



PRELIMINARY

CY62256V

32K x 8 Static RAM

Features

- 55, 70 ns access time
- CMOS for optimum speed/power
- Wide voltage range: 2.7V–3.6V
- Low active power (70 ns, LL version) — 108 mW (max.)
- Low standby power (70 ns, LL version) — 18 μW (max.)
- Easy memory expansion with \overline{CE} and \overline{OE} features
- TTL-compatible inputs and outputs
- Automatic power-down when deselected

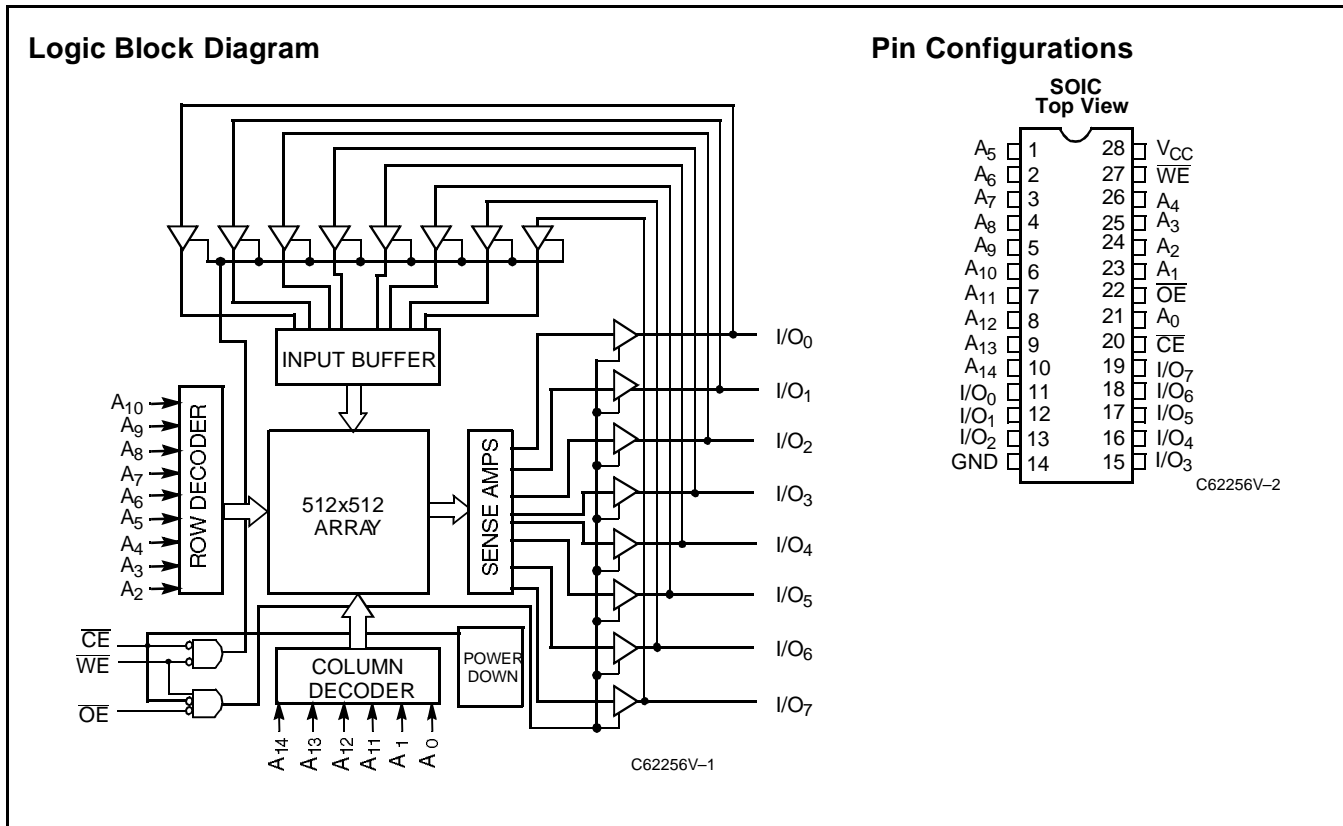
Functional Description

The CY62256V is a high-performance CMOS static RAM organized as 32,768 words by 8 bits. Easy memory expansion is provided by an active LOW chip enable (\overline{CE}) and active

LOW output enable (\overline{OE}) and three-state drivers. This device has an automatic power-down feature, reducing the power consumption by 98% when deselected. The CY62256V is in the standard 450-mil-wide (300-mil body width) SOIC, TSOP, and reverse TSOP packages.

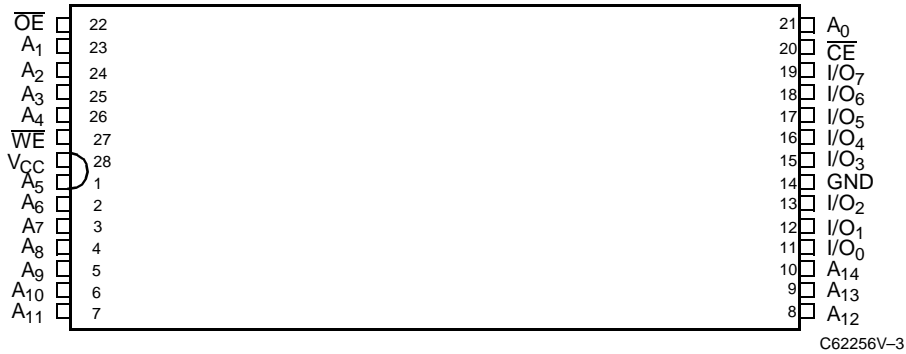
An active LOW write enable signal (\overline{WE}) controls the writing/reading operation of the memory. When \overline{CE} and \overline{WE} inputs are both LOW, data on the eight data input/output pins (I/O_0 through I/O_7) is written into the memory location addressed by the address present on the address pins (A_0 through A_{14}). Reading the device is accomplished by selecting the device and enabling the outputs, \overline{CE} and \overline{OE} active LOW, while \overline{WE} remains inactive or HIGH. Under these conditions, the contents of the location addressed by the information on address pins is present on the eight data input/output pins.

The input/output pins remain in a high-impedance state unless the chip is selected, outputs are enabled, and write enable (\overline{WE}) is HIGH. A die coat is used to ensure alpha immunity.



Pin Configurations (continued)

**TSOP
Top View**



**TSOP Reversed
Top View**



Selection Guide

		CY62256V-55	CY62256V-70
Maximum Access Time (ns)		55	70
Maximum Operating Current (mA)		50	50
	L	50	50
	LL	30	30
Maximum Standby Current (µA)		500	500
	L	50	50
	LL	5	5

Shaded area contains advanced information.

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..... 0°C to +70°C
- Supply Voltage to Ground Potential (Pin 28 to Pin 14)..... -0.5V to +4.6V
- DC Voltage Applied to Outputs in High Z State^[1] -0.5V to V_{CC} + 0.5V

- DC Input Voltage^[1]..... -0.5V to V_{CC} + 0.5V
- Output Current into Outputs (LOW)..... 20 mA
- Static Discharge Voltage >2001V (per MIL-STD-883, Method 3015)
- Latch-Up Current..... >200 mA

Operating Range

Range	Ambient Temperature	V _{CC}
Commercial	0°C to +70°C	2.7V to 3.6V

Note:

1. V_{IL} (min.) = -2.0V for pulse durations of less than 20 ns.

Electrical Characteristics Over the Operating Range

Parameter	Description	Test Conditions	CY62256V-55		CY62256V-70		Unit
			Min.	Max.	Min.	Max.	
V _{OH}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = -1.0 mA	2.4		2.4		V
V _{OL}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 2.1 mA		0.4		0.4	V
V _{IH}	Input HIGH Voltage		2.2	V _{CC} +0.3V	2.2	V _{CC} +0.3V	V
V _{IL}	Input LOW Voltage		-0.5	0.8	-0.5	0.8	V
I _{IX}	Input Load Current	GND ≤ V _I ≤ V _{CC}	-1	+1	-1	+1	μA
I _{OZ}	Output Leakage Current	GND ≤ V _O ≤ V _{CC} , Output Disabled	-5	+5	-5	+5	μA
I _{OS}	Output Short Circuit Current ^[2]	V _{CC} = Max., V _{OUT} = GND		-200		-200	mA
I _{CC}	V _{CC} Operating Supply Current	V _{CC} = Max., I _{OUT} = 0 mA, f = f _{MAX} = 1/t _{RC}		50		50	mA
			L	50		50	mA
			LL	30		30	mA
I _{SB1}	Automatic CE Power-Down Current—TTL Inputs	Max. V _{CC} , $\overline{CE} \geq V_{IH}$, V _{IN} ≥ V _{IH} or V _{IN} ≤ V _{IL} , f = f _{MAX}		5		5	mA
			L	3		3	mA
			LL	1		1	mA
I _{SB2}	Automatic CE Power-Down Current—CMOS Inputs	Max. V _{CC} , $\overline{CE} \geq V_{CC} - 0.3V$, V _{IN} ≥ V _{CC} - 0.3V or V _{IN} ≤ 0.3V, f = 0		500		500	μA
			L	50		50	μA
			LL	5		5	μA

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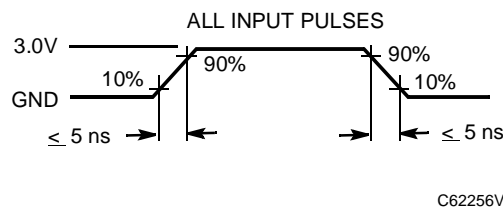
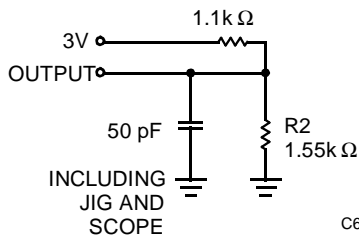
Capacitance^[3]

Parameter	Description	Test Conditions	Max.	Unit
C _{IN}	Input Capacitance	T _A = 25°C, f = 1 MHz, V _{CC} = 3.0V	6	pF
C _{OUT}	Output Capacitance		8	pF

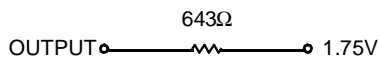
Notes:

- Not more than one output should be shorted at one time. Duration of the short circuit should not exceed 30 seconds.
- Tested initially and after any design or process changes that may affect these parameters.

AC Test Loads and Waveforms



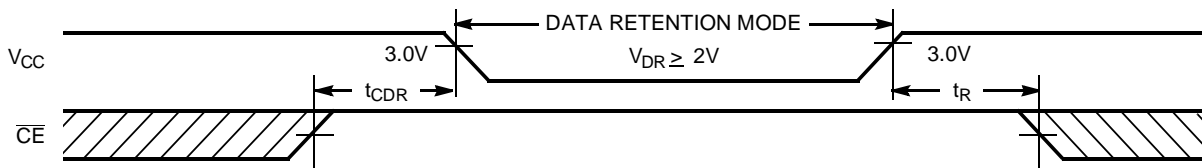
Equivalent to: THÉVENIN EQUIVALENT



Data Retention Characteristics (Over the Operating Range)

Parameter	Description	Conditions ^[4]	Min.	Max.	Unit
V _{DR}	V _{CC} for Data Retention		2.0		V
I _{CCDR}	Data Retention Current	V _{CC} = V _{DR} = 3.0V, CE ≥ V _{CC} - 0.3V, V _{IN} ≥ V _{CC} - 0.3V or V _{IN} ≤ 0.3V		200	μA
			L	20	μA
			LL	5	μA
t _{CDR} ^[3]	Chip Deselect to Data Retention Time		0		ns
t _R ^[3]	Operation Recovery Time		t _{RC}		ns

Data Retention Waveform



C62256V-7

Switching Characteristics Over the Operating Range^[5]

Parameter	Description	CY62256V-55		CY62256V-70		Unit
		Min.	Max.	Min.	Max.	
READ CYCLE						
t _{RC}	Read Cycle Time	55		70		ns
t _{AA}	Address to Data Valid		55		70	ns
t _{OHA}	Data Hold from Address Change	3		3		ns
t _{ACE}	CE LOW to Data Valid		55		70	ns
t _{DOE}	OE LOW to Data Valid		25		35	ns
t _{LZOE}	OE LOW to Low Z ^[6]	3		3		ns
t _{HZOE}	OE HIGH to High Z ^[6, 7]		20		25	ns
t _{LZCE}	CE LOW to Low Z ^[6]	3		3		ns
t _{HZCE}	CE HIGH to High Z ^[6, 7]		20		25	ns
t _{PU}	CE LOW to Power-Up	0		0		ns
t _{PD}	CE HIGH to Power-Down		55		70	ns

Shaded area contains advanced information.

Notes:

- No input may exceed V_{CC}+0.3V.
- Test conditions assume signal transition time of 5 ns or less timing reference levels of 1.5V, input pulse levels of 0 to 3.0V, and output loading of the specified I_{OL}/I_{OH} and 100-pF load capacitance.
- At any given temperature and voltage condition, t_{HZCE} is less than t_{LZCE}; t_{HZOE} is less than t_{LZOE}, and t_{HZWE} is less than t_{LZWE} for any given device.
- t_{HZOE}, t_{HZCE}, and t_{HZWE} are specified with C_L = 5 pF as in part (b) of AC Test Loads. Transition is measured ±500 mV from steady-state voltage.

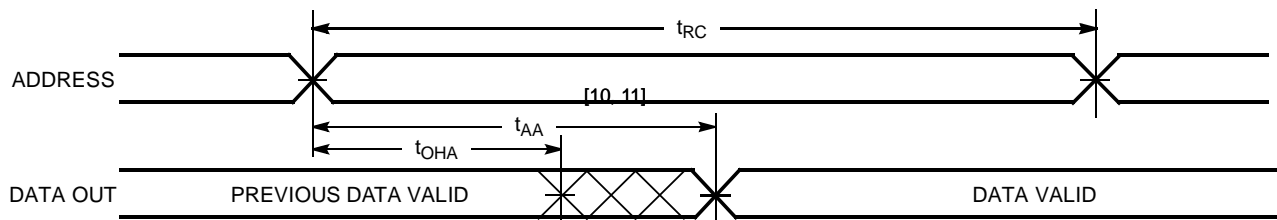
Switching Characteristics Over the Operating Range^[5] (continued)

Parameter	Description	CY62256V-55		CY62256V-70		Unit
		Min.	Max.	Min.	Max.	
WRITE CYCLE^[8,9]						
t_{WC}	Write Cycle Time	55		70		ns
t_{SCE}	\overline{CE} LOW to Write End	45		60		ns
t_{AW}	Address Set-Up to Write End	45		60		ns
t_{HA}	Address Hold from Write End	0		0		ns
t_{SA}	Address Set-Up to Write Start	0		0		ns
t_{PWE}	\overline{WE} Pulse Width	40		50		ns
t_{SD}	Data Set-Up to Write End	25		30		ns
t_{HD}	Data Hold from Write End	0		0		ns
t_{HZWE}	\overline{WE} LOW to High Z ^[6, 7]		20		25	ns
t_{LZWE}	\overline{WE} HIGH to Low Z ^[6]	3		3		ns

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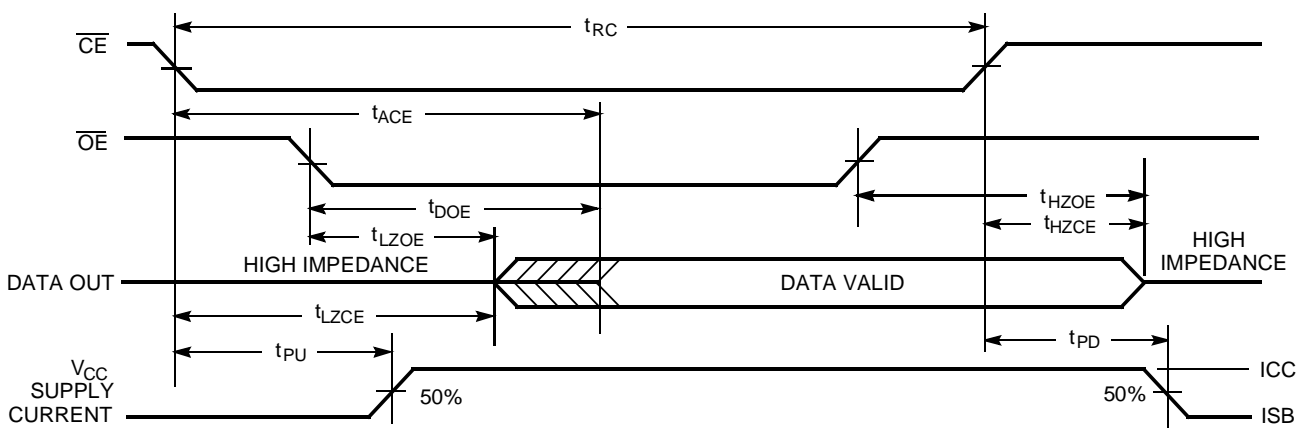
Switching Waveforms

Read Cycle No. 1^[10, 11]



C62256V-8

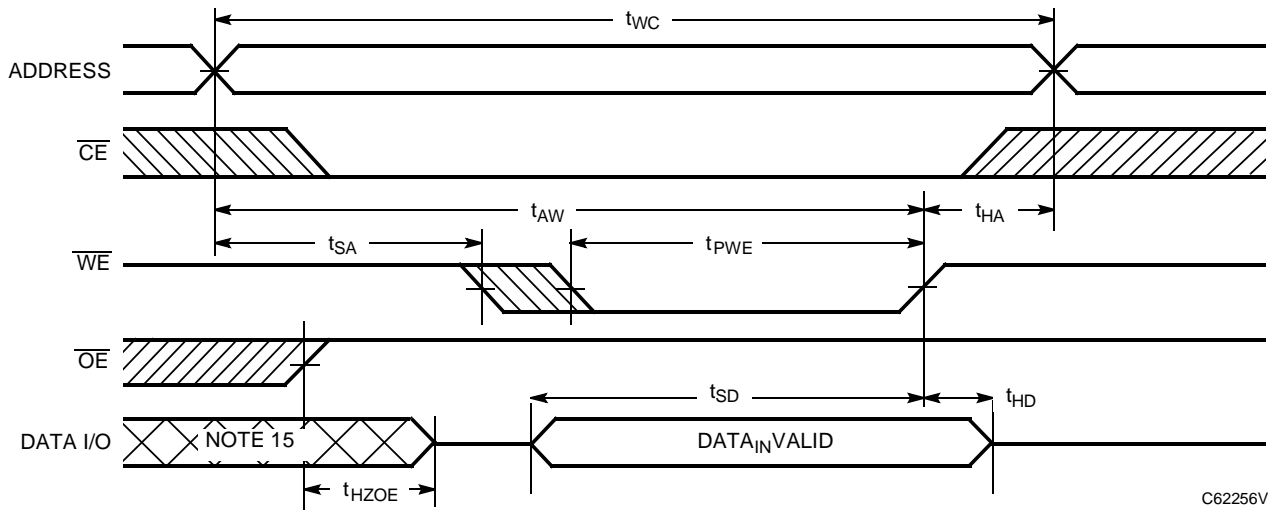
Read Cycle No. 2^[11, 12]



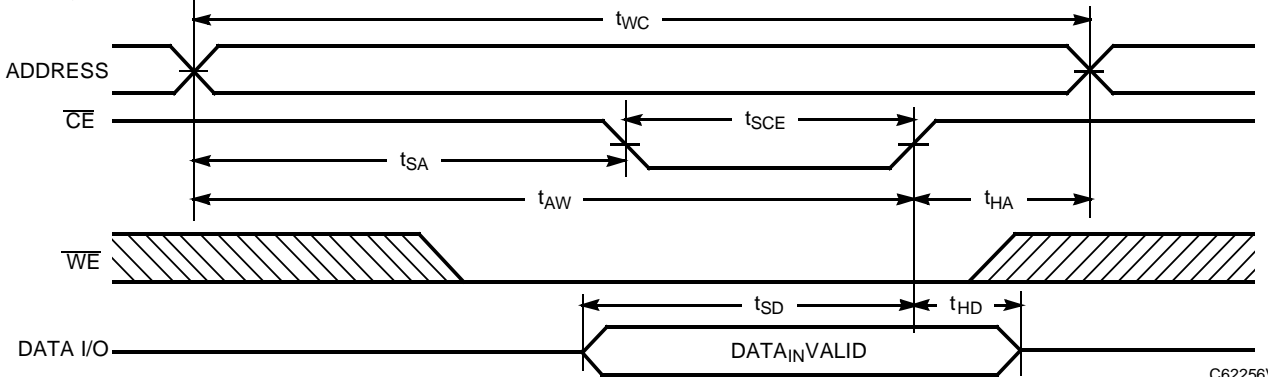
C62256V-9

Notes:

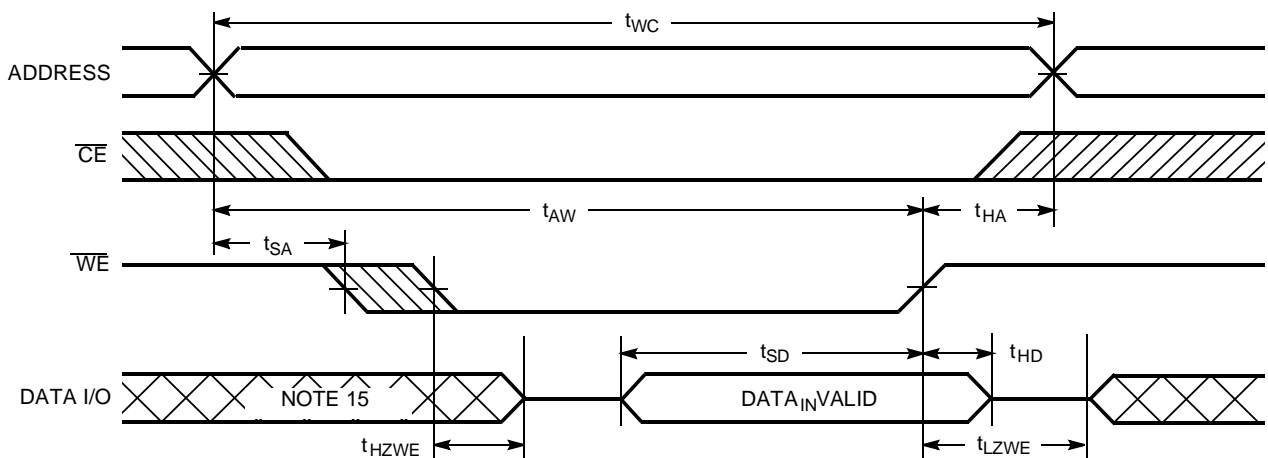
8. The internal write time of the memory is defined by the overlap of \overline{CE} LOW and \overline{WE} LOW. Both signals must be LOW to initiate a write and either signal can terminate a write by going HIGH. The data input set-up and hold timing should be referenced to the rising edge of the signal that terminates the write.
9. The minimum write cycle time for write cycle #3 (\overline{WE} controlled, \overline{OE} LOW) is the sum of t_{HZWE} and t_{SD} .
10. Device is continuously selected. \overline{OE} , $\overline{CE} = V_{IL}$.
11. \overline{WE} is HIGH for read cycle.
12. Address valid prior to or coincident with \overline{CE} transition LOW.

Switching Waveforms (continued)
Write Cycle No. 1 (WE Controlled)^[8, 13, 14]


C62256V-10

Write Cycle No. 2 (\overline{CE} Controlled)^[8, 13, 14]


C62256V-11

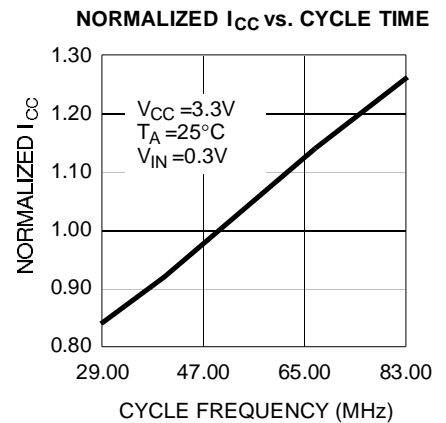
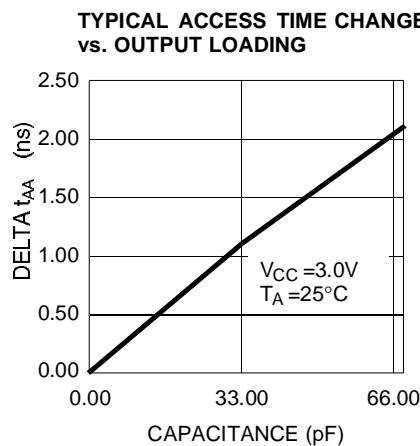
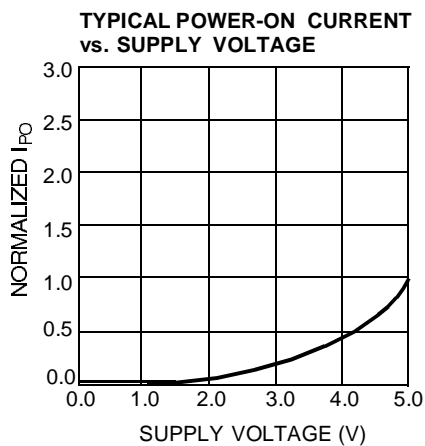
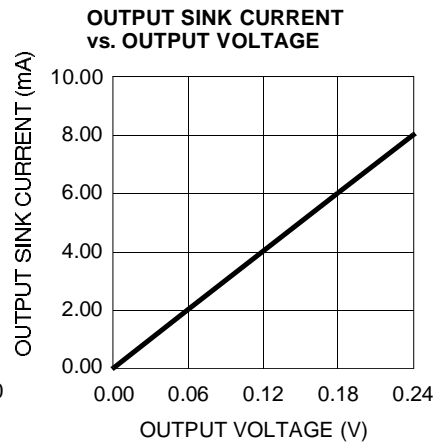
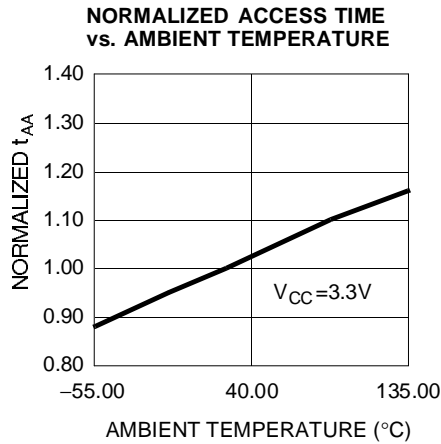
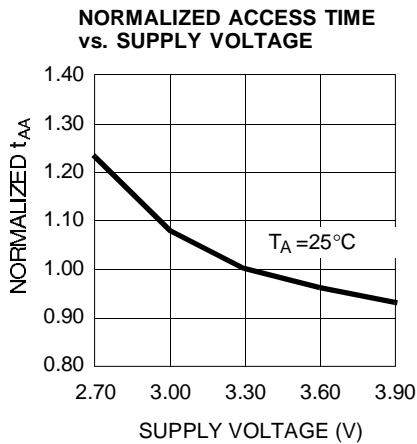
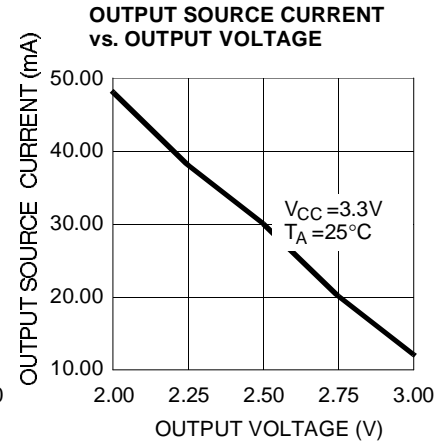
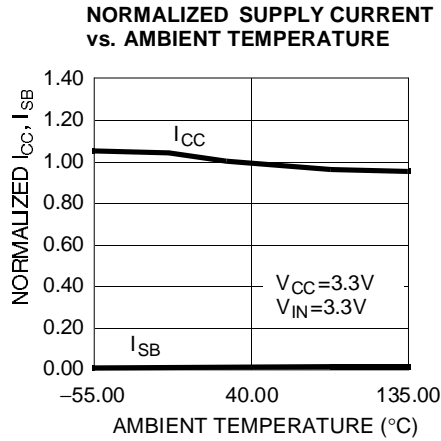
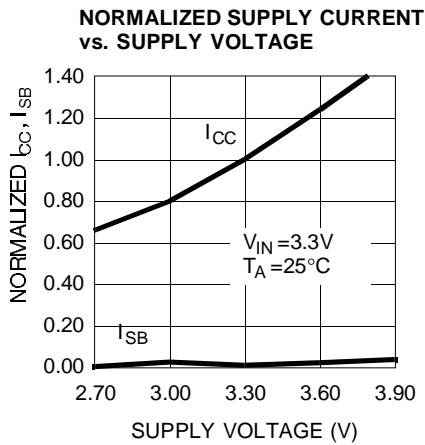
Write Cycle No. 3 (WE Controlled, \overline{OE} LOW)^[9, 14]


C62256V-12

Notes:

13. Data I/O is high impedance if $\overline{OE} = V_{IH}$.
14. If \overline{CE} goes HIGH simultaneously with \overline{WE} HIGH, the output remains in a high-impedance state.
15. During this period, the I/Os are in output state and input signals should not be applied.

Typical DC and AC Characteristics



Truth Table

CE	WE	OE	Inputs/Outputs	Mode	Power
H	X	X	High Z	Deselect/Power-Down	Standby (I_{SB})
L	H	L	Data Out	Read	Active (I_{CC})
L	L	X	Data In	Write	Active (I_{CC})
L	H	H	High Z	Deselect, Output Disabled	Active (I_{CC})

Ordering Information

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
55	CY62256V-55SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	Commercial
	CY62256VL-55SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	
	CY62256VLL-55SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	
	CY62256V-55RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256VL-55RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256VLL-55RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256V-55ZC	Z28	28-Lead Thin Small Outline Package	
	CY62256VL-55ZC	Z28	28-Lead Thin Small Outline Package	
70	CY62256V-70SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	Commercial
	CY62256VL-70SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	
	CY62256VLL-70SNC	S22	28-Lead 450-Mil (300-Mil Body Width) SOIC	
	CY62256V-70RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256VL-70RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256VLL-70RZC	RZ28	28-Lead Reverse Thin Small Outline Package	
	CY62256V-70ZC	Z28	28-Lead Thin Small Outline Package	
	CY62256VL-70ZC	Z28	28-Lead Thin Small Outline Package	
CY62256VLL-70ZC	Z28	28-Lead Thin Small Outline Package		

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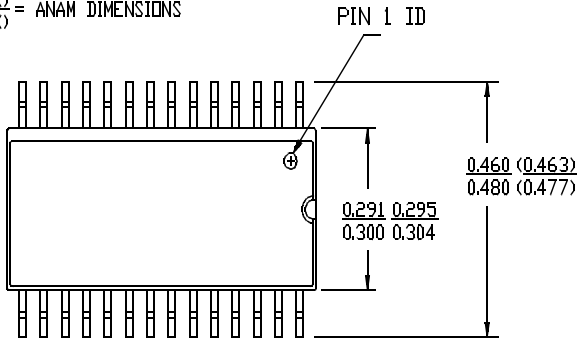
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Package Diagrams

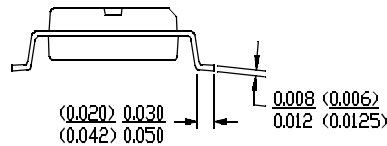
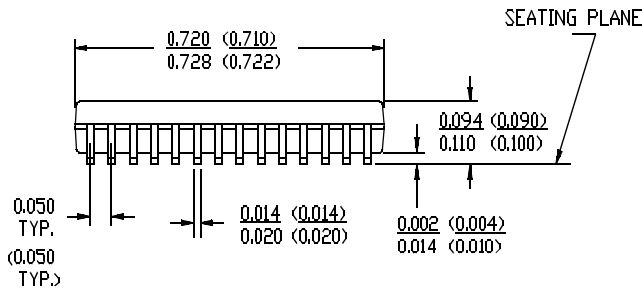
28-Lead 450-Mil (300-Mil Body Width) SOIC S22

$\frac{XXX}{.XXX}$ = HYUNDAI DIMENSIONS

$\frac{<XXX>}{<XXX>}$ = ANAM DIMENSIONS



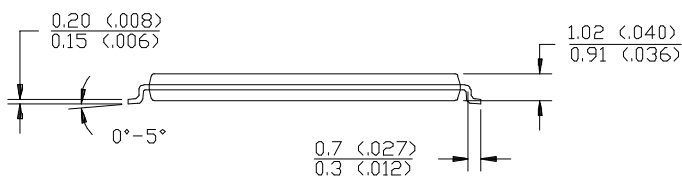
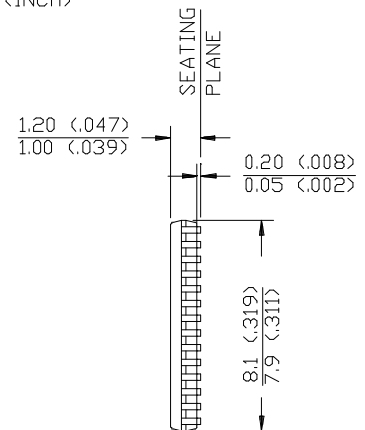
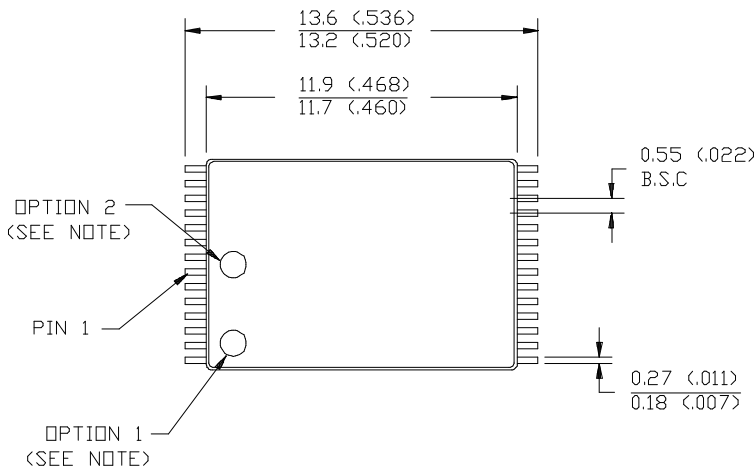
DIMENSIONS IN INCHES MIN.
MAX.
LEAD COPLANARITY 0.004 MAX.



28-Lead Reverse Thin Small Outline Package RZ28

NOTE: ORIENTATION I.D. MAY BE LOCATED EITHER AS SHOWN IN OPTION 1 OR OPTION 2

DIMENSION IN MM (<INCH>
MAX.
MIN.



Package Diagrams (continued)

28-Lead Thin Small Outline Package Z28

NOTE: ORIENTATION I.D MAY BE LOCATED EITHER AS SHOWN IN OPTION 1 OR OPTION 2

DIMENSION IN MM (INCH)
MAX.
MIN.

