

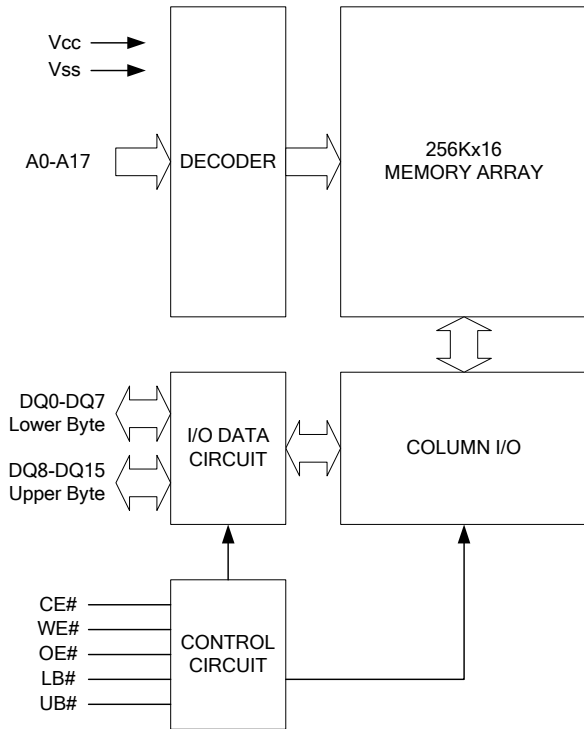


REVISION HISTORY

<u>Revision</u>	<u>Description</u>	<u>Issue Date</u>
Rev. 1.0	Initial Issue	Mar.23.2006
Rev. 1.1	Revised $V_{IL} = 0.6V \Rightarrow 0.8V$	Jun.9.2006
Rev. 1.2	Revised Package Outline Dimension(TSOP-II)	Apr.12.2007
Rev. 2.0	Added LL Spec. Revised Test Condition of I_{SB1}/I_{DR} Added -12ns Spec. Revised I_{CC} and I_{SB1} Added I grade	Jun.25.2007
Rev. 2.1	Revised <u>ABSOLUTE MAXIMUM RATINGS</u> Revised Test Condition of I_{CC} Revised <u>FEATURES & ORDERING INFORMATION</u> Lead free and green package available to Green package available Deleted T_{SOLDER} in <u>ABSOLUTE MAXIMUM RATINGS</u> Added packing type in <u>ORDERING INFORMATION</u>	Apr.17.2009
Rev. 2.2	Added package type TFBGA	May.6.2010
Rev. 2.3	Revised <u>ORDERING INFORMATION</u> in page 12	Aug.30.2010
Rev. 2.4	Revised -12ns spec as -10ns spec and related parameter Revised <u>ORDERING INFORMATION</u> in page 11	July.03.2013



FUNCTIONAL BLOCK DIAGRAM

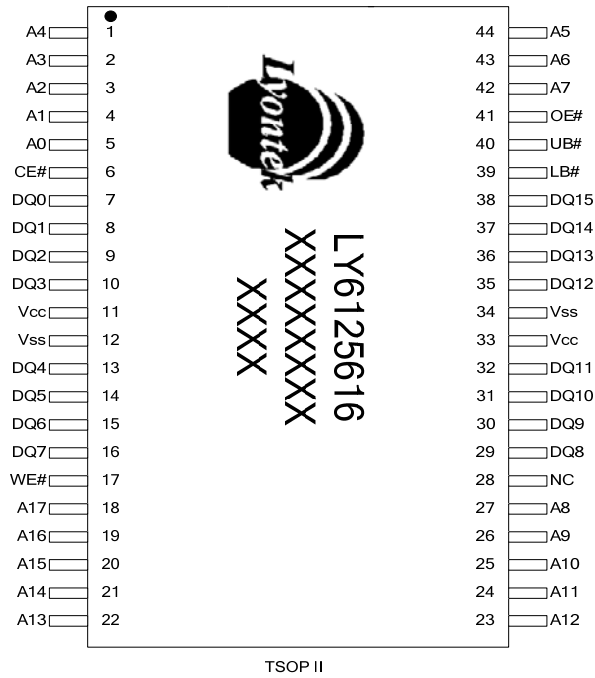


PIN DESCRIPTION

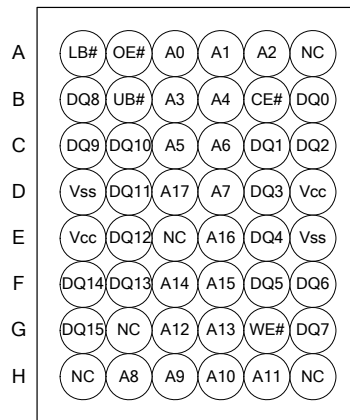
SYMBOL	DESCRIPTION
A0 - A17	Address Inputs
DQ0 - DQ15	Data Inputs/Outputs
CE#	Chip Enable Input
WE#	Write Enable Input
OE#	Output Enable Input
LB#	Lower Byte Control
UB#	Upper Byte Control
Vcc	Power Supply
Vss	Ground



PIN CONFIGURATION



TFBGA



TFBGA

**ABSOLUTE MAXIMUM RATINGS***

PARAMETER	SYMBOL	RATING	UNIT
Voltage on V _{CC} relative to V _{SS}	V _{T1}	-0.5 to 6.5	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
		-20 to 80(E grade)	
		-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#	LB#	UB#	I/O OPERATION		SUPPLY CURRENT
						DQ0-DQ7	DQ8-DQ15	
Standby	H	X	X	X	X	High - Z	High - Z	I _{SB1}
Output Disable	L	H	H	X	X	High - Z	High - Z	I _{CC}
	L	X	X	H	H	High - Z	High - Z	
Read	L	L	H	L	H	D _{OUT}	High - Z	I _{CC}
	L	L	H	H	L	High - Z	D _{OUT}	
	L	L	H	L	L	D _{OUT}	D _{OUT}	
Write	L	X	L	L	H	D _{IN}	High - Z	I _{CC}
	L	X	L	H	L	High - Z	D _{IN}	
	L	X	L	L	L	D _{IN}	D _{IN}	

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}		4.5	5.0	5.5	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}	Cycle time = Min. CE# = V _{IL} , I _{I/O} = 0mA Others at V _{IL} or V _{IH}	10	-	-	215	mA
			15	-	100	140	mA
			20	-	80	110	mA
			25	-	75	100	mA
Standby Power Supply Current	I _{SB1}	CE# ≥ V _{CC} - 0.2V Others at 0.2V / V _{CC} -0.2V	10	-	-	15	mA
			15/20/25	-	0.1	3 ⁵	mA
			15/20/25LL	-	20	100 ⁶	μA

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
- 1mA for special request
- 50μA for special request

Lyontek Inc. reserves the rights to change the specifications and products without notice.

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**CAPACITANCE (TA = 25°C, f = 1.0MHz)**

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	0.2V to V _{CC} - 0.2V
Input Rise and Fall Times	3ns
Input and Output Timing Reference Levels	1.5V
Output Load	C _L = 30pF + 1TTL, I _{OH} /I _{OL} = -8mA/16mA

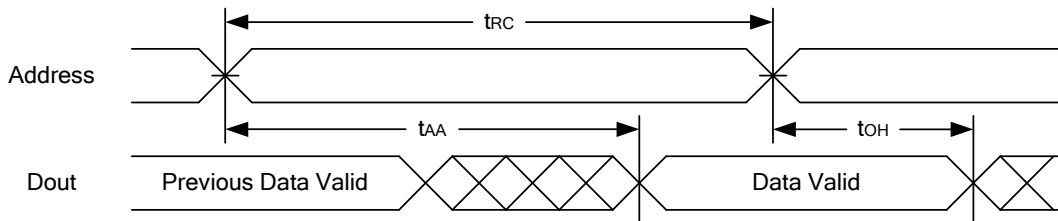
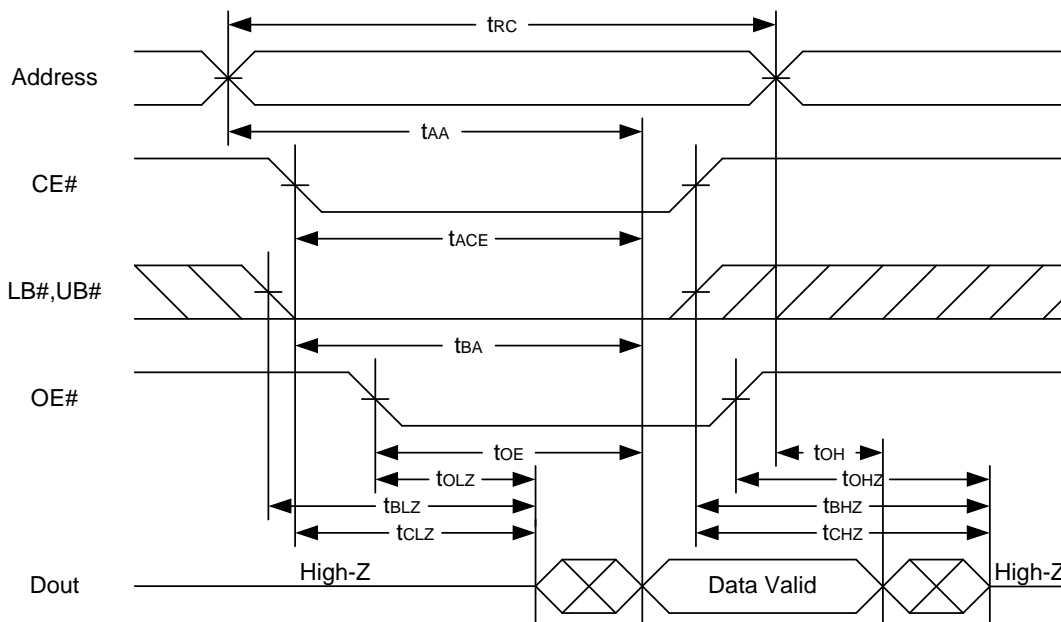
AC ELECTRICAL CHARACTERISTICS**(1) READ CYCLE**

PARAMETER	SYM.	LY6125616-10		LY6125616-15		LY6125616-20		LY6125616-25		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Read Cycle Time	t _{RC}	10	-	15	-	20	-	25	-	ns
Address Access Time	t _{AA}	-	10	-	15	-	20	-	25	ns
Chip Enable Access Time	t _{ACE}	-	10	-	15	-	20	-	25	ns
Output Enable Access Time	t _{OE}	-	5	-	7	-	8	-	9	ns
Chip Enable to Output in Low-Z	t _{CLZ} *	2	-	4	-	4	-	4	-	ns
Output Enable to Output in Low-Z	t _{OLZ} *	0	-	0	-	0	-	0	-	ns
Chip Disable to Output in High-Z	t _{CHZ} *	-	5	-	7	-	8	-	9	ns
Output Disable to Output in High-Z	t _{OHZ} *	-	5	-	7	-	8	-	9	ns
Output Hold from Address Change	t _{OH}	3	-	3	-	3	-	3	-	ns
LB#, UB# Access Time	t _{BA}	-	5	-	7	-	8	-	9	ns
LB#, UB# to High-Z Output	t _{BHZ} *	-	5	-	7	-	8	-	9	ns
LB#, UB# to Low-Z Output	t _{BLZ} *	2	-	4	-	4	-	4	-	ns

(2) WRITE CYCLE

PARAMETER	SYM.	LY6125616-10		LY6125616-15		LY6125616-20		LY6125616-25		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Write Cycle Time	t _{WC}	10	-	15	-	20	-	25	-	ns
Address Valid to End of Write	t _{AW}	8	-	12	-	16	-	20	-	ns
Chip Enable to End of Write	t _{CW}	8	-	12	-	16	-	20	-	ns
Address Set-up Time	t _{AS}	0	-	0	-	0	-	0	-	ns
Write Pulse Width	t _{WP}	8	-	10	-	11	-	12	-	ns
Write Recovery Time	t _{WR}	0	-	0	-	0	-	0	-	ns
Data to Write Time Overlap	t _{DW}	6	-	8	-	9	-	10	-	ns
Data Hold from End of Write Time	t _{DH}	0	-	0	-	0	-	0	-	ns
Output Active from End of Write	t _{OW} *	2	-	4	-	5	-	6	-	ns
Write to Output in High-Z	t _{WHZ} *	-	6	-	8	-	9	-	10	ns
LB#, UB# Valid to End of Write	t _{BW}	8	-	12	-	16	-	20	-	ns

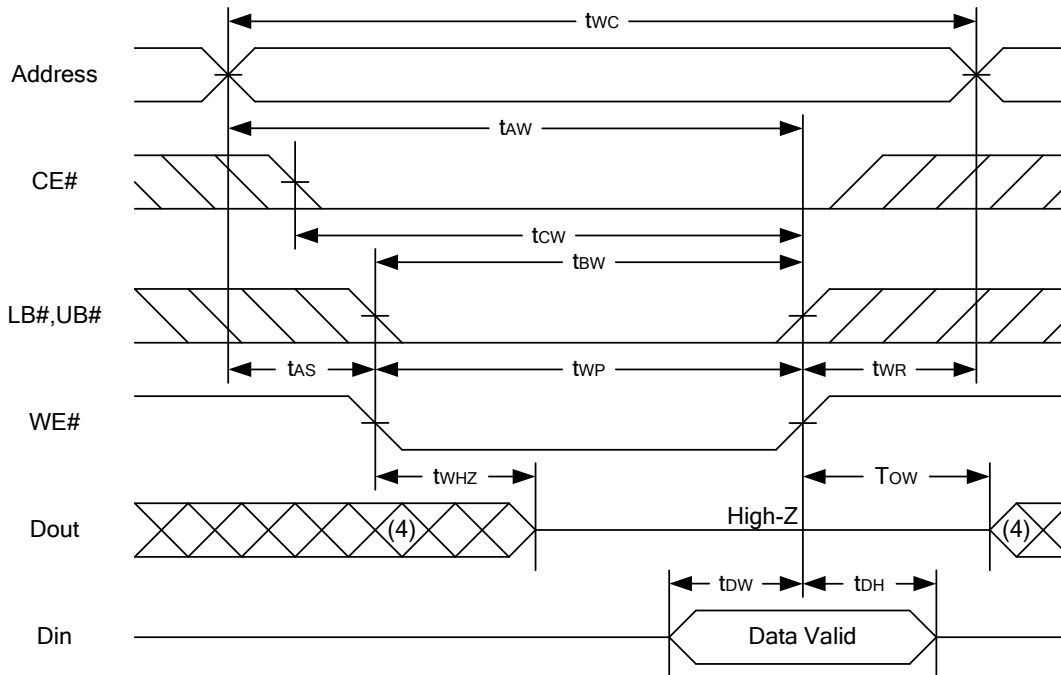
*These parameters are guaranteed by device characterization, but not production tested.

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

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

Notes :

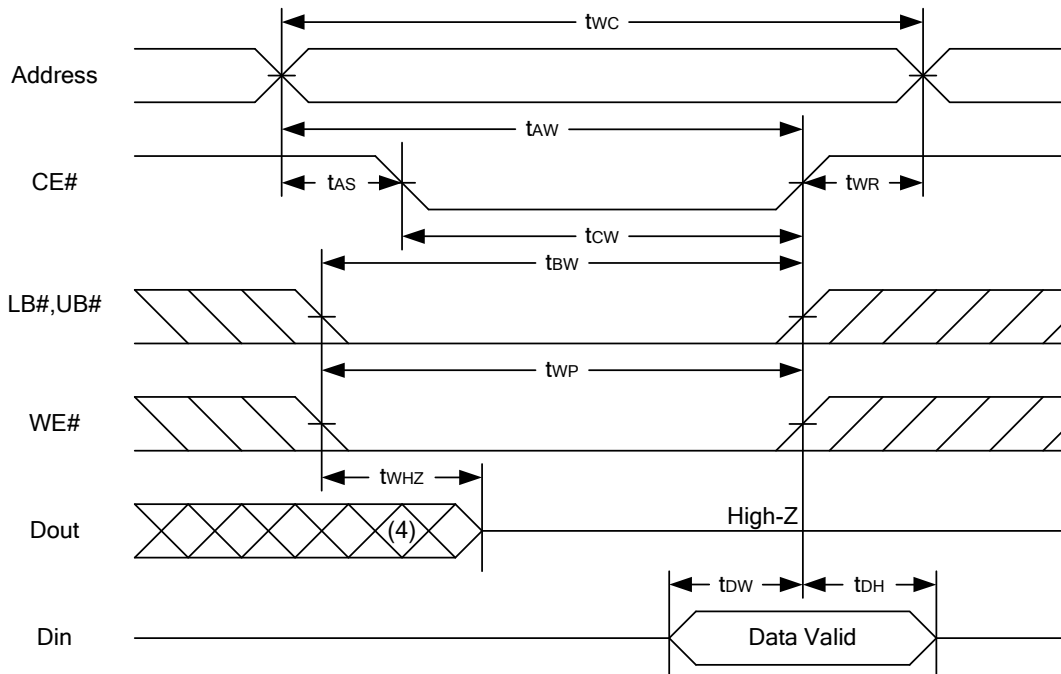
1. WE# is high for read cycle.
2. Device is continuously selected OE# = low, CE# = low, LB# or UB# = low.
3. Address must be valid prior to or coincident with CE# = low, LB# or UB# = low transition; otherwise t_{AA} is the limiting parameter.
4. t_{CLZ} , t_{BLZ} , t_{OLZ} , t_{CHZ} , t_{BHZ} and t_{OHZ} 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_{BHZ} is less than t_{BLZ} , t_{OHZ} is less than t_{OLZ} .

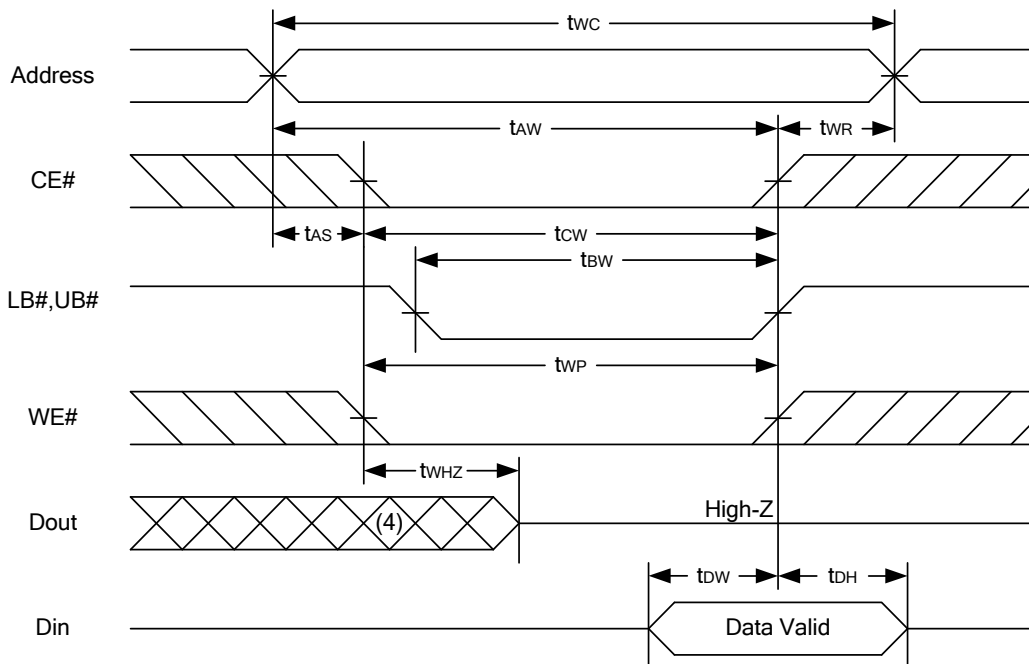


WRITE CYCLE 1 (WE# Controlled) (1,2,3,5,6)



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



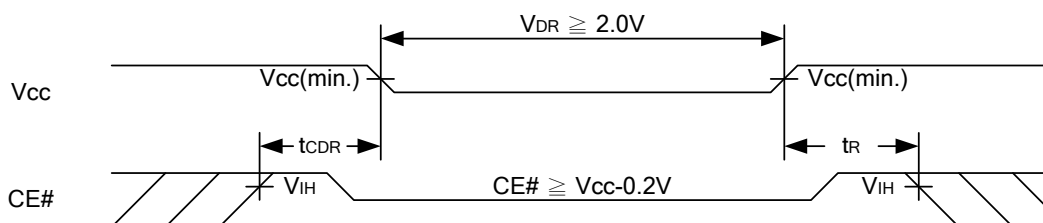
WRITE CYCLE 3 (LB#,UB# Controlled) (1,2,5,6)

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 + tDQ 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. tDQ and tWHZ are specified with CL = 5pF. Transition is measured ±500mV from steady state.

DATA RETENTION CHARACTERISTICS

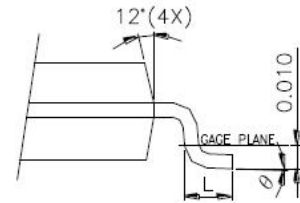
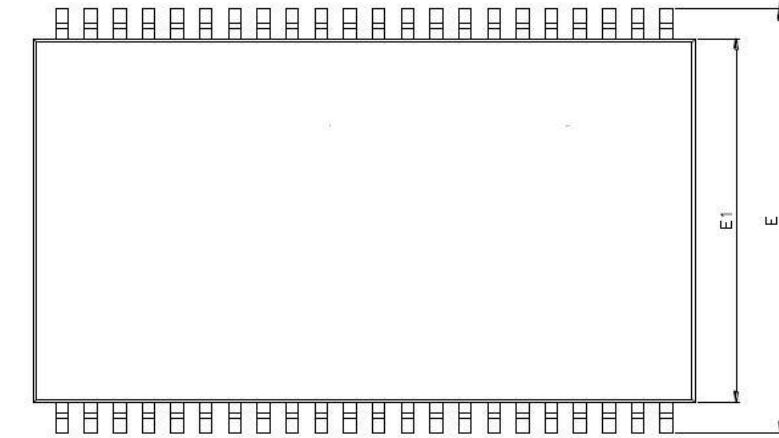
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
VCC for Data Retention	V _{DR}	CE# ≥ V _{CC} - 0.2V	2.0	-	5.5	V	
Data Retention Current	I _{DR}	V _{CC} = 2.0V	10	-	10	mA	
		CE# ≥ V _{CC} - 0.2V	15/20/25	-	0.05	2	mA
		other pins at 0.2V or V _{CC} -0.2V	15/20/25LL	-	10	50	μA
Chip Disable to Data Retention Time	t _{CDR}	See Data Retention Waveforms (below)	0	-	-	ns	
Recovery Time	t _R		t _{RC} *	-	-	ns	

 t_{RC}* = Read Cycle Time

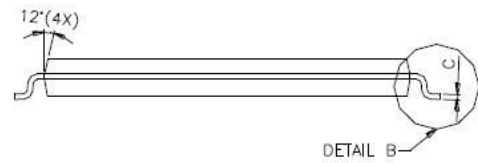
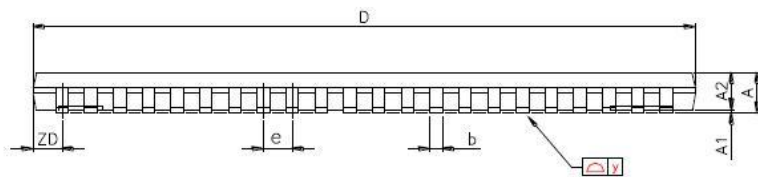
DATA RETENTION WAVEFORM


PACKAGE OUTLINE DIMENSION

44-pin 400mil TSOP-II Package Outline Dimension



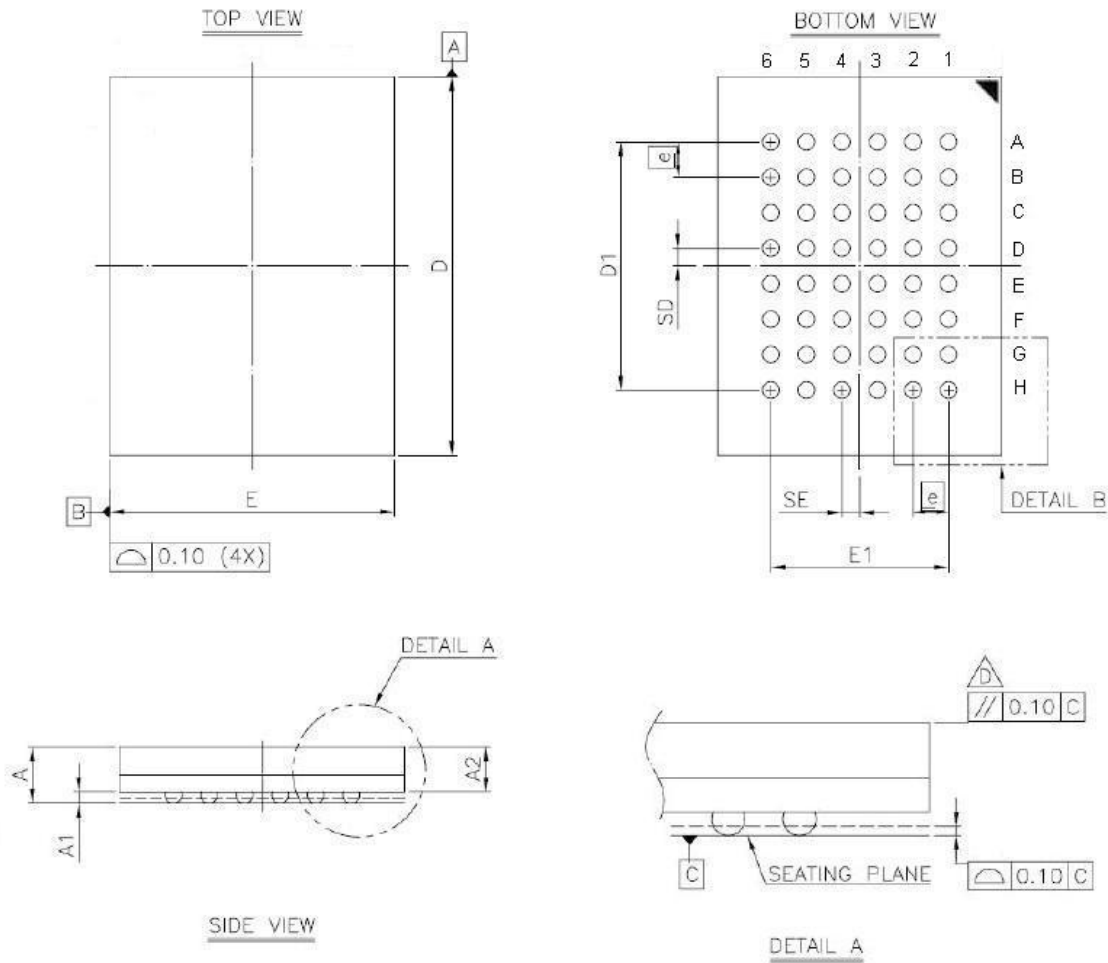
DETAIL B



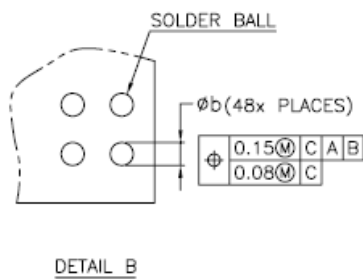
DETAIL B

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 x 8mm TFBGA Package Outline Dimension



SYM.	DIMENSION (mm)			DIMENSION (inch)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	—	—	1.20	—	—	0.047
A1	0.20	0.25	0.30	0.008	0.010	0.012
A2	—	—	0.94	—	—	0.037
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		
e	0.75 BSC			0.030 BSC		



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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.	
44Pin(400mil) TSOP-II	10	0°C~70°C	Tray	LY6125616ML-10	
			Tape Reel	LY6125616ML-10T	
		-40°C~85°C	Tray	LY6125616ML-10I	
			Tape Reel	LY6125616ML-10IT	
	15	0°C~70°C	Tray	LY6125616ML-15	
				LY6125616ML-15LL	
			Tape Reel	LY6125616ML-15T	
				LY6125616ML-15LLT	
		-20°C~80°C	Tray	LY6125616ML-15E	
			Tape Reel	LY6125616ML-15ET	
		-40°C~85°C	Tray	LY6125616ML-15I	
				LY6125616ML-15LLI	
			Tape Reel	LY6125616ML-15IT	
				LY6125616ML-15LLIT	
		20	0°C~70°C	Tray	LY6125616ML-20
					LY6125616ML-20LL
	Tape Reel			LY6125616ML-20T	
				LY6125616ML-20LLT	
	-20°C~80°C		Tray	LY6125616ML-20E	
			Tape Reel	LY6125616ML-20ET	
	-40°C~85°C		Tray	LY6125616ML-20I	
				LY6125616ML-20LLI	
			Tape Reel	LY6125616ML-20IT	
				LY6125616ML-20LLIT	
25	0°C~70°C		Tray	LY6125616ML-25I	
				LY6125616ML-25LLI	
		Tape Reel	LY6125616ML-25IT		
			LY6125616ML-25LLIT		
	-20°C~80°C	Tray	LY6125616ML-25E		
		Tape Reel	LY6125616ML-25ET		
	-40°C~85°C	Tray	LY6125616ML-25I		
			LY6125616ML-25LLI		
Tape Reel	LY6125616ML-25IT				
	LY6125616ML-25LLIT				



Package Type	Access Time (Speed)(ns)	Temperature Range(°C)	Packing Type	Lyontek Item No.	
48-ball(6mmx8mm) TFBGA	10	0°C~70°C	Tray	LY6125616GL-10	
			Tape Reel	LY6125616GL-10T	
		-40°C~85°C	Tray	LY6125616GL-10I	
			Tape Reel	LY6125616GL-10IT	
	15	0°C~70°C	Tray	LY6125616GL-15	
				LY6125616GL-15LL	
			Tape Reel	LY6125616GL-15T	
				LY6125616GL-15LLT	
		-20°C~80°C	Tray	LY6125616GL-15E	
			Tape Reel	LY6125616GL-15ET	
		-40°C~85°C	Tray	LY6125616GL-15I	
				LY6125616GL-15LLI	
			Tape Reel	LY6125616GL-15IT	
				LY6125616GL-15LLIT	
		20	0°C~70°C	Tray	LY6125616GL-20
					LY6125616GL-20LL
	Tape Reel			LY6125616GL-20T	
				LY6125616GL-20LLT	
	-20°C~80°C		Tray	LY6125616GL-20E	
			Tape Reel	LY6125616GL-20ET	
	-40°C~85°C		Tray	LY6125616GL-20I	
				LY6125616GL-20LLI	
			Tape Reel	LY6125616GL-20IT	
				LY6125616GL-20LLIT	
25	0°C~70°C		Tray	LY6125616GL-25	
				LY6125616GL-25LL	
		Tape Reel	LY6125616GL-25T		
			LY6125616GL-25LLT		
	-20°C~80°C	Tray	LY6125616GL-25E		
		Tape Reel	LY6125616GL-25ET		
	-40°C~85°C	Tray	LY6125616GL-25I		
			LY6125616GL-25LLI		
		Tape Reel	LY6125616GL-25IT		
			LY6125616GL-25LLIT		



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