

8K x 8 Static RAM

Features

- **Temperature Ranges**
 - Commercial: 0°C to 70°C
 - Industrial: -40°C to 85°C
 - Automotive-A: -40°C to 85°C
- **High Speed**
 - 55 ns
- **CMOS for optimum speed/power**
- **Easy memory expansion with \overline{CE}_1 , CE_2 and \overline{OE} features**
- **TTL-compatible inputs and outputs**
- **Automatic power-down when deselected**
- **Available in Pb-free and non Pb-free 28-lead SNC package**

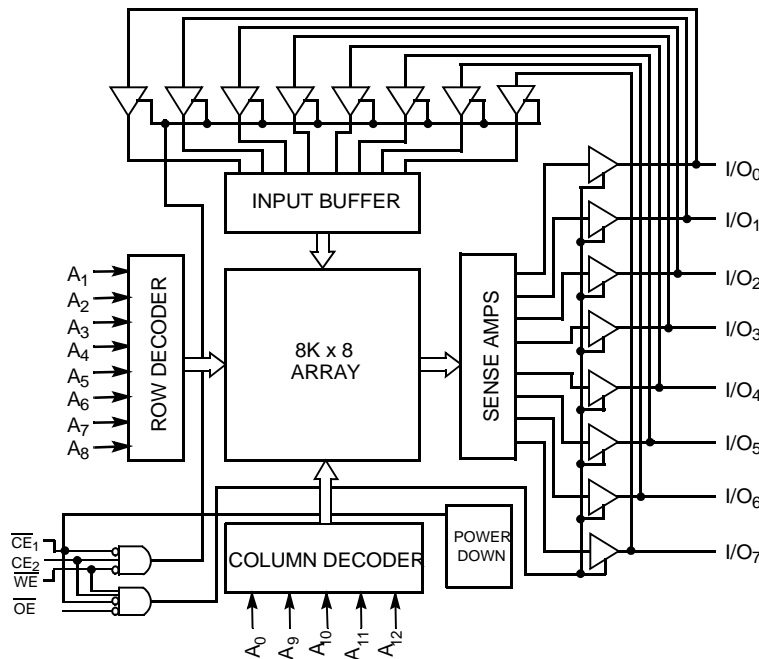
Functional Description

The CY6264 is a high-performance CMOS static RAM organized as 8192 words by 8 bits. Easy memory expansion is provided by an active LOW chip enable (\overline{CE}_1), an active HIGH chip enable (CE_2), and active LOW output enable (\overline{OE}) and three-state drivers. Both devices have an automatic power-down feature (\overline{CE}_1), reducing the power consumption by over 70% when deselected. The CY6264 is packaged in a 450-mil (300-mil body) SOIC.

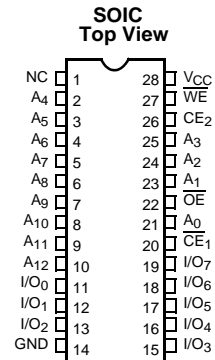
An active LOW write enable signal (\overline{WE}) controls the writing/reading operation of the memory. When \overline{CE}_1 and \overline{WE} inputs are both LOW and CE_2 is HIGH, data on the eight data input/output pins (I/O_0 through I/O_7) is written into the memory location addressed by the address present on the address pins (A_0 through A_{12}). Reading the device is accomplished by selecting the device and enabling the outputs, \overline{CE}_1 and \overline{OE} active LOW, CE_2 active HIGH, while \overline{WE} remains inactive or HIGH. Under these conditions, the contents of the location addressed by the information on address pins is present on the eight data input/output pins.

The input/output pins remain in a high-impedance state unless the chip is selected, outputs are enabled, and write enable (\overline{WE}) is HIGH. A die coat is used to ensure alpha immunity.

Logic Block Diagram



Pin Configuration



Selection Guide

	Range	-55	-70	Unit
Maximum Access Time		55	70	ns
Maximum Operating Current	Commercial	100	100	mA
	Industrial	260	200	mA
	Automotive-A		200	mA
Maximum CMOS Standby Current	Commercial	15	15	mA
	Industrial	30	30	mA
	Automotive-A		30	mA

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature -65°C to +150°C
 Ambient Temperature with Power Applied..... -55°C to +125°C
 Supply Voltage to Ground Potential -0.5V to +7.0V
 DC Voltage Applied to Outputs in High Z State^[1] -0.5V to +7.0V
 DC Input Voltage^[1] -0.5V to +7.0V

Output Current into Outputs (LOW)..... 20 mA
 Static Discharge Voltage..... >2001V (per MIL-STD-883, Method 3015)
 Latch-Up Current..... >200 mA

Operating Range

Range	Ambient Temperature	V _{CC}
Commercial	0°C to +70°C	5V ± 10%
Industrial	-40°C to +85°C	
Automotive-A	-40°C to +85°C	

Electrical Characteristics Over the Operating Range

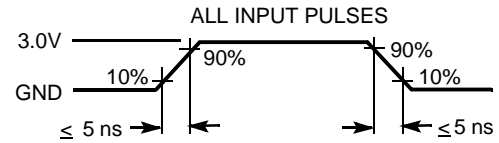
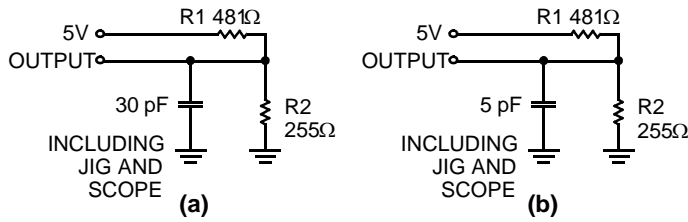
Parameter	Description	Test Conditions	-55		-70		Unit
			Min.	Max.	Min.	Max.	
V _{OH}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = -4.0 mA	2.4		2.4		V
V _{OL}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 8.0 mA		0.4		0.4	V
V _{IH}	Input HIGH Voltage		2.2	V _{CC}	2.2	V _{CC}	V
V _{IL}	Input LOW Voltage ^[1]		-0.5	0.8	-0.5	0.8	V
I _{IX}	Input Leakage Current	GND ≤ V _I ≤ V _{CC}	-5	+5	-5	+5	μA
I _{OZ}	Output Leakage Current	GND ≤ V _I ≤ V _{CC} , Output Disabled	-5	+5	-5	+5	μA
I _{CC}	V _{CC} Operating Supply Current	V _{CC} = Max., I _{OUT} = 0 mA	Com'l	100		100	mA
			Ind'l	260		200	
			Auto-A			200	
I _{SB1}	Automatic \overline{CE}_1 Power-Down Current	Max. V _{CC} , $\overline{CE}_1 \geq V_{IH}$, Min. Duty Cycle=100%	Com'l	20		20	mA
			Ind'l	50		40	
			Auto-A			40	
I _{SB2}	Automatic \overline{CE}_1 Power-Down Current	Max. V _{CC} , $\overline{CE}_1 \geq V_{CC} - 0.3V$, V _{IN} ≥ V _{CC} - 0.3V or V _{IN} ≤ 0.3V	Com'l	15		15	mA
			Ind'l	30		30	
			Auto-A			30	

Capacitance^[2]

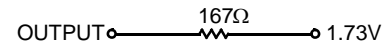
Parameter	Description	Test Conditions	Max.	Unit
C _{IN}	Input Capacitance	T _A = 25°C, f = 1 MHz, V _{CC} = 5.0V	7	pF
C _{OUT}	Output Capacitance		7	pF

Notes:

- Minimum voltage is equal to -3.0V for pulse durations less than 30 ns.
- Tested initially and after any design or process changes that may affect these parameters.

AC Test Loads and Waveforms


Equivalent to: THEVENIN EQUIVALENT


Switching Characteristics Over the Operating Range^[3]

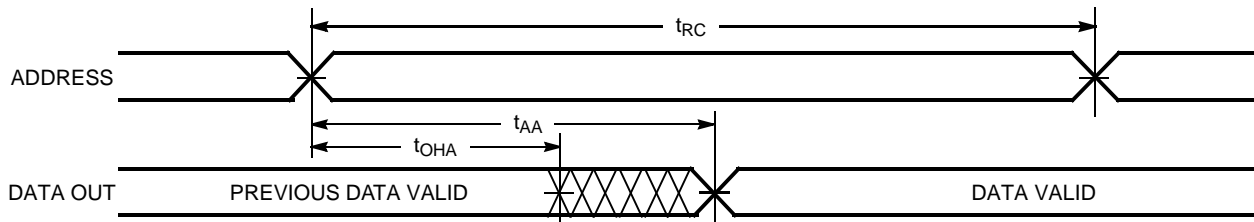
Parameter	Description	-55		-70		Unit
		Min.	Max.	Min.	Max.	
READ CYCLE						
t_{RC}	Read Cycle Time	55		70		ns
t_{AA}	Address to Data Valid		55		70	ns
t_{OHA}	Data Hold from Address Change	5		5		ns
t_{ACE1}	\overline{CE}_1 LOW to Data Valid		55		70	ns
t_{ACE2}	CE_2 HIGH to Data Valid		40		70	ns
t_{DOE}	\overline{OE} LOW to Data Valid		25		35	ns
t_{LZOE}	\overline{OE} LOW to Low Z	3		5		ns
t_{HZOE}	\overline{OE} HIGH to High Z ^[4]		20		30	ns
t_{LZCE1}	\overline{CE}_1 LOW to Low Z ^[5]	5		5		ns
t_{LZCE2}	CE_2 HIGH to Low Z	3		5		ns
t_{HZCE}	\overline{CE}_1 HIGH to High Z ^[4, 6] CE_2 LOW to High Z		20		30	ns
t_{PU}	\overline{CE}_1 LOW to Power-Up	0		0		ns
t_{PD}	\overline{CE}_1 HIGH to Power-Down		25		30	ns
WRITE CYCLE^[6]						
t_{WC}	Write Cycle Time	50		70		ns
t_{SCE1}	\overline{CE}_1 LOW to Write End	40		60		ns
t_{SCE2}	CE_2 HIGH to Write End	30		50		ns
t_{AW}	Address Set-Up to Write End	40		55		ns
t_{HA}	Address Hold from Write End	0		0		ns
t_{SA}	Address Set-Up to Write Start	0		0		ns
t_{PWE}	\overline{WE} Pulse Width	25		40		ns
t_{SD}	Data Set-Up to Write End	25		35		ns
t_{HD}	Data Hold from Write End	0		0		ns
t_{HZWE}	\overline{WE} LOW to High Z ^[4]		20		30	ns
t_{LZWE}	\overline{WE} HIGH to Low Z	5		5		ns

Notes:

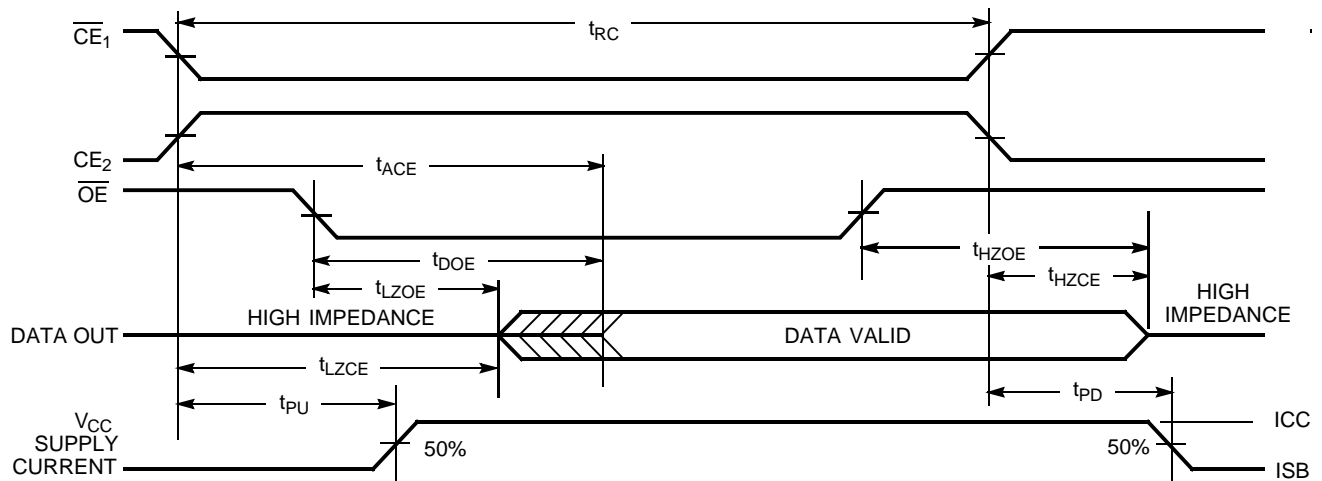
- Test conditions assume signal transition time of 5 ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V, and output loading of the specified I_{OL}/I_{OH} and 30-pF load capacitance.
- t_{HZOE} , t_{HZCE} , and t_{HZWE} are specified with $C_L = 5$ pF as in part (b) of AC Test Loads. Transition is measured ± 500 mV from steady-state voltage.
- At any given temperature and voltage condition, t_{HZCE} is less than t_{LZCE} for any given device.
- The internal write time of the memory is defined by the overlap of \overline{CE}_1 LOW, CE_2 HIGH, and \overline{WE} LOW. Both signals must be LOW to initiate a write and either signal can terminate a write by going HIGH. The data input set-up and hold timing should be referenced to the rising edge of the signal that terminates the write.

Switching Waveforms

Read Cycle No. 1^[7, 8]



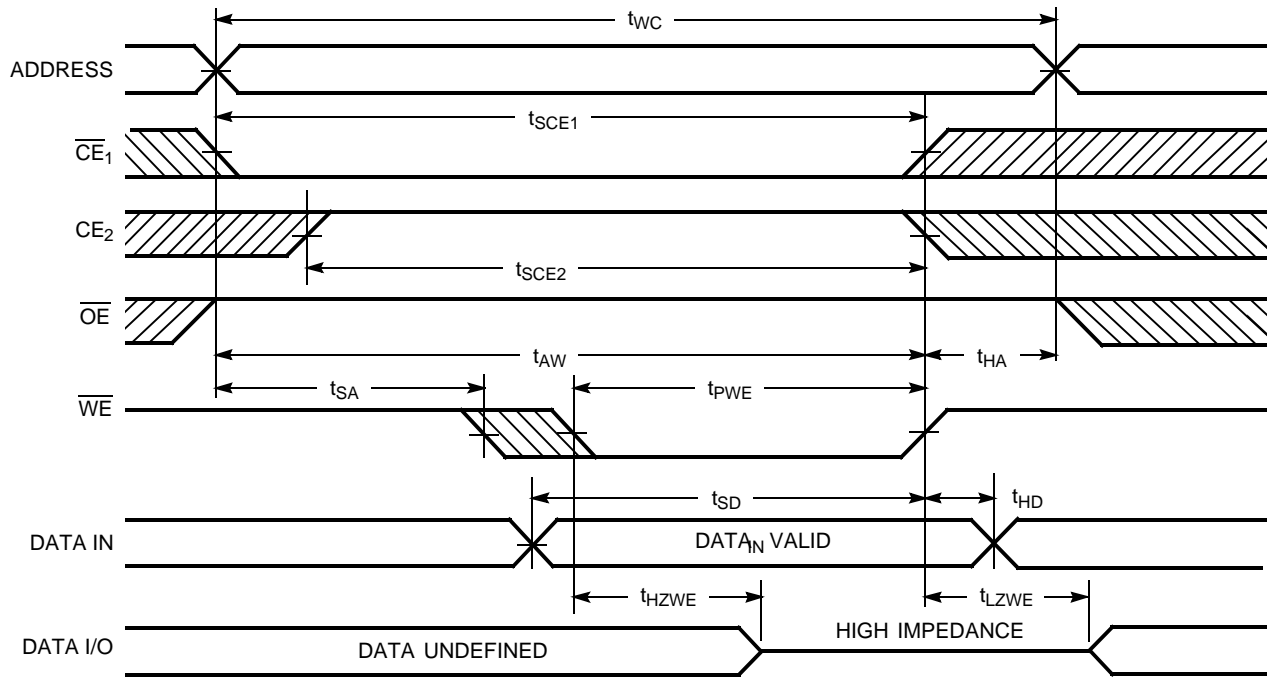
Read Cycle No. 2^[9, 10]



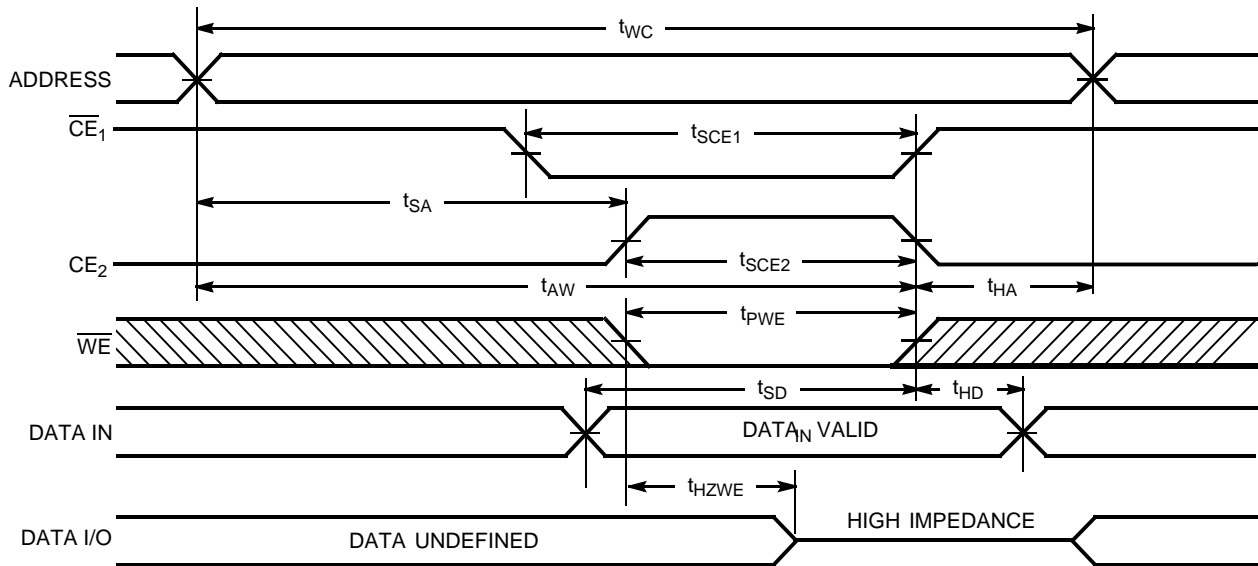
Notes:

- 7. Device is continuously selected. \overline{OE} , $\overline{CE}_1 = V_{IL}$. $\overline{CE}_2 = V_{IH}$.
- 8. Address valid prior to or coincident with \overline{CE} transition LOW.
- 9. \overline{WE} is HIGH for read cycle.
- 10. Data I/O is High Z if $\overline{OE} = V_{IH}$, $\overline{CE}_1 = V_{IH}$, or $\overline{WE} = V_{IL}$.

Switching Waveforms (continued)
Write Cycle No. 1 (WE Controlled)^[8, 10]

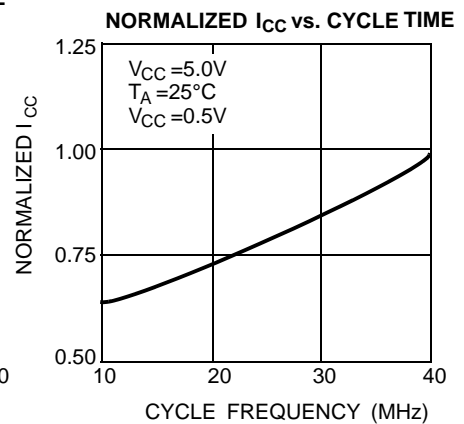
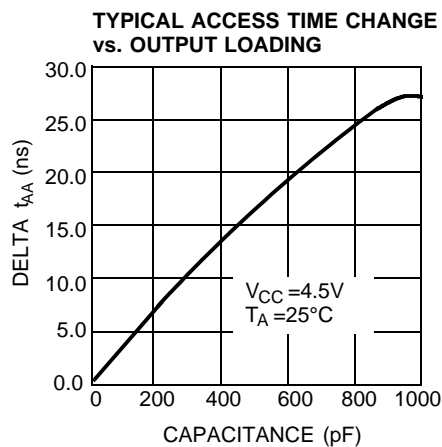
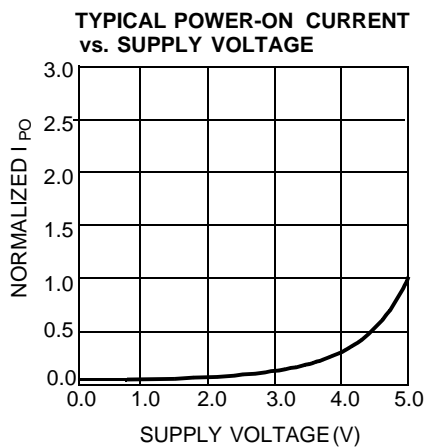
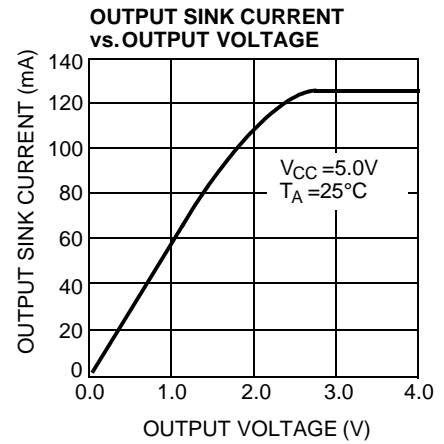
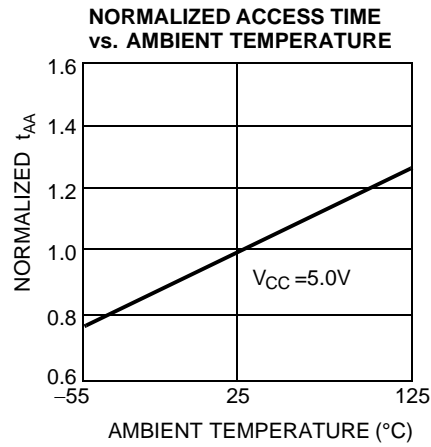
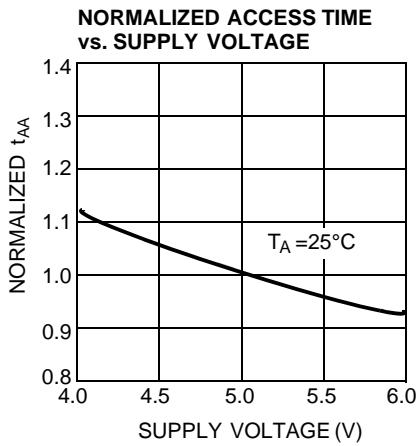
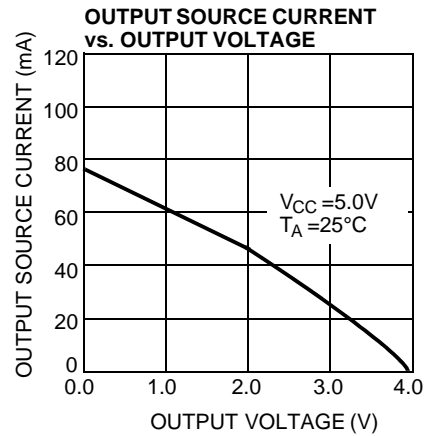
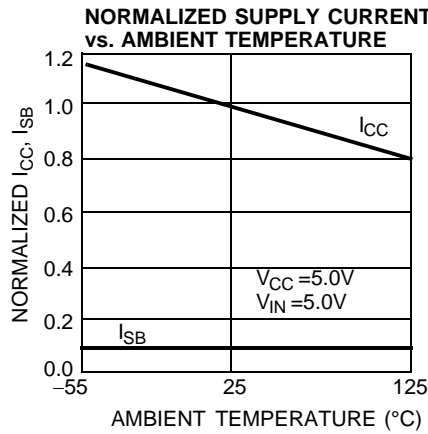
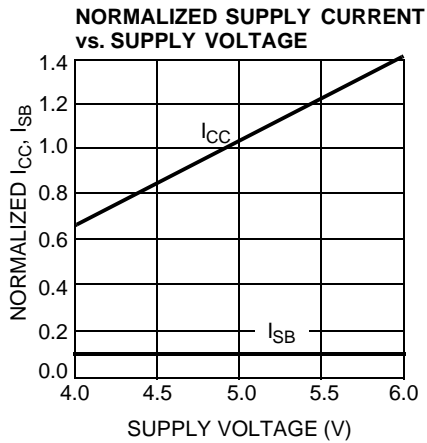


Write Cycle No. 2 (CE Controlled)^[8, 10, 11]



Note:
 11. If \overline{CE} goes HIGH simultaneously with \overline{WE} HIGH, the output remains in a high-impedance state.

Typical DC and AC Characteristics



Truth Table

\overline{CE}_1	\overline{CE}_2	\overline{WE}	\overline{OE}	Input/Output	Mode
H	X	X	X	High Z	Deselect/Power-Down
X	L	X	X	High Z	Deselect
L	H	H	L	Data Out	Read
L	H	L	X	Data In	Write
L	H	H	H	High Z	Deselect

Address Designators

Address Name	Address Function	Pin Number
A4	X3	2
A5	X4	3
A6	X5	4
A7	X6	5
A8	X7	6
A9	Y1	7
A10	Y4	8
A11	Y3	9
A12	Y0	10
A0	Y2	21
A1	X0	23
A2	X1	24
A3	X2	25

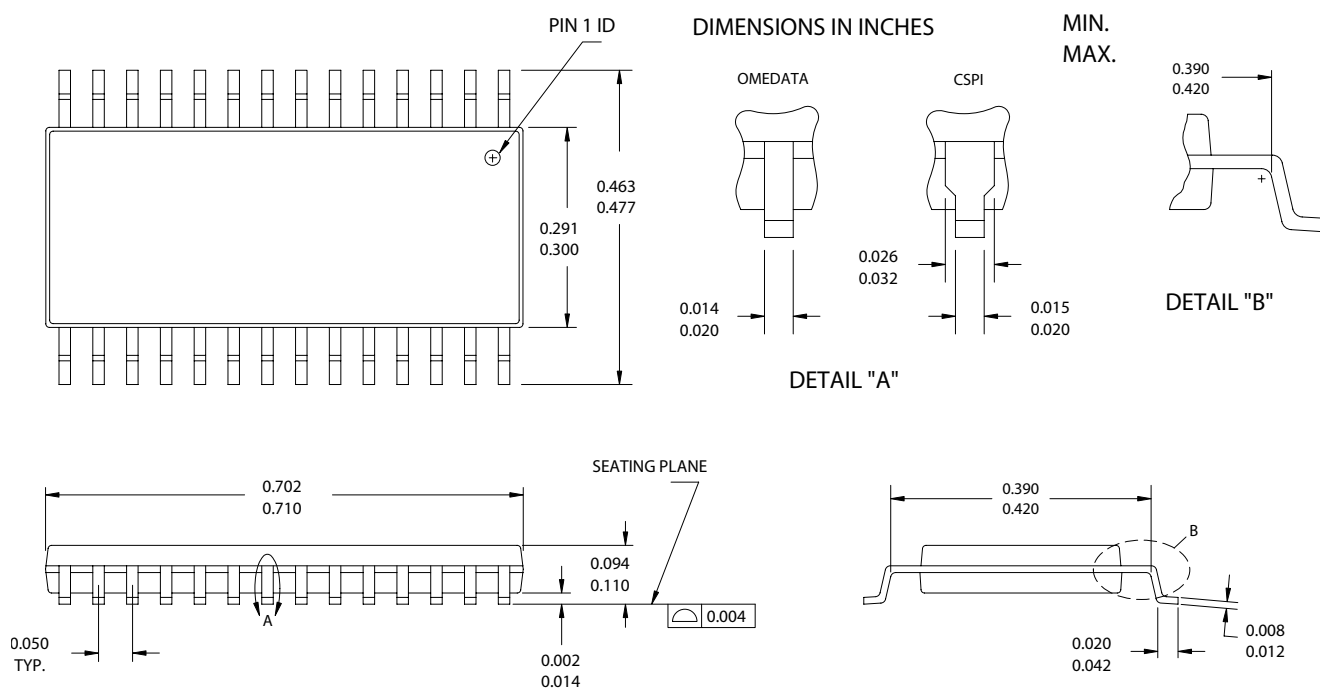
Ordering Information

Speed (ns)	Ordering Code	Package Diagram	Package Type	Operating Range
55	CY6264-55SNXC	51-85092	28-lead (300-mil Narrow Body) SNC (Pb-Free)	Commercial
	CY6264-55SNXI		28-lead (300-mil Narrow Body) SNC (Pb-Free)	Industrial
70	CY6264-70SNC		28-lead (300-mil Narrow Body) SNC	Commercial
	CY6264-70SNXC		28-lead (300-mil Narrow Body) SNC (Pb-Free)	
	CY6264-70SNI		28-lead (300-mil Narrow Body) SNC	Industrial
	CY6264-70SNXI		28-lead (300-mil Narrow Body) SNC (Pb-Free)	
	CY6264-70SNXA		28-lead (300-mil Narrow Body) SNC (Pb-Free)	

Please contact your local Cypress sales representative for availability of these parts

Package Diagram

28-lead (300 mil) SNC Package Outline (Narrow Body) (51-85092)



51-85092-*B

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Document History Page

Document Title: CY6264 8K x 8 Static RAM Document Number: 001-02367				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	384870	See ECN	PCI	Spec # change from 38-00425 to 001-02367
*A	488954	See ECN	VKN	Added Automotive product Added 55 ns Industrial spec Removed SOIC package from the product offering Changed the description of I _{IX} from Input Load Current to Input Leakage Current in DC Electrical Characteristics table Removed I _{OS} parameter from DC Electrical Characteristics table Updated ordering Information table