

## 4-Mbit (512K words × 8 bit) Static RAM with Error-Correcting Code (ECC)

### Features

- High speed
  - $t_{AA} = 10$  ns
- Embedded ECC for single-bit error correction<sup>[1]</sup>
- Low active and standby currents
  - Active current:  $I_{CC} = 38$  mA typical
  - Standby current:  $I_{SB2} = 6$  mA typical
- Operating voltage range: 1.65 V to 2.2 V, 2.2 V to 3.6 V, and 4.5 V to 5.5 V
- 1.0-V data retention
- TTL-compatible inputs and outputs
- Error indication (ERR) pin to indicate 1-bit error detection and correction
- Pb-free 36-pin SOJ and 44-pin TSOP II packages

### Functional Description

CY7C1049G and CY7C1049GE are high-performance CMOS fast static RAM devices with embedded ECC. Both devices are

offered in single and dual chip-enable options and in multiple pin configurations. The CY7C1049GE device includes an ERR pin that signals an error-detection and correction event during a read cycle.

Data writes are performed by asserting the Chip Enable ( $\overline{CE}$ ) and Write Enable ( $\overline{WE}$ ) inputs LOW, while providing the data on I/O<sub>0</sub> through I/O<sub>7</sub> and address on A<sub>0</sub> through A<sub>18</sub> pins.

Data reads are performed by asserting the Chip Enable ( $\overline{CE}$ ) and Output Enable ( $\overline{OE}$ ) inputs LOW and providing the required address on the address lines. Read data is accessible on the I/O lines (I/O<sub>0</sub> through I/O<sub>7</sub>).

All I/Os (I/O<sub>0</sub> through I/O<sub>7</sub>) are placed in a high-impedance state during the following events:

- The device is deselected ( $\overline{CE}$  HIGH)
- The control signal  $\overline{OE}$  is de-asserted

On the CY7C1049GE devices, the detection and correction of a single-bit error in the accessed location is indicated by the assertion of the ERR output (ERR = HIGH)<sup>[1]</sup>. See the [Truth Table on page 14](#) for a complete description of read and write modes.

The logic block diagram is on page 2.

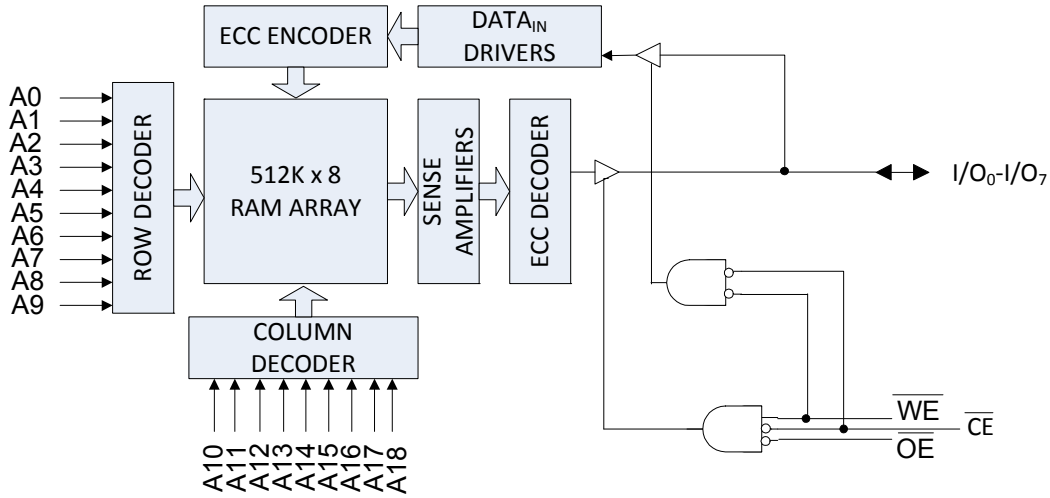
### Product Portfolio

| Product <sup>[2]</sup> | Features and Options (see <a href="#">Pin Configurations on page 4</a> ) | Range      | V <sub>CC</sub> Range (V) | Speed (ns)<br>10/15 | Power Dissipation              |     |                                |     |
|------------------------|--|------------|---------------------------|---------------------|--------------------------------|-----|--------------------------------|-----|
|                        |  |            |                           |                     | Operating I <sub>CC</sub> (mA) |     | Standby, I <sub>SB2</sub> (mA) |     |
|                        |  |            |                           |                     | f = f <sub>max</sub>           |     |                                |     |
|                        |  |            |                           |                     | Typ <sup>[3]</sup>             | Max | Typ <sup>[3]</sup>             | Max |
| CY7C1049G(E)18         | Single or Dual Chip Enables  | Industrial | 1.65 V–2.2 V              | 15                  | –                              | 40  | 6                              | 8   |
| CY7C1049G(E)30         | Optional ERR pins  |            | 2.2 V–3.6 V               | 10                  | 38                             | 45  |                                |     |
| CY7C1049G(E)           |  |            | 4.5 V–5.5 V               | 10                  | 38                             | 45  |                                |     |

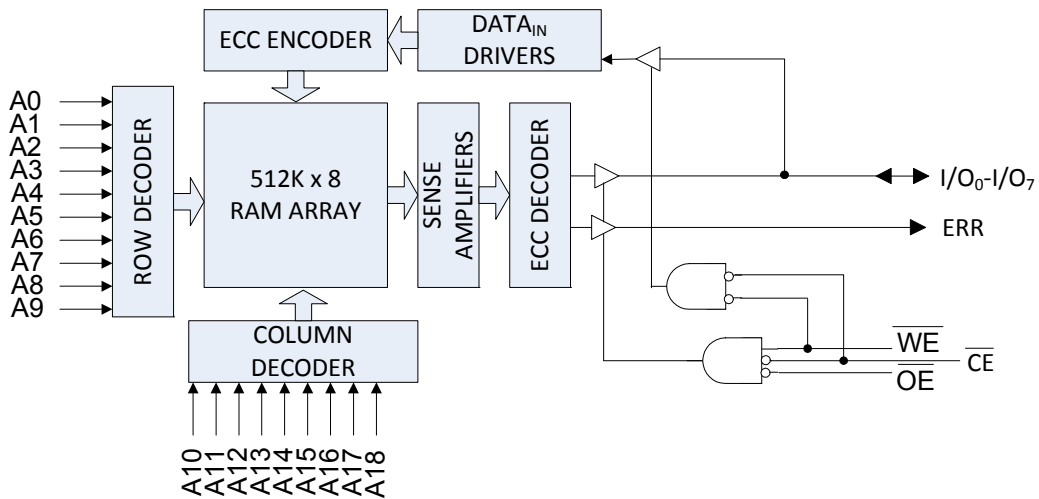
#### Notes

1. This device does not support automatic write-back on error detection.
2. The ERR pin is available only for devices which have ERR option "E" in the ordering code. Refer [Ordering Information on page 15](#) for details.
3. Typical values are included only for reference and are not guaranteed or tested. Typical values are measured at V<sub>CC</sub> = 1.8 V (for a V<sub>CC</sub> range of 1.65 V–2.2 V), V<sub>CC</sub> = 3 V (for a V<sub>CC</sub> range of 2.2 V–3.6 V), and V<sub>CC</sub> = 5 V (for a V<sub>CC</sub> range of 4.5 V–5.5 V), T<sub>A</sub> = 25 °C.

**Logic Block Diagram – CY7C1049G**



**Logic Block Diagram – CY7C1049GE**

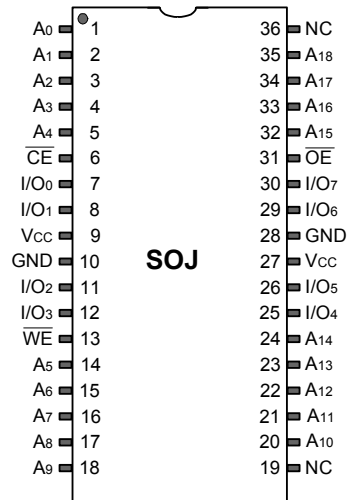


## Contents

|   |           |  |           |
|---|-----------|--|-----------|
| <b>Pin Configurations</b> .....             | <b>4</b>  | <b>Ordering Information</b> .....                    | <b>15</b> |
| <b>Maximum Ratings</b> .....                | <b>6</b>  | Ordering Code Definitions .....                      | 15        |
| <b>Operating Range</b> .....                | <b>6</b>  | <b>Package Diagrams</b> .....                        | <b>16</b> |
| <b>DC Electrical Characteristics</b> .....  | <b>6</b>  | <b>Acronyms</b> .....                                | <b>17</b> |
| <b>Capacitance</b> .....                    | <b>7</b>  | <b>Document Conventions</b> .....                    | <b>17</b> |
| <b>Thermal Resistance</b> .....             | <b>7</b>  | Units of Measure .....                               | 17        |
| <b>AC Test Loads and Waveforms</b> .....    | <b>7</b>  | <b>Document History Page</b> .....                   | <b>18</b> |
| <b>Data Retention Characteristics</b> ..... | <b>8</b>  | <b>Sales, Solutions, and Legal Information</b> ..... | <b>19</b> |
| <b>Data Retention Waveform</b> .....        | <b>8</b>  | Worldwide Sales and Design Support .....             | 19        |
| <b>AC Switching Characteristics</b> .....   | <b>9</b>  | Products .....                                       | 19        |
| <b>Switching Waveforms</b> .....            | <b>10</b> | PSoC@Solutions .....                                 | 19        |
| <b>Truth Table</b> .....                    | <b>14</b> | Cypress Developer Community .....                    | 19        |
| <b>ERR Output – CY7C1049GE</b> .....        | <b>14</b> | Technical Support .....                              | 19        |

## Pin Configurations

Figure 1. 36-pin SOJ pinout, Single Chip Enable without ERR - CY7C1049G [4]

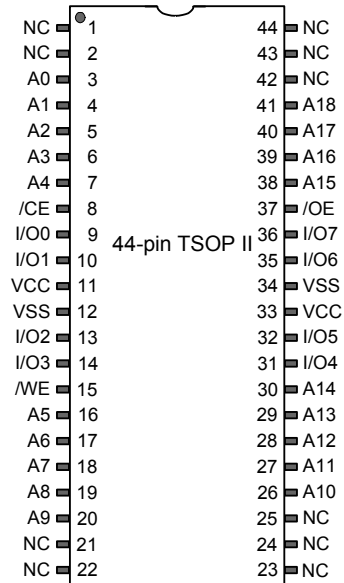


**Note**

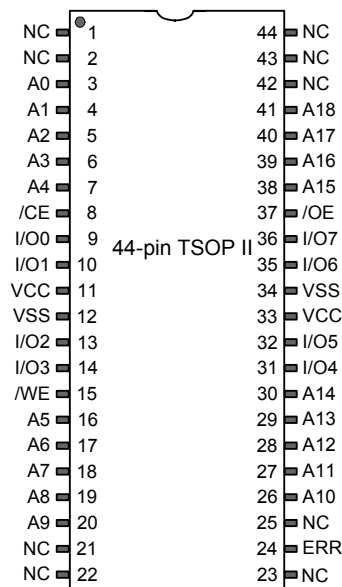
4. NC pins are not connected internally to the die.

**Pin Configurations** (continued)

**Figure 2. 44-pin TSOP II pinout, Single Chip Enable without ERR - CY7C1049G** [5]



**Figure 3. 44-pin TSOP II pinout, Single Chip Enable with ERR - CY7C1049GE** [5, 6]



**Notes**

- 5. NC pins are not connected internally to the die.
- 6. ERR is an output pin.

## Maximum Ratings

Exceeding 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 <sub>CC</sub> relative to GND <sup>[7]</sup> ..... | -0.5 to V <sub>CC</sub> + 0.5 V   |
| DC voltage applied to outputs in HI-Z State <sup>[7]</sup> .....       | -0.5 V to V <sub>CC</sub> + 0.5 V |

|   |                                   |
|---|-----------------------------------|
| DC input voltage <sup>[7]</sup> .....                     | -0.5 V to V <sub>CC</sub> + 0.5 V |
| Current into outputs (in LOW state) .....                 | 20 mA                             |
| Static discharge voltage (MIL-STD-883, Method 3015) ..... | > 2001 V                          |
| Latch-up current .....                                    | > 140 mA                          |

## Operating Range

| Grade      | Ambient Temperature | V <sub>CC</sub>                                 |
|------------|---------------------|---|
| Industrial | -40 °C to +85 °C    | 1.65 V to 2.2 V, 2.2 V to 3.6 V, 4.5 V to 5.5 V |

## DC Electrical Characteristics

Over the operating range of -40 °C to 85 °C

| Parameter        | Description                                   | Test Conditions  | 10 ns / 15 ns                                    |                                      |     | Unit                                 |    |
|------------------|---|--|--|--------------------------------------|-----|--------------------------------------|----|
|                  |   |  | Min  | Typ <sup>[8]</sup>                   | Max |                                      |    |
| V <sub>OH</sub>  | Output HIGH voltage                           | 1.65 V to 2.2 V  | V <sub>CC</sub> = Min, I <sub>OH</sub> = -0.1 mA | 1.4                                  | -   | -                                    | V  |
|                  |   | 2.2 V to 2.7 V   | V <sub>CC</sub> = Min, I <sub>OH</sub> = -1.0 mA | 2                                    | -   | -                                    |    |
|                  |   | 2.7 V to 3.0 V   | V <sub>CC</sub> = Min, I <sub>OH</sub> = -4.0 mA | 2.2                                  | -   | -                                    |    |
|                  |   | 3.0 V to 3.6 V   | V <sub>CC</sub> = Min, I <sub>OH</sub> = -4.0 mA | 2.4                                  | -   | -                                    |    |
|                  |   | 4.5 V to 5.5 V   | V <sub>CC</sub> = Min, I <sub>OH</sub> = -4.0 mA | 2.4                                  | -   | -                                    |    |
|                  |   | 4.5 V to 5.5 V   | V <sub>CC</sub> = Min, I <sub>OH</sub> = -0.1mA  | V <sub>CC</sub> - 0.5 <sup>[9]</sup> | -   | -                                    |    |
| V <sub>OL</sub>  | Output LOW voltage                            | 1.65 V to 2.2 V  | V <sub>CC</sub> = Min, I <sub>OL</sub> = 0.1 mA  | -                                    | -   | 0.2                                  | V  |
|                  |   | 2.2 V to 2.7 V   | V <sub>CC</sub> = Min, I <sub>OL</sub> = 2 mA    | -                                    | -   | 0.4                                  |    |
|                  |   | 2.7 V to 3.6 V   | V <sub>CC</sub> = Min, I <sub>OL</sub> = 8 mA    | -                                    | -   | 0.4                                  |    |
|                  |   | 4.5 V to 5.5 V   | V <sub>CC</sub> = Min, I <sub>OL</sub> = 8 mA    | -                                    | -   | 0.4                                  |    |
| V <sub>IH</sub>  | Input HIGH voltage                            | 1.65 V to 2.2 V  | -  | 1.4                                  | -   | V <sub>CC</sub> + 0.2 <sup>[7]</sup> | V  |
|                  |   | 2.2 V to 2.7 V   | -  | 2                                    | -   | V <sub>CC</sub> + 0.3 <sup>[7]</sup> |    |
|                  |   | 2.7 V to 3.6 V   | -  | 2                                    | -   | V <sub>CC</sub> + 0.3 <sup>[7]</sup> |    |
|                  |   | 4.5 V to 5.5 V   | -  | 2                                    | -   | V <sub>CC</sub> + 0.5 <sup>[7]</sup> |    |
| V <sub>IL</sub>  | Input LOW voltage                             | 1.65 V to 2.2 V  | -  | -0.2 <sup>[7]</sup>                  | -   | 0.4                                  | V  |
|                  |   | 2.2 V to 2.7 V   | -  | -0.3 <sup>[7]</sup>                  | -   | 0.6                                  |    |
|                  |   | 2.7 V to 3.6 V   | -  | -0.3 <sup>[7]</sup>                  | -   | 0.8                                  |    |
|                  |   | 4.5 V to 5.5 V   | -  | -0.5 <sup>[7]</sup>                  | -   | 0.8                                  |    |
| I <sub>IX</sub>  | Input leakage current                         | GND ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>  | -1   | -                                    | +1  | μA                                   |    |
| I <sub>OZ</sub>  | Output leakage current                        | GND ≤ V <sub>OUT</sub> ≤ V <sub>CC</sub> , Output disabled   | -1   | -                                    | +1  | μA                                   |    |
| I <sub>CC</sub>  | Operating supply current                      | Max V <sub>CC</sub> , I <sub>OUT</sub> = 0 mA, CMOS levels   | f = 100 MHz                                      | -                                    | 38  | 45                                   | mA |
|                  |   |  | f = 66.7 MHz                                     | -                                    | -   | 40                                   |    |
| I <sub>SB1</sub> | Automatic CE power-down current – TTL inputs  | Max V <sub>CC</sub> , 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> | -  | -                                    | 15  | mA                                   |    |
| I <sub>SB2</sub> | Automatic CE power-down current – CMOS inputs | Max V <sub>CC</sub> , CE ≥ V <sub>CC</sub> - 0.2 V, V <sub>IN</sub> ≥ V <sub>CC</sub> - 0.2 V or V <sub>IN</sub> ≤ 0.2 V, f = 0            | -  | 6                                    | 8   | mA                                   |    |

### Notes

- V<sub>IL(min)</sub> = -2.0 V and V<sub>IH(max)</sub> = V<sub>CC</sub> + 2 V for pulse durations of less than 20 ns.
- Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at V<sub>CC</sub> = 1.8 V (for V<sub>CC</sub> range of 1.65 V – 2.2 V), V<sub>CC</sub> = 3 V (for V<sub>CC</sub> range of 2.2 V – 3.6 V), and V<sub>CC</sub> = 5 V (for V<sub>CC</sub> range of 4.5 V – 5.5 V), T<sub>A</sub> = 25 °C.
- This parameter is guaranteed by design and not tested.

## Capacitance

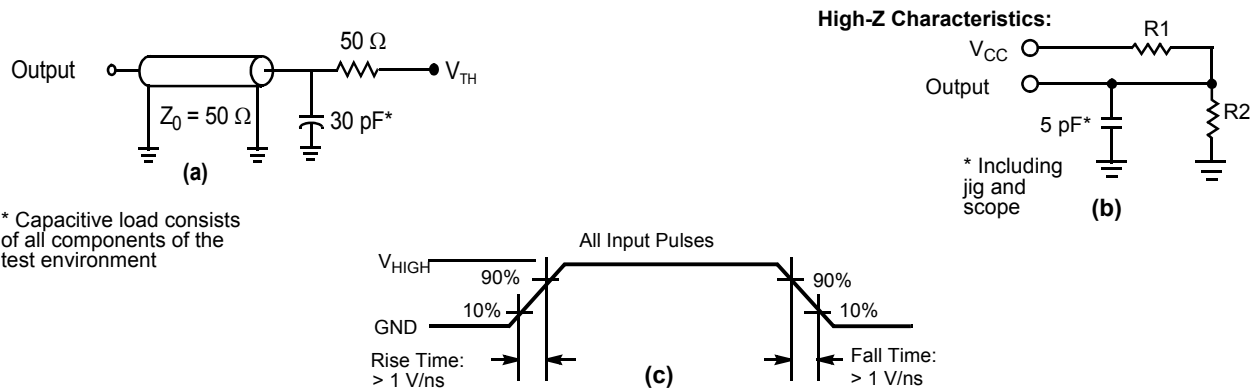
| Parameter <sup>[10]</sup> | Description       | Test Conditions  | 36-pin SOJ | 44-pin TSOP II | Unit |
|---------------------------|-------------------|--|------------|----------------|------|
| C <sub>IN</sub>           | Input capacitance | T <sub>A</sub> = 25 °C, f = 1 MHz,<br>V <sub>CC</sub> = V <sub>CC(typ)</sub> | 10         | 10             | pF   |
| C <sub>OUT</sub>          | I/O capacitance   |  | 10         | 10             | pF   |

## Thermal Resistance

| Parameter <sup>[10]</sup> | Description                              | Test Conditions   | 36-pin SOJ | 44-pin TSOP II | Unit |
|---------------------------|--|---|------------|----------------|------|
| θ <sub>JA</sub>           | Thermal resistance (junction to ambient) | Still air, soldered on a 3 × 4.5 inch, four-layer printed circuit board | 59.52      | 68.85          | °C/W |
| θ <sub>JC</sub>           | Thermal resistance (junction to case)    |   | 31.48      | 15.97          | °C/W |

## AC Test Loads and Waveforms

Figure 4. AC Test Loads and Waveforms <sup>[11]</sup>



\* Capacitive load consists of all components of the test environment

| Parameters        | 1.8 V | 3.0 V | 5.0 V | Unit |
|-------------------|-------|-------|-------|------|
| R1                | 1667  | 317   | 317   | Ω    |
| R2                | 1538  | 351   | 351   | Ω    |
| V <sub>TH</sub>   | 0.9   | 1.5   | 1.5   | V    |
| V <sub>HIGH</sub> | 1.8   | 3     | 3     | V    |

### Notes

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

11. Full-device AC operation assumes a 100-μs ramp time from 0 to V<sub>CC(min)</sub> and a 100-μs wait time after V<sub>CC</sub> stabilization.

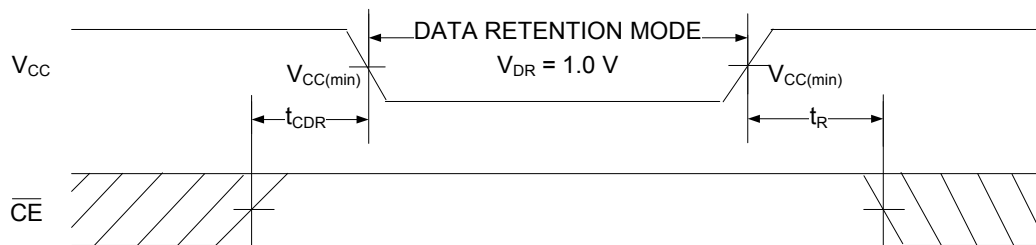
## Data Retention Characteristics

Over the operating range of  $-40\text{ }^{\circ}\text{C}$  to  $85\text{ }^{\circ}\text{C}$

| Parameter                 | Description                          | Conditions  | Min | Max | Unit |
|---------------------------|--------------------------------------|---|-----|-----|------|
| $V_{DR}$                  | $V_{CC}$ for data retention          |   | 1   | –   | V    |
| $I_{CCDR}$                | Data retention current               | $V_{CC} = 1.2\text{ V}$ , $\overline{CE} \geq V_{CC} - 0.2\text{ V}$ <sup>[13]</sup> ,<br>$V_{IN} \geq V_{CC} - 0.2\text{ V}$ , or $V_{IN} \leq 0.2\text{ V}$ | –   | 8   | mA   |
| $t_{CDR}$ <sup>[12]</sup> | Chip deselect to data retention time |   | 0   | –   | ns   |
| $t_R$ <sup>[12, 13]</sup> | Operation recovery time              | $V_{CC} \geq 2.2\text{ V}$  | 10  | –   | ns   |
|                           |                                      | $V_{CC} < 2.2\text{ V}$   | 15  | –   | ns   |

## Data Retention Waveform

Figure 5. Data Retention Waveform<sup>[13]</sup>



### Notes

12. These parameters are guaranteed by design.
13. Full-device operation requires linear  $V_{CC}$  ramp from  $V_{DR}$  to  $V_{CC(min)} \geq 100\text{ }\mu\text{s}$  or stable at  $V_{CC(min)} \geq 100\text{ }\mu\text{s}$ .



## AC Switching Characteristics

Over the operating range of –40 °C to 85 °C

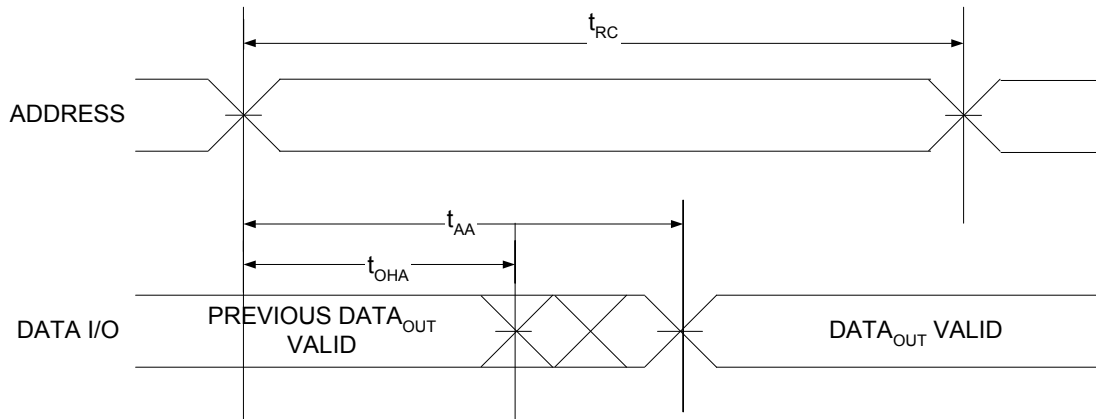
| Parameter <sup>[14]</sup>              | Description  | 10 ns |     | 15 ns |     | Unit |
|--|--|-------|-----|-------|-----|------|
|  |  | Min   | Max | Min   | Max |      |
| <b>Read Cycle</b>                      |  |       |     |       |     |      |
| $t_{RC}$                               | Read cycle time  | 10    | –   | 15    | –   | ns   |
| $t_{AA}$                               | Address to data / ERR valid                            | –     | 10  | –     | 15  | ns   |
| $t_{OHA}$                              | Data / ERR hold from address change                    | 3     | –   | 3     | –   | ns   |
| $t_{ACE}$                              | $\overline{CE}$ LOW to data / ERR valid                | –     | 10  | –     | 15  | ns   |
| $t_{DOE}$                              | $\overline{OE}$ LOW to data / ERR valid                | –     | 4.5 | –     | 8   | ns   |
| $t_{LZOE}$                             | $\overline{OE}$ LOW to low impedance <sup>[15]</sup>   | 0     | –   | 0     | –   | ns   |
| $t_{HZOE}$                             | $\overline{OE}$ HIGH to HI-Z <sup>[15]</sup>           | –     | 5   | –     | 8   | ns   |
| $t_{LZCE}$                             | $\overline{CE}$ LOW to low impedance <sup>[15]</sup>   | 3     | –   | 3     | –   | ns   |
| $t_{HZCE}$                             | $\overline{CE}$ HIGH to HI-Z <sup>[15]</sup>           | –     | 5   | –     | 8   | ns   |
| $t_{PU}$                               | $\overline{CE}$ LOW to power-up <sup>[16, 17]</sup>    | 0     | –   | 0     | –   | ns   |
| $t_{PD}$                               | $\overline{CE}$ HIGH to power-down <sup>[16, 17]</sup> | –     | 10  | –     | 15  | ns   |
| <b>Write Cycle <sup>[17, 18]</sup></b> |  |       |     |       |     |      |
| $t_{WC}$                               | Write cycle time                                       | 10    | –   | 15    | –   | ns   |
| $t_{SCE}$                              | $\overline{CE}$ LOW to write end                       | 7     | –   | 12    | –   | ns   |
| $t_{AW}$                               | Address setup to write end                             | 7     | –   | 12    | –   | ns   |
| $t_{HA}$                               | Address hold from write end                            | 0     | –   | 0     | –   | ns   |
| $t_{SA}$                               | Address setup to write start                           | 0     | –   | 0     | –   | ns   |
| $t_{PWE}$                              | $\overline{WE}$ pulse width                            | 7     | –   | 12    | –   | ns   |
| $t_{SD}$                               | Data setup to write end                                | 5     | –   | 8     | –   | ns   |
| $t_{HD}$                               | Data hold from write end                               | 0     | –   | 0     | –   | ns   |
| $t_{LZWE}$                             | $\overline{WE}$ HIGH to low impedance <sup>[15]</sup>  | 3     | –   | 3     | –   | ns   |
| $t_{HZWE}$                             | $\overline{WE}$ LOW to HI-Z <sup>[15]</sup>            | –     | 5   | –     | 8   | ns   |

### Notes

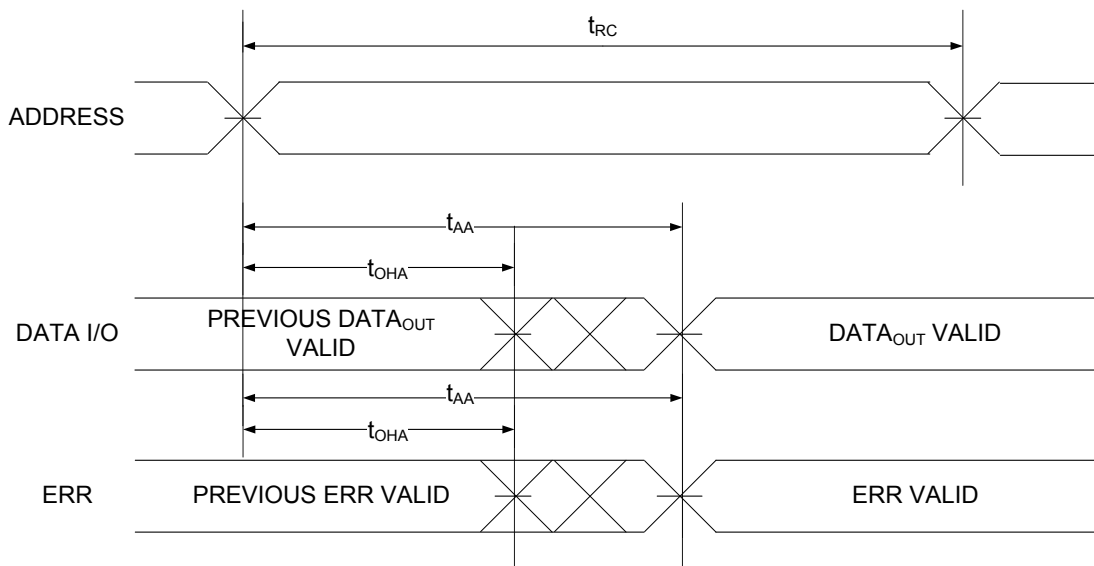
14. Test conditions assume a signal transition time (rise/fall) of 3 ns or less, timing reference levels of 1.5 V (for  $V_{CC} \geq 3$  V) and  $V_{CC}/2$  (for  $V_{CC} < 3$  V), and input pulse levels of 0 to 3 V (for  $V_{CC} \geq 3$  V) and 0 to  $V_{CC}$  (for  $V_{CC} < 3$  V). Test conditions for the read cycle use output loading, as shown in part (a) of Figure 4 on page 7, unless specified otherwise.
15.  $t_{HZOE}$ ,  $t_{HZCE}$ ,  $t_{HZWE}$ ,  $t_{LZOE}$ ,  $t_{LZCE}$ , and  $t_{LZWE}$  are specified with a load capacitance of 5 pF, as shown in part (b) of Figure 4 on page 7. Transition is measured  $\pm 200$  mV from steady state voltage.
16. These parameters are guaranteed by design and are not tested.
17. The internal write time of the memory is defined by the overlap of  $\overline{WE} = V_{IL}$ ,  $\overline{CE} = V_{IL}$ . These signals must be LOW to initiate a write, and the HIGH transition of any of these signals can terminate the operation. The input data setup and hold timing should be referenced to the edge of the signal that terminates the write.
18. The minimum write cycle pulse width in Write Cycle No. 2 ( $\overline{WE}$  Controlled,  $\overline{OE}$  LOW) should be equal to sum of  $t_{DS}$  and  $t_{HZWE}$ .

## Switching Waveforms

**Figure 6. Read Cycle No. 1 of CY7C1049G (Address Transition Controlled)** [19, 20]



**Figure 7. Read Cycle No. 1 of CY7C1049GE (Address Transition Controlled)** [19, 20]

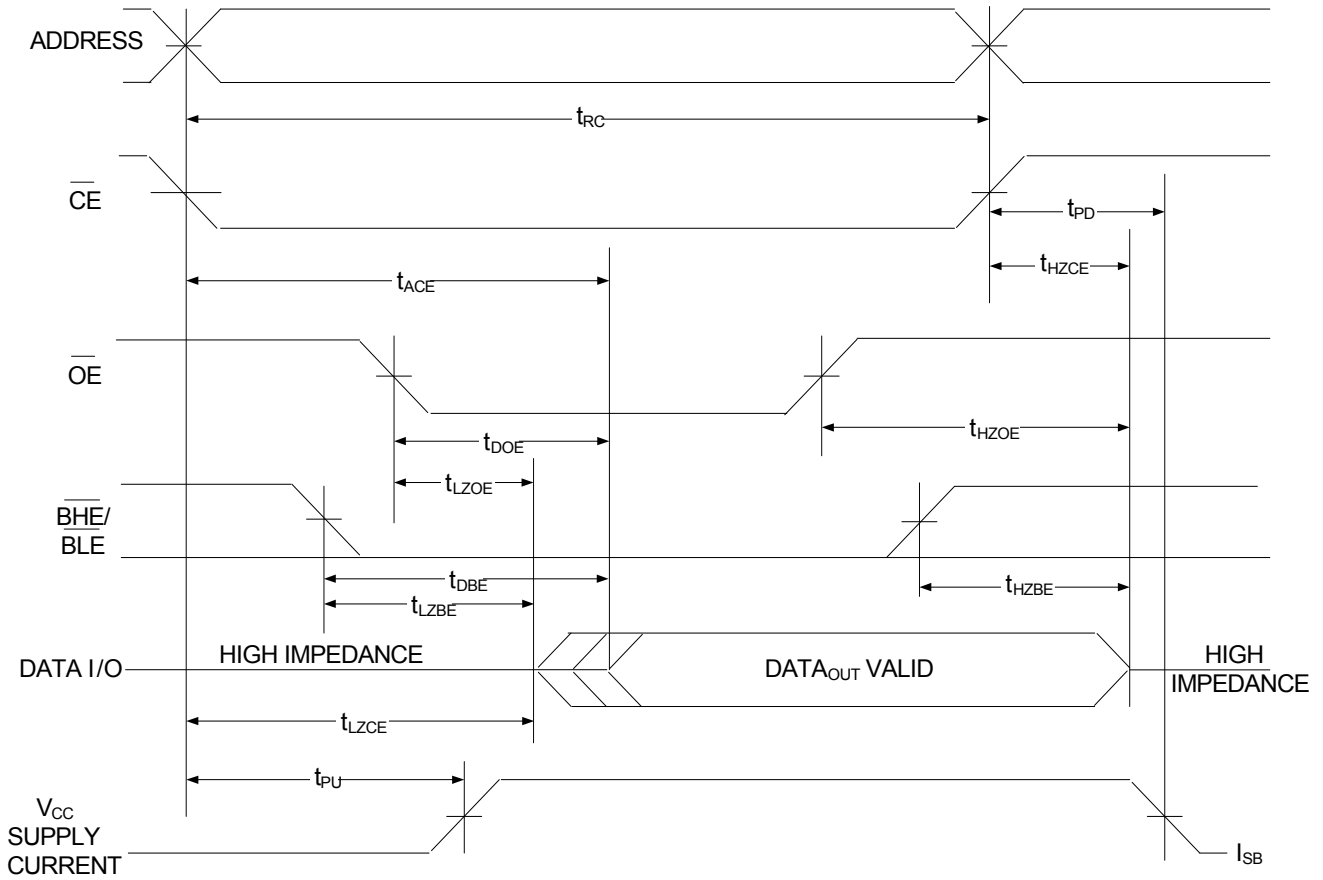


### Notes

19. The device is continuously selected,  $\overline{OE} = V_{IL}$ ,  $\overline{CE} = V_{IL}$ .  
20.  $\overline{WE}$  is HIGH for the read cycle.

**Switching Waveforms** (continued)

**Figure 8. Read Cycle No. 2 ( $\overline{\text{OE}}$  Controlled)** [21, 22]

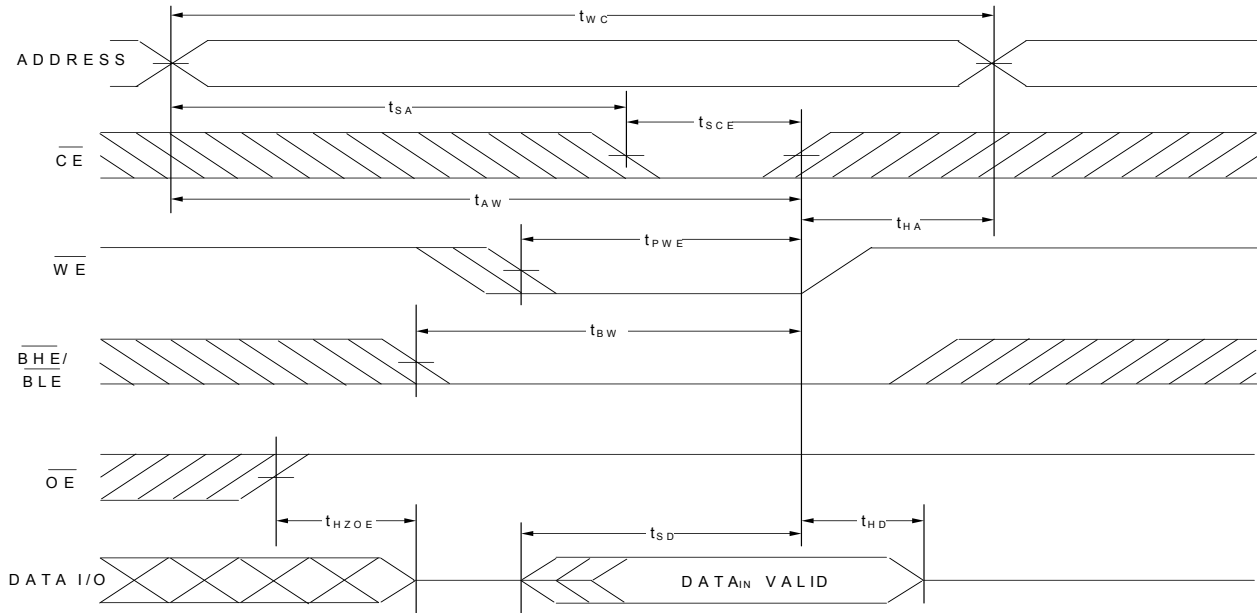


**Notes**

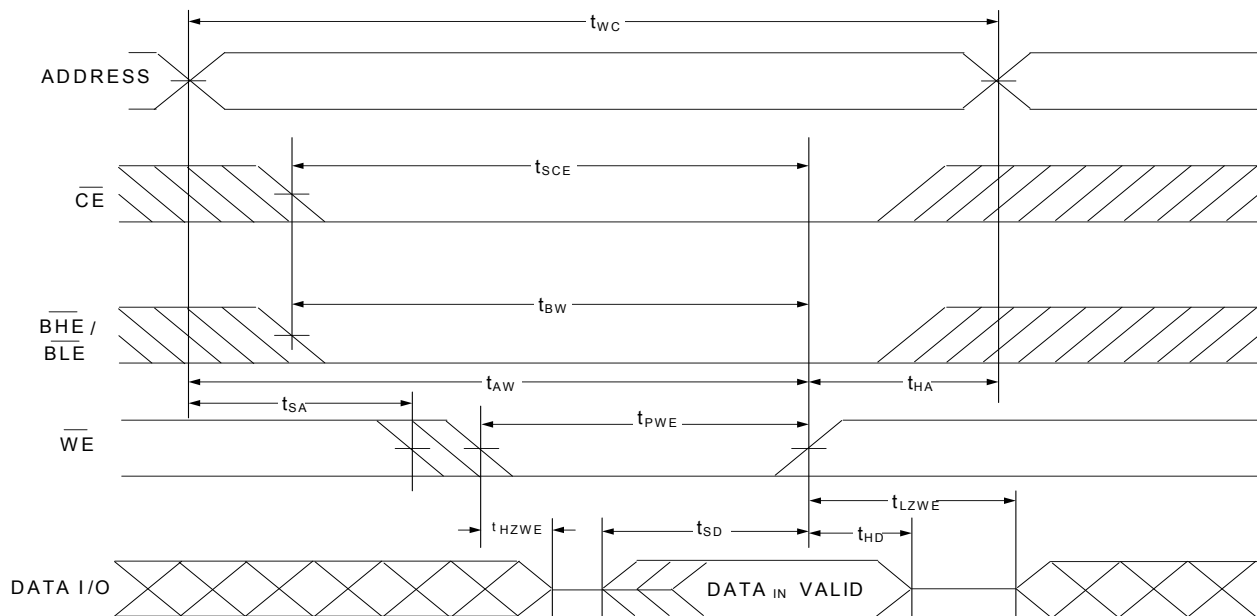
- 21.  $\overline{\text{WE}}$  is HIGH for the read cycle.
- 22. Address valid prior to or coincident with  $\overline{\text{CE}}$  LOW transition.

**Switching Waveforms** (continued)

**Figure 9. Write Cycle No. 1 ( $\overline{\text{CE}}$  Controlled)** [23, 24]



**Figure 10. Write Cycle No. 2 ( $\overline{\text{WE}}$  Controlled,  $\overline{\text{OE}}$  LOW)** [23, 24, 25]

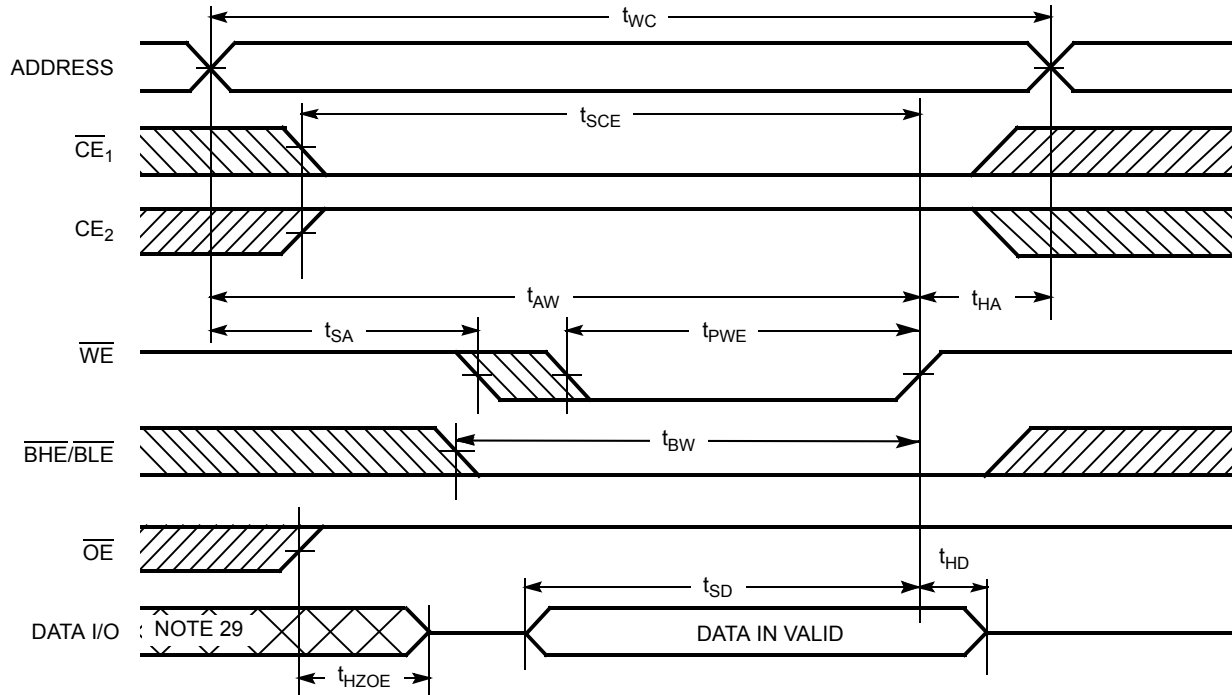


**Notes**

- 23. The internal write time of the memory is defined by the overlap of  $\overline{\text{WE}} = V_{IL}$ ,  $\overline{\text{CE}} = V_{IL}$ . These signals must be LOW to initiate a write, and the HIGH transition of any of these signals can terminate the operation. The input data setup and hold timing should be referenced to the edge of the signal that terminates the write.
- 24. Data I/O is in HI-Z state if  $\overline{\text{CE}} = V_{IH}$ , or  $\overline{\text{OE}} = V_{IH}$ .
- 25. The minimum write cycle pulse width should be equal to sum of  $t_{SD}$  and  $t_{HZWE}$ .

**Switching Waveforms** (continued)

**Figure 11. Write Cycle No. 3 ( $\overline{WE}$  Controlled)** [26, 27, 28]



**Notes**

- 26. The internal write time of the memory is defined by the overlap of  $\overline{WE} = V_{IL}$ ,  $\overline{CE} = V_{IL}$ . These signals must be LOW to initiate a write, and the HIGH transition of any of these signals can terminate the operation. The input data setup and hold timing should be referenced to the edge of the signal that terminates the write.
- 27. Data I/O is in HI-Z state if  $\overline{CE} = V_{IH}$ , or  $\overline{OE} = V_{IH}$ .
- 28. Data I/O is high impedance if  $\overline{OE} = V_{IH}$ .
- 29. During this period the I/Os are in output state. Do not apply input signals.

## Truth Table

| $\overline{CE}$ | $\overline{OE}$   | $\overline{WE}$   | I/O <sub>0</sub> –I/O <sub>7</sub> | Mode                       | Power                      |
|-----------------|-------------------|-------------------|------------------------------------|----------------------------|----------------------------|
| H               | X <sup>[30]</sup> | X <sup>[30]</sup> | HI-Z                               | Power down                 | Standby (I <sub>SB</sub> ) |
| L               | L                 | H                 | Data out                           | Read all bits              | Active (I <sub>CC</sub> )  |
| L               | X                 | L                 | Data in                            | Write all bits             | Active (I <sub>CC</sub> )  |
| L               | H                 | H                 | HI-Z                               | Selected, outputs disabled | Active (I <sub>CC</sub> )  |

## ERR Output – CY7C1049GE

| Output <sup>[31]</sup> | Mode  |
|------------------------|---|
| 0                      | Read operation, no single-bit error in the stored data.   |
| 1                      | Read operation, single-bit error detected and corrected.  |
| HI-Z                   | Device deselected or outputs disabled or Write operation. |

### Notes

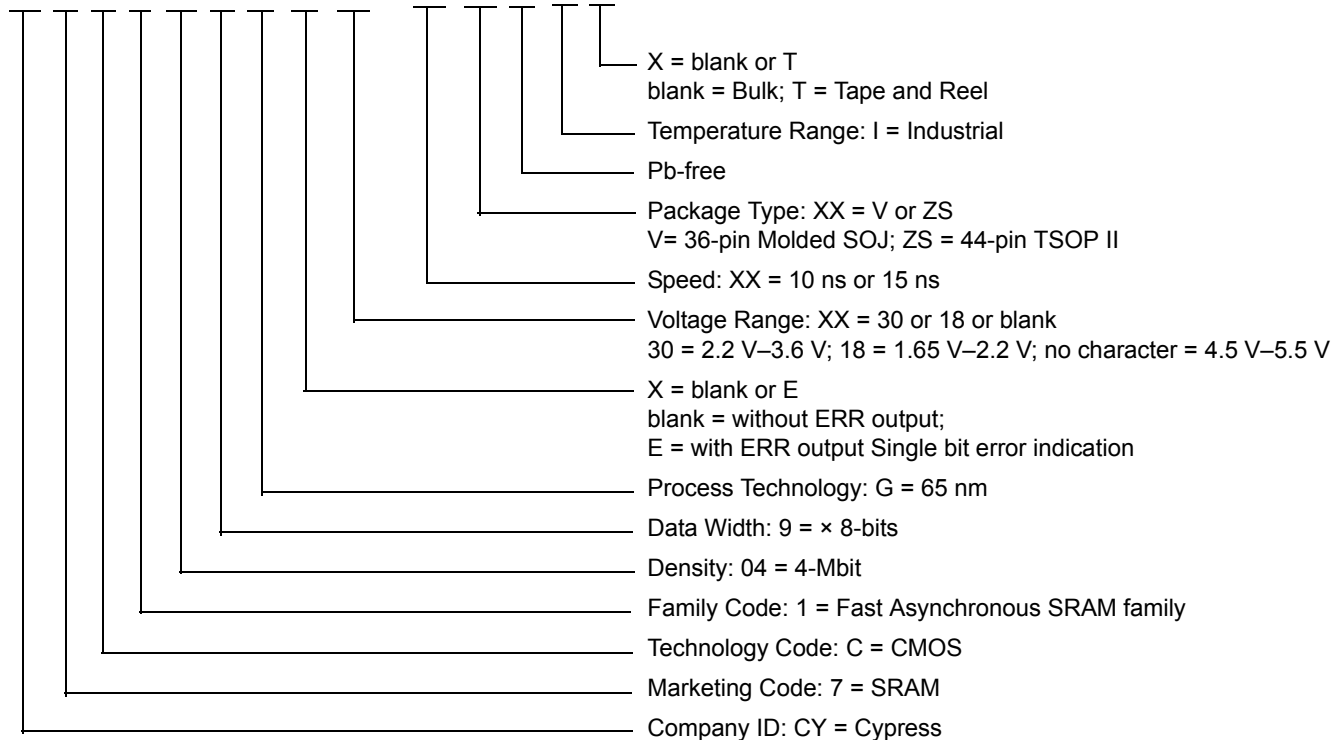
30. The input voltage levels on these pins should be either at V<sub>IH</sub> or V<sub>IL</sub>.  
31. ERR pin is an output pin. It should be left floating when not used.

## Ordering Information

| Speed (ns) | Voltage Range | Ordering Code        | Package Diagram | Package Type (all Pb-free)                | Operating Range |
|------------|---------------|----------------------|-----------------|---|-----------------|
| 10         | 2.2 V–3.6 V   | CY7C1049G30-10VXI    | 51-85090        | 36-pin Molded SOJ                         | Industrial      |
|            |               | CY7C1049G30-10VXIT   | 51-85090        | 36-pin Molded SOJ, Tape and Reel          |                 |
|            |               | CY7C1049GE30-10ZSXI  | 51-85087        | 44-pin TSOP II, ERR output                |                 |
|            |               | CY7C1049GE30-10ZSXIT | 51-85087        | 44-pin TSOP II, ERR output, Tape and Reel |                 |
|            |               | CY7C1049G30-10ZSXI   | 51-85087        | 44-pin TSOP II                            |                 |
|            |               | CY7C1049G30-10ZSXIT  | 51-85087        | 44-pin TSOP II, Tape and Reel             |                 |
| 15         | 1.65 V–2.2 V  | CY7C1049G18-15ZSXI   | 51-85087        | 44-pin TSOP II                            |                 |
|            |               | CY7C1049G18-15ZSXIT  | 51-85087        | 44-pin TSOP II, Tape and Reel             |                 |
| 10         | 4.5 V–5.5 V   | CY7C1049G-10VXI      | 51-85090        | 36-pin Molded SOJ                         |                 |
|            |               | CY7C1049G-10VXIT     | 51-85090        | 36-pin Molded SOJ, Tape and Reel          |                 |
|            |               | CY7C1049G-10ZSXI     | 51-85087        | 44-pin TSOP II                            |                 |
|            |               | CY7C1049G-10ZSXIT    | 51-85087        | 44-pin TSOP II, Tape and Reel             |                 |

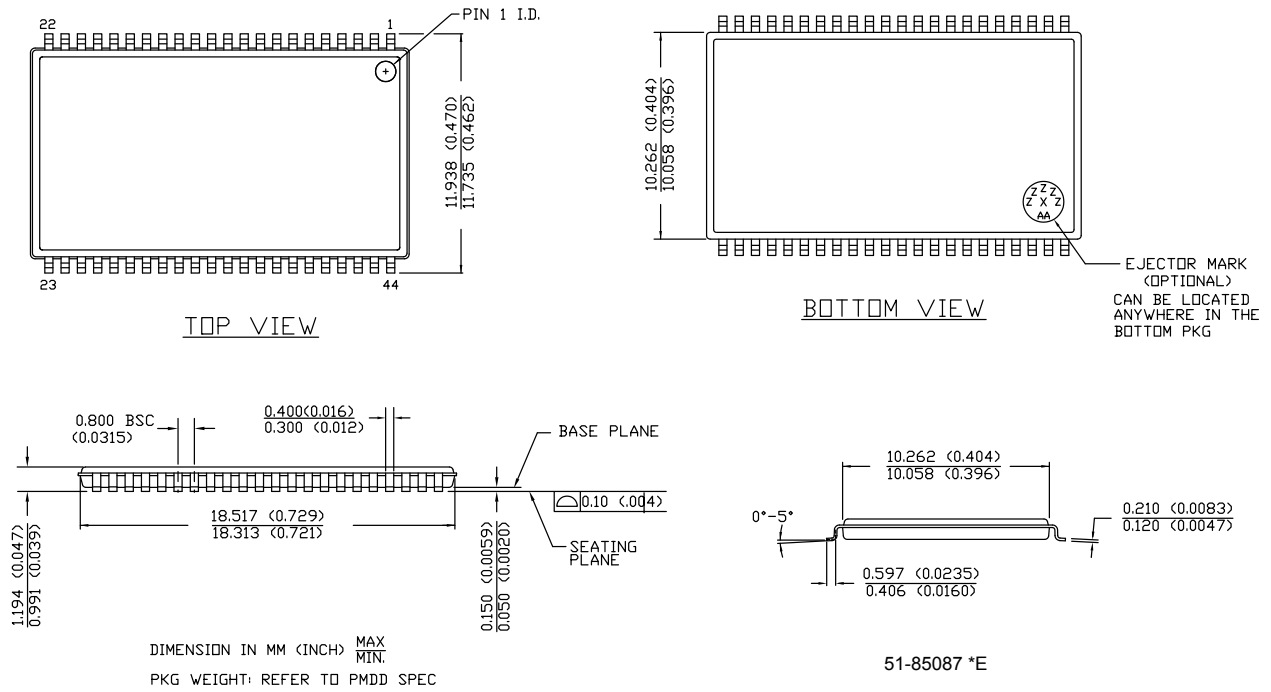
## Ordering Code Definitions

CY 7 C 1 04 9 G X XX - XX XX X I X

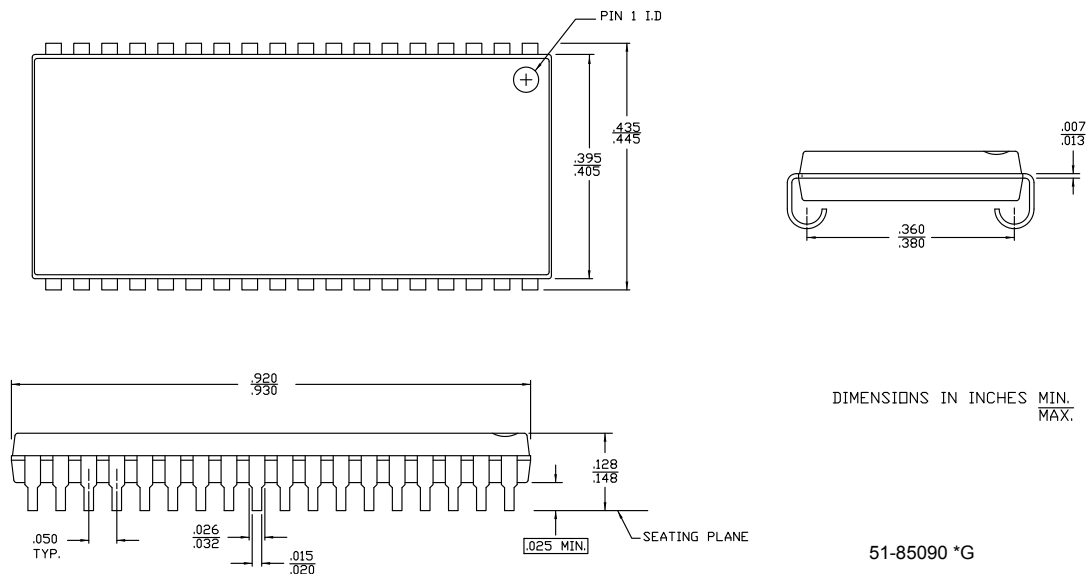


**Package Diagrams**

**Figure 12. 44-pin TSOP II Package Outline, 51-85087**



**Figure 13. 36L SOJ V36.4 (Molded) Package Outline, 51-85090**





## Acronyms

| Acronym                 | Description                             |
|-------------------------|---|
| $\overline{\text{BHE}}$ | Byte High Enable                        |
| $\overline{\text{BLE}}$ | Byte Low Enable                         |
| $\overline{\text{CE}}$  | Chip Enable                             |
| CMOS                    | Complementary Metal Oxide Semiconductor |
| I/O                     | Input/Output                            |
| $\overline{\text{OE}}$  | Output Enable                           |
| SRAM                    | Static Random Access Memory             |
| TSOP                    | Thin Small Outline Package              |
| TTL                     | Transistor-Transistor Logic             |
| VFBGA                   | Very Fine-Pitch Ball Grid Array         |
| $\overline{\text{WE}}$  | Write Enable                            |

## Document Conventions

### Units of Measure

| Symbol | Unit of Measure |
|--------|-----------------|
| °C     | degrees Celsius |
| MHz    | megahertz       |
| μA     | microampere     |
| μs     | microsecond     |
| mA     | milliampere     |
| mm     | millimeter      |
| ns     | nanosecond      |
| Ω      | ohm             |
| %      | percent         |
| pF     | picofarad       |
| V      | volt            |
| W      | watt            |

## Document History Page

| Document Title: CY7C1049G/CY7C1049GE, 4-Mbit (512K words × 8 bit) Static RAM with Error-Correcting Code (ECC)<br>Document Number: 001-95412 |         |                 |                 |   |
|---|---------|-----------------|-----------------|---|
| Rev.  | ECN No. | Orig. of Change | Submission Date | Description of Change   |
| **  | 4685774 | VINI            | 03/13/2015      | New data sheet.   |
| *A  | 4831087 | NILE            | 07/10/2015      | Updated <a href="#">Package Diagrams</a> :<br>Added spec 51-85090 *G ( <a href="#">Figure 13</a> ).<br>Removed spec 51-85082 *E.<br>Removed spec 51-85150 *H.   |
| *B  | 4968879 | NILE            | 10/16/2015      | Fixed typo in bookmarks.  |
| *C  | 5020573 | VINI            | 11/25/2015      | Changed status from Preliminary to Final.<br>Updated <a href="#">Pin Configurations</a> :<br>Removed figure "36-pin SOJ Single Chip Enable with ERR CY7C1049GE".<br>Updated <a href="#">Ordering Information</a> :<br>Updated part numbers.   |
| *D  | 5429076 | NILE            | 09/07/2016      | Updated <a href="#">Maximum Ratings</a> :<br>Updated Note 7 (Replaced "2 ns" with "20 ns").<br>Updated <a href="#">DC Electrical Characteristics</a> :<br>Removed Operating Range "2.7 V to 3.6 V" and all values corresponding to V <sub>OH</sub> parameter.<br>Included Operating Ranges "2.7 V to 3.0 V" and "3.0 V to 3.6 V" and all values corresponding to V <sub>OH</sub> parameter.<br>Changed minimum value of V <sub>IH</sub> parameter from 2.2 V to 2 V corresponding to Operating Range "4.5 V to 5.5 V".<br>Updated <a href="#">Ordering Information</a> :<br>Updated part numbers.<br>Updated to new template. |

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