

## 512K x 16 Static RAM

### Features

- **Temperature Ranges**
  - Automotive-A: -40°C to 85°C
  - Automotive-E: -40°C to 125°C
- **Voltage range:**
  - CY62157CV30: 2.7V–3.3V
  - CY62157CV33: 3.0V–3.6V
- **Ultra-low active power**
  - Typical active current: 1.5 mA @ f = 1 MHz
  - Typical active current: 5.5 mA @ f = f<sub>max</sub>
- **Low standby power**
- **Easy memory expansion with  $\overline{CE}_1$ ,  $\overline{CE}_2$  and  $\overline{OE}$  features**
- **Automatic power-down when deselected**
- **CMOS for optimum speed/power**
- **Available in Pb-free and non Pb-free 48-ball FBGA package**

### Functional Description<sup>[1]</sup>

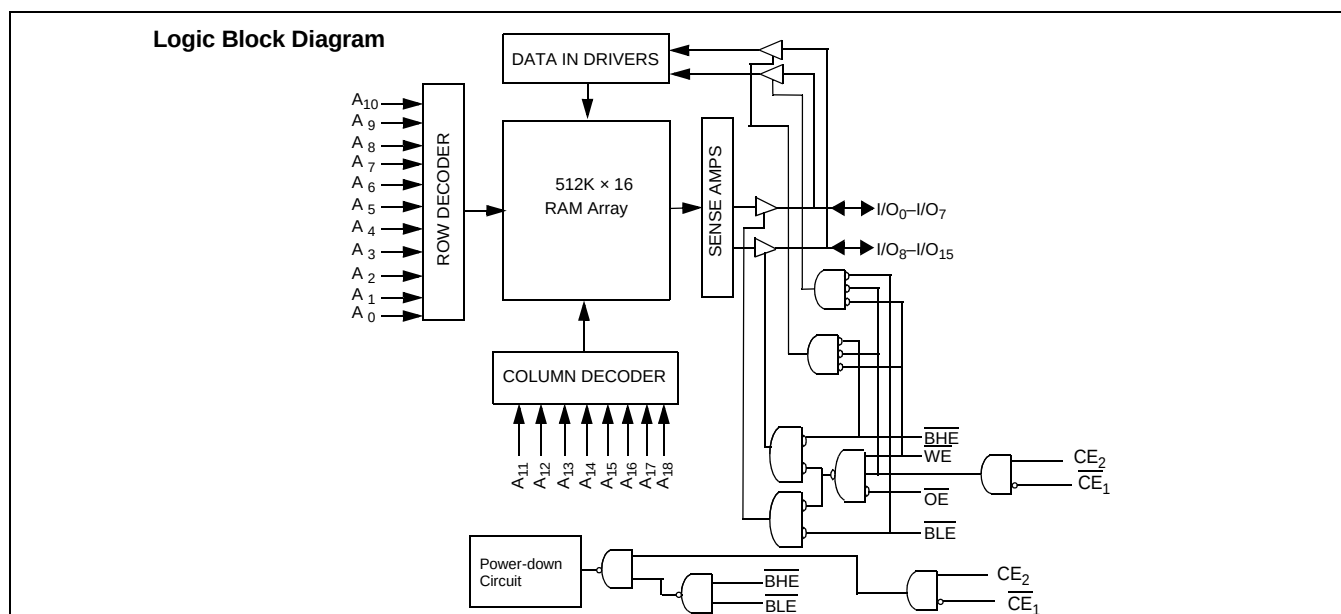
The CY62157CV30/33 are high-performance CMOS static RAMs organized as 512K words by 16 bits. These devices feature advanced circuit design to provide ultra-low active current. This is ideal for providing More Battery Life™ (MoBL™) in portable applications such as cellular telephones. The devices also have an automatic power-down feature that

significantly reduces power consumption by 80% when addresses are not toggling. The device can also be put into standby mode reducing power consumption by more than 99% when deselected ( $\overline{CE}_1$  HIGH or  $\overline{CE}_2$  LOW or both BLE and BHE are HIGH). The input/output pins (I/O<sub>0</sub> through I/O<sub>15</sub>) are placed in a high-impedance state when: deselected ( $\overline{CE}_1$  HIGH or  $\overline{CE}_2$  LOW), outputs are disabled ( $\overline{OE}$  HIGH), both Byte High Enable and Byte Low Enable are disabled (BHE, BLE HIGH), or during a write operation ( $\overline{CE}_1$  LOW and  $\overline{CE}_2$  HIGH and WE LOW).

Writing to the device is accomplished by taking Chip Enable 1 ( $\overline{CE}_1$ ) and Write Enable (WE) inputs LOW and Chip Enable 2 ( $\overline{CE}_2$ ) HIGH. If Byte Low Enable (BLE) is LOW, then data from I/O pins (I/O<sub>0</sub> through I/O<sub>7</sub>), is written into the location specified on the address pins (A<sub>0</sub> through A<sub>18</sub>). If Byte High Enable (BHE) is LOW, then data from I/O pins (I/O<sub>8</sub> through I/O<sub>15</sub>) is written into the location specified on the address pins (A<sub>0</sub> through A<sub>18</sub>).

Reading from the device is accomplished by taking Chip Enable 1 ( $\overline{CE}_1$ ) and Output Enable ( $\overline{OE}$ ) LOW and Chip Enable 2 ( $\overline{CE}_2$ ) HIGH while forcing the Write Enable (WE) HIGH. If Byte Low Enable (BLE) is LOW, then data from the memory location specified by the address pins will appear on I/O<sub>0</sub> to I/O<sub>7</sub>. If Byte High Enable (BHE) is LOW, then data from memory will appear on I/O<sub>8</sub> to I/O<sub>15</sub>. See the truth table at the back of this data sheet for a complete description of read and write modes.

The CY62157CV30/33 are available in a 48-ball FBGA package.



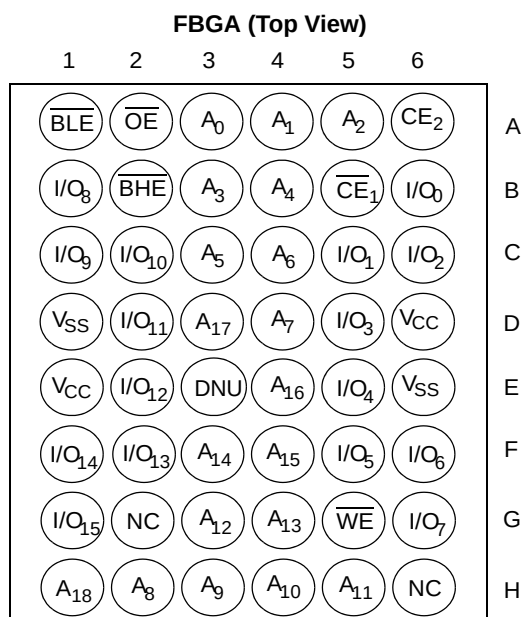
**Note:**

1. For best practice recommendations, please refer to the Cypress application note "System Design Guidelines" on <http://www.cypress.com>.

## Product Portfolio

| Product     | Range        | V <sub>CC</sub> Range |                     |      | Power Dissipation               |      |                      |      |                                   |      |
|-------------|--------------|-----------------------|---------------------|------|---------------------------------|------|----------------------|------|-----------------------------------|------|
|             |              |                       |                     |      | Operating (I <sub>CC</sub> ) mA |      |                      |      | Standby (I <sub>SB2</sub> )<br>μA |      |
|             |              |                       |                     |      | f = 1 MHz                       |      | f = f <sub>max</sub> |      |                                   |      |
|             |              | Min.                  | Typ. <sup>[2]</sup> | Max. | Typ. <sup>[2]</sup>             | Max. | Typ. <sup>[2]</sup>  | Max. | Typ. <sup>[2]</sup>               | Max. |
| CY62157CV30 | Automotive-E | 2.7V                  | 3.0V                | 3.3V | 1.5                             | 3    | 7                    | 15   | 8                                 | 70   |
| CY62157CV33 | Automotive-A | 3.0V                  | 3.3V                | 3.6V | 1.5                             | 3    | 5.5                  | 12   | 10                                | 30   |
|             | Automotive-E |                       |                     |      | 1.5                             | 3    | 7                    | 15   | 10                                | 80   |

## Pin Configurations<sup>[2, 3, 4]</sup>



## Pin Definitions

| Name          | Definition                                                                                                                                                                                           |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input         | <b>A<sub>0</sub>-A<sub>18</sub></b> . Address Inputs                                                                                                                                                 |
| Input/Output  | <b>I/O<sub>0</sub>-I/O<sub>15</sub></b> . Data lines. Used as input or output lines depending on operation                                                                                           |
| Input/Control | <b>WE</b> . Write Enable, Active LOW. When selected LOW, a WRITE is conducted. When selected HIGH, a READ is conducted.                                                                              |
| Input/Control | <b>CE<sub>1</sub></b> . Chip Enable 1, Active LOW.                                                                                                                                                   |
| Input/Control | <b>CE<sub>2</sub></b> . Chip Enable 2, Active HIGH.                                                                                                                                                  |
| Input/Control | <b>OE</b> . Output Enable, Active LOW. Controls the direction of the I/O pins. When LOW, the I/O pins behave as outputs. When deasserted HIGH, I/O pins are three-stated, and act as input data pins |
| Ground        | <b>V<sub>SS</sub></b> . Ground for the device                                                                                                                                                        |
| Power Supply  | <b>V<sub>CC</sub></b> . Power supply for the device                                                                                                                                                  |

### Notes:

- Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V<sub>CC</sub> = V<sub>CC(typ.)</sub>, T<sub>A</sub> = 25°C.
- NC pins are not connected on the die.
- E3 (DNU) can be left as NC or V<sub>SS</sub> to ensure proper application.

## 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  $V_{CCmax} + 0.5V$

DC Voltage Applied to Outputs in High-Z State<sup>[5]</sup> .....–0.5V to  $V_{CC} + 0.3V$

DC Input Voltage<sup>[5]</sup> .....–0.5V to  $V_{CC} + 0.3V$

Output Current into Outputs (LOW) .....20 mA

Static Discharge Voltage..... > 2001V  
(per MIL-STD-883, Method 3015)

Latch-up Current ..... > 200 mA

## Operating Range

| Device      | Range        | Ambient Temperature [T <sub>A</sub> ] <sup>[6]</sup> | V <sub>CC</sub> |
|-------------|--------------|------------------------------------------------------|-----------------|
| CY62157CV30 | Automotive-E | –40°C to +125°C                                      | 2.7V – 3.3V     |
| CY62157CV33 | Automotive-A | –40°C to +85°C                                       | 3.0V – 3.6V     |
|             | Automotive-E | –40°C to +125°C                                      |                 |

## Electrical Characteristics Over the Operating Range

| Parameter        | Description                                  | Test Conditions                                                                                                                                                                                                 | CY62157CV30-70 |                     |                        | Unit |
|------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------|------------------------|------|
|                  |                                              |                                                                                                                                                                                                                 | Min.           | Typ. <sup>[2]</sup> | Max.                   |      |
| V <sub>OH</sub>  | Output HIGH Voltage                          | I <sub>OH</sub> = –1.0 mA<br>V <sub>CC</sub> = 2.7V                                                                                                                                                             | 2.4            |                     |                        | V    |
| V <sub>OL</sub>  | Output LOW Voltage                           | I <sub>OL</sub> = 2.1 mA<br>V <sub>CC</sub> = 2.7V                                                                                                                                                              |                |                     | 0.4                    | V    |
| V <sub>IH</sub>  | Input HIGH Voltage                           |                                                                                                                                                                                                                 | 2.2            |                     | V <sub>CC</sub> + 0.3V | V    |
| V <sub>IL</sub>  | Input LOW Voltage                            |                                                                                                                                                                                                                 | –0.3           |                     | 0.8                    | V    |
| I <sub>IX</sub>  | Input Leakage Current                        | GND ≤ V <sub>I</sub> ≤ V <sub>CC</sub>                                                                                                                                                                          | –10            |                     | +10                    | μA   |
| I <sub>OZ</sub>  | Output Leakage Current                       | GND ≤ V <sub>O</sub> ≤ V <sub>CC</sub> , Output Disabled                                                                                                                                                        | –10            |                     | +10                    | μA   |
| I <sub>CC</sub>  | V <sub>CC</sub> Operating Supply Current     | f = f <sub>MAX</sub> = 1/t <sub>RC</sub><br>f = 1 MHz                                                                                                                                                           |                | 7                   | 15                     | mA   |
|                  |                                              | V <sub>CC</sub> = 3.3V<br>I <sub>OUT</sub> = 0 mA<br>CMOS Levels                                                                                                                                                |                | 1.5                 | 3                      |      |
| I <sub>SB1</sub> | Automatic CE Power-Down Current— CMOS Inputs | $\overline{CE}_1 \geq V_{CC} - 0.2V$ or $CE_2 \leq 0.2V$<br>V <sub>IN</sub> ≥ V <sub>CC</sub> – 0.2V or V <sub>IN</sub> ≤ 0.2V,<br>f = f <sub>max</sub> (Address and Data Only),<br>f = 0 (OE, WE, BHE and BLE) |                | 8                   | 70                     | μA   |
| I <sub>SB2</sub> | Automatic CE Power-Down Current—CMOS Inputs  | $\overline{CE}_1 \geq V_{CC} - 0.2V$ or $CE_2 \leq 0.2V$<br>V <sub>IN</sub> ≥ V <sub>CC</sub> – 0.2V or V <sub>IN</sub> ≤ 0.2V,<br>f = 0, V <sub>CC</sub> = 3.3V                                                |                | 8                   | 70                     | μA   |

### Notes:

5. V<sub>IL(min.)</sub> = –2.0V for pulse durations less than 20 ns.

6. T<sub>A</sub> is the “Instant-On” case temperature.

**Electrical Characteristics** Over the Operating Range

| Parameter        | Description                                 | Test Conditions                                                                                                                                                                                                                  |                                                                  | CY62157CV33-70    |                     |                        | Unit |    |
|------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------|---------------------|------------------------|------|----|
|                  |                                             |                                                                                                                                                                                                                                  |                                                                  | Min.              | Typ. <sup>[2]</sup> | Max.                   |      |    |
| V <sub>OH</sub>  | Output HIGH Voltage                         | I <sub>OH</sub> = −1.0 mA<br>V <sub>CC</sub> = 3.0V                                                                                                                                                                              |                                                                  | 2.4               |                     |                        | V    |    |
| V <sub>OL</sub>  | Output LOW Voltage                          | I <sub>OL</sub> = 2.1 mA<br>V <sub>CC</sub> = 3.0V                                                                                                                                                                               |                                                                  |                   |                     | 0.4                    | V    |    |
| V <sub>IH</sub>  | Input HIGH Voltage                          |                                                                                                                                                                                                                                  |                                                                  | 2.2               |                     | V <sub>CC</sub> + 0.3V | V    |    |
| V <sub>IL</sub>  | Input LOW Voltage                           |                                                                                                                                                                                                                                  |                                                                  | −0.3              |                     | 0.8                    | V    |    |
| I <sub>IX</sub>  | Input Leakage Current                       | GND ≤ V <sub>I</sub> ≤ V <sub>CC</sub>                                                                                                                                                                                           | Auto-A                                                           | −1                |                     | +1                     | μA   |    |
|                  |                                             |                                                                                                                                                                                                                                  | Auto-E                                                           | −10               |                     | +10                    | μA   |    |
| I <sub>OZ</sub>  | Output Leakage Current                      | GND ≤ V <sub>O</sub> ≤ V <sub>CC</sub> , Output Disabled                                                                                                                                                                         | Auto-A                                                           | −1                |                     | +1                     | μA   |    |
|                  |                                             |                                                                                                                                                                                                                                  | Auto-E                                                           | −10               |                     | +10                    | μA   |    |
| I <sub>CC</sub>  | V <sub>CC</sub> Operating Supply Current    | f = f <sub>MAX</sub> = 1/t <sub>RC</sub>                                                                                                                                                                                         | V <sub>CC</sub> = 3.6V<br>I <sub>OUT</sub> = 0 mA<br>CMOS Levels | Auto-A            |                     | 5.5                    | 12   | mA |
|                  |                                             |                                                                                                                                                                                                                                  |                                                                  | Auto-E            |                     | 7                      | 15   |    |
|                  |                                             | f = 1 MHz                                                                                                                                                                                                                        |                                                                  | Auto-A/<br>Auto-E |                     | 1.5                    | 3    |    |
| I <sub>SB1</sub> | Automatic CE Power-Down Current—CMOS Inputs | CE <sub>1</sub> ≥ V <sub>CC</sub> − 0.2V or<br>CE <sub>2</sub> ≤ 0.2V<br>V <sub>IN</sub> ≥ V <sub>CC</sub> − 0.2V or<br>V <sub>IN</sub> ≤ 0.2V,<br>f = f <sub>max</sub> (Address and Data Only),<br>f = 0 (OE, WE, BHE, and BLE) |                                                                  | Auto-A            |                     | 10                     | 30   | μA |
|                  |                                             |                                                                                                                                                                                                                                  | Auto-E                                                           |                   | 10                  | 80                     | μA   |    |
| I <sub>SB2</sub> | Automatic CE Power-Down Current—CMOS Inputs | CE <sub>1</sub> ≥ V <sub>CC</sub> − 0.2V or<br>CE <sub>2</sub> ≤ 0.2V<br>V <sub>IN</sub> ≥ V <sub>CC</sub> − 0.2V or<br>V <sub>IN</sub> ≤ 0.2V,<br>f = 0, V <sub>CC</sub> = 3.6V                                                 |                                                                  | Auto-A            |                     | 10                     | 30   | μA |
|                  |                                             |                                                                                                                                                                                                                                  | Auto-E                                                           |                   | 10                  | 80                     | μA   |    |

**Thermal Resistance<sup>[7]</sup>**

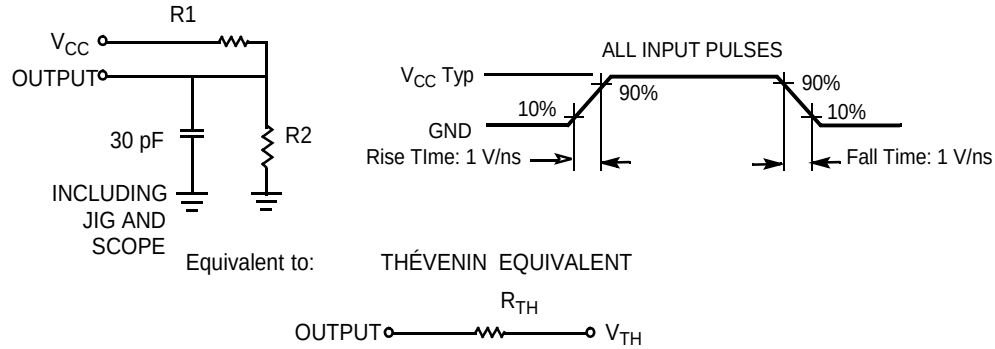
| Parameter       | Description                              | Test Conditions                                                        | FBGA | Unit |
|-----------------|------------------------------------------|------------------------------------------------------------------------|------|------|
| Θ <sub>JA</sub> | Thermal Resistance (Junction to Ambient) | Still Air, soldered on a 3 x 4.5 inch, two-layer printed circuit board | 55   | °C/W |
| Θ <sub>JC</sub> | Thermal Resistance (Junction to Case)    |                                                                        | 16   | °C/W |

**Note:**

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

**Capacitance<sup>[7]</sup>**

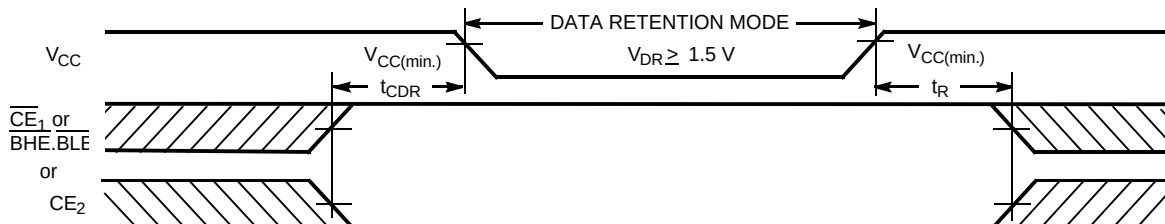
| Parameter | Description        | Test Conditions                                                                   | Max. | Unit |
|-----------|--------------------|-----------------------------------------------------------------------------------|------|------|
| $C_{IN}$  | Input Capacitance  | $T_A = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ ,<br>$V_{CC} = V_{CC}(\text{typ.})$ | 6    | pF   |
| $C_{OUT}$ | Output Capacitance |                                                                                   | 8    | pF   |

**AC Test Loads and Waveforms**


| Parameters      | 3.0V  | 3.3V  | Unit       |
|-----------------|-------|-------|------------|
| R1              | 1.105 | 1.216 | K $\Omega$ |
| R2              | 1.550 | 1.374 | K $\Omega$ |
| R <sub>TH</sub> | 0.645 | 0.645 | K $\Omega$ |
| V <sub>TH</sub> | 1.75  | 1.75  | V          |

**Data Retention Characteristics (Over the Operating Range)**

| Parameter                       | Description                          | Conditions                                                                                                                                                           | Min.            | Typ. <sup>[2]</sup> | Max. | Unit          |
|---------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------|------|---------------|
| V <sub>DR</sub>                 | V <sub>CC</sub> for Data Retention   |                                                                                                                                                                      | 1.5             |                     |      | V             |
| I <sub>CCDR</sub>               | Data Retention Current               | $V_{CC} = 1.5\text{V}$ , $\overline{CE}_1 \geq V_{CC} - 0.2\text{V}$ or $CE_2 \leq 0.2\text{V}$ ,<br>$V_{IN} \geq V_{CC} - 0.2\text{V}$ or $V_{IN} \leq 0.2\text{V}$ | Auto-A          | 4                   | 20   | $\mu\text{A}$ |
|                                 |                                      |                                                                                                                                                                      | Auto-E          | 4                   | 60   | $\mu\text{A}$ |
| t <sub>CDR</sub> <sup>[8]</sup> | Chip Deselect to Data Retention Time |                                                                                                                                                                      | 0               |                     |      | ns            |
| t <sub>R</sub> <sup>[8]</sup>   | Operation Recovery Time              |                                                                                                                                                                      | t <sub>RC</sub> |                     |      | ns            |

**Data Retention Waveform<sup>[9]</sup>**

**Notes:**

8. Full Device AC operation requires linear V<sub>CC</sub> ramp from V<sub>DR</sub> to V<sub>CC(min.)</sub> > 100  $\mu\text{s}$  or stable at V<sub>CC(min.)</sub> > 100  $\mu\text{s}$ .
9. BHE.BLE is the AND of both BHE and BLE. Chip can be deselected by either disabling the chip enable signals or by disabling both BHE and BLE.

**Switching Characteristics** Over the Operating Range <sup>[10]</sup>

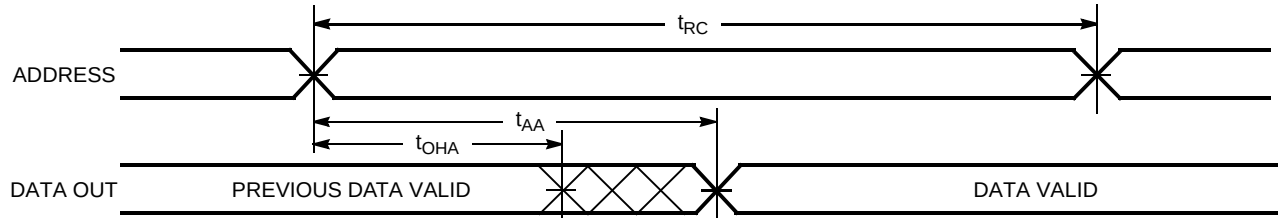
| Parameter                         | Description                                                                 | 70 ns |      | Unit |
|-----------------------------------|-----------------------------------------------------------------------------|-------|------|------|
|                                   |                                                                             | Min.  | Max. |      |
| Read Cycle                        |                                                                             |       |      |      |
| t <sub>RC</sub>                   | Read Cycle Time                                                             | 70    |      | ns   |
| t <sub>AA</sub>                   | Address to Data Valid                                                       |       | 70   | ns   |
| t <sub>OHA</sub>                  | Data Hold from Address Change                                               | 10    |      | ns   |
| t <sub>ACE</sub>                  | $\overline{CE}_1$ LOW and CE <sub>2</sub> HIGH to Data Valid                |       | 70   | ns   |
| t <sub>DOE</sub>                  | OE LOW to Data Valid                                                        |       | 35   | ns   |
| t <sub>LZOE</sub>                 | $\overline{OE}$ LOW to Low-Z <sup>[11]</sup>                                | 5     |      | ns   |
| t <sub>HZOE</sub>                 | $\overline{OE}$ HIGH to High-Z <sup>[11, 12]</sup>                          |       | 25   | ns   |
| t <sub>LZCE</sub>                 | $\overline{CE}_1$ LOW and CE <sub>2</sub> HIGH to Low-Z <sup>[11]</sup>     | 10    |      | ns   |
| t <sub>HZCE</sub>                 | $\overline{CE}_1$ HIGH or CE <sub>2</sub> LOW to High-Z <sup>[11, 12]</sup> |       | 25   | ns   |
| t <sub>PU</sub>                   | $\overline{CE}_1$ LOW and CE <sub>2</sub> HIGH to Power-up                  | 0     |      | ns   |
| t <sub>PD</sub>                   | $\overline{CE}_1$ HIGH or CE <sub>2</sub> LOW to Power-down                 |       | 70   | ns   |
| t <sub>DBE</sub>                  | $\overline{BHE}/\overline{BLE}$ LOW to Data Valid                           |       | 70   | ns   |
| t <sub>LZBE</sub> <sup>[11]</sup> | $\overline{BHE}/\overline{BLE}$ LOW to Low-Z <sup>[13]</sup>                | 5     |      | ns   |
| t <sub>HZBE</sub>                 | $\overline{BHE}/\overline{BLE}$ HIGH to High-Z <sup>[11, 12]</sup>          |       | 25   | ns   |
| Write Cycle <sup>[14]</sup>       |                                                                             |       |      |      |
| t <sub>WC</sub>                   | Write Cycle Time                                                            | 70    |      | ns   |
| t <sub>SCE</sub>                  | $\overline{CE}_1$ LOW and CE <sub>2</sub> HIGH to Write End                 | 60    |      | ns   |
| t <sub>AW</sub>                   | Address Set-up to Write End                                                 | 60    |      | ns   |
| t <sub>HA</sub>                   | Address Hold from Write End                                                 | 0     |      | ns   |
| t <sub>SA</sub>                   | Address Set-up to Write Start                                               | 0     |      | ns   |
| t <sub>PWE</sub>                  | $\overline{WE}$ Pulse Width                                                 | 50    |      | ns   |
| t <sub>BW</sub>                   | $\overline{BHE}/\overline{BLE}$ Pulse Width                                 | 60    |      | ns   |
| t <sub>SD</sub>                   | Data Set-up to Write End                                                    | 30    |      | ns   |
| t <sub>HD</sub>                   | Data Hold from Write End                                                    | 0     |      | ns   |
| t <sub>HZWE</sub>                 | $\overline{WE}$ LOW to High-Z <sup>[11, 12]</sup>                           |       | 25   | ns   |
| t <sub>LZWE</sub>                 | $\overline{WE}$ HIGH to Low-Z <sup>[11]</sup>                               | 5     |      | ns   |

**Notes:**

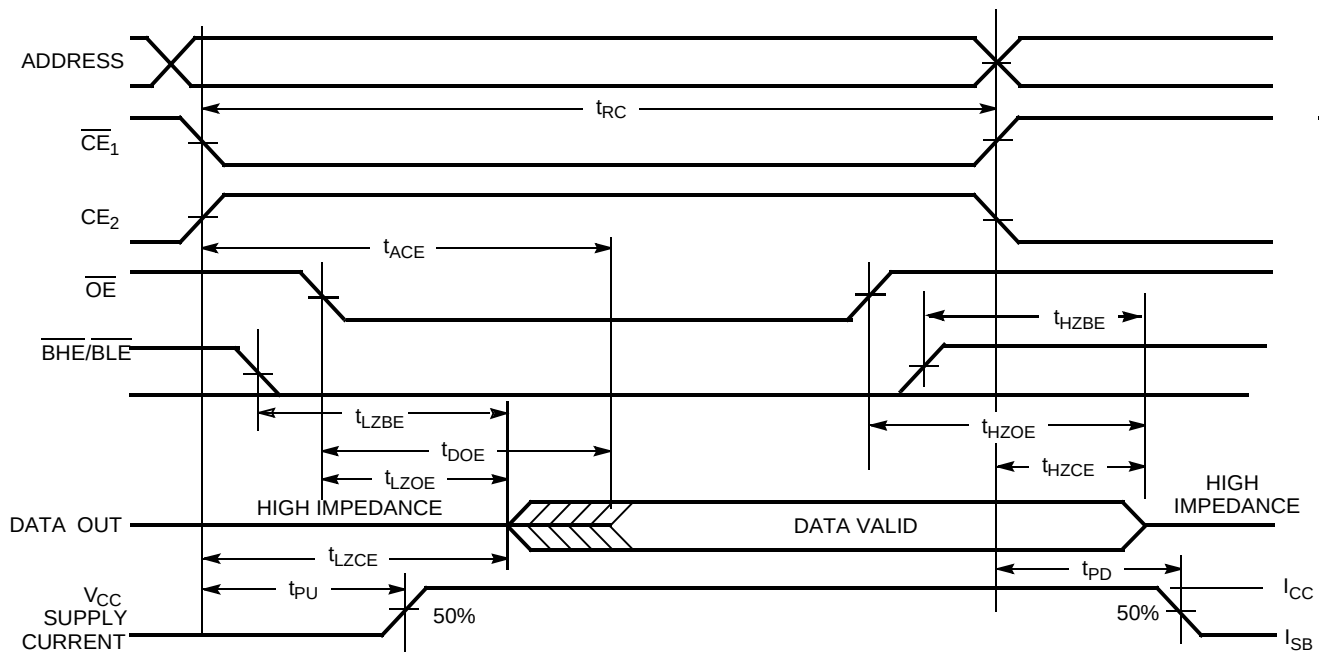
10. Test conditions assume signal transition time of 5 ns or less, timing reference levels of  $V_{CC(typ.)}/2$ , input pulse levels of 0 to  $V_{CC(typ.)}$ , and output loading of the specified  $I_{OL}/I_{OH}$  and 30-pF load capacitance.
11. At any given temperature and voltage condition,  $t_{HZCE}$  is less than  $t_{LZCE}$ ,  $t_{HZBE}$  is less than  $t_{LZBE}$ ,  $t_{HZOE}$  is less than  $t_{LZOE}$ , and  $t_{HZWE}$  is less than  $t_{LZWE}$  for any given device.
12.  $t_{HZOE}$ ,  $t_{HZCE}$ ,  $t_{HZBE}$ , and  $t_{HZWE}$  transitions are measured when the outputs enter a high-impedance state.
13. When both byte enables are toggled together this value is 10 ns.
14. The internal Write time of the memory is defined by the overlap of  $\overline{WE}$ ,  $\overline{CE}_1 = V_{IL}$ ,  $\overline{BHE}$  and/or  $\overline{BLE} = V_{IL}$ ,  $CE_2 = V_{IH}$ . All signals must be ACTIVE to initiate a Write and any of these signals can terminate a Write by going INACTIVE. The data input set-up and hold timing should be referenced to the edge of the signal that terminates the Write.

## Switching Waveforms

### Read Cycle No. 1 (Address Transition Controlled)<sup>[15, 16]</sup>



### Read Cycle No. 2 ( $\overline{\text{OE}}$ Controlled)<sup>[16, 17]</sup>

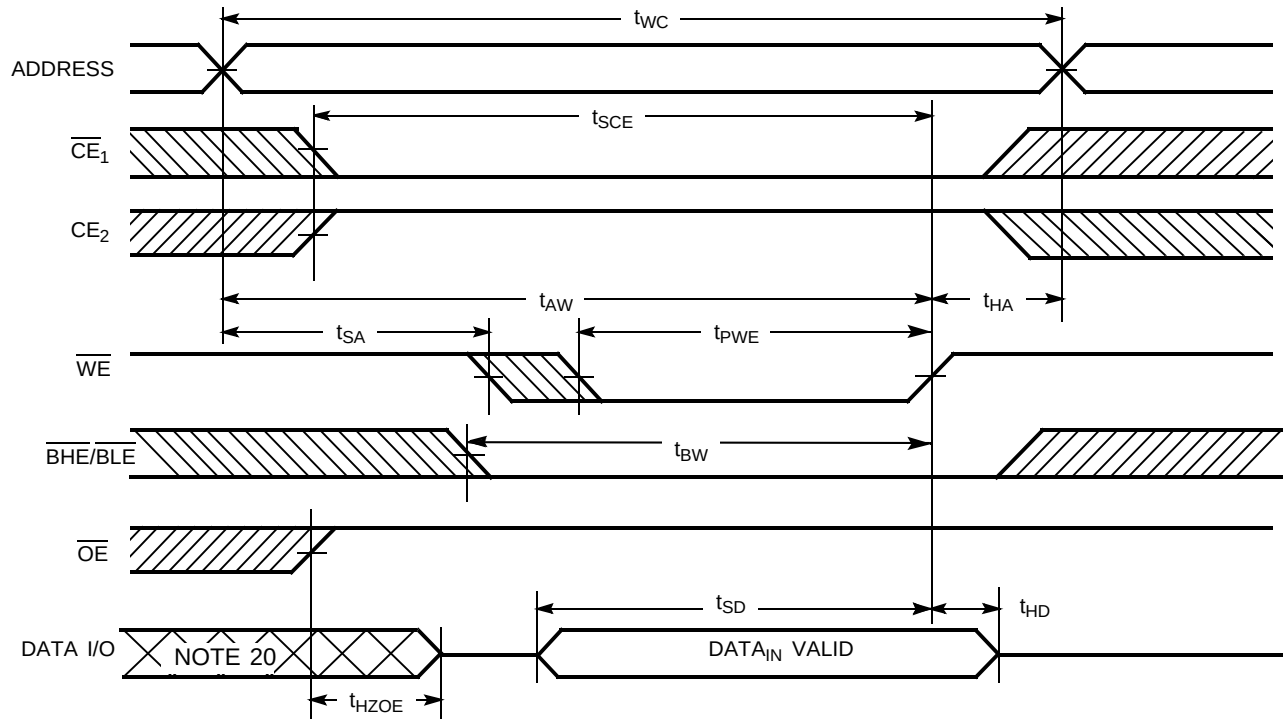


#### Notes:

15. Device is continuously selected.  $\overline{\text{OE}}$ ,  $\overline{\text{CE}}_1 = V_{IL}$ ,  $\overline{\text{BHE}}$  and/or  $\overline{\text{BLE}} = V_{IL}$ ,  $\text{CE}_2 = V_{IH}$ .

16. WE is HIGH for Read cycle.

17. Address valid prior to or coincident with  $\overline{\text{CE}}_1$ ,  $\overline{\text{BHE}}$ ,  $\overline{\text{BLE}}$  transition LOW and  $\text{CE}_2$  transition HIGH.

**Switching Waveforms (continued)**
**Write Cycle No. 1 ( $\overline{\text{WE}}$  Controlled)**<sup>[14, 18, 19]</sup>

**Notes:**

18. Data I/O is high-impedance if  $\overline{\text{OE}} = V_{IH}$ .

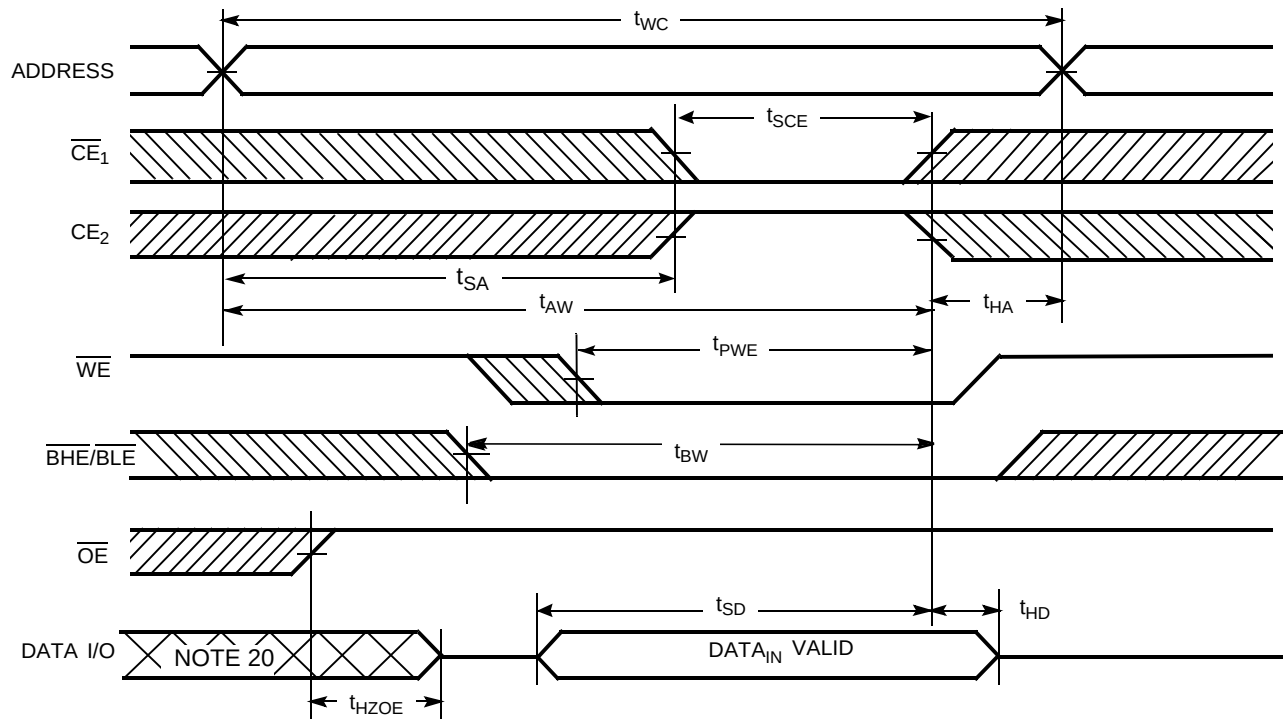
19. If  $\overline{\text{CE}}_1$  goes HIGH or  $\overline{\text{CE}}_2$  goes LOW simultaneously with  $\overline{\text{WE}}$  HIGH, the output remains in a high-impedance state.

20. During this period, the I/Os are in output state and input signals should not be applied.

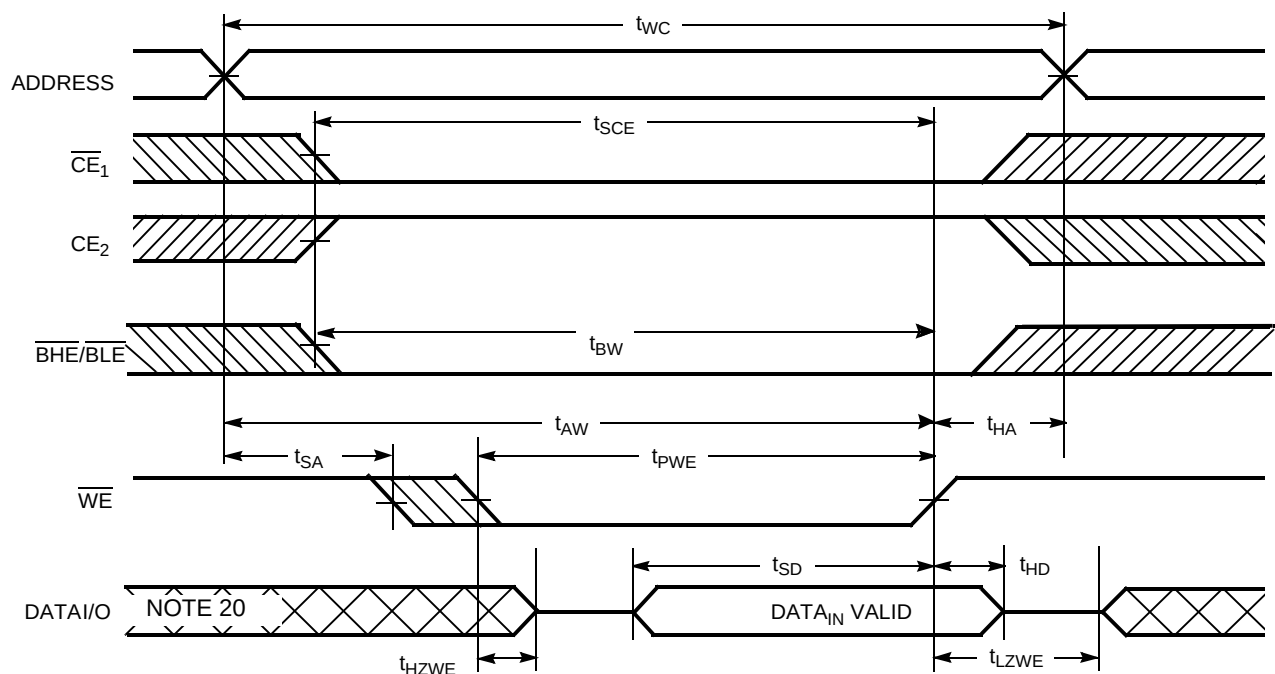


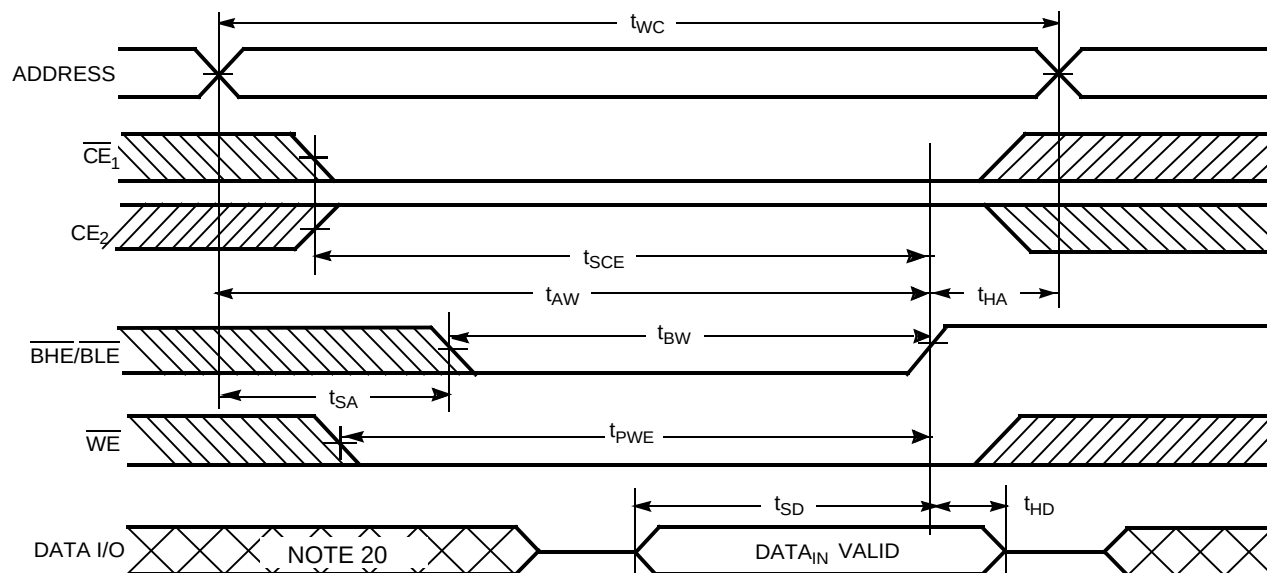
## Switching Waveforms (continued)

Write Cycle No. 2 ( $\overline{CE}_1$  or  $\overline{CE}_2$  Controlled) [14, 18, 19]



Write Cycle No. 3 ( $\overline{WE}$  Controlled,  $\overline{OE}$  LOW)<sup>[19]</sup>

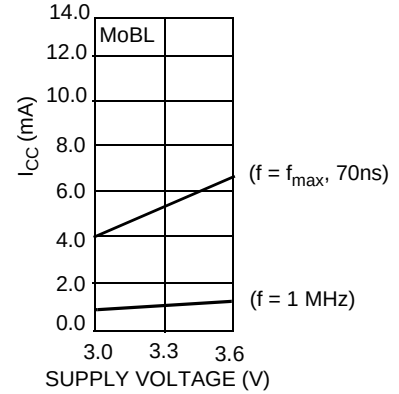
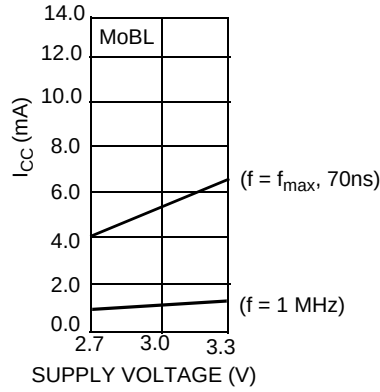
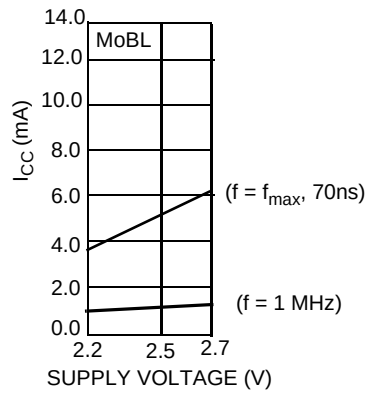


**Switching Waveforms (continued)**
**Write Cycle No. 4 (BHE/BLE Controlled,  $\overline{\text{OE}}$  LOW)<sup>[19]</sup>**

**Truth Table**

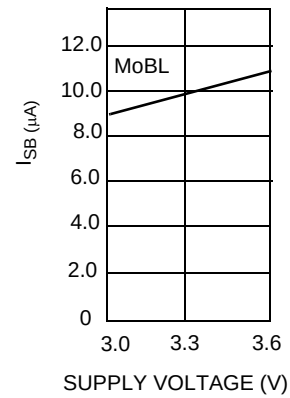
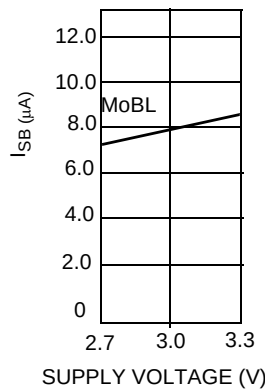
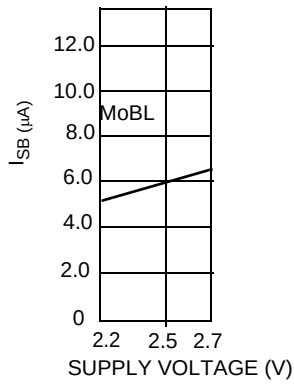
| CE <sub>1</sub> | CE <sub>2</sub> | WE | OE | BHE | BLE | Inputs/Outputs                                                                                   | Mode                | Power                      |
|-----------------|-----------------|----|----|-----|-----|--------------------------------------------------------------------------------------------------|---------------------|----------------------------|
| H               | X               | X  | X  | X   | X   | High Z                                                                                           | Deselect/Power-Down | Standby (I <sub>SB</sub> ) |
| X               | L               | X  | X  | X   | X   | High Z                                                                                           | Deselect/Power-Down | Standby (I <sub>SB</sub> ) |
| X               | X               | X  | X  | H   | H   | High Z                                                                                           | Deselect/Power-Down | Standby (I <sub>SB</sub> ) |
| L               | H               | H  | L  | L   | L   | Data Out (I/O <sub>0</sub> –I/O <sub>15</sub> )                                                  | Read                | Active (I <sub>CC</sub> )  |
| L               | H               | H  | L  | H   | L   | Data Out (I/O <sub>0</sub> –I/O <sub>7</sub> );<br>I/O <sub>8</sub> –I/O <sub>15</sub> in High Z | Read                | Active (I <sub>CC</sub> )  |
| L               | H               | H  | L  | L   | H   | Data Out (I/O <sub>8</sub> –I/O <sub>15</sub> );<br>I/O <sub>0</sub> –I/O <sub>7</sub> in High Z | Read                | Active (I <sub>CC</sub> )  |
| L               | H               | H  | H  | L   | L   | High Z                                                                                           | Output Disabled     | Active (I <sub>CC</sub> )  |
| L               | H               | H  | H  | H   | L   | High Z                                                                                           | Output Disabled     | Active (I <sub>CC</sub> )  |
| L               | H               | H  | H  | L   | H   | High Z                                                                                           | Output Disabled     | Active (I <sub>CC</sub> )  |
| L               | H               | L  | X  | L   | L   | Data In (I/O <sub>0</sub> –I/O <sub>15</sub> )                                                   | Write               | Active (I <sub>CC</sub> )  |
| L               | H               | L  | X  | H   | L   | Data In (I/O <sub>0</sub> –I/O <sub>7</sub> );<br>I/O <sub>8</sub> –I/O <sub>15</sub> in High Z  | Write               | Active (I <sub>CC</sub> )  |
| L               | H               | L  | X  | L   | H   | Data In (I/O <sub>8</sub> –I/O <sub>15</sub> );<br>I/O <sub>0</sub> –I/O <sub>7</sub> in High Z  | Write               | Active (I <sub>CC</sub> )  |

## Typical DC and AC Characteristics<sup>[2]</sup>

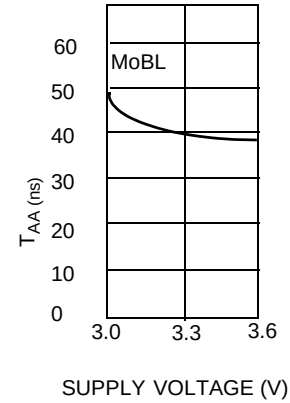
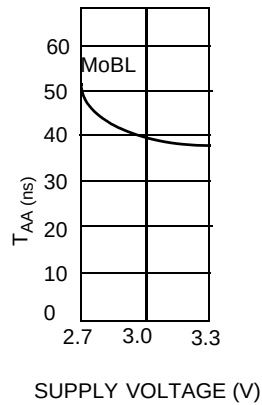
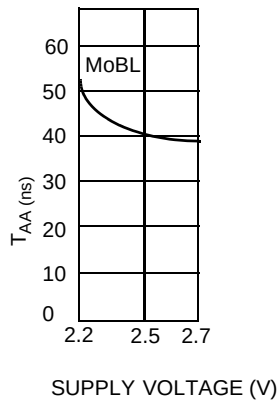
### Operating Current vs. Supply Voltage



### Standby Current vs. Supply Voltage



### Access Time vs. Supply Voltage

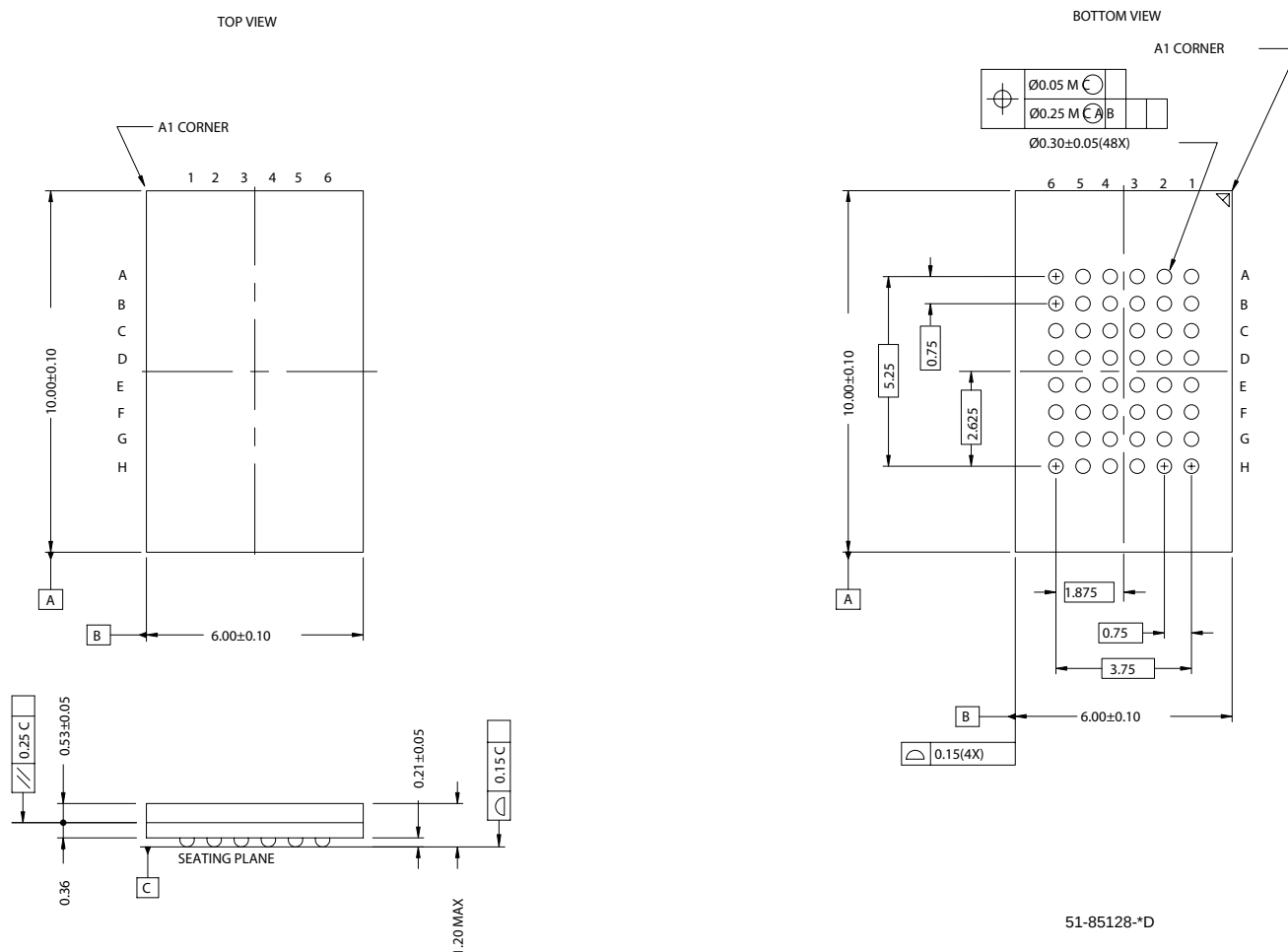


## Ordering Information

| Speed (ns) | Ordering Code        | Package Diagram | Package Type                         | Operating Range |
|------------|----------------------|-----------------|--------------------------------------|-----------------|
| 70         | CY62157CV30LL-70BAE  | 51-85128        | 48-Ball (6 mm x 10 mm x 1.2 mm) FBGA | Automotive-E    |
|            | CY62157CV33LL-70BAXA |                 |                                      | Automotive-A    |
|            | CY62157CV33LL-70BAE  |                 |                                      | Automotive-E    |

## Package Diagram

### 48-Ball (6 mm x 10 mm x 1.2 mm) FBGA (51-85128)



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**Document History Page**

| Document Title: CY62157CV30/33 512K x 16 Static RAM<br>Document Number: 38-05014 |         |            |                 |                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------|---------|------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REV.                                                                             | ECN NO. | Issue Date | Orig. of Change | Description of Change                                                                                                                                                                                      |
| **                                                                               | 106184  | 05/10/01   | HRT/MGN         | New data sheet – Advance Information                                                                                                                                                                       |
| *A                                                                               | 107241  | 07/24/01   | MGN             | Made corrections to Advance Information<br>Added 55 ns bin                                                                                                                                                 |
| *B                                                                               | 109621  | 03/11/02   | MGN             | Changed from Advance Information to Final                                                                                                                                                                  |
| *C                                                                               | 114218  | 05/01/02   | GUG/MGN         | Improved Typical and Max I <sub>CC</sub> values                                                                                                                                                            |
| *D                                                                               | 238448  | See ECN    | AJU             | Added Automotive Product Information                                                                                                                                                                       |
| *E                                                                               | 269729  | See ECN    | SYT             | Added Automotive Product information for CY62157CV30 – 70 ns<br>Added I <sub>LX</sub> and I <sub>OZ</sub> values for Automotive range of CY62157CV33 – 70 ns                                               |
| *F                                                                               | 498575  | See ECN    | NXR             | Removed Industrial Operating Range<br>Removed 55 ns speed bin<br>Removed CY62157CV25 part number from the Product Offering<br>Added Automotive-A operating range<br>Updated the Ordering Information Table |