	$I_{CC}, I_{CC1}, I_{CC2}$
Write	L	H	L	$D_{IN}$	$I_{CC}, I_{CC1}, I_{CC2}$

Note: H = VIH, L = VIL, X = Don't care.

**DC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5V \pm 10\%$ ,  $T_A = 0$  to 70 )**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Input High Voltage	$V_{IH}^1$		2.2	-	$V_{CC}+0.5$	V	
Input Low Voltage	$V_{IL}^2$		-0.5	-	0.8	V	
Input Leakage Current	$I_{LI}$	$V_{SS}, V_{IN}, V_{CC}$	-1	-	1	$\mu A$	
Output Leakage Current	$I_{LO}$	$V_{SS}, V_{IO}, V_{CC}$ $CE = V_{IH}$ or $CE2 = V_{IL}$	-1	-	1	$\mu A$	
Output High Voltage	$V_{OH}$	$I_{OH} = -1mA$	2.4	-	-	V	
Output Low Voltage	$V_{OL}$	$I_{OL} = 4mA$	-	-	0.4	V	
Operating Power Supply Current	$I_{CC}$	Cycle time=Min., $I_{IO} = 0mA$ , $CE = V_{IL}$ , $CE2 = V_{IH}$	-35	-	40	50	mA
			-70	-	30	40	mA
	$I_{CC1}$	Cycle time=1 $\mu s$ , 100% duty, $I_{IO} = 0mA$ , $CE = 0.2V$ ; $CE2 = V_{CC}-0.2V$ , other pins at 0.2V or $V_{CC}-0.2V$	-	-	-	10	mA
$I_{CC2}$	Cycle time=500ns, 100% duty, $I_{IO} = 0mA$ , $CE = 0.2V$ ; $CE2 = V_{CC}-0.2V$ , other pins at 0.2V or $V_{CC}-0.2V$	-	-	-	20	mA	
Standby Power Supply Current	$I_{SB}$	$CE = V_{IH}$ or $CE2 = V_{IL}$	normal	-	1	10	mA
	$I_{SB1}$	$CE = V_{CC}-0.2V$ $CE2 = V_{CC}-0.2V$		-	0.3	5	mA
	$I_{SB}$	$CE = V_{IH}$ or $CE2 = V_{IL}$	-L/-LL	-	-	3	mA
	$I_{SB1}$	$CE = V_{CC}-0.2V$ $CE2 = V_{CC}-0.2V$	-L	-	2	100	$\mu A$
			-LL	-	1	40	$\mu A$

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.

**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	$C_L = 100\text{pF}$ , $I_{OH}/I_{OL} = -1\text{mA}/4\text{mA}$

**AC ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 5V \pm 10\%$  ,  $T_A = 0$  to  $70$  )**(1) READ CYCLE**

PARAMETER	SYMBOL	UT62257C-35		UT62257C-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**

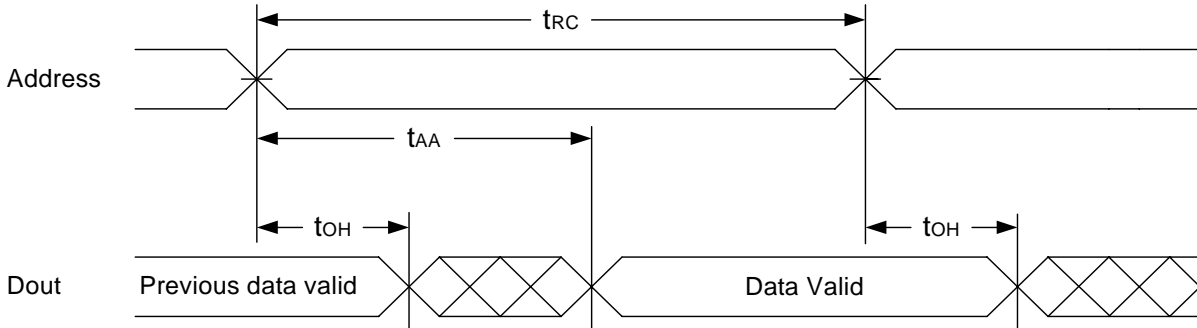
PARAMETER	SYMBOL	UT62257C-35		UT62257C-70		UNIT
		MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	$t_{WC}$	35	-	70	-	ns
Address Valid to End of Write	$t_{AW}$	30	-	60	-	ns
Chip Enable to End of Write	$t_{CW}$	30	-	60	-	ns
Address Set-up Time	$t_{AS}$	0	-	0	-	ns
Write Pulse Width	$t_{WP}$	25	-	50	-	ns
Write Recovery 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.

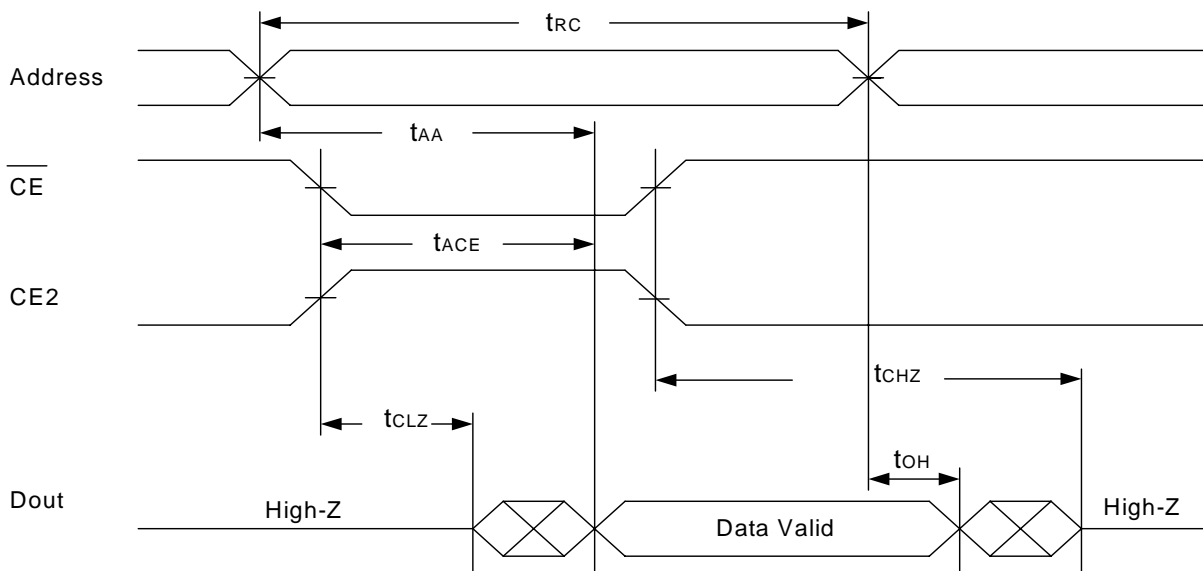


TIMING WAVEFORMS

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



READ CYCLE 2 ( $\overline{CE}$  and CE2 Controlled) (1,3,4,5)

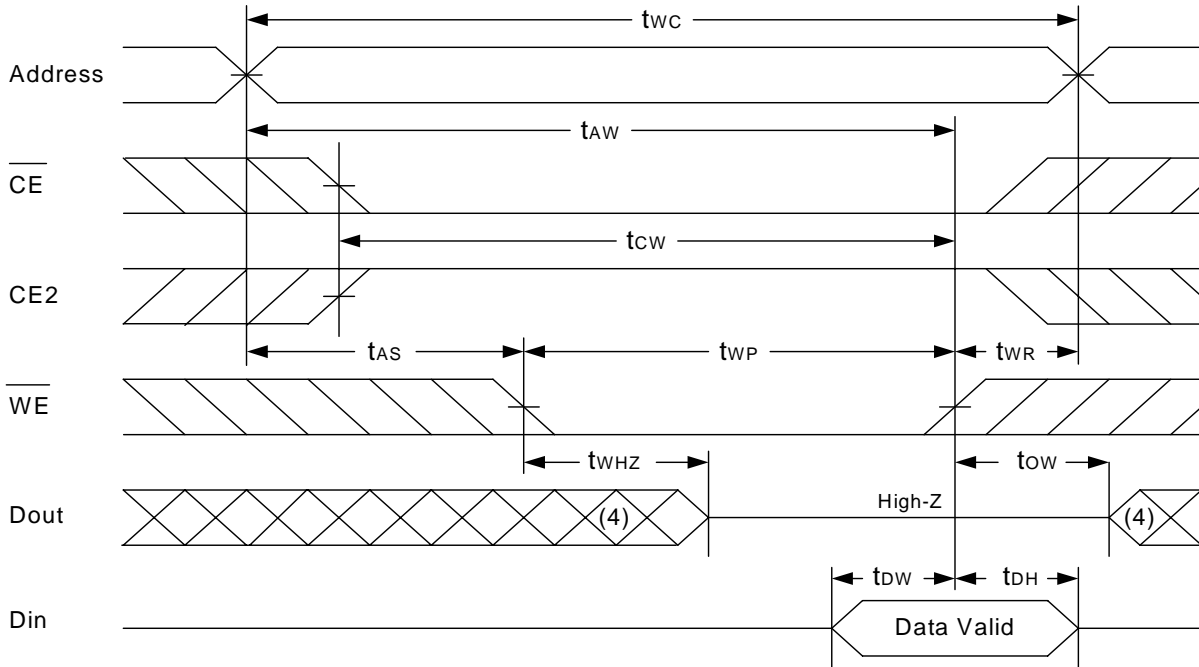


Notes :

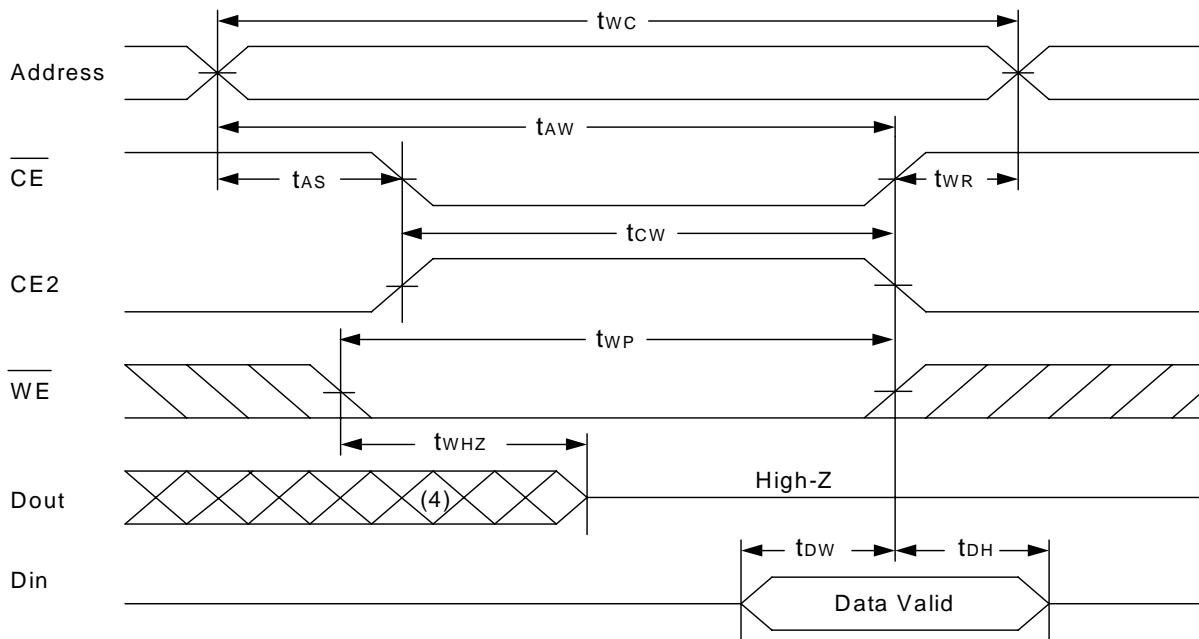
1.  $\overline{WE}$  is high for read cycle.
2. Device is continuously selected  $\overline{CE}$  =low, CE2=high.
3. Address must be valid prior to or coincident with  $\overline{CE}$  =low, CE2=high; otherwise  $t_{AA}$  is the limiting parameter.
4.  $t_{CLZ}$ ,  $t_{OLZ}$ ,  $t_{CHZ}$  and  $t_{OHZ}$  are specified with  $C_L=5pF$ . Transition is measured  $\pm 500mV$  from steady state.
5. At any given temperature and voltage condition,  $t_{CHZ}$  is less than  $t_{CLZ}$ .



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



**WRITE CYCLE 2** ( $\overline{CE}$  and CE2 Controlled) (1,2,5,6)





Notes :

1.  $\overline{WE}$ ,  $\overline{CE}$  must be high or CE2 must be low during all address transitions.
2. A write occurs during the overlap of a low  $\overline{CE}$ , high CE2, low  $\overline{WE}$ .
3. During a  $\overline{WE}$  controlled write cycle,  $t_{WP}$  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 and CE2 high 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.

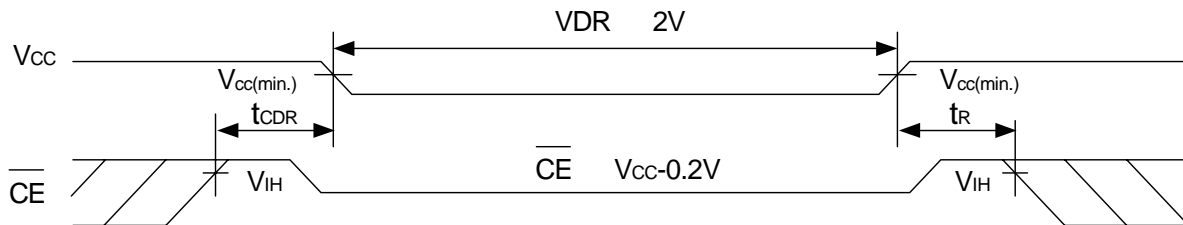
**DATA RETENTION CHARACTERISTICS (T<sub>A</sub> = 0 to 70 )**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
V <sub>CC</sub> for Data Retention	V <sub>DR</sub>	$\overline{CE} \leq V_{CC} - 0.2V$ or $CE2 \leq 0.2V$	2.0	-	5.5	V
Data Retention Current	I <sub>DR</sub>	V <sub>CC</sub> =3V, CE2 ≤ 0.2V	- L	1	50	μA
		or $\overline{CE} \leq V_{CC} - 0.2V$	- LL	0.5	20	μA
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

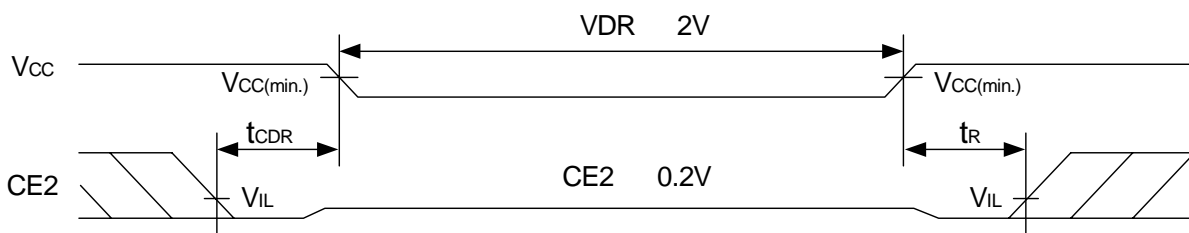
t<sub>RC</sub>\* = Read Cycle Time

**DATA RETENTION WAVEFORM**

**Low V<sub>CC</sub> Data Retention Waveform (1) ( $\overline{CE}$  controlled)**



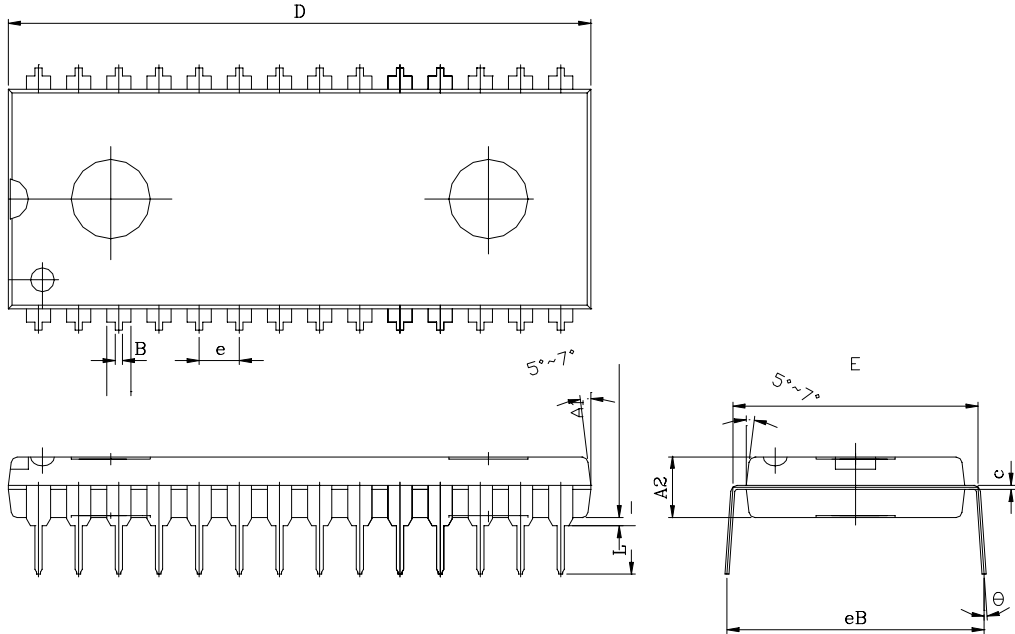
**Low V<sub>CC</sub> Data Retention Waveform (2) (CE2 controlled)**





PACKAGE OUTLINE DIMENSION

28 pin 600 mil PDIP Package Outline Dimension

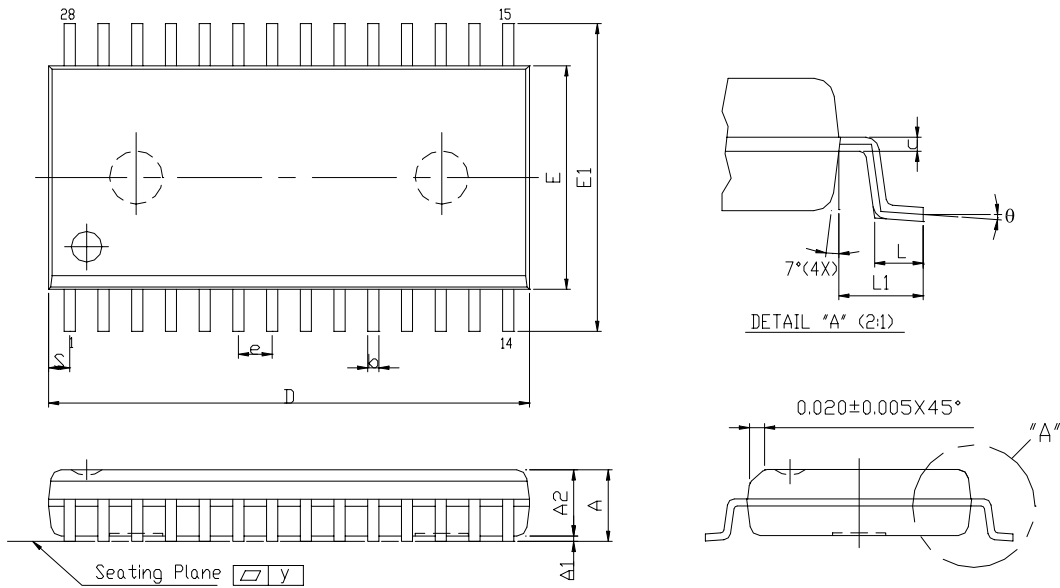


UNIT SYMBOL	INCH(BASE)	MM(REF)
A1	0.010(MIN)	0.254(MIN)
A2	0.150±0.001	3.810±0.254
B	0.018±0.005	0.457±0.127
c	0.010±0.004	0.254±0.102
D	1.460±0.005	37.084±0.127
E	0.600±0.010	15.240±0.254
e	0.100 (TYP)	2.540(TYP)
eB	0.640±0.03	16.256±0.762
L	0.130±0.010	3.302±0.254
	0°~15°	0°~15°





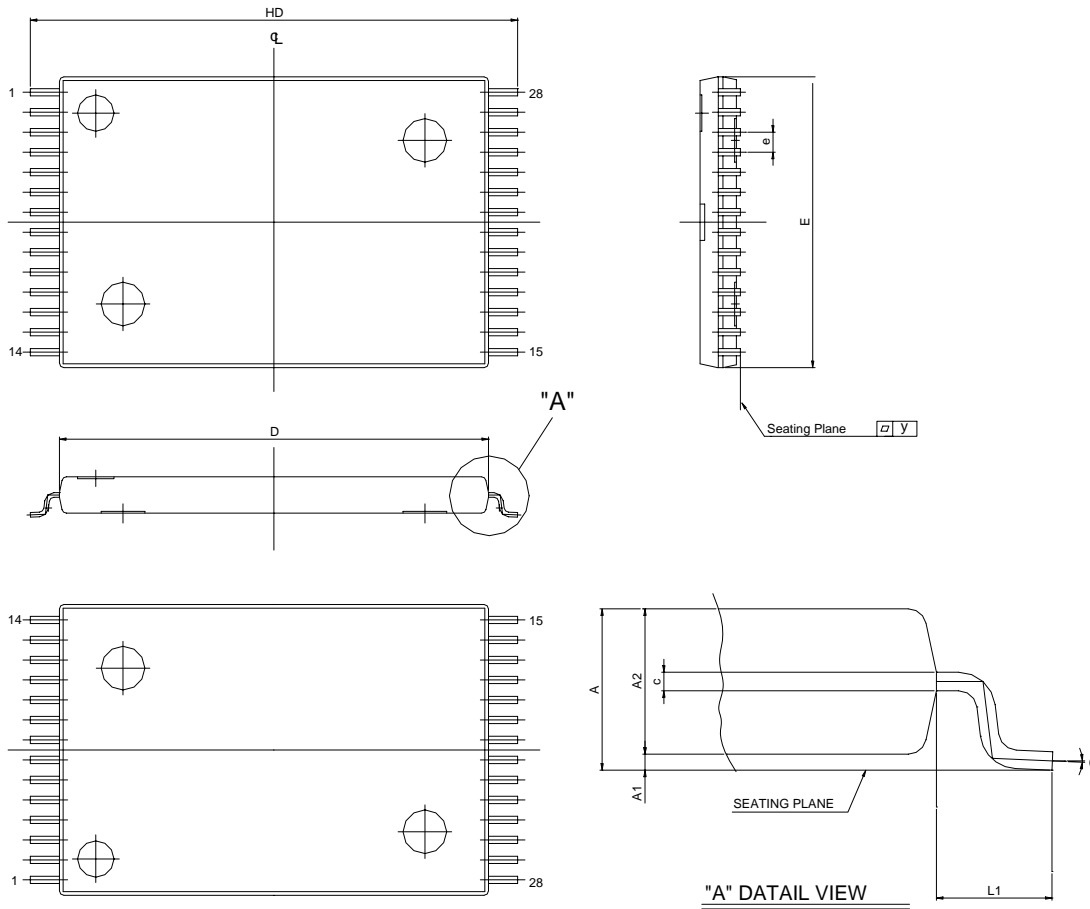
28 pin 330 mil SOP Package Outline Dimension



UNIT SYMBOL	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°



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°

**ORDERING INFORMATION**

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A)	PACKAGE
UT62257CPC-70	70	5 mA	28 PIN PDIP
UT62257CPC-70L	70	100 $\mu$ A	28 PIN PDIP
UT62257CPC-70LL	70	40 $\mu$ A	28 PIN PDIP
UT62257CSC-35	35	5 mA	28 PIN SOP
UT62257CSC-35L	35	100 $\mu$ A	28 PIN SOP
UT62257CSC-35LL	35	40 $\mu$ A	28 PIN SOP
UT62257CSC-70	70	5 mA	28 PIN SOP
UT62257CSC-70L	70	100 $\mu$ A	28 PIN SOP
UT62257CSC-70LL	70	40 $\mu$ A	28 PIN SOP
UT62257CLS-35L	35	100 $\mu$ A	28 PIN STSOP
UT62257CLS-35LL	35	50 $\mu$ A	28 PIN STSOP
UT62257CLS-70L	70	100 $\mu$ A	28 PIN STSOP
UT62257CLS-70LL	70	40 $\mu$ A	28 PIN STSOP

**ORDERING INFORMATION (for lead free product)**

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A)	PACKAGE
UT62257CPCL-70	70	5 mA	28 PIN PDIP
UT62257CPCL-70L	70	100 $\mu$ A	28 PIN PDIP
UT62257CPCL-70LL	70	40 $\mu$ A	28 PIN PDIP
UT62257CSCL-35	35	5 mA	28 PIN SOP
UT62257CSCL-35L	35	100 $\mu$ A	28 PIN SOP
UT62257CSCL-35LL	35	40 $\mu$ A	28 PIN SOP
UT62257CSCL-70	70	5 mA	28 PIN SOP
UT62257CSCL-70L	70	100 $\mu$ A	28 PIN SOP
UT62257CSCL-70LL	70	40 $\mu$ A	28 PIN SOP
UT62257CLSL-35L	35	100 $\mu$ A	28 PIN STSOP
UT62257CLSL-35LL	35	50 $\mu$ A	28 PIN STSOP
UT62257CLSL-70L	70	100 $\mu$ A	28 PIN STSOP
UT62257CLSL-70LL	70	40 $\mu$ A	28 PIN STSOP



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