CY7C131E/CY7C131AE
CY7C136E/CY7C136AE

1K/2K × 8 Dual-Port Static RAM

Features

- True dual-ported memory cells, which allow simultaneous reads of the same memory location
- 1K/2K × 8 organization
- 0.35 micron complementary metal oxide semiconductor (CMOS) for optimum speed and power
- High speed access: 15 ns
- Low operating power: I_{CC} = 110 mA (typical), Standby: I_{SB3} = 0.05 mA (typical)
- Fully asynchronous operation
- Automatic power-down
- $\overline{BUSY}$ output flag to indicate access to the same location by both ports
- $\overline{INT}$ flag for port-to-port communication
- Available in 52-pin plastic leaded chip carrier (PLCC), 52-pin plastic quad flat package (PQFP)
- Pb-free packages available

Functional Description

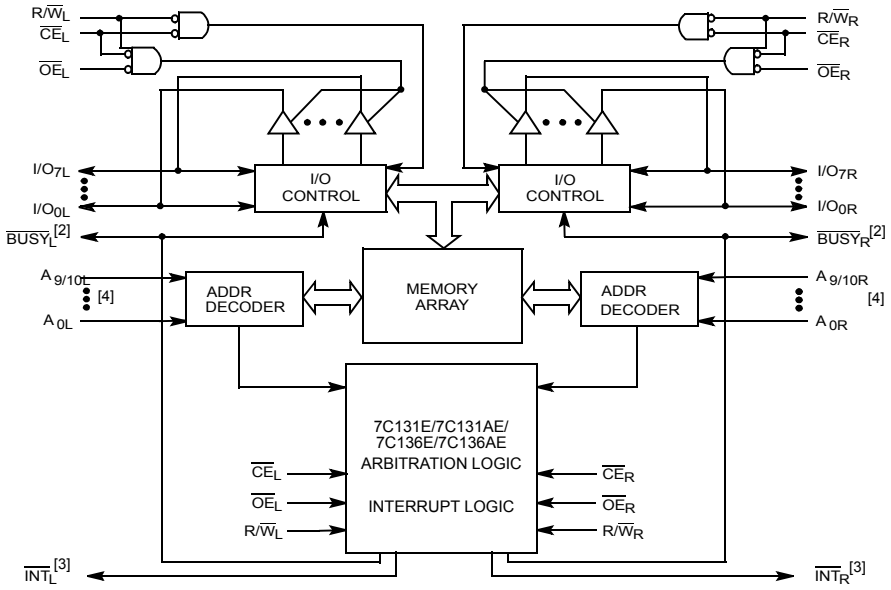
CY7C131E/CY7C131AE/CY7C136E/CY7C136AE are high-speed, low-power CMOS 1K/2K × 8 dual-port static RAMs. Two ports are provided permitting independent access to any location in memory. The CY7C131E/CY7C131AE/CY7C136E/CY7C136AE can be used as a standalone dual-port static RAM. It is the solution to applications requiring shared or buffered data, such as cache memory for DSP, bit-slice, or multiprocessor designs.

Each port has independent control pins; chip enable ($\overline{CE}$), write enable (R/$\overline{W}$), and output enable ($\overline{OE}$). Two flags are provided on each port, $\overline{BUSY}$ and $\overline{INT}$. The $\overline{BUSY}$ flag signals that the port is trying to access the same location, which is currently being accessed by the other port. The $\overline{INT}$ is an interrupt flag indicating that data is placed in a unique location[1]. The $\overline{BUSY}$ and $\overline{INT}$ flags are push pull outputs. An automatic power-down feature is controlled independently on each port by the chip enable ($\overline{CE}$) pins.

The CY7C131E/CY7C131AE/CY7C136E/CY7C136AE are available in 52-pin Pb-free PLCC and 52-pin Pb-free PQFP.

For a complete list of related documentation, click here.

Logic Block Diagram



Notes
1. Unique location used by interrupt flag: 1K × 8: Left port reads from 3FE, Right port reads from 3FF; 2K × 8: Left port reads from 7FE, Right port reads from 7FF.
2. $\overline{BUSY}$ is a push-pull output. No pull-up resistor required.
3. $\overline{INT}$: push-pull output. No pull-up resistor required.
4. 1K × 8: A0–A9, 2K × 8: A0–A10, address lines are for both left and right ports.

Contents

Pin Configurations

Figure 1. 52-pin PLCC pinout (Top View)

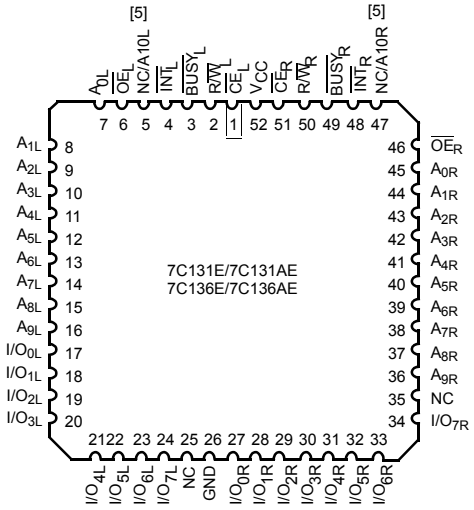
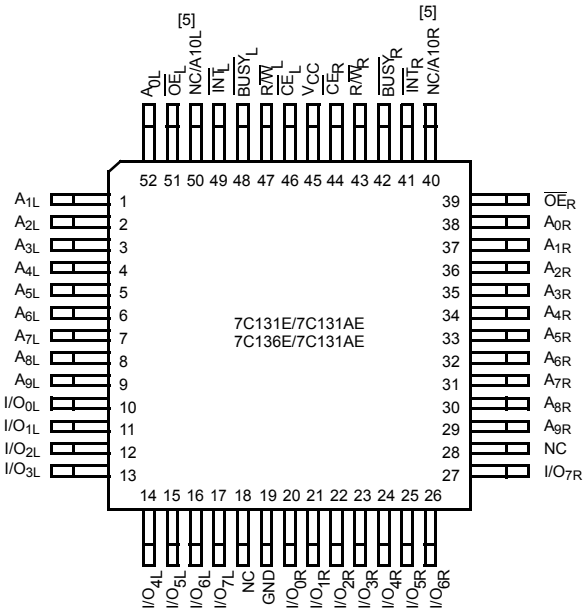


Figure 2. 52-pin PQFP pinout (Top View)



Pin Definitions

Left Port	Right Port	Description
$\overline{CE}_L$	$\overline{CE}_R$	Chip Enable
$R/\overline{W}_L$	$R/\overline{W}_R$	Read/Write Enable
$\overline{OE}_L$	$\overline{OE}_R$	Output Enable
A_{0L}–$A_{9/10L}$[5]	A_{0R}–$A_{9/10R}$[5]	Address
I/O_{0L}–I/O_{7L}	I/O_{0R}–I/O_{7R}	Data Bus Input/Output
$\overline{INT}_L$	$\overline{INT}_R$	Interrupt Flag
$\overline{BUSY}_L$	$\overline{BUSY}_R$	Busy Flag
V_{CC}		Power
GND		Ground

Selection Guide

Parameter	7C131E-15 7C131AE-15	7C131E-25 7C136E-25	7C131E-55 7C136E-55 7C136AE-55	Unit
Maximum Access Time	15	25	55	ns
Typical Operating Current	110	100	95	mA
Typical Standby Current for I_{SB1} (both ports TTL level)	50	45	45	mA
Typical Standby Current for I_{SB3} (Both ports CMOS level)	0.05	0.05	0.05	mA

Note
5. 1K × 8: A0–A9, 2K × 8: A0–A10, address lines are for both left and right ports.

Maximum Ratings

Exceeding maximum ratings [6] 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 +7.0 V

DC voltage applied to outputs in High Z State .....–0.5 V to +7.0 V

DC input voltage [7] .....–0.5 V to +7.0 V

Output current into outputs (LOW) ..... 20 mA

Static discharge voltage ..... >1100 V

Latch up current ..... >200 mA

Operating Range

Range	Ambient Temperature	V_{CC}
Commercial	0 °C to +70 °C	5 V ± 10%
Industrial	–40 °C to +85 °C	5 V ± 10%

Electrical Characteristics

Over the Operating Range

Parameter	Description	Test Conditions		7C131E-15 7C131AE-15			7C131E-25 7C136E-25			7C131E-55 7C136E-55 7C136AE-55			Unit
				Min	Typ [8]	Max	Min	Typ [8]	Max	Min	Typ [8]	Max	
V_{OH}	Output HIGH Voltage	V_{CC} = Min, I_{OH} = –4.0 mA		2.4	–	–	2.4	–	–	2.4	–	–	V
V_{OL}	Output LOW Voltage	V_{CC} = Min, I_{OL} = 4.0 mA		–	–	0.4	–	–	0.4	–	–	0.4	V
V_{IH}	Input HIGH Voltage			2.2	–	–	2.2	–	–	2.2	–	–	V
V_{IL}	Input LOW Voltage			–	–	0.8	–	–	0.8	–	–	0.8	V
I_{OZ}	Output Leakage Current	GND ≤ V_O ≤ V_{CC}, Output disabled		–20	–	+20	–20	–	+20	–20	–	+20	µA
I_{CC}	V_{CC} Operating Supply Current	V_{CC} = Max, I_{OUT} = 0 mA Outputs disabled	Commercial Industrial	–	110 115	190 200	–	100 110	170 180	–	95 105	160 170	mA
I_{SB1}	Standby Current, Both Ports, TTL Inputs	$\overline{CE}_L$ and $\overline{CE}_R$ ≥ V_{IH}, f = f_{MAX} [9]	Commercial Industrial	–	50 65	70 95	–	45 65	65 95	–	45 65	65 95	mA
I_{SB2}	Standby Current, One Port, TTL Inputs	$\overline{CE}_L$ or $\overline{CE}_R$ ≥ V_{IH}, Active Port Outputs Open, f = f_{MAX} [9]	Commercial Industrial	–	120 135	180 205	–	110 135	160 205	–	110 135	160 205	mA
I_{SB3}	Standby Current, Both Ports, CMOS Inputs	Both Ports $\overline{CE}_L$ and $\overline{CE}_R$ ≥ V_{CC} – 0.2 V, V_{IN} ≥ V_{CC} – 0.2 V or V_{IN} ≤ 0.2 V, f = 0	Commercial Industrial	–	0.05 0.05	0.5 0.5	–	0.05 0.05	0.5 0.5	–	0.05 0.05	0.5 0.5	mA
I_{SB4}	Standby Current, One Port, CMOS Inputs	One Port $\overline{CE}_L$ or $\overline{CE}_R$ ≥ V_{CC} – 0.2 V, V_{IN} ≥ V_{CC} – 0.2 V or V_{IN} ≤ 0.2 V, Active Port Outputs Open, f = f_{MAX} [9]	Commercial Industrial	–	110 125	160 175	–	100 125	140 175	–	100 125	140 175	mA

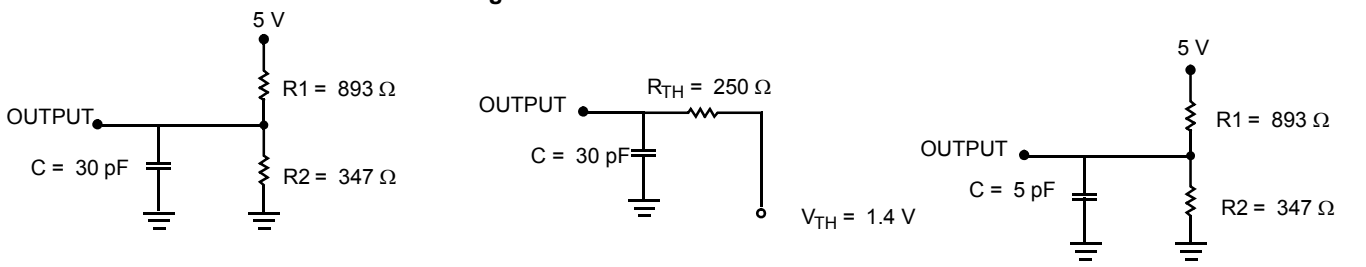
Notes
6. The voltage on any I/O pin cannot exceed the power pin during power-up.
7. Pulse width < 20 ns.
8. Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V_{CC} = V_{CC}(typ.), T_A = 25 °C.
9. At f = f_{MAX}, address and data inputs are cycling at the maximum frequency of read cycle of 1/t_{RC} and using AC Test Waveforms input levels of GND to 3 V.

Capacitance

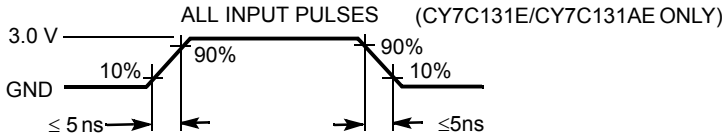
Parameter [10]	Description	Test Conditions	Max	Unit
C_{IN}	Input capacitance	T_A = 25 °C, f = 1 MHz, V_{CC} = 5.0 V	15	pF
C_{OUT}	Output capacitance		10	pF

AC Test Loads and Waveforms

Figure 3. AC Test Loads and Waveforms



(a) Normal Load (Load 1) **(b) Thévenin Equivalent (Load 1)** **(c) Three-State Delay (Load 2)**
(Used for t_{LZ}, t_{HZ}, t_{HZWE}, and t_{LZWE} including scope and jig)



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

Switching Characteristics

Over the Operating Range

Parameter [11]	Description	7C131E-15/7C131AE-15		7C131E-25/7C136E-25		Unit
		Min	Max	Min	Max	
Read Cycle						
t_{RC}	Read cycle time	15	–	25	–	ns
t_{AA}	Address to data valid [12]	–	15	–	25	ns
t_{OHA}	Data hold from Address change	3	–	3	–	ns
t_{ACE}	$\overline{CE}$ LOW to data valid [12]	–	15	–	25	ns
t_{DOE}	$\overline{OE}$ LOW to data valid [12]	–	10	–	15	ns
t_{LZOE}	$\overline{OE}$ LOW to Low Z [13, 14, 15]	3	–	3	–	ns
t_{HZOE}	$\overline{OE}$ HIGH to High Z [13, 14, 15]	–	10	–	15	ns
t_{LZCE}	$\overline{CE}$ LOW to Low Z [13, 14, 15]	3	–	5	–	ns
t_{HZCE}	$\overline{CE}$ HIGH to High Z [13, 14, 15]	–	10	–	15	ns
t_{PU}	$\overline{CE}$ LOW to power-up [13]	0	–	0	–	ns
t_{PD}	$\overline{CE}$ HIGH to power-down [13]	–	15	–	25	ns
Write Cycle [16]						
t_{WC}	Write cycle time	15	–	25	–	ns
t_{SCE}	$\overline{CE}$ LOW to write end	12	–	20	–	ns
t_{AW}	Address setup to write end	12	–	20	–	ns
t_{HA}	Address hold from write end	0	–	0	–	ns
t_{SA}	Address setup to write start	0	–	0	–	ns
t_{PWE}	R/$\overline{W}$ pulse width	10	–	12	–	ns
t_{SD}	Data setup to write end	10	–	15	–	ns
t_{HD}	Data hold from write end	0	–	0	–	ns
t_{HZWE} [13]	R/$\overline{W}$ LOW to High Z [15]	–	10	–	15	ns
t_{LZWE} [13]	R/$\overline{W}$ HIGH to Low Z [15]	3	–	3	–	ns

Notes
11. Test conditions assume signal transition times of 5 ns or less, timing reference levels of 1.5 V, input pulse levels of 0 to 3.0 V and output loading of the specified I_{OL}/I_{OH} and 30 pF load capacitance.
12. AC Test Conditions use V_{OH} = 1.6 V and V_{OL} = 1.4 V.
13. This parameter is guaranteed but not tested.
14. At any given temperature and voltage condition for any given device, t_{HZCE} is less than t_{LZCE} and t_{HZOE} is less than t_{LZOE}.
15. Parameters t_{LZCE}, t_{LZWE}, t_{HZOE}, t_{LZOE}, t_{HZCE} and t_{HZWE} are tested with C_L = 5 pF as in part (c) of Figure 3 on page 5. Transition is measured ±500 mV from steady state voltage.
16. The internal write time of the memory is defined by the overlap of $\overline{CE}$ LOW and R/$\overline{W}$ LOW. Both signals must be low to initiate a write and either signal can terminate a write by going high. The data input setup and hold timing should be referenced to the rising edge of the signal that terminates the write.

Switching Characteristics (continued)

Over the Operating Range

Parameter [11]	Description	7C131E-15/7C131AE-15		7C131E-25/7C136E-25		Unit
		Min	Max	Min	Max	
Busy/Interrupt Timing[17]						
t_{BLA}	$\overline{BUSY}$ LOW from Address match	–	15	–	20	ns
t_{BHA}	$\overline{BUSY}$ HIGH from Address mismatch [18]	–	15	–	20	ns
t_{BLC}	$\overline{BUSY}$ LOW from $\overline{CE}$ LOW	–	15	–	20	ns
t_{BHC}	$\overline{BUSY}$ HIGH from $\overline{CE}$ HIGH [18]	–	15	–	20	ns
t_{PS}	Port setup for priority	5	–	5	–	ns
t_{BDD}	$\overline{BUSY}$ HIGH to valid data	–	15	–	25	ns
t_{DDD}	Write data valid to read data valid [19]	–	25	–	30	ns
t_{WDD}	Write pulse to data delay [19]	–	30	–	45	ns
Interrupt Timing						
t_{WINS}	R/$\overline{W}$ to $\overline{INTERRUPT}$ set time	–	15	–	25	ns
t_{EINS}	$\overline{CE}$ to $\overline{INTERRUPT}$ set time	–	15	–	25	ns
t_{INS}	Address to $\overline{INTERRUPT}$ set time	–	15	–	25	ns
t_{OINR}	$\overline{OE}$ to $\overline{INTERRUPT}$ reset time [18]	–	15	–	25	ns
t_{EINR}	$\overline{CE}$ to $\overline{INTERRUPT}$ reset time [18]	–	15	–	25	ns
t_{INR}	Address to $\overline{INTERRUPT}$ reset time [18]	–	15	–	25	ns

Notes
17. Test conditions used are Load 2.
18. These parameters are measured from the input signal changing, until the output pin goes to a high impedance state.
19. A write operation on Port A, where Port A has priority, leaves the data on Port B's outputs undisturbed until one access time after one of the following:
    BUSY on Port B goes HIGH.
    Port B's address toggled.
    CE for Port B is toggled.

Switching Characteristics

Over the Operating Range

Parameter	Description	7C131E-55/7C136E-55/ 7C136AE-55		Unit
		Min	Max	
Read Cycle				
t_{RC}	Read cycle time	55	–	ns
t_{AA}	Address to data valid [20]	–	55	ns
t_{OHA}	Data hold from Address change	3	–	ns
t_{ACE}	$\overline{CE}$ LOW to data valid [20]	–	55	ns
t_{DOE}	$\overline{OE}$ LOW to data valid [20]	–	25	ns
t_{LZOE}	$\overline{OE}$ LOW to Low Z [20, 21, 22]	3	–	ns
t_{HZOE}	$\overline{OE}$ HIGH to High Z [20, 21, 22]	–	25	ns
t_{LZCE}	$\overline{CE}$ LOW to Low Z [20, 21, 22]	5	–	ns
t_{HZCE}	$\overline{CE}$ HIGH to High Z [20, 21, 22]	–	25	ns
t_{PU}	$\overline{CE}$ LOW to power-up [21]	0	–	ns
t_{PD}	$\overline{CE}$ HIGH to power-down [21]	–	35	ns
Write Cycle				
t_{WC}	Write cycle time	55	–	ns
t_{SCE}	$\overline{CE}$ LOW to write end	40	–	ns
t_{AW}	Address setup to write end	40	–	ns
t_{HA}	Address hold from write end	2	–	ns
t_{SA}	Address setup to write start	0	–	ns
t_{PWE}	R/$\overline{W}$ pulse width	30	–	ns
t_{SD}	Data setup to write end	20	–	ns
t_{HD}	Data hold from write end	0	–	ns
t_{HZWE}	R/$\overline{W}$ LOW to High Z [23]	–	25	ns
t_{LZWE}	R/$\overline{W}$ HIGH to Low Z [23]	3	–	ns

Notes

20. The internal write time of the memory is defined by the overlap of $\overline{CE}$ LOW and R/$\overline{W}$ LOW. Both signals must be low to initiate a write and either signal can terminate a write by going high. The data input setup and hold timing should be referenced to the rising edge of the signal that terminates the write.
21. AC Test Conditions use V_{OH} = 1.6 V and V_{OL} = 1.4 V.
22. These parameters are measured from the input signal changing, until the output pin goes to a high impedance state.
23. Parameters t_{LZCE}, t_{LZWE}, t_{HZOE}, t_{LZOE}, t_{HZCE} and t_{HZWE} are tested with C = 5 pF as in part (b) of Figure 3 on page 5. Transition is measured ±500 mV from steady state voltage.

Switching Characteristics (continued)

Over the Operating Range

Parameter	Description	7C131E-55/7C136E-55/ 7C136AE-55		Unit
		Min	Max	
Busy/Interrupt Timing [24]				
t_{BLA}	$\overline{BUSY}$ LOW from Address match	–	30	ns
t_{BHA}	$\overline{BUSY}$ HIGH from Address mismatch [25]	–	30	ns
t_{BLC}	$\overline{BUSY}$ LOW from $\overline{CE}$ LOW	–	30	ns
t_{BHC}	$\overline{BUSY}$ HIGH from $\overline{CE}$ HIGH [25]	–	30	ns
t_{PS}	Port setup for priority	5	–	ns
t_{BDD}	$\overline{BUSY}$ HIGH to valid data	–	45	ns
t_{DDD}	Write data valid to read data valid [25]	–	30	ns
t_{WDD}	Write pulse to data delay [25]	–	45	ns
Interrupt Timing				
t_{WINS}	R/$\overline{W}$ to $\overline{INTERRUPT}$ set time	–	45	ns
t_{EINS}	$\overline{CE}$ to $\overline{INTERRUPT}$ set time	–	45	ns
t_{INS}	Address to $\overline{INTERRUPT}$ set time	–	45	ns
t_{OINR}	$\overline{OE}$ to $\overline{INTERRUPT}$ reset time [26]	–	45	ns
t_{EINR}	$\overline{CE}$ to $\overline{INTERRUPT}$ reset time [26]	–	45	ns
t_{INR}	Address to $\overline{INTERRUPT}$ reset time [26]	–	45	ns

Notes
24. Test conditions used are Load 2.
25. A write operation on Port A, where Port A has priority, leaves the data on Port B's outputs undisturbed until one access time after one of the following:
    BUSY on Port B goes HIGH.
    Port B's address toggled.
    CE for Port B is toggled.
    R/W for Port B is toggled during valid read.
26. These parameters are measured from the input signal changing, until the output pin goes to a high impedance state.

Switching Waveforms

Figure 4. Read Cycle No. 1 [27, 28]

Either Port ADDR Access

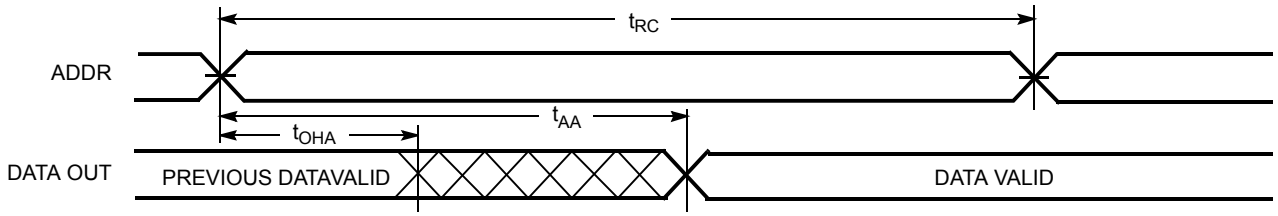


Figure 5. Read Cycle No. 2 [27, 29]

Either Port $\overline{CE}$/$\overline{OE}$ Access

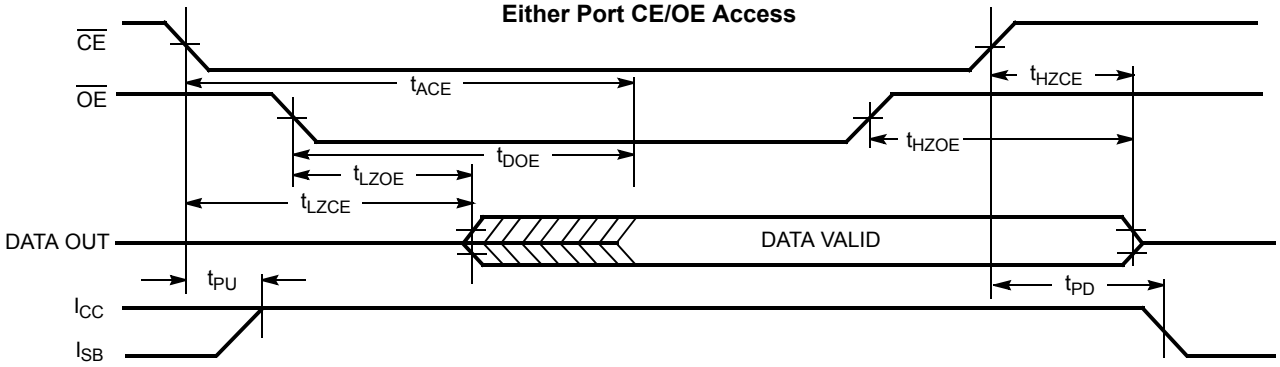
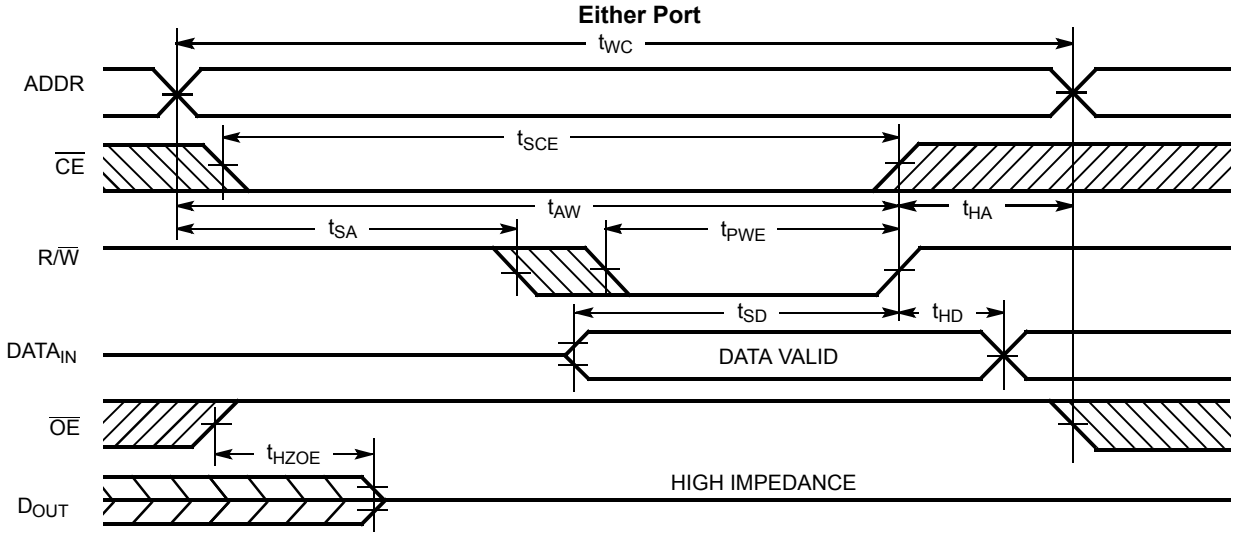


Figure 6. Write Cycle No. 1 ($\overline{OE}$ Three-States Data I/Os – Either Port) [30, 31]

Either Port



Notes

27. R/$\overline{W}$ is HIGH for read cycle.
28. Device is continuously selected, $\overline{CE}$ = V_{IL} and $\overline{OE}$ = V_{IL}.
29. Address valid prior to or coincident with $\overline{CE}$ transition LOW.
30. The internal write time of the memory is defined by the overlap of $\overline{CE}$ LOW and R/$\overline{W}$ LOW. Both signals must be LOW to initiate a write and either signal can terminate a write by going HIGH. The data input setup and hold timing must be referenced to the rising edge of the signal that terminates the write.
31. If $\overline{OE}$ is LOW during a R/$\overline{W}$ controlled write cycle, the write pulse width must be the larger of t_{PWE} or t_{HZWE} + t_{SD} to allow the data I/O pins to enter high impedance and for data to be placed on the bus for the required t_{SD}.

Switching Waveforms (continued)

Figure 7. Write Cycle No. 2 (R/$\overline{W}$ Three-States Data I/Os – Either Port) [32, 33]

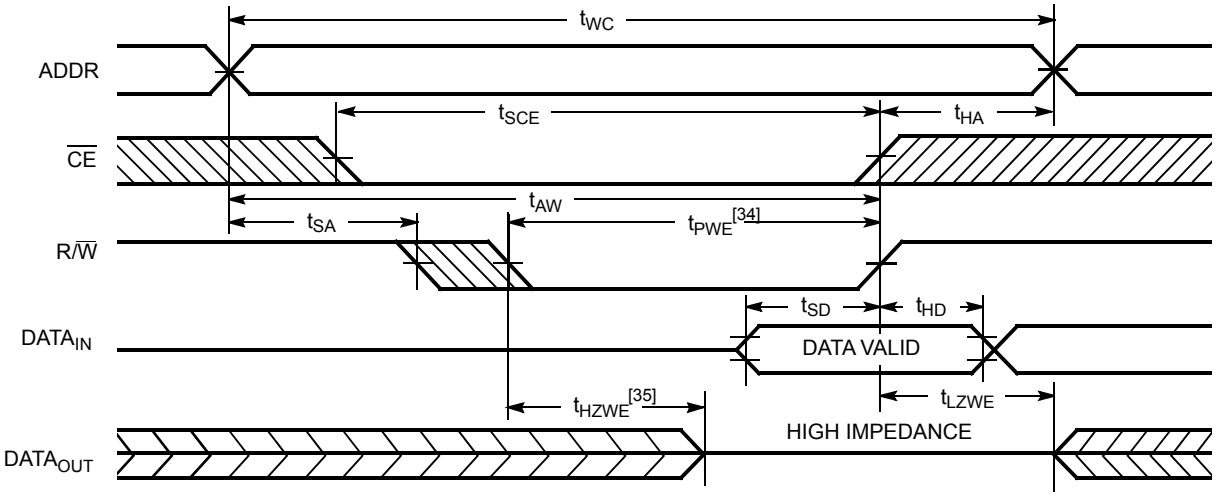
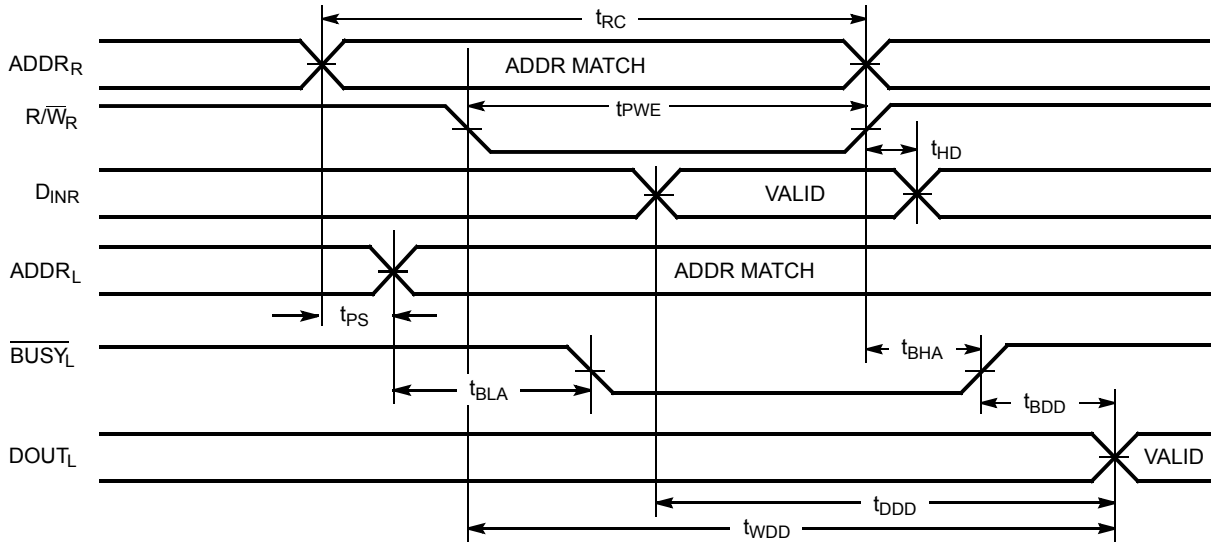


Figure 8. Read Cycle No. 3 [36]

Read with $\overline{BUSY}$



Notes

32. These parameters are measured from the input signal changing, until the output pin goes to a high impedance state.
33. If the $\overline{CE}$ LOW transition occurs simultaneously with or after the R/$\overline{W}$ LOW transition, the outputs remain in a high impedance state.
34. If $\overline{OE}$ is LOW during a R/$\overline{W}$ controlled write cycle, the write pulse width must be the larger of tPWE or (tHZWE + tSD) to allow the I/O drivers to turn off and data to be placed on the bus for the required tSD. If $\overline{OE}$ is HIGH during a R/Wn controlled write cycle, this requirements does not apply and the write pulse can be as short as the specified tPWE.
35. Transition is measured ±500 mV from steady state with a 5 pF load (including scope and jig). This parameter is sampled and not 100% tested.
36. $\overline{CEL}$ = $\overline{CER}$ = LOW.

Switching Waveforms (continued)

Figure 9. Busy Timing Diagram No. 1 ($\overline{CE}$ Arbitration) [37]

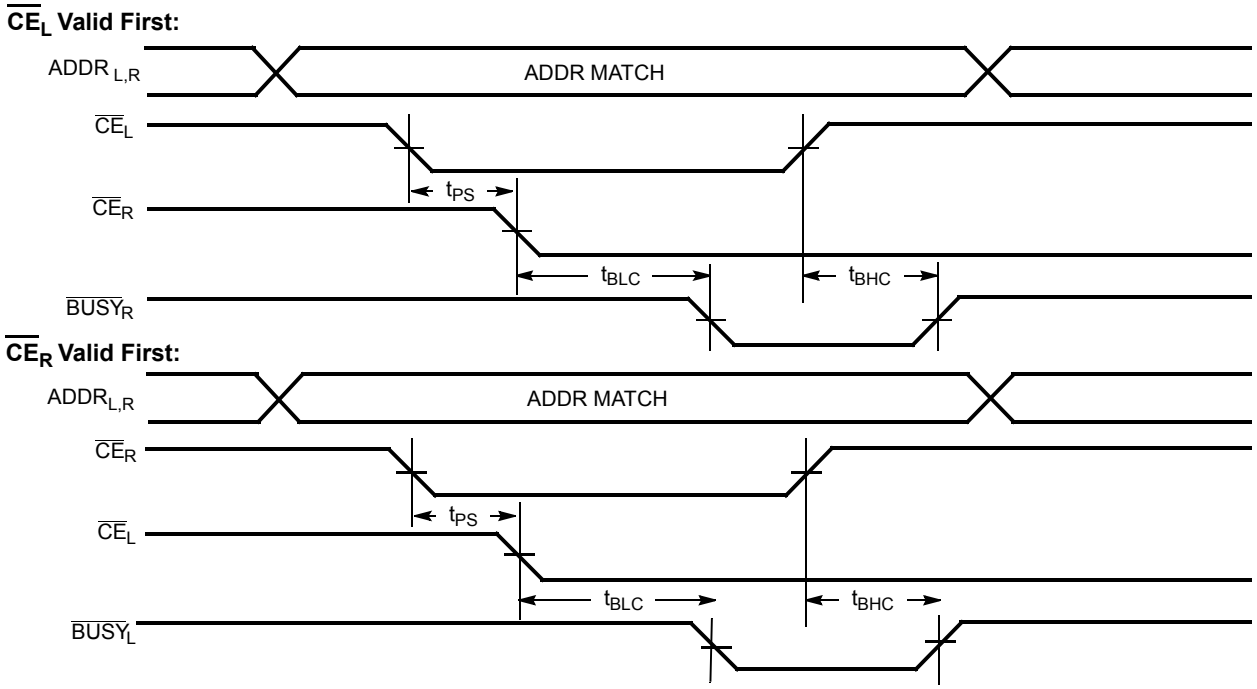
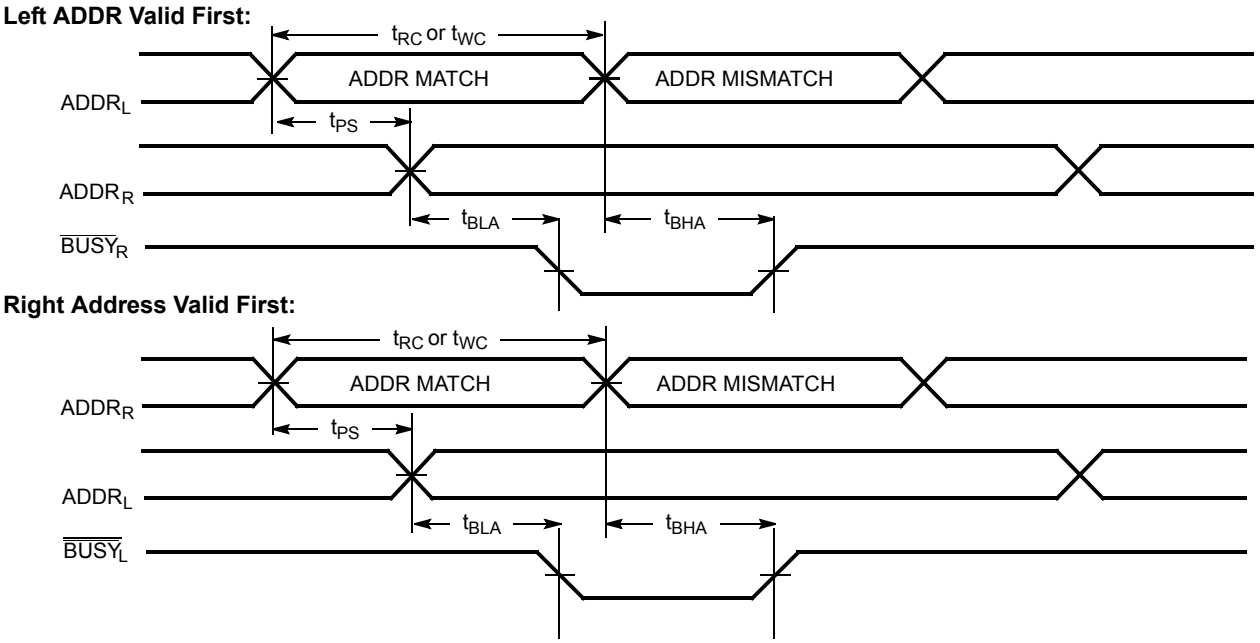


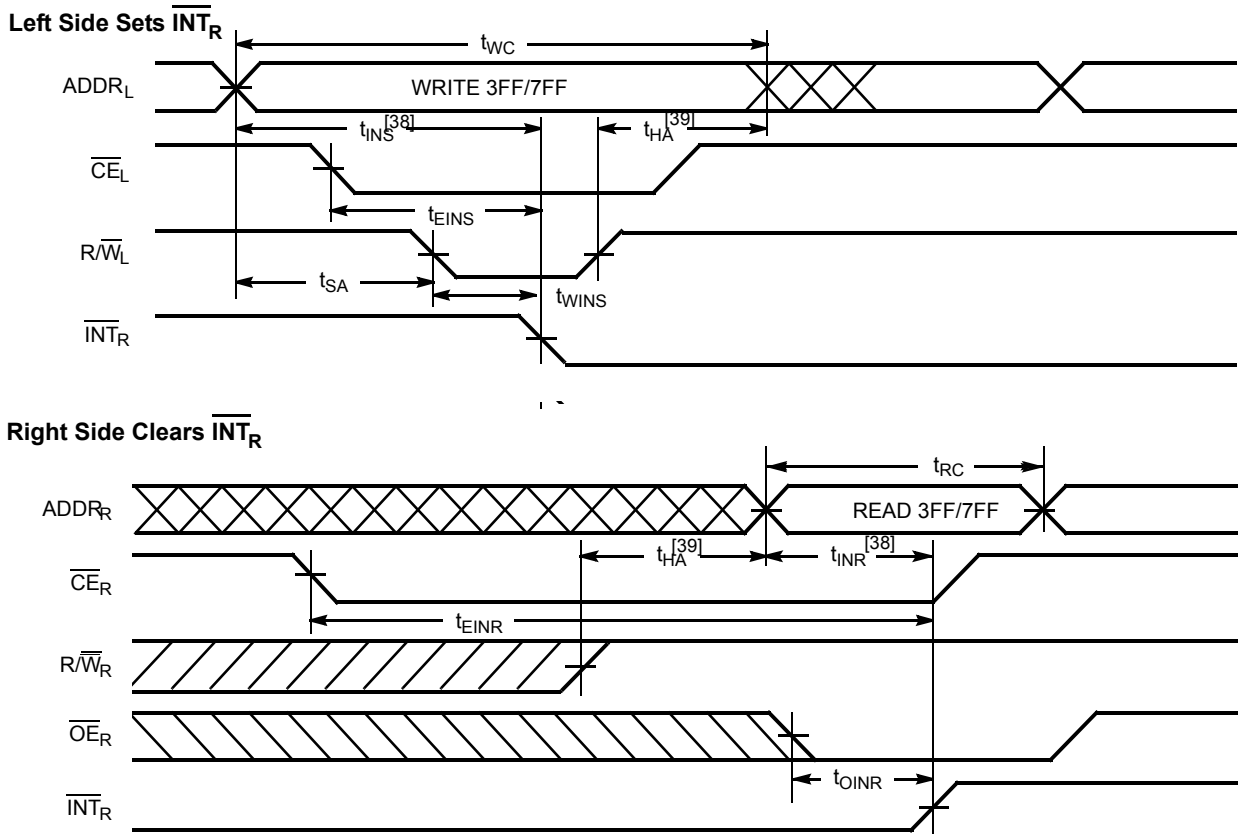
Figure 10. Busy Timing Diagram No. 2 (ADDR Arbitration) [37]



Note
37. If tPS is violated, the busy signal will be asserted on one side or the other, but there is no guarantee to which side $\overline{BUSY}$ will be asserted.

Switching Waveforms (continued)

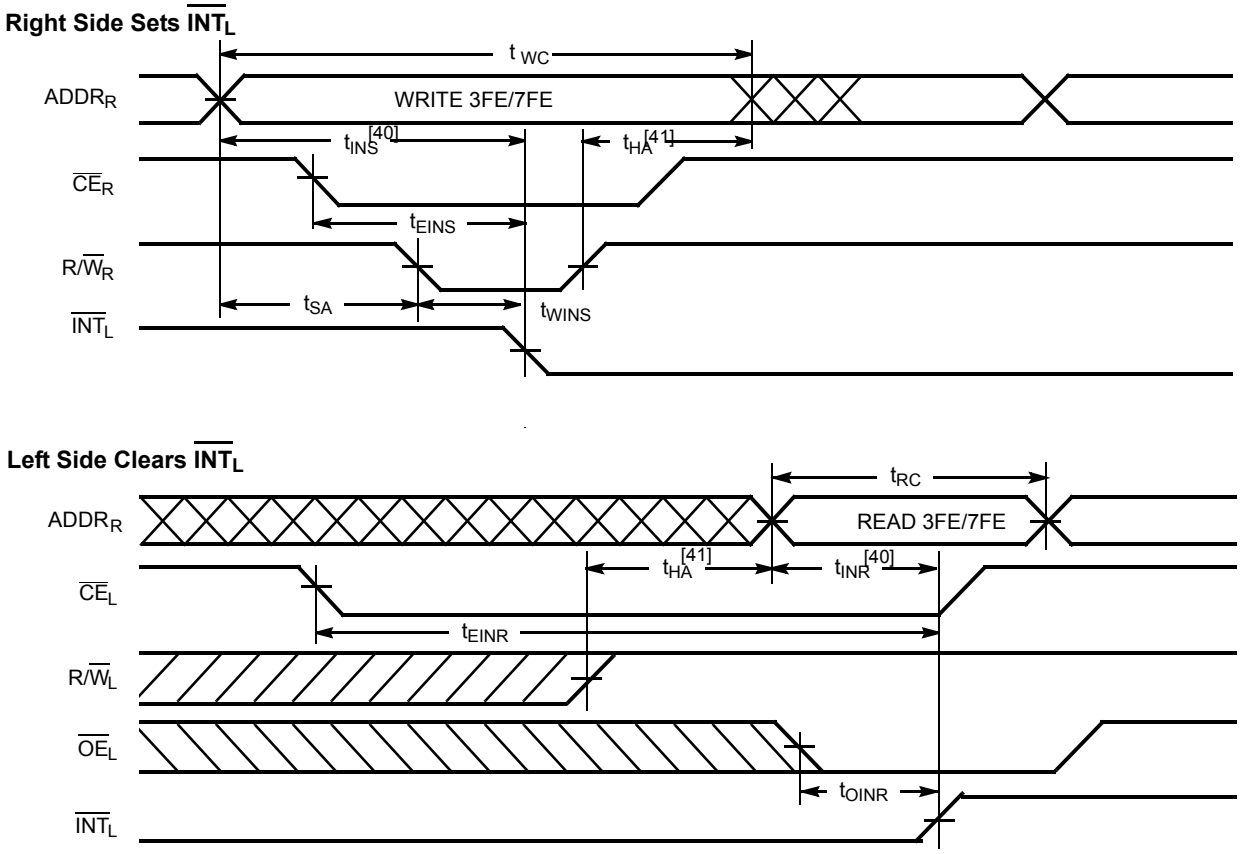
Figure 11. Interrupt Timing Diagrams



Notes
38. Parameter t_{INS} or t_{INR} depends on which enable pin ($\overline{CE}_L$ or R/$\overline{W}_L$) is asserted last.
39. Parameter t_{HA} depends on which enable pin ($\overline{CE}_L$ or R/$\overline{W}_L$) is deasserted first.

Switching Waveforms (continued)

Figure 12. Interrupt Timing Diagrams

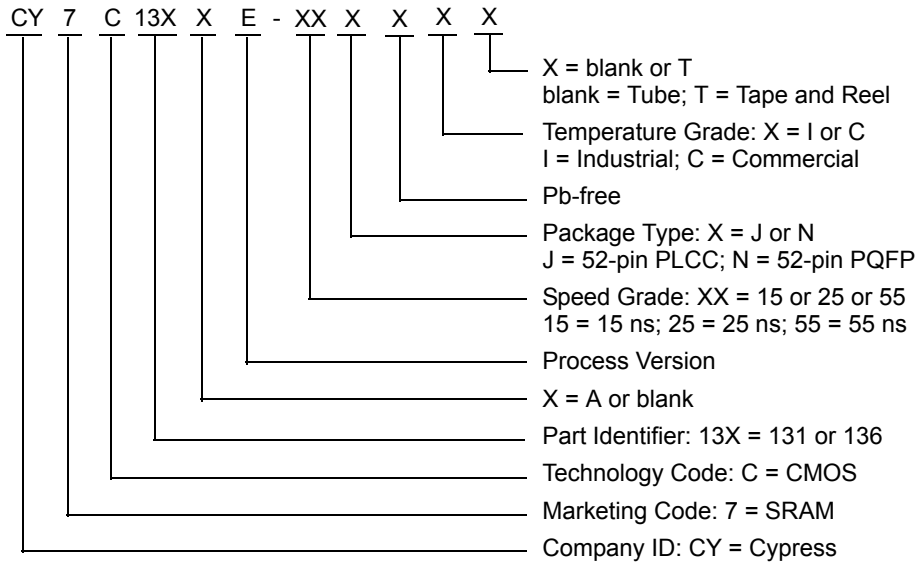


Notes
40. Parameter t_{INS} or t_{INR} depends on which enable pin ($\overline{CE}_L$ or R/$\overline{W}_L$) is asserted last.
41. Parameter t_{HA} depends on which enable pin ($\overline{CE}_L$ or R/$\overline{W}_L$) is deasserted first.

Ordering Information

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
1K × 8 Dual-port SRAM				
15	CY7C131E-15NXI	51-85042	52-pin PQFP (Pb-free)	Industrial
	CY7C131E-15NXIT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	
25	CY7C131E-25JXC	51-85004	52-pin PLCC (Pb-free)	Commercial
	CY7C131E-25JXCT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
	CY7C131E-25NXC	51-85042	52-pin PQFP (Pb-free)	
	CY7C131E-25NXCT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	
55	CY7C131E-55JXC	51-85004	52-pin PLCC (Pb-free)	Commercial
	CY7C131E-55JXCT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
	CY7C131E-55NXC	51-85042	52-pin PQFP (Pb-free)	
	CY7C131E-55NXCT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	
	CY7C131E-55JXI	51-85004	52-pin PLCC (Pb-free)	Industrial
	CY7C131E-55JXIT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
2K × 8 Dual-port SRAM				
25	CY7C136E-25JXC	51-85004	52-pin PLCC (Pb-free)	Commercial
	CY7C136E-25JXCT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
	CY7C136E-25NXC	51-85042	52-pin PQFP (Pb-free)	
	CY7C136E-25NXCT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	
	CY7C136E-25JXI	51-85004	52-pin PLCC (Pb-free)	Industrial
	CY7C136E-25JXIT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
55	CY7C136E-55JXC	51-85004	52-pin PLCC (Pb-free)	Commercial
	CY7C136E-55JXCT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
	CY7C136E-55NXC	51-85042	52-pin PQFP (Pb-free)	
	CY7C136E-55NXCT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	
	CY7C136AE-55JXI	51-85004	52-pin PLCC (Pb-free)	Industrial
	CY7C136AE-55JXIT	51-85004	52-pin PLCC (Pb-free), Tape and Reel	
	CY7C136AE-55NXI	51-85042	52-pin PQFP (Pb-free)	
	CY7C136AE-55NXIT	51-85042	52-pin PQFP (Pb-free), Tape and Reel	

Ordering Code Definitions



Package Diagrams

Figure 13. 52-pin PLCC (0.756 × 0.756 Inches) J52 Package Outline, 51-85004

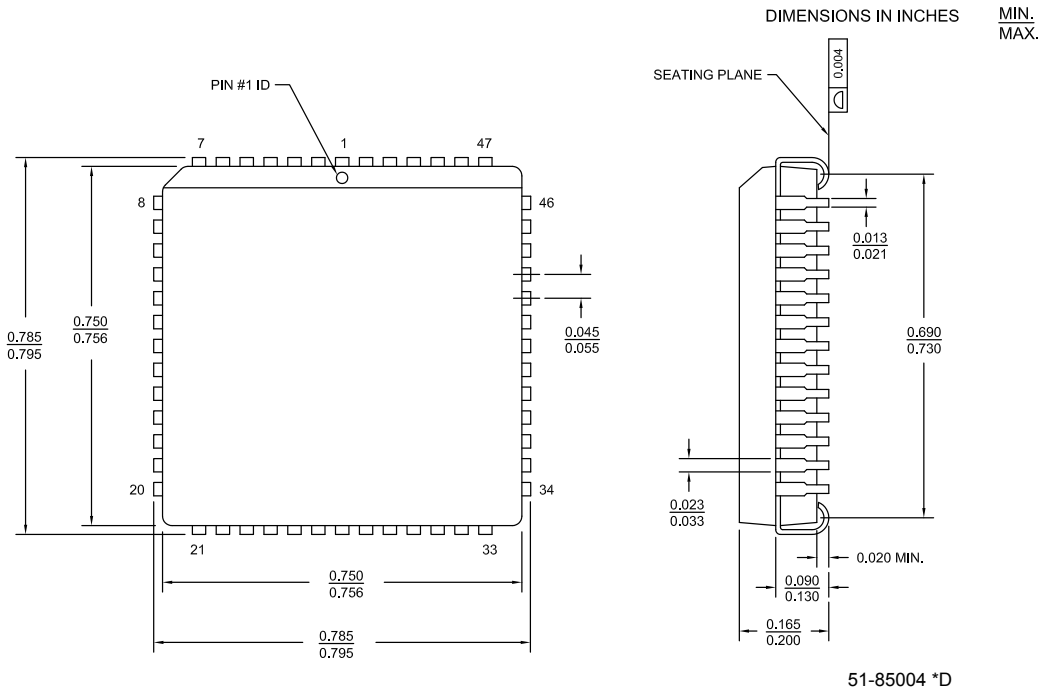
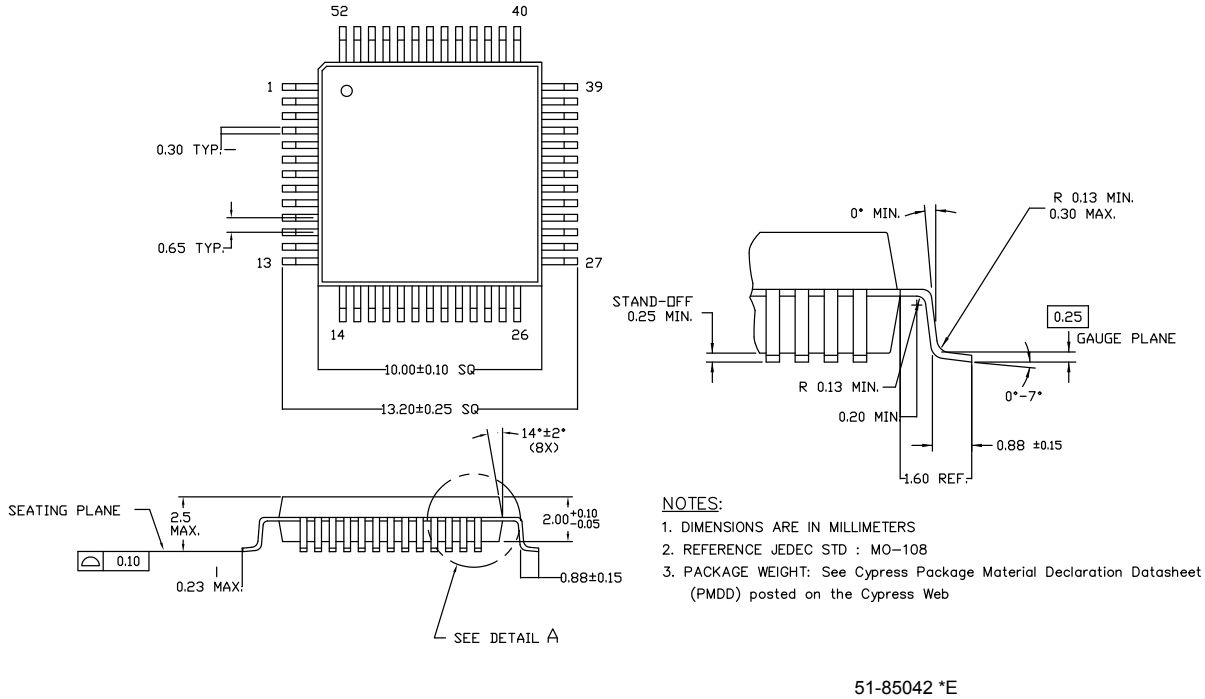


Figure 14. 52-pin PQFP (10 × 10 × 2.0 mm) N5210 Package Outline, 51-85042



Acronyms

Acronym	Description
$\overline{CE}$	Chip Enable
CMOS	Complementary Metal Oxide Semiconductor
I/O	Input/Output
$\overline{OE}$	Output Enable
PLCC	Plastic Leaded Chip Carrier
PQFP	Plastic Quad Flat Package
SRAM	Static Random Access Memory
TTL	Transistor-Transistor Logic
$\overline{WE}$	Write Enable

Document Conventions

Units of Measure

Symbol	Unit of Measure
°C	degree Celsius
µA	microampere
mA	milliampere
mV	millivolt
ns	nanosecond
Ω	ohm
%	percent
pF	picofarad
V	volt
W	watt

Document History Page

Document Title: CY7C131E/CY7C131AE/CY7C136E/CY7C136AE, 1K/2K × 8 Dual-Port Static RAM Document Number: 001-64231				
Rev.	**ECN No.**	**Orig. of Change**	**Submission Date**	**Description of Change**
**	3038037	ADMU	09/24/2010	New data sheet.
*A	3394800	ADMU	10/04/2011	Changed status from Preliminary to Final. Updated Maximum Ratings (Removed (Pin 48 to Pin 24)). Updated Electrical Characteristics (changed minimum value of I_{OZ} parameter from –10 µA to –20 µA, changed maximum value of I_{OZ} parameter from +10 µA to +20 µA and changed maximum value of I_{SB3} from 0.5 mA to 15 mA for both Commercial and Industrial temperature ranges). Updated Package Diagrams (Updated revision of 51-85004 from *B to *C and revision of 51-85042 from *A to *C). Updated in new template.
*B	3403147	ADMU	10/12/2011	No technical updates.
*C	3435230	ADMU	11/17/2011	Updated Features (Removed a feature “Expandable data bus width to 16 bits or more using Master/Slave chip select when using more than one device.” and updated another feature to read as “$\overline{\text{BUSY}}$ output flag to indicate access to the same location by both ports.”. Updated Functional Description (Updated the sentence in the first paragraph to read as “The CY7C131E / CY7C131AE / CY7C136E / CY7C136AE can be used as a standalone dual-port static RAM.”. Updated Note 2 to read as “$\overline{\text{BUSY}}$ is a push-pull output. No pull-up resistor required.”. Updated Note 3 to read as “Interrupt: push-pull output. No pull-up resistor required.”. Updated Maximum Ratings (Removed “(per MIL-STD-883, Method 3015)”). Updated Electrical Characteristics (Removed the Note “See the last page of this specification for Group A subgroup testing information.” and its reference in Parameter column.). Updated Capacitance (Changed maximum value of C_{IN} parameter from 10 pF to 15 pF). Updated AC Test Loads and Waveforms. Updated Switching Characteristics (Removed the Note “See the last page of this specification for Group A subgroup testing information.” and its reference in Parameter column.). Updated Switching Characteristics (Changed the minimum value of t_{OHA} from 0 ns to 3 ns). Removed the section “Typical DC and AC Characteristics”. Removed the section “Reference Documents”.

Document History Page (continued)

Document Title: CY7C131E/CY7C131AE/CY7C136E/CY7C136AE, 1K/2K × 8 Dual-Port Static RAM Document Number: 001-64231				
Rev.	**ECN No.**	**Orig. of Change**	**Submission Date**	**Description of Change**
*D	3620277	ADMU	06/15/2012	Updated missing overbars in all instances across the document. Updated Selection Guide: Updated all values of “Typical Operating Current” parameter. Updated Maximum Ratings: Changed value of “Static discharge voltage” from “>2001 V” to “>1100 V”. Updated Electrical Characteristics: Fixed typos. Added Note 8 and referred the same note in “Typ” column. Updated all values of I_{CC} parameter. Updated AC Test Loads and Waveforms: Updated Figure 3 (Replaced 3 ns with 5 ns). Updated Switching Characteristics: Added Note 17 and referred the same note in “Busy/Interrupt Timing”. Updated Switching Characteristics: Added Note 24 and referred the same note in “Busy/Interrupt Timing”. Updated Switching Waveforms: Added Note 34 and referred the same note in “t_{PWE}” in Figure 7. Added Note 35 and referred the same note in “t_{PWE}” in Figure 7. Added Note 38 and referred the same note in “t_{INS}” in Figure 11. Added Note 39 and referred the same note in “t_{HA}” in Figure 11. Added Note 40 and referred the same note in “t_{INS}” in Figure 12. Added Note 41 and referred the same note in “t_{HA}” in Figure 12. Removed “Busy Timing Diagram No. 3”. Updated Package Diagrams: spec 51-85042 – Changed revision from *C to *D.
*E	3997575	ADMU	05/15/2013	Updated Package Diagrams: spec 51-85004 – Changed revision from *C to *D. Added Appendix: Silicon Errata for CY7C131E/131AE/136E/136AE 1K/2K × 8 Dual Port Static RAM.
*F	4241174	ADMU	01/09/2014	Removed Appendix: Silicon Errata for CY7C131E/131AE/136E/136AE 1K/2K × 8 Dual Port Static RAM. Updated to new template.
*G	4559526	AMDU	11/07/2014	Updated Functional Description: Added “For a complete list of related documentation, click here.” at the end.
*H	5397125	NILE	08/09/2016	Updated Ordering Information: Updated part numbers. Updated Package Diagrams: spec 51-85042 – Changed revision from *D to *E. Updated to new template.
*I	5966445	AESATMP8	11/14/2017	Updated logo and Copyright.

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