

65536-word × 16-bit High Speed Bi-CMOS Static RAM

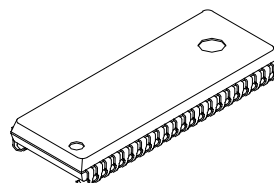
Description

CXK5B16120J/TM is a high speed 1M bit Bi-CMOS static RAM organized as 65536 words by 16 bits. Operating on a single 3.3V supply this asynchronous IC is suitable for use in high speed and low power applications.

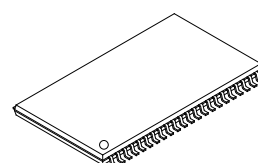
Features

- Single 3.3V Supply 3.3V±0.3V
- Fast access time 12ns (Max.)
- Low stand-by current: 10mA (Max.)
- Low power operation 972mW (Max.)
- Package line-up
 - Dual Vcc/Vss
 - CXK5B16120J 400mil 44pin SOJ Package
 - CXK5B16120TM 400mil 44pin TSOP Package

CXK5B16120J
44 pin SOJ (Plastic)



CXK5B16120TM
44 pin TSOP (Plastic)



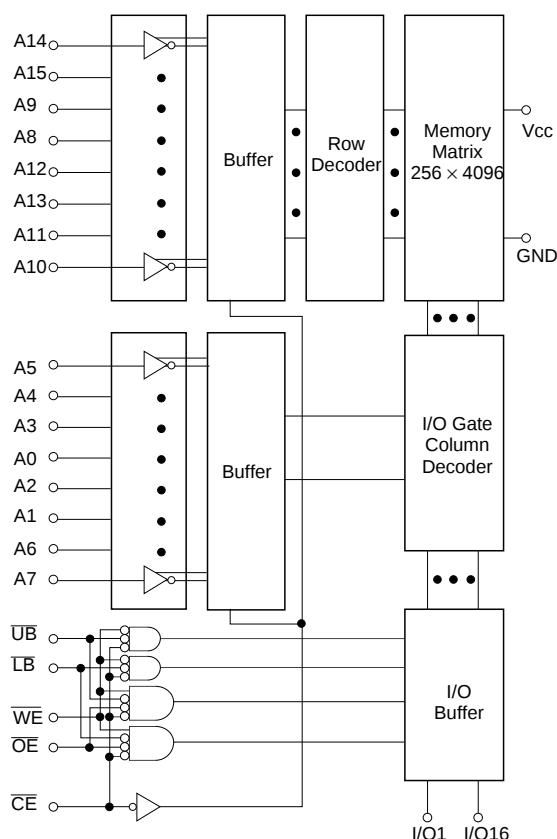
Function

65536-word × 16-bit static RAM

Structure

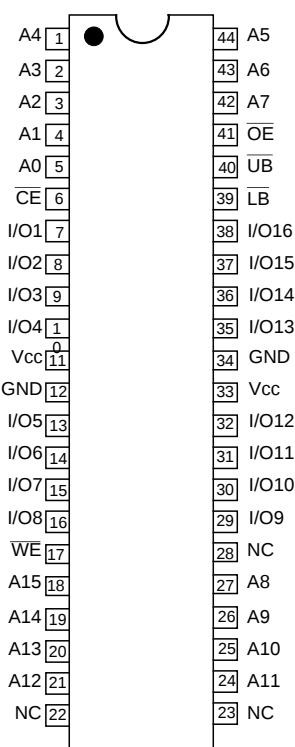
Silicon gate Bi-CMOS IC

Block Diagram



Pin configuration

(Top View)



Pin Description

Symbol	Description
A0 to A15	Address input
I/O1 to I/O8	Data input output (lower byte I/O)
I/O9 to I/O16	Data input output (upper byte I/O)
CE	Chip enable input
WE	Write enable input
OE	Output enable input
LB	Lower byte select input
UB	Upper byte select input
Vcc	+3.3V Power supply
GND	Ground
NC	No connection

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Absolute Maximum Ratings

(Ta = 25°C, GND = 0V)

Item	Symbol	Rating	Unit
Supply voltage	V _{CC}	−0.5 ^{*1} to +4.6	V
Input voltage	V _{IN}	−0.5 ^{*1} to V _{CC} + 0.5	V
Input and output voltage	V _{I/O}	−0.5 ^{*1} to V _{CC} + 0.5	V
Allowable power dissipation	P _D	1.5 ^{*2}	W
Operating temperature	T _{opr}	0 to +70	°C
Storage temperature	T _{stg}	−55 to +150	°C
Soldering temperature • time	T _{solder}	J	260 • 10
		TM	235 • 10

*1 V_{CC}, V_{IN}, V_{I/O} = −2.0V Min. for pulse width less than 5ns

*2 Air Flow ≥ 1m/s

Truth Table

CE	OE	WE	LB	UB	Mode	I/O1 to I/O8	I/O9 to I/O16	Current
H	×	×	×	×	Not selected	High Z	High Z	I _{SB1} , I _{SB2}
L	L	H	L	L	Read	Data Out	Data out	I _{CC}
			L	H	Read	Data Out	High Z	I _{CC}
			H	L	Read	High Z	Data out	I _{CC}
			H	H	Not selected	High Z	High Z	I _{CC}
L	×	L	L	L	Write	Data in	Data in	I _{CC}
			L	H	Write	Data in	High Z	I _{CC}
			H	L	Write	High Z	Data in	I _{CC}
L	H	H	×	×	Output disable	High Z	High Z	I _{CC}
L	×	×	H	H	Not selected	High Z	High Z	I _{CC}

~: "H" or "L"

Recommended Operating Conditions

(Ta = 0 to +70°C, GND = 0V)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{CC}	3.0	3.3	3.6	V
Input high voltage	V _{IH}	2.0	—	V _{CC} + 0.3	V
Input low voltage	V _{IL}	−0.3 [*]	—	0.8	V

* V_{IL} = −2.0V Min. for pulse width less than 5ns

Electrical Characteristics

DC Characteristics

(V_{CC} = 3.3V±0.3V, GND = 0V, T_a = 0 to +70°C)

Item	Symbol	Conditions	Min.	Typ.*	Max.	Unit
Input leakage current	I _{LI}	V _{IN} = GND to V _{CC}	-10	—	+10	μA
Output leakage current	I _{LO}	$\overline{CE} = V_{IH}$ or $\overline{OE} = V_{IH}$ or $\overline{WE} = V_{IL}$ or $\overline{UB} = V_{IH}$ or $\overline{LB} = V_{IH}$ V _{I/O} = GND to V _{CC}	-10	—	+10	μA
Average operating current	I _{CC}	Min. Cycle Duty = 100% I _{OUT} = 0mA, $\overline{CE} = V_{IL}$, V _{IN} = V _{IH} or V _{IL}	—	—	270	mA
Standby current	I _{SB1}	$\overline{CE} \geq V_{CC} - 0.2V$ V _{IN} ≥ V _{CC} - 0.2V or V _{IN} ≤ 0.2V	—	—	10	mA
	I _{SB2}	Min. Cycle Duty = 100% $\overline{CE} = V_{IH}$, V _{IN} = V _{IH} or V _{IL}	—	—	100	mA
Output high voltage	V _{OH}	I _{OH} = -2.0mA	2.4	—	—	V
Output low voltage	V _{OL}	I _{OL} = 2.0mA	—	—	0.4	V

* V_{CC} = 3.3V, T_a = 25°C

I/O Capacitance

(T_a = 25°C, f = 1MHz)

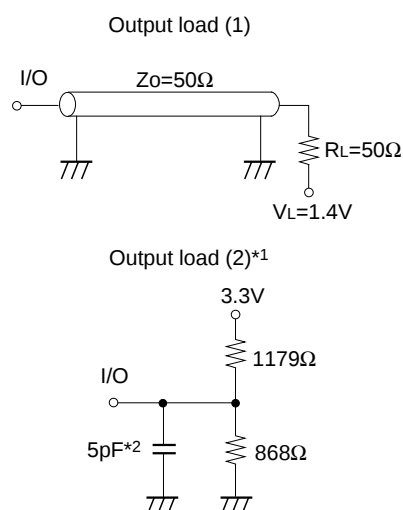
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input capacitance	C _{IN}	V _{IN} = 0V	—	—	5	pF
I/O capacitance	C _{I/O}	V _{I/O} = 0V	—	—	7	pF

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

AC Characteristics

• AC test condition (V_{CC} = 3.3V±0.3V, T_a = 0 to +70°C)

Item	Condition
Input pulse high level	V _{IH} = 3.0V
Input pulse low level	V _{IL} = 0.0V
Input rise time	t _r = 2ns
Input fall time	t _f = 2ns
Input and output reference level	1.4V
Output load conditions	Fig. 1

*1. For t_{lZ}, t_{oLZ}, t_{lBLZ}, t_{uBLZ}, t_{hZ}, t_{oHZ}, t_{lBHZ}, t_{uBHZ}, t_{ow}, t_{whZ}

*2. Including scope and jig capacitances.

Fig. 1

• Read cycle

Item	Symbol	-12		Unit
		Min.	Max.	
Read cycle time	t_{RC}	12	—	ns
Address access time	t_{AA}	—	12	ns
Chip enable access time	t_{CO}	—	12	ns
Output enable to output valid	t_{OE}	—	6	ns
Byte select to output valid	t_{LB}, t_{UB}	—	6	ns
Output data hold time	t_{OH}	3	—	ns
Chip enable to output in low Z ($\overline{CE}$)	t_{LZ}^*	3	—	ns
Output enable to output in low Z ($\overline{OE}$)	t_{OLZ}^*	0	—	ns
Byte select to output in low Z ($\overline{LB}, \overline{UB}$)	t_{LBLZ}, t_{UBLZ}^*	0	—	ns
Chip disable to output in high Z ($\overline{CE}$)	t_{HZ}^*	0	6	ns
Output disable to output in high Z ($\overline{OE}$)	t_{OHZ}^*	0	6	ns
Byte select to output in high Z ($\overline{LB}, \overline{UB}$)	t_{LBHZ}, t_{UBHZ}^*	0	6	ns

* Transition is measured $\pm 200\text{mV}$ from steady voltage with specified loading in Fig. 1-(2).

This parameter is sampled and is not 100% tested.

• Write cycle

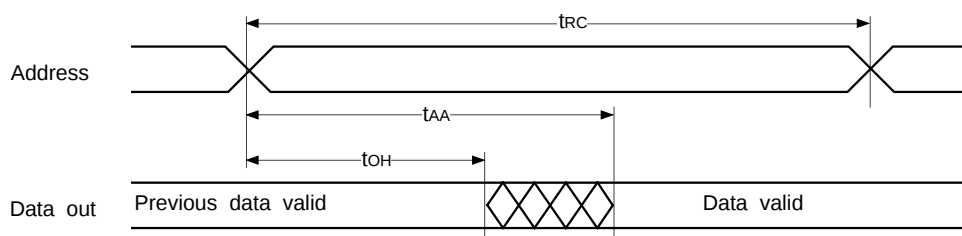
Item	Symbol	-12		Unit
		Min.	Max.	
Write cycle time	t_{WC}	12	—	ns
Address valid to end of write	t_{AW}	10	—	ns
Chip enable to end of write	t_{CW}	10	—	ns
Byte select to end of write	t_{LBW}, t_{UBW}	10	—	ns
Data valid to end to write	t_{DW}	8	—	ns
Data hold from end of write	t_{DH}	0	—	ns
Write pulse width	t_{WP}	10	—	ns
Address set up time	t_{AS}	0	—	ns
Write recovery time	t_{WR}	0	—	ns
Output active from end of write	t_{OW}^*	4	—	ns
Write to output in high Z	t_{WHZ}^*	0	6	ns

* Transition is measured $\pm 200\text{mV}$ from steady voltage with specified loading in Fig. 1-(2).

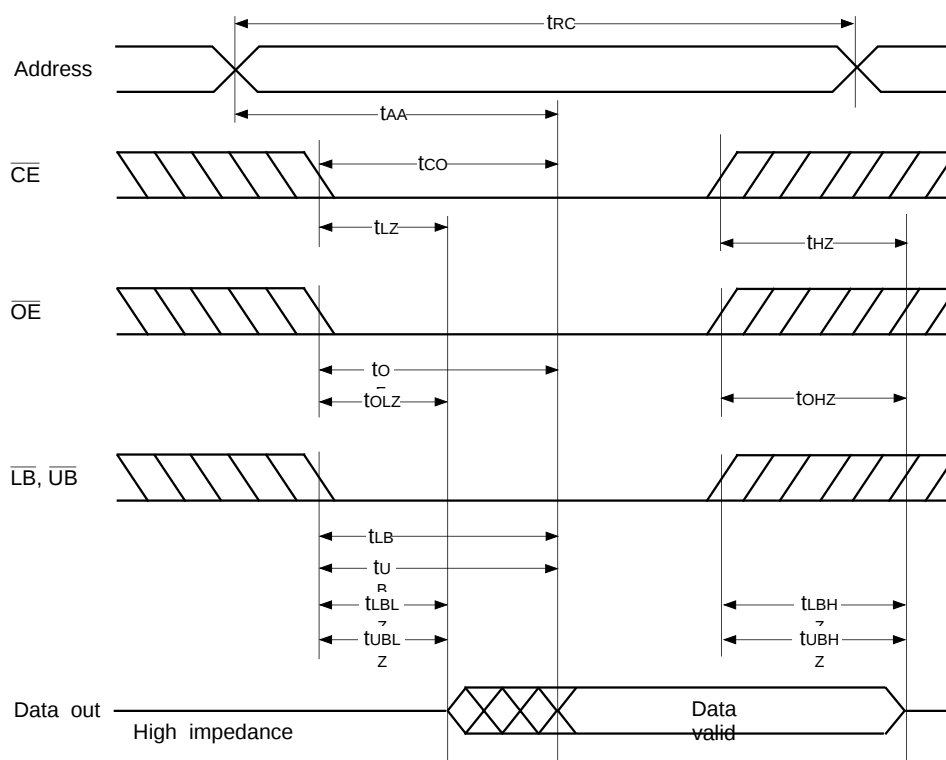
This parameter is sampled and is not 100% tested.

Timing Waveform

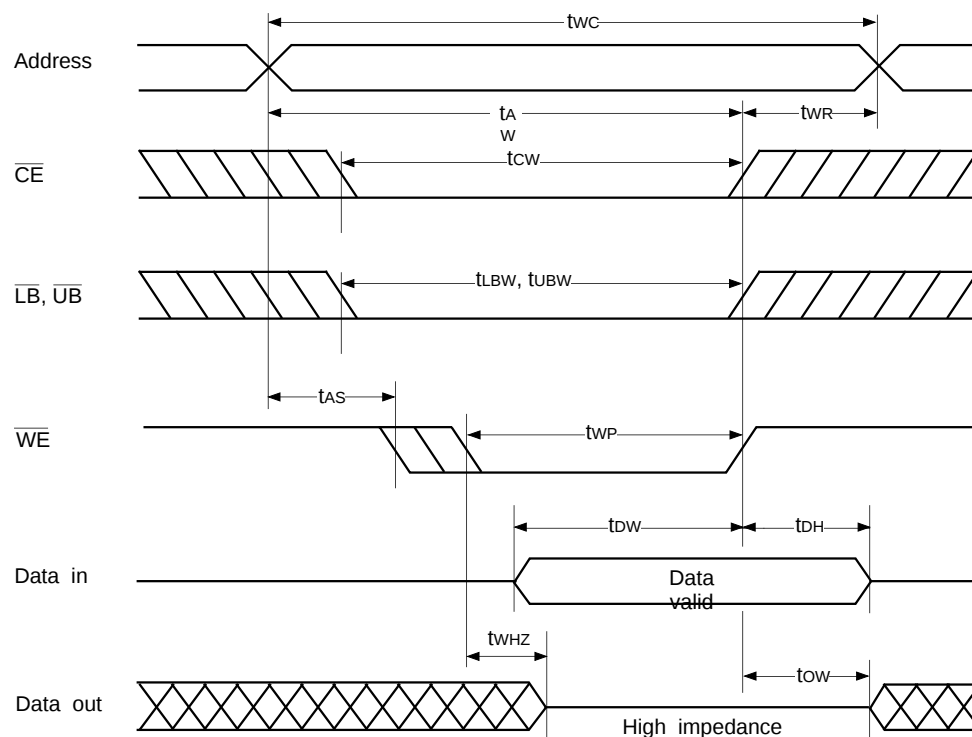
- Read cycle (1) : $\overline{CE} = \overline{OE} = V_{IL}$, $\overline{WE} = V_{IH}$



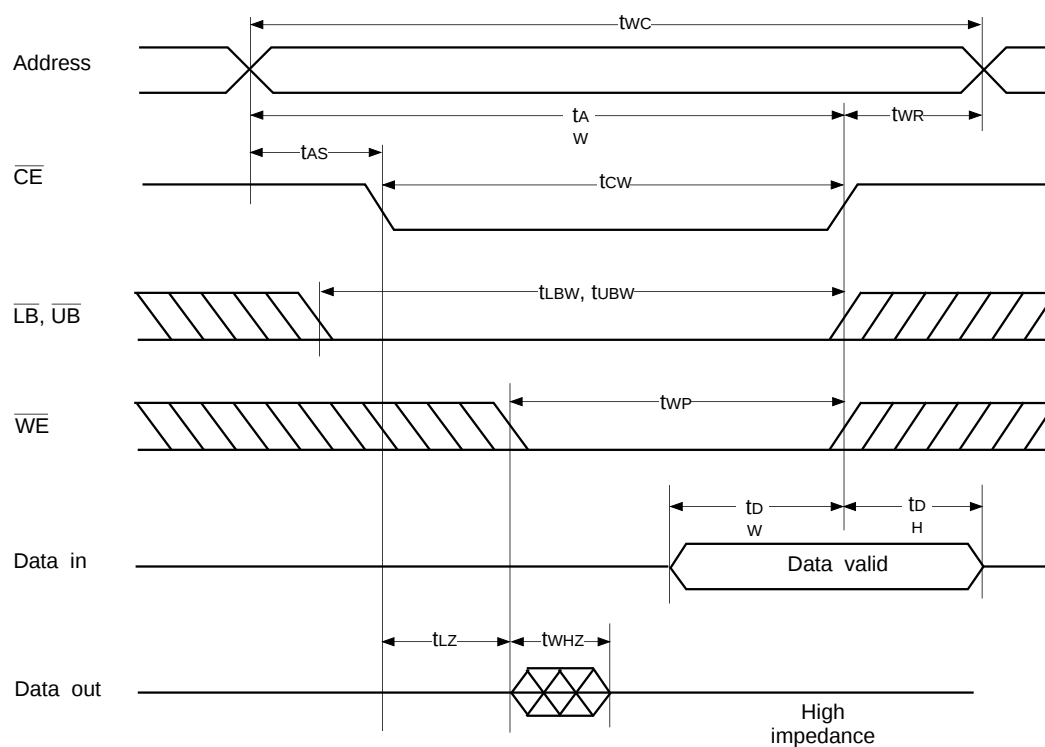
- Read cycle (2) : $\overline{WE} = V_{IH}$



• Write cycle (1) : $\overline{\text{WE}}$ control

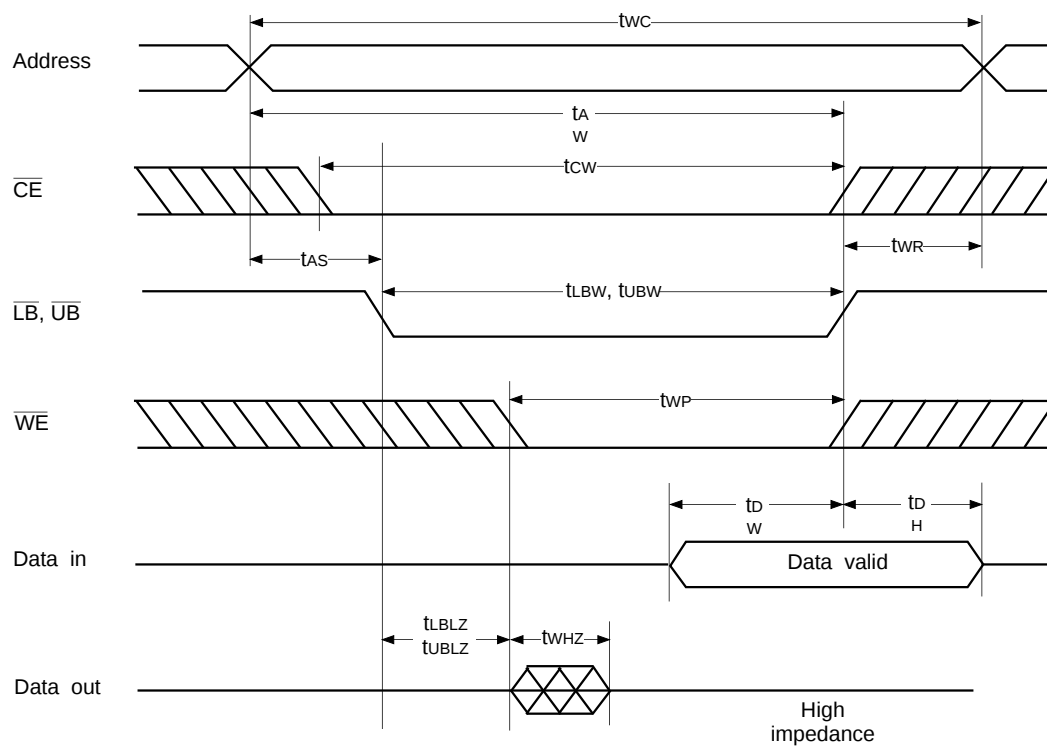


• Write cycle (2) : $\overline{\text{CE}}$ control



* Do not apply the data input voltage of the opposite phase to the output while I/O pin is in output condition.

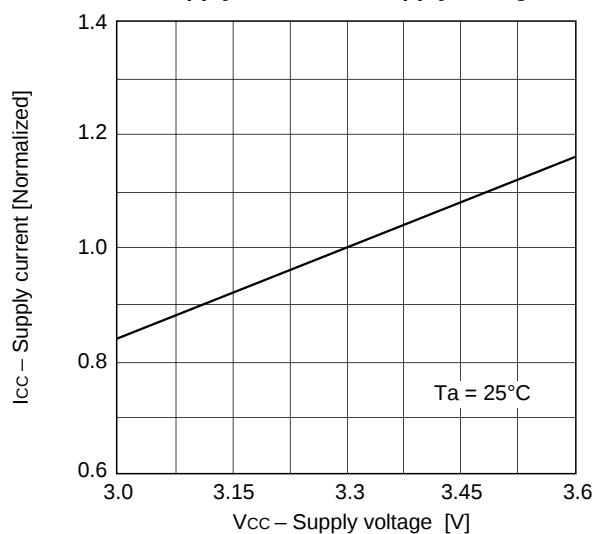
• Write cycle (3) : LB, UB control



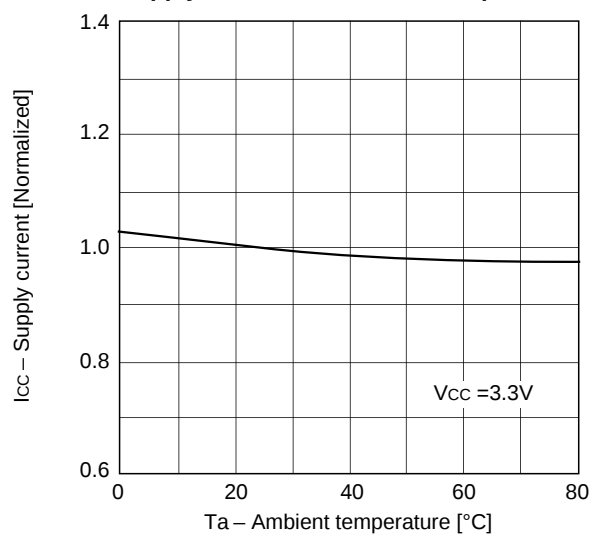
* Do not apply the data input voltage of the opposite phase to the output while I/O pin is in output condition.

Example of Representative Characteristics

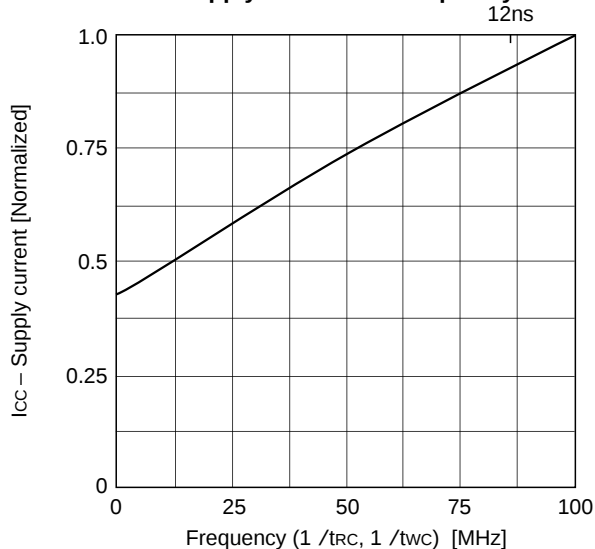
Supply current vs. Supply voltage



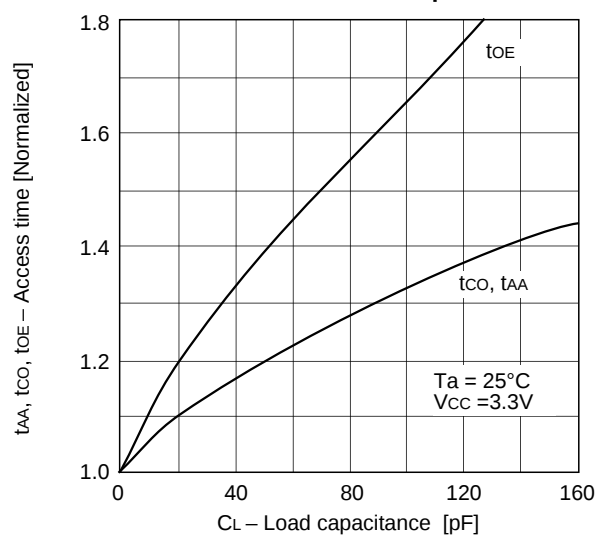
Supply current vs. Ambient temperature



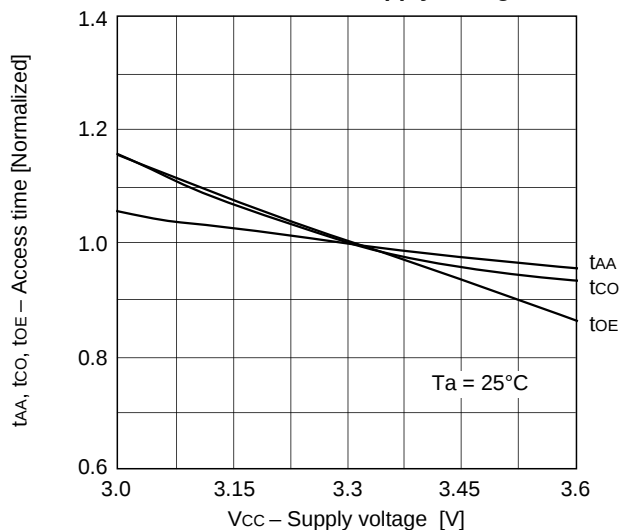
Supply current vs. Frequency



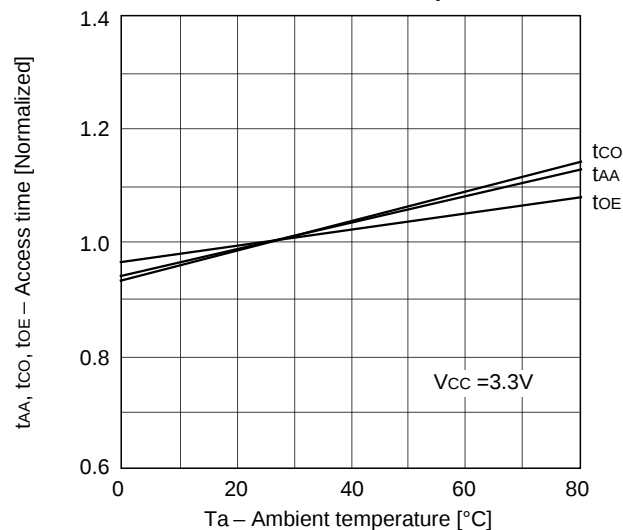
Access time vs. Load capacitance

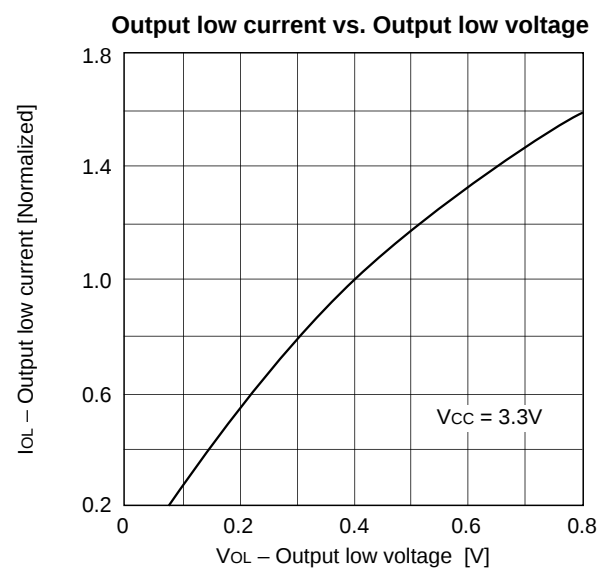
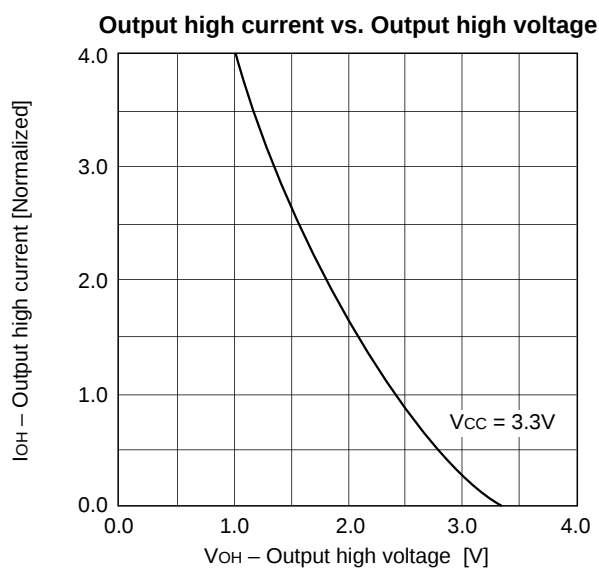
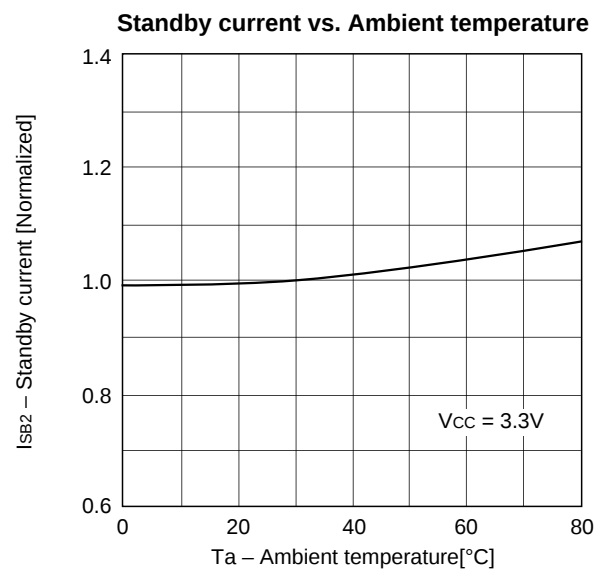
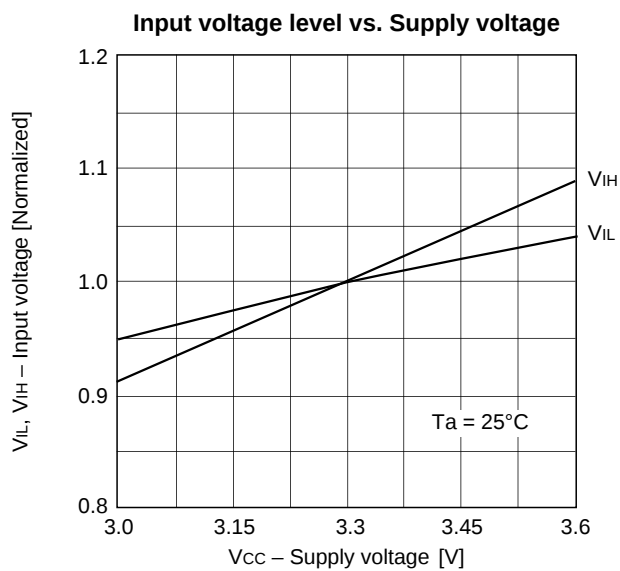
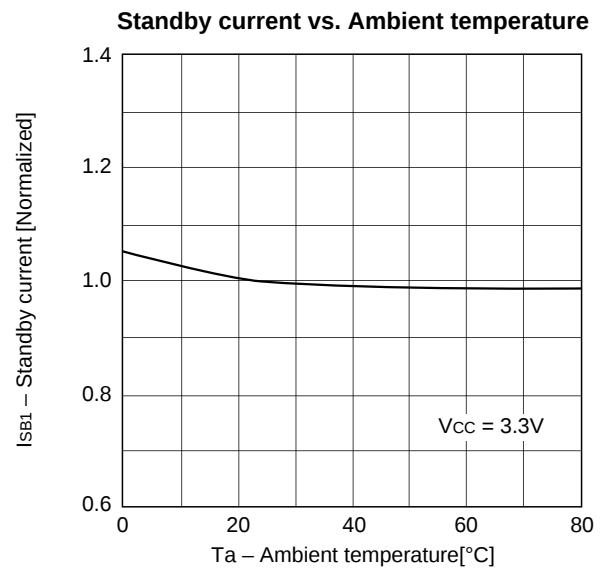
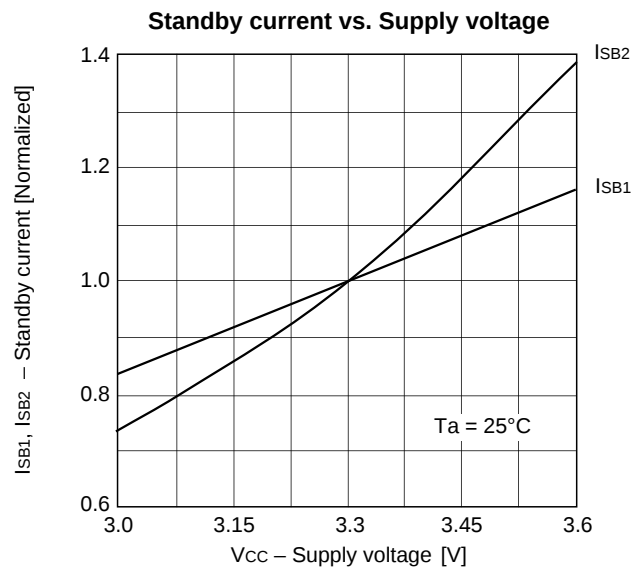


Access time vs. Supply voltage



Access time vs. Load capacitance

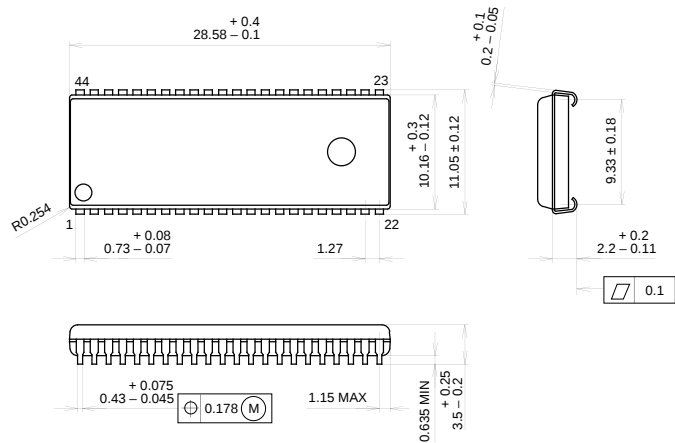




Package Outline Unit: mm

CXK5B16120J

44PIN SOJ (PLASTIC) 400mil

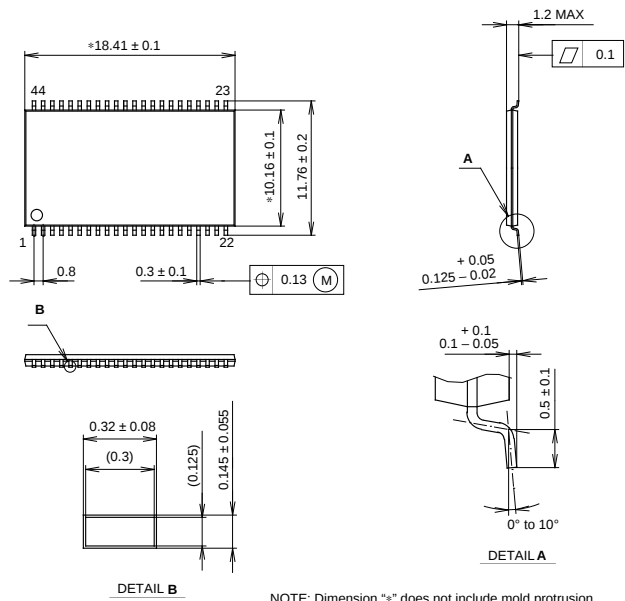


PACKAGE STRUCTURE

SONY CODE	SOJ-44P-01	PACKAGE MATERIAL	EPOXY RESIN
EIAJ CODE	*SOJ044-P-0400-A	LEAD TREATMENT	SOLDER PLATING
JEDEC CODE		LEAD MATERIAL	COPPER ALLOY
		PACKAGE WEIGHT	1.9g

CXK5B16120TM

44PIN TSOP (II) (PLASTIC) 400mil



NOTE: Dimension "s" does not include mold protrusion.

PACKAGE STRUCTURE

SONY CODE	TSOP (II) -44P-L01	MOLDING COMPOUND	EPOXY / PHENOL RESIN
EIAJ CODE	TSOP (II) 044-P-0400-A	LEAD TREATMENT	SOLDER PLATING
JEDEC CODE		LEAD MATERIAL	42 ALLOY
		PACKAGE WEIGHT	0.5g