

SONY® CXK584000TM/YM/M/P -55L/70L/85L/10L -55LL/70LL/85LL/10LL

524288-word × 8-bit High Speed CMOS Static RAM

Preliminary

Description

CXK584000TM/YM/M/P is a 4,194,304 bits high speed CMOS static RAM organized as 524,288 words by 8-bits. Polysilicon TFT cell technology realized extremely low stand-by current and higher data retention stability. Operating on a single 2.7 to 5.5V supply, this asynchronous IC is suitable for high speed and low power consumption applications where battery back up for nonvolatility is required.

Features

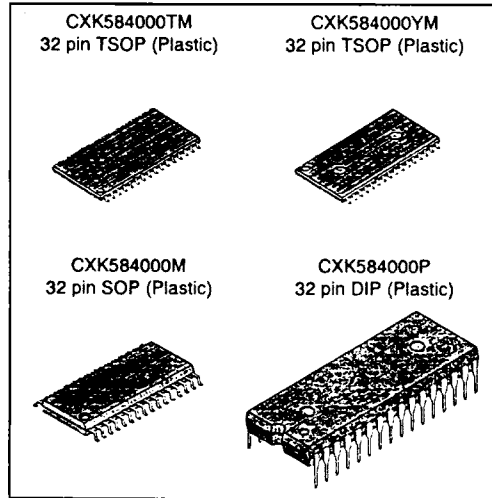
- Wide supply voltage range: 2.7 to 5.5V
- Fast access time: 5V operation/3V operation

-55L/55LL	55ns/110ns (Max.)
-70L/70LL	70ns/140ns (Max.)
-85L/85LL	85ns/170ns (Max.)
-10L/10LL	100ns/200ns (Max.)
- Low stand-by current:

-55L/70L/85L/10L	100 μA (Max.)
-55LL/70LL/85LL/10LL	50 μA (Max.)
- Low data retention current:

-55L/70L/85L/10L	15 μA (Max.) Ta=0 to +40 °C
-55LL/70LL/85LL/10LL	3 μA (Max.) Ta=0 to +40 °C
- Low voltage data retention: 2.0V (Min.)
- Package line-up

CXK584000TM/YM	400mil 32 pin TSOP (Type II)
CXK584000M	525mil 32 pin SOP
CXK584000P	600mil 32 pin DIP



Function

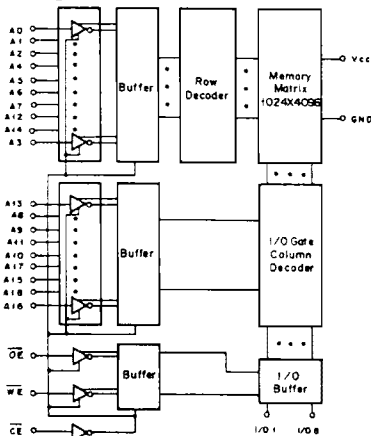
524288-word × 8-bit static RAM

Structure

Silicon gate CMOS IC

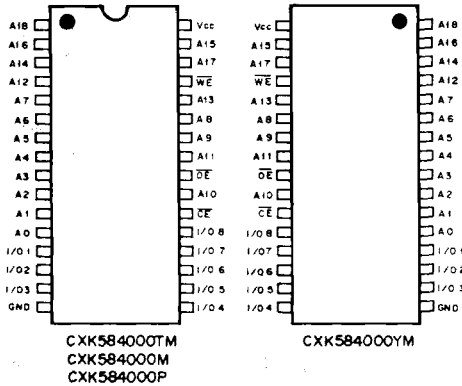
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Block Diagram



Pin Configuration

(Top View)



Pin Description

Symbol	Description
A0 to A18	Address input
I/O1 to I/O8	Data input/output
CE	Chip enable input
WE	Write enable input
OE	Output enable input
Vcc	Power supply
GND	Ground

Absolute Maximum Ratings

(Ta=25°C, GND=0V)

Item	Symbol	Rating	Unit
Supply voltage	Vcc	-0.5 to +7.0	V
Input voltage	V _{IN}	-0.5 * to Vcc+0.5	V
Input and output voltage	V _{I/O}	-0.5 * to Vcc+0.5	V
Allowable power dissipation	P _D	CXK584000TM/YM/M	0.7
		CXK584000P	1.0
Operating temperature	T _{opr}	0 to +70	°C
Storage temperature	T _{stg}	-55 to +150	°C
Soldering temperature • time	T _{solder}	CXK584000TM/YM	235 • 10
		CXK584000M/P	260 • 10

* V_{IN}, V_{I/O} = -3.0V Min. for pulse width less than 50ns.

Truth Table

CE	OE	WE	Mode	I/O pin	Vcc current
H	x	x	Not selected	High Z	I _{SB1} , I _{SB2}
L	H	H	Output disable	High Z	I _{CC1} , I _{CC2} , I _{CC3}
L	L	H	Read	Data out	I _{CC1} , I _{CC2} , I _{CC3}
L	x	L	Write	Data in	I _{CC1} , I _{CC2} , I _{CC3}

x : "H" or "L"

DC Recommended Operating Conditions

(Ta=0 to +70 °C, GND=0V)

Item	Symbol	Vcc=5V ± 10%			Vcc=2.7 to 5.5V			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Supply voltage	Vcc	4.5	—	5.5	2.7	—	5.5	V
Input high voltage	V _{IH}	2.2	—	Vcc+0.3	2.2	—	Vcc+0.3	V
Input low voltage	V _{IL}	-0.3*	—	0.8	-0.3*	—	0.4	V

* V_{IL}=-3.0V Min. for pulse width less than 50ns.

Electrical Characteristics

• DC characteristics

(GND=0V, Ta=0 to +70 °C)

Item	Symbol	Test conditions	Vcc=5V ± 10%			Vcc=3V ± 10%			Unit		
			Min.	Typ. *1	Max.	Min.	Typ. *2	Max.			
Input leakage current	I _{LI}	V _{IN} =GND to Vcc	-1	—	1	-1	—	1	μA		
Output leakage current	I _{LO}	$\overline{CE}=V_{IH}$ or $\overline{OE}=V_{IH}$ or $\overline{WE}=V_{IL}$ V _{I/O} =GND to Vcc	-1	—	1	-1	—	1	μA		
Operating power supply current	I _{CC1}	$\overline{CE}=V_{IL}$, V _{IN} =V _{IH} or V _{IL} I _{OUT} =0mA	—	6	15	—	0.4	0.8	mA		
Average operating current	I _{CC2}	Min. cycle Duty=100% I _{OUT} =0mA	—	60	100	—	20	35	mA		
	I _{CC3}	Cycle time 1 μs Duty=100% I _{OUT} =0mA CE ≤ 0.2V, V _{IL} ≤ 0.2V, V _{IH} ≥ Vcc-0.2V	—	10	20	—	5	10	mA		
Standby current	I _{SB1}	$\overline{CE} \geq Vcc-0.2V$	L*3	0 to +70 °C	—	—	100	—	—	74	μA
				0 to +40 °C	—	—	35	—	—	24	
				+25 °C	—	2	—	—	1	—	
			LL*4	0 to +70 °C	—	—	50	—	—	22	
				0 to +40 °C	—	—	18	—	—	4.5	
				+25 °C	—	2	—	—	0.5	—	
I _{SB2}	$\overline{CE}=V_{IH}$	—	0.3	3	—	0.06	0.3	mA			
Output high voltage	V _{OH}	I _{OH} =-1.0mA	2.4	—	—	2.2	—	—	V		
Output low voltage	V _{OL}	I _{OL} =2.1mA	—	—	0.4	—	—	0.4	V		

*1 Vcc=5V, Ta=25 °C

*2 Vcc=3V, Ta=25 °C

*3 Guaranteed for L-version (-55L/70L/85L/10L)

*4 Guaranteed for LL-version (-55LL/70LL/85LL/10LL)

I/O Capacitance

(Ta=25°C, f=1MHz)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input capacitance	C _{IN}	V _{IN} =0V	—	—	7	pF
I/O capacitance	C _{I/O}	V _{I/O} =0V	—	—	8	pF

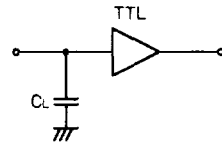
Note) This parameter is sampled and is not 100% tested.

AC Characteristics

● AC test conditions

(V_{CC}=2.7 to 5.5V, Ta=0 to +70°C)

Item		Conditions	
		V _{CC} =5V	V _{CC} =3V
Input pulse high level		V _{IH} =2.2V	V _{IH} =2.2V
Input pulse low level		V _{IL} =0.8V	V _{IL} =0.4V
Input rise time		t _r =5ns	t _r =5ns
Input fall time		t _f =5ns	t _f =5ns
Input and output reference level		1.5V	1.5V
Output load conditions	-70L/70LL	C _L * =100pF, 1TTL	C _L * =100pF, 1TTL
	-85L/85LL		
	-10L/10LL		
	-55L/55LL	C _L * =30pF, 1TTL	C _L * =30pF, 1TTL



* C_L includes scope and jig capacitances.

• Read cycle

(V_{cc}=5V ± 10%, GND=0V, T_a=0 to +70°C)

Item	Symbol	- 55L/55LL		- 70L/70LL		- 85L/85LL		- 10L/10LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Read cycle time	t _{RC}	55	—	70	—	85	—	100	—	ns
Address access time	t _{AA}	—	55	—	70	—	85	—	100	ns
Chip enable access time	t _{CO}	—	55	—	70	—	85	—	100	ns
Output enable to output valid	t _{OE}	—	30	—	40	—	45	—	50	ns
Output hold from address change	t _{OH}	10	—	10	—	10	—	10	—	ns
Chip enable to output in low Z (\overline{CE})	t _{LZ}	10	—	10	—	10	—	10	—	ns
Output enable to output in low Z (\overline{OE})	t _{OLZ}	5	—	5	—	5	—	5	—	ns
Chip disable to output in high Z (\overline{CE})	t _{HZ} *	0	20	0	25	0	30	0	35	ns
Output disable to output in high Z (\overline{OE})	t _{OHZ} *	0	20	0	25	0	30	0	35	ns

* t_{HZ} and t_{OHZ} are defined as the time required for outputs to turn to high impedance state and are not referred to as output voltage levels.

• Write cycle

(V_{cc}=5V ± 10%, GND=0V, T_a=0 to +70°C)

Item	Symbol	- 55L/55LL		- 70L/70LL		- 85L/85LL		- 10L/10LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t _{WC}	55	—	70	—	85	—	100	—	ns
Address valid to end of write	t _{AW}	50	—	60	—	70	—	80	—	ns
Chip enable to end of write	t _{CW}	50	—	60	—	70	—	80	—	ns
Data to write time overlap	t _{DW}	25	—	30	—	35	—	40	—	ns
Data hold from write time	t _{DH}	0	—	0	—	0	—	0	—	ns
Write pulse width	t _{WP}	40	—	50	—	60	—	70	—	ns
Address setup time	t _{AS}	0	—	0	—	0	—	0	—	ns
Write recovery time (\overline{WE})	t _{WR}	0	—	0	—	0	—	0	—	ns
Write recovery time (\overline{CE})	t _{WR1}	0	—	0	—	0	—	0	—	ns
Output active from end of write	t _{OW}	5	—	5	—	5	—	5	—	ns
Write to output in high Z	t _{WHZ} *	0	20	0	25	0	30	0	30	ns

* t_{WHZ} is defined as the time required for outputs to turn to high impedance state and is not referred to as output voltage level.

• Read cycle

(V_{CC}=3V ± 10%, GND=0V, T_a=0 to +70 °C)

Item	Symbol	- 55L/55LL		- 70L/70LL		- 85L/85LL		- 10L/10LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Read cycle time	t _{RC}	110	—	140	—	170	—	200	—	ns
Address access time	t _{AA}	—	110	—	140	—	170	—	200	ns
Chip enable access time	t _{CO}	—	110	—	140	—	170	—	200	ns
Output enable to output valid	t _{OE}	—	60	—	80	—	90	—	100	ns
Output hold from address change	t _{OH}	20	—	20	—	20	—	20	—	ns
Chip enable to output in low Z (\overline{CE})	t _{LZ}	20	—	20	—	20	—	20	—	ns
Output enable to output in low Z (\overline{OE})	t _{OLZ}	10	—	10	—	10	—	10	—	ns
Chip disable to output in high Z (\overline{CE})	t _{HZ} *	0	40	0	50	0	60	0	70	ns
Output disable to output in high Z (\overline{OE})	t _{OHZ} *	0	40	0	50	0	60	0	70	ns

* t_{HZ} and t_{OHZ} are defined as the time required for outputs to turn to high impedance state and are not referred to as output voltage levels.

• Write cycle

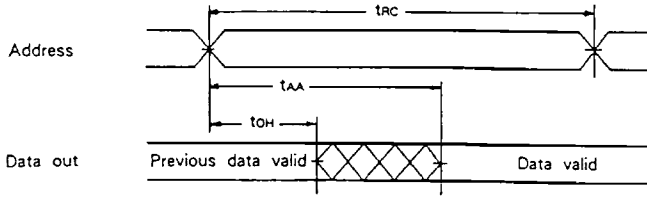
(V_{CC}=3V ± 10%, GND=0V, T_a=0 to +70 °C)

Item	Symbol	- 55L/55LL		- 70L/70LL		- 85L/85LL		- 10L/10LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t _{WC}	110	—	140	—	170	—	200	—	ns
Address valid to end of write	t _{AW}	100	—	120	—	140	—	160	—	ns
Chip enable to end of write	t _{CW}	100	—	120	—	140	—	160	—	ns
Data to write time overlap	t _{DW}	50	—	60	—	70	—	80	—	ns
Data hold from write time	t _{DH}	0	—	0	—	0	—	0	—	ns
Write pulse width	t _{WP}	80	—	100	—	120	—	140	—	ns
Address setup time	t _{AS}	0	—	0	—	0	—	0	—	ns
Write recovery time (\overline{WE})	t _{WR}	0	—	0	—	0	—	0	—	ns
Write recovery time (\overline{CE})	t _{WR1}	0	—	0	—	0	—	0	—	ns
Output active from end of write	t _{OW}	10	—	10	—	10	—	10	—	ns
Write to output in high Z	t _{WHZ} *	0	40	0	50	0	60	0	60	ns

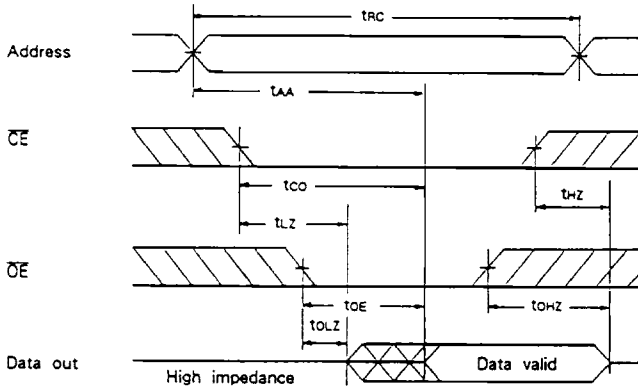
* t_{WHZ} is defined as the time required for outputs to turn to high impedance state and is not referred to as output voltage level.

Timing Waveform

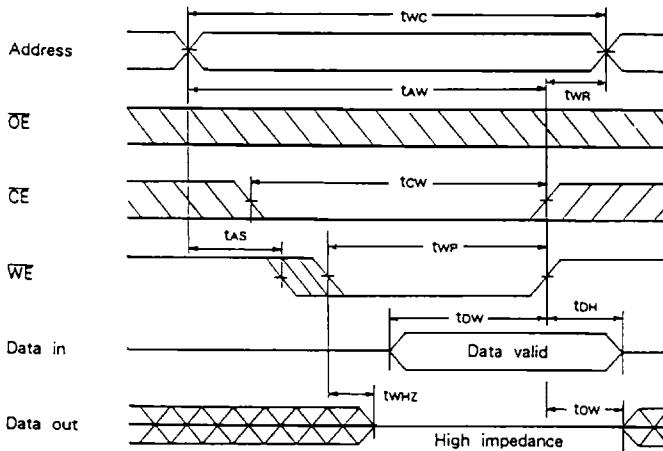
- Read cycle (1) : $\overline{CE}=\overline{OE}=V_{IL}, \overline{WE}=V_{IH}$



- Read cycle (2) : $\overline{WE}=V_{IH}$

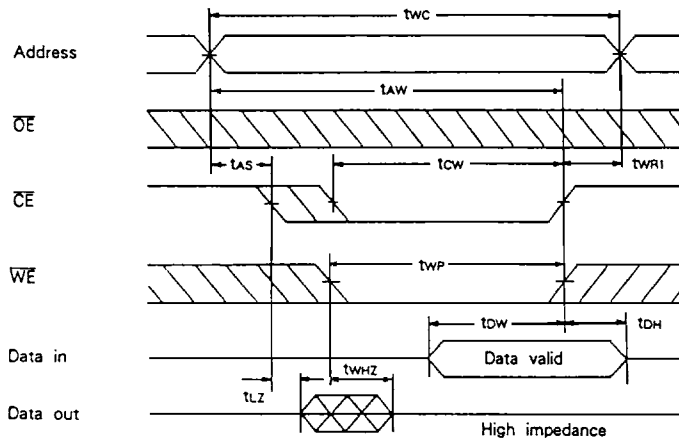


- Write cycle (1) : \overline{WE} control



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• Write cycle (2) : \overline{CE} control



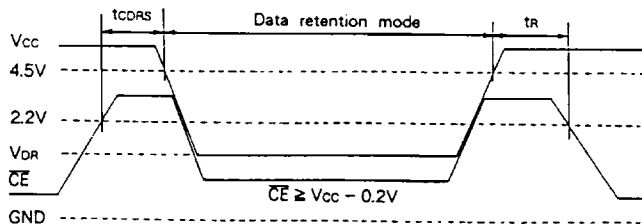
During I/O pins are in the output state, the data input signals of opposite phase to the output must not be applied.

Data Retention Characteristics

($T_a=0$ to 70°C)

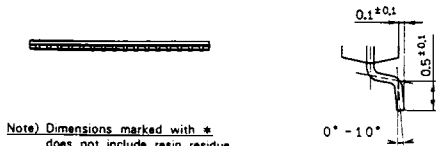
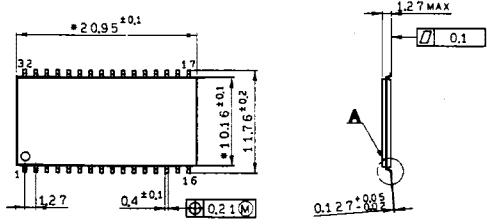
Item	Symbol	Test conditions	- 55L/70L/85L/10L			- 55LL/70LL/85LL/10LL			Unit	
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Data retention voltage	V_{DR}	$\overline{CE} \cong V_{CC}-0.2V$	2.0	—	5.5	2.0	—	5.5	V	
Data retention current	I_{CCDR1}	$V_{CC}=3.0V$ $\overline{CE} \cong 2.8V$	0 to 70°C	—	—	50	—	—	15	μA
			0 to 40°C	—	—	15	—	—	3	
			25°C	—	1	—	—	0.5	—	
	I_{CCDR2}	$V_{CC}=2.0$ to $5.5V$ $\overline{CE} \cong V_{CC}-0.2V$	—	2	100	—	2	50	μA	
Data retention setup time	t_{CDRS}	Chip disable to data retention mode	0	—	—	0	—	—	ns	
Recovery time	t_R		5	—	—	5	—	—	ms	

Data retention waveform



Package Outline Unit : mm

CXK584000TM 32pin TSOP (Plastic) 400mil

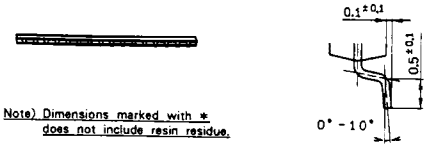
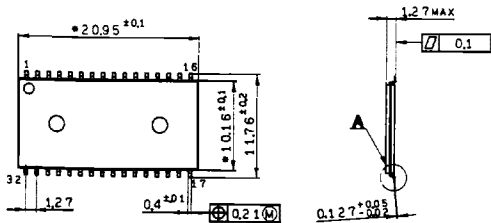


Note) Dimensions marked with * does not include resin residue.

Detailed diagram of A.

SONY NAME	TSOP(I)-32P-L01
EIAJ NAME	TSOP(I)032-P-0400-A
JEDEC CODE	

CXK584000YM 32pin TSOP (Plastic) 400mil



Note) Dimensions marked with * does not include resin residue.

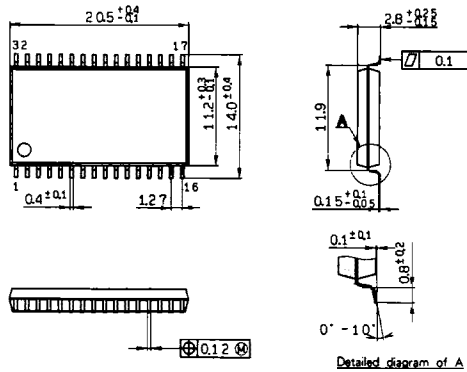
Detailed diagram of A.

SONY NAME	TSOP(I)-32P-L01R
EIAJ NAME	TSOP(I)032-P-0400-B
JEDEC CODE	

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CXK584000M

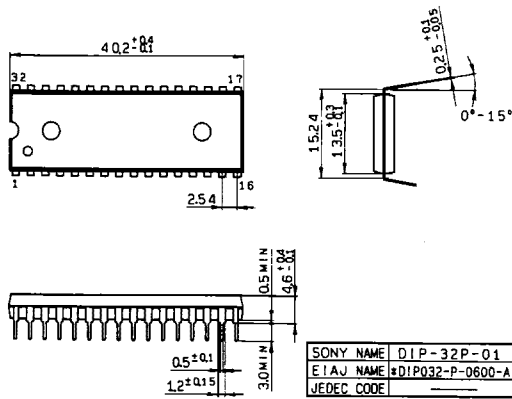
32pin SOP (Plastic) 525mil



SONY NAME	SOP-32P-LQ2
EIAJ NAME	#SOP032-P-0525-A
JEDEC CODE	

CXK584000P

32pin DIP (Plastic) 600mil 4.5g



SONY NAME	DIP-32P-01
EIAJ NAME	#DIP032-P-0600-A
JEDEC CODE	