

128K x 8 Static RAM

Features

- **High Speed**
 - 55 ns and 70 ns availability
- **Low voltage range:**
 - 2.7V–3.6V
- **Low active power and standby power**
- **Easy memory expansion with CE and OE features**
- **TTL-compatible inputs and outputs**
- **Automatic power-down when deselected**
- **CMOS for optimum speed/power**

Functional Description

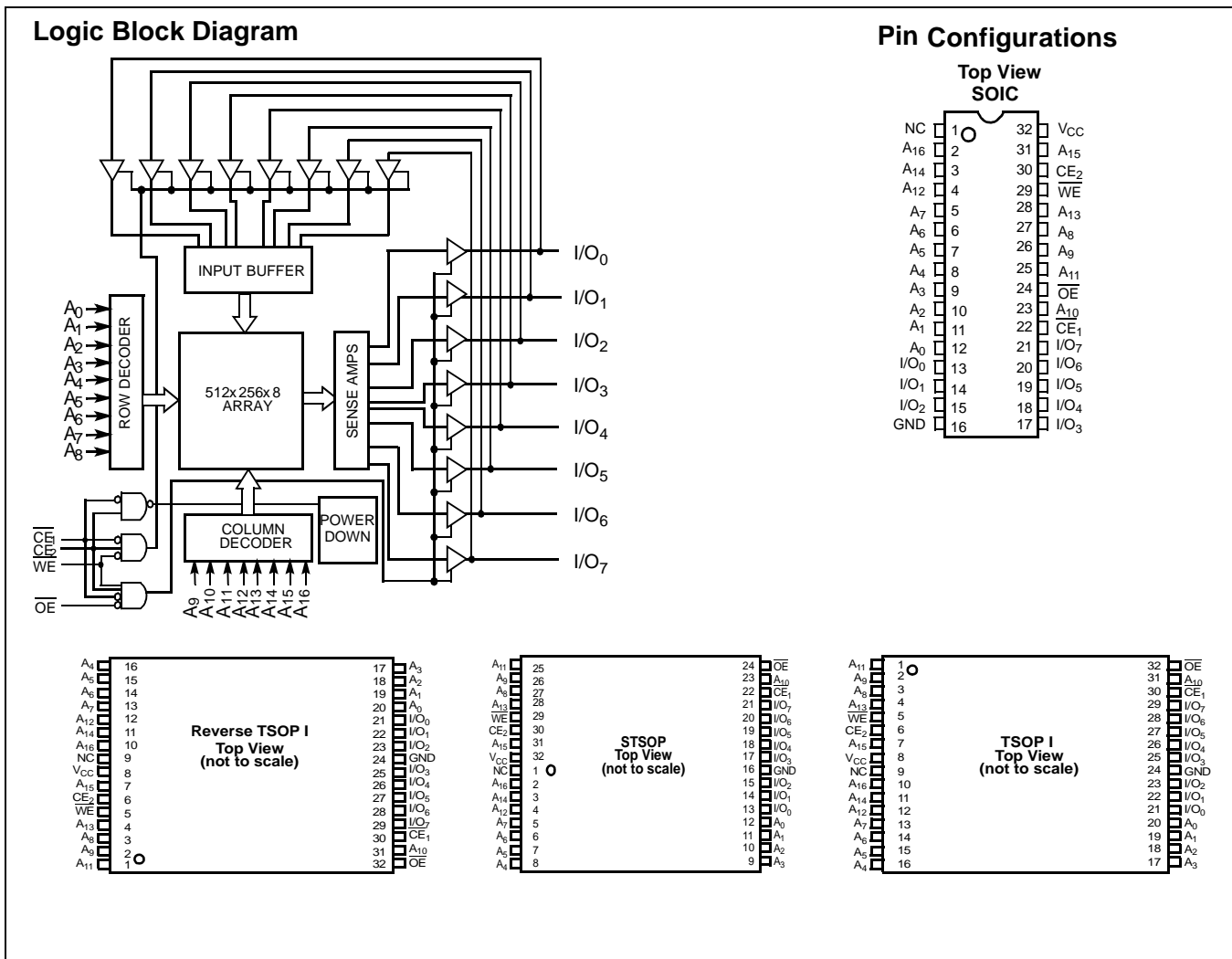
The CY62128V is composed of high-performance CMOS static RAMs organized as 128K words by 8 bits. Easy memory expansion is provided by an active LOW Chip Enable (\overline{CE}_1), an active HIGH Chip Enable (CE_2), an active LOW Output Enable (\overline{OE}) and three-state drivers. These devices have an

automatic power-down feature, reducing the power consumption by over 99% when deselected. The CY62128V is available in the standard 450-mil-wide SOIC, 32-lead TSOP-I, 32-lead Reverse TSOP-1, and STSOP packages.

Writing to the device is accomplished by taking Chip Enable one (\overline{CE}_1) and Write Enable (WE) inputs LOW and the Chip Enable two (CE_2) input HIGH. Data on the eight I/O pins (I/O_0 through I/O_7) is then written into the location specified on the address pins (A_0 through A_{16}).

Reading from the device is accomplished by taking Chip Enable one (\overline{CE}_1) and Output Enable (\overline{OE}) LOW while forcing Write Enable (WE) and Chip Enable two (CE_2) HIGH. Under these conditions, the contents of the memory location specified by the address pins will appear on the I/O pins.

The eight input/output pins (I/O_0 through I/O_7) are placed in a high-impedance state when the device is deselected (\overline{CE}_1 HIGH or CE_2 LOW), the outputs are disabled (\overline{OE} HIGH), or during a write operation (\overline{CE}_1 LOW, CE_2 HIGH, and WE LOW).



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.....	-55°C to +125°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
Industrial	-40°C to +85°C	2.7V to 3.6V

Product Portfolio

Product	V_{CC} Range			Speed	Power Dissipation (Commercial)			
					Operating (I_{CC})		Standby (I_{SB2})	
	Min.	Typ. ^[2]	Max.		Typ. ^[2]	Maximum	Typ. ^[2]	Maximum
CY62128V	2.7V	3.0V	3.6V	70 ns	20 mA	40 mA	0.4 μA	100 μA
				55 ns				

Notes:

- V_{IL} (min.) = -2.0V 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 $V_{CC} = V_{CC}$ Typ., $T_A = 25^\circ C$

Electrical Characteristics Over the Operating Range

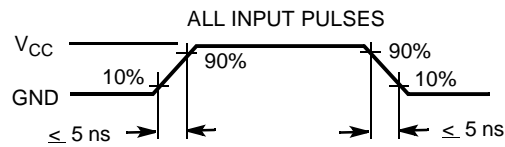
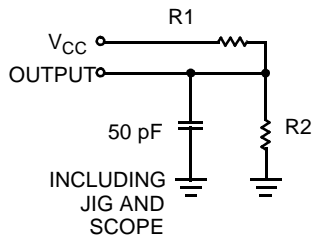
Parameter	Description	Test Conditions	CY62128V-55/70			Unit
			Min.	Typ. ^[2]	Max.	
V _{OH}	Output HIGH Voltage	V _{CC} = Min., I _{OH} = -1.0 mA	2.4			V
V _{OL}	Output LOW Voltage	V _{CC} = Min., I _{OL} = 2.1 mA			0.4	V
V _{IH}	Input HIGH Voltage		2		V _{CC} + 0.5V	V
V _{IL}	Input LOW Voltage		-0.5		0.8	V
I _{IX}	Input Leakage Current	GND ≤ V _I ≤ V _{CC}	-1		1	μA
I _{OZ}	Output Leakage Current	GND ≤ V _O ≤ V _{CC} , Output Disabled	-1		1	μA
I _{CC}	V _{CC} Operating Supply Current	V _{CC} = Max., I _{OUT} = 0 mA, f = f _{MAX} = 1/t _{RC}	Com'l, 70 ns	20	40	mA
			Ind'l, 55 ns	23	50	
			Ind'l, 70 ns	20	40	
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}	Com'l, 70 ns	15	300	μA
			Com'l, 55 ns	17	350	
			Ind'l, 70ns	15	300	
I _{SB2}	Automatic CE Power-Down Current—CMOS Inputs	Max. V _{CC} , CE ≥ V _{CC} - 0.3V V _{IN} ≥ V _{CC} - 0.3V or V _{IN} ≤ 0.3V, f = 0	Com'l	0.4	15	μA
			Ind'l		30	

Capacitance^[3]

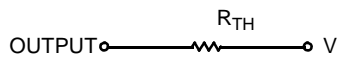
Parameter	Description	Test Conditions	Max.	Unit
C _{IN}	Input Capacitance	T _A = 25°C, f = 1 MHz, V _{CC} = 3.0V	6	pF
C _{OUT}	Output Capacitance		8	pF

Note:

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

AC Test Loads and Waveforms


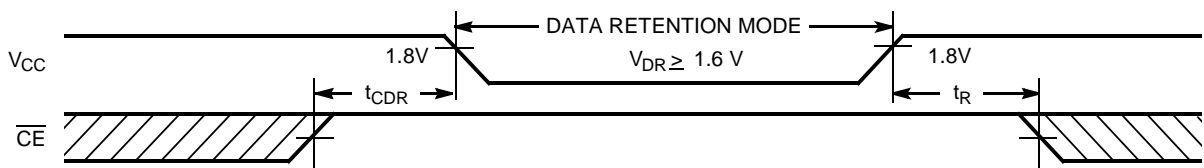
Equivalent to: THÉVENIN EQUIVALENT



Parameters	3.3V	Unit
R1	1213	Ohms
R2	1378	Ohms
R _{TH}	645	Ohms
V _{TH}	1.75V	Volts

Data Retention Characteristics (Over the Operating Range)

Parameter	Description	Conditions ^[4]	Min.	Typ. ^[2]	Max.	Unit
V _{DR}	V _{CC} for Data Retention		1.6			V
I _{CCDR}	Data Retention Current	Com'l	V _{CC} = 2V CE ≥ V _{CC} - 0.3V, V _{IN} ≥ V _{CC} - 0.3V or V _{IN} ≤ 0.3V No input may exceed V _{CC} +0.3V	0.4	10	μA
		Ind'l			20	
t _{CDR} ^[3]	Chip Deselect to Data Retention Time		0			ns
t _R	Operation Recovery Time		t _{RC}			ns

Data Retention Waveform

Note:

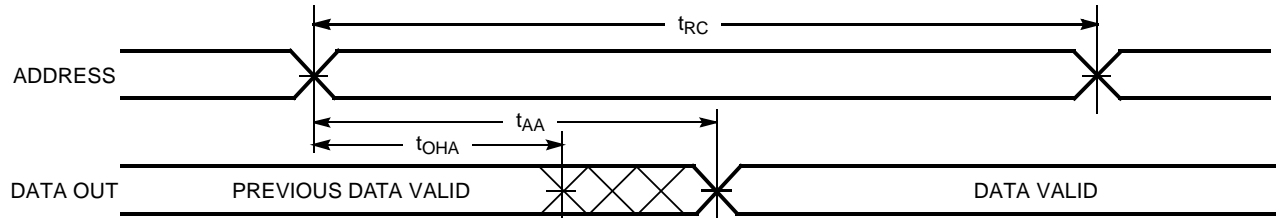
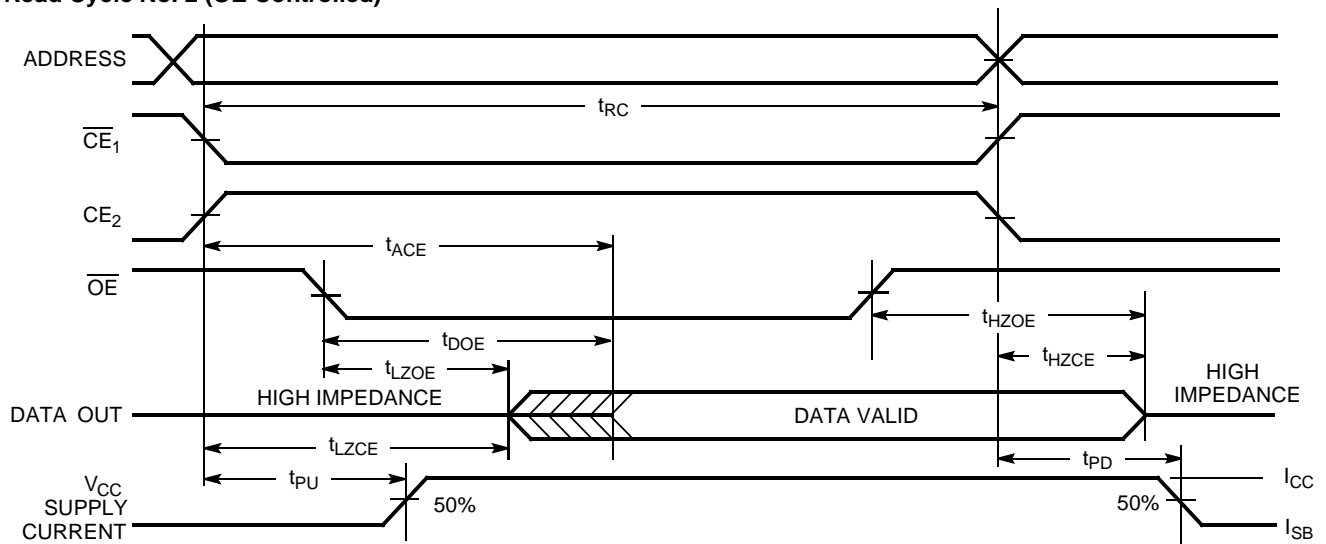
4. No input may exceed V_{CC}+0.3V.

Switching Characteristics Over the Operating Range^[5]

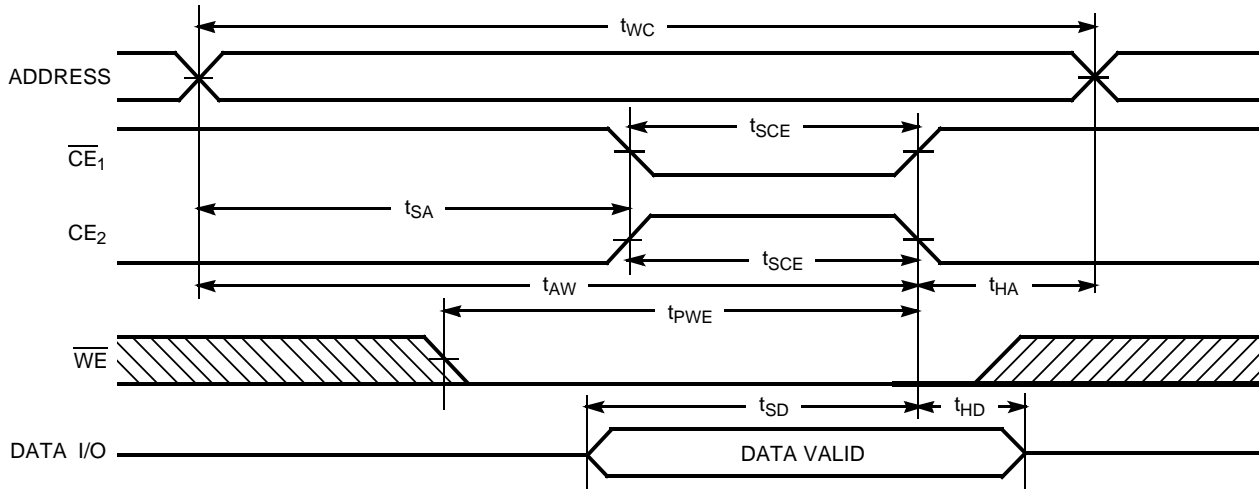
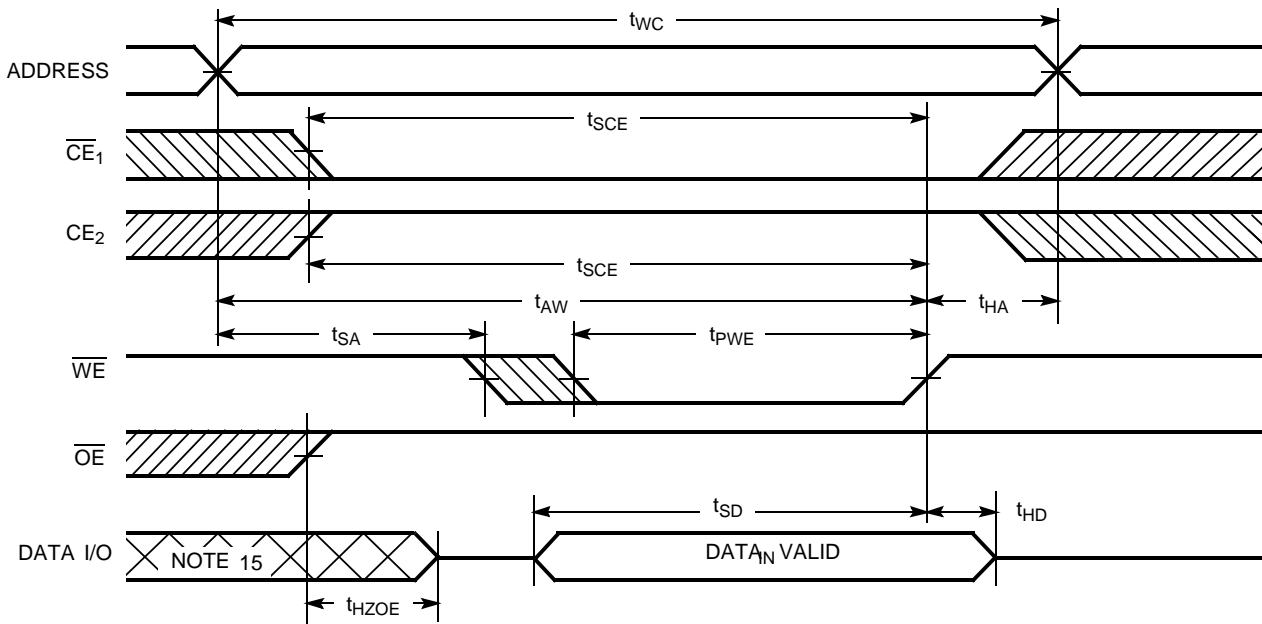
Parameter	Description	CY62128V-55		CY62128V-70		Unit
		Min.	Max.	Min.	Max.	
READ CYCLE						
t_{RC}	Read Cycle Time	55		70		ns
t_{AA}	Address to Data Valid		55		70	ns
t_{OHA}	Data Hold from Address Change	5		10		ns
t_{ACE}	\overline{CE} LOW to Data Valid		55		70	ns
t_{DOE}	\overline{OE} LOW to Data Valid		20		35	ns
t_{LZOE}	\overline{OE} LOW to Low Z ^[6]	10		10		ns
t_{HZOE}	\overline{OE} HIGH to High Z ^[6, 7]		20		25	ns
t_{LZCE}	\overline{CE} LOW to Low Z ^[6]	10		10		ns
t_{HZCE}	\overline{CE} HIGH to High Z ^[6, 7]		20		25	ns
t_{PU}	\overline{CE} LOW to Power-Up	0		0		ns
t_{PD}	\overline{CE} HIGH to Power-Down		55		70	ns
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	45		55		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]	5		5		ns

5. 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.
6. 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.
7. 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 ± 200 mV from steady-state voltage.
8. The internal write time of the memory is defined by the overlap of CE_1 LOW, CE_2 HIGH, and WE LOW. CE_1 and WE signals must be LOW and CE_2 HIGH 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 (WE controlled, OE LOW) is the sum of t_{HZWE} and t_{SD} .

Switching Waveforms

Read Cycle No. 1^[10, 11]

Read Cycle No. 2 (\overline{OE} Controlled)^[11, 12]

Notes:

10. Device is continuously selected. $\overline{OE}, \overline{CE} = V_{IL}, CE_2 = V_{IH}$.
11. \overline{WE} is HIGH for read cycle.
12. Address valid prior to or coincident with \overline{CE}_1 transition LOW and CE_2 transition HIGH.

Switching Waveforms (continued)
Write Cycle No. 1 (\overline{CE}_1 or CE_2 Controlled)^[13,14]

Write Cycle No. 2 (\overline{WE} Controlled, \overline{OE} HIGH During Write)^[13, 14]

Notes:

13. Data I/O is high impedance if $\overline{OE} = V_{IH}$.
14. If \overline{CE}_1 goes HIGH or CE_2 goes LOW 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.

Truth Table

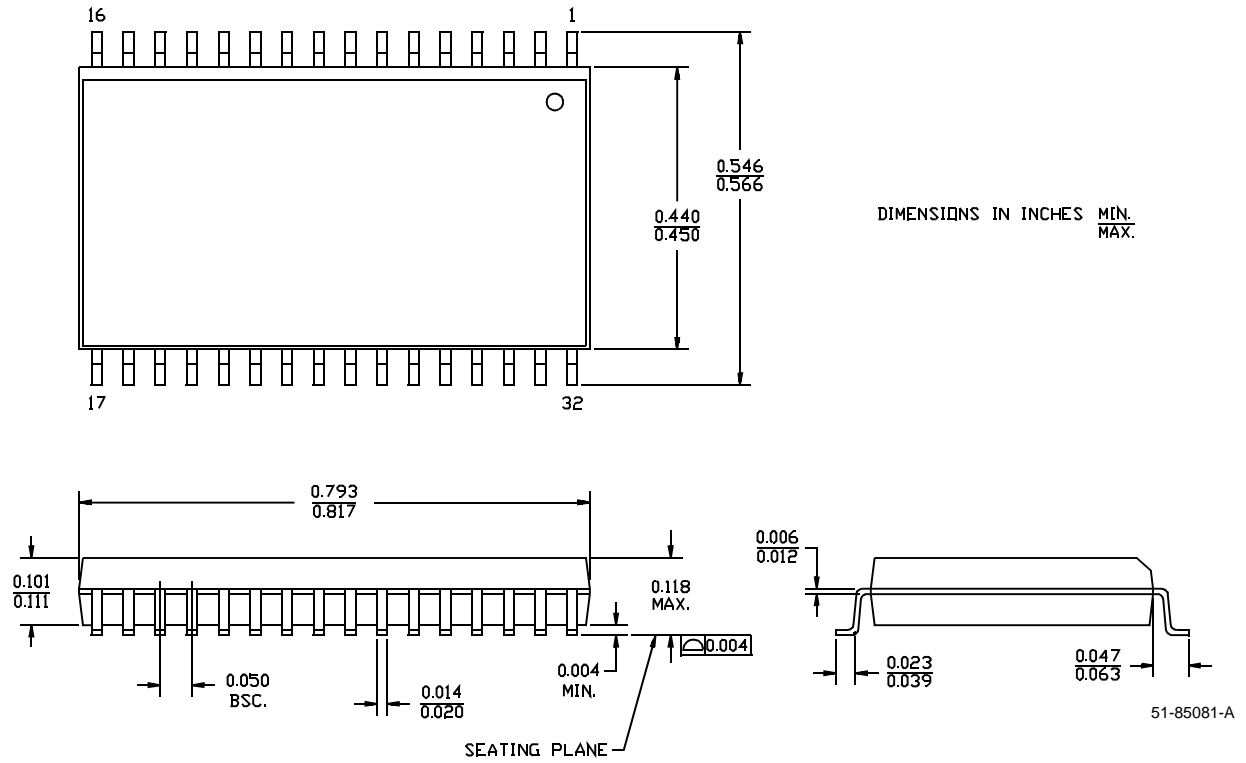
CE ₁	CE ₂	OE	WE	I/O ₀ -I/O ₇	Mode	Power
H	X	X	X	High Z	Power-Down	Standby (I _{SB})
X	L	X	X	High Z	Power-Down	Standby (I _{SB})
L	H	L	H	Data Out	Read	Active (I _{CC})
L	H	X	L	Data In	Write	Active (I _{CC})
L	H	H	H	High Z	Selected, Outputs Disabled	Active (I _{CC})

Ordering Information

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
55	CY62128VLL-55SC	S34	32-Lead 450-Mil SOIC	Commercial
	CY62128VLL-55ZAI	ZA32	32-Lead STSOP Type 1	
	CY62128VLL-55ZI	Z32	32-Lead TSOP Type 1	
70	CY62128VLL-70SC	S34	32-Lead 450-Mil SOIC	Commercial
	CY62128VLL-70ZC	Z32	32-Lead TSOP Type 1	
	CY62128VLL-70ZAC	ZA32	32-Lead STSOP Type 1	
	CY62128VLL-70ZRC	ZR32	32-Lead Reverse TSOP Type 1	
	CY62128VLL-70SI	S34	32-Lead 450-Mil SOIC	
	CY62128VLL-70ZI	Z32	32-Lead TSOP Type 1	Industrial
	CY62128VLL-70ZAI	ZA32	32-Lead STSOP Type 1	
	CY62128VLL-70ZRI	ZR32	32-Lead Reverse TSOP Type 1	

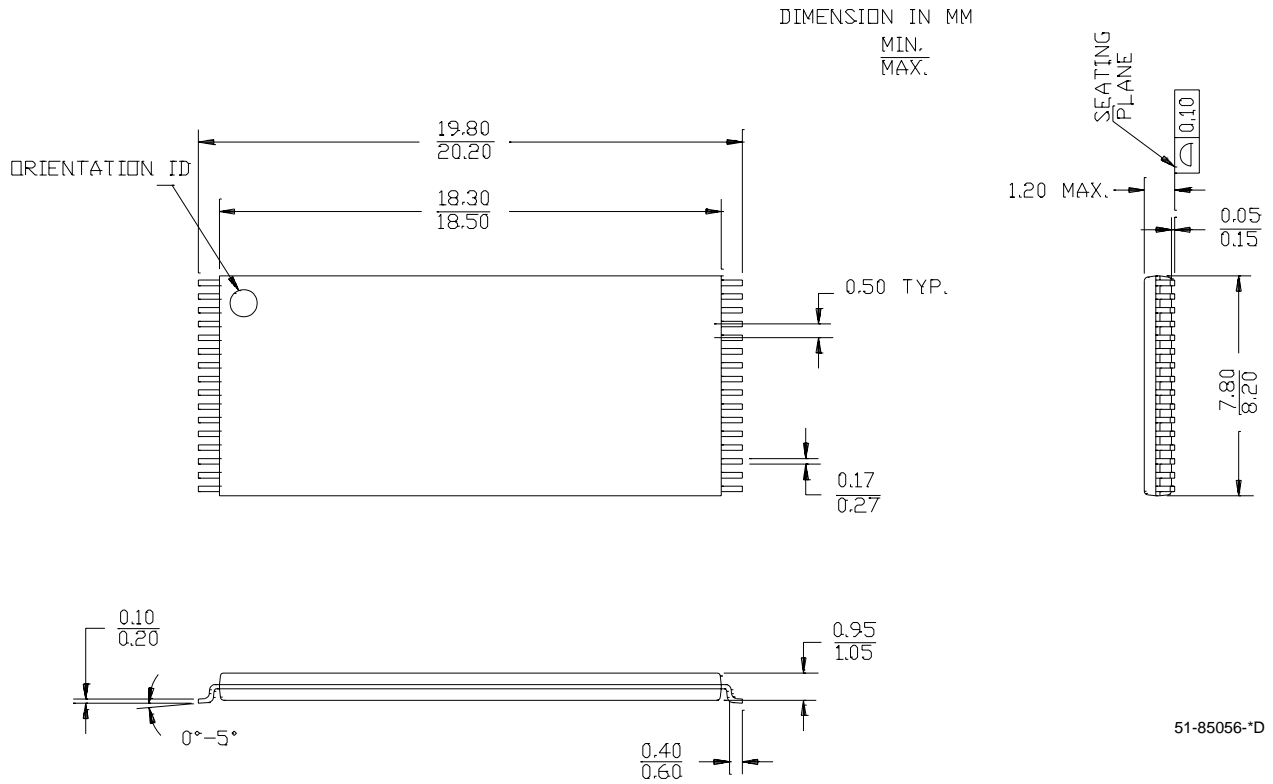
Package Diagrams

32-Lead (450 MIL) Molded SOIC S34



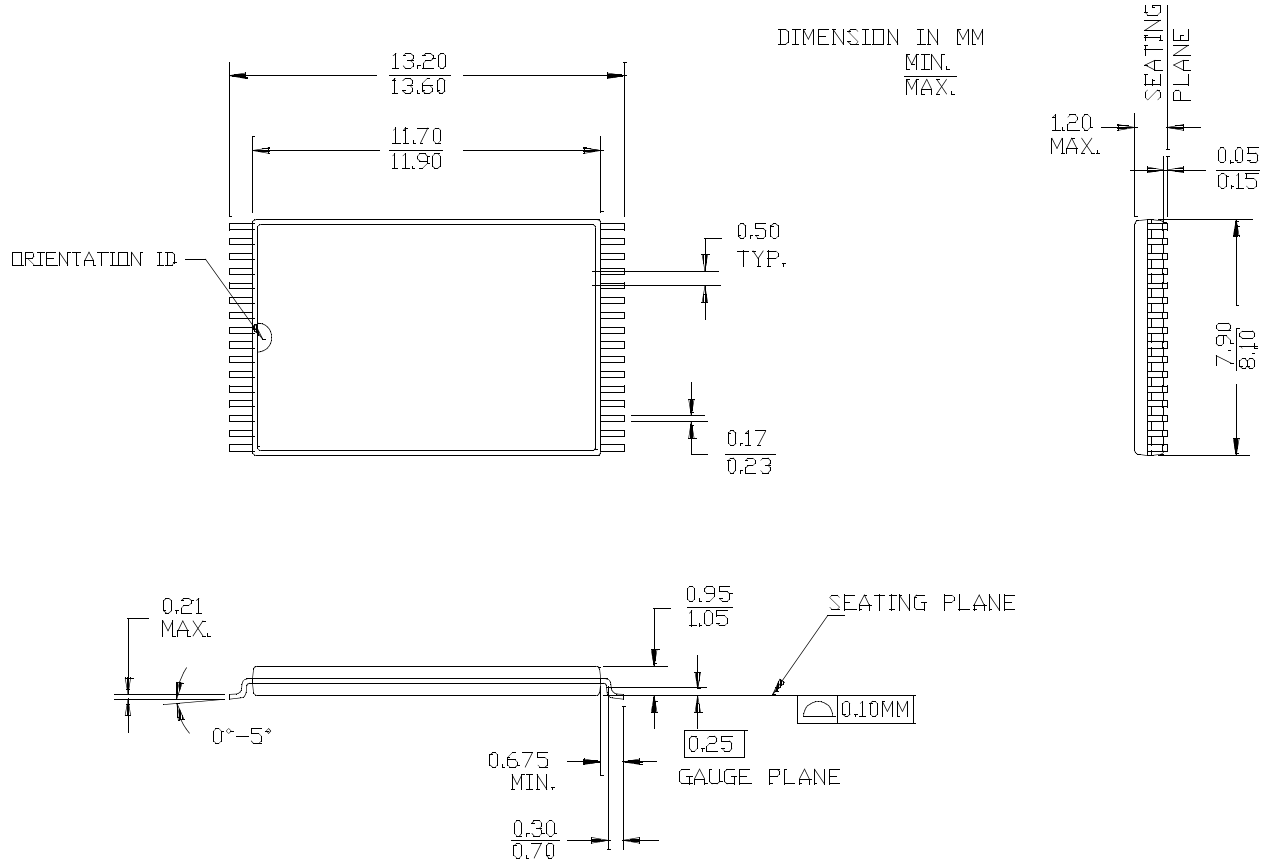
Package Diagrams

32-Lead Thin Small Outline Package Type I (8x20 mm) Z32



Package Diagrams

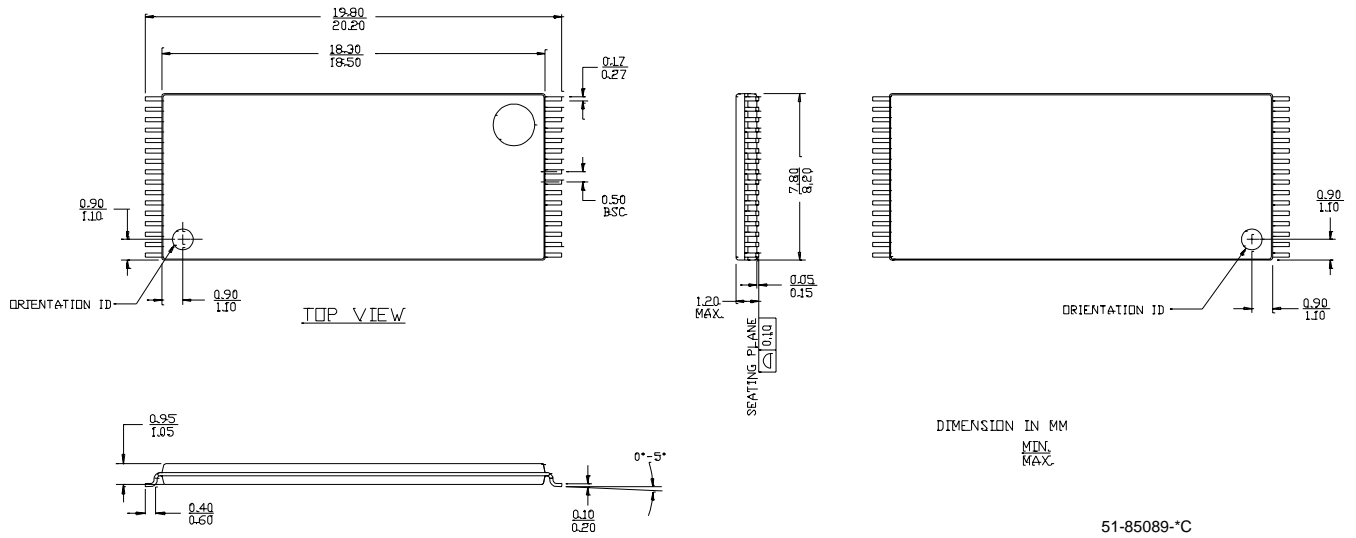
32-Lead Shrunken Thin Small Outline Package (8x13.4 mm) ZA32



51-85094-*D

Package Diagrams

32-Lead Reverse Thin Small Outline Package ZR32



Document Title: CY62128V 128K x 8 Static RAM				
Document Number: 38-05061				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	107252	09/10/01	SZV	Change Spec number from 38-00547 to 38-05061
*A	111446	03/01/02	MGN	Remove obsolete parts. Change to standardized format.