



UTRON

Rev. 1.9

UT62L1024  
128KX8 BIT LOW POWER CMOS SRAM

REVISION HISTORY

REVISION	DESCRIPTION	DATE
Rev. 1.0	Original	Jun 01, 1997
Rev. 1.1	128Kx 8 Low Voltage CMOS SRAM 之TN8106 body 已作fine tunings,將 $I_{SB1}$ 降為0.5uA(LL)、2uA(L)、Vcc range : 3.0V~3.6V	Apr 05, 2000
Rev. 1.2	Add STSOP-I Package	Aug 29, 2000
Rev. 1.3	Modify the format of power consumption	Sep 01, 2000
Rev. 1.4	Add speed : -55ns	Dec 01, 2000
Rev. 1.5	Vcc min 3.1→2.7V	Mar 15, 2001
Rev. 1.6	1. The symbols CE1# ,OE# & WE# are revised as $\overline{CE1}$ , $\overline{OE}$ & $\overline{WE}$ 2. Add Icc value of 55ns range(access time) 3. $V_{OH}$ is revised as 2.2V 4. $I_{SB1}$ is revised as 100 $\mu$ A	Jun 26, 2001
Rev. 1.7	Revised 32 pin 8mmx13.4mm STSOP Package Outline Dimension	Nov 26, 2001
Rev. 1.8	1. $V_{OH}$ is revised as 2.4V (min.) 2. Revised Package Outline Dimension	Apr 9, 2002
Rev. 1.9	1. Add Operation temperature : Extended temp -20 ~80 2. Add Order information for lead free product	May 09.2003



FEATURES

- Fast access time : 35/55/70ns (max.)
- Low power consumption :
  - Operating current : 40/35/30mA (typical)
  - Standby current : 2.5μA (typical) L-version  
0.5μA (typical) LL-version
- Power supply range : 2.7V to 3.6V
- Operating temperature :
  - Commercial : 0 ~70
  - Extended : -20 ~80
- All inputs and outputs TTL compatible
- Fully static operation
- Three state outputs
- Data retention voltage : 2V (min.)
- Package : 32-pin 600 mil PDIP  
32-pin 450 mil SOP  
32-pin 8x20 mm TSOP-1  
32-pin 8x13.4 mm STSOP

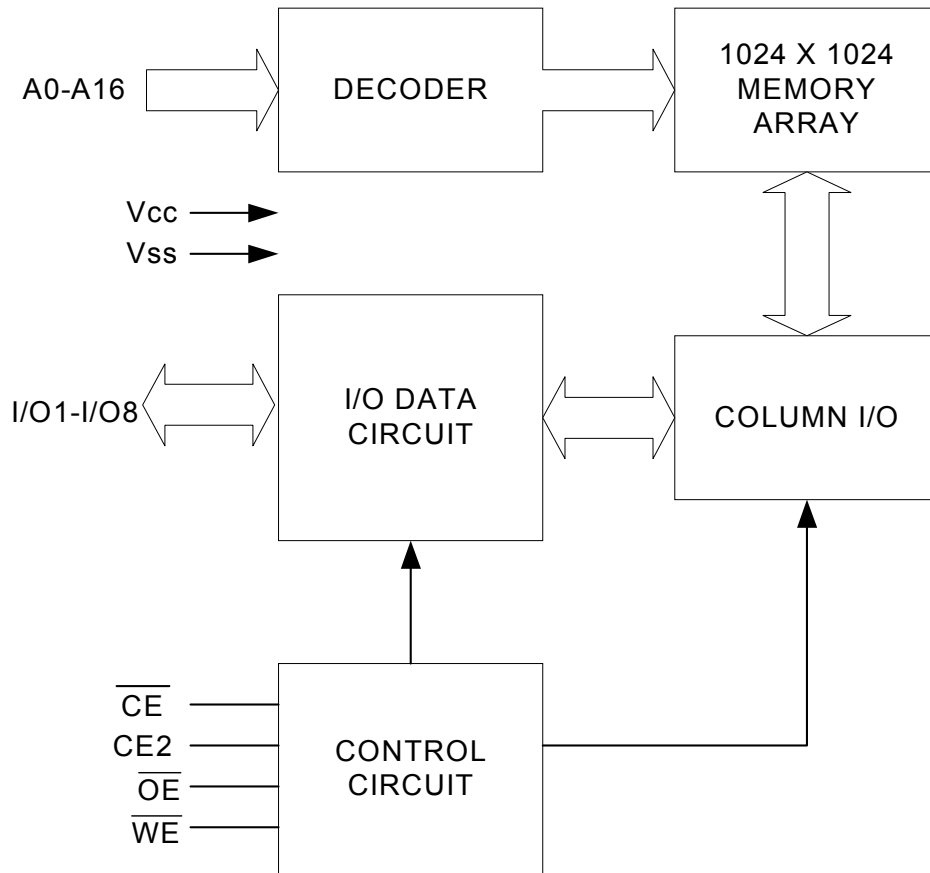
GENERAL DESCRIPTION

The UT62L1024 is a 1,048,576-bit low power CMOS static random access memory organized as 131,072 words by 8 bits. It is fabricated using high performance, high reliability CMOS technology.

Easy memory expansion is provided by using two chip enable inputs.(  $\overline{CE}$  ,CE2) It is particularly well suited for battery back-up nonvolatile memory application.

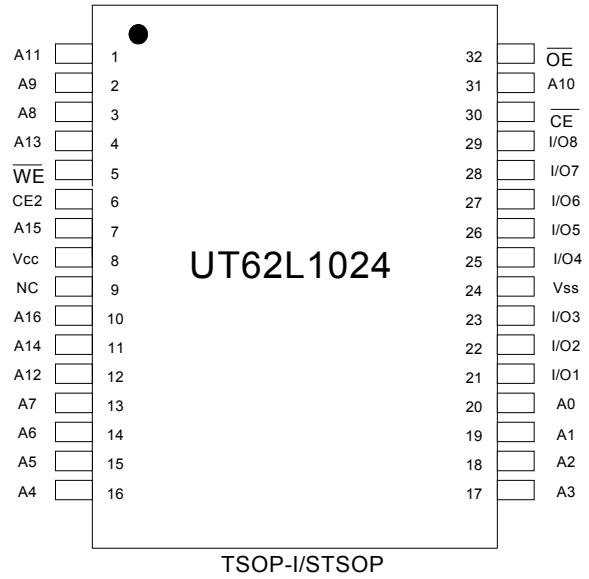
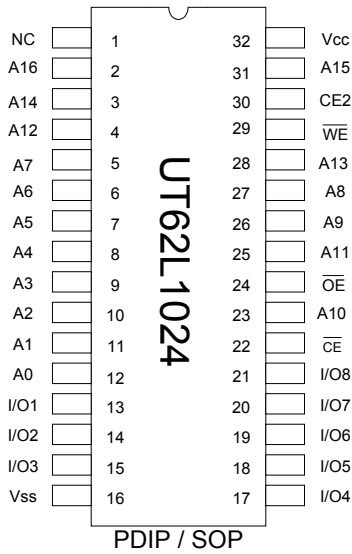
The UT62L1024 operates from a single 2.7V~ 3.6V power supply and all inputs and outputs are fully TTL compatible.

FUNCTIONAL BLOCK DIAGRAM





PIN CONFIGURATION



PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A16	Address Inputs
I/O1 - I/O8	Data Inputs/Outputs
$\overline{CE}$ , CE2	Chip enable 1,2 Inputs
$\overline{WE}$	Write Enable Input
$\overline{OE}$	Output Enable Input
V <sub>CC</sub>	Power Supply
V <sub>SS</sub>	Ground
NC	No Connection

**ABSOLUTE MAXIMUM RATINGS\***

PARAMETER	SYMBOL	RATING	UNIT
Terminal Voltage with Respect to V <sub>SS</sub>	V <sub>TERM</sub>	-0.5 to +4.6	V
Operating Temperature	Commerical	T <sub>A</sub>	0 to +70
	Extended	T <sub>A</sub>	-20 to +80
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	

\*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	$\overline{CE}$	CE2	$\overline{OE}$	$\overline{WE}$	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	X	High - Z	I <sub>SB</sub> , I <sub>SB1</sub>
Standby	X	L	X	X	High - Z	I <sub>SB</sub> , I <sub>SB1</sub>
Output Disable	L	H	H	H	High - Z	I <sub>CC</sub> , I <sub>CC1</sub>
Read	L	H	L	H	D <sub>OUT</sub>	I <sub>CC</sub> , I <sub>CC1</sub>
Write	L	H	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.

**DC ELECTRICAL CHARACTERISTICS** (V<sub>CC</sub> = 2.7V~3.6V, T<sub>A</sub> = 0 to +70 / -20 to +80 (E))

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT			
Input High Voltage	V <sub>IH</sub> <sup>*1</sup>		2.0	-	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>IL</sub>	V <sub>SS</sub> V <sub>IN</sub> V <sub>CC</sub>	- 1	-	1	μA			
Output Leakage Current	I <sub>OL</sub>	V <sub>SS</sub> V <sub>I/O</sub> V <sub>CC</sub> $\overline{CE} = V_{IH}$ or $CE2 = V_{IL}$ or $\overline{OE} = V_{IH}$ or $\overline{WE} = V_{IL}$	- 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			
Average Operating Power Supply Current	I <sub>CC</sub>	Cycle time = Min. 100% Duty, $\overline{CE} = V_{IL}$ , CE2 = V <sub>IH</sub> , I <sub>I/O</sub> = 0mA	35	-	40	60	mA		
			55	-	35	50	mA		
			70	-	30	40	mA		
	I <sub>CC1</sub>	Cycle time = 1μs, 100% Duty, $\overline{CE} = 0.2V$ , CE2 = V <sub>CC</sub> -0.2V, I <sub>I/O</sub> = 0mA	-	-	5	mA			
Standby Power Supply Current	I <sub>SB</sub>	$\overline{CE} = V_{IH}$ or CE2 = V <sub>IL</sub>	-	-	1.0	mA			
			I <sub>SB1</sub>	$\overline{CE} = V_{CC}-0.2V$ or CE2 = 0.2V	- L	-	2.5	100 20 <sup>*4</sup>	μA
					- LL	-	0.5	40 10 <sup>*4</sup>	μA

Notes:

1. Overshoot : V<sub>CC</sub>+3.0v for pulse width less than 10ns.
2. Undershoot : V<sub>SS</sub>-3.0v for pulse width less than 10ns.
3. Overshoot and Undershoot are sampled, not 100% tested.
4. Those parameters are for reference only under 50□

**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	0.4V to 2.4V
Input Rise and Fall Times	5ns
Input and Output Timing Reference Levels	1.5V
Output Load	$C_L=50\text{pF}$ , $I_{OH}/I_{OL}=-1\text{mA}/2\text{mA}$

**AC ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 2.7\text{V}\sim 3.6\text{V}$  ,  $T_A = 0$  to  $+70$  /  $-20$  to  $+80$  (E))**(1) READ CYCLE**

PARAMETER	SYMBOL	UT62L1024-35		UT62L1024-55		UT62L1024-70		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	$t_{RC}$	35	-	55	-	70	-	ns
Address Access Time	$t_{AA}$	-	35	-	55	-	70	ns
Chip Enable Access Time	$t_{ACE}$	-	35	-	55	-	70	ns
Output Enable Access Time	$t_{OE}$	-	25	-	30	-	35	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	$t_{CHZ}^*$	-	25	-	30	-	35	ns
Output Disable to Output in High-Z	$t_{OHZ}^*$	-	25	-	30	-	35	ns
Output Hold from Address Change	$t_{OH}$	5	-	5	-	5	-	ns

**(2) WRITE CYCLE**

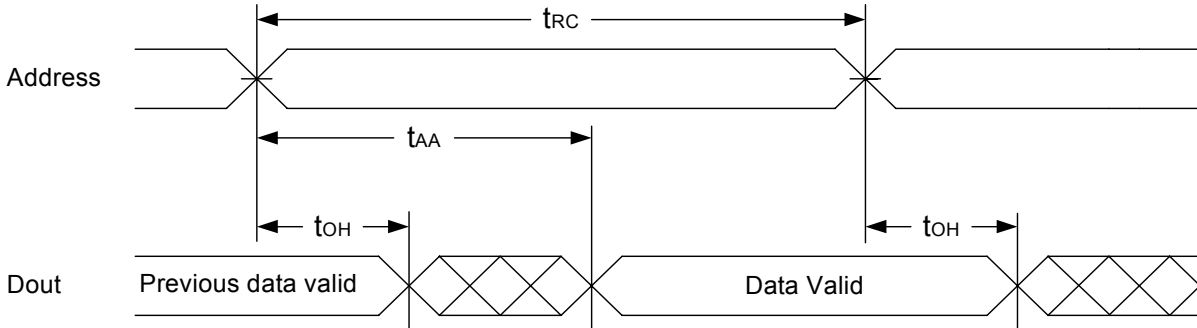
PARAMETER	SYMBOL	UT62L1024-35		UT62L1024-55		UT62L1024-70		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	$t_{WC}$	35	-	55	-	70	-	ns
Address Valid to End of Write	$t_{AW}$	30	-	50	-	60	-	ns
Chip Enable to End of Write	$t_{CW}$	30	-	50	-	60	-	ns
Address Set-up Time	$t_{AS}$	0	-	0	-	0	-	ns
Write Pulse Width	$t_{WP}$	25	-	40	-	45	-	ns
Write Recovery Time	$t_{WR}$	0	-	0	-	0	-	ns
Data to Write Time Overlap	$t_{DW}$	20	-	25	-	30	-	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	$t_{WHZ}^*$	-	15	-	20	-	25	ns

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

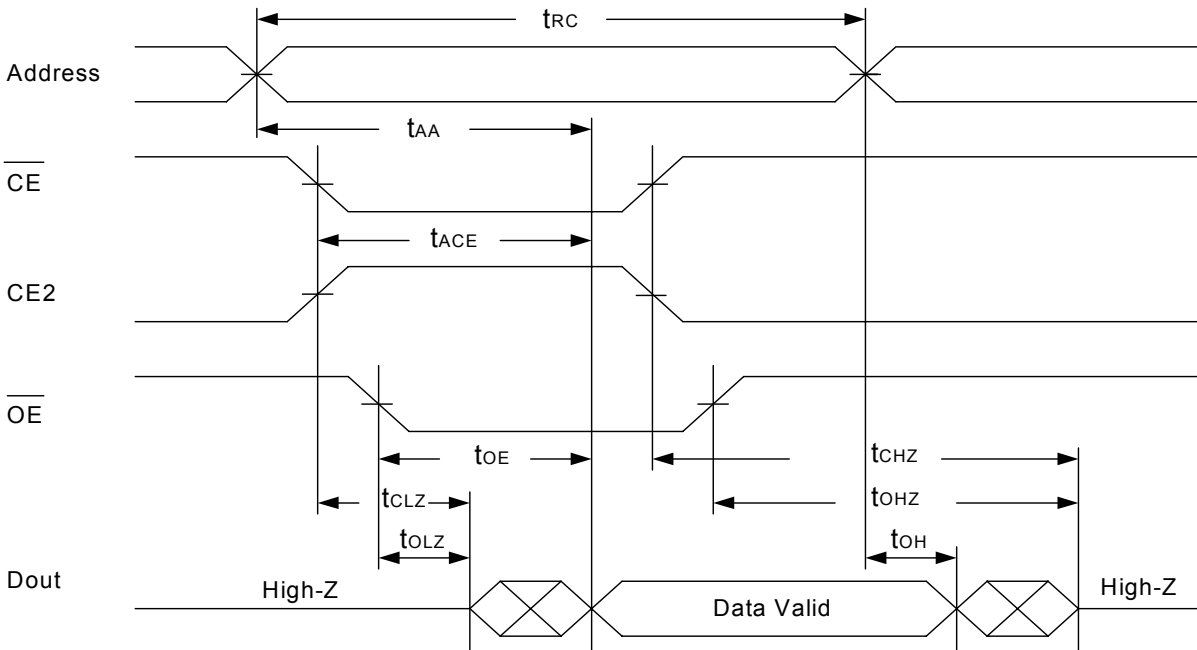


TIMING WAVEFORMS

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



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

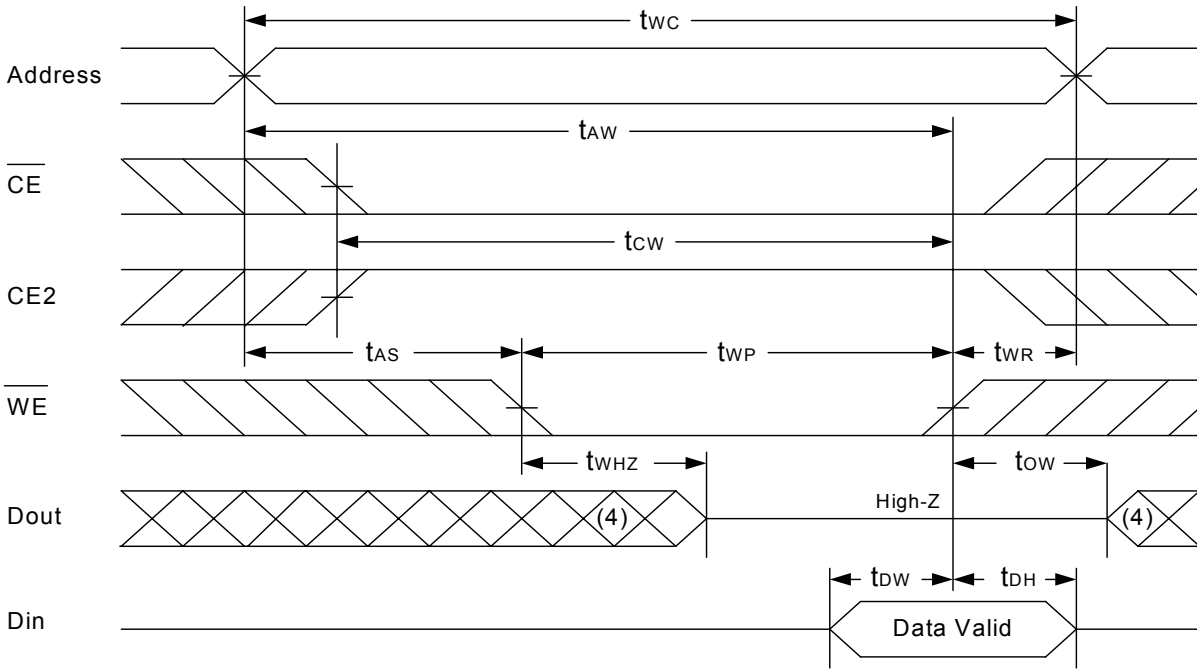


Notes :

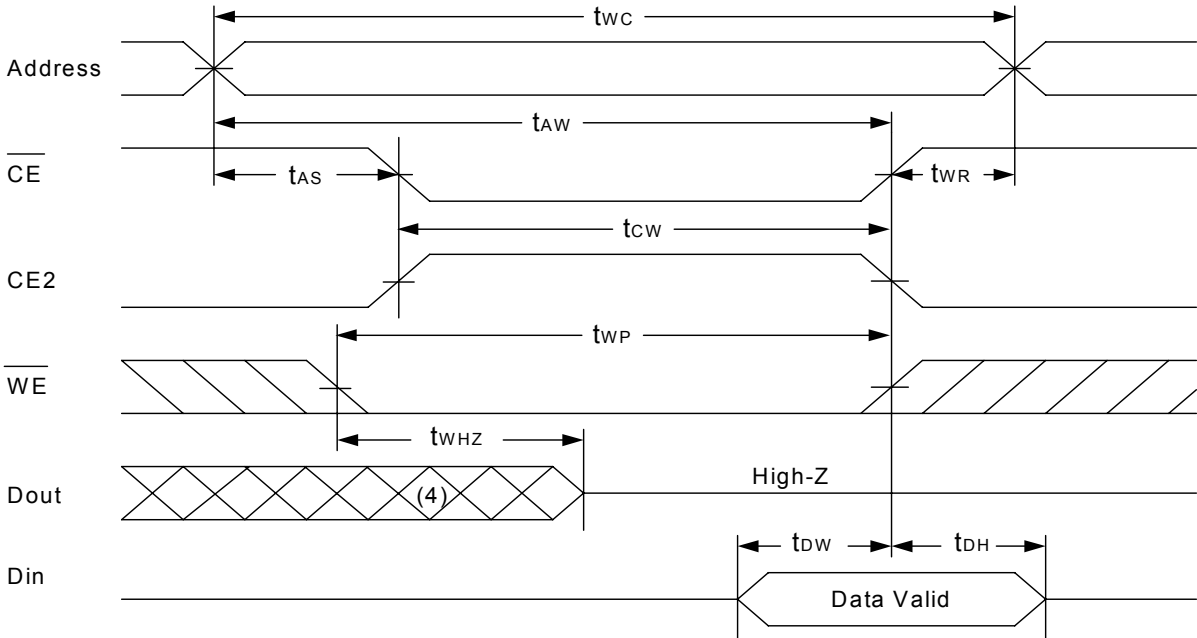
1.  $\overline{WE}$  is high for read cycle.
2. Device is continuously selected  $\overline{OE}$  =low,  $\overline{CE}$  =low, CE2=high.
3. Address must be valid prior to or coincident with  $\overline{CE}$  =low, CE2=high; otherwise  $t_{AA}$  is the limiting parameter.
4.  $t_{CLZ}$ ,  $t_{OLZ}$ ,  $t_{CHZ}$  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  $t_{CLZ}$ ,  $t_{OHZ}$  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  $t_{WHZ} + t_{OW}$  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))

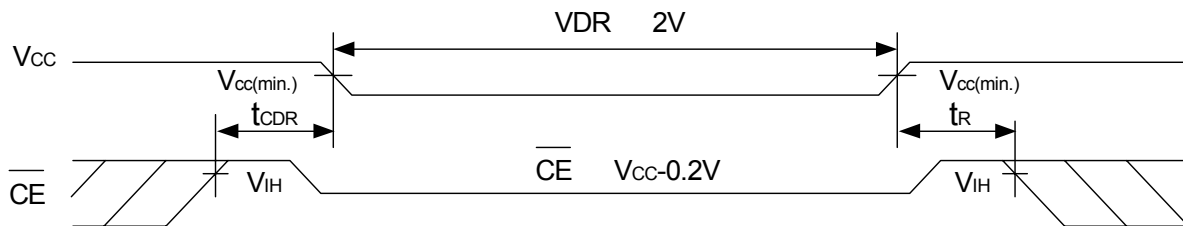
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vcc for Data Retention	V <sub>DR</sub>	$\overline{CE}$ V <sub>CC</sub> -0.2V or CE2 $\leq 0.2V$	2.0	-	3.3	V
Data Retention Current	I <sub>DR</sub>	V <sub>CC</sub> =2V $\overline{CE}$ V <sub>CC</sub> -0.2V or CE2 $\leq 0.2V$	- L	1	40	$\mu A$
			- LL	0.3	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

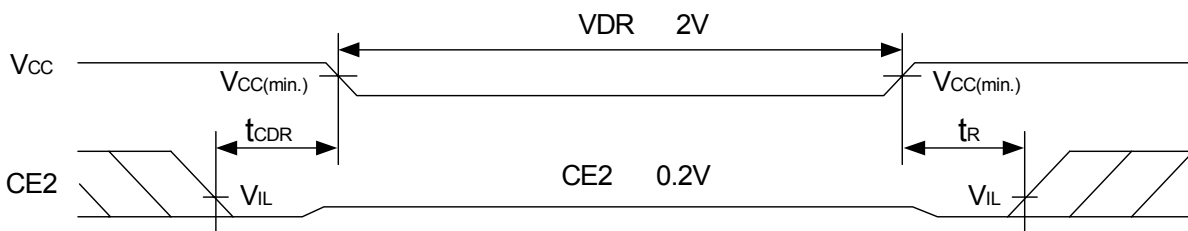
\*Those parameters are for reference only under 50

DATA RETENTION WAVEFORM

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



Low Vcc Data Retention Waveform (2) (CE2 controlled)

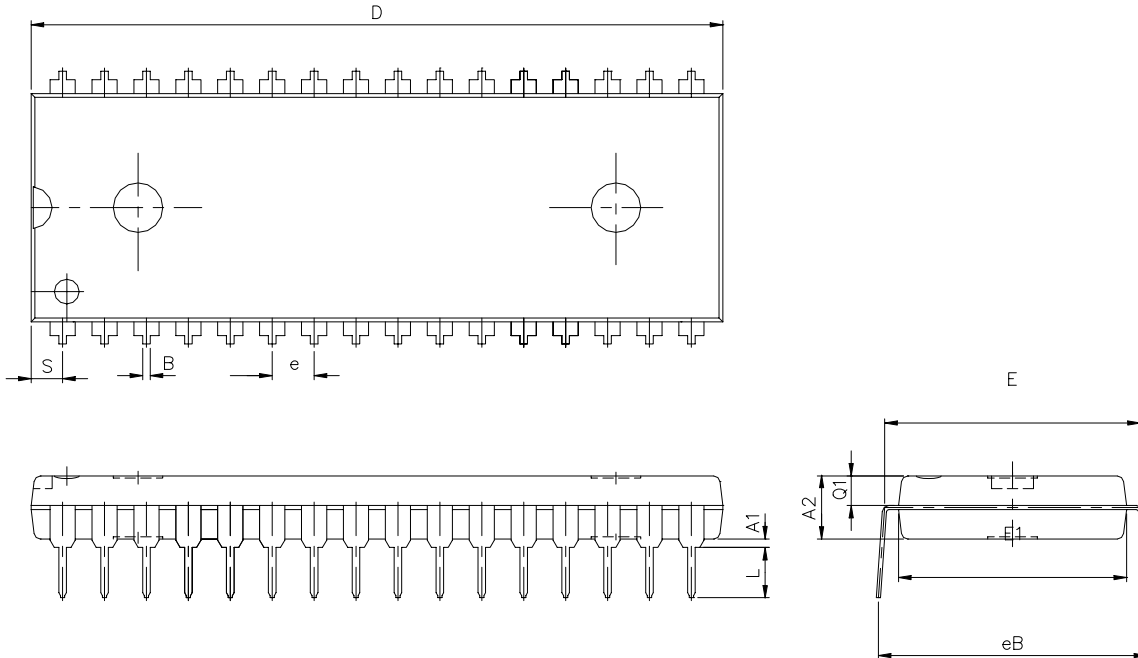






PACKAGE OUTLINE DIMENSION

32-pin 600mil PDIP Package Outline Dimension



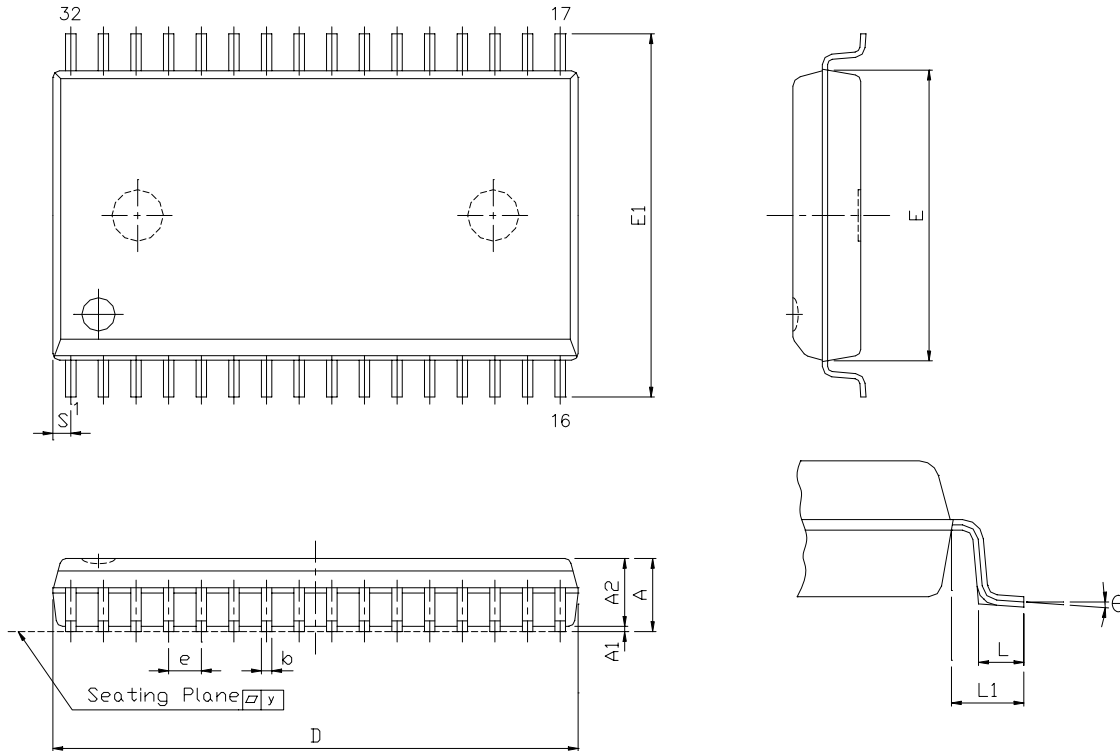
SYMBOL \ UNIT	INCH(BASE)	MM(REF)
A1	0.010(MIN)	0.254(MIN)
A2	0.150 ± 0.005	3.810 ± 0.127
B	0.018 ± 0.005	0.457 ± 0.127
D	1.650 ± 0.005	41.910 ± 0.127
E	0.600 ± 0.010	15.240 ± 0.254
E1	0.544 ± 0.004	13.818 ± 0.102
e	0.100 (TYP)	2.540 (TYP)
eB	0.640 ± 0.020	16.256 ± 0.508
L	0.130 ± 0.010	3.302 ± 0.254
S	0.075 ± 0.010	1.905 ± 0.254
Q1	0.070 ± 0.005	1.778 ± 0.127

NOTE:

1. D/E1/S dimension do not include mold flash.



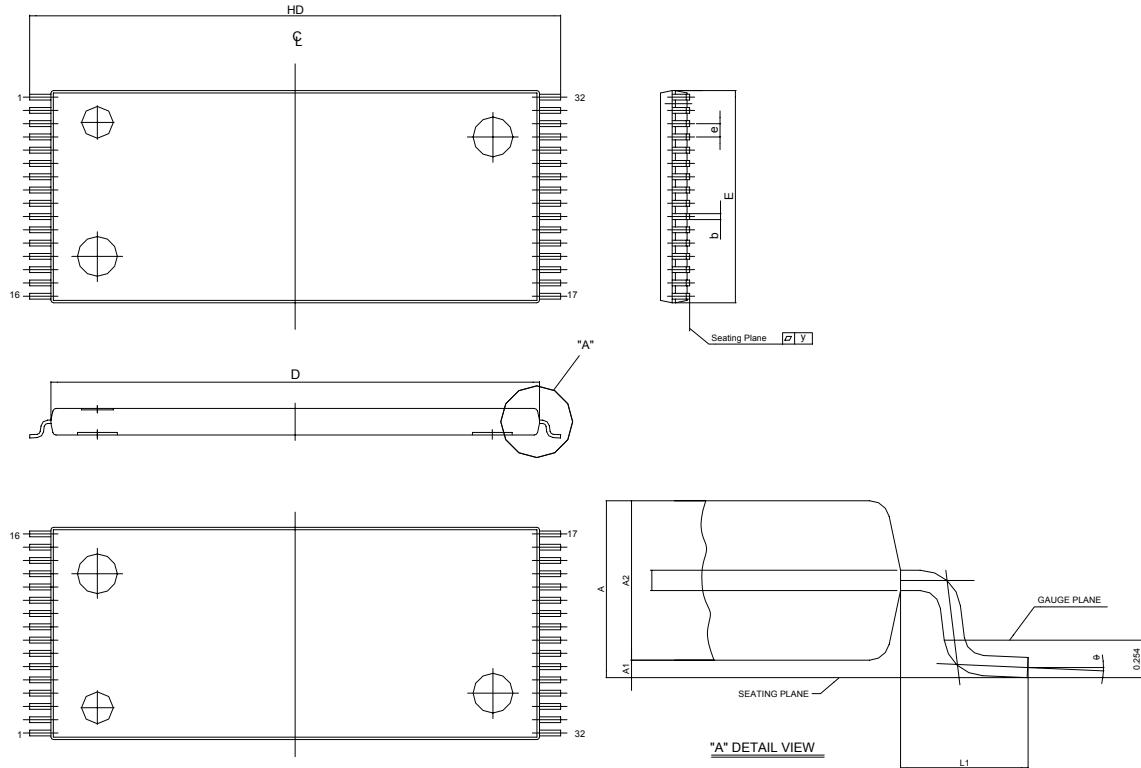
32-pin 450mil SOP Package Outline Dimension



SYMBOL \ UNIT	INCH(BASE)	MM(REF)
A	0.118 (MAX)	2.997 (MAX)
A1	0.004 (MIN)	0.102 (MIN)
A2	0.111 (MAX)	2.82 (MAX)
b	0.016 (TYP)	0.406 (TYP)
D	0.817 (MAX)	20.75 (MAX)
E	0.445 ± 0.005	11.303 ± 0.127
E1	0.555 ± 0.012	14.097 ± 0.305
e	0.050 (TYP)	1.270 (TYP)
L	0.0347 ± 0.008	0.881 ± 0.203
L1	0.055 ± 0.008	1.397 ± 0.203
S	0.026 (MAX)	0.660 (MAX)
y	0.004 (MAX)	0.101 (MAX)
	0° ~ 10°	0° ~ 10°



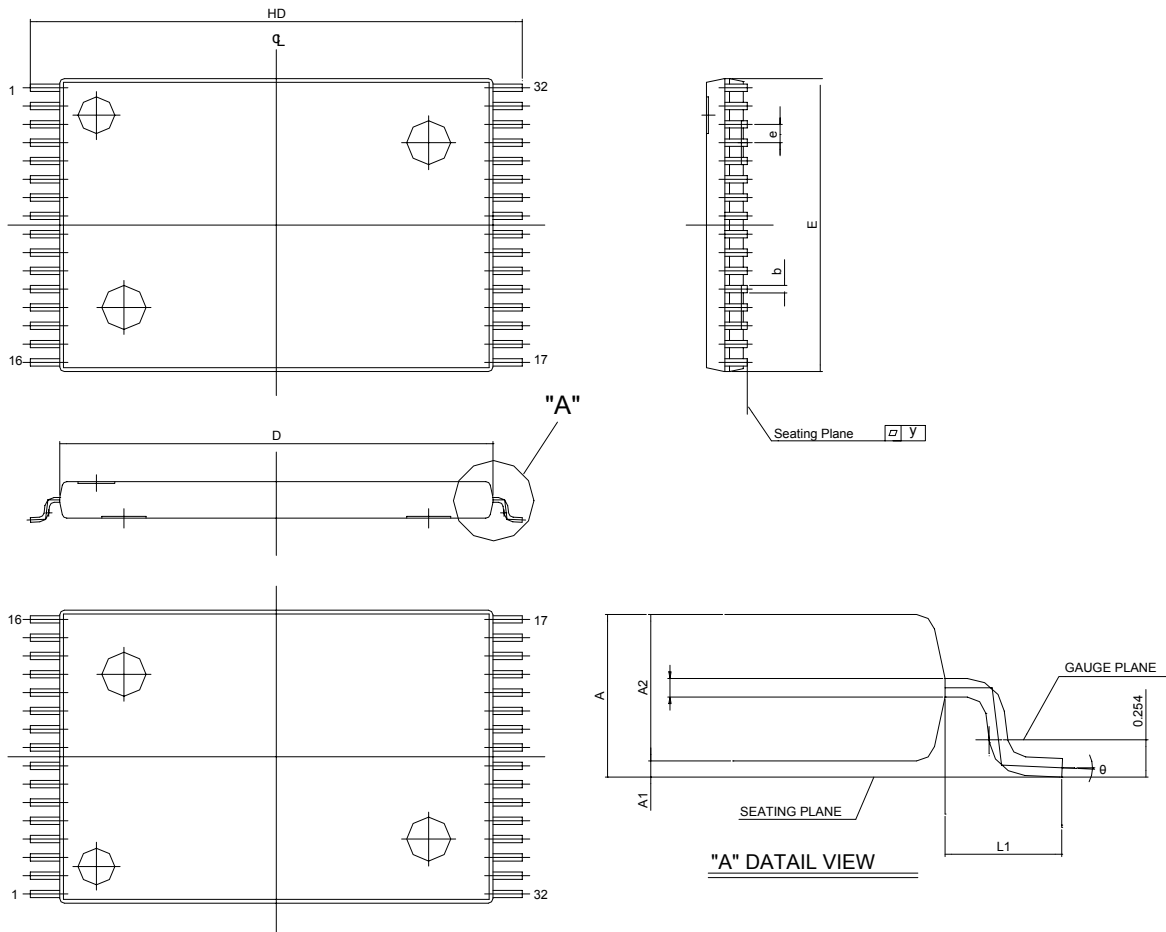
32-pin 8mm x 20mm TSOP- Package Outline Dimension



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
b		0.008 + 0.002 - 0.001	0.20 + 0.05 -0.03
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
L1		0.0315 ± 0.004	0.80 ± 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		0.047 (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 ± 0.001	0.200 ± 0.025
D		0.465 ± 0.004	11.800 ± 0.100
E		0.315 ± 0.004	8.000 ± 0.100
e		0.020 (TYP)	0.50 (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**

Commercial temperature :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) (max) Ta = 50	PACKAGE
UT62L1024PC-35L	35	20	32 PIN PDIP
UT62L1024PC-35LL	35	10	32 PIN PDIP
UT62L1024PC-55L	55	20	32 PIN PDIP
UT62L1024PC-55LL	55	10	32 PIN PDIP
UT62L1024PC-70L	70	20	32 PIN PDIP
UT62L1024PC-70LL	70	10	32 PIN PDIP
UT62L1024SC-35L	35	20	32 PIN SOP
UT62L1024SC-35LL	35	10	32 PIN SOP
UT62L1024SC-55L	55	20	32 PIN SOP
UT62L1024SC-55LL	55	10	32 PIN SOP
UT62L1024SC-70L	70	20	32 PIN SOP
UT62L1024SC-70LL	70	10	32 PIN SOP
UT62L1024LC-35L	35	20	32 PIN TSOP-I
UT62L1024LC-35LL	35	10	32 PIN TSOP-I
UT62L1024LC-55L	55	20	32 PIN TSOP-I
UT62L1024LC-55LL	55	10	32 PIN TSOP-I
UT62L1024LC-70L	70	20	32 PIN TSOP-I
UT62L1024LC-70LL	70	10	32 PIN TSOP-I
UT62L1024LS-35L	35	20	32 PIN STSOP
UT62L1024LS-35LL	35	10	32 PIN STSOP
UT62L1024LS-55L	55	20	32 PIN STSOP
UT62L1024LS-55LL	55	10	32 PIN STSOP
UT62L1024LS-70L	70	20	32 PIN STSOP
UT62L1024LS-70LL	70	10	32 PIN STSOP

**ORDERING INFORMATION**

Extended temp :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) (max) Ta = 50	PACKAGE
UT62L1024PC-35LE	35	20	32 PIN PDIP
UT62L1024PC-35LLE	35	10	32 PIN PDIP
UT62L1024PC-55LE	55	20	32 PIN PDIP
UT62L1024PC-55LLE	55	10	32 PIN PDIP
UT62L1024PC-70LE	70	20	32 PIN PDIP
UT62L1024PC-70LLE	70	10	32 PIN PDIP
UT62L1024SC-35LE	35	20	32 PIN SOP
UT62L1024SC-35LLE	35	10	32 PIN SOP
UT62L1024SC-55LE	55	20	32 PIN SOP
UT62L1024SC-55LLE	55	10	32 PIN SOP
UT62L1024SC-70LE	70	20	32 PIN SOP
UT62L1024SC-70LLE	70	10	32 PIN SOP
UT62L1024LC-35LE	35	20	32 PIN TSOP-I
UT62L1024LC-35LLE	35	10	32 PIN TSOP-I
UT62L1024LC-55LE	55	20	32 PIN TSOP-I
UT62L1024LC-55LLE	55	10	32 PIN TSOP-I
UT62L1024LC-70LE	70	20	32 PIN TSOP-I
UT62L1024LC-70LLE	70	10	32 PIN TSOP-I
UT62L1024LS-35LE	35	20	32 PIN STSOP
UT62L1024LS-35LLE	35	10	32 PIN STSOP
UT62L1024LS-55LE	55	20	32 PIN STSOP
UT62L1024LS-55LLE	55	10	32 PIN STSOP
UT62L1024LS-70LE	70	20	32 PIN STSOP
UT62L1024LS-70LLE	70	10	32 PIN STSOP

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

Commercial temperature :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT ( $\mu$ A) (max) Ta = 50	PACKAGE
UT62L1024PCL-35L	35	20	32 PIN PDIP
UT62L1024PCL-35LL	35	10	32 PIN PDIP
UT62L1024PCL-55L	55	20	32 PIN PDIP
UT62L1024PCL-55LL	55	10	32 PIN PDIP
UT62L1024PCL-70L	70	20	32 PIN PDIP
UT62L1024PCL-70LL	70	10	32 PIN PDIP
UT62L1024SCL-35L	35	20	32 PIN SOP
UT62L1024SCL-35LL	35	10	32 PIN SOP
UT62L1024SCL-55L	55	20	32 PIN SOP
UT62L1024SCL-55LL	55	10	32 PIN SOP
UT62L1024SCL-70L	70	20	32 PIN SOP
UT62L1024SCL-70LL	70	10	32 PIN SOP
UT62L1024LCL-35L	35	20	32 PIN TSOP-I
UT62L1024LCL-35LL	35	10	32 PIN TSOP-I
UT62L1024LCL-55L	55	20	32 PIN TSOP-I
UT62L1024LCL-55LL	55	10	32 PIN TSOP-I
UT62L1024LCL-70L	70	20	32 PIN TSOP-I
UT62L1024LCL-70LL	70	10	32 PIN TSOP-I
UT62L1024LSL-35L	35	20	32 PIN STSOP
UT62L1024LSL-35LL	35	10	32 PIN STSOP
UT62L1024LSL-55L	55	20	32 PIN STSOP
UT62L1024LSL-55LL	55	10	32 PIN STSOP
UT62L1024LSL-70L	70	20	32 PIN STSOP
UT62L1024LSL-70LL	70	10	32 PIN STSOP



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

Extended temperature :

PART NO.	ACCESS TIME (ns)	STANDBY CURRENT (μA) (max) Ta = 50	PACKAGE
UT62L1024PCL-35LE	35	20	32 PIN PDIP
UT62L1024PCL-35LLE	35	10	32 PIN PDIP
UT62L1024PCL-55LE	55	20	32 PIN PDIP
UT62L1024PCL-55LLE	55	10	32 PIN PDIP
UT62L1024PCL-70LE	70	20	32 PIN PDIP
UT62L1024PCL-70LLE	70	10	32 PIN PDIP
UT62L1024SCL-35LE	35	20	32 PIN SOP
UT62L1024SCL-35LLE	35	10	32 PIN SOP
UT62L1024SCL-55LE	55	20	32 PIN SOP
UT62L1024SCL-55LLE	55	10	32 PIN SOP
UT62L1024SCL-70LE	70	20	32 PIN SOP
UT62L1024SCL-70LLE	70	10	32 PIN SOP
UT62L1024LCL-35LE	35	20	32 PIN TSOP-I
UT62L1024LCL-35LLE	35	10	32 PIN TSOP-I
UT62L1024LCL-55LE	55	20	32 PIN TSOP-I
UT62L1024LCL-55LLE	55	10	32 PIN TSOP-I
UT62L1024LCL-70LE	70	20	32 PIN TSOP-I
UT62L1024LCL-70LLE	70	10	32 PIN TSOP-I
UT62L1024LSL-35LE	35	20	32 PIN STSOP
UT62L1024LSL-35LLE	35	10	32 PIN STSOP
UT62L1024LSL-55LE	55	20	32 PIN STSOP
UT62L1024LSL-55LLE	55	10	32 PIN STSOP
UT62L1024LSL-70LE	70	20	32 PIN STSOP
UT62L1024LSL-70LLE	70	10	32 PIN STSOP





UTRON

Rev. 1.9

UT62L1024

128KX8 BIT LOW POWER CMOS SRAM

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