



**UTRON**

Rev. 1.1

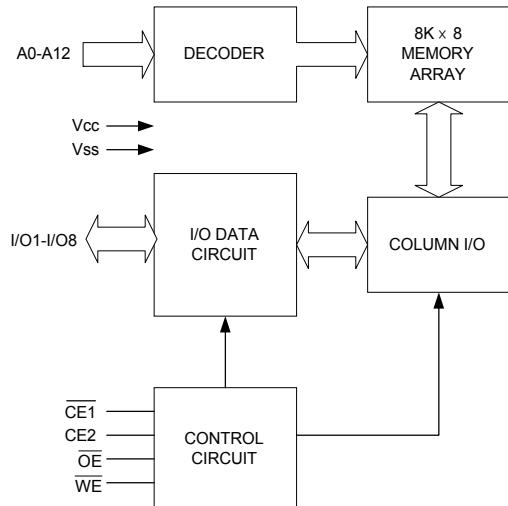
**UT6264C**

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

## FEATURES

- Access time : 35/70ns (max.)
- Low power consumption :
  - Operating : 45/30 mA (typ.)
  - CMOS Standby : 2mA (typ.) normal  
2  $\mu$ A (typ.) L-version  
1  $\mu$ A (typ.) LL-version
- Single 4.5V~5.5V power supply
- Operating temperature :
  - Commercial : 0°C~70°C
- All inputs and outputs TTL compatible
- Fully static operation
- Three state outputs
- Data retention voltage : 2V (min.)
- Package : 28-pin 600 mil PDIP  
28-pin 330 mil SOP

## FUNCTIONAL BLOCK DIAGRAM



## PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A12	Address Inputs
I/O1 - I/O8	Data Inputs/Outputs
CE1,CE2	Chip Enable Inputs
WE	Write Enable Input
OE	Output Enable Input
V <sub>CC</sub>	Power Supply
V <sub>SS</sub>	Ground
NC	No connection

## GENERAL DESCRIPTION



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## ABSOLUTE MAXIMUM RATINGS\*

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to V <sub>SS</sub>	V <sub>TERM</sub>	-0.5 to +7.0	V
Operating Temperature	T <sub>A</sub>	0 to +70	°C
Storage Temperature	T <sub>STG</sub>	-65 to +150	°C
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	CE1	CE2	OE	WE	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	X	High - Z	ISB, ISB1
Standby	X	L	X	X	High - Z	ISB, ISB1
Output Disable	L	H	H	H	High - Z	Icc,Icc1,Icc2
Read	L	H	L	H	D <sub>OUT</sub>	Icc,Icc1,Icc2
Write	L	H	X	L	D <sub>IN</sub>	Icc,Icc1,Icc2

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

DC ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 4.5V~5.5V, T<sub>A</sub> = 0°C to 70°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Power Voltage	V <sub>CC</sub>		4.5	5.0	5.5	V	
Input High Voltage	V <sub>IH</sub>		2.2	-	V <sub>CC</sub> +0.5	V	
Input Low Voltage	V <sub>IL</sub>		- 0.5	-	0.8	V	
Input Leakage Current	I <sub>II</sub>	V <sub>SS</sub> ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>	- 1	-	1	μA	
Output Leakage Current	I <sub>IO</sub>	V <sub>SS</sub> ≤ V <sub>I/O</sub> ≤ V <sub>CC</sub> ; CE1 = V <sub>IH</sub> ; or CE2 = V <sub>IL</sub> ; or OE = V <sub>IH</sub> ; or WE = V <sub>IL</sub>	- 1	-	1	μA	
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = - 1mA	2.4	-	-	V	
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 4mA	-	-	0.4	V	
Operating Power Supply Current	I <sub>CC</sub>	Cycle time=Min, I <sub>I/O</sub> = 0mA; CE1 = V <sub>IL</sub> , CE2 = V <sub>IH</sub>	- 35	-	45	mA	
			- 70	-	30	mA	
	I <sub>CC1</sub>	Cycle time=1us; I <sub>I/O</sub> = 0mA; CE1=0.2V; CE2=V <sub>CC</sub> -0.2V; other pins at 0.2V or V <sub>CC</sub> -0.2V	-	20	30	mA	
	I <sub>CC2</sub>	Cycle time=500ns; I <sub>I/O</sub> = 0mA; CE1=0.2V; CE2=V <sub>CC</sub> -0.2V; other pins at 0.2V or V <sub>CC</sub> -0.2V	-	10	15	mA	
	I <sub>SB</sub>	CE1 = V <sub>IH</sub> or CE2 = V <sub>IL</sub>	Normal	-	1	10	mA
			- L/- LL	-	0.3	3	mA
Standby Current (CMOS)	I <sub>SB1</sub>	CE1 ≥ V <sub>CC</sub> -0.2V; or CE2 ≤ 0.2V; other pins at 0.2V or V <sub>CC</sub> -0.2V	Normal	-	2	5	mA
			- L	-	2	100	μA
			- LL	-	1	50	μA



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

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** ( $V_{CC} = 4.5\text{V}\sim 5.5\text{V}$ ,  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$ )**(1) READ CYCLE**

PARAMETER	SYMBOL	UT6264C-35		UT6264C-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	$t_{ACE1}, t_{ACE2}$	-	35	-	70	ns
Output Enable Access Time	$t_{OE}$	-	25	-	35	ns
Chip Enable to Output in Low-Z	$t_{CLZ1^*}, t_{CLZ2^*}$	10	-	10	-	ns
Output Enable to Output in Low-Z	$t_{OLZ^*}$	5	-	5	-	ns
Chip Disable to Output in High-Z	$t_{CHZ1^*}, t_{CHZ2^*}$	-	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	UT6264C-35		UT6264C-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	$t_{CW1}, t_{CW2}$	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.



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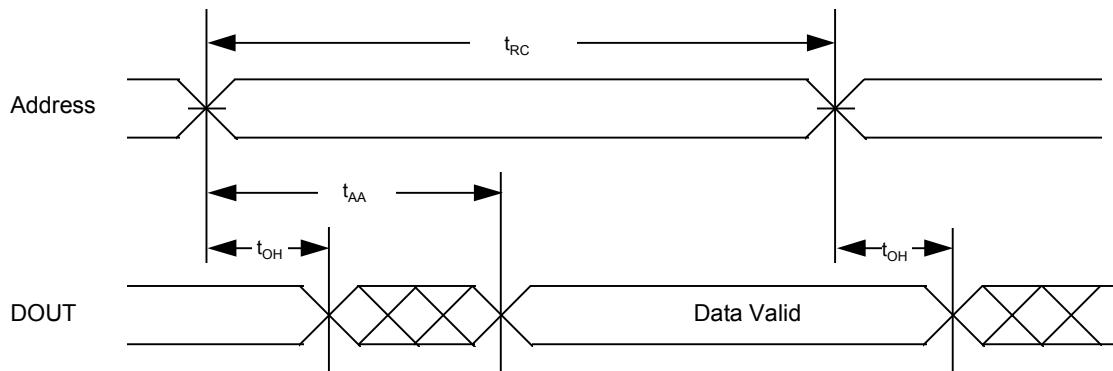
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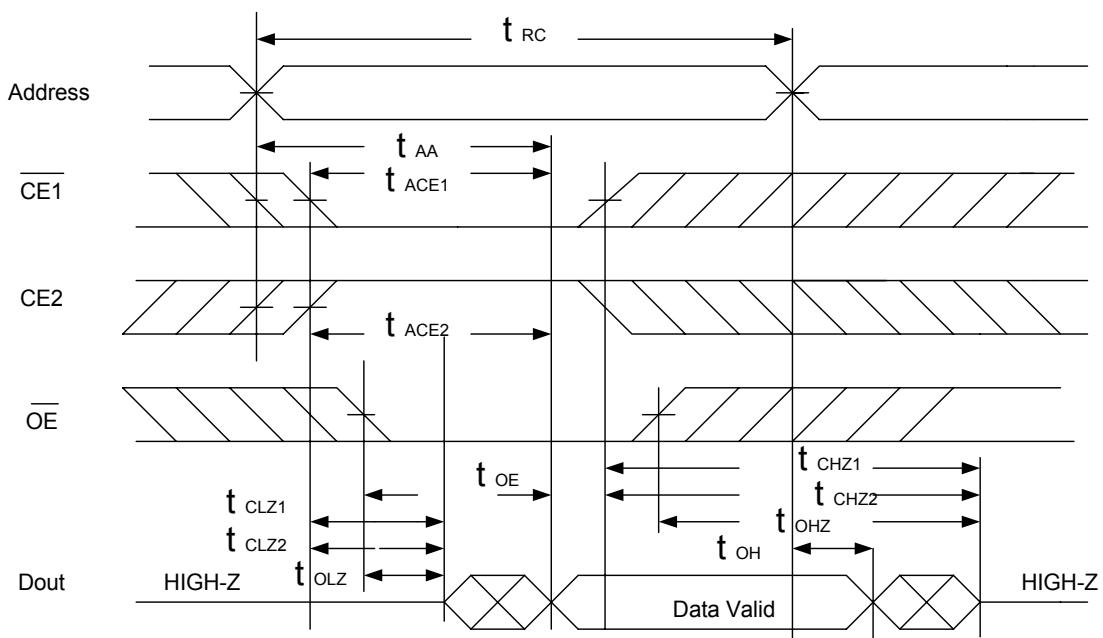
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## TIMING WAVEFORMS

### READ CYCLE 1 (Address Controlled) (1,2,4)



### READ CYCLE 2 ( $\overline{CE1}$ , $CE2$ and $\overline{OE}$ Controlled) (1,3,5,6)



#### Notes :

1.  $\overline{WE}$  is HIGH for a read cycle.
2. Device is continuously selected  $\overline{OE}$ ,  $\overline{CE1} = V_{IL}$  and  $CE2 = V_{IH}$ .
3. Address must be valid prior to or coincident with  $\overline{CE1}$  low and  $CE2$  high transition; otherwise  $t_{AA}$  is the limiting parameter.
4.  $\overline{OE}$  is low.
5.  $t_{CLZ1}$ ,  $t_{CLZ2}$ ,  $t_{OLZ}$ ,  $t_{CHZ1}$ ,  $t_{CHZ2}$  and  $t_{OHZ}$  are specified with  $C_L=5pF$ . Transition is measured  $\pm 500mV$  from steady state.
6. At any given temperature and voltage condition,  $t_{CHZ1}$  is less than  $t_{CLZ1}$ ,  $t_{CHZ2}$  is less than  $t_{CLZ2}$ ,  $t_{OHZ}$  is less than  $t_{OLZ}$ .



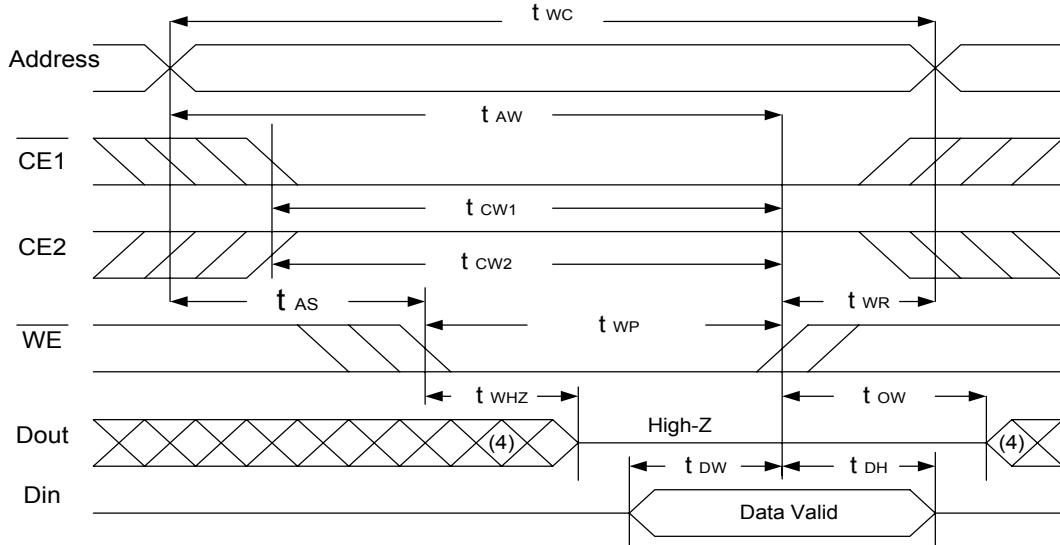
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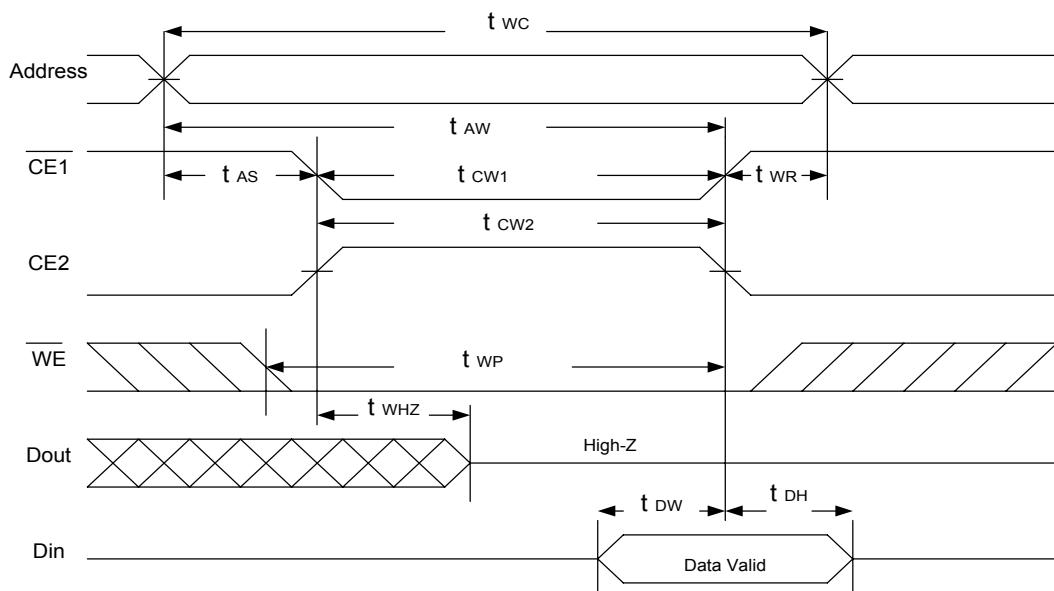
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**WRITE CYCLE 1 ( $\overline{WE}$  Controlled) (1,2,3,5,6)**



**WRITE CYCLE 2 ( $\overline{CE1}$  and  $\overline{CE2}$  Controlled) (1,2,5)**



Notes :

1.  $\overline{WE}$  or  $\overline{CE1}$  must be HIGH or  $CE2$  must be LOW during all address transitions.
2. A write occurs during the overlap of a low  $\overline{CE1}$ , a high  $CE2$  and a 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 I/O 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  $\overline{CE1}$  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.



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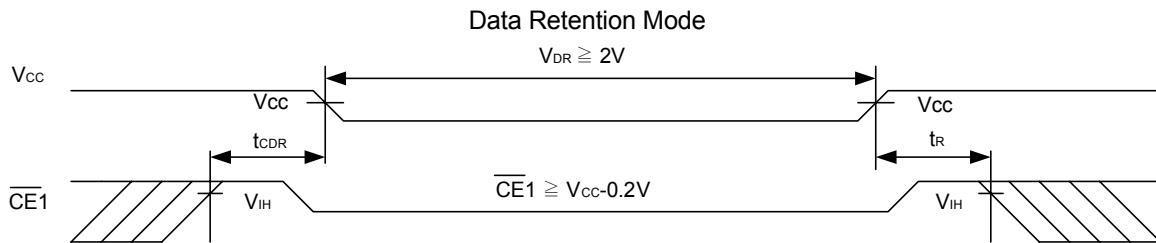
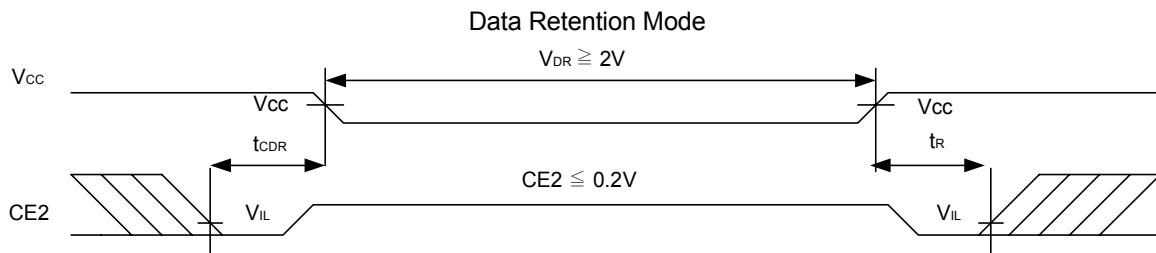
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**DATA RETENTION CHARACTERISTICS (TA = 0°C to 70°C)**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vcc for Data Retention	V <sub>DR</sub>	CE1 $\geq$ Vcc-0.2V or CE2 $\leq$ 0.2V	2.0	-	5.5	V
Data Retention Current	I <sub>DR</sub>	V <sub>CC</sub> =2V	-L	-	1	$\mu$ A
		CE1 $\geq$ Vcc-0.2V or CE2 $\leq$ 0.2V	-LL	-	0.5	$\mu$ A
Chip Disable to Data Retention Time	t <sub>CDR</sub>	See Data Retention Waveforms (below)		0	-	-
Recovery Time	t <sub>R</sub>		t <sub>RC*</sub>	-	-	ns

t<sub>RC\*</sub> = Read Cycle Time**DATA RETENTION WAVEFORM****Low Vcc Data Retention Waveform (1) ( $\overline{CE1}$  controlled)****Low Vcc Data Retention Waveform (2) (CE2 controlled)**



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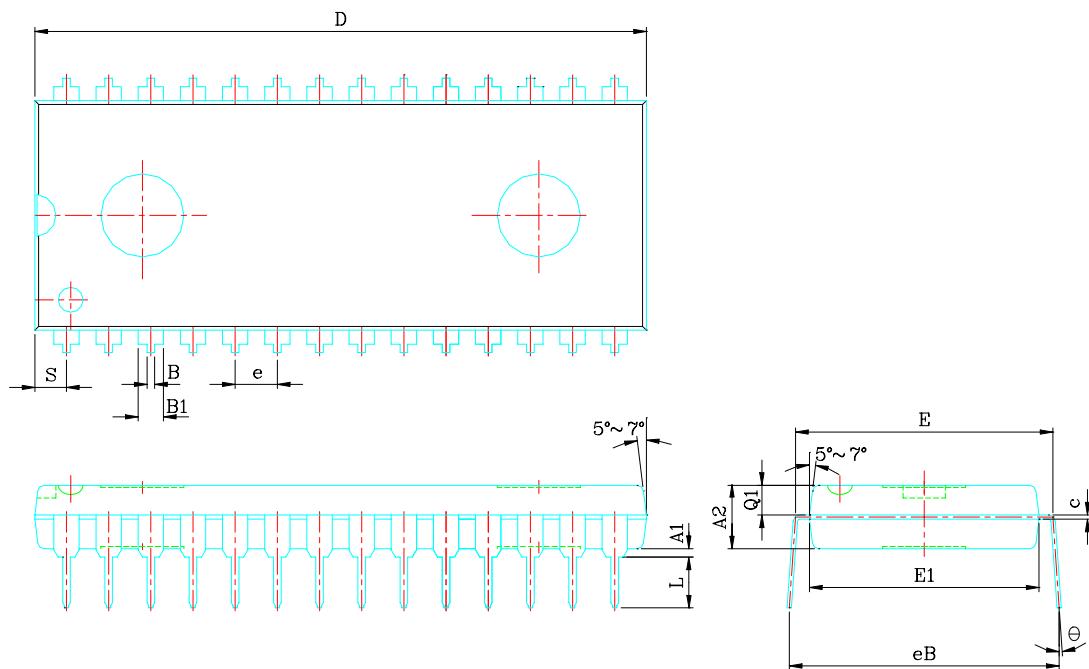
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## PACKAGE OUTLINE DIMENSION

### 28 pin 600 mil PDIP Package Outline Dimension



UNIT SYMBOL	INCH(BASE)	MM(REF)
A1	0.010 (MIN)	0.254 (MIN)
A2	0.150± 0.005	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	0.625 (MAX)	15.87 (MAX)
E1	0.52 (MAX)	13.208 (MAX)
e	0.100 (TYP)	2.540(TYP)
eB	0.6 (TYP)	15.24 (TYP)
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)



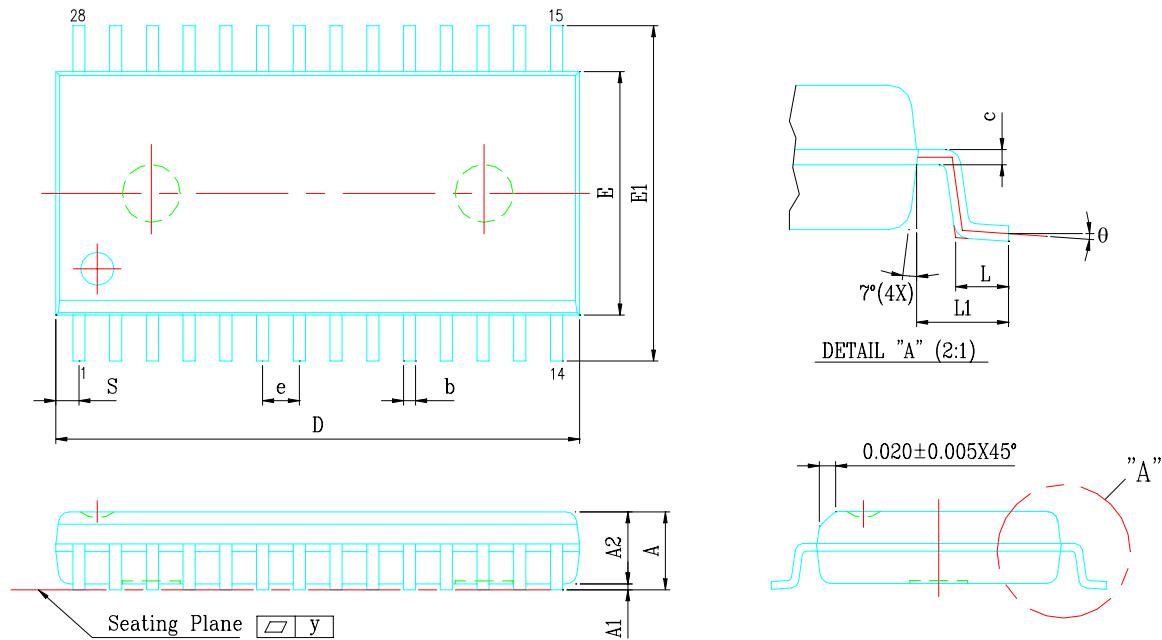
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28 pin 330 mil SOP Package Outline Dimension



SYMBOL	UNIT	INCH(REF)	MM(BASE)
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)
θ		0°~10°	0°~10°



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### ORDERING INFORMATION

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) (TYP.)	PACKAGE
UT6264CPC-35	35	2mA	28 PIN PDIP
UT6264CPC-35L	35	2 $\mu$ A	28 PIN PDIP
UT6264CPC-35LL	35	1 $\mu$ A	28 PIN PDIP
UT6264CPC-70	70	2mA	28 PIN PDIP
UT6264CPC-70L	70	2 $\mu$ A	28 PIN PDIP
UT6264CPC-70LL	70	1 $\mu$ A	28 PIN PDIP
UT6264CSC-35	35	2mA	28 PIN SOP
UT6264CSC-35L	35	2 $\mu$ A	28 PIN SOP
UT6264CSC-35LL	35	1 $\mu$ A	28 PIN SOP
UT6264CSC-70	70	2mA	28 PIN SOP
UT6264CSC-70L	70	2 $\mu$ A	28 PIN SOP
UT6264CSC-70LL	70	1 $\mu$ A	28 PIN SOP



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## REVISION HISTORY

REVISION	DESCRIPTION	DATE
Preliminary Rev. 0.1	Original.	May 3 ,2001
Rev. 1.0	The timeing waveforms add CE2 control pin.	Jun.4,2001
Rev. 1.1	1. Revised package outline dimension. 2. Revised waveform.	Jan 15,2002