CY7C107BN
CY7C1007BN

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 and CY7C1007BN are 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 three-state drivers. These devices have an automatic power-down feature that reduces power consumption by more than 65% when deselected.

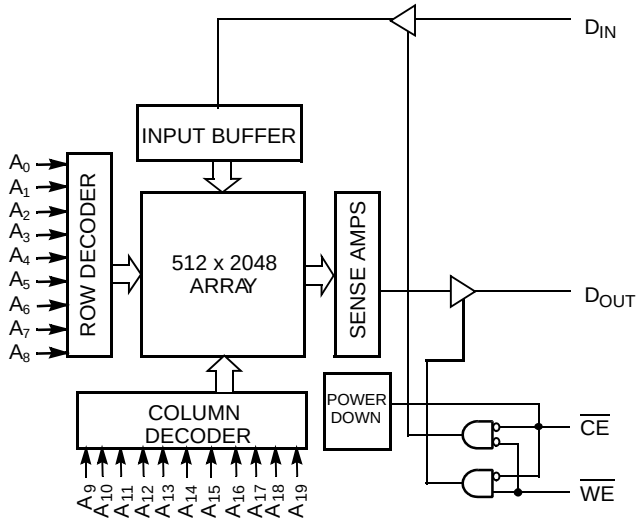
Writing to the devices is accomplished by taking Chip Enable ($\overline{CE}$) and Write Enable ($\overline{WE}$) inputs LOW. Data on the input pin (D_{IN}) is written into the memory location specified on the address pins (A_0 through A_{19}).

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 will 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).

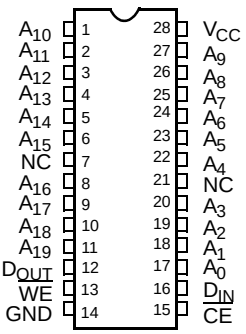
The CY7C107BN is available in a standard 400-mil-wide SOJ; the CY7C1007BN is available in a standard 300-mil-wide SOJ

Logic Block Diagram



Pin Configuration

SOJ
Top View



Selection Guide

	7C107BN-15 7C1007BN-15
Maximum Access Time (ns)	15
Maximum Operating Current (mA)	80
Maximum CMOS Standby Current I_{SB2} (mA)	2

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 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%
Industrial	-40°C to +85°C	5V ± 10%

Electrical Characteristics Over the Operating Range

Parameter	Description	Test Conditions	7C107BN-15 7C1007BN-15		Unit
			Min.	Max.	
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

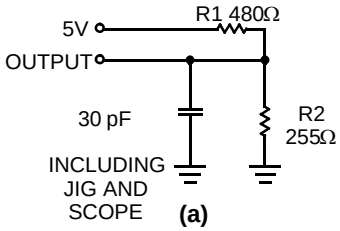
Capacitance[4]

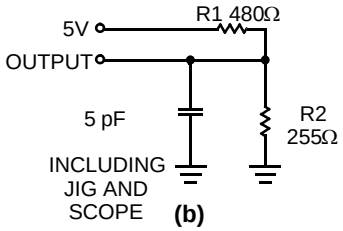
Parameter	Description	Test Conditions	Max.	Unit
C_{IN}: Addresses	Input Capacitance	T_A = 25 × C, f = 1 MHz, V_{CC} = 5.0V	7	pF
C_{IN}: Controls			10	pF
C_{OUT}	Output Capacitance		10	pF

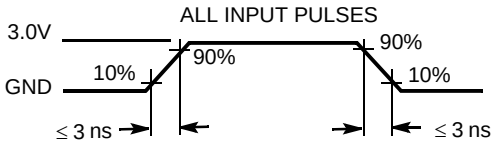
Notes:
1. V_{IL} (min.) = –2.0V for pulse durations of less than 20 ns.
2. T_A is the “Instant On” case temperature.
3. Not more than 1 output should be shorted at one time. Duration of the short circuit should not exceed 30 seconds.
4. Tested initially and after any design or process changes that may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

[+] Feedback

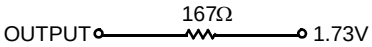
AC Test Loads and Waveforms







Equivalent to: THÉVENIN EQUIVALENT



Switching Characteristics[5] Over the Operating Range

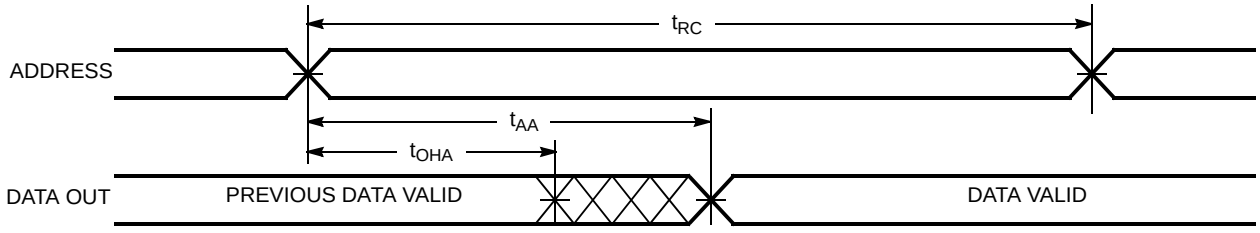
Parameter	Description	7C107BN-15 7C1007BN-15		Unit
		Min.	Max.	
READ CYCLE				
t_{RC}	Read Cycle Time	15		ns
t_{AA}	Address to Data Valid		15	ns
t_{OHA}	Data Hold from Address Change	3		ns
t_{ACE}	$\overline{CE}$ LOW to Data Valid		15	ns
t_{LZCE}	$\overline{CE}$ LOW to Low Z[6]	3		ns
t_{HZCE}	$\overline{CE}$ 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 Set-Up to Write End	12		ns
t_{HA}	Address Hold from Write End	0		ns
t_{SA}	Address Set-Up to Write Start	0		ns
t_{PWE}	$\overline{WE}$ Pulse Width	12		ns
t_{SD}	Data Set-Up 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 set-up and hold timing should be referenced to the leading edge of the signal that terminates the write.

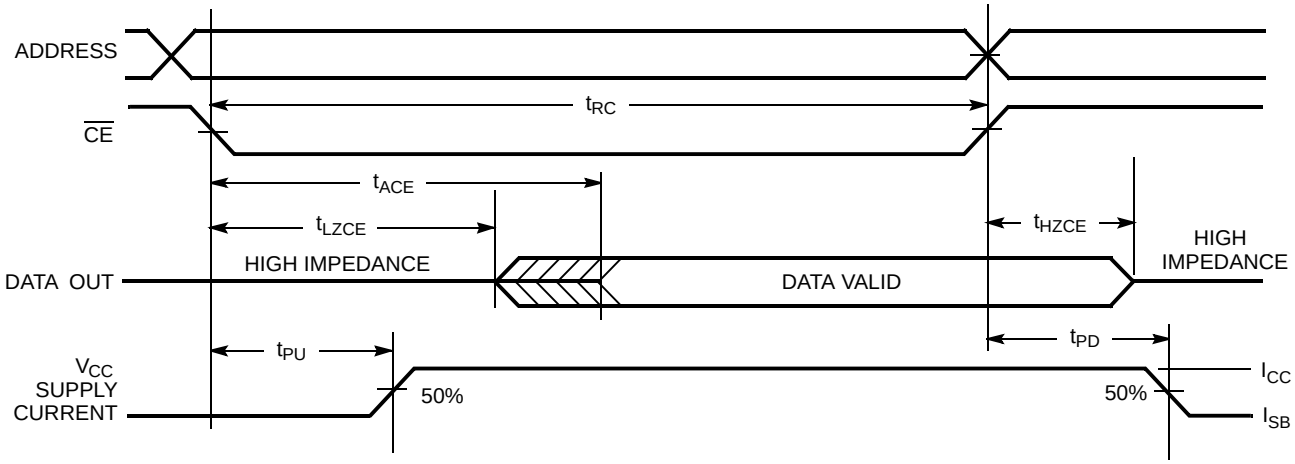
[+] Feedback

Switching Waveforms

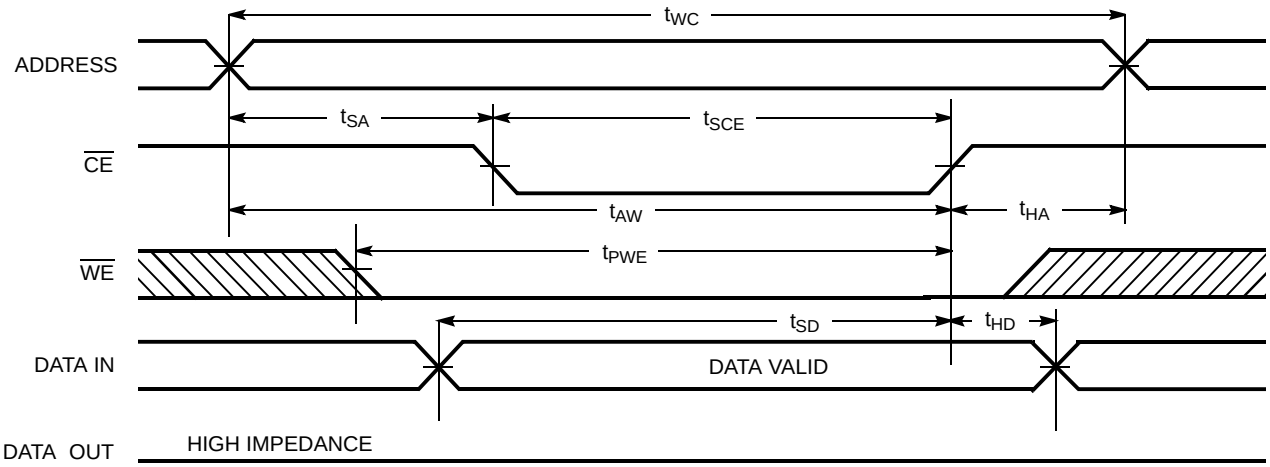
Read Cycle No. 1[10, 11]



Read Cycle No. 2[11, 12]



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

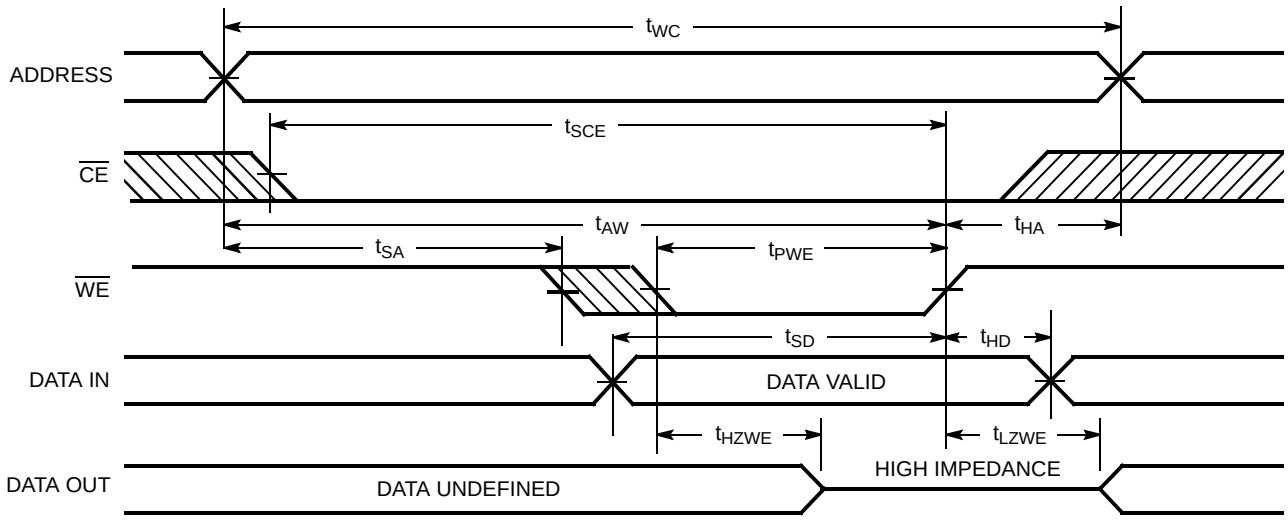


Notes:
9. No input may exceed V_{CC} + 0.5V.
10. Device is continuously selected, $\overline{CE} = V_{IL}$.
11. $\overline{WE}$ is HIGH for read cycle.
12. Address valid prior to or coincident with $\overline{CE}$ transition LOW.
13. If $\overline{CE}$ goes HIGH simultaneously with $\overline{WE}$ going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

[+] Feedback

Switching Waveforms (continued)

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

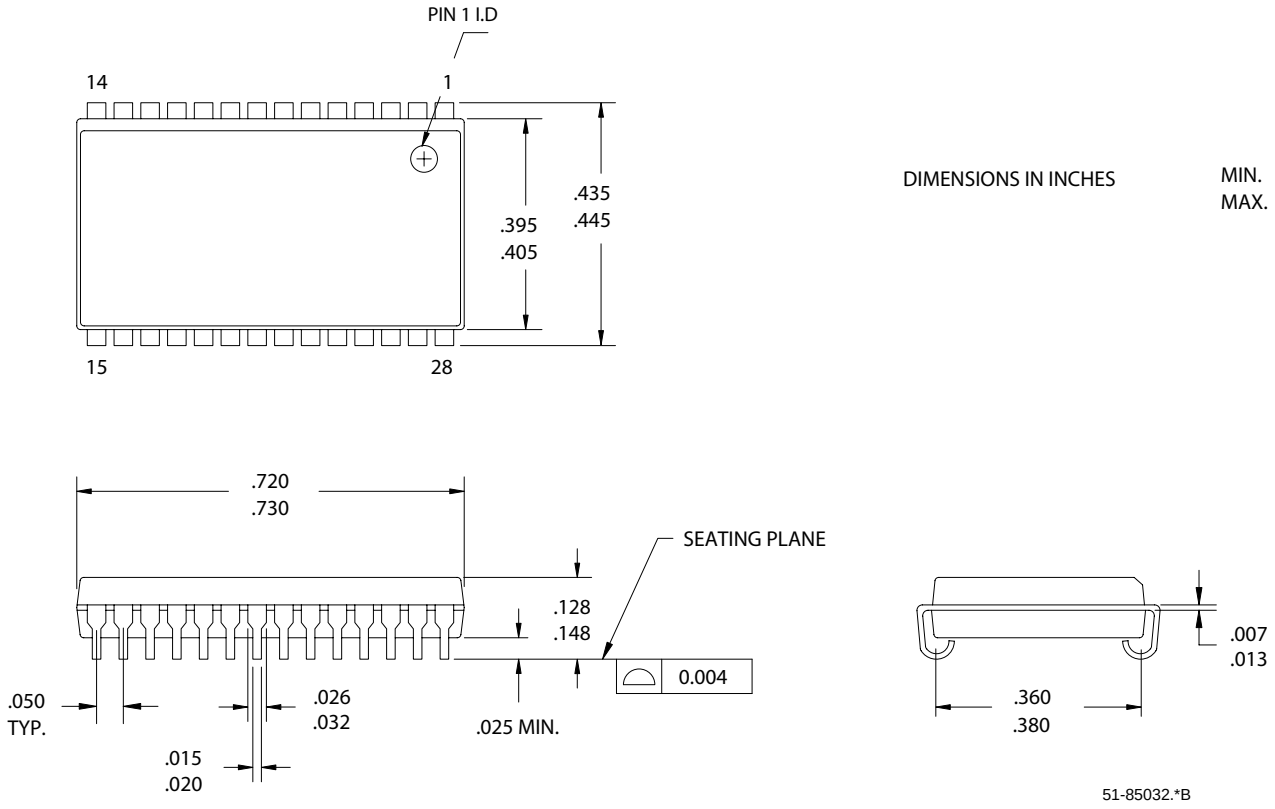
Speed (ns)	Ordering Code	Package Diagram	Package Type	Operating Range
15	CY7C107BN-15VC	51-85032	28-Lead (400-Mil) Molded SOJ	Commercial
	CY7C1007BN-15VC	51-85031	28-Lead (300-Mil) Molded SOJ	
	CY7C1007BN-15VXC	51-85031	28-Lead (300-Mil) Molded SOJ (Pb-free)	
	CY7C107BN-15VI	51-85032	28-Lead (400-Mil) Molded SOJ	Industrial

Please contact local sales representative regarding availability of these parts

[+] Feedback

Package Diagrams

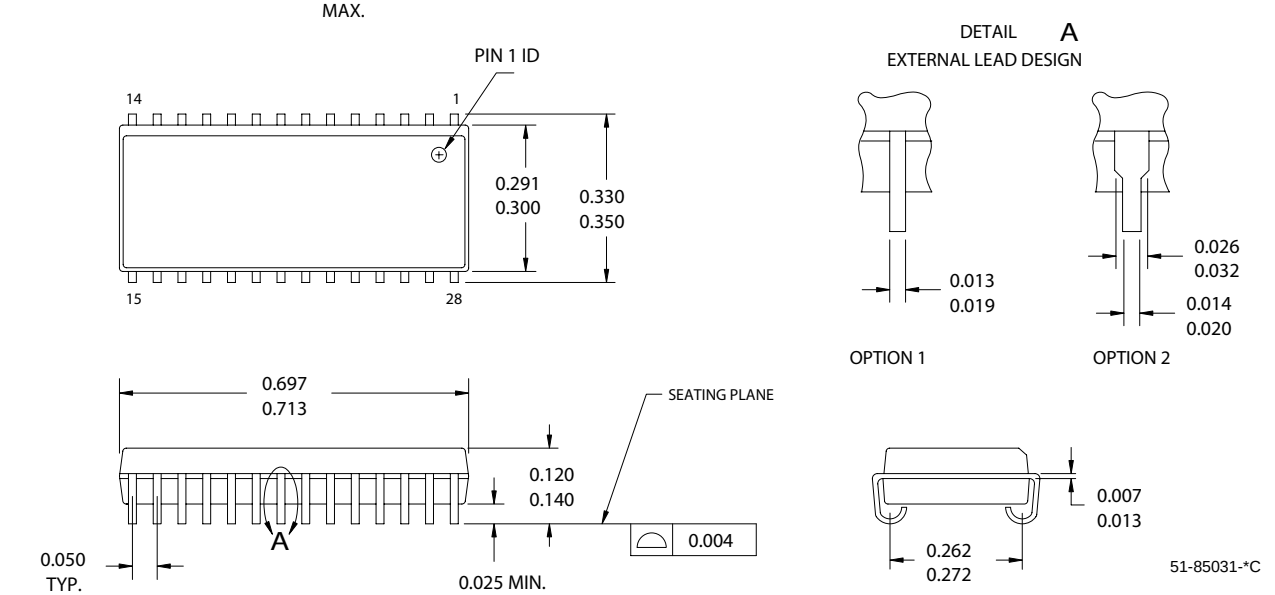
28-Lead (400-Mil) Molded SOJ (51-85032)



28-Lead (300-Mil) Molded SOJ (51-85031)

NOTE :

1. JEDEC STD REF MO088
2. BODY LENGTH DIMENSION DOES NOT INCLUDE MOLD PROTRUSION/END FLASH
   MOLD PROTRUSION/END FLASH SHALL NOT EXCEED 0.006 in (0.152 mm) PER SIDE
3. DIMENSIONS IN INCHES MIN.
   MAX.



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Document History Page

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REV.	**ECN NO.**	**Issue Date**	**Orig. of Change**	**Description of Change**
**	423847	See ECN	NXR	New Data Sheet

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