



# CY7C197B

## 256 Kb (256K x 1) Static RAM

### Features

- **Fast access time: 12 ns and 25 ns**
- **Wide voltage range: 5.0V ± 10% (4.5V to 5.5V)**
- **CMOS for optimum speed/power**
- **TTL-compatible Inputs and Outputs**
- **Available in 24 DIP and 24 SOJ**

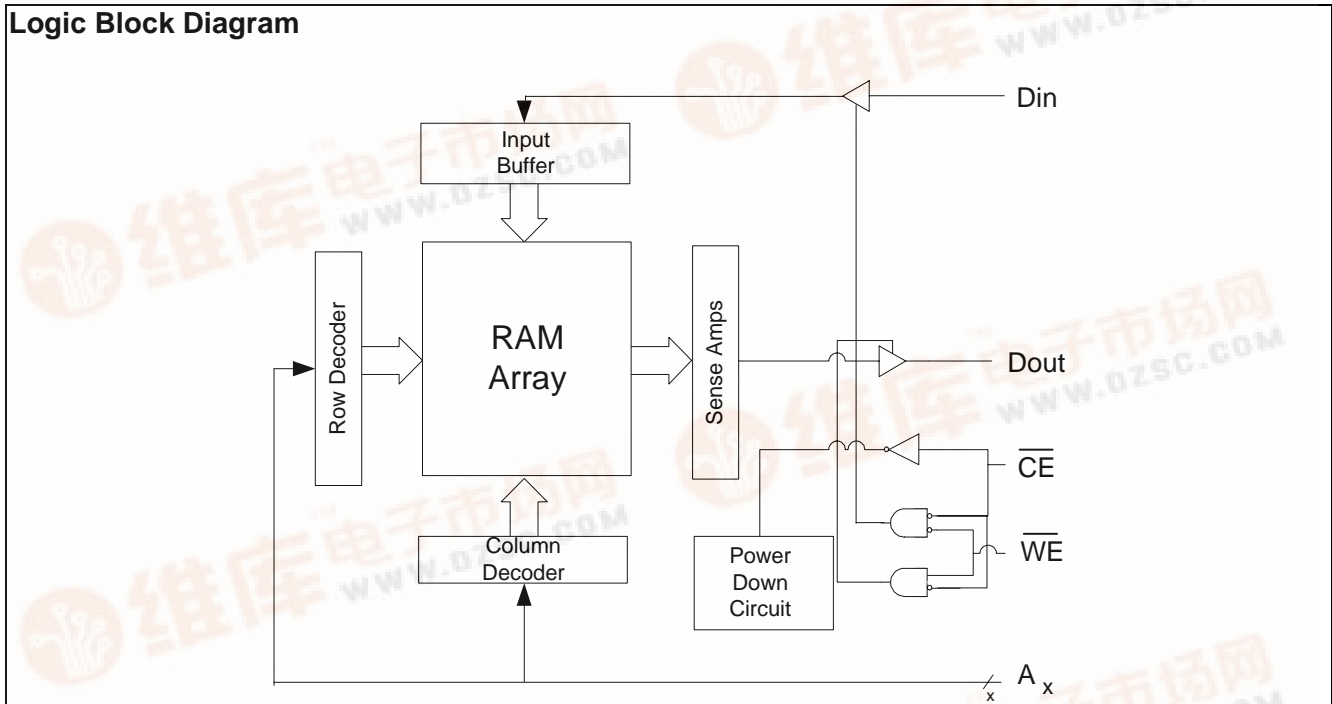
### General Description<sup>1</sup>

The CY7C197B is a high-performance CMOS Asynchronous SRAM organized as 256K x 1 bits that supports an asynchronous memory interface. The device features an automatic power-down feature that significantly reduces power consumption when deselected.

See the Truth Table in this data sheet for a complete description of read and write modes.

The CY7C197B is available in 24 DIP and 24 SOJ package(s).

### Logic Block Diagram



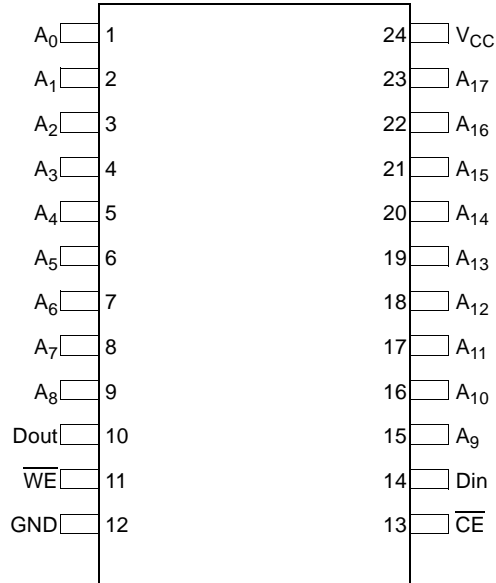
### Product Portfolio

	12 ns	25 ns	Unit
Maximum Access Time	12	25	ns
Maximum Operating Current	150	95	mA
Maximum CMOS Standby Current	10	10	mA

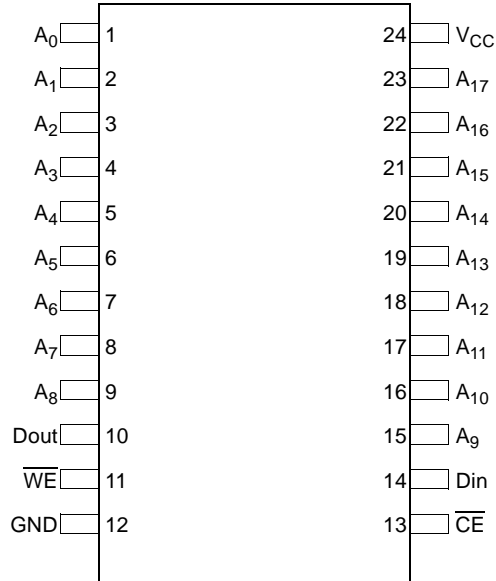


**Pin Layout and Specifications**

**24 DIP (6.6 × 31.8 × 3.5 mm) – P13**



**24 SOJ (8 × 15 × 3.5 mm) – V13**





**Pin Description**

Pin	Type	Description	DIP	SOJ
A <sub>x</sub>	Input	Address Inputs.	1, 2, 3, 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 23	1, 2, 3, 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 23
CE	Control	Chip Enable.	13	13
Din	Input	Data Input Pins.	14	14
Dout	Output	Data Output Pins.	10	10
V <sub>CC</sub>	Supply	Power (5.0V).	24	24
WE	Control	Write Enable.	11	11

**Truth Table**

$\overline{CE}$	$\overline{WE}$	Input/Output	Mode	Power
H	X	High Z	Deselect/Power-Down	Standby (I <sub>SB</sub> )
L	H	Data Out	Read	Active (I <sub>CC</sub> )
L	L	Data In	Write	Active (I <sub>CC</sub> )

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

Parameter	Description	Value	Unit
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C
T <sub>AMB</sub>	Ambient Temperature with Power Applied (i.e., case temperature)	-55 to +125	°C
V <sub>CC</sub>	Core Supply Voltage Relative to V <sub>SS</sub>	-0.5 to +7.0	V
V <sub>IN</sub> , V <sub>OUT</sub>	DC Voltage Applied to any Pin Relative to V <sub>SS</sub>	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>OUT</sub>	Output Short-Circuit Current	20	mA
V <sub>ESD</sub>	Static Discharge Voltage (per MIL-STD-883, Method 3015)	> 2001	V
I <sub>LU</sub>	Latch-up Current	> 200	mA

### Operating Range

Range	Ambient Temperature (T <sub>A</sub> )	Voltage Range (V <sub>CC</sub> )
Commercial	0°C to 70°C	5.0V ± 10%

### DC Electrical Characteristics<sup>2</sup>

Parameter	Description	Condition	12 ns		25 ns		Unit
			Min	Max	Min	Max	
V <sub>IH</sub>	Input HIGH Voltage	-	2.2	V <sub>CC</sub> +0.3	2.2	V <sub>CC</sub> +0.3	V
V <sub>IL</sub>	Input LOW Voltage		-0.3	0.8	-0.3	0.8	V
V <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = Min., I <sub>OH</sub> = -4.0 mA	2.4	-	2.4	-	V
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = Min., I <sub>OL</sub> = 8.0 mA	-	0.4	-	0.4	V
I <sub>CC</sub>	V <sub>CC</sub> Operating Supply Current	V <sub>CC</sub> = Max., I <sub>OUT</sub> = 0 mA, f = F <sub>MAX</sub> = 1/t <sub>RC</sub>	-	150	-	95	mA
I <sub>SB1</sub>	Automatic CE Power-down Current TTL Inputs	V <sub>CC</sub> = Max., CE ≥ V <sub>IH</sub> , V <sub>IN</sub> ≥ V <sub>IH</sub> or V <sub>IN</sub> ≤ V <sub>IL</sub> , f = F <sub>MAX</sub>	-	30	-	30	mA
I <sub>SB2</sub>	Automatic CE Power-down Current CMOS Inputs	V <sub>CC</sub> = Max., CE ≥ V <sub>CC</sub> - 0.3v, V <sub>IN</sub> ≥ V <sub>CC</sub> - 0.3v or V <sub>IN</sub> < 0.3v, f = 0	-	10	-	10	mA
I <sub>OZ</sub>	Output Leakage Current	GND ≤ V <sub>i</sub> ≤ V <sub>CC</sub> , Output Disabled	-5	+5	-5	+5	uA
I <sub>IX</sub>	Input Load Current	GND ≤ V <sub>i</sub> ≤ V <sub>CC</sub>	-5	+5	-5	+5	uA

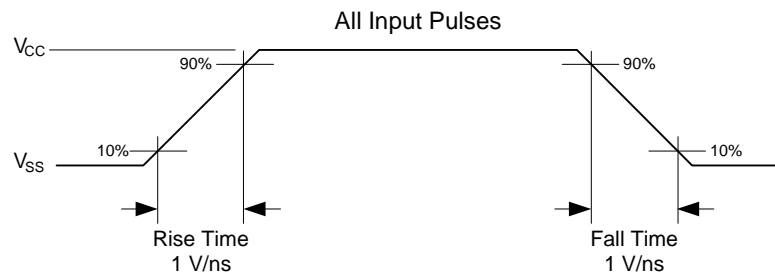
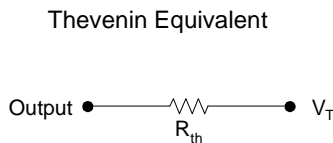
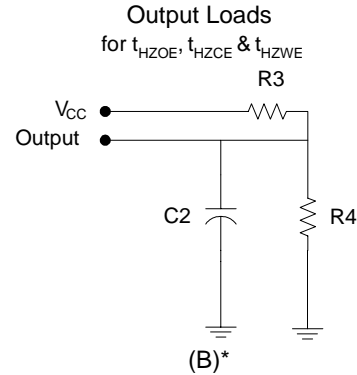
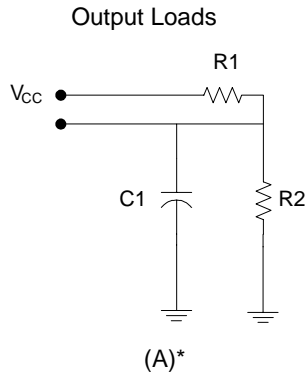
### Capacitance<sup>3</sup>

Parameter	Description	Conditions	Max	Unit
			ALL - PACKAGES	
C <sub>IN</sub>	Input Capacitance	T <sub>A</sub> = 25°C, f = 1 MHz, V <sub>CC</sub> = 5.0V	8	pF
C <sub>OUT</sub>	Output Capacitance		10	

#### Notes:

- V<sub>IL</sub> (min) = -2.0V for pulse durations of less than 20 ns.
- Tested initially and after any design or process change that may affect these parameters.

**AC Test Loads**



\* including scope and jig capacitance

**AC Test Conditions**

Parameter	Description	Nom.	Unit
C1	Capacitor 1	30	pF
C2	Capacitor 2	5	
R1	Resistor 1	480	Ω
R2	Resistor 2	255	
R3	Resistor 3	480	
R4	Resistor 4	255	
R <sub>TH</sub>	Resistor Thevenin	167	
V <sub>TH</sub>	Voltage Thevenin	1.73	V

**Thermal Resistance<sup>4</sup>**

Parameter	Description	Conditions	All – Packages	Unit
Θ <sub>JA</sub>	Thermal Resistance (Junction to Ambient)	Still Air, soldered on a 3 × 4.5 square inches, two-layer printed circuit board	TBD	°C/W
Θ <sub>JC</sub>	Thermal Resistance (Junction to Case)		TBD	

**Notes:**

4. Test conditions assume a transition time of 3 ns or less for –12 speed and 5 ns or less for –25 speed, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V, and output loading of the specified I<sub>OL</sub>/I<sub>OH</sub> and 30-pF load capacitance.



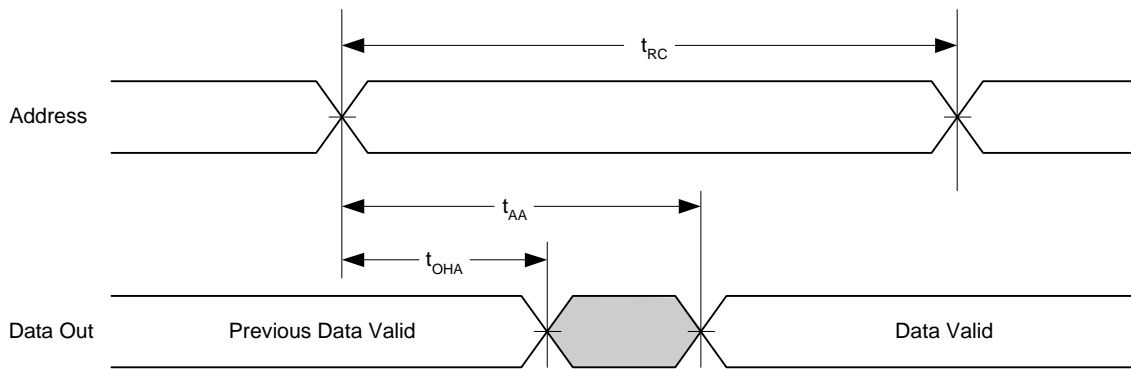
AC Electrical Characteristics<sup>5 6 7</sup>

Parameter	Description	12 ns		25 ns		Unit
		Min	Max	Min	Max	
t <sub>RC</sub>	Read Cycle Time	12	–	25	–	ns
t <sub>AA</sub>	Address to Data Valid	–	12	–	25	ns
t <sub>OHA</sub>	Data Hold from Address Change	3	–	3	–	ns
t <sub>ACE</sub>	$\overline{CE}$ to Data Valid	–	12	–	25	ns
t <sub>LZCE</sub>	$\overline{CE}$ to Low Z	3	–	3	–	ns
t <sub>HZCE</sub>	$\overline{CE}$ to High Z	–	5	–	11	ns
t <sub>PU</sub>	$\overline{CE}$ to Power-up	0	–	0	–	ns
t <sub>PD</sub>	$\overline{CE}$ to Power-down	–	12	–	20	ns
t <sub>WC</sub>	Write Cycle Time	12	–	25	–	ns
t <sub>SCE</sub>	$\overline{CE}$ to Write End	9	–	20	–	ns
t <sub>AW</sub>	Address Set-up to Write End	9	–	20	–	ns
t <sub>HA</sub>	Address Hold from Write End	0	–	0	–	ns
t <sub>SA</sub>	Address Set-up to Write Start	0	–	0	–	ns
t <sub>PWE</sub>	$\overline{WE}$ Pulse Width	8	–	20	–	ns
t <sub>SD</sub>	Data Set-up to Write End	8	–	15	–	ns
t <sub>HD</sub>	Data Hold from Write End	0	–	0	–	ns
t <sub>HZWE</sub>	$\overline{WE}$ LOW to High Z	–	7	–	11	ns
t <sub>LZWE</sub>	$\overline{WE}$ HIGH to Low Z	2	–	3	–	ns

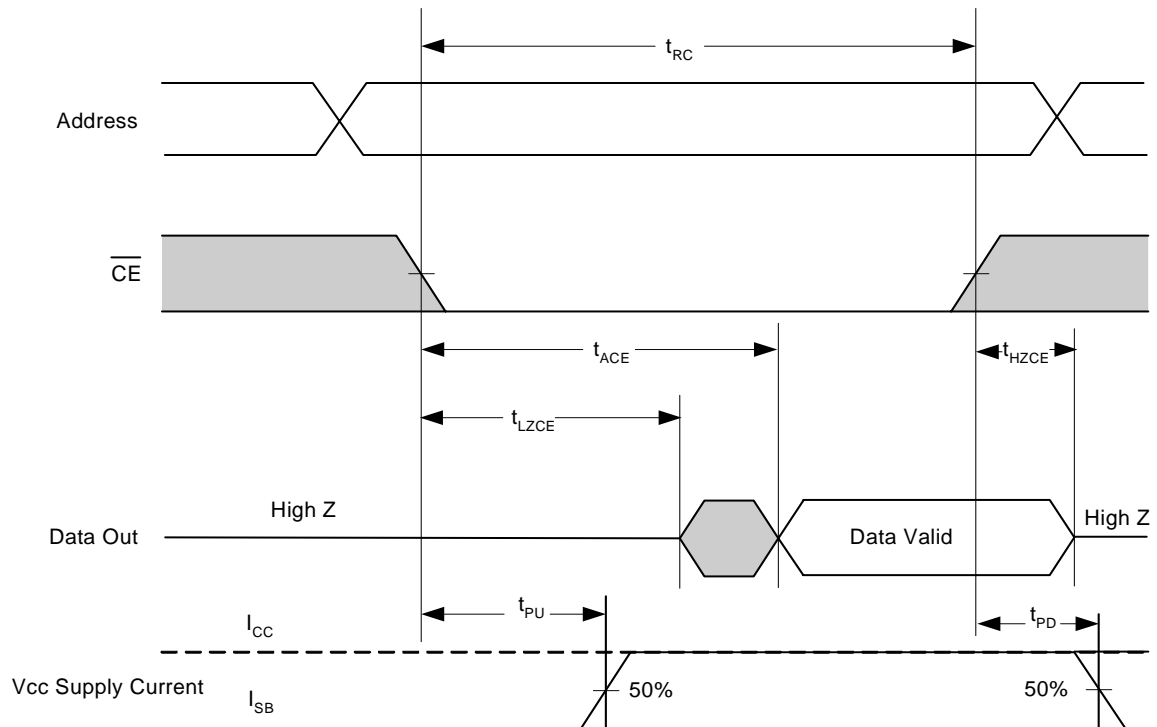
**Notes:**

5. At any given temperature and voltage condition, t<sub>HZCE</sub> is less than t<sub>LZCE</sub>, t<sub>HZOE</sub> is less than t<sub>LZOE</sub>, and t<sub>HZWE</sub> is less than t<sub>LZWE</sub> for any given device.
6. t<sub>HZCE</sub> and t<sub>LZCE</sub> are specified with CL = 5 pF as in part (B) in AC Test Loads and Waveforms. Transition is measured +/-500 mV from steady-state voltage.
7. The internal write time of the memory is defined by the overlap of  $\overline{CE}$  LOW 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.

**Timing Waveforms**  
**Read Cycle No. 1<sup>8 9</sup>**



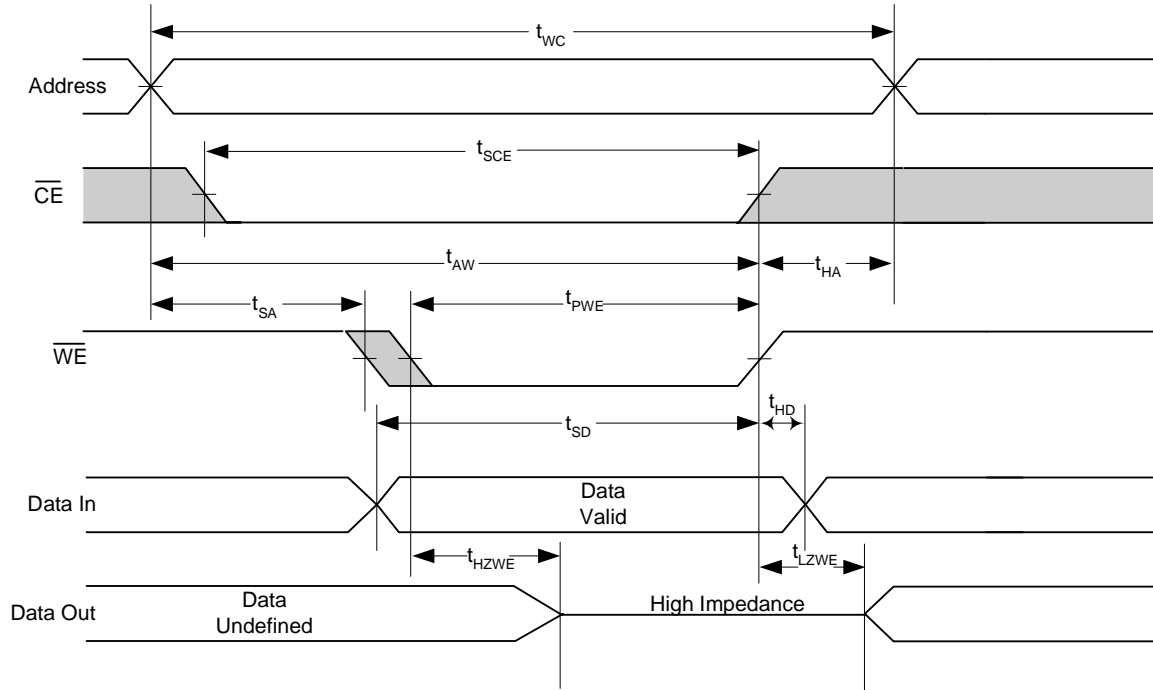
**Read Cycle No. 2<sup>8</sup>**



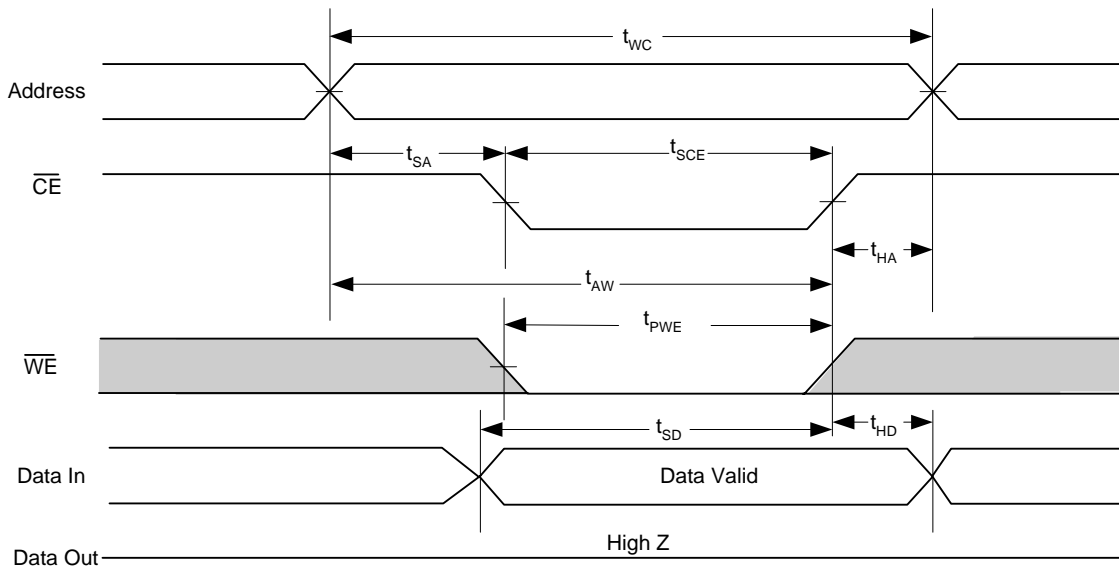
**Notes:**

- 8.  $\overline{WE}$  is HIGH for ready cycle.
- 9. Device is continuously selected,  $\overline{CE} = V_{IL}$ .

**Write Cycle No. 1 ( $\overline{WE}$  Controlled)<sup>7</sup>**



**Write Cycle No. 2 ( $\overline{CE}$  Controlled)<sup>7 10</sup>**



**Notes:**

10. If  $\overline{CE}$  goes HIGH simultaneously with  $\overline{WE}$  HIGH, the output remains in high-impedance state.



**Ordering Information**

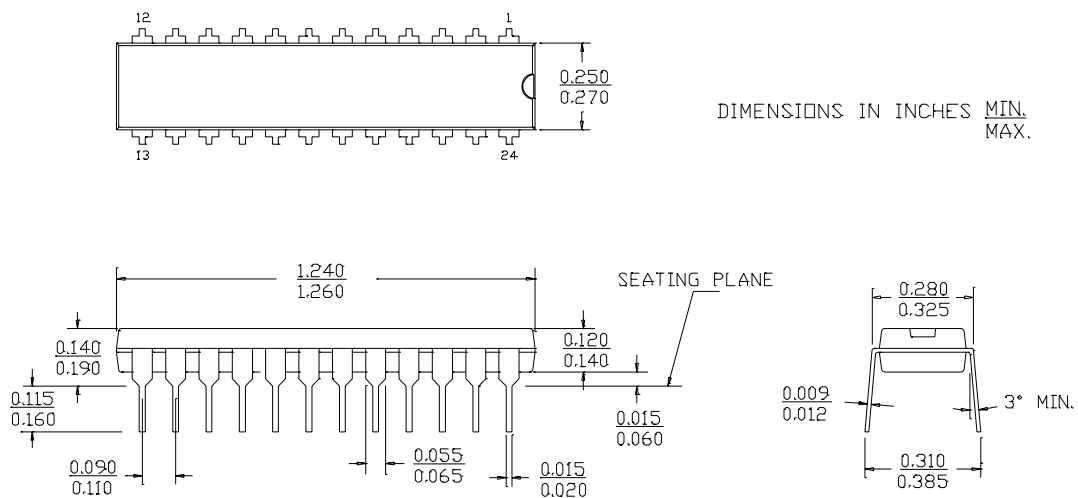
Speed	Ordering Code	Package Name	Package Type	Power Option	Operating Range
12 ns	CY7C197B-12VC	V13	24 SOJ (8 x 15 x 3.5 mm)	Standard	Commercial
25 ns	CY7C197B-25PC	P13	24 DIP (6.6 x 31.8 x 3.5 mm)	Standard	Commercial

**Package Diagram**

**24-Lead (300-Mil) Molded SOJ V13**

51-85030-\*A

**24-Lead (300-Mil) PDIP P13**



51-85013-\*B

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**Document History Page**

<b>Document Title: CY7C197B 256 Kb (256K x 1) Static RAM</b> <b>Document Number: 38-05410</b>				
<b>REV.</b>	<b>ECN No.</b>	<b>Issue Date</b>	<b>Orig. of Change</b>	<b>Description of Change</b>
**	129235	09/16/03	HGK	New Data Sheet