



REVISION HISTORY

REVISION	DESCRIPTION	Release Date
Preliminary Rev. 0.1	Original.	Jun 18, 2001
Rev. 1.0	1. Revised Power supply a、 55ns (max.) for Vcc=2.7V~3.6V b、 70/100ns (max.) for Vcc=2.5V~3.6V 2. Revised DC ELECTRICAL CHARACTERISTICS : a、 Revised V <sub>IH</sub> as 2.2V b、 Revised standby current I <sub>SB1</sub> of LL-version Typical : 3uA→2uA Maximum : 25uA→20uA 3. Revised AC ELECTRICAL CHARACTERISTICS : a、 Revised t <sub>OH</sub> as 10ns (min.) 4. Revised 36-pin TFBGA package outline dimension : a、 Rev. 0.1 ball diameter=0.3mm b、 Rev. 1.0 ball diameter=0.35mm	Jul 30, 2002
Rev. 1.1	1.Revised "FEATURES" Operating current : 40/35/25mA(I <sub>CC</sub> max)→20/18/15mA (I <sub>CC</sub> typ.) 2.TRUTH TABLE & DC ELECTRICAL : Delete I <sub>SB2</sub> 3.Revised V <sub>TERM</sub> : -0.5 to Vcc+0.3V → -0.5 to 4.6V 4.Added V <sub>OH</sub> : 2.7V at Vcc=3.0V 5.Revised DC (I <sub>CC</sub> max) 45/35/25mA→35/30/25mA (I <sub>CC</sub> typ.) 30/25/20mA→20/18/15mA 6.Add under/overshoot range of V <sub>IL</sub> & V <sub>IH</sub> 7.Revised AC t <sub>OHZ</sub> * @100ns (max): 35ns→30ns t <sub>WHZ</sub> *(max) :30/30/40→20/25/30ns 8.Revised "Data retention Characteristics" : I <sub>DR</sub> -LL (Typ.) : NA→1uA, I <sub>DR</sub> -L (Typ.) : NA→10uA I <sub>DR</sub> -LL (Max.) : 25uA→6uA t <sub>R</sub> (min) : 5ns→"t <sub>RC</sub> " 9.Add order information for lead free product	Apr 28, 2003



FEATURES

- Fast access time :
  - 55ns(max.) for Vcc=2.7V~3.6V
  - 70/100ns(max.) for Vcc=2.5V~3.6V
- CMOS low power operation
  - Operating : 20/18/15mA (TYP.)
  - Standby : 20 uA(TYP.) L -version
  - 2 uA(TYP.) LL-version
- Single 2.5V~3.6V power supply
- Operating temperature:
  - Commercial : 0 ~70
  - Extended : -20 ~80
- All TTL compatible inputs and outputs
- Fully static operation
- Three state outputs
- Data retention voltage: 1.5V (min)
- Package : 32-pin 8mm x 20mm TSOP-
  - 32-pin 8mm x 13.4mm STSOP
  - 36-pin 6mm x 8mm TFBGA

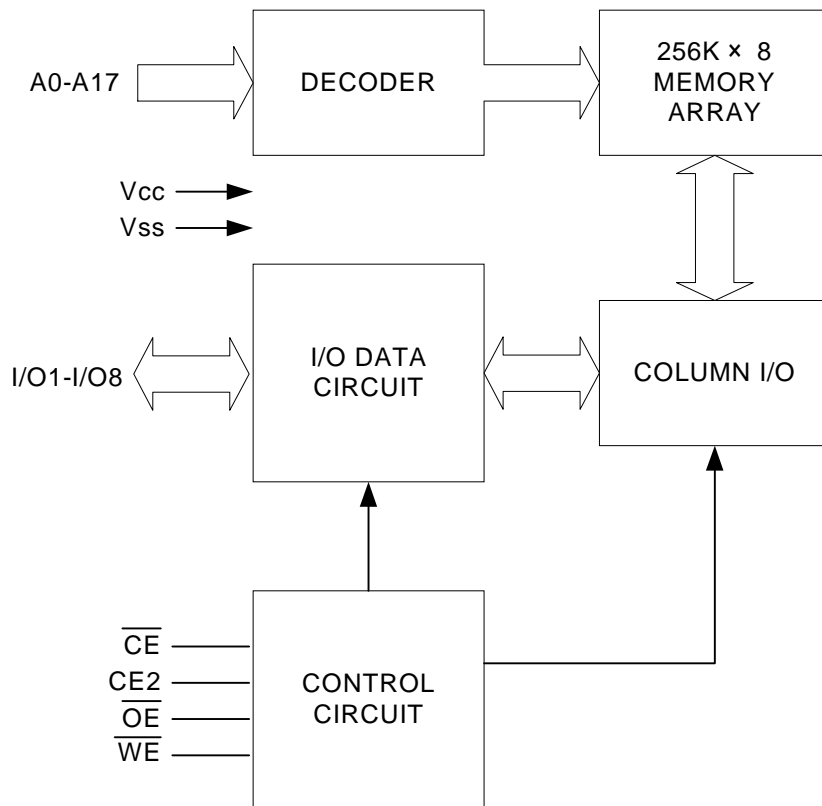
GENERAL DESCRIPTION

The UT62L2568 is a 2,097,152-bit low power CMOS static random access memory organized as 262,144 words by 8 bits. It is fabricated using high performance, high reliability CMOS technology.

The UT62L2568 is designed for very low power system applications. It is particularly well suited for battery back-up nonvolatile memory applications.

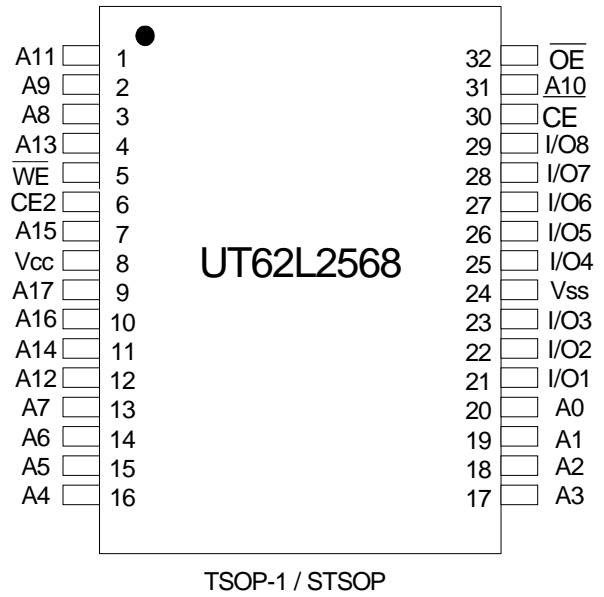
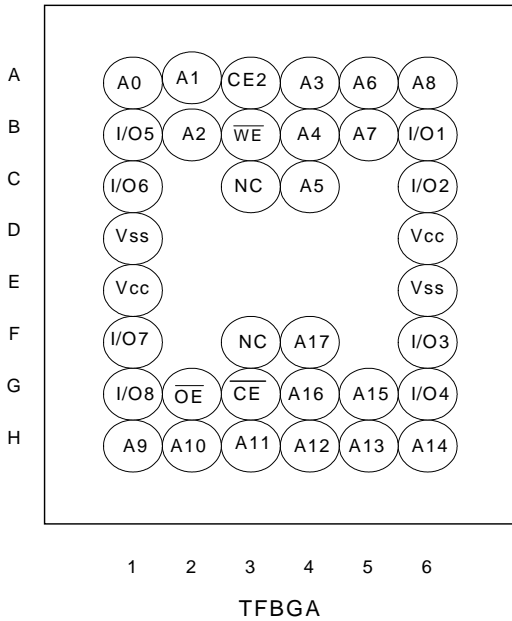
It operates from a wide range of 2.5V~ 3.6V supply voltage. Easy memory expansion is provided by using two chip enable input ( $\overline{CE}$ , CE2). And all inputs and three-state outputs are fully TTL compatible.

FUNCTIONAL BLOCK DIAGRAM





**PIN CONFIGURATION**



**PIN DESCRIPTION**

SYMBOL	DESCRIPTION
A0 - A17	Address Inputs
I/O1 - I/O8	Data Inputs/Outputs
CE, 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



## TRUTH TABLE

MODE	$\overline{CE}$	CE2	$\overline{OE}$	$\overline{WE}$	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	X	High - Z	$I_{SB}, I_{SB1}$
	X	L	X	X	High - Z	$I_{SB}, I_{SB1}$
Output Disable	L	H	H	H	High - Z	$I_{CC}, I_{CC1}, I_{CC2}$
Read	L	H	L	H	$D_{OUT}$	$I_{CC}, I_{CC1}, I_{CC2}$
Write	L	H	X	L	$D_{IN}$	$I_{CC}, I_{CC1}, I_{CC2}$

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

## ABSOLUTE MAXIMUM RATINGS\*

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to $V_{SS}$	$V_{TERM}$	-0.5 to 4.6	V
Operating Temperature	Commercial	0 to 70	
	Extended	-20 to 80	
Storage Temperature	$T_{STG}$	-65 to 150	
Power Dissipation	$P_D$	1	W
DC Output Current	$I_{OUT}$	50	mA
Soldering Temperature (under 10 secs)	$T_{solder}$	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.

DC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 2.5V \sim 3.6V$ ,  $T_A = 0$  to 70 / -20 to 80 (E))

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Power Voltage	$V_{CC}$		55	2.7	3.0	3.6	V
			70/100	2.5	3.0	3.6	V
Input High Voltage	$V_{IH}^{*1}$		2.2	-	$V_{CC} + 0.3$	V	
Input Low Voltage	$V_{IL}^{*2}$		-0.2	-	0.6	V	
Input Leakage Current	$I_{LI}$	$V_{SS} \quad V_{IN} \quad V_{CC}$	-1	-	1	$\mu A$	
Output Leakage Current	$I_{LO}$	$V_{SS} \quad V_{I/O} \quad V_{CC}$ , Output Disabled	-1	-	1	$\mu A$	
Output High Voltage	$V_{OH}$	$I_{OH} = -1mA$ ( $I_{OH} = -0.5mA$ when $V_{CC} < 2.7V$ )	2.2	2.7	-	V	
Output Low Voltage	$V_{OL}$	$I_{OL} = 2.1mA$	-	-	0.4	V	
Operating Current	$I_{CC}$	Cycle time=Min.100% duty, $\overline{CE} = V_{IL}$ and $CE2 = V_{IH}$ , $I_{I/O} = 0mA$	55	-	20	35	mA
			70	-	18	30	mA
			100	-	15	25	mA
	$I_{CC1}$	100%duty, $I_{I/O} = 0mA$ , $\overline{CE} = 0.2V$ and $CE2 = V_{CC} - 0.2V$ , other pins at 0.2V or $V_{CC} - 0.2V$	$T_{Cycle} = 1\mu s$	-	4	5	mA
$I_{CC2}$	at 0.2V or $V_{CC} - 0.2V$	$T_{Cycle} = 500ns$	-	8	10	mA	
Standby Current (TTL)	$I_{SB}$	$\overline{CE} = V_{IH}$ or $CE2 = V_{IL}$	-	0.3	0.5	mA	
Standby Current (CMOS)	$I_{SB1}$	$\overline{CE} = V_{CC} - 0.2V$ or $CE2 = 0.2V$ , other pins at 0.2V or $V_{CC} - 0.2V$	-L	-	20	80	$\mu A$
			-LL	-	2	20	$\mu A$

Notes:

1. Overshoot :  $V_{CC} + 3.0v$  for pulse width less than 10ns.
2. Undershoot :  $V_{SS} - 3.0v$  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	$C_{IN}$	-	6	pF
Input/Output Capacitance	$C_{I/O}$	-	8	pF

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

**AC TEST CONDITIONS**

Input Pulse Levels	0V to 3V
Input Rise and Fall Times	5ns
Input and Output Timing Reference Levels	1.5V
Output Load	$C_L = 30\text{pF}+1\text{TTL}$ , $I_{OH} = -1\text{mA}$ , $I_{OL} = 2.1\text{mA}$

**AC ELECTRICAL CHARACTERISTICS** ( $T_A = 0$  to  $70$  /  $-20$  to  $80$  (E))**(1) READ CYCLE**

PARAMETER	SYMBOL	UT62L2568-55 $V_{CC} = 2.7\text{V}\sim 3.6\text{V}$		UT62L2568-70 $V_{CC} = 2.5\text{V}\sim 3.6\text{V}$		UT62L2568-100 $V_{CC} = 2.5\text{V}\sim 3.6\text{V}$		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	$t_{RC}$	55	-	70	-	100	-	ns
Address Access Time	$t_{AA}$	-	55	-	70	-	100	ns
Chip Enable Access Time	$t_{ACE}$	-	55	-	70	-	100	ns
Output Enable Access Time	$t_{OE}$	-	30	-	35	-	50	ns
Chip Enable to Output in Low Z	$t_{CLZ}^*$	10	-	10	-	10	-	ns
Output Enable to Output in Low Z	$t_{OLZ}^*$	5	-	5	-	5	-	ns
Chip Disable to Output in High Z	$t_{CHZ}^*$	-	20	-	25	-	30	ns
Output Disable to Output in High Z	$t_{OHZ}^*$	-	20	-	25	-	30	ns
Output Hold from Address Change	$t_{OH}$	10	-	10	-	10	-	ns

**(2) WRITE CYCLE**

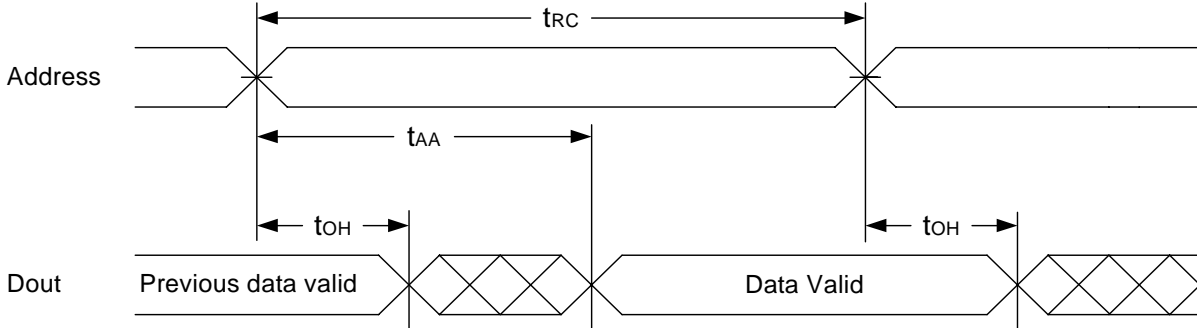
PARAMETER	SYMBOL	UT62L2568-55 $V_{CC} = 2.7\text{V}\sim 3.6\text{V}$		UT62L2568-70 $V_{CC} = 2.5\text{V}\sim 3.6\text{V}$		UT62L2568-100 $V_{CC} = 2.5\text{V}\sim 3.6\text{V}$		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	$t_{WC}$	55	-	70	-	100	-	ns
Address Valid to End of Write	$t_{AW}$	50	-	60	-	80	-	ns
Chip Enable to End of Write	$t_{CW}$	50	-	60	-	80	-	ns
Address Set-up Time	$t_{AS}$	0	-	0	-	0	-	ns
Write Pulse Width	$t_{WP}$	45	-	55	-	70	-	ns
Write Recovery Time	$t_{WR}$	0	-	0	-	0	-	ns
Data to Write Time Overlap	$t_{DW}$	25	-	30	-	40	-	ns
Data Hold from End of Write Time	$t_{DH}$	0	-	0	-	0	-	ns
Output Active from End of Write	$t_{OW}^*$	5	-	5	-	5	-	ns
Write to Output in High Z	$t_{WHZ}^*$	-	20	-	25	-	30	ns

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

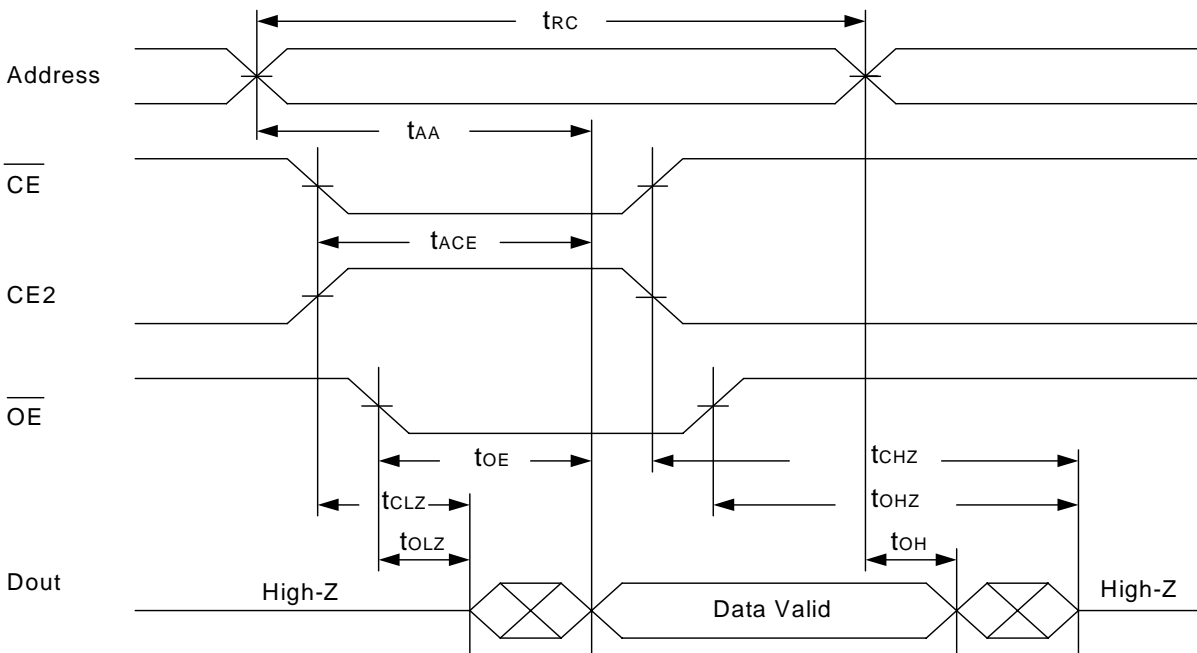


TIMING WAVEFORMS

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



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

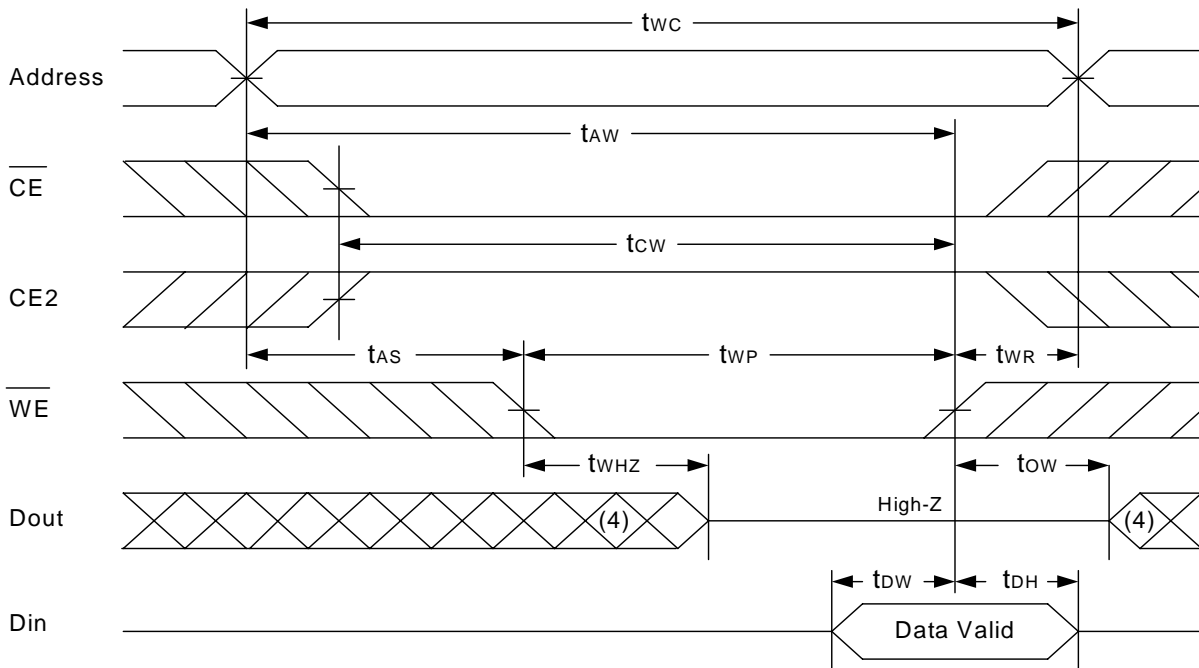


Notes :

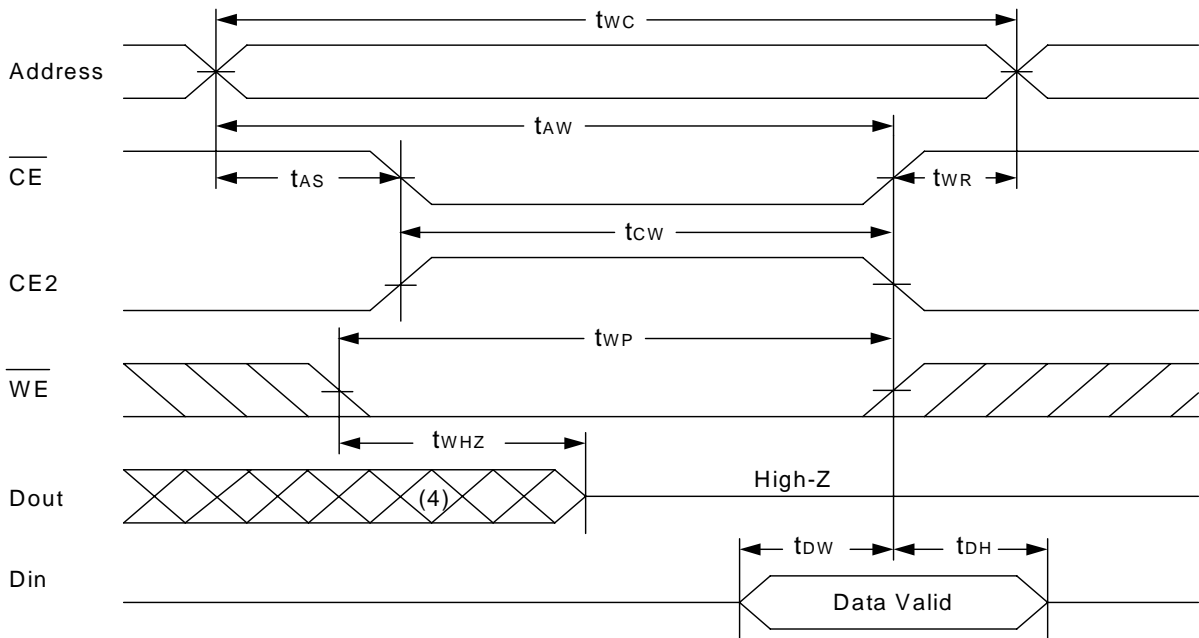
1.  $\overline{WE}$  is high for read cycle.
2. Device is continuously selected  $\overline{OE} = \text{low}$ ,  $\overline{CE} = \text{low}$ ,  $CE2 = \text{high}$ .
3. Address must be valid prior to or coincident with  $\overline{CE} = \text{low}$ ,  $CE2 = \text{high}$ ; otherwise  $t_{AA}$  is the 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  $t_{CLZ}$  is less than  $t_{OHZ}$  is less than  $t_{OLZ}$ .



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



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





Notes :

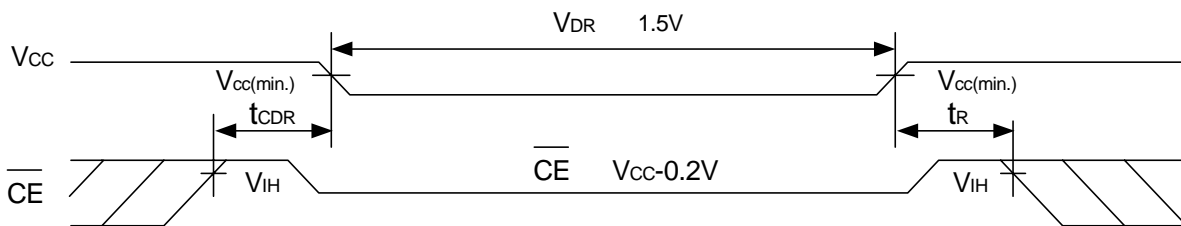
1.  $\overline{WE}$ ,  $\overline{CE}$  must be high or  $\overline{CE2}$  must be low during all address transitions.
2. A write occurs during the overlap of a low  $\overline{CE}$ , high  $\overline{CE2}$ , low  $\overline{WE}$ .
3. During a  $\overline{WE}$  controlled write cycle with  $\overline{OE}$  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 and  $\overline{CE2}$  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** ( $T_A = 0$  to  $70$  /  $-20$  to  $80$  (E))

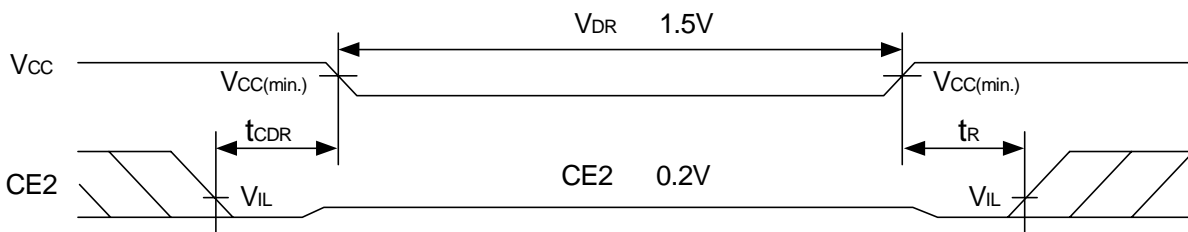
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Vcc for Data Retention	$V_{DR}$	$\overline{CE} \ V_{CC}-0.2V$ or $\overline{CE2} \ 0.2V$	1.5	-	3.6	V	
Data Retention Current	$I_{DR}$	$V_{CC}=1.5V$ $\overline{CE} \ V_{CC}-0.2V$ or $\overline{CE2} \ 0.2V$	- L	-	10	80	$\mu A$
			- LL	-	1	10	$\mu A$
Chip Disable to Data Retention Time	$t_{CDR}$	See Data Retention Waveforms (below)	0	-	-	ns	
Recovery Time	$t_R$		$t_{RC}$	-	-	ns	

**DATA RETENTION WAVEFORM**

**Low Vcc Data Retention Waveform (1)** ( $\overline{CE}$  controlled)



**Low Vcc Data Retention Waveform (2)** ( $\overline{CE2}$  controlled)

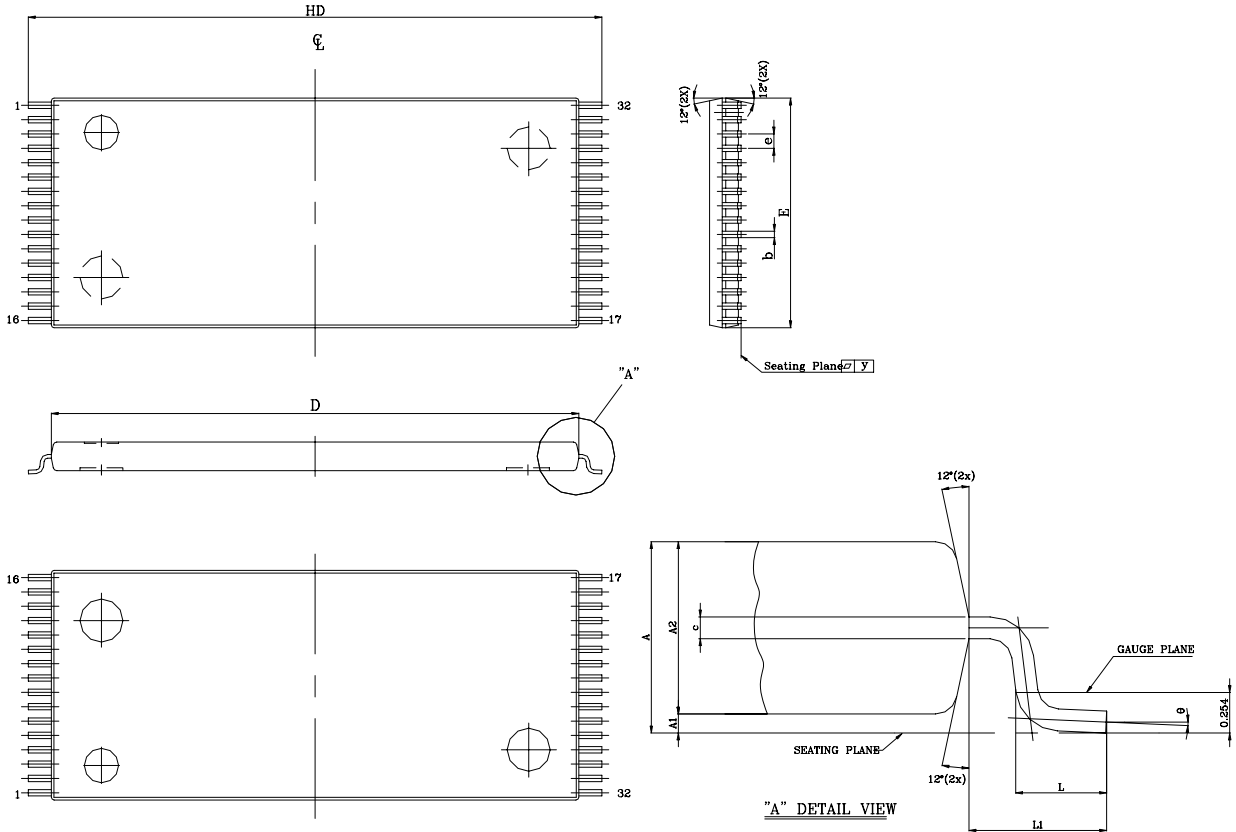






PACKAGE OUTLINE DIMENSION

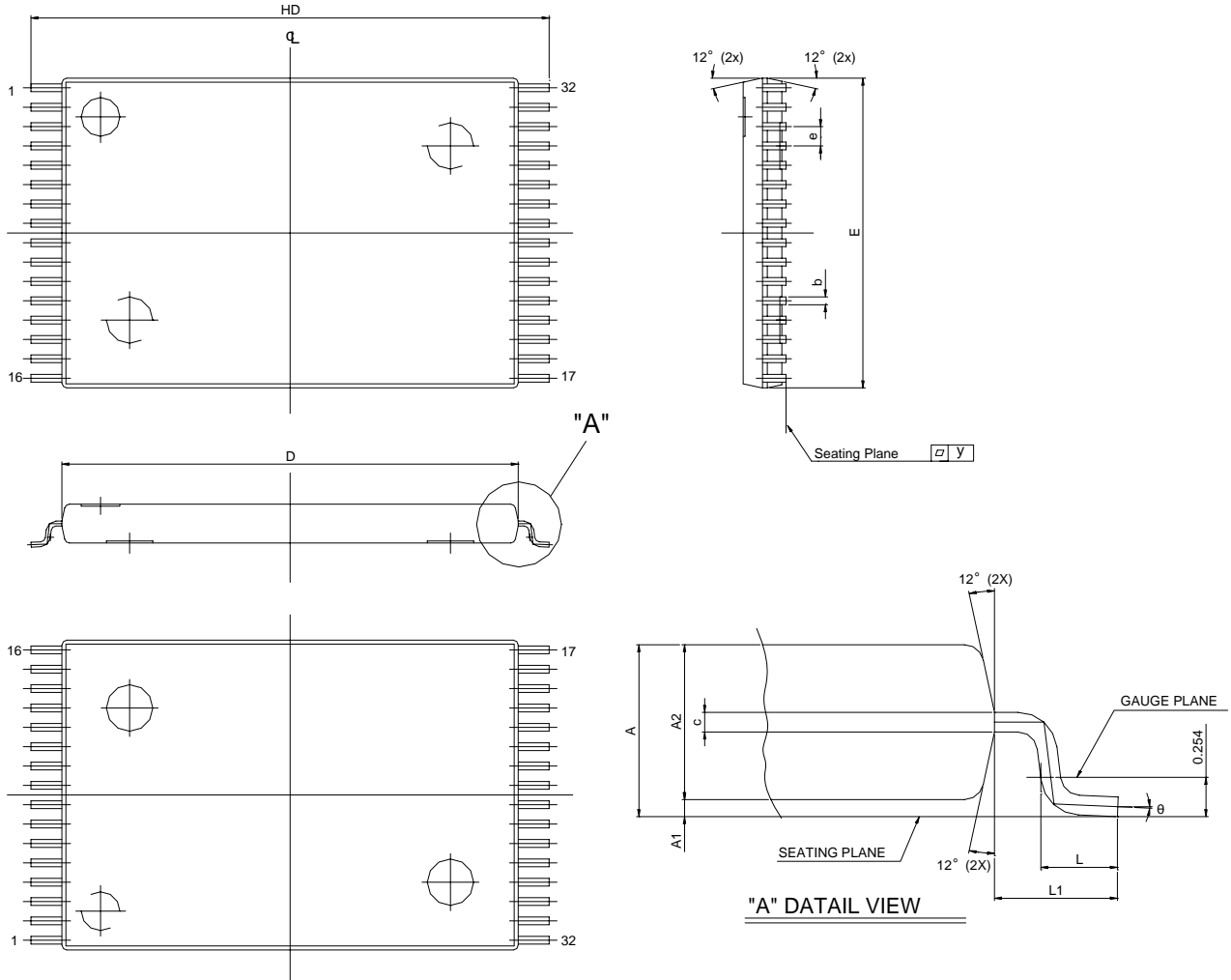
32 pin 8mm x 20mm TSOP-I Package Outline Dimension



UNIT SYMBOL	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	0.008 + 0.002 - 0.001	0.20 + 0.05 - 0.03
c	0.005 (TYP)	0.127 (TYP)
D	0.724 ±0.004	18.40 ±0.10
E	0.315 ±0.004	8.00 ±0.10
e	0.020 (TYP)	0.50 (TYP)
HD	0.787 ±0.008	20.00 ±0.20
L	0.0197 ±0.004	0.50 ±0.10
L1	0.0315 ±0.004	0.08 ±0.10
y	0.003 (MAX)	0.076 (MAX)
	0° 5°	0° 5°



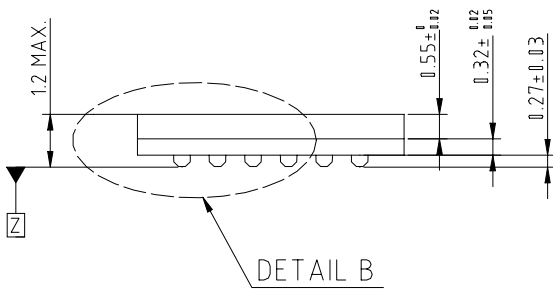
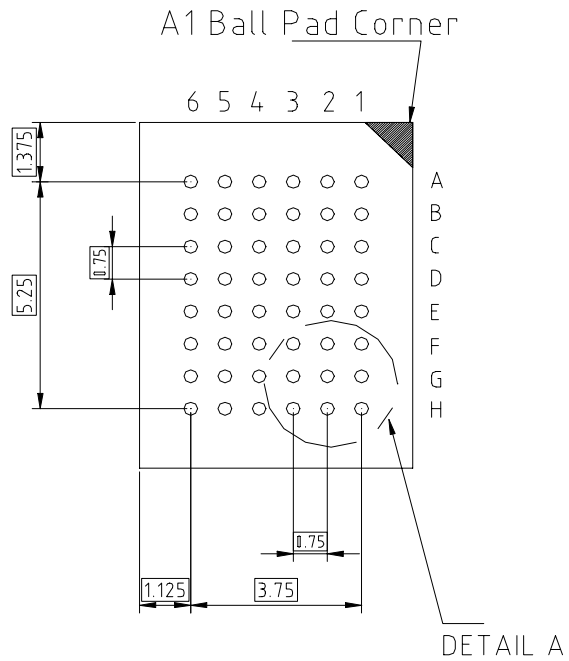
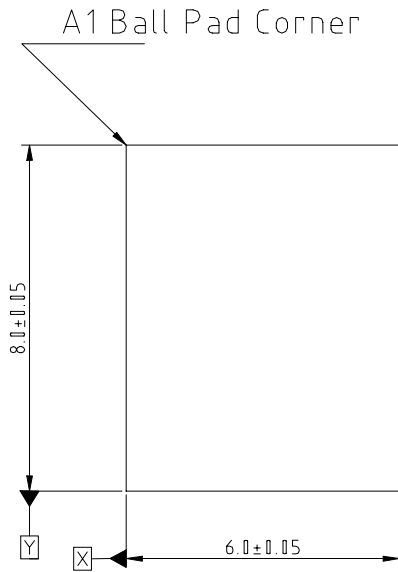
32 pin 8mm x 13.4mm STSOP Package Outline Dimension



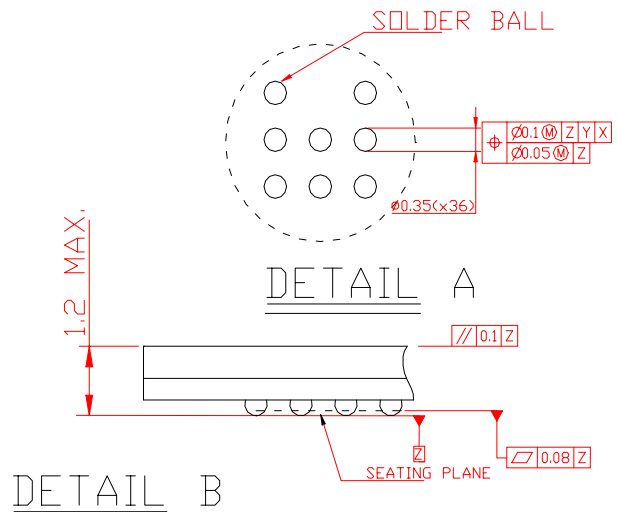
SYMBOL \ UNIT	INCH(BASE)	MM(REF)
A	0.049 (MAX)	1.25 (MAX)
A1	0.005 ±0.002	0.130 ±0.05
A2	0.039 ±0.002	1.00 ±0.05
b	0.008 ±0.01	0.20±0.025
c	0.005 (TYP)	0.127 (TYP)
D	0.465 ±0.004	11.80 ±0.10
E	0.315 ±0.004	8.00 ±0.10
e	0.020 (TYP)	0.50 (TYP)
HD	0.528±0.008	13.40 ±0.20.
L	0.0197 ±0.004	0.50 ±0.10
L1	0.0315 ±0.004	0.8 ±0.10
y	0.003 (MAX)	0.076 (MAX)
	0° 5°	0° 5°



36 pin 6mmx8mm TFBGA Package Outline Dimension



SIDE VIEW



DETAIL B



ORDERING INFORMATION

COMMERCIAL TEMPERATURE

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT (µA) TYP.	PACKAGE
UT62L2568LC-55L	55	20	32 PIN TSOP-I
UT62L2568LC-55LL	55	2	32 PIN TSOP-I
UT62L2568LC-70L	70	20	32 PIN TSOP-I
UT62L2568LC-70LL	70	2	32 PIN TSOP-I
UT62L2568LC-100L	100	20	32 PIN TSOP-I
UT62L2568LC-100LL	100	2	32 PIN TSOP-I
UT62L2568LS-55L	55	20	32 PIN STSOP
UT62L2568LS-55LL	55	2	32 PIN STSOP
UT62L2568LS-70L	70	20	32 PIN STSOP
UT62L2568LS-70LL	70	2	32 PIN STSOP
UT62L2568LS-100L	100	20	32 PIN STSOP
UT62L2568LS-100LL	100	2	32 PIN STSOP
UT62L2568BS-55L	55	20	36 PIN TFBGA
UT62L2568BS-55LL	55	2	36 PIN TFBGA
UT62L2568BS-70L	70	20	36 PIN TFBGA
UT62L2568BS-70LL	70	2	36 PIN TFBGA
UT62L2568BS-100L	100	20	36 PIN TFBGA
UT62L2568BS-100LL	100	2	36 PIN TFBGA

EXTENDED TEMPERATURE

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT (µA) TYP.	PACKAGE
UT62L2568LC-55LE	55	20	32 PIN TSOP-I
UT62L2568LC-55LLE	55	2	32 PIN TSOP-I
UT62L2568LC-70LE	70	20	32 PIN TSOP-I
UT62L2568LC-70LLE	70	2	32 PIN TSOP-I
UT62L2568LC-100LE	100	20	32 PIN TSOP-I
UT62L2568LC-100LLE	100	2	32 PIN TSOP-I
UT62L2568LS-55LE	55	20	32 PIN STSOP
UT62L2568LS-55LLE	55	2	32 PIN STSOP
UT62L2568LS-70LE	70	20	32 PIN STSOP
UT62L2568LS-70LLE	70	2	32 PIN STSOP
UT62L2568LS-100LE	100	20	32 PIN STSOP
UT62L2568LS-100LLE	100	2	32 PIN STSOP
UT62L2568BS-55LE	55	20	36 PIN TFBGA
UT62L2568BS-55LLE	55	2	36 PIN TFBGA
UT62L2568BS-70LE	70	20	36 PIN TFBGA
UT62L2568BS-70LLE	70	2	36 PIN TFBGA
UT62L2568BS-100LE	100	20	36 PIN TFBGA
UT62L2568BS-100LLE	100	2	36 PIN TFBGA



ORDERING INFORMATION (for lead free product)

COMMERCIAL TEMPERATURE

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT (µA) TYP.	PACKAGE
UT62L2568LCL-55L	55	20	32 PIN TSOP-I
UT62L2568LCL-55LL	55	2	32 PIN TSOP-I
UT62L2568LCL-70L	70	20	32 PIN TSOP-I
UT62L2568LCL-70LL	70	2	32 PIN TSOP-I
UT62L2568LCL-100L	100	20	32 PIN TSOP-I
UT62L2568LCL-100LL	100	2	32 PIN TSOP-I
UT62L2568LSL-55L	55	20	32 PIN STSOP
UT62L2568LSL-55LL	55	2	32 PIN STSOP
UT62L2568LSL-70L	70	20	32 PIN STSOP
UT62L2568LSL-70LL	70	2	32 PIN STSOP
UT62L2568LSL-100L	100	20	32 PIN STSOP
UT62L2568LSL-100LL	100	2	32 PIN STSOP
UT62L2568BSL-55L	55	20	36 PIN TFBGA
UT62L2568BSL-55LL	55	2	36 PIN TFBGA
UT62L2568BSL-70L	70	20	36 PIN TFBGA
UT62L2568BSL-70LL	70	2	36 PIN TFBGA
UT62L2568BSL-100L	100	20	36 PIN TFBGA
UT62L2568BSL-100LL	100	2	36 PIN TFBGA

EXTENDED TEMPERATURE

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT (µA) TYP.	PACKAGE
UT62L2568LCL-55LE	55	20	32 PIN TSOP-I
UT62L2568LCL-55LLE	55	2	32 PIN TSOP-I
UT62L2568LCL-70LE	70	20	32 PIN TSOP-I
UT62L2568LCL-70LLE	70	2	32 PIN TSOP-I
UT62L2568LCL-100LE	100	20	32 PIN TSOP-I
UT62L2568LCL-100LLE	100	2	32 PIN TSOP-I
UT62L2568LSL-55LE	55	20	32 PIN STSOP
UT62L2568LSL-55LLE	55	2	32 PIN STSOP
UT62L2568LSL-70LE	70	20	32 PIN STSOP
UT62L2568LSL-70LLE	70	2	32 PIN STSOP
UT62L2568LSL-100LE	100	20	32 PIN STSOP
UT62L2568LSL-100LLE	100	2	32 PIN STSOP
UT62L2568BSL-55LE	55	20	36 PIN TFBGA
UT62L2568BSL-55LLE	55	2	36 PIN TFBGA
UT62L2568BSL-70LE	70	20	36 PIN TFBGA
UT62L2568BSL-70LLE	70	2	36 PIN TFBGA
UT62L2568BSL-100LE	100	20	36 PIN TFBGA
UT62L2568BSL-100LLE	100	2	36 PIN TFBGA



Rev. 1.1

UTRON

UT62L2568  
256K X 8 BIT LOW POWER CMOS SRAM

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