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Product Portfolio

					Power Dissipation						
Product	Product V _{CC} Range (V) Speed			Operating, I _{CC} (mA)				Standby I _{SB2} (μA)			
Troduct				(ns)	f = 1 MHz f = f _{MAX}			'SB2 (μΑ)			
	Min	Тур	Max		Typ ^[1]	Max	Typ ^[1]	Max	Range	Typ ^[1]	Max
CY62127DV30LL	2.2	3.0	3.6	55	0.85	1.5	5	10	Industrial	1.5	4

Pin Configurations

Figure 1. 48-ball FBGA pinout [2, 3]

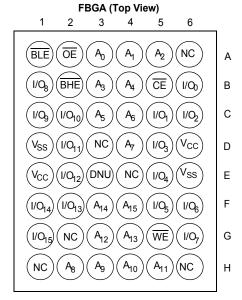
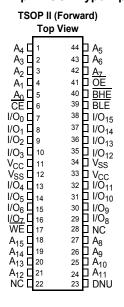


Figure 2. 44-pin TSOP Type II pinout [2, 3]



Notes

- 1. Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V_{CC} = V_{CC(typ)}, T_A = 25 °C.

 2. NC pins are not connected to the die. Expansion pins on FBGA Package: E4 2M, D3 4M, H1 8M, G2 16M, H6 32M

 3. Pin #23 of TSOP-II and E3 ball of FBGA are DNU, which have to be left floating or tied to Vss to ensure proper application.



Maximum Ratings

Exceeding maximum ratings may shorten the useful life of the device. User guidelines are not tested. Storage temperature-65 °C to +150 °C Ambient temperature with power applied—55 °C to +125 °C Supply voltage to ground potential-0.3 V to 3.9 V

DC input voltage ^[4] –0.3 V to V_{CC} + 0.3 V
Output current into outputs (LOW)20 mA
Static discharge voltage (per MIL-STD-883, method 3015)
Latch-up current> 200 mA

Operating Range

Range	V cc ^[5]	
Industrial	–40 °C to +85 °C	2.2 V to 3.6 V

DC Electrical Characteristics

Over the Operating Range

D	December 1	To ad O and	-55				
Parameter	Description	Test Cond	itions	Min	Typ ^[6]	Max	Unit
V _{OH}	Output HIGH voltage	$2.2 \leq V_{CC} \leq 2.7$	$I_{OH} = -0.1 \text{ mA}$	2.0	_	_	V
		$2.7 \le V_{CC} \le 3.6$	$I_{OH} = -1.0 \text{ mA}$	2.4	_	_	
V _{OL}	Output LOW voltage	$2.2 \leq V_{CC} \leq 2.7$	I _{OL} = 0.1 mA	_	_	0.4	V
		$2.7 \le V_{CC} \le 3.6$	I _{OL} = 2.1 mA	_	_	0.4	
V _{IH}	Input HIGH voltage	$2.2 \leq V_{CC} \leq 2.7$		1.8	_	V _{CC} + 0.3	V
		$2.7 \le V_{CC} \le 3.6$		2.2	_	V _{CC} + 0.3	
V _{IL}	Input LOW voltage	$2.2 \leq V_{CC} \leq 2.7$		-0.3	_	0.6	V
		$2.7 \le V_{CC} \le 3.6$		-0.3	_	0.8	
I _{IX}	Input leakage current	$GND \leq V_I \leq V_{CC}$	-1	_	+1	μΑ	
l _{oz}	Output leakage current	$GND \leq V_O \leq V_CC, Ou$	tput disabled	-1	_	+1	μΑ
I _{CC}	V _{CC} operating supply current	$f = f_{MAX} = 1/t_{RC}$	V _{CC} = 3.6 V,	_	5	10	mA
		f = 1 MHz	I _{OUT} = 0 mA, CMOS level	_	0.85	1.5	
I _{SB1}	Automatic CE power-down	$\overline{CE} \ge V_{CC} - 0.2 \text{ V},$	•	_	1.5	4	μΑ
	current – CMOS Inputs	$V_{IN} \ge V_{CC} - 0.2 \text{ V, } V_{II}$					
		f = f _{MAX} (Address and	d data only),				
		$f = 0$ (\overline{OE} , \overline{WE} , \overline{BHE} a	and BLE)				
I _{SB2}	Automatic CE power-down current – CMOS Inputs		_	1.5	4	μΑ	
	ourion civico inputo	$V_{IN} \ge V_{CC} - 0.2 \text{ V or } $	$V_{IN} \le 0.2 V$,				
		f = 0, V _{CC} = 3.6 V					

Notes

 ^{4.} V_{IL(min)} = -2.0 V for pulse durations less than 20 ns., V_{IH(max)} = V_{CC} + 0.75 V for pulse durations less than 20 ns.
 5. Full device operation requires linear ramp of V_{CC} from 0 V to V_{CC(min)} and V_{CC} must be stable at V_{CC(min)} for 500 μs.
 6. Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V_{CC} = V_{CC(typ)}, T_A = 25 °C.



Capacitance

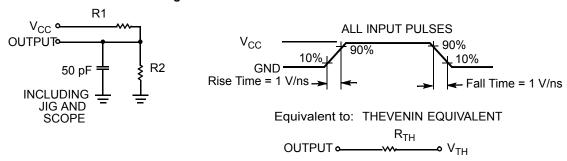
Parameter [7]	Description	Test Conditions	Max	Unit
C _{IN}	Input capacitance	$T_A = 25 ^{\circ}\text{C}, f = 1 \text{MHz}, V_{CC} = V_{CC(typ)}$	8	pF
C _{OUT}	Output capacitance		8	pF

Thermal Resistance

Parameter [8]	Description	Test Conditions	FBGA	TSOP-II	Unit
U/A		Still air, soldered on a 3 × 4.5 inch, four-layer printed circuit board	52.02	62.01	°C/W
θ_{JC}	Thermal resistance (junction to case)		10.98	22.08	°C/W

AC Test Loads and Waveforms

Figure 3. AC Test Loads and Waveforms



Parameters	2.5 V (2.2 V-2.7 V)	3.0 V (2.7 V-3.6 V)	Unit
R1	16600	1103	Ω
R2	15400	1554	Ω
R _{TH}	8000	645	Ω
V _{TH}	1.20	1.75	V

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Note7. Tested initially and after any design or process changes that may affect these parameters.

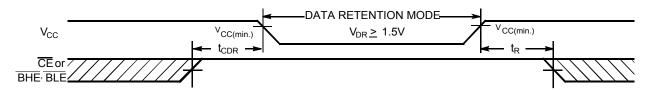


Data Retention Characteristics

Parameter	Description	Conditions	Min	Typ ^[9]	Max	Unit
V_{DR}	V _{CC} for data retention		1.5	-	_	V
I _{CCDR}	Data retention current	V_{CC} = 1.5 V, $\overline{CE} \ge V_{CC} - 0.2$ V, $V_{IN} \ge V_{CC} - 0.2$ V or $V_{IN} \le 0.2$ V		-	3	μА
t _{CDR}	Chip deselect to data retention time		0	_	_	ns
t _R ^[10]	Operation recovery time		55	_	_	ns

Data Retention Waveform

Figure 4. Data Retention Waveform [11]



Notes

^{8.} Tested initially and after any design or process changes that may affect these parameters.

9. Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V_{CC} = V_{CC(typ)}, T_A = 25 °C.

10. Full device operation requires linear V_{CC} ramp from V_{DR} to V_{CC(min)} > 200 µs.



Switching Characteristics

Over the Operating Range

Parameter [12]	B	CY62127	DV30-55	
Parameter 1123	Description	Min	Max	Unit
Read Cycle		•	•	
t _{RC}	Read cycle time	55	_	ns
t _{AA}	Address to data valid	-	55	ns
t _{OHA}	Data hold from address change	10	_	ns
t _{ACE}	CE LOW to data valid	-	55	ns
t _{DOE}	OE LOW to data valid	-	25	ns
t _{LZOE}	OE LOW to low Z ^[13]	5	_	ns
t _{HZOE}	OE HIGH to high Z ^[13, 14]	-	20	ns
t _{LZCE}	CE LOW to low Z ^[13]	10	_	ns
t _{HZCE}	CE HIGH to high Z ^[13, 14]	-	20	ns
t _{PU}	CE LOW to power-up	0	_	ns
t _{PD}	CE HIGH to power-down	-	55	ns
t _{DBE}	BLE/BHE LOW to data valid	-	55	ns
t _{LZBE} ^[15]	BLE/BHE LOW to low Z ^[13]	5	_	ns
t _{HZBE}	BLE/BHE HIGH to high Z ^[13, 14]	-	20	ns
Write Cycle ^{[16,}	17]	·		
t _{WC}	Write cycle time	55	_	ns
t _{SCE}	CE LOW to write end	40	-	ns
t _{AW}	Address setup to write end	40	-	ns
t _{HA}	Address hold from write end	0	-	ns
t _{SA}	Address setup to write start	0	_	ns
t _{PWE}	WE pulse width	40	_	ns
t _{BW}	BLE/BHE LOW to write end	40	_	ns
t _{SD}	Data setup to write end	25	_	ns
t _{HD}	Data hold from write end	0	_	ns
t _{HZWE}	WE LOW to high Z ^[13, 14]	-	20	ns
t _{LZWE}	WE HIGH to low Z ^[13]	10	-	ns

^{11.} BHE.BLE is the AND of both BHE and BLE. Chip can be deselected by either disabling the Chip Enable signals or by disabling both byte enable pins.

^{12.} Test conditions assume signal transition time of 1V/ns or less, timing reference levels of V_{CC(typ.)}/2, input pulse levels of 0 to V_{CC(typ.)}, and output loading of the 12. Test conditions assume signal transition time of TV/hs of less, timing reference levels of V_{CC(typ.)}/2, input pulse levels of to V_{CC(typ.)}, and output loading of the specified I_{OL}.

13. At any temperature and voltage condition, t_{HZCE} is less than t_{LZCE}, t_{HZBE} is less than t_{LZDE}, t_{HZOE}, and t_{HZWE} is less than t_{LZWE} for any device.

14. t_{HZOE}, t_{HZCE}, t_{HZBE}, and t_{HZWE} transitions are measured when the outputs enter a high-impedance state.

15. If both byte enables are toggled together, this value is 10 ns.

^{16.} The internal Write time of the memory is defined by the overlap of WE, CE = V_{IL}, BHE and/or BLE = V_{IL}. All signals must be ACTIVE to initiate a write and any of these signals can terminate a write by going INACTIVE. The data input setup and hold timing should be referenced to the edge of the signal that terminates the write.

17. The minimum write pulse width for WRITE Cycle No. 3 (WE Controlled, OE LOW) should be sum of t_{HZWE} and t_{SD}.



Switching Waveforms

Figure 5. Read Cycle No. 1 (Address Transition Controlled) [18, 19]

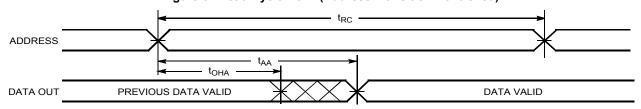
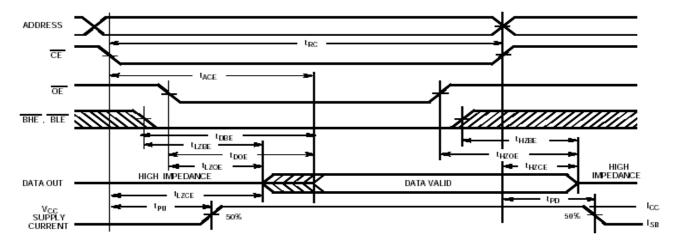


Figure 6. Read Cycle No. 2 (OE Controlled) [18, 19, 20]



^{18.} Device is continuously selected. \overline{OE} , $\overline{CE} = V_{|L}$, \overline{BHE} , $\overline{BLE} = V_{|L}$.

19. WE is HIGH for Read cycle.

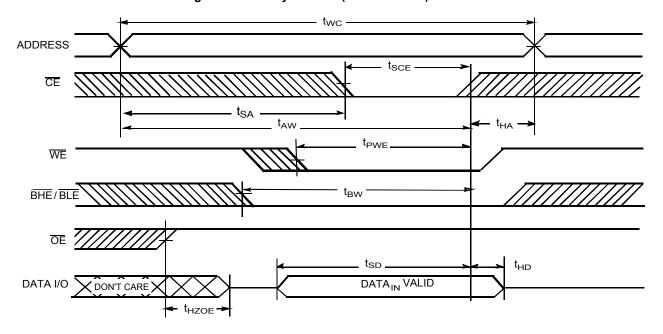
^{20.} Address valid prior to or coincident with \overline{CE} , \overline{BHE} , \overline{BLE} transition LOW.



Switching Waveforms (continued)

Figure 7. Write Cycle No. 1 ($\overline{\text{WE}}$ Controlled) [21, 22, 23, 24, 25] **ADDRESS** t_{SCE} t_{AW} WE BHE/BLE t_{BW} t_{HD} DATA I/O DATAIN VALID ON'T CARE

Figure 8. Write Cycle No. 2 (CE Controlled) [21, 22, 23, 24, 25]



- 21. t_{HZOE}, t_{HZOE}, t_{HZOE}, t_{HZDE}, and t_{HZWE} transitions are measured when the <u>outputs</u> enter <u>a high-impedance</u> state.

 22. The internal Write time of the memory is defined by the overlap of WE, CE = V_{IL}, BHE and/or BLE = V_{IL}. All signals must be ACTIVE to initiate a write and any of these signals can terminate a <u>write</u> by going INACTIVE. The data input setup and hold timing should be referenced to the edge of the signal that terminates the write.

 23. Data I/O is high-impedance if OE = V_{IL}.

 24. If CE goes HIGH simultaneously with WE HIGH, the output remains in a high-impedance state.

- 25. During the DON'T CARE period in the DATA I/O waveform, the I/Os are in output state and input signals should not be applied.

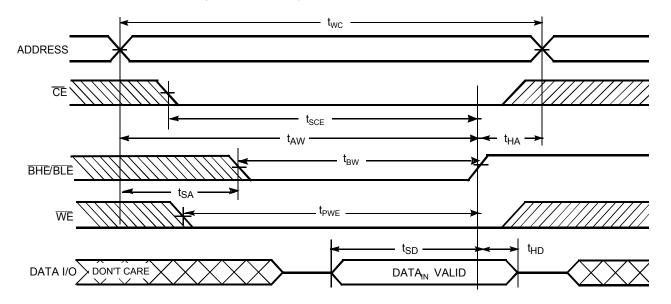


Switching Waveforms (continued)

 t_{WC} **ADDRESS** t_{SCE} CE BHE/BLE WE t_{HD} t_{SD} DATA I/O DON'T CARE DATA_{IN} VALID

Figure 9. Write Cycle No. 3 ($\overline{\text{WE}}$ Controlled, $\overline{\text{OE}}$ LOW) [26, 27, 28]

Figure 10. Write Cycle No. 4 (BHE / BLE Controlled) [26, 27]



^{26.} If CE goes HIGH simultaneously with WE HIGH, the output remains in a high-impedance state.

27. During the DON'T CARE period in the DATA I/O wavefo<u>rm,</u> the I/Os are <u>in</u> output state and input signals should not be applied.

28. The minimum write pulse width for WRITE Cycle No.3 (WE Controlled, OE LOW) should be sum of t_{HZWE} and t_{SD}.



Truth Table

CE [29, 30]	WE	OE	BHE	BLE	I/O ₀ –I/O ₇	I/O ₈ -I/O ₁₅	Mode	Power
Н	Χ	Χ	Х	Χ	High Z	High Z	Deselect/Power-down	Standby (I _{SB})
L	Χ	Χ	Н	Н	High Z	High Z	Deselect/Power-down	Standby (I _{SB})
L	Н	L	L	L	Data Out	Data Out	Read All Bits	Active (I _{CC})
L	Н	L	Н	L	Data Out	High Z	Read Lower Byte Only	Active (I _{CC})
L	Н	L	L	Н	High Z	Data Out	Read Upper Byte Only	Active (I _{CC})
L	Н	Н	L	L	High Z	High Z	Output Disabled	Active (I _{CC})
L	Н	Н	Н	L	High Z	High Z	Output Disabled	Active (I _{CC})
L	Н	Н	L	Н	High Z	High Z	Output Disabled	Active (I _{CC})
L	L	Х	L	L	Data in	Data in	Write	Active (I _{CC})
L	L	Х	Н	L	Data in	High Z	Write Lower Byte Only	Active (I _{CC})
L	L	Х	L	Н	High Z	Data in	Write Upper Byte Only	Active (I _{CC})



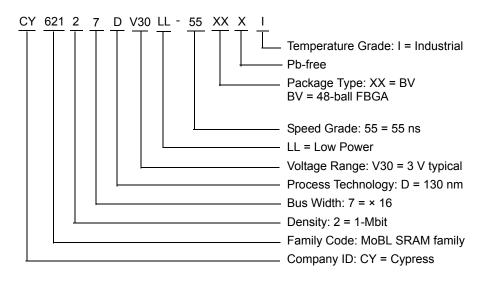
Ordering Information

Cypress offers other versions of this type of product in many different configurations and features. The below table contains only the list of parts that are currently available. For a complete listing of all options, visit the Cypress website at www.cypress.com/products or contact your local sales representative.

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	peed (ns)	Ordering Code	Package Diagram	Package Type	Operating Range
55		CY62127DV30LL-55BVXI	51-85150	48-ball FBGA (6 mm × 8 mm × 1 mm) (Pb-free)	Industrial

Ordering Code Definitions





Package Diagrams

Figure 11. 48-ball VFBGA (6 × 8 × 1.0 mm) BV48/BZ48 Package Outline, 51-85150

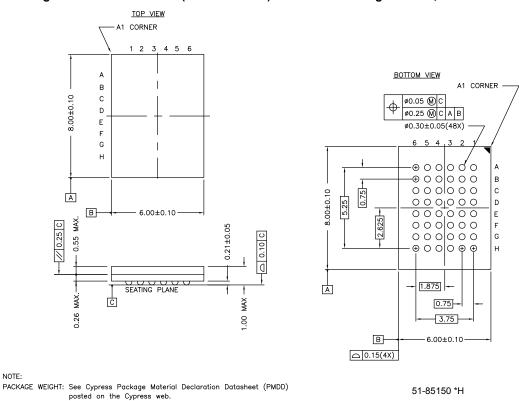
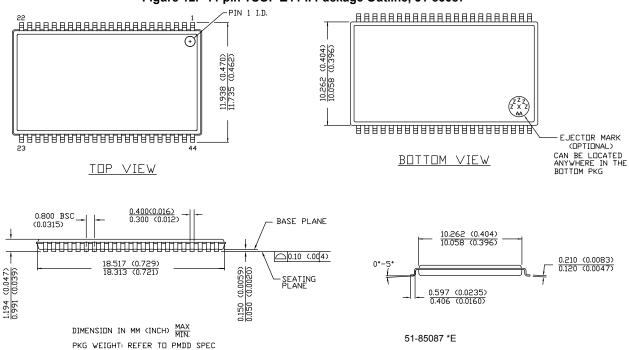


Figure 12. 44-pin TSOP Z44-II Package Outline, 51-85087



NOTE:



Acronyms

Acronym	Description			
BHE	Byte High Enable			
BLE	Byte Low Enable			
CMOS	Complementary Metal Oxide Semiconductor			
CE	Chip Enable			
FBGA	Fine-Pitch Ball Grid Array			
I/O	Input/Output			
ŌĒ	Output Enable			
SRAM	Static Random Access Memory			
TSOP	Thin Small Outline Package			
WE	Write Enable			

Document Conventions

Units of Measure

Symbol	Unit of Measure			
°C	degree Celsius			
μA microampere				
mA milliampere				
ns nanosecond				
pF	picofarad			
V	volt			
W	watt			



Document History Page

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	117690	JUI	08/27/02	New data sheet
*A	127311	MPR	06/13/03	Changed status from Advanced to Preliminary. Updated DC Electrical Characteristics: Changed maximum value of I_{SB2} parameter from 4 μA to 5 μA corresponding to Test Condition "L". Changed maximum value of I_{SB2} parameter from 3 μA to 4 μA corresponding to Test Condition "LL". Updated Capacitance: Changed value of C_{IN} parameter from 6 pF to 8 pF. Updated Data Retention Characteristics: Changed maximum value of I_{CCDR} parameter from 1.2 μA to 4 μA corresponding to Test Condition "L". Changed maximum value of I_{CCDR} parameter from 0.8 μA to 3 μA corresponding to Test Condition "L".
*B	128341	JUI	07/22/03	Changed status from Preliminary to Final. Add 70 ns speed related information in all instances across the document. Updated Ordering Information.
*C	129000	CDY	08/29/03	Updated DC Electrical Characteristics: Changed typical value of I _{CC} parameter corresponding to Test Condition "f = 1 MHz" from 0.5 mA to 0.85 mA.
*D	316039	PCI	See ECN	Added 45 ns speed bin related information in all instances across the document. Updated AC Test Loads and Waveforms: Added Note "Test condition for the 45-ns part is a load capacitance of 30 pF. and referred the same note in Figure 3. Updated Ordering Information: Updated part numbers. Changed name of 44-lead TSOP-II package from Z44 to ZS44 in "Package Name" column.
*E	346982	AJU	See ECN	Added 56-pin QFN package related information in all instances across the document. Updated Ordering Information.
*F	369955	SYT	See ECN	Added Automotive related information in all instances across the document. Updated Features: Added Temperature Ranges. Updated Ordering Information: Added Pb-free Automotive parts for 55 ns Speed bin.
*G	457685	NXR	See ECN	Removed 56-pin QFN package related information in all instances across the document. Updated Ordering Information.
*H	470383	NXR	See ECN	Updated Pin Configurations: Updated Figure 2 (Changed pin 23 of TSOP II from NC to DNU). Updated Note 3.
*I	2897885	RAME / NIKM	03/22/10	Updated Ordering Information (Removed inactive parts). Updated Package Diagrams.

Document Number: 38-05229 Rev. *R



Document History Page (continued)

Document Title: CY62127DV30 MoBL [®] , 1-Mbit (64K × 16) Static RAM Document Number: 38-05229				
Revision	ECN	Orig. of Change	Submission Date	Description of Change
*J	3010373	AJU	08/20/2010	Updated Features. Updated Product Portfolio. Updated Operating Range. Updated DC Electrical Characteristics. Updated Data Retention Characteristics. Updated Switching Characteristics. Updated Ordering Information and added Ordering Code Definitions. Minor edits. Updated to new template.
*K	3329789	RAME	07/27/11	Updated Functional Description: Removed the Note "For best practice recommendations, refer to the Cypress application note "System Design Guidelines" at http://www.cypress.com website." and its reference. Updated to new template.
*L	3393183	RAME	10/03/11	Post to web.
*M	3861271	TAVA	01/08/2013	Updated Ordering Information (Updated part numbers). Updated Package Diagrams: spec 51-85150 – Changed revision from *G to *H. spec 51-85087 – Changed revision from *D to *E.
*N	4499469	MEMJ	09/11/2014	Updated Switching Characteristics: Added Note 17 and referred the same note in "Write Cycle". Updated Switching Waveforms: Added Note 28 and referred the same note in Figure 9. Updated to new template. Completing Sunset Review.
*0	4576478	MEMJ	11/21/2014	Updated Functional Description: Added "For a complete list of related documentation, click here." at the end.
*P	4920942	VINI	09/15/2015	Updated to new template. Completing Sunset Review.
*Q	5444200	VINI	09/21/2016	Updated Thermal Resistance: Replaced "two-layer" with "four-layer" in "Test Conditions" column. Updated all values of θ_{JA} and θ_{JC} parameters. Updated to new template. Completing Sunset Review.
*R	5997966	AESATMP9	12/21/2017	Updated logo and copyright.



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