



Lyontek Inc.

LY61L20508A

Rev. 1.0

2048K X 8 BIT HIGH SPEED CMOS SRAM

REVISION HISTORY

<u>Revision</u>	<u>Description</u>	<u>Issue Date</u>
Rev. 1.0	Initial Issue	Jan.21.2014



FEATURES

- Fast access time : 10ns
- **Low power consumption:**
 Operating current:
 90mA (TYP.)
 Standby current:
 4mA (TYP.)
- Single 3.3V power supply
- All inputs and outputs TTL compatible
- Fully static operation
- Tri-state output
- Data retention voltage : 1.5V (MIN.)
- **Green package available**
- Package : 44-pin 400mil TSOP-II
 48-ball 6mm x 8mm TFBGA

GENERAL DESCRIPTION

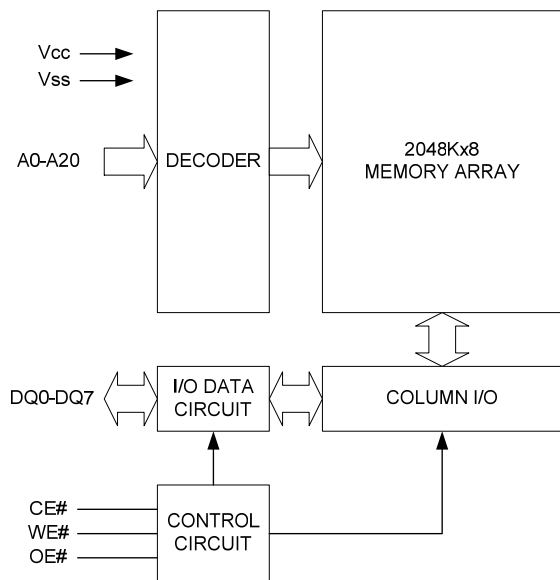
The LY61L20508A is a 16M-bit high speed CMOS static random access memory organized as 2048K words by 8 bits. It is fabricated using very high performance, high reliability CMOS technology. Its standby current is stable within the range of operating temperature.

The LY61L20508A operates from a single power supply of 3.3V and all inputs and outputs are fully TTL compatible

PRODUCT FAMILY

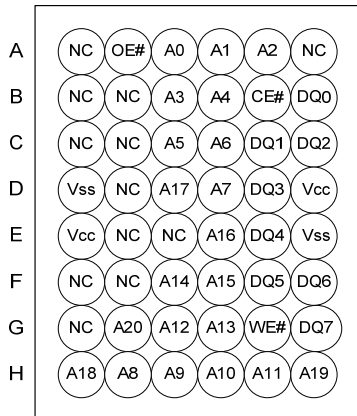
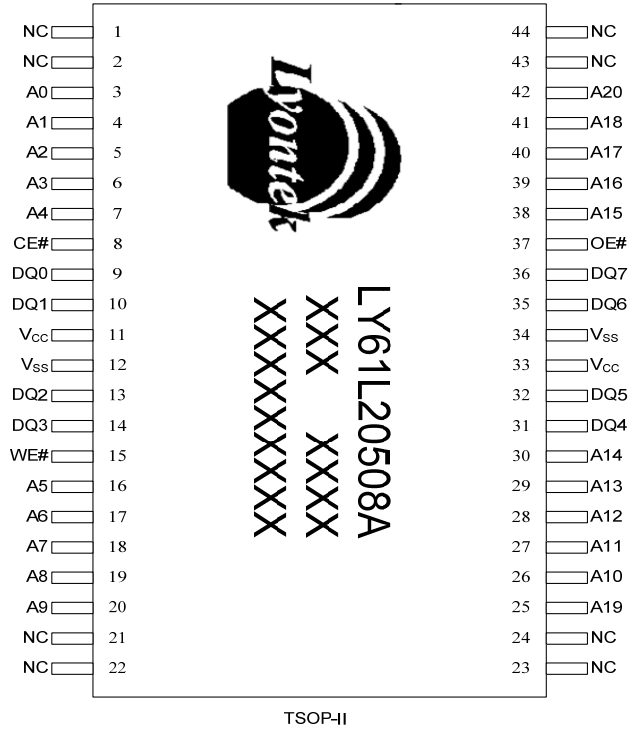
Product Family	Operating Temperature	V _{CC} Range	Speed	Power Dissipation	
				Standby(I _{SB1} , TYP.)	Operating(I _{CC} , TYP.)
LY61L20508A	0 ~ 70°C	2.7 ~ 3.6V	10ns	4mA	90mA
LY61L20508A(I)	-40 ~ 85°C	2.7 ~ 3.6V	10ns	4mA	90mA

FUNCTIONAL BLOCK DIAGRAM

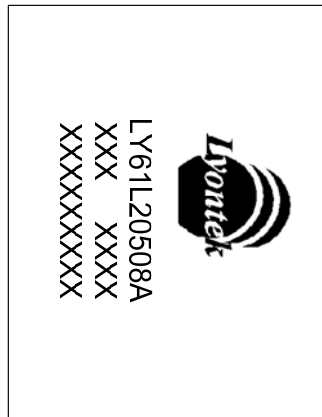


PIN DESCRIPTION

SYMBOL	DESCRIPTION
A0 - A20	Address Inputs
DQ0 - DQ7	Data Inputs/Outputs
CE#	Chip Enable Input
WE#	Write Enable Input
OE#	Output Enable Input
V _{CC}	Power Supply
V _{SS}	Ground

PIN CONFIGURATION


TFBGA(See through with Top View)



TFBGA(Top View)



ABSOLUTE MAXIMUM RATINGS*

PARAMETER	SYMBOL	RATING	UNIT
Voltage on V _{CC} relative to V _{SS}	V _{T1}	-0.5 to 4.6	V
Voltage on any other pin relative to V _{SS}	V _{T2}	-0.5 to V _{CC} +0.5	V
Operating Temperature	T _A	0 to 70(C grade)	°C
		-40 to 85(I grade)	
Storage Temperature	T _{STG}	-65 to 150	°C
Power Dissipation	P _D	1	W
DC Output Current	I _{OUT}	50	mA

*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#	OE#	WE#	I/O OPERATION	SUPPLY CURRENT
Standby	H	X	X	High-Z	I _{SB1}
Output Disable	L	H	H	High-Z	I _{CC}
Read	L	L	H	D _{OUT}	I _{CC}
Write	L	X	L	D _{IN}	I _{CC}

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

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP. ^{*4}	MAX.	UNIT
Supply Voltage	V _{CC}		2.7	3.3	3.6	V
Input High Voltage	V _{IH} ^{*1}		2.2	-	V _{CC} +0.3	V
Input Low Voltage	V _{IL} ^{*2}		-0.3	-	0.8	V
Input Leakage Current	I _{LI}	V _{CC} ≥ V _{IN} ≥ V _{SS}	-1	-	1	μA
Output Leakage Current	I _{LO}	V _{CC} ≥ V _{OUT} ≥ V _{SS} , Output Disabled	-1	-	1	μA
Output High Voltage	V _{OH}	I _{OH} = -4mA	2.4	-	-	V
Output Low Voltage	V _{OL}	I _{OL} = 8mA	-	-	0.4	V
Average Operating Power Supply Current	I _{CC}	CE# ≤ 0.2, Others at 0.2V or V _{CC} -0.2V I _{I/O} = 0mA; f = max		90	120	mA
Standby Power Supply Current	I _{SB1}	CE# ≥ V _{CC} - 0.2V, Others at 0.2V or V _{CC} - 0.2V	-	4	40	mA

Notes:

- V_{IH}(max) = V_{CC} + 2.0V for pulse width less than 6ns.
- V_{IL}(min) = V_{SS} - 2.0V for pulse width less than 6ns.
- Over/Undershoot specifications are characterized on engineering evaluation stage, not for mass production test.
- Typical values are included for reference only and are not guaranteed or tested.
Typical values are measured at V_{CC} = V_{CC}(TYP.) and T_A = 25°C

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

Speed	10ns
Input Pulse Levels	0.2V to $V_{CC} - 0.2\text{V}$
Input Rise and Fall Times	3ns
Input and Output Timing Reference Levels	$V_{CC}/2$
Output Load	$C_L = 30\text{pF} + 1\text{TTL}$, $I_{OH}/I_{OL} = -4\text{mA}/8\text{mA}$

AC ELECTRICAL CHARACTERISTICS
(1) READ CYCLE

PARAMETER	SYM.	LY61L20508A-10		UNIT
		MIN.	MAX.	
Read Cycle Time	t_{RC}	10	-	ns
Address Access Time	t_{AA}	-	10	ns
Chip Enable Access Time	t_{ACE}	-	10	ns
Output Enable Access Time	t_{OE}	-	4.5	ns
Chip Enable to Output in Low-Z	t_{CLZ}^*	2	-	ns
Output Enable to Output in Low-Z	t_{OLZ}^*	0	-	ns
Chip Disable to Output in High-Z	t_{CHZ}^*	-	4	ns
Output Disable to Output in High-Z	t_{OHZ}^*	-	4	ns
Output Hold from Address Change	t_{OH}	2	-	ns

(2) WRITE CYCLE

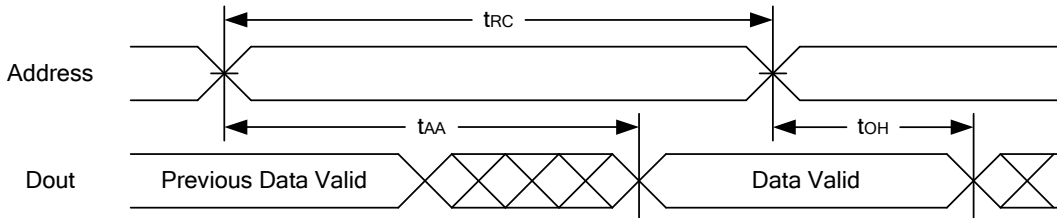
PARAMETER	SYM.	LY61L20508A-10		UNIT
		MIN.	MAX.	
Write Cycle Time	t_{WC}	10	-	ns
Address Valid to End of Write	t_{AW}	8	-	ns
Chip Enable to End of Write	t_{CW}	8	-	ns
Address Set-up Time	t_{AS}	0	-	ns
Write Pulse Width	t_{WP}	8	-	ns
Write Recovery Time	t_{WR}	0	-	ns
Data to Write Time Overlap	t_{DW}	6	-	ns
Data Hold from End of Write Time	t_{DH}	0	-	ns
Output Active from End of Write	t_{OW}^*	2	-	ns
Write to Output in High-Z	t_{WHZ}^*	-	4	ns

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

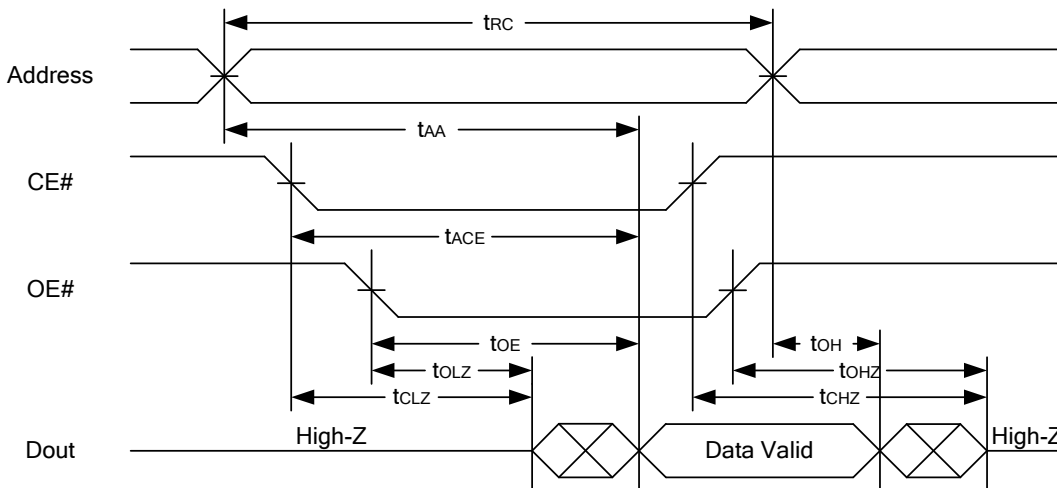


TIMING WAVEFORMS

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



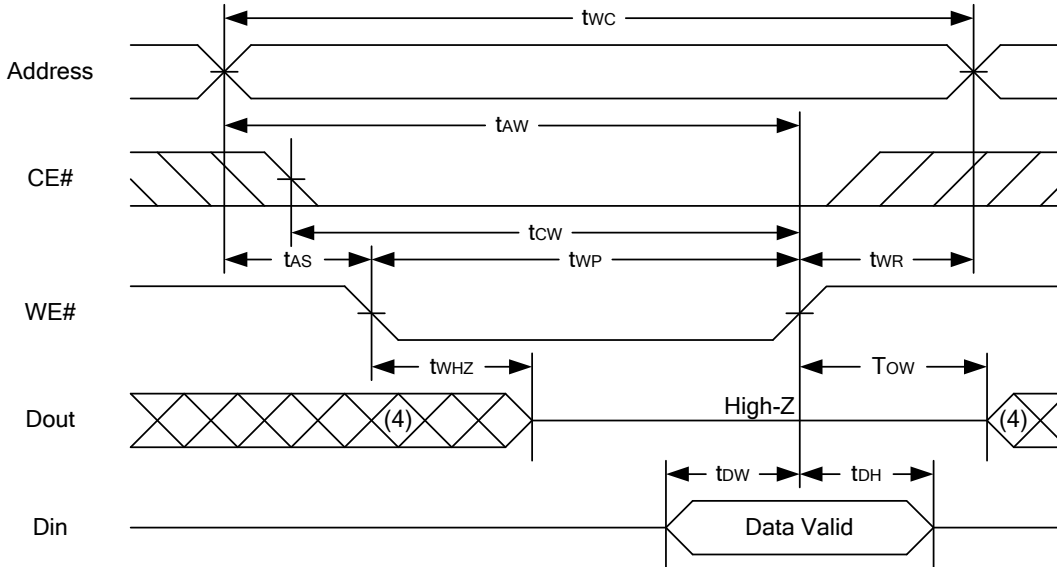
READ CYCLE 2 (CE# and OE# Controlled) (1,3,4,5)



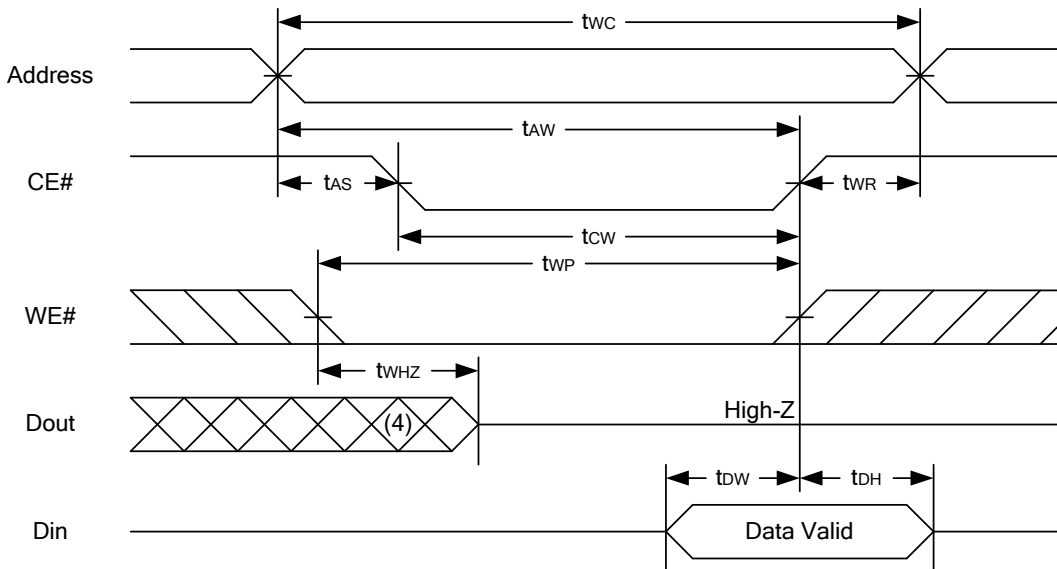
Notes :

1. $WE\#$ is high for read cycle.
2. Device is continuously selected $OE\# = \text{low}$, $CE\# = \text{low}$.
3. Address must be valid prior to or coincident with $CE\# = \text{low}$; 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} .

WRITE CYCLE 1 (WE# Controlled) (1,2,3,5,6)



WRITE CYCLE 2 (CE# Controlled) (1,2,5,6)



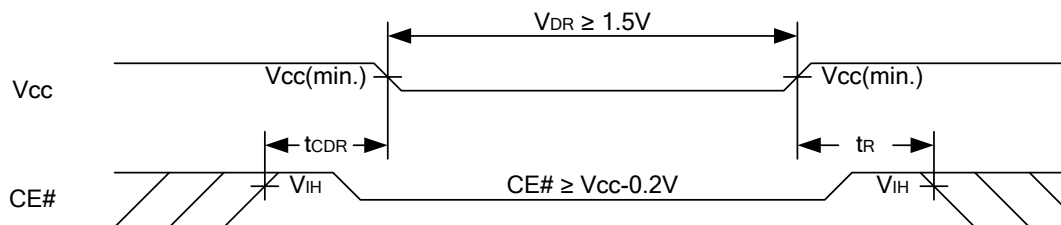
Notes :

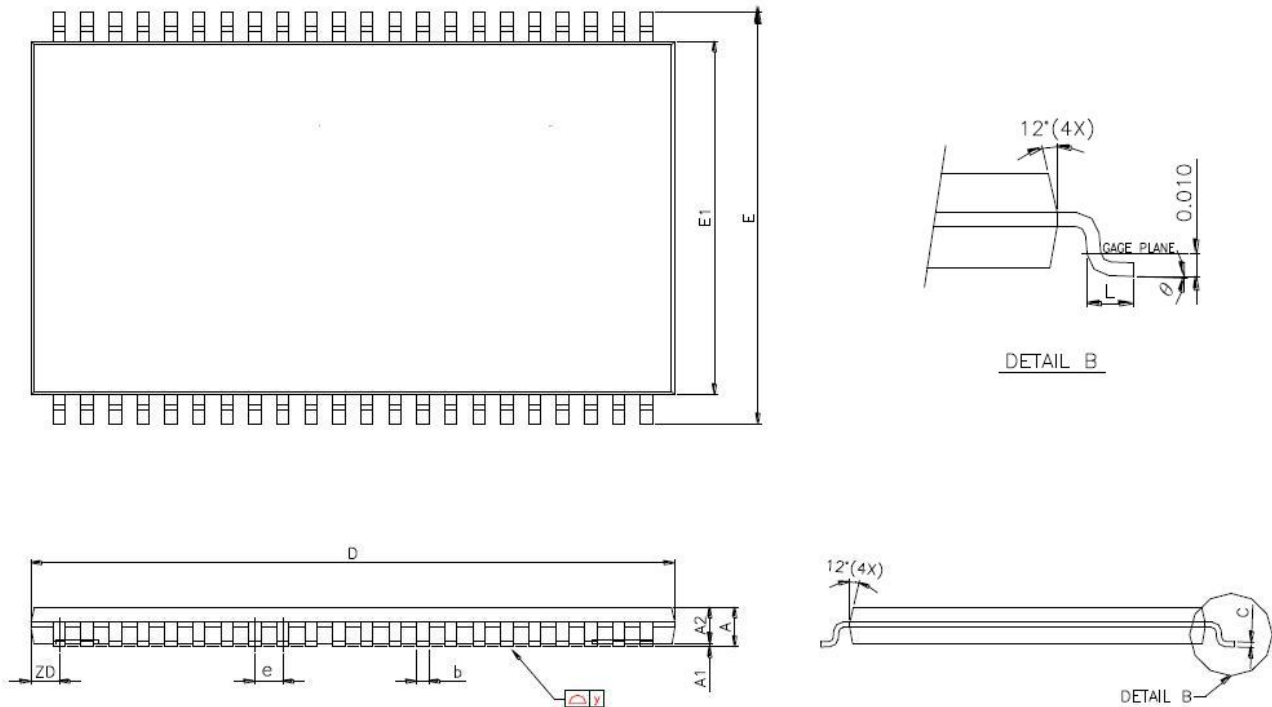
1. WE#, CE#, LB#, UB# must be high during all address transitions.
2. A write occurs during the overlap of a low CE#, low WE#, LB# or UB# = low.
3. During a WE# controlled write cycle with OE# low, tWP must be greater than tWHZ + tDW to allow the drivers to turn off and data to be placed on the bus.
4. During this period, I/O pins are in the output state, and input signals must not be applied.
5. If the CE#, LB#, UB# low transition occurs simultaneously with or after WE# low transition, the outputs remain in a high impedance state.
6. tOW and tWHZ are specified with CL = 5pF. Transition is measured ±500mV from steady state.

DATA RETENTION CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
VCC for Data Retention	V_{DR}	$CE\# \geq V_{CC} - 0.2V$	1.5	-	3.6	V
Data Retention Current	I_{DR}	$V_{CC} = 1.5V$ $CE\# \geq V_{CC} - 0.2V$ Others at 0.2V or $V_{CC} - 0.2V$	-	4	40	mA
Chip Disable to Data Retention Time	t_{CDR}	See Data Retention Waveforms (below)	0	-	-	ns
Recovery Time	t_R		t_{RC}^*	-	-	ns

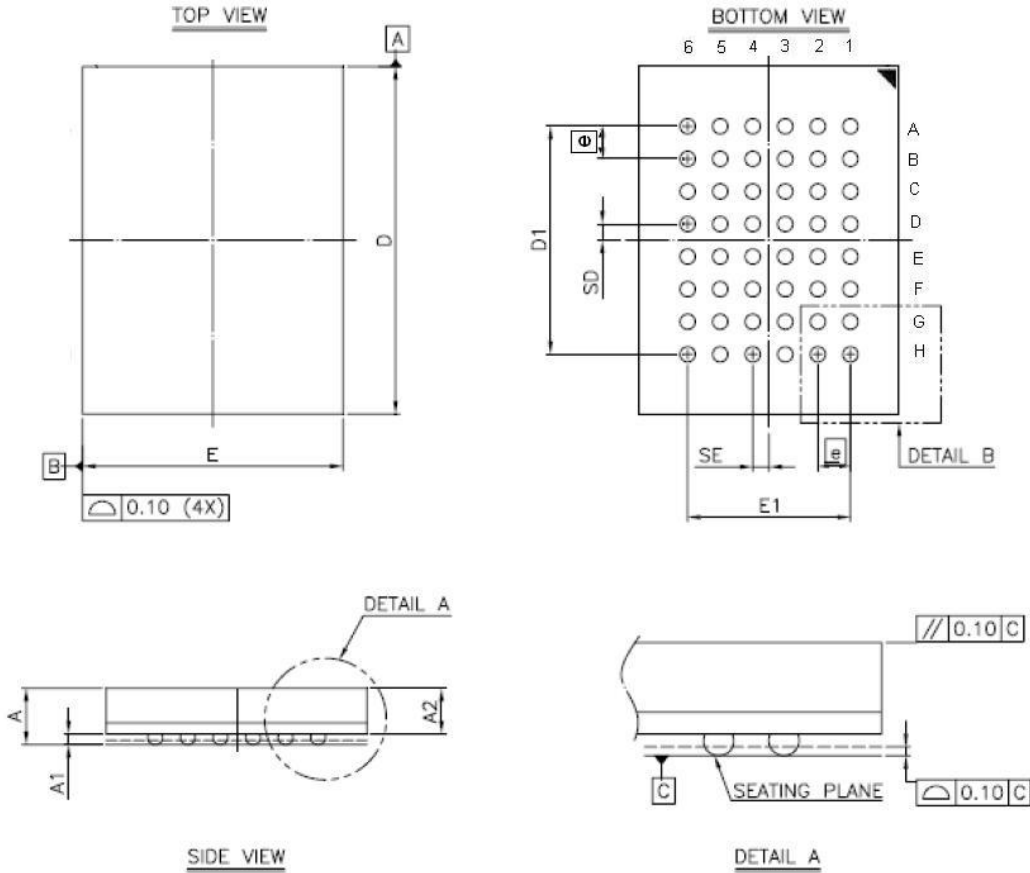
 t_{RC}^* = Read Cycle Time

DATA RETENTION WAVEFORM


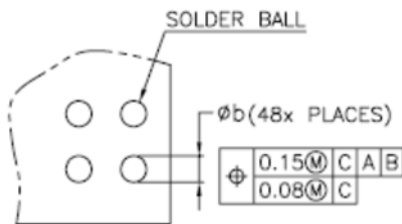
PACKAGE OUTLINE DIMENSION
44-pin 400mil TSOP-II Package Outline Dimension


SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN MILS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	-	-	1.20	-	-	47.2
A1	0.05	0.10	0.15	2.0	3.9	5.9
A2	0.95	1.00	1.05	37.4	39.4	41.3
b	0.30	-	0.45	11.8	-	17.7
c	0.12	-	0.21	4.7	-	8.3
D	18.212	18.415	18.618	717	725	733
E	11.506	11.760	12.014	453	463	473
E1	9.957	10.160	10.363	392	400	408
e	-	0.800	-	-	31.5	-
L	0.40	0.50	0.60	15.7	19.7	23.6
ZD	-	0.805	-	-	31.7	-
y	-	-	0.076	-	-	3
θ	0°	3°	6°	0°	3°	6°

48-ball 6mm × 8mm TFBGA Package Outline Dimension



SYM.	DIMENSION (mm)			DIMENSION (inch)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	—	—	1.40	—	—	0.055
A1	0.20	0.25	0.30	0.008	0.010	0.012
A2	—	—	1.05	—	—	0.041
b	0.30	0.35	0.40	0.012	0.014	0.016
D	7.95	8.00	8.05	0.313	0.315	0.317
D1	5.25 BSC			0.207 BSC		
E	5.95	6.00	6.05	0.234	0.236	0.238
E1	3.75 BSC			0.148 BSC		
SE	0.375 TYP			0.015 TYP		
SD	0.375 TYP			0.015 TYP		
Ⓢ	0.75 BSC			0.030 BSC		



DETAIL B

NOTE:

1. CONTROLLING DIMENSION : MILLIMETER.
2. REFERENCE DOCUMENT : JEDEC MO-207.



ORDERING INFORMATION

Package Type	Access Time (Speed/ns)	Temperature Range(°C)	Packing Type	Lyontek Item No.
44-Pin 400mil TSOP-II	10	0°C~70°C	Tray	LY61L20508AML-10
			Tape Reel	LY61L20508AML-10T
		-40°C~85°C	Tray	LY61L20508AML-10I
			Tape Reel	LY61L20508AML-10IT
48-Ball 6mm x 8mm TFBGA	10	0°C~70°C	Tray	LY61L20508AGL-10
			Tape Reel	LY61L20508AGL-10T
		-40°C~85°C	Tray	LY61L20508AGL-10I
			Tape Reel	LY61L20508AGL-10IT



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