

# IS63LV1024



## 128K x 8 HIGH-SPEED CMOS STATIC RAM 3.3V REVOLUTIONARY PINOUT

PRELIMINARY  
 JUNE 1996

### FEATURES

- High-speed access times:  
 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
- Fully static operation: no clock or refresh required
- TTL compatible inputs and outputs
- Single 3.3V power supply
- Packages available:
  - 32-pin 300-mil SOJ
  - 32-pin TSOP (Type 2)

### DESCRIPTION

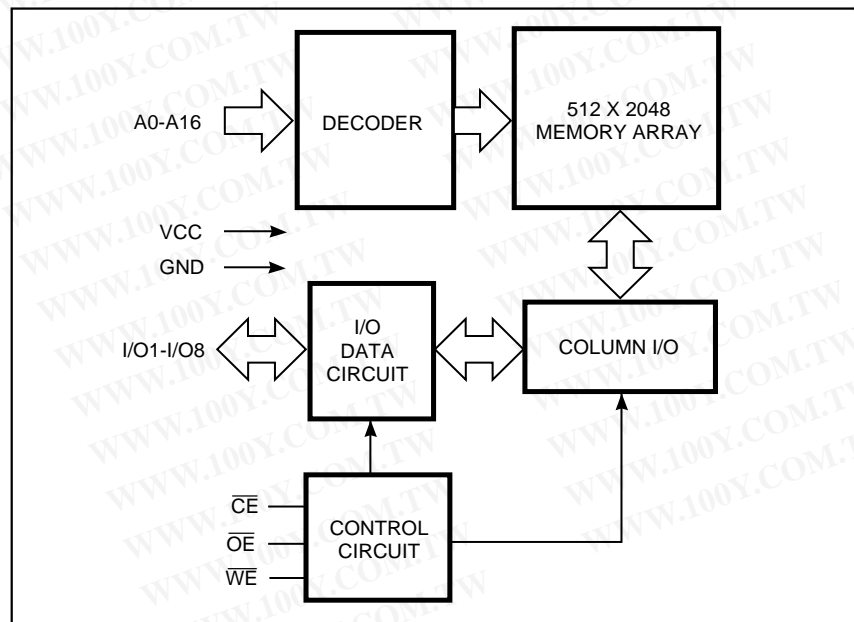
The *ISSI* IS63LV1024 is a very high-speed, low power, 131,072-word by 8-bit CMOS static RAM in revolutionary pinout. The IS63LV1024 is fabricated using *ISSI*'s high-performance CMOS technology. This highly reliable process coupled with innovative circuit design techniques, yields higher performance 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 250  $\mu$ W (typical) with CMOS input levels.

The IS63LV1024 operates from a single 3.3V power supply and all inputs are TTL-compatible.

The IS63LV1024 is available in 32-pin 300-mil SOJ and TSOP (type 2) packages.

### FUNCTIONAL BLOCK DIAGRAM

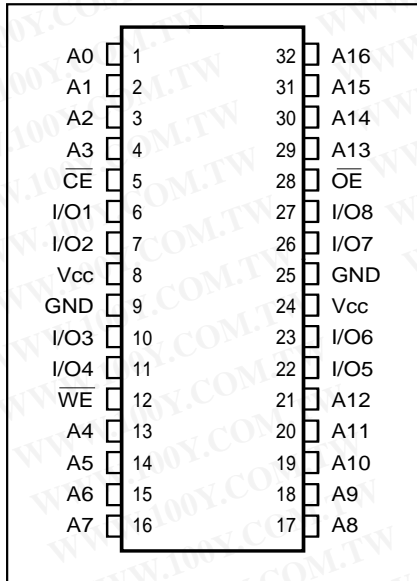


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## IS63LV1024

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### PIN CONFIGURATION 32-Pin SOJ and TSOP (Type 2)



### PIN DESCRIPTIONS

A0-A16	Address Inputs
CE	Chip Enable Input
OE	Output Enable Input
WE	Write Enable Input
I/O1-I/O8	Bidirectional Ports
Vcc	Power
GND	Ground

### TRUTH TABLE

Mode	WE	CE	OE	I/O Operation	Vcc Current
Not Selected (Power-down)	X	H	X	High-Z	Isb1, Isb2
Output Disabled	H	L	H	High-Z	Icc1, Icc2
Read	H	L	L	DOUT	Icc1, Icc2
Write	L	L	X	DIN	Icc1, Icc2

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

Symbol	Parameter	Value	Unit
VTERM	Terminal Voltage with Respect to GND	-0.5 to Vcc + 0.5	V
TBIAS	Temperature Under Bias	-55 to +125	°C
TSTG	Storage Temperature	-65 to +150	°C
Pt	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.

## IS63LV1024

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### OPERATING RANGE

Range	Ambient Temperature	V <sub>CC</sub>
Commercial	0°C to +70°C	3.3V ± 0.3V
Industrial	-40°C to +85°C	3.3V ± 0.15V

### DC ELECTRICAL CHARACTERISTICS (Over Operating Range)

Symbol	Parameter	Test Conditions	Min.	Max.	Unit	
V <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = Min., I <sub>OH</sub> = -4.0 mA	2.4	—	V	
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = Min., I <sub>OL</sub> = 8.0 mA	—	0.4	V	
V <sub>IH</sub>	Input HIGH Voltage		2.2	V <sub>CC</sub> + 0.3	V	
V <sub>IL</sub>	Input LOW Voltage <sup>(1)</sup>		-0.3	0.8	V	
I <sub>I</sub>	Input Leakage	GND ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>	Com. Ind.	-2 5	2 5	μA
I <sub>LO</sub>	Output Leakage	GND ≤ V <sub>OUT</sub> ≤ V <sub>CC</sub> , Outputs Disabled	Com. Ind.	-2 -5	2 5	μA

**Notes:**

1. V<sub>IL</sub> = -3.0V for pulse width less than 10 ns.

### POWER SUPPLY CHARACTERISTICS<sup>(1)</sup> (Over Operating Range)

Symbol	Parameter	Test Conditions	-10 ns		-12 ns		-15 ns		Unit	
			Min.	Max.	Min.	Max.	Min.	Max.		
I <sub>CC1</sub>	V <sub>CC</sub> Operating Supply Current	V <sub>CC</sub> = Max., $\overline{CE}$ = V <sub>IL</sub> I <sub>OUT</sub> = 0 mA, f = 0	Com.	—	100	—	90	—	85	mA
			Ind.	—	110	—	100	—	100	
I <sub>SB1</sub>	TTL Standby Current (TTL Inputs)	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> CE ≥ V <sub>IH</sub> , f = 0	Com.	—	10	—	10	—	10	mA
			Ind.	—	15	—	15	—	15	
I <sub>SB2</sub>	CMOS Standby Current (CMOS Inputs)	V <sub>CC</sub> = Max., CE ≤ V <sub>CC</sub> - 0.2V, V <sub>IN</sub> > V <sub>CC</sub> - 0.2V, or V <sub>IN</sub> ≤ 0.2V, f = 0	Com.	—	5	—	5	—	5	mA
			Ind.	—	10	—	10	—	10	

**Notes:**

1. At f = f<sub>MAX</sub>, address and data inputs are cycling at the maximum frequency, f = 0 means no input lines change.

### CAPACITANCE<sup>(1,2)</sup>

Symbol	Parameter	Conditions	Max.	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	6	pF
C <sub>I/O</sub>	Input/Output Capacitance	V <sub>OUT</sub> = 0V	8	pF

**Notes:**

1. Tested initially and after any design or process changes that may affect these parameters.  
 2. Test conditions: T<sub>A</sub> = 25°C, f = 1 MHz, V<sub>CC</sub> = 3.3V.

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## IS63LV1024

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### READ CYCLE SWITCHING CHARACTERISTICS<sup>(1)</sup> (Over Operating Range)

Symbol	Parameter	-10 ns		-12 ns		-15 ns		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t <sub>RC</sub>	Read Cycle Time	10	—	12	—	15	—	ns
t <sub>AA</sub>	Address Access Time	—	10	—	12	—	15	ns
t <sub>OHA</sub>	Output Hold Time	3	—	3	—	3	—	ns
t <sub>ACE</sub>	$\overline{CE}$ Access Time	—	10	—	12	—	15	ns
t <sub>DOE</sub>	$\overline{OE}$ Access Time	—	5	—	5	—	5	ns
t <sub>LZOE</sub> <sup>(2)</sup>	$\overline{OE}$ to Low-Z Output	0	—	0	—	0	—	ns
t <sub>HZOE</sub> <sup>(2)</sup>	$\overline{OE}$ to High-Z Output	0	5	0	6	0	7	ns
t <sub>LZCE</sub> <sup>(2)</sup>	$\overline{CE}$ to Low-Z Output	3	—	3	—	3	—	ns
t <sub>HZCE</sub> <sup>(2)</sup>	$\overline{CE}$ to High-Z Output	0	5	0	6	0	7	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 1a.
2. Tested with the load in Figure 1b. Transition is measured  $\pm 500$  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 1a and 1b

### AC TEST LOADS

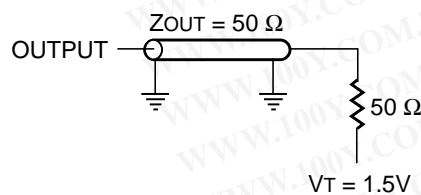


Figure 1a.

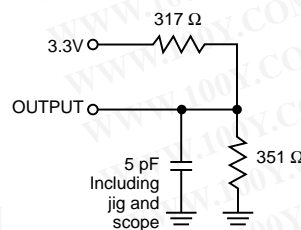


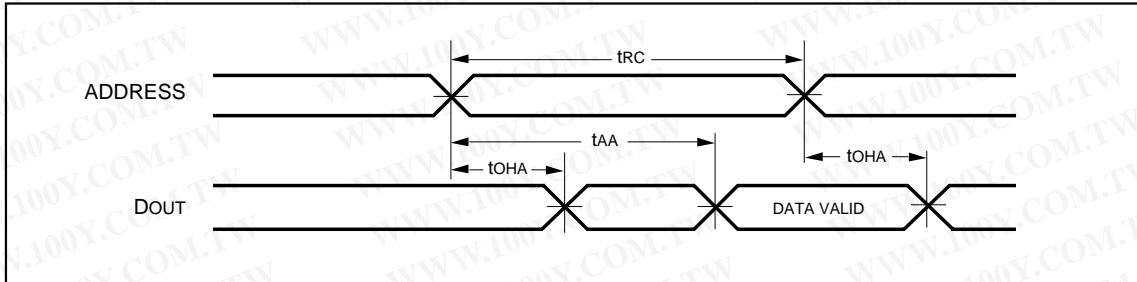
Figure 1b.

**IS63LV1024**

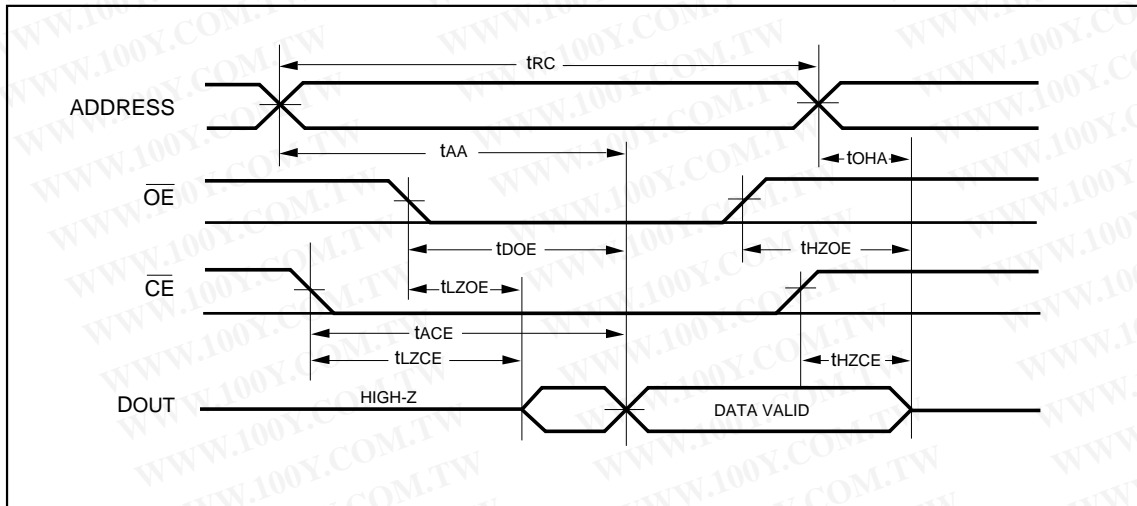


**AC WAVEFORMS**

**READ CYCLE NO. 1<sup>(1,2)</sup>**



**READ CYCLE NO. 2<sup>(1,3)</sup>**



**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.

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WRITE CYCLE SWITCHING CHARACTERISTICS<sup>(1,3)</sup> (Over Operating Range)

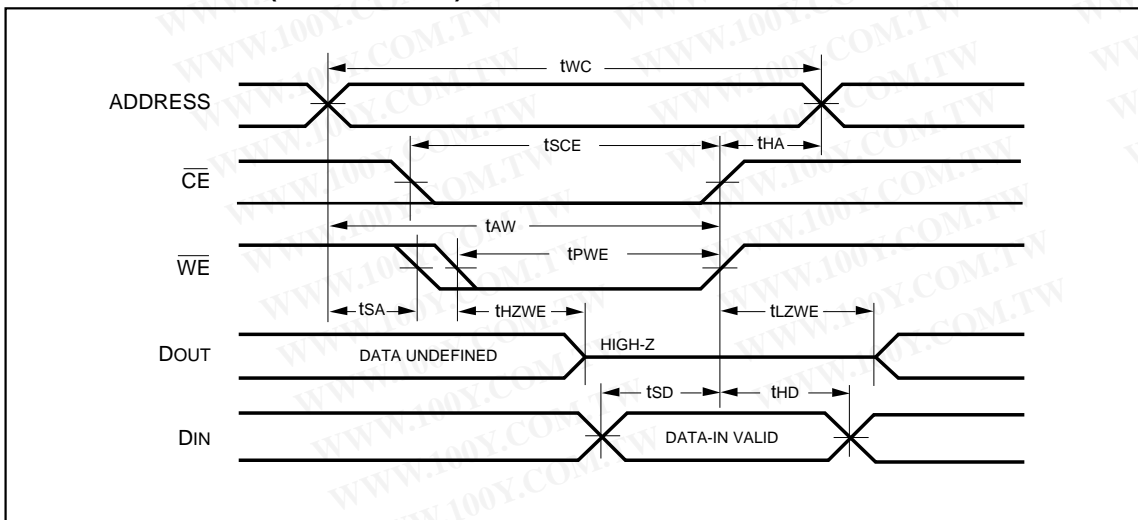
Symbol	Parameter	-10 ns		-12 ns		-15 ns		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t <sub>wc</sub>	Write Cycle Time	10	—	12	—	15	—	ns
t <sub>sce</sub>	$\overline{CE}$ to Write End	8	—	8	—	10	—	ns
t <sub>aw</sub>	Address Setup Time to Write End	8	—	8	—	10	—	ns
t <sub>ha</sub>	Address Hold from Write End	0	—	0	—	0	—	ns
t <sub>sa</sub>	Address Setup Time	0	—	0	—	0	—	ns
t <sub>pwe</sub> <sup>(4)</sup>	$\overline{WE}$ Pulse Width	8	—	8	—	9	—	ns
t <sub>sd</sub>	Data Setup to Write End	6	—	6	—	7	—	ns
t <sub>hd</sub>	Data Hold from Write End	0	—	0	—	0	—	ns
t <sub>hzwe</sub> <sup>(2)</sup>	$\overline{WE}$ LOW to High-Z Output	0	5	0	6	0	7	ns
t <sub>lzwe</sub> <sup>(2)</sup>	$\overline{WE}$ HIGH to Low-Z Output	0	—	0	—	0	—	ns

Notes:

1. Test conditions assume signal transition times of 3ns or less, timing reference levels of 1.5V, input pulse levels of 0 to 3.0V and output loading specified in Figure 1a.
2. Tested with the load in Figure 1b. Transition is measured  $\pm 500$  mV from steady-state voltage. Not 100% tested.
3. 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.
4. Tested with OE HIGH.

AC WAVEFORMS

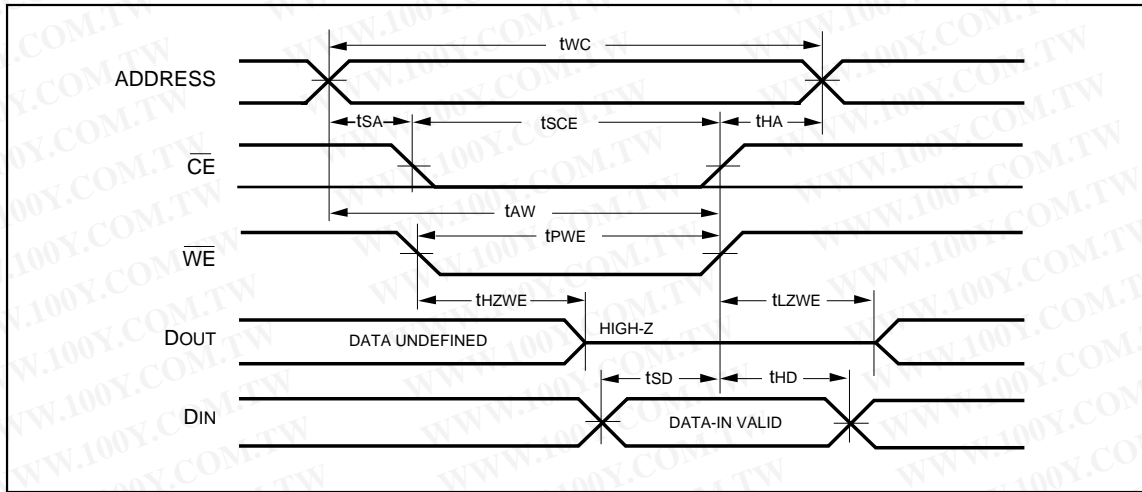
WRITE CYCLE NO. 1 ( $\overline{WE}$  Controlled)<sup>(1,2)</sup>



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WRITE CYCLE NO. 2 ( $\overline{CE}$  Controlled)<sup>(1,2)</sup>



Notes:

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.
2. I/O will assume the High-Z state if  $\overline{OE} \geq V_{IH}$ .

ORDERING INFORMATION

Commercial Range: 0°C to +70°C

Speed (ns)	Order Part No.	Package
10	IS63LV1024-10T	TSOP (Type 2)
10	IS63LV1024-10J	300-mil Plastic SOJ
12	IS63LV1024-12T	TSOP (Type 2)
12	IS63LV1024-12J	300-mil Plastic SOJ
15	IS63LV1024-15T	TSOP (Type 2)
15	IS63LV1024-15J	300-mil Plastic SOJ

ORDERING INFORMATION

Industrial Range: -40°C to +85°C

Speed (ns)	Order Part No.	Package
10	IS63LV1024-10TI	TSOP (Type 2)
10	IS63LV1024-10JI	300-mil Plastic SOJ
12	IS63LV1024-12TI	TSOP (Type 2)
12	IS63LV1024-12JI	300-mil Plastic SOJ
15	IS63LV1024-15TI	TSOP (Type 2)
15	IS63LV1024-15JI	300-mil Plastic SOJ

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