

256K x 8 HIGH-SPEED CMOS STATIC RAM

DECEMBER 2000

FEATURES

- High-speed access times:
8, 10, 12 and 15 ns
- High-performance, low-power CMOS process
- Multiple center power and ground pins for greater noise immunity
- Easy memory expansion with $\overline{CE}$ and $\overline{OE}$ options
- $\overline{CE}$ power-down
- Low power: 540 mW @ 10 ns
36 mW standby mode
- TTL compatible inputs and outputs
- Single 3.3V $\pm 10\%$ power supply
- Packages available:
 - 36-pin 400-mil SOJ
 - 44-pin TSOP (Type II)

DESCRIPTION

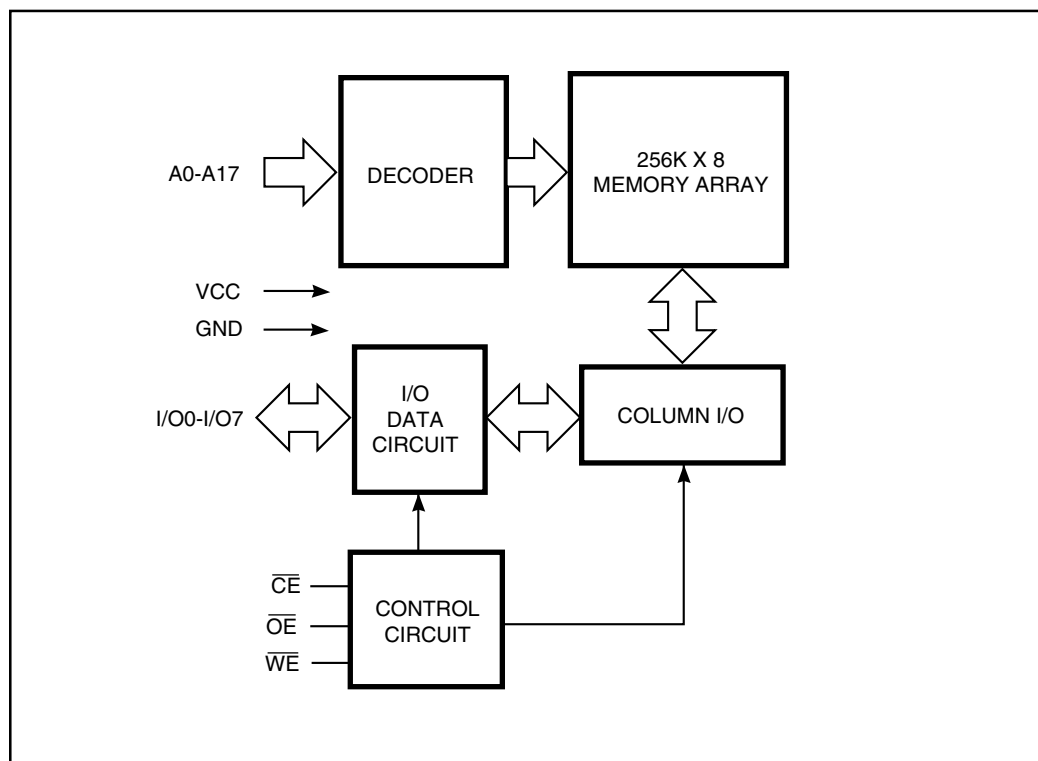
The ISSI IS61LV2568 is a very high-speed, low power, 262,144-word by 8-bit CMOS static RAM. The IS61LV2568 is fabricated using ISSI's high-performance CMOS technology. This highly reliable process coupled with innovative circuit design techniques, yields higher performance and low power consumption devices.

When $\overline{CE}$ is HIGH (deselected), the device assumes a standby mode at which the power dissipation can be reduced down to 36mW (max.) with CMOS input levels.

The IS61LV2568 operates from a single 3.3V power supply and all inputs are TTL-compatible.

The IS61LV2568 is available in 36-pin 400-mil SOJ, and 44-pin TSOP (Type II) packages.

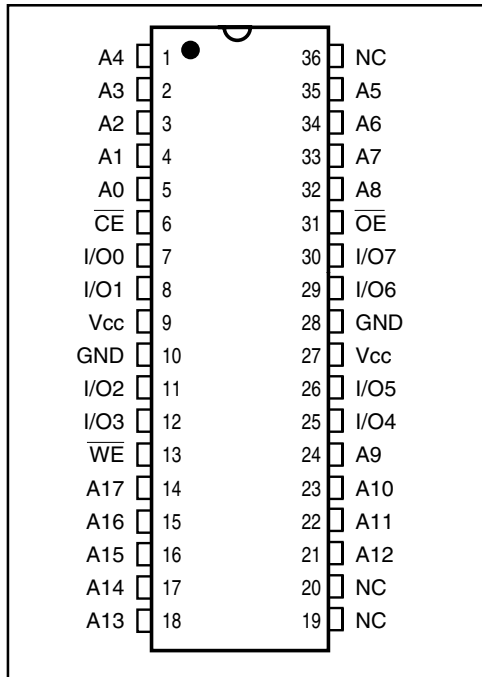
FUNCTIONAL BLOCK DIAGRAM



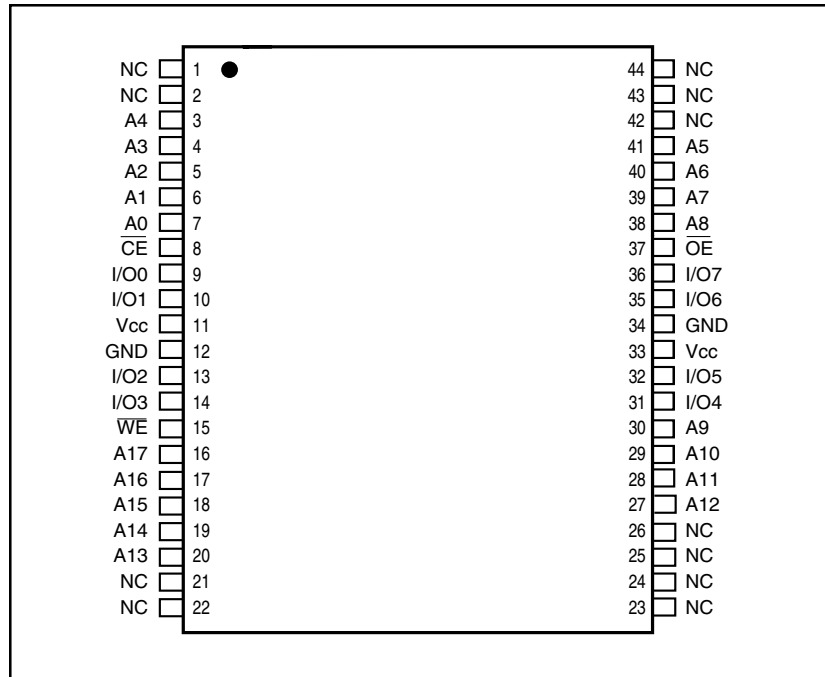
ISSI reserves the right to make changes to its products at any time without notice in order to improve design and supply the best possible product. We assume no responsibility for any errors which may appear in this publication. © Copyright 2000, Integrated Silicon Solution, Inc.

PIN CONFIGURATION

36-Pin SOJ



44-Pin TSOP (Type II)



PIN DESCRIPTIONS

A0-A17	Address Inputs
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
$\overline{WE}$	Write Enable Input
I/O0-I/O7	Bidirectional Ports
Vcc	Power
GND	Ground
NC	No Connection

TRUTH TABLE

Mode	$\overline{WE}$	$\overline{CE}$	$\overline{OE}$	I/O Operation	Vcc Current
Not Selected (Power-down)	X	H	X	High-Z	Isb1, Isb2
Output Disabled	H	L	H	High-Z	Icc
Read	H	L	L	DOUT	Icc
Write	L	L	X	DIN	Icc

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Parameter	Value	Unit
Vcc	Supply voltage with Respect to GND	-0.5 to +4.6	V
VTERM	Terminal Voltage with Respect to GND	-0.5 to Vcc + 0.5	V
TBIAS	Temperature Under Bias	Com. -10 to +85 Ind. -45 to +90	°C
TSTG	Storage Temperature	-65 to +150	°C
PD	Power Dissipation	1.0	W

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

Range	Ambient Temperature	V _{CC}
Commercial	0°C to +70°C	3.3V ± 10%
Industrial	−40°C to +85°C	3.3V ± 10%

DC ELECTRICAL CHARACTERISTICS (Over Operating Range)

Symbol	Parameter	Test Conditions		Min.	Max.	Unit
V _{OH}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = −4.0 mA		2.4	—	V
V _{OL}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 8.0 mA		—	0.4	V
V _{IH}	Input HIGH Voltage ⁽¹⁾			2.0	V _{CC} + 0.3	V
V _{IL}	Input LOW Voltage ⁽¹⁾			−0.3	0.8	V
I _{LI}	Input Leakage	GND - V _{IN} - V _{CC}	Com. Ind.	−1 −5	1 5	μA
I _{LO}	Output Leakage	GND - V _{OUT} - V _{CC} , Outputs Disabled	Com. Ind.	−1 −5	1 5	μA

Note:

1. V_{IL}(min) = −0.3V (DC); V_{IL}(min) = −2.0V (pulse width - 2.0 ns).
V_{IH}(max) = V_{CC} + 0.3V (DC); V_{IH}(max) = V_{CC} + 2.0V (pulse width - 2.0 ns).

POWER SUPPLY CHARACTERISTICS⁽¹⁾ (Over Operating Range)

Symbol	Parameter	Test Conditions		-8 ns		-10 ns		-12 ns		-15 ns		Unit
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
I _{CC}	V _{CC} Operating Supply Current	V _{CC} = Max., $\overline{CE}$ = V _{IL}	Com.	—	150	—	125	—	110	—	90	mA
		I _{OUT} = 0 mA, f = Max.	Ind.	—	160	—	135	—	120	—	100	
I _{SB1}	TTL Standby Current (TTL Inputs)	V _{CC} = Max., V _{IN} = V _{IH} or V _{IL} $\overline{CE} \cdot V_{IH}$, f = max	Com.	—	50	—	40	—	35	—	30	mA
			Ind.	—	60	—	50	—	45	—	40	
I _{SB2}	CMOS Standby Current (CMOS Inputs)	V _{CC} = Max., $\overline{CE}$ - V _{CC} − 0.2V, V _{IN} > V _{CC} − 0.2V, or V _{IN} - 0.2V, f = 0	Com.	—	10	—	10	—	10	—	10	mA
			Ind.	—	20	—	20	—	20	—	20	

Note:

1. At f = f_{MAX}, address and data inputs are cycling at the maximum frequency, f = 0 means no input lines change.

CAPACITANCE^(1,2)

Symbol	Parameter	Conditions	Max.	Unit
C _{IN}	Input Capacitance	V _{IN} = 0V	6	pF
C _{I/O}	Input/Output Capacitance	V _{OUT} = 0V	8	pF

Notes:

1. Tested initially and after any design or process changes that may affect these parameters.
2. Test conditions: T_A = 25°C, f = 1 MHz, V_{CC} = 3.3V.

READ CYCLE SWITCHING CHARACTERISTICS⁽¹⁾ (Over Operating Range)

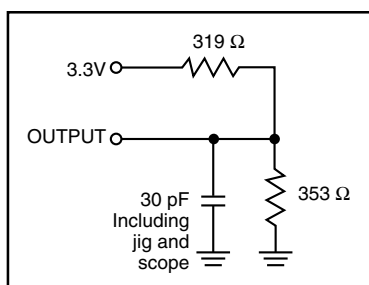
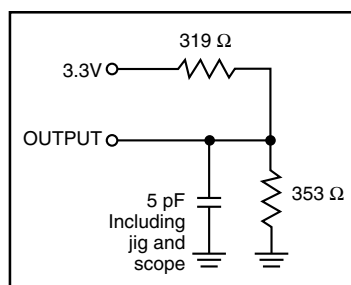
Symbol	Parameter	- 8 ns		-10 ns		-12 ns		-15 ns		Unit
		Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.	
t_{RC}	Read Cycle Time	8	—	10	—	12	—	15	—	ns
t_{AA}	Address Access Time	—	8	—	10	—	12	—	15	ns
t_{OHA}	Output Hold Time	3	—	3	—	3	—	3	—	ns
t_{ACE}	$\overline{CE}$ Access Time	—	8	—	10	—	12	—	15	ns
t_{DOE}	$\overline{OE}$ Access Time	—	3	—	4	—	5	—	6	ns
$t_{LZOE}^{(2)}$	$\overline{OE}$ to Low-Z Output	0	—	0	—	0	—	0	—	ns
$t_{HZOE}^{(2)}$	$\overline{OE}$ to High-Z Output	0	3	0	4	0	5	0	6	ns
$t_{LZCE}^{(2)}$	$\overline{CE}$ to Low-Z Output	3	—	3	—	3	—	3	—	ns
$t_{HZCE}^{(2)}$	$\overline{CE}$ to High-Z Output	0	3	0	4	0	5	0	6	ns

Notes:

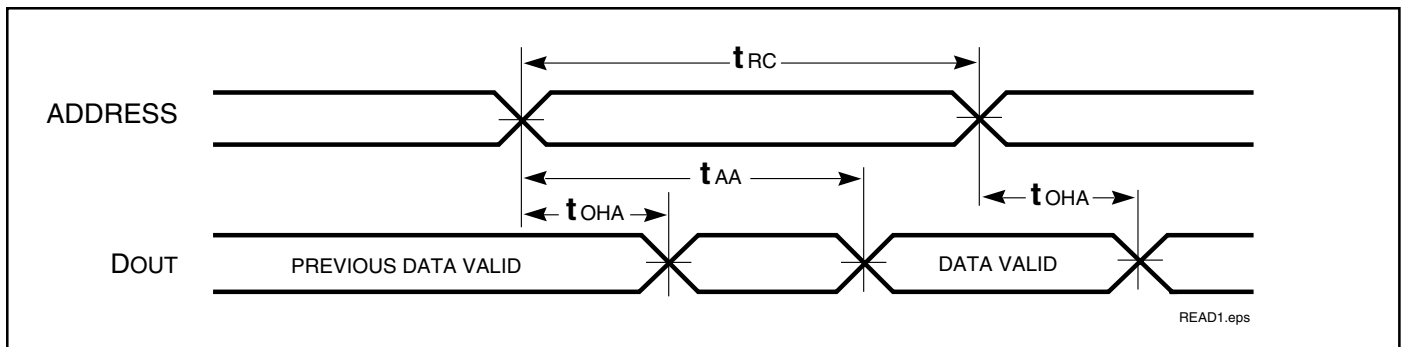
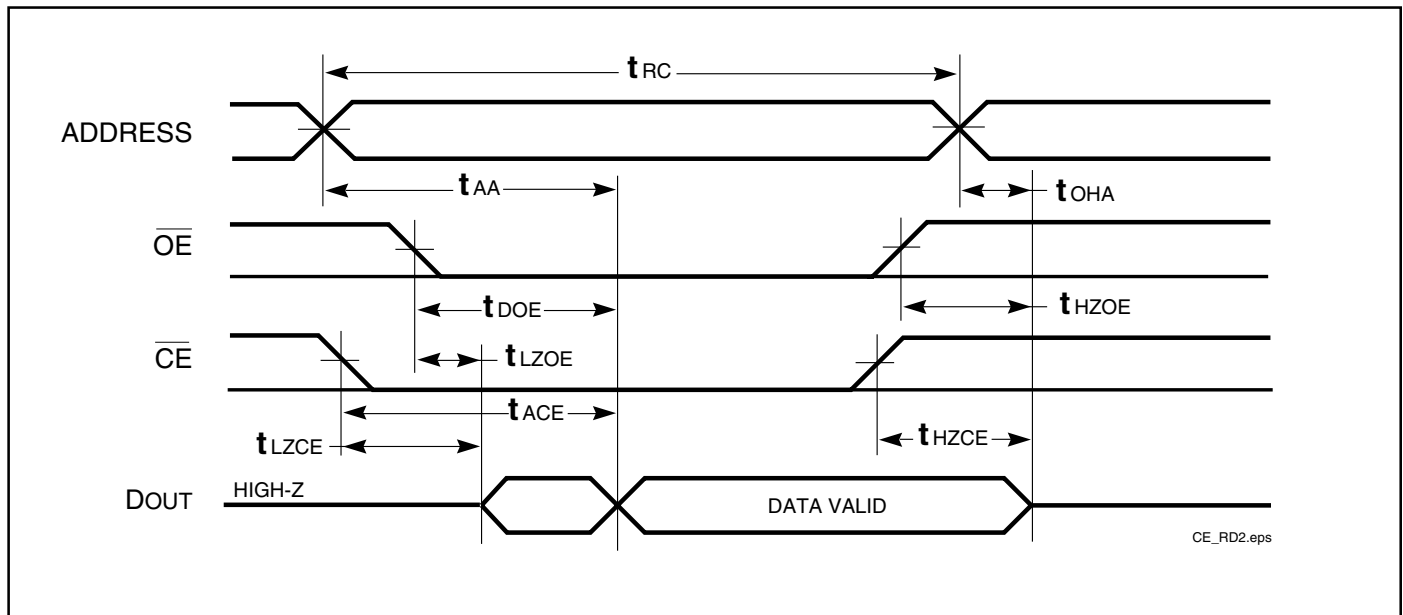
1. Test conditions assume signal transition times of 3 ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V and output loading specified in Figure 1.
2. Tested with the load in Figure 2. Transition is measured ± 200 mV from steady-state voltage. Not 100% tested.

AC TEST CONDITIONS

Parameter	Unit
Input Pulse Level	0V to 3.0V
Input Rise and Fall Times	3 ns
Input and Output Timing and Reference Levels	1.5V
Output Load	See Figures 1 and 2

AC TEST LOADS**Figure 1****Figure 2**

AC WAVEFORMS

READ CYCLE NO. 1^(1,2) (Address Controlled) ($\overline{CE} = \overline{OE} = V_{IL}$)READ CYCLE NO. 2^(1,3) ($\overline{CE}$ and $\overline{OE}$ Controlled)**Notes:**

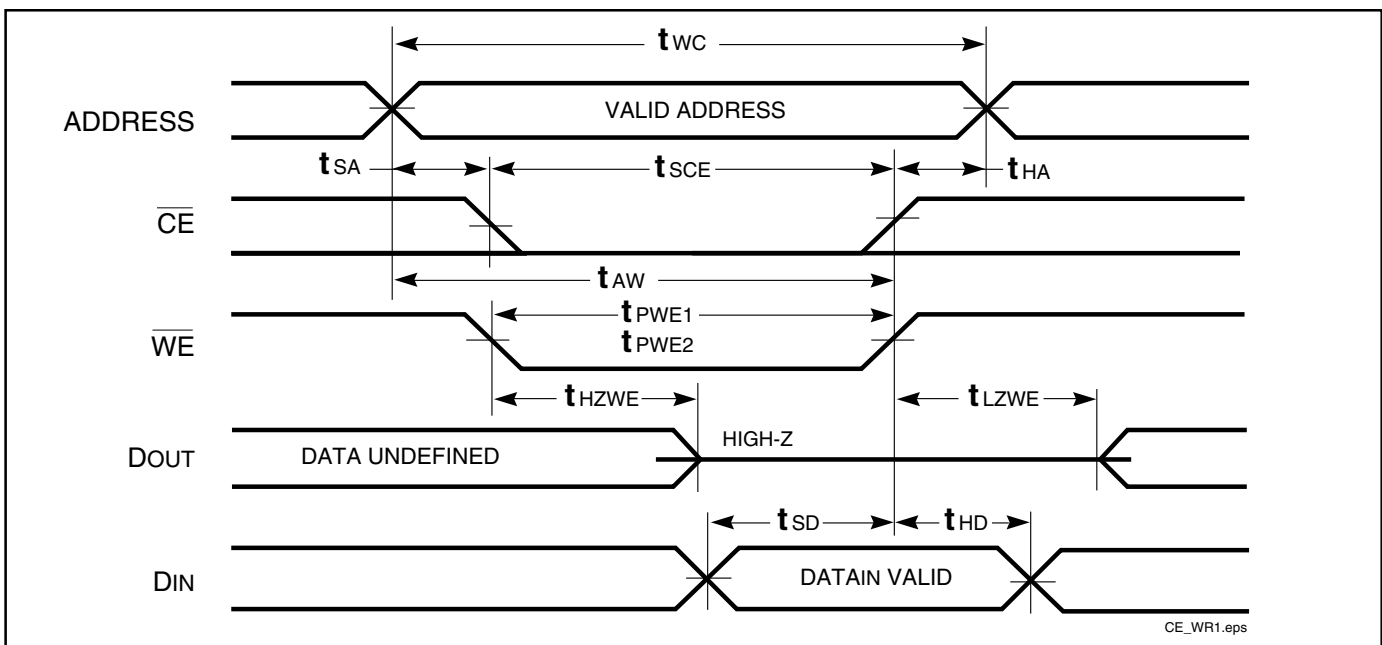
1. $\overline{WE}$ is HIGH for a Read Cycle.
2. The device is continuously selected. $\overline{OE}$, $\overline{CE} = V_{IL}$.
3. Address is valid prior to or coincident with $\overline{CE}$ LOW transitions.

WRITE CYCLE SWITCHING CHARACTERISTICS^(1,2) (Over Operating Range)

Symbol	Parameter	- 8 ns		-10 ns		-12 ns		-15 ns		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
t_{WC}	Write Cycle Time	8	—	10	—	12	—	15	—	ns
t_{SCE}	$\overline{CE}$ to Write End	6.5	—	8	—	9	—	10	—	ns
t_{AW}	Address Setup Time to Write End	6.5	—	8	—	9	—	10	—	ns
t_{HA}	Address Hold from Write End	0	—	0	—	0	—	0	—	ns
t_{SA}	Address Setup Time	0	—	0	—	0	—	0	—	ns
t_{PWE1}	$\overline{WE}$ Pulse Width ($\overline{OE}$ = HIGH)	5	—	7	—	8	—	10	—	ns
t_{PWE2}	$\overline{WE}$ Pulse Width ($\overline{OE}$ = LOW)	6.5	—	8	—	10	—	11	—	ns
t_{SD}	Data Setup to Write End	4	—	5	—	6	—	7	—	ns
t_{HD}	Data Hold from Write End	0	—	0	—	0	—	0	—	ns
$t_{HZWE}^{(3)}$	$\overline{WE}$ LOW to High-Z Output	—	3	—	4	—	5	—	6	ns
$t_{LZWE}^{(3)}$	$\overline{WE}$ HIGH to Low-Z Output	0	—	0	—	0	—	0	—	ns

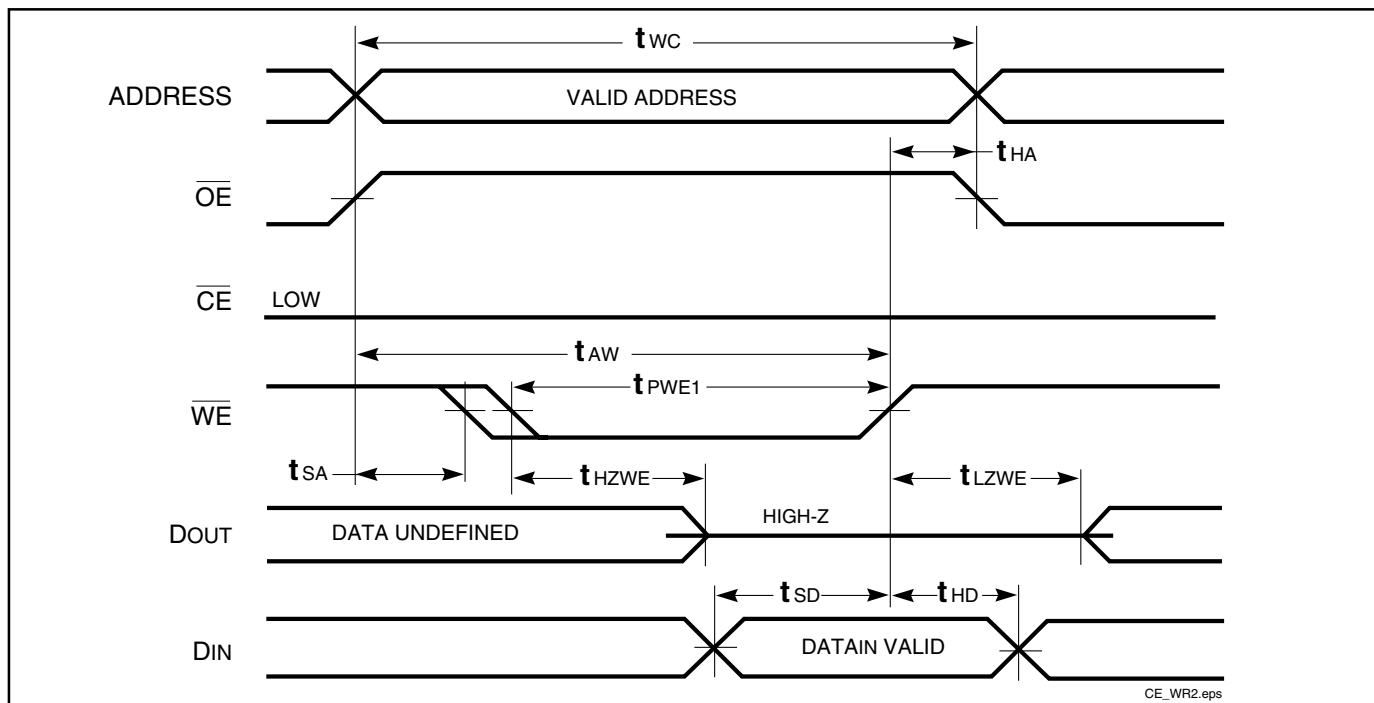
Notes:

- Test conditions assume signal transition times of 3 ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V and output loading specified in Figure 1.
- The internal write time is defined by the overlap of $\overline{CE}$ LOW and $\overline{WE}$ LOW. All signals must be in valid states to initiate a Write, but any one 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.
- Tested with the load in Figure 2. Transition is measured ± 500 mV from steady-state voltage. Not 100% tested.

AC WAVEFORMS**WRITE CYCLE NO. 1^(1,2)** ($\overline{CE}$ Controlled, $\overline{OE}$ = HIGH or LOW)**Note:**

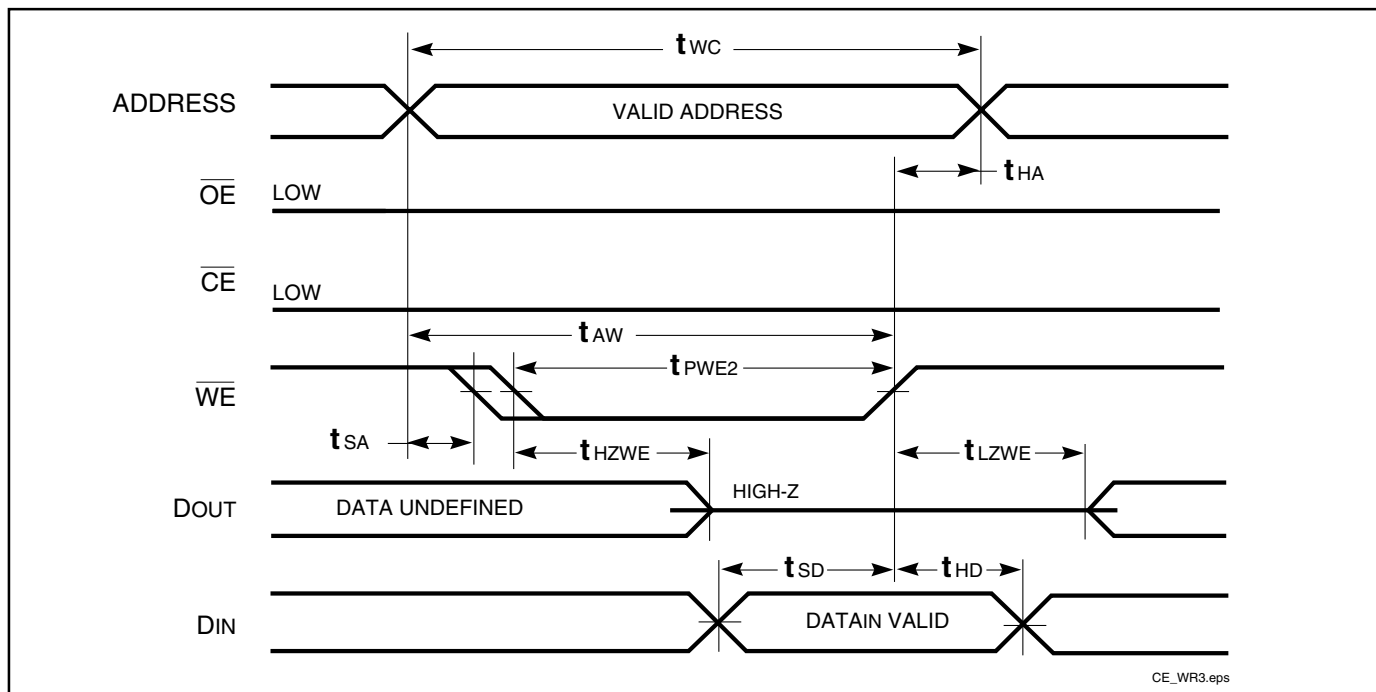
- The internal Write time is defined by the overlap of $\overline{CE}$ = LOW and $\overline{WE}$ = LOW. All signals must be in valid states to initiate a Write, but any can be deasserted to terminate the Write. The Data Input Setup and Hold timing is referenced to the rising or falling edge of the signal that terminates the Write.

AC WAVEFORMS

WRITE CYCLE NO. 2⁽¹⁾ ($\overline{WE}$ Controlled, $\overline{OE}$ = HIGH during Write Cycle)

Note:

1. The internal Write time is defined by the overlap of $\overline{CE}$ = LOW and $\overline{WE}$ = LOW. All signals must be in valid states to initiate a Write, but any can be deasserted to terminate the Write. The Data Input Setup and Hold timing is referenced to the rising or falling edge of the signal that terminates the Write.

WRITE CYCLE NO. 3 ($\overline{WE}$ Controlled: $\overline{OE}$ is LOW During Write Cycle)

Note:

1. The internal Write time is defined by the overlap of $\overline{CE}$ = LOW and $\overline{WE}$ = LOW. All signals must be in valid states to initiate a Write, but any can be deasserted to terminate the Write. The Data Input Setup and Hold timing is referenced to the rising or falling edge of the signal that terminates the Write.

ORDERING INFORMATION**Commercial Range: 0°C to +70°C**

Speed (ns)	Order Part No.	Package
8	IS61LV2568-8K IS61LV2568-8T	400-mil Plastic SOJ TSOP (Type II)
10	IS61LV2568-10K IS61LV2568-10T	400-mil Plastic SOJ TSOP (Type II)
12	IS61LV2568-12K IS61LV2568-12T	400-mil Plastic SOJ TSOP (Type II)
15	IS61LV2568-15K IS61LV2568-15T	400-mil Plastic SOJ TSOP (Type II)

ORDERING INFORMATION**Industrial Range: -40°C to +85°C**

Speed (ns)	Order Part No.	Package
8	IS61LV2568-8KI IS61LV2568-8TI	400-mil Plastic SOJ TSOP (Type II)
10	IS61LV2568-10KI IS61LV2568-10TI	400-mil Plastic SOJ TSOP (Type II)
12	IS61LV2568-12KI IS61LV2568-12TI	400-mil Plastic SOJ TSOP (Type II)
15	IS61LV2568-15KI IS61LV2568-15TI	400-mil Plastic SOJ TSOP (Type II)

ISSI®**Integrated Silicon Solution, Inc.**

2231 Lawson Lane
Santa Clara, CA 95054
Tel: 1-800-379-4774
Fax: (408) 588-0806
E-mail: sales@issi.com
www.issi.com