

## 1Mx16 LOW VOLTAGE, ULTRA LOW POWER & LOW POWER CMOS STATIC RAM

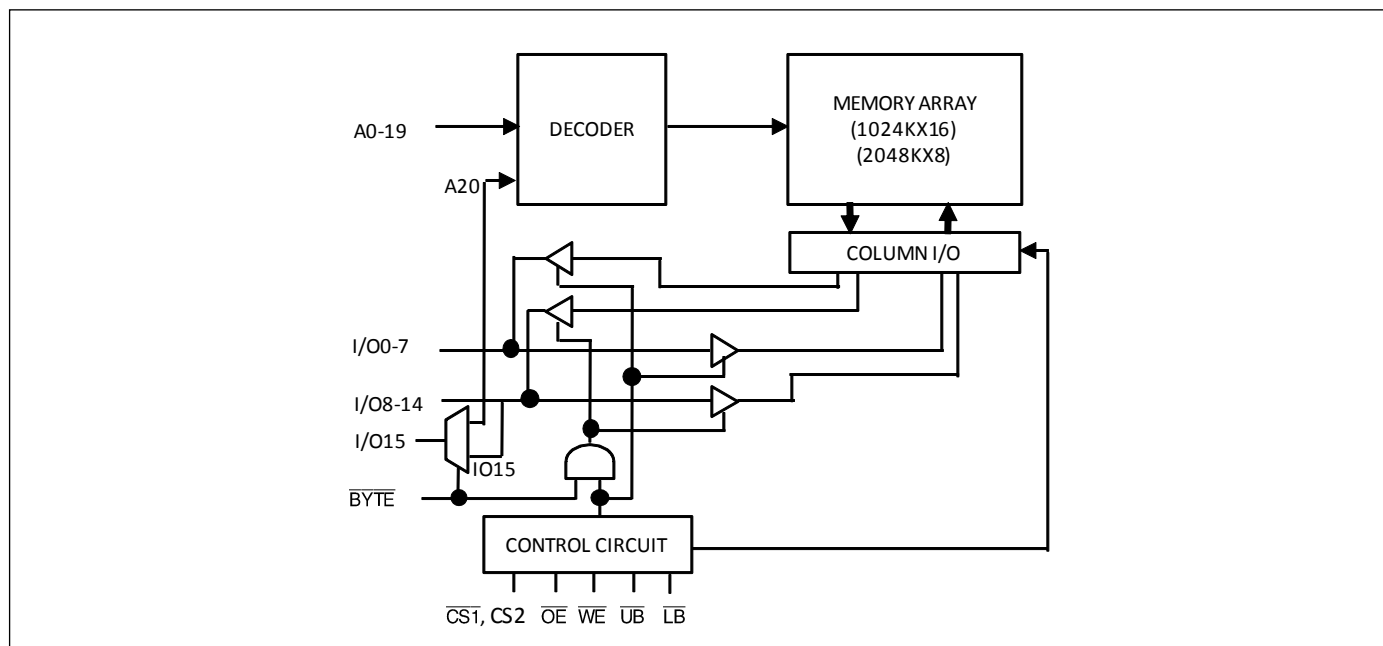
### KEY FEATURES

- High-speed access time: 45ns, 55ns.
- CMOS low power operation
  - 25  $\mu$ A (typical) CMOS standby
- CMOS for optimum speed and power and TTL compatible interface levels
- Single power supply
  - 1.65V~1.98V  $V_{DD}$  (IS62/65WV102416DALL)
  - 2.2V~3.6V  $V_{DD}$  (IS62/65WV102416DBLL)
- Fully static operation: no clock or refresh required
- Industrial and Automotive temperature support

### DESCRIPTION

The /ISS/ IS62/65WV102416DALL, IS62/65WV102416DBLL are ULTRA LOW POWER CMOS 16Mbit static RAMs organized as 1M words by 16 bits. It is fabricated using /ISS/'s high-performance CMOS technology. This highly reliable process coupled with innovative circuit design techniques, yields high-performance and low power consumption devices. The IS62WV102416DALL/DBLL and IS65WV102416DALL/DBLL are packaged in 48-Pin TSOP (TYPE I).

### BLOCK DIAGRAM



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48-PIN TSOP-I



PIN DESCRIPTIONS

|            |   |
|------------|---|
| A0-A19     | Address Inputs  |
| I/O0-I/O14 | Data Inputs/Outputs, I/O8 to I/O14 pins are not used in x8 Mode.  |
| I/O15/A20  | I/O15, when used in a x16 Mode. A20 when used in a x8 Mode,   |
| CS1, CS2   | Chip Enable Input   |
| OE         | Output Enable Input   |
| WE         | Write Enable Input  |
| LB         | Lower-byte Control (I/O0-I/O7). This pin is not used in x8 Mode.  |
| UB         | Upper-byte Control (I/O8-I/O15). This pin is not used in x8 Mode.   |
| BYTE       | BYTE pin must be tied to either V <sub>DD</sub> to use the device as a 1024Kx16 SRAM or GND to use as 2048Kx8 SRAM. In x8 mode, Pin 45 becomes A20, while UB, LB and I/O8 to I/O14 pins are not used. |
| NC         | No Connection   |
| VDD        | Power   |
| Vss        | Ground  |

\*For x8/x16 switchable configuration BGA option, please contact sram@issi.com

**FUNCTION DESCRIPTION**

SRAM is one of random access memories. Each byte or word has an address and can be accessed randomly. SRAM has three different modes supported. Each function is described below with Truth Table.

**STANDBY MODE**

Device enters standby mode when deselected ( $\overline{CS1}$  HIGH or CS2 LOW or both  $\overline{UB}$  and  $\overline{LB}$  are HIGH). The input and output pins (I/O0-15) are placed in a high impedance state. The current consumption in this mode will be either ISB1 or ISB2 depending on the input level. CMOS input in this mode will maximize saving power.

**WRITE MODE**

Write operation issues with Chip selected ( $\overline{CS1}$  LOW and CS2 HIGH) and Write Enable ( $\overline{WE}$ ) input LOW. The input and output pins(I/O0-15) are in data input mode. Output buffers are closed during this time even if  $\overline{OE}$  is LOW.  $\overline{UB}$  and  $\overline{LB}$  enables a byte write feature. By enabling  $\overline{LB}$  LOW, data from I/O pins (I/O0 through I/O7) are written into the location specified on the address pins. And with  $\overline{UB}$  being LOW, data from I/O pins (I/O8 through I/O15) are written into the location.

**READ MODE**

Read operation issues with Chip selected ( $\overline{CS1}$  LOW and CS2 HIGH) and Write Enable ( $\overline{WE}$ ) input HIGH. When  $\overline{OE}$  is LOW, output buffer turns on to make data output. Any input to I/O pins during READ mode is not permitted.  $\overline{UB}$  and  $\overline{LB}$  enables a byte read feature. By enabling  $\overline{LB}$  LOW, data from memory appears on I/O0-7. And with  $\overline{UB}$  being LOW, data from memory appears on I/O8-15.

In the READ mode, output buffers can be turned off by pulling  $\overline{OE}$  HIGH. In this mode, internal device operates as READ but I/Os are in a high impedance state. Since device is in READ mode, active current is used.

**TRUTH TABLE**

| Mode            | $\overline{CS1}$ | CS2 | $\overline{WE}$ | $\overline{OE}$ | $\overline{LB}$ | $\overline{UB}$ | I/O0-I/O7 | I/O8-I/O15 | VDD Current |
|-----------------|------------------|-----|-----------------|-----------------|-----------------|-----------------|-----------|------------|-------------|
| Not Selected    | H                | X   | X               | X               | X               | X               | High-Z    | High-Z     | ISB1,ISB2   |
|                 | X                | L   | X               | X               | X               | X               | High-Z    | High-Z     |             |
|                 | X                | X   | X               | X               | H               | H               | High-Z    | High-Z     |             |
| Output Disabled | L                | H   | H               | H               | L               | X               | High-Z    | High-Z     | ICC         |
|                 | L                | H   | H               | H               | X               | L               | High-Z    | High-Z     |             |
| Read            | L                | H   | H               | L               | L               | H               | DOUT      | High-Z     | ICC         |
|                 | L                | H   | H               | L               | H               | L               | High-Z    | DOUT       |             |
|                 | L                | H   | H               | L               | L               | L               | DOUT      | DOUT       |             |
| Write           | L                | H   | L               | X               | L               | H               | DIN       | High-Z     | ICC         |
|                 | L                | H   | L               | X               | H               | L               | High-Z    | DIN        |             |
|                 | L                | H   | L               | X               | L               | L               | DIN       | DIN        |             |

**ABSOLUTE MAXIMUM RATINGS AND OPERATING RANGE**

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

| Symbol            | Parameter                            | Value                               | Unit |
|-------------------|--------------------------------------|-------------------------------------|------|
| V <sub>term</sub> | Terminal Voltage with Respect to GND | -0.2 to +3.9(V <sub>DD</sub> +0.3V) | V    |
| t <sub>BIAS</sub> | Temperature Under Bias               | -55 to +125                         | °C   |
| V <sub>DD</sub>   | V <sub>DD</sub> Related to GND       | -0.2 to +3.9(V <sub>DD</sub> +0.3V) | V    |
| t <sub>Stg</sub>  | Storage Temperature                  | -65 to +150                         | °C   |
| I <sub>OUT</sub>  | DC Output Current (LOW)              | 20                                  | mA   |

Notes:

1. Stress greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

**OPERATING RANGE<sup>(1)</sup>**

| Range      | Device Marking   | Ambient Temperature | V <sub>DD</sub> (min) | V <sub>DD</sub> (typ) | V <sub>DD</sub> (max) |
|------------|------------------|---------------------|-----------------------|-----------------------|-----------------------|
| Commercial | IS62WV102416DALL | 0°C to +70°C        | 1.65V                 | 1.8V                  | 1.98V                 |
| Industrial | IS62WV102416DALL | -40°C to +85°C      | 1.65V                 | 1.8V                  | 1.98V                 |
| Automotive | IS65WV102416DALL | -40°C to +125°C     | 1.65V                 | 1.8V                  | 1.98V                 |
| Commercial | IS62WV102416DBLL | 0°C to +70°C        | 2.2V                  | 3.3V                  | 3.6V                  |
| Industrial | IS62WV102416DBLL | -40°C to +85°C      | 2.2V                  | 3.3V                  | 3.6V                  |
| Automotive | IS65WV102416DBLL | -40°C to +125°C     | 2.2V                  | 3.3V                  | 3.6V                  |

Note:

1. Full device AC operation assumes a 100 μs ramp time from 0 to V<sub>cc</sub>(min) and 200 μs wait time after V<sub>cc</sub> stabilization.

**PIN CAPACITANCE<sup>(1)</sup>**

| Parameter                 | Symbol           | Test Condition  | Max | Units |
|---------------------------|------------------|---|-----|-------|
| Input capacitance         | C <sub>IN</sub>  | T <sub>A</sub> = 25°C, f = 1 MHz, V <sub>DD</sub> = V <sub>DD</sub> (typ) | 10  | pF    |
| DQ capacitance (IO0–IO15) | C <sub>I/O</sub> |   | 10  | pF    |

Note:

1. These parameters are guaranteed by design and tested by a sample basis only.

**THERMAL CHARACTERISTICS<sup>(1)</sup>**

| Parameter  | Symbol           | Rating | Units |
|--|------------------|--------|-------|
| Thermal resistance from junction to ambient (airflow = 1m/s) | R <sub>θJA</sub> | 43.8   | °C/W  |
| Thermal resistance from junction to case                     | R <sub>θJC</sub> | 7.7    | °C/W  |

Note:

1. These parameters are guaranteed by design and tested by a sample basis only.

**ELECTRICAL CHARACTERISTICS**

**IS62(5)WV102416DALL DC ELECTRICAL CHARACTERISTICS-I (OVER THE OPERATING RANGE)**

| Symbol         | Parameter           | Test Conditions                           | Min. | Max.           | Unit          |
|----------------|---------------------|---|------|----------------|---------------|
| $V_{OH}$       | Output HIGH Voltage | $I_{OH} = -0.1 \text{ mA}$                | 1.4  | —              | V             |
| $V_{OL}$       | Output LOW Voltage  | $I_{OL} = 0.1 \text{ mA}$                 | —    | 0.2            | V             |
| $V_{IH}^{(1)}$ | Input HIGH Voltage  |   | 1.4  | $V_{DD} + 0.2$ | V             |
| $V_{IL}^{(1)}$ | Input LOW Voltage   |   | -0.2 | 0.4            | V             |
| $I_{LI}$       | Input Leakage       | $GND < V_{IN} < V_{DD}$                   | -1   | 1              | $\mu\text{A}$ |
| $I_{LO}$       | Output Leakage      | $GND < V_{IN} < V_{DD}$ , Output Disabled | -1   | 1              | $\mu\text{A}$ |

Notes:

- $V_{ILL}(\text{min}) = -1.0\text{V AC}$  (pulse width < 10ns). Not 100% tested.  
 $V_{IHH}(\text{max}) = V_{DD} + 1.0\text{V AC}$  (pulse width < 10ns). Not 100% tested.

**IS62(5)WV102416DBLL DC ELECTRICAL CHARACTERISTICS-I (OVER THE OPERATING RANGE)**

| Symbol         | Parameter           | Test Conditions   | Min. | Max.           | Unit          |
|----------------|---------------------|---|------|----------------|---------------|
| $V_{OH}$       | Output HIGH Voltage | $2.2 \leq V_{DD} < 2.7$ , $I_{OH} = -0.1 \text{ mA}$    | 2.0  | —              | V             |
|                |                     | $2.7 \leq V_{DD} \leq 3.6$ , $I_{OH} = -1.0 \text{ mA}$ | 2.4  | —              | V             |
| $V_{OL}$       | Output LOW Voltage  | $2.2 \leq V_{DD} < 2.7$ , $I_{OL} = 0.1 \text{ mA}$     | —    | 0.4            | V             |
|                |                     | $2.7 \leq V_{DD} \leq 3.6$ , $I_{OL} = 2.1 \text{ mA}$  | —    | 0.4            | V             |
| $V_{IH}^{(1)}$ | Input HIGH Voltage  | $2.2 \leq V_{DD} < 2.7$                                 | 1.8  | $V_{DD} + 0.3$ | V             |
|                |                     | $2.7 \leq V_{DD} \leq 3.6$                              | 2.2  | $V_{DD} + 0.3$ | V             |
| $V_{IL}^{(1)}$ | Input LOW Voltage   | $2.2 \leq V_{DD} < 2.7$                                 | -0.3 | 0.6            | V             |
|                |                     | $2.7 \leq V_{DD} \leq 3.6$                              | -0.3 | 0.8            | V             |
| $I_{LI}$       | Input Leakage       | $GND < V_{IN} < V_{DD}$                                 | -1   | 1              | $\mu\text{A}$ |
| $I_{LO}$       | Output Leakage      | $GND < V_{IN} < V_{DD}$ , Output Disabled               | -1   | 1              | $\mu\text{A}$ |

Notes:

- $V_{ILL}(\text{min}) = -2.0\text{V AC}$  (pulse width < 10ns). Not 100% tested.  
 $V_{IHH}(\text{max}) = V_{DD} + 2.0\text{V AC}$  (pulse width < 10ns). Not 100% tested.

**IS62(5)WV102416DALL DC ELECTRICAL CHARACTERISTICS-II FOR POWER  
(OVER THE OPERATING RANGE)**

| Symbol | Parameter  | Test Conditions   | Grade | Typ. | Max. | Unit |
|--------|--|---|-------|------|------|------|
| ICC    | V <sub>DD</sub> Dynamic Operating Supply Current | V <sub>DD</sub> =V <sub>DD</sub> (max), I <sub>OUT</sub> =0mA, f=f <sub>MAX</sub>   | Com.  | 6    | 12   | mA   |
|        |  |   | Ind.  | -    | 12   |      |
|        |  |   | Auto. | -    | 12   |      |
| ICC1   | V <sub>DD</sub> Static Operating Supply Current  | V <sub>DD</sub> =V <sub>DD</sub> (max), I <sub>OUT</sub> = 0mA, f=0Hz   | Com.  | 3    | 6    | mA   |
|        |  |   | Ind.  | -    | 6    |      |
|        |  |   | Auto. | -    | 6    |      |
| ISB1   | CMOS Standby Current (CMOS Inputs)               | V <sub>DD</sub> =V <sub>DD</sub> (max),<br>(1) 0V ≤ CS2 ≤ 0.2V<br>or<br>(2) $\overline{CS1} \geq V_{DD} - 0.2V$ , CS2 ≥ V <sub>DD</sub> - 0.2V<br>or<br>(3) $\overline{LB}$ and $\overline{UB} \geq V_{DD} - 0.2V$<br>$\overline{CS1} \leq 0.2V$ , CS2 ≥ V <sub>DD</sub> - 0.2V | Com.  | 25   | 50   | μA   |
|        |  |   | Ind.  | -    | 65   | μA   |
|        |  |   | Auto. | -    | 165  | μA   |

Note:

Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at VDD = VDD(typ), TA = 25°C

**IS62(5)WV102416DBLL DC ELECTRICAL CHARACTERISTICS-II FOR POWER  
(OVER THE OPERATING RANGE)**

| Symbol | Parameter  | Test Conditions   | Grade | Typ. | Max. | Unit |
|--------|--|---|-------|------|------|------|
| ICC    | V <sub>DD</sub> Dynamic Operating Supply Current | V <sub>DD</sub> =V <sub>DD</sub> (max), I <sub>OUT</sub> =0mA, f=f <sub>MAX</sub>   | Com.  | 6    | 12   | mA   |
|        |  |   | Ind.  | -    | 12   |      |
|        |  |   | Auto. | -    | 12   |      |
| ICC1   | V <sub>DD</sub> Static Operating Supply Current  | V <sub>DD</sub> =V <sub>DD</sub> (max), I <sub>OUT</sub> = 0mA, f=0Hz   | Com.  | 3    | 6    | mA   |
|        |  |   | Ind.  | -    | 6    |      |
|        |  |   | Auto. | -    | 6    |      |
| ISB1   | CMOS Standby Current (CMOS Inputs)               | V <sub>DD</sub> =V <sub>DD</sub> (max),<br>(1) 0V ≤ CS2 ≤ 0.2V<br>or<br>(2) $\overline{CS1} \geq V_{DD} - 0.2V$ , CS2 ≥ V <sub>DD</sub> - 0.2V<br>or<br>(3) $\overline{LB}$ and $\overline{UB} \geq V_{DD} - 0.2V$<br>$\overline{CS1} \leq 0.2V$ , CS2 ≥ V <sub>DD</sub> - 0.2V | Com.  | 25   | 50   | μA   |
|        |  |   | Ind.  | -    | 65   | μA   |
|        |  |   | Auto. | -    | 165  | μA   |

Note:

Typical values are included for reference only and are not guaranteed or tested. Typical values are measured at VDD = VDD(typ), TA = 25°C

**AC CHARACTERISTICS<sup>(6)</sup> (OVER OPERATING RANGE)**

**READ CYCLE AC CHARACTERISTICS**

| Parameter  | Symbol        | 45ns |     | 55ns |     | unit | notes |
|--|---------------|------|-----|------|-----|------|-------|
|  |               | Min  | Max | Min  | Max |      |       |
| Read Cycle Time                                    | tRC           | 45   | -   | 55   | -   | ns   | 1,5   |
| Address Access Time                                | tAA           | -    | 45  | -    | 55  | ns   | 1     |
| Output Hold Time                                   | tOHA          | 8    | -   | 8    | -   | ns   | 1     |
| $\overline{CS1}$ , CS2 Access Time                 | tACS1/tACS2   | -    | 45  | -    | 55  | ns   | 1     |
| $\overline{OE}$ Access Time                        | tDOE          | -    | 22  | -    | 25  | ns   | 1     |
| $\overline{OE}$ to High-Z Output                   | tHZOE         | -    | 18  | -    | 18  | ns   | 2     |
| $\overline{OE}$ to Low-Z Output                    | tLZOE         | 5    | -   | 5    | -   | ns   | 2     |
| $\overline{CS1}$ , CS2 to High-Z Output            | tHZCS//tHZCS2 | -    | 18  | -    | 18  | ns   | 2     |
| $\overline{CS1}$ , CS2 to Low-Z Output             | tLZCS/tLZCS2  | 10   | -   | 10   | -   | ns   | 2     |
| $\overline{LB}$ , $\overline{UB}$ Access Time      | tBA           | -    | 45  | -    | 55  | ns   | 1     |
| $\overline{LB}$ , $\overline{UB}$ to High-Z Output | tHZB          | -    | 18  | -    | 18  | ns   | 2     |
| $\overline{LB}$ , $\overline{UB}$ to Low-Z Output  | tLZB          | 10   | -   | 10   | -   | ns   | 2     |

**WRITE CYCLE AC CHARACTERISTICS**

| Parameter   | Symbol      | 45ns |     | 55ns |     | unit | notes |
|---|-------------|------|-----|------|-----|------|-------|
|   |             | Min  | Max | Min  | Max |      |       |
| Write Cycle Time  | tWC         | 45   | -   | 55   | -   | ns   | 1,3,5 |
| $\overline{CS1}$ , CS2 to Write End                     | tSCS1/tSCS2 | 35   | -   | 40   | -   | ns   | 1,3   |
| Address Setup Time to Write End                         | tAW         | 35   | -   | 40   | -   | ns   | 1,3   |
| Address Hold from Write End                             | tHA         | 0    | -   | 0    | -   | ns   | 1,3   |
| Address Setup Time                                      | tSA         | 0    | -   | 0    | -   | ns   | 1,3   |
| $\overline{LB}$ , $\overline{UB}$ Valid to End of Write | tPWB        | 35   | -   | 40   | -   | ns   | 1,3   |
| $\overline{WE}$ Pulse Width                             | tPWE        | 35   | -   | 40   | -   | ns   | 1,3,4 |
| Data Setup to Write End                                 | tSD         | 28   | -   | 28   | -   | ns   | 1,3   |
| Data Hold from Write End                                | tHD         | 0    | -   | 0    | -   | ns   | 1,3   |
| $\overline{WE}$ LOW to High-Z Output                    | tHZWE       | -    | 18  | -    | 18  | ns   | 2,3   |
| $\overline{WE}$ HIGH to Low-Z Output                    | tLZWE       | 10   | -   | 10   | -   | ns   | 2,3   |

Notes:

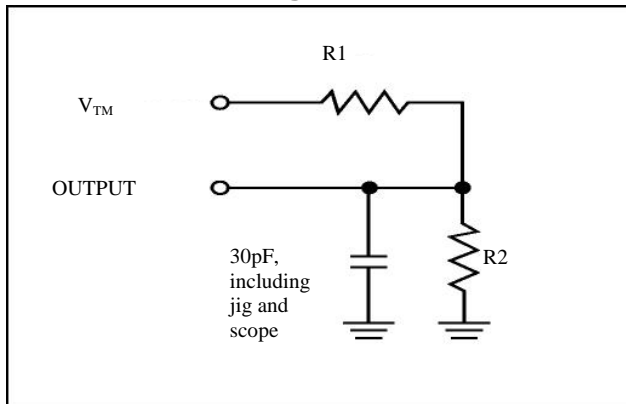
1. Tested with the load in Figure 1.
2. Tested with the load in Figure 2. Transition is measured  $\pm 500$  mV from steady-state voltage. tHZOE, tHZCS, tHZB, and tHZWE transitions are measured when the output enters a high impedance state. Not 100% tested.
3. The internal write time is defined by the overlap of  $\overline{CS1}$ =LOW, CS2=HIGH, ( $\overline{UB}$  or  $\overline{LB}$ )=LOW, and  $\overline{WE}$ =LOW. All four conditions must be in valid states to initiate a Write, but any condition can go inactive to terminate the Write. The Data Input Setup and Hold timing are referenced to the rising or falling edge of the signal that terminates the write.
4. tPWE > tHZWE + tSD when OE is LOW.
5. Address inputs must meet  $V_{IH}$  and  $V_{IL}$  SPEC during this period. Any glitch or unknown inputs are not permitted. Unknown input with standby mode is acceptable.
6. Data retention characteristics are defined later in DATA RETENTION CHARACTERISTICS.

**AC TEST CONDITIONS (OVER THE OPERATING RANGE)**

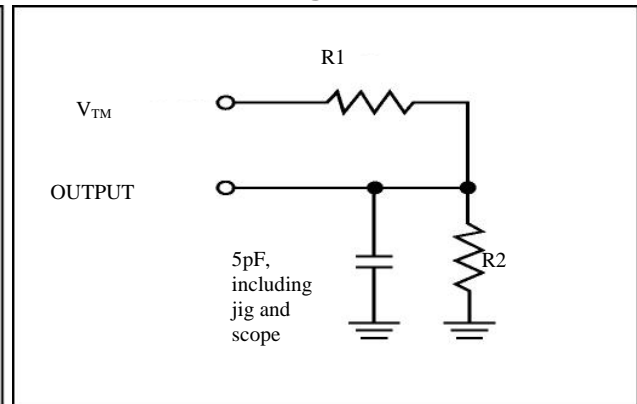
| Parameter                     | Symbol                  | Conditions           | Units |
|-------------------------------|-------------------------|----------------------|-------|
| Input Rise Time               | $T_R$                   | 1.0                  | V/ns  |
| Input Fall Time               | $T_F$                   | 1.0                  | V/ns  |
| Output Timing Reference Level | $V_{REF}$               | $\frac{1}{2} V_{TM}$ | V     |
| Output Load Conditions        | Refer to Figure 1 and 2 |                      |       |

**OUTPUT LOAD CONDITIONS FIGURES**

**Figure1**



**Figure2**

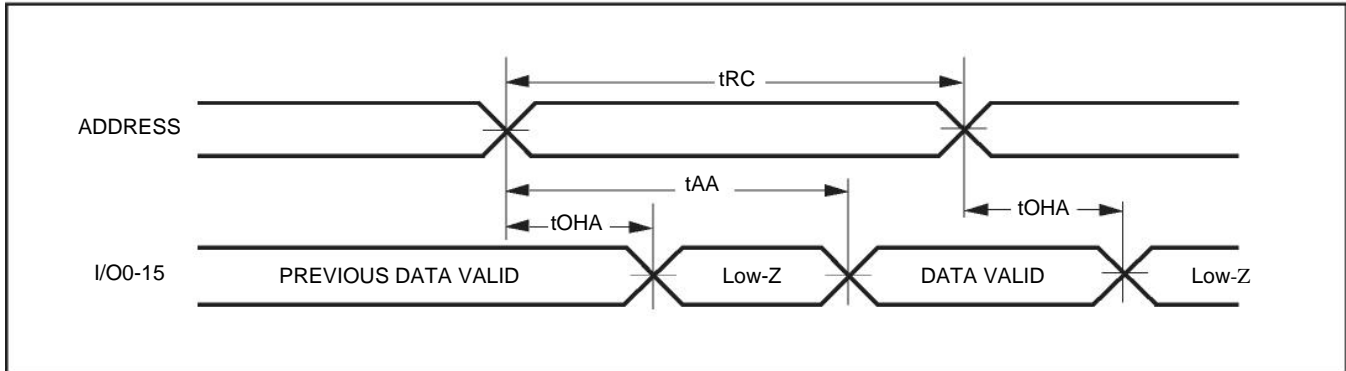


| Parameters | $V_{DD}=1.65\sim 1.98V$ | $V_{DD}=2.2\sim 2.7V$ | $V_{DD}=2.7\sim 3.6V$ |
|------------|-------------------------|-----------------------|-----------------------|
| R1         | 13500 $\Omega$          | 16667 $\Omega$        | 1103 $\Omega$         |
| R2         | 10800 $\Omega$          | 15385 $\Omega$        | 1554 $\Omega$         |
| $V_{TM}$   | VDD                     | VDD                   | VDD                   |

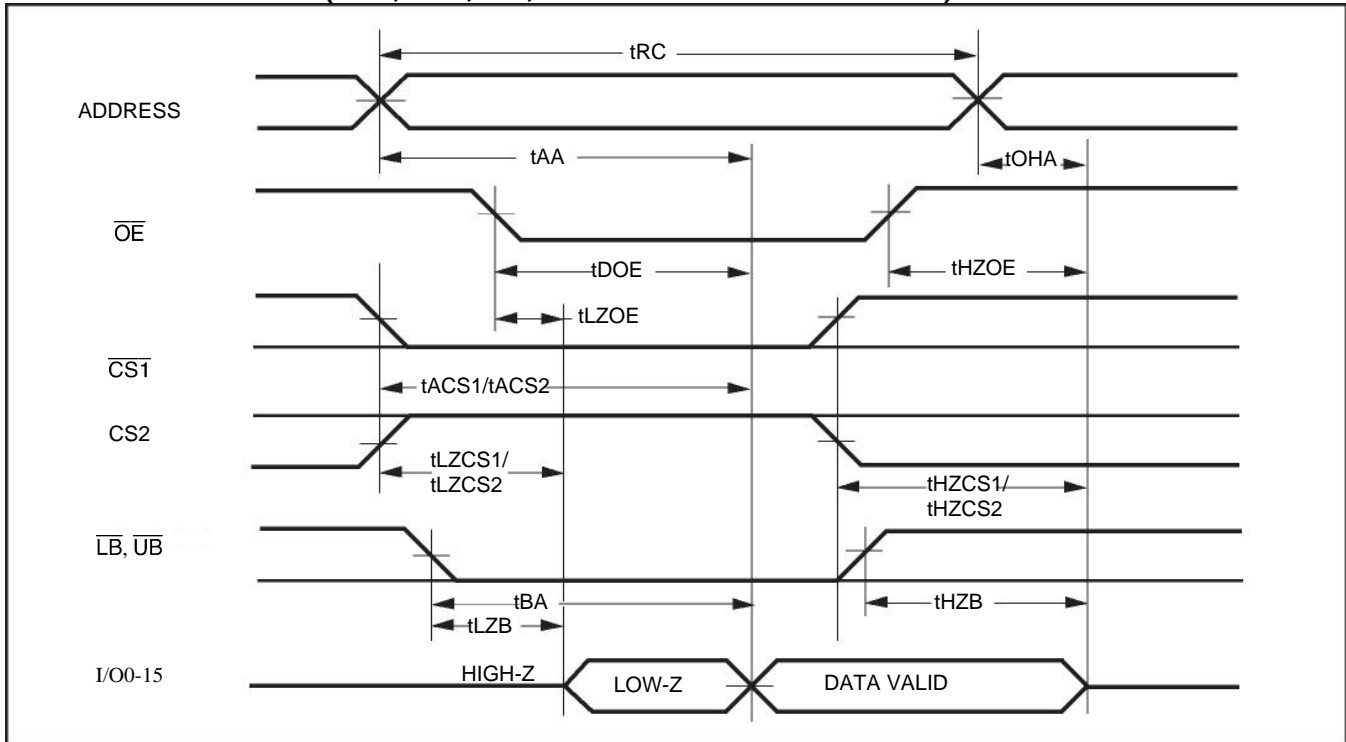


**TIMING DIAGRAM**

**READ CYCLE NO. 1<sup>(1,2)</sup> (ADDRESS CONTROLLED) ( $\overline{CS1}=\overline{OE}=V_{IL}$ ,  $CS2=\overline{WE}=V_{IH}$ )**



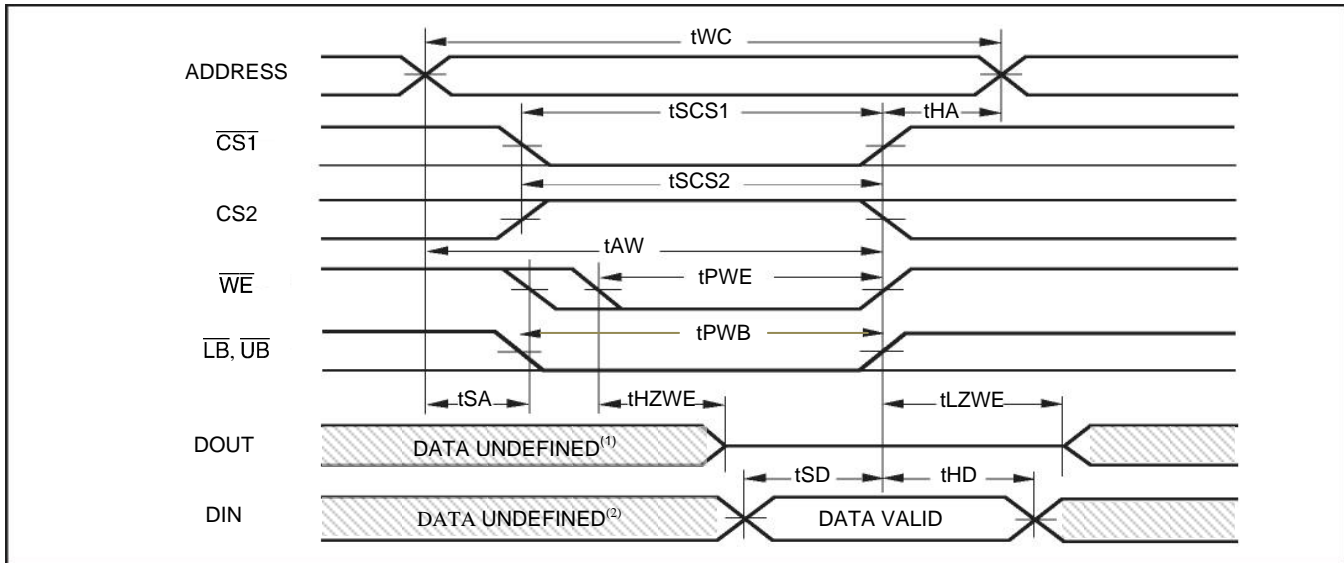
**READ CYCLE NO. 2<sup>(1,3)</sup> ( $\overline{CS1}$ ,  $CS2$ ,  $\overline{OE}$ , AND  $\overline{UB}$  &  $\overline{LB}$  CONTROLLED)**



Notes:

1.  $\overline{WE}$  is HIGH for Read Cycle.
2. The device is continuously selected.  $\overline{OE}$ ,  $\overline{CS1}$ ,  $\overline{UB}$ , or  $\overline{LB}=V_{IL}$ .  $CS2=\overline{WE}=V_{IH}$ .
3. Address is valid prior to or coincident with  $\overline{CS1}$  LOW transition.

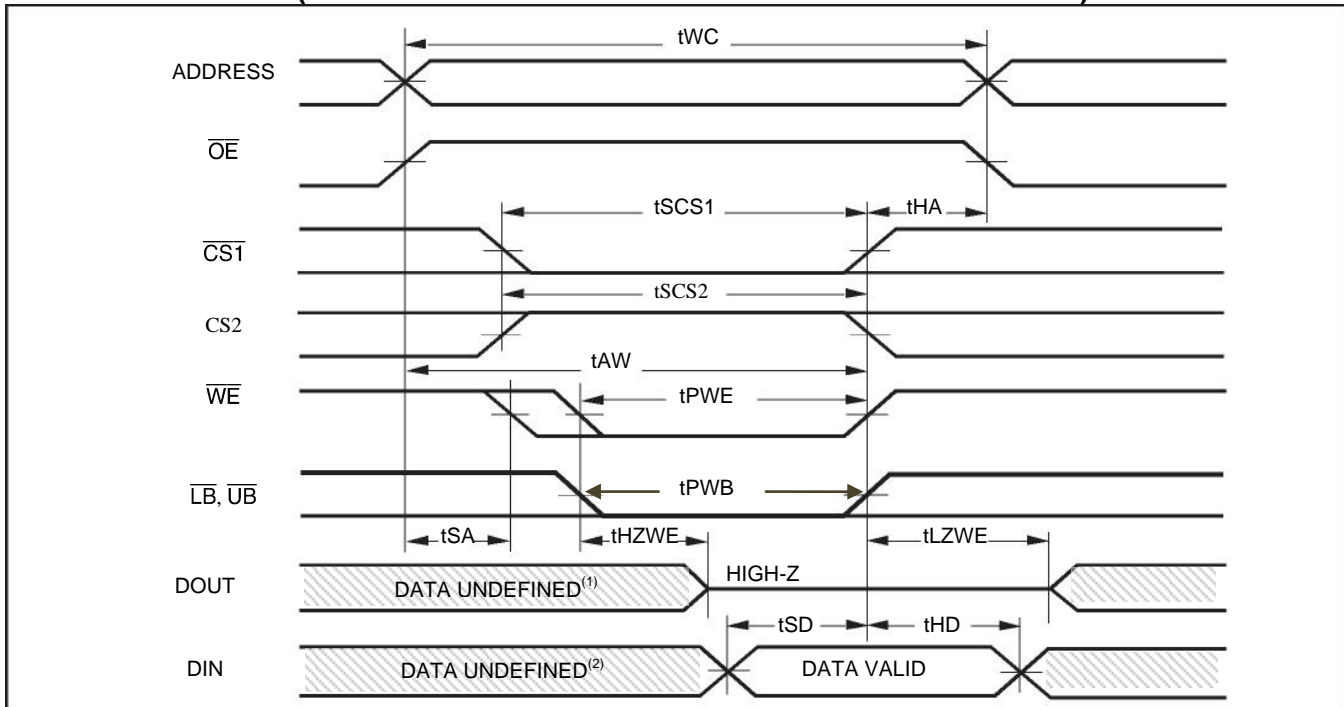
**WRITE CYCLE NO. 1 ( $\overline{CS1}$  CONTROLLED,  $\overline{OE}$  = HIGH OR LOW)**



Notes:

1. tHZWE is based on the assumption when tSA=0nS after READ operation. Actual DOUT for tHZWE may not appear if  $\overline{OE}$  goes high before Write Cycle. tHZOE is the time DOUT goes to High-Z after  $\overline{OE}$  goes high.
2. During this period the I/Os are in output state. Do not apply input signals.

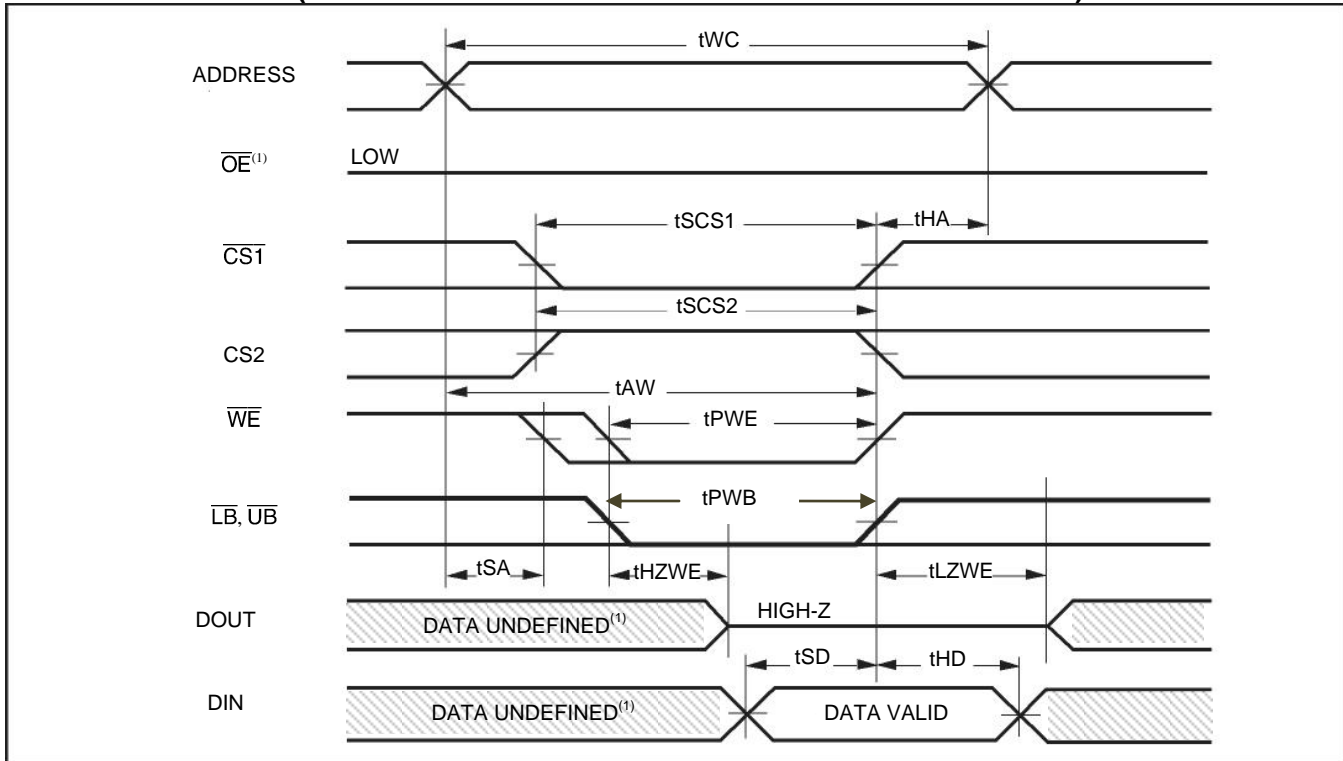
**WRITE CYCLE NO. 2 ( $\overline{WE}$  CONTROLLED:  $\overline{OE}$  IS HIGH DURING WRITE CYCLE)**



Notes:

1. tHZWE is based on the assumption when tSA=0nS after READ operation. Actual DOUT for tHZWE may not appear if  $\overline{OE}$  goes high before Write Cycle. tHZOE is the time DOUT goes to High-Z after  $\overline{OE}$  goes high.
2. During this period the I/Os are in output state. Do not apply input signals.

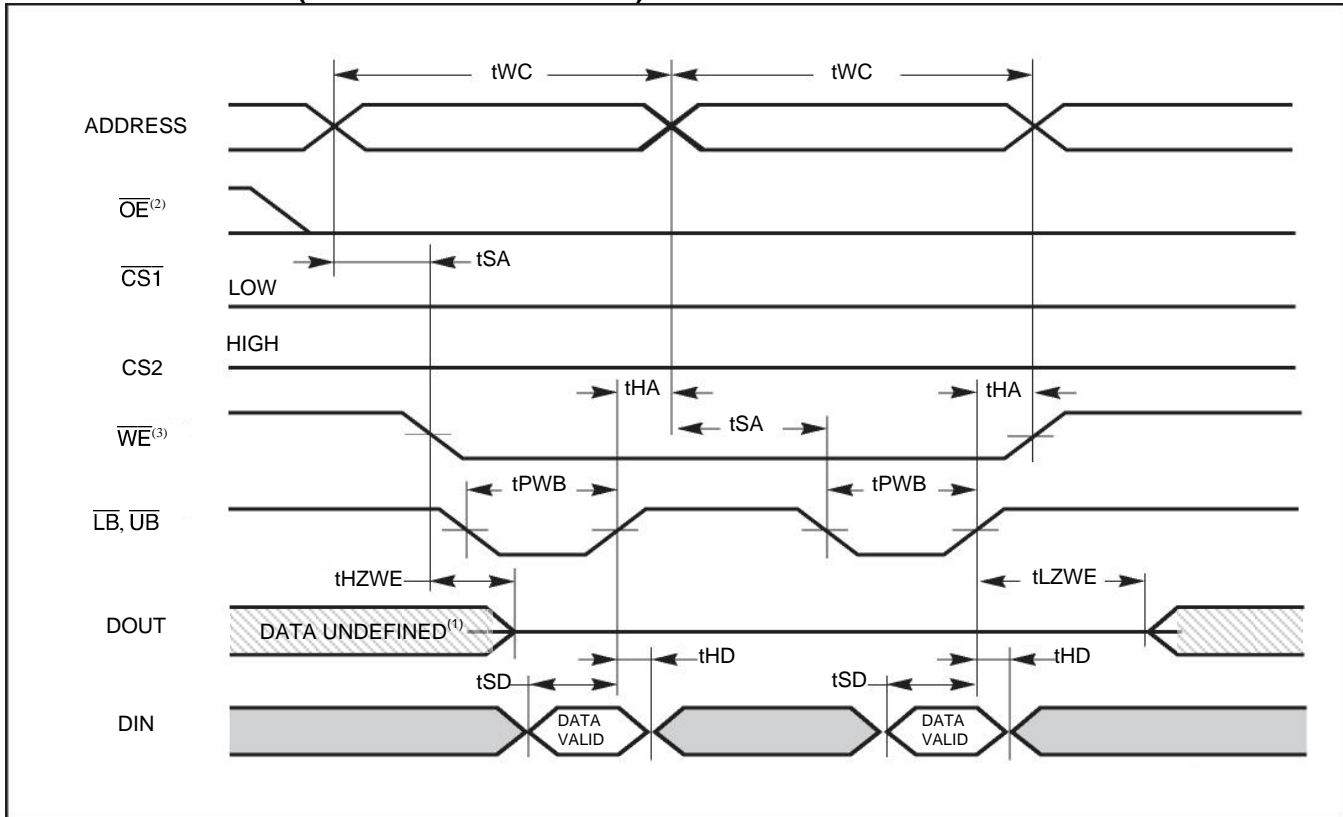
WRITE CYCLE NO. 3 ( $\overline{WE}$  CONTROLLED:  $\overline{OE}$  IS LOW DURING WRITE CYCLE)



Notes:

1. If  $\overline{OE}$  is low during write cycle,  $t_{HZWE}$  must be met in the application. Do not apply input signal during this period. Data output from the previous READ operation will drive IO BUS.

WRITE CYCLE NO. 4 ( $\overline{UB}$  &  $\overline{LB}$  CONTROLLED)



Notes:

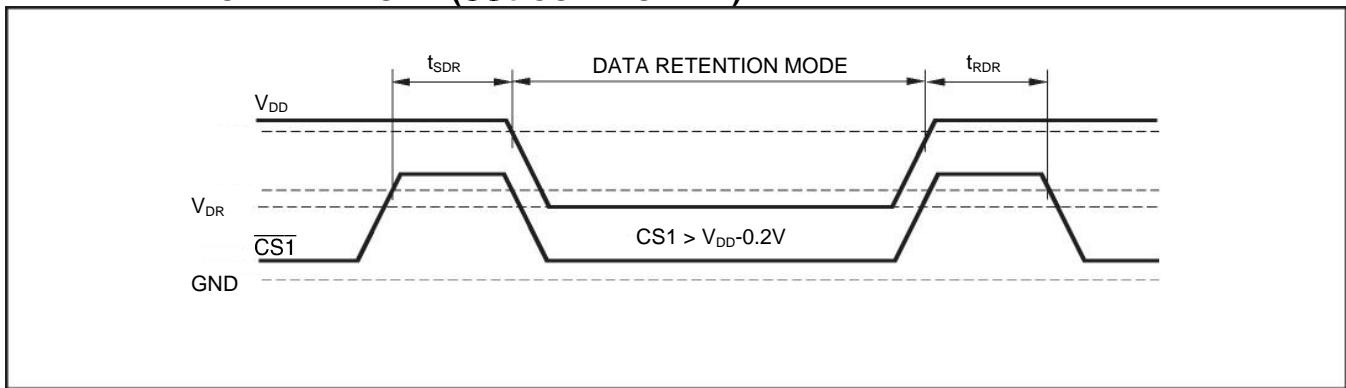
1. If  $\overline{OE}$  is low during write cycle,  $t_{HZWE}$  must be met in the application. Do not apply input signal during this period. Data output from the previous READ operation will drive IO BUS.
2. Due to the restriction of note 1,  $\overline{OE}$  is recommended to be HIGH during write period.
3. Note  $\overline{WE}$  stays LOW in this example. If  $\overline{WE}$  toggles,  $t_{PWE}$  and  $t_{HZWE}$  must be considered.

**DATA RETENTION CHARACTERISTICS**

| Symbol           | Parameter                          | Test Condition  | OPTION              | Min.            | Typ. | Max. | Unit |
|------------------|------------------------------------|---|---------------------|-----------------|------|------|------|
| V <sub>DR</sub>  | V <sub>DD</sub> for Data Retention | See Data Retention Waveform   | IS62(5)WV102416DALL | 1.5             |      | -    | V    |
|                  |                                    |   | IS62(5)WV102416DBLL | 1.5             |      | -    | V    |
| I <sub>DR</sub>  | Data Retention Current             | V <sub>DD</sub> = V <sub>DR</sub> (min),<br>(1) 0V ≤ CS2 ≤ 0.2V, or<br>(2) $\overline{CS1} \geq V_{DD} - 0.2V$ ,<br>CS2 ≥ V <sub>DD</sub> - 0.2V<br>(3) $\overline{LB}$ and $\overline{UB} \geq V_{DD} - 0.2V$ ,<br>$\overline{CS1} \leq 0.2V$ , CS2 ≥ V <sub>DD</sub> - 0.2V | Com.                | -               | -    | 50   | uA   |
|                  |                                    |   | Ind.                | -               | -    | 65   |      |
|                  |                                    |   | Auto                | -               | -    | 165  |      |
| t <sub>SDR</sub> | Data Retention Setup Time          | See Data Retention Waveform   |                     | 0               | -    | -    | ns   |
| t <sub>RDR</sub> | Recovery Time                      | See Data Retention Waveform   |                     | t <sub>RC</sub> | -    | -    | ns   |

Note:  
Typical values are measured at V<sub>DD</sub>=V<sub>DR</sub>(min), TA = 25°C and not 100% tested.

**DATA RETENTION WAVEFORM ( $\overline{CS1}$  CONTROLLED)**



**DATA RETENTION WAVEFORM (CS2 CONTROLLED)**



**ORDERING INFORMATION**

**1.65V~1.98V Industrial Range (-40°C to +85°C)**

| Speed (ns) | Order Part No          | Package                        |
|------------|------------------------|--------------------------------|
| 55         | IS62WV102416DALL-55TI  | 48pin TSOP (Type I)            |
|            | IS62WV102416DALL-55TLI | 48pin TSOP (Type I), Lead-free |

**1.65V~1.98V Automotive (A3) Range (-40°C to +125°C)**

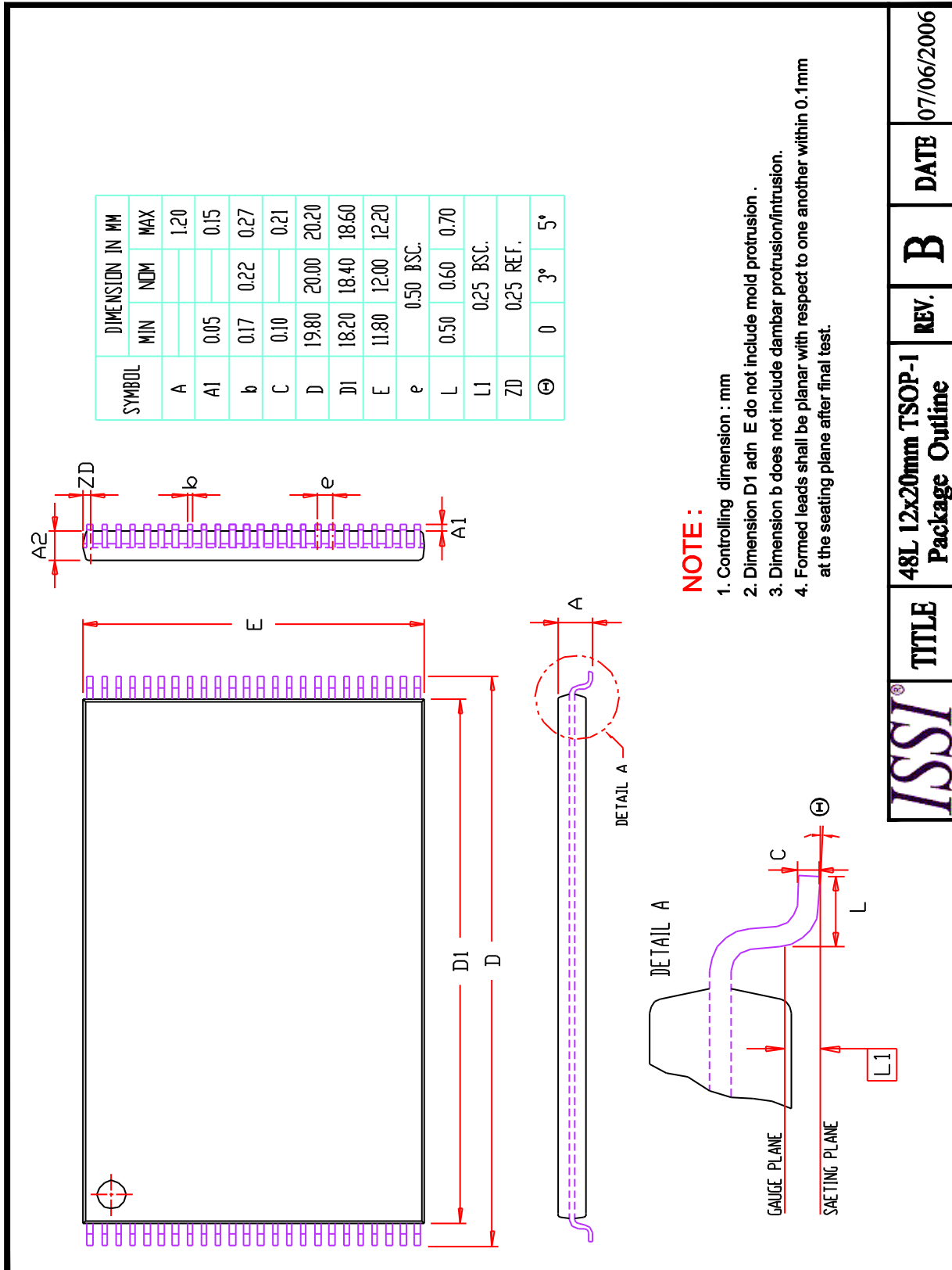
| Speed (ns) | Order Part No           | Package                        |
|------------|-------------------------|--------------------------------|
| 55         | IS65WV102416DALL-55TA3  | 48pin TSOP (Type I)            |
|            | IS65WV102416DALL-55TLA3 | 48pin TSOP (Type I), Lead-free |

**2.2V~3.6V Industrial Range (-40°C to +85°C)**

| Speed (ns) | Order Part No          | Package                        |
|------------|------------------------|--------------------------------|
| 45         | IS62WV102416DBLL-45TI  | 48pin TSOP (Type I)            |
|            | IS62WV102416DBLL-45TLI | 48pin TSOP (Type I), Lead-free |
| 55         | IS62WV102416DBLL-55TLI | 48pin TSOP (Type I), Lead-free |

**2.2V~3.6V Automotive (A3) Range (-40°C to +125°C)**

| Speed (ns) | Order Part No            | Package  |
|------------|--------------------------|--|
| 55         | IS65WV102416DBLL-55CTA3  | 48pin TSOP (Type I), Copper Leadframe            |
|            | IS65WV102416DBLL-55CTLA3 | 48pin TSOP (Type I), Lead-free, Copper Leadframe |



|             |                                       |             |          |             |
|-------------|---------------------------------------|-------------|----------|-------------|
| <b>ISSI</b> | <b>TITLE</b>                          | <b>REV.</b> | <b>B</b> | <b>DATE</b> |
|             | 48L 12x20mm TSOP-1<br>Package Outline |             |          | 07/06/2006  |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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