CY7C107BN

1M x 1 Static RAM

Features

- High speed
  - t_{AA} = 15 ns
- CMOS for optimum speed/power
- Automatic power down when deselected
- TTL-compatible inputs and outputs

Functional Description

The CY7C107BN is a high performance CMOS static RAMs organized as 1,048,576 words by 1 bit. Easy memory expansion is provided by an active LOW Chip Enable ($\overline{CE}$) and tristate drivers. The devices has an automatic power down feature that reduces power consumption by more than 65% when deselected.

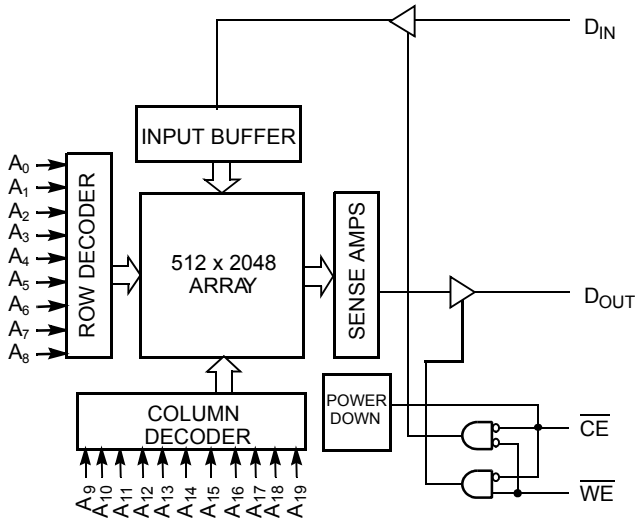
Writing to the devices is accomplished by taking Chip Enable ($\overline{CE}$) and Write Enable ($\overline{WE}$) inputs LOW. Data on the input pin (D_{IN}) is written into the memory location specified on the address pins (A_0 through A_{19}).

Reading from the devices is accomplished by taking Chip Enable ($\overline{CE}$) LOW while Write Enable ($\overline{WE}$) remains HIGH. Under these conditions, the contents of the memory location specified by the address pins appear on the data output (D_{OUT}) pin.

The output pin (D_{OUT}) is placed in a high impedance state when the device is deselected ($\overline{CE}$ HIGH) or during a write operation ($\overline{CE}$ and $\overline{WE}$ LOW).

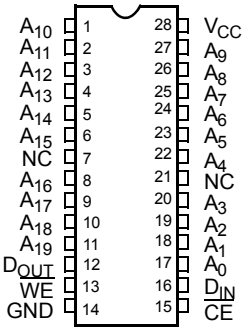
The CY7C107BN is available in a standard 400-mil-wide SOJ.

Logic Block Diagram



Pin Configuration

Figure 1. 28-Pin SOJ (Top View)



Selection Guide

Description	7C107BN-15
Maximum Access Time (ns)	15
Maximum Operating Current (mA)	80
Maximum CMOS Standby Current I_{SB2} (mA)	2

Maximum Ratings

Exceeding the maximum ratings may impair the useful life of the device. These user guidelines are not tested.

Storage Temperature ..... -65°C to +150°C

Ambient Temperature with Power Applied ..... -55°C to +125°C

Supply Voltage on V_{CC} Relative to GND[1] ..... -0.5V to +7.0V

DC Voltage Applied to Outputs in High Z State[1] .....-0.5V to V_{CC} + 0.5V

DC Input Voltage[1] .....-0.5V to V_{CC} + 0.5V

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[2]	V_{CC}
Commercial	0°C to +70°C	5V ± 10%

Electrical Characteristics Over the Operating Range

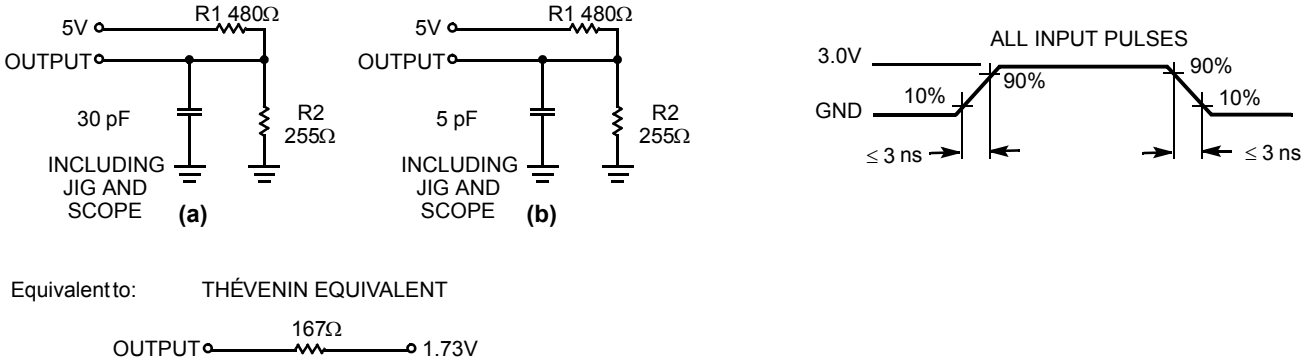
Parameter	Description	Test Conditions	7C107BN-15		
			Min	Max	Unit
V_{OH}	Output HIGH Voltage	V_{CC} = Min, I_{OH} = –4.0 mA	2.4		V
V_{OL}	Output LOW Voltage	V_{CC} = Min, I_{OL} = 8.0 mA		0.4	V
V_{IH}	Input HIGH Voltage		2.2	V_{CC} + 0.3	V
V_{IL}	Input LOW Voltage[1]		-0.3	0.8	V
I_{IX}	Input Leakage Current	GND ≤ V_I ≤ V_{CC}	-1	+1	mA
I_{OZ}	Output Leakage Current	GND ≤ V_I ≤ V_{CC}, Output Disabled	–5	+5	mA
I_{OS}	Output Short Circuit Current[3]	V_{CC} = Max, V_{OUT} = GND		-300	mA
I_{CC}	V_{CC} Operating Supply Current	V_{CC} = Max, I_{OUT} = 0 mA, f = f_{MAX} = $1/t_{RC}$		80	mA
I_{SB1}	Automatic $\overline{CE}$ Power Down Current— TTL Inputs	Max V_{CC}, $\overline{CE}$ ≥ V_{IH}, V_{IN} ≥V_{IH} or V_{IN} ≤V_{IL}, f = f_{MAX}		20	mA
I_{SB2}	Automatic $\overline{CE}$ Power Down Current — CMOS Inputs	Max V_{CC}, $\overline{CE}$ ≥ V_{CC} – 0.3V, V_{IN} ≥ V_{CC} – 0.3V or V_{IN} ≤ 0.3V, f = 0		2	mA

Capacitance[4]

Parameter	Description	Test Conditions	Max	Unit
C_{IN}: Addresses	Input Capacitance	T_A = 25 × C, f = 1 MHz, V_{CC} = 5.0V	7	pF
C_{IN}: Controls			10	pF
C_{OUT}	Output Capacitance		10	pF

Notes
1. V_{IL} (min.) = –2.0V for pulse durations of less than 20 ns.
2. T_A is the “Instant On” case temperature.
3. Not more than 1 output should be shorted at one time. Duration of the short circuit should not exceed 30 seconds.
4. Tested initially and after any design or process changes that may affect these parameters.

Figure 2. AC Test Loads and Waveforms



Switching Characteristics[5] Over the Operating Range

Parameter	Description	7C107BN-15		Unit
		Min	Max	
READ CYCLE				
t_{RC}	Read Cycle Time	15		ns
t_{AA}	Address to Data Valid		15	ns
t_{OHA}	Data Hold from Address Change	3		ns
t_{ACE}	$\overline{CE}$ LOW to Data Valid		15	ns
t_{LZCE}	$\overline{CE}$ LOW to Low Z[6]	3		ns
t_{HZCE}	$\overline{CE}$ HIGH to High Z[6, 7]		7	ns
t_{PU}	$\overline{CE}$ LOW to Power Up	0		ns
t_{PD}	$\overline{CE}$ HIGH to Power Down		15	ns
WRITE CYCLE[8]				
t_{WC}	Write Cycle Time	15		ns
t_{SCE}	$\overline{CE}$ LOW to Write End	12		ns
t_{AW}	Address Setup to Write End	12		ns
t_{HA}	Address Hold from Write End	0		ns
t_{SA}	Address Setup to Write Start	0		ns
t_{PWE}	$\overline{WE}$ Pulse Width	12		ns
t_{SD}	Data Setup to Write End	8		ns
t_{HD}	Data Hold from Write End	0		ns
t_{LZWE}	$\overline{WE}$ HIGH to Low Z[6]	3		ns
t_{HZWE}	$\overline{WE}$ LOW to High Z[6, 7]		7	ns

Notes
5. Test conditions assume signal transition time of 3 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.
6. At any given temperature and voltage condition, t_{HZCE} is less than t_{LZCE} and t_{HZWE} is less than t_{LZWE} for any given device.
7. t_{HZCE} and t_{HZWE} are specified with a load capacitance of 5 pF as in part (b) of AC Test Loads. Transition is measured ±500 mV from steady-state voltage.
8. The internal write time of the memory is defined by the overlap of $\overline{CE}$ LOW and $\overline{WE}$ LOW. $\overline{CE}$ and $\overline{WE}$ must be LOW to initiate a write, and the transition of any of these signals can terminate the write. The input data setup and hold timing should be referenced to the leading edge of the signal that terminates the write.

Switching Waveforms

Figure 3. Read Cycle No. 1[10, 11]

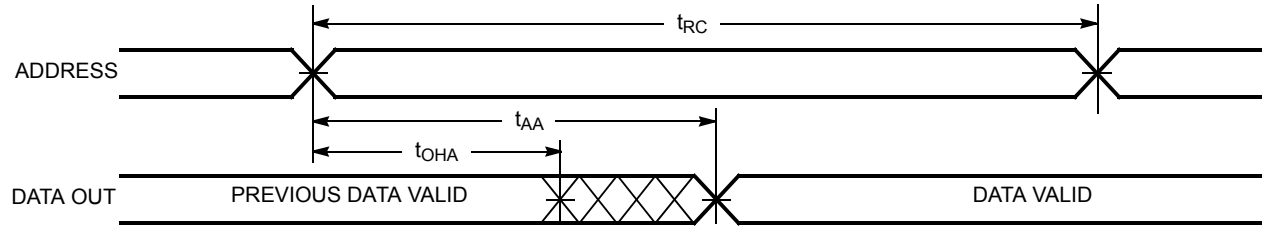


Figure 4. Read Cycle No. 2[11, 12]

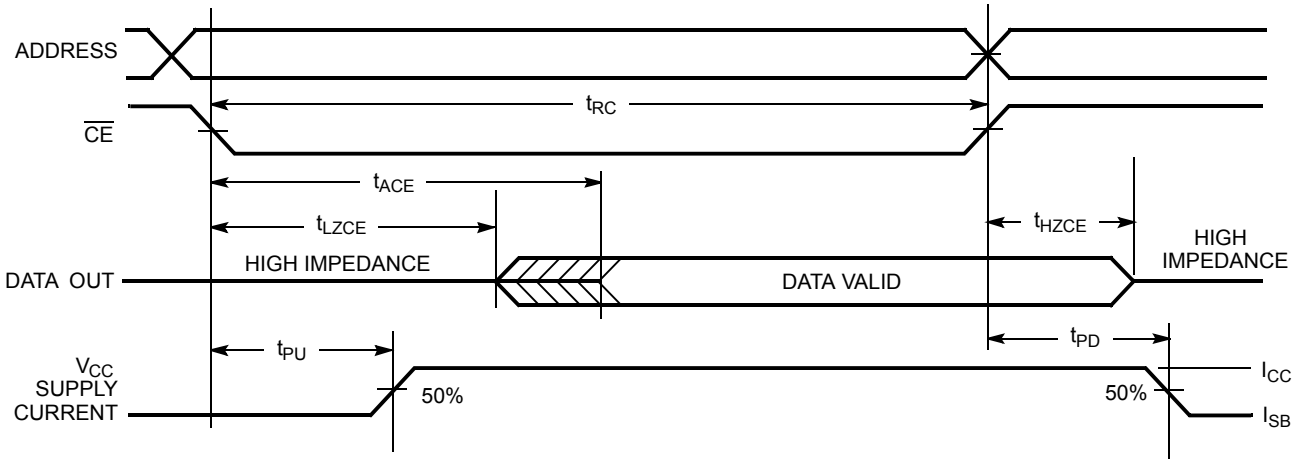
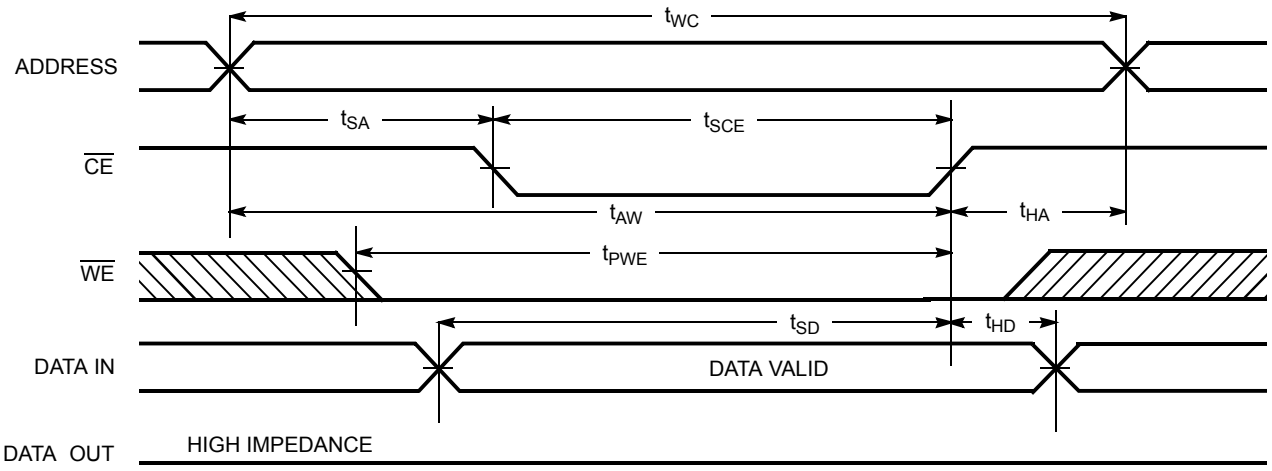


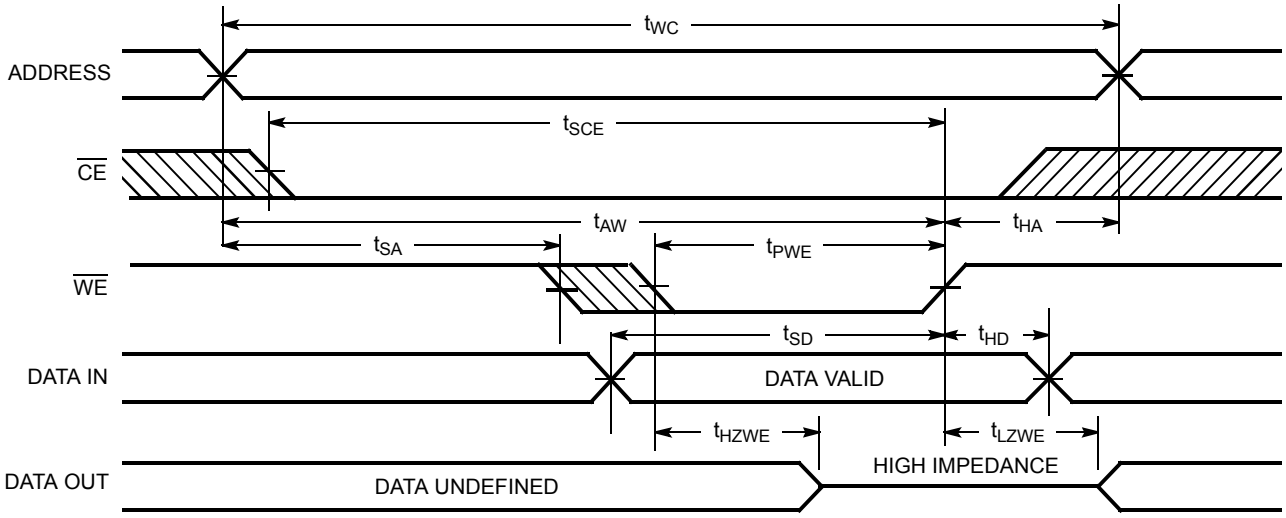
Figure 5. Write Cycle No. 1 (CE Controlled)[13]



Notes
9. No input may exceed V_{CC} + 0.5V.
10. Device is continuously selected, $\overline{CE} = V_{IL}$.
11. $\overline{WE}$ is HIGH for read cycle.
12. Address valid prior to or coincident with $\overline{CE}$ transition LOW.
13. If $\overline{CE}$ goes HIGH simultaneously with $\overline{WE}$ going HIGH, the output remains in a high impedance state.

Switching Waveforms (continued)

Figure 6. Write Cycle No. 2 ($\overline{WE}$ Controlled)[13]



Truth Table

$\overline{CE}$	$\overline{WE}$	D_{OUT}	Mode	Power
H	X	High Z	Power Down	Standby (I_{SB})
L	H	Data Out	Read	Active (I_{CC})
L	L	High Z	Write	Active (I_{CC})

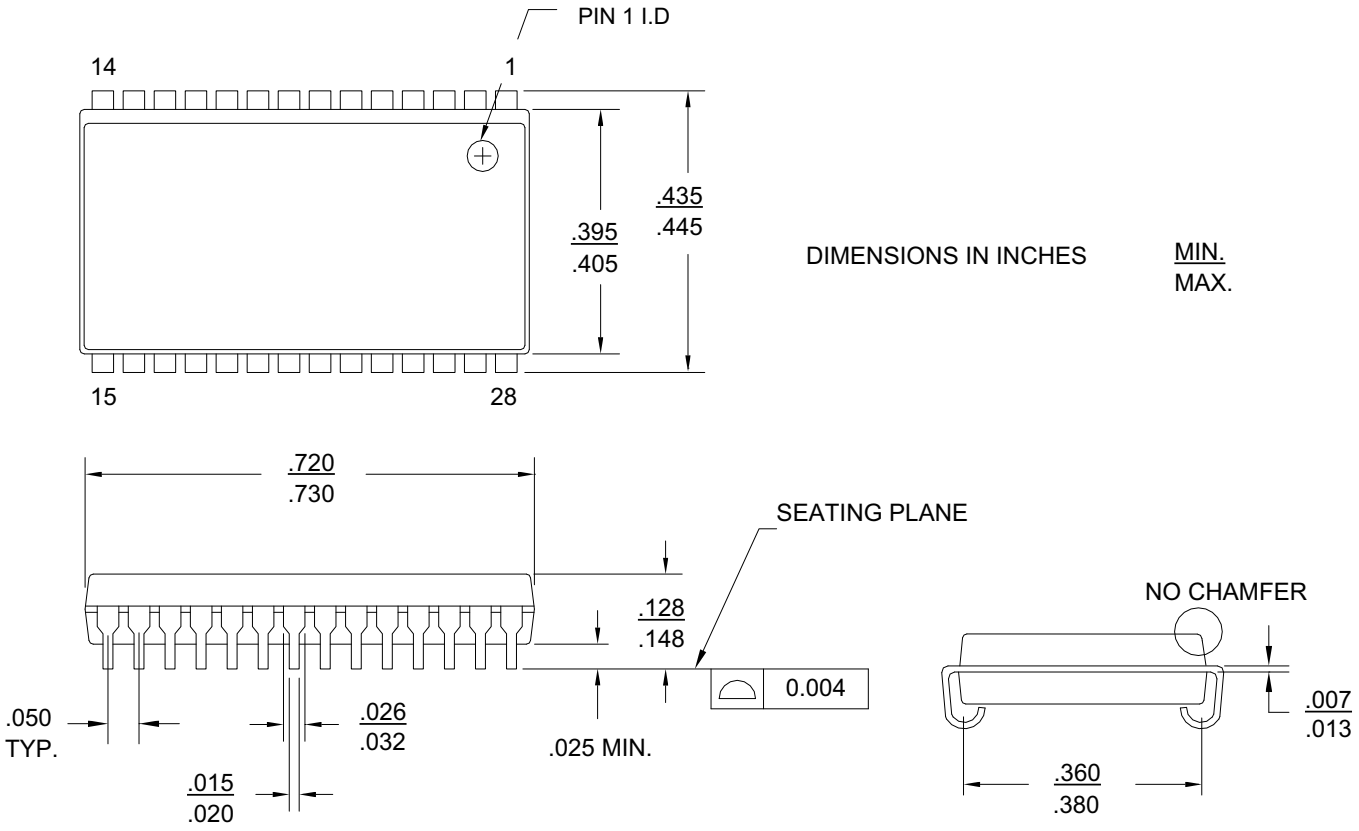
Ordering Information

Speed (ns)	Ordering Code	Package Diagram	Package Type	Operating Range
15	CY7C107BN-15VC	51-85032	28-Pin (400-Mil) Molded SOJ	Commercial

Contact your local sales representative regarding availability of these parts

Package Diagrams

Figure 7. 28-Pin (400 Mil) Molded SOJ (51-85032)



NOTES :

1. PACKAGE WEIGHT : 1.24g
2. JEDEC REFERENCE : MS-027

51-85032.*D

Document History Page

Document Title: CY7C107BN 1M x 1 Static RAM Document Number: 001-06426				
REV.	**ECN NO.**	**Submission Date**	**Orig. of Change**	**Description of Change**
**	423847	See ECN	NXR	New Data Sheet
*A	2891262	03/12/2010	VKN	Removed CY7C1007BN from the datasheet, Removed Industrial operating grade, Removed 28-Pin (300-Mil) Molded SOJ package, Updated 28-Pin (400-Mil) Molded SOJ POD Updated Ordering Infomation table Updated URLs in Sales, Solutions, and Legal Information

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