65,536-word x 18-bit High-Speed Bi-CMOS Static RAM

Description

CXK5B18120J/TM are high speed 1Mbit Bi-CMOS static RAMs organized as 65,536-words-by-18-bits. Operating on a single 3.3V supply these asynchronous ICs are 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: 1116mW (max.)
- Package line-up

  Dual Vcc/Vss

  CXK5B18120J 400mil, 44-pin SOJ pkg.

  CXK5B18120TM 400mil, 44-pin TSOP pkg.

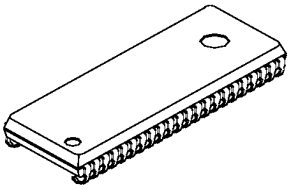
Function

65536-word x 18-bit static RAM

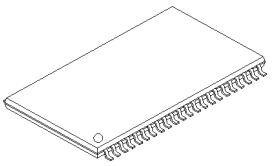
Structure

Silicon gate Bi-CMOS IC

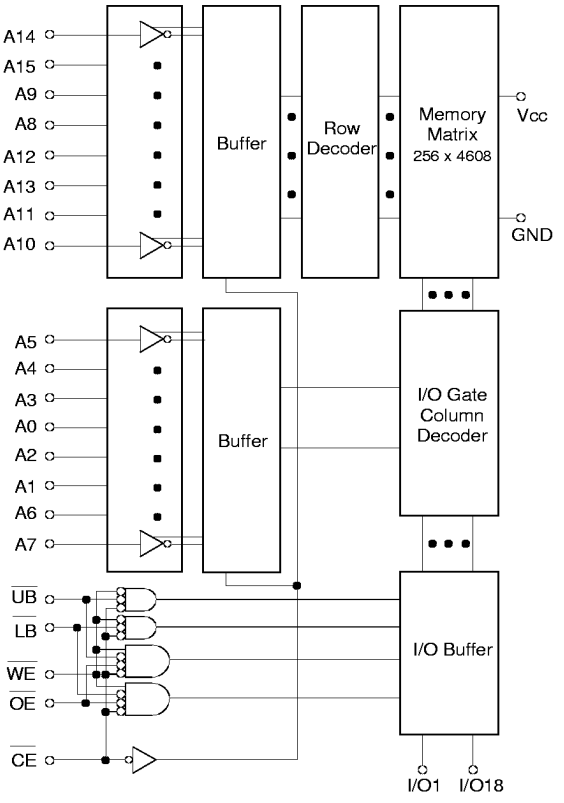
CXK5B18120J
44-pin SOJ (Plastic)



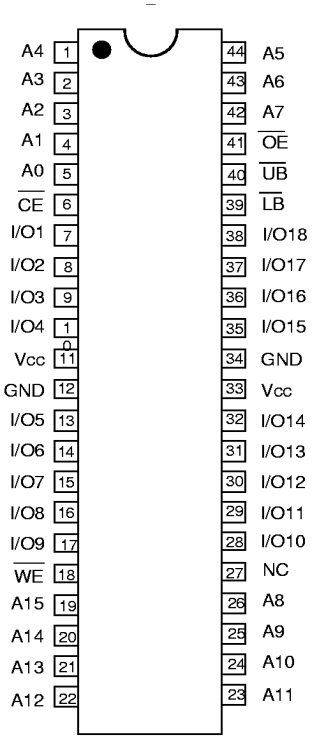
CXK5B18120TM
44-pin TSOP (Plastic)



Block Diagram



Pin Configuration (Top View)



Pin Description

Symbol	Description
A0 to A15	Address input
I/O1 to I/O9	Data input output (lower byte I/O)
I/O10 to I/O18	Data input output (upper byte I/O)
$\overline{CE}$	Chip enable input
$\overline{WE}$	Write enable input
$\overline{OE}$	Output enable input
$\overline{LB}$	Lower byte select input
$\overline{UB}$	Upper byte select input
Vcc	+3.3V power supply
GND	Ground
NC	No connection

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 VCC + 0.5	V
Input and output voltage	$V_{I/O}$		–0.5[1] to VCC + 0.5	V
Allowable power dissipation	P_D		1.5[2]	W
Operating temperature	Topr		0 to +70	°C
Storage temperature	Tstg		–55 to +150	°C
Soldering temperature · time	Tsolder	J	260 • 10	°C • sec
		TM	235 • 10	

NOTES:
1. Vcc, V_{IN}, $V_{I/O}$ = –2.0V min. for pulse width less than 5ns.
2. Air Flow ≥ 1m/s.

Truth Table

$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	$\overline{LB}$	$\overline{UB}$	Mode	I/O1 to I/O9	I/O10 to I/O18	Current
H	X	X	X	X	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	X	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	X	X	Output disable	High Z	High Z	I_{CC}
L	X	X	H	H	Not selected	High Z	High Z	I_{CC}

X: "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[1]	—	0.8	V

NOTE:
1. V_{IL} = –2.0V min. for pulse width less than 5ns.

Electrical Characteristics

DC Characteristics (Vcc = 3.3V ± 0.3V, GND = 0V, Ta = 0 to +70°C)

Item	Symbol	Conditions	Min.	Typ.(1)	Max.	Unit
Input leakage current	I_{LI}	V_{IN} = GND to Vcc	–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 Vcc	–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}	—	—	310	mA
Standby current	I_{SB1}	$\overline{CE}$ ≥ Vcc – 0.2V V_{IN} ≥ Vcc – 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

NOTE:
1. Vcc = 3.3V, Ta = +25°C.

I/O Capacitance (Ta = +25°C, f = 1MHz)

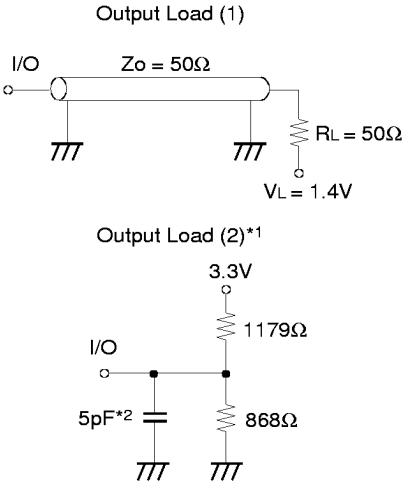
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input capacitance	C_{IN}	V_{IN} = 0V	—	—	5	pF
I/O capacitance	$C_{I/O}$	$V_{I/O}$ = 0V	—	—	7	pF

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

AC Characteristics

• **AC Test Condition** (Vcc = 3.3V±0.3V, Ta = 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	tr = 2ns
Input fall time	tf = 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	Min.	Max.	Unit
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}(1)	3	—	ns
Output enable to output in low Z ($\overline{OE}$)	t_{OLZ}(1)	0	—	ns
Byte select to output in low Z ($\overline{LB}$, $\overline{UB}$)	t_{LBLZ}, t_{UBLZ}(1)	0	—	ns
Chip disable to output in high Z ($\overline{CE}$)	t_{HZ}(1)	0	6	ns
Output disable to output in high Z ($\overline{OE}$)	t_{OHZ}(1)	0	6	ns
Byte select to output in high Z ($\overline{LB}$, $\overline{UB}$)	t_{LBHZ}, t_{UBHZ}(1)	0	6	ns

NOTE:
1. Transition is measured ±200mV from steady voltage with specified loading in Fig. 1-(2). This parameter is sampled and is not 100% tested.

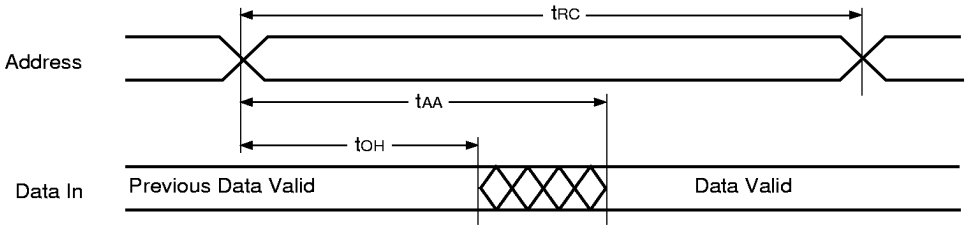
• **Write Cycle**

Item	Symbol	Min.	Max.	Unit
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}(1)	4	—	ns
Write to output in high Z	t_{WHZ}(1)	0	6	ns

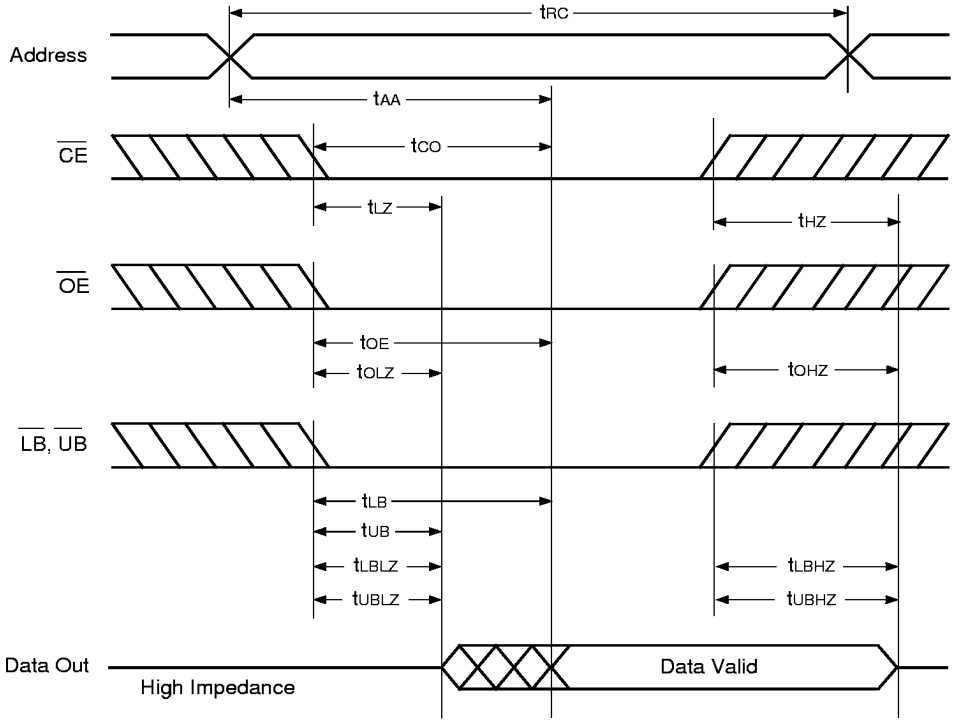
NOTE:
1. Transition is measured ±200mV from steady voltage with specified loading in Fig. 1-(2). This parameter is sampled and is not 100% tested.

Timing Waveform

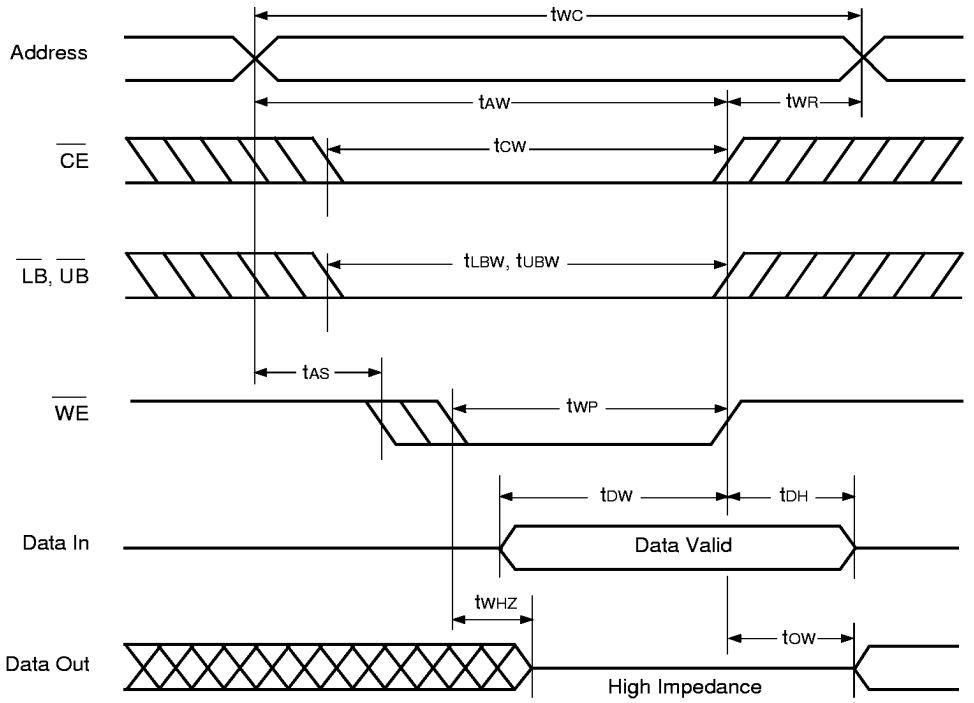
• Read Cycle (1) : $\overline{CE}$ = $\overline{OE}$ = V_{IL}, $\overline{WE}$ = V_{IH}



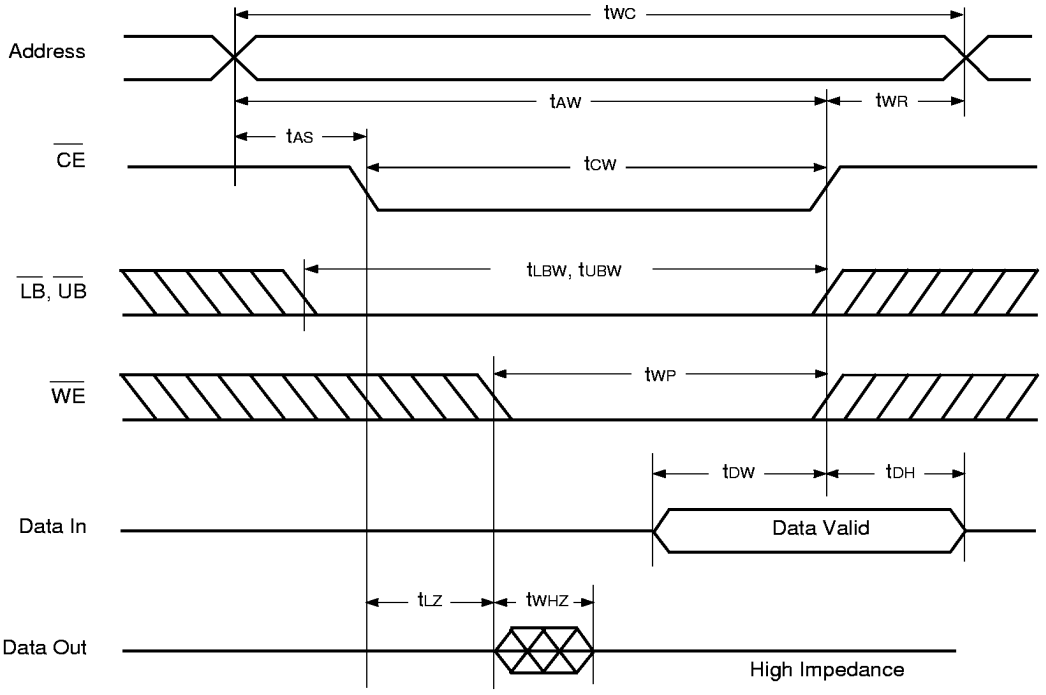
• Read Cycle (2) : $\overline{WE}$ = V_{IH}



• Write Cycle (1) : $\overline{WE}$ Control

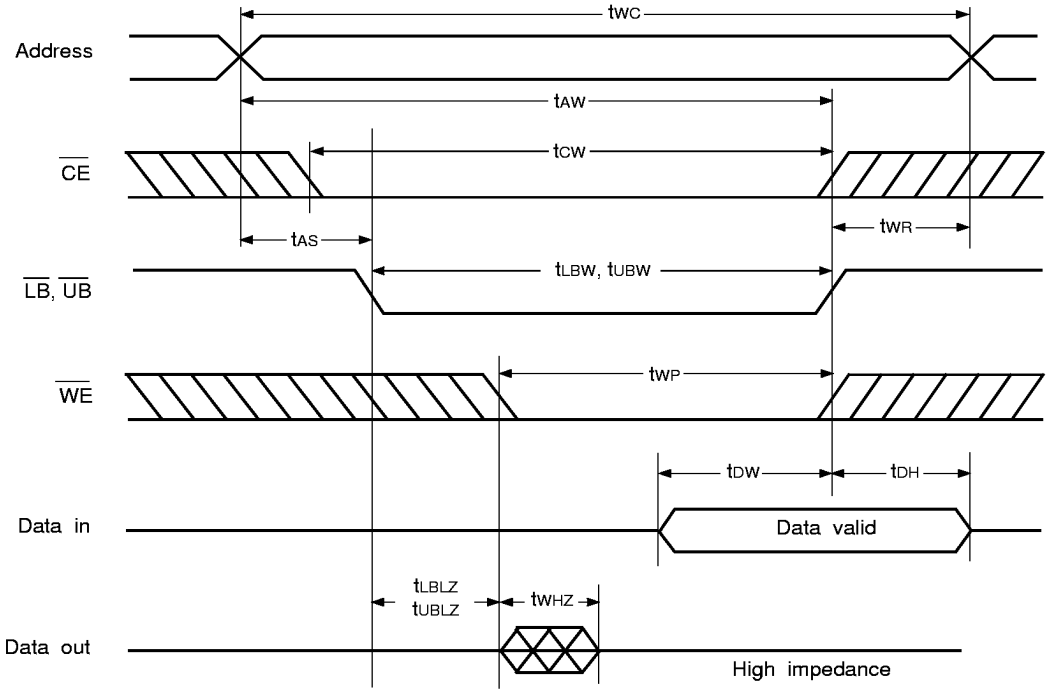


• Write Cycle (2) : $\overline{CE}$ Control



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

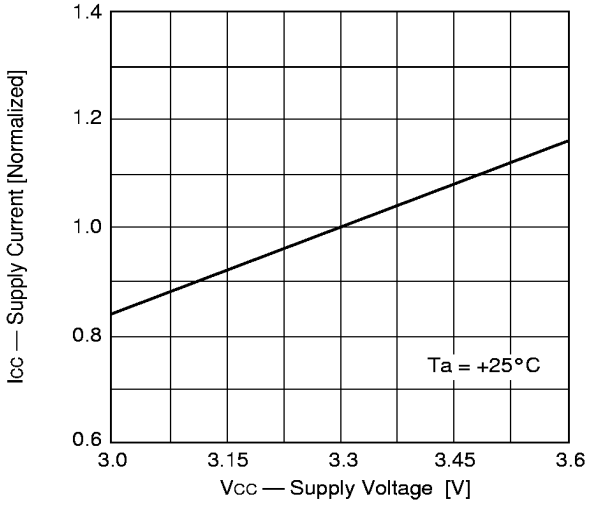
• Write Cycle (3) : $\overline{LB}$, $\overline{UB}$ Control



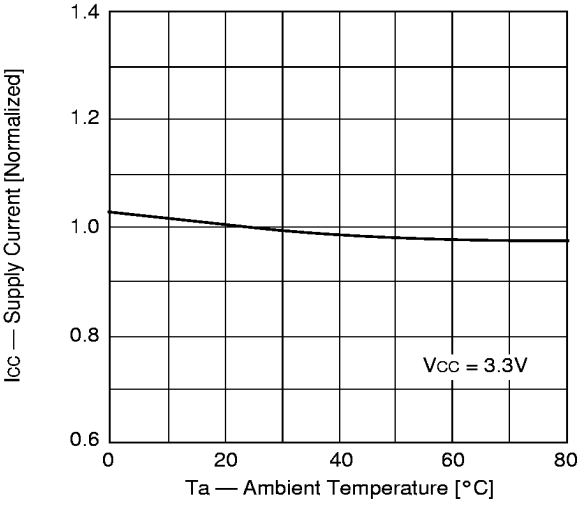
* Do not apply the data input voltage of the opposite phase to the output while I/O pin is in output condition.

Example of Representative Characteristics

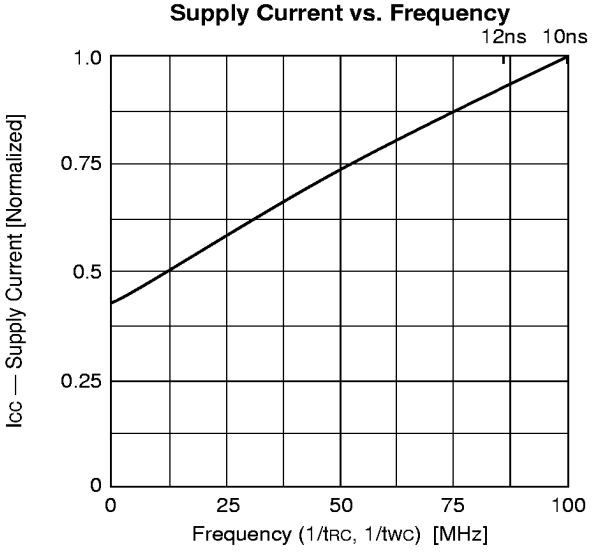
Supply Current vs. Supply Voltage



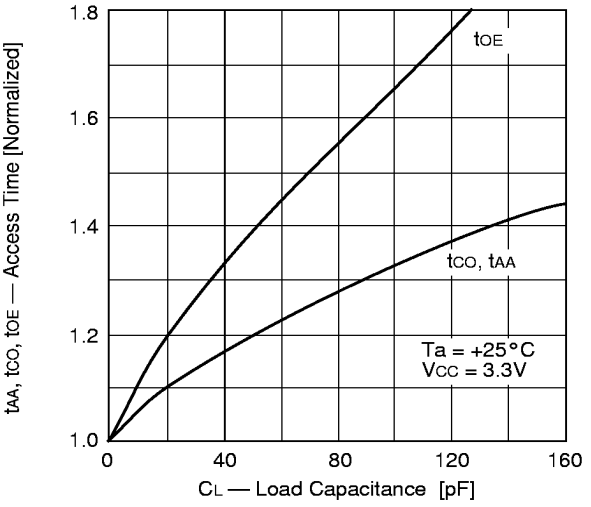
Supply Current vs. Ambient Temperature



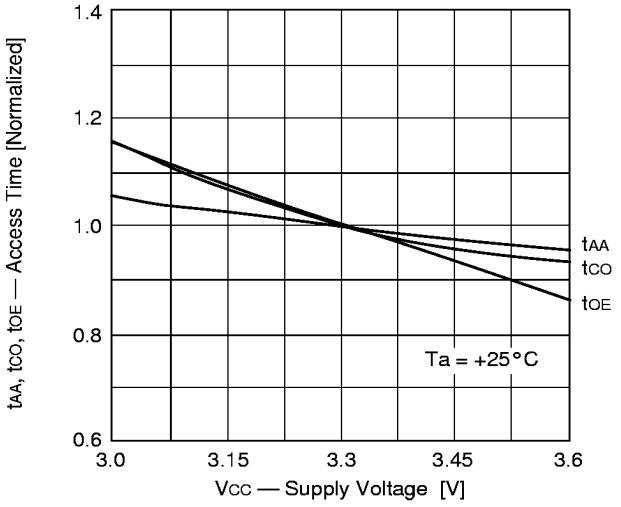
Supply Current vs. Frequency



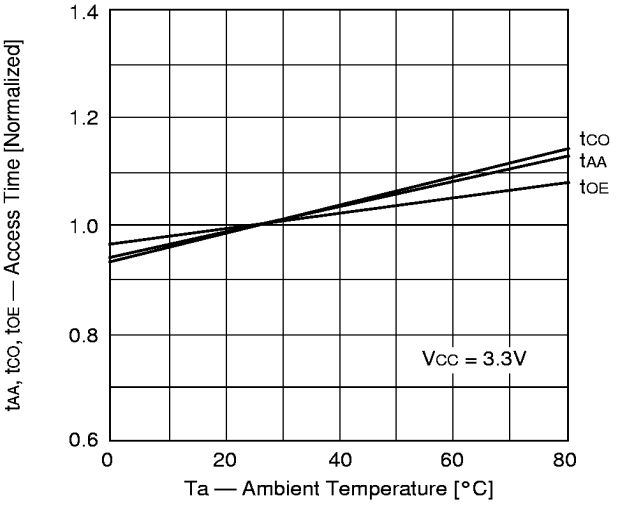
Access Time vs. Load Capacitance



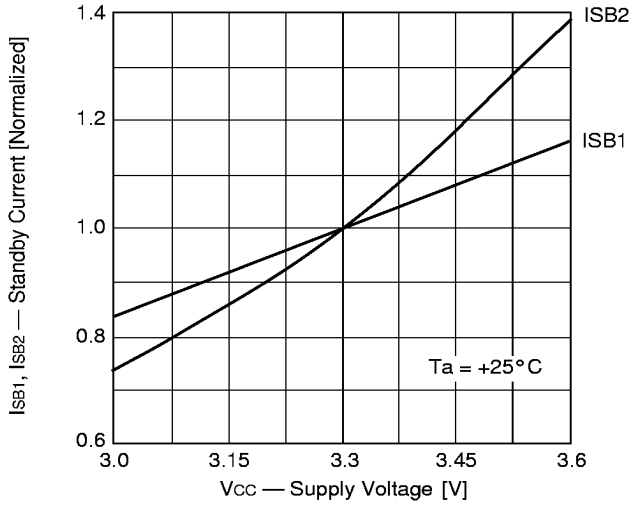
Access Time vs. Supply Voltage



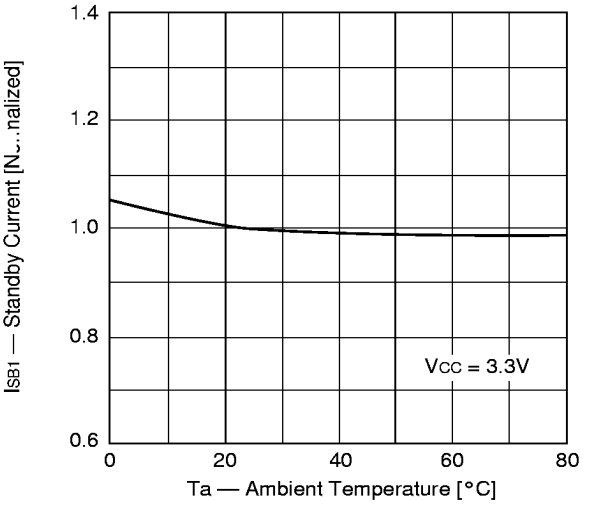
Access time vs. Load capacitance



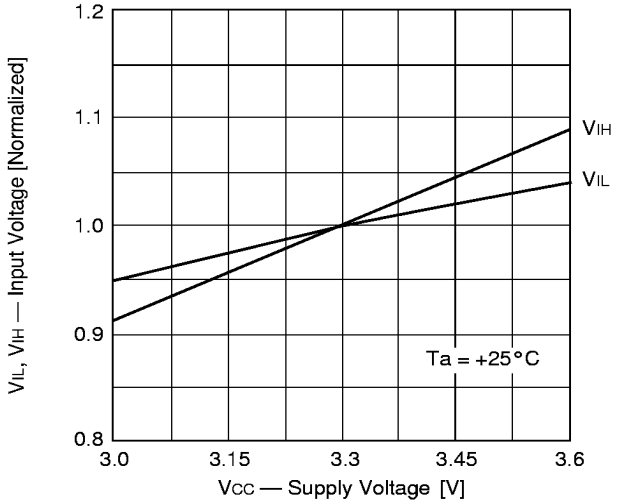
Standby Current vs. Supply Voltage



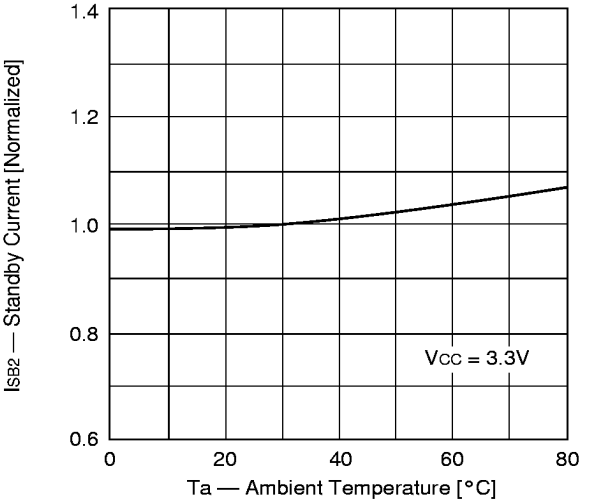
Standby Current vs. Ambient Temperature



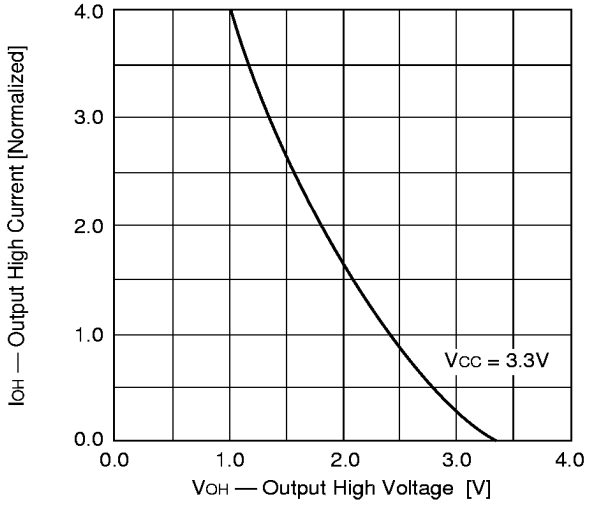
Input Voltage Level vs. Supply Voltage



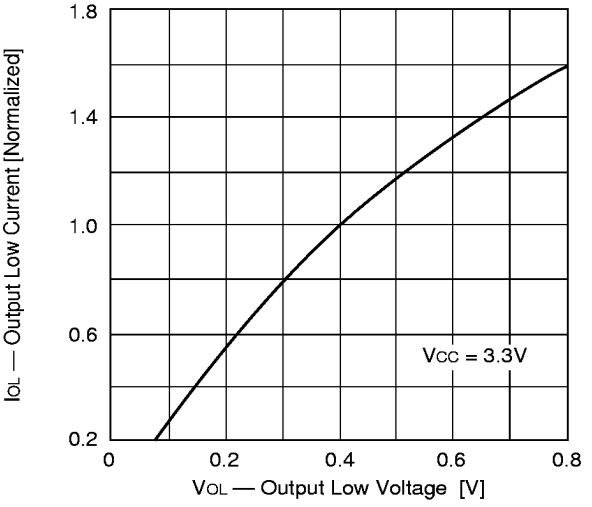
Standby Current vs. Ambient Temperature



Output High Current vs. Output High Voltage

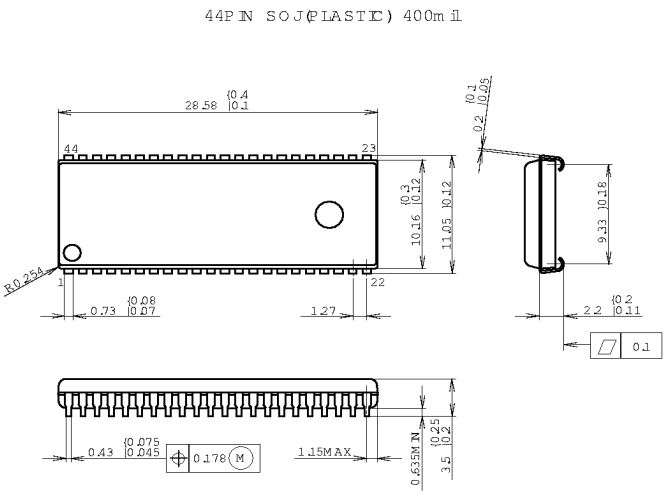


Output Low Current vs. Output Low Voltage



Package Outline Unit : mm

CXK5B18120J

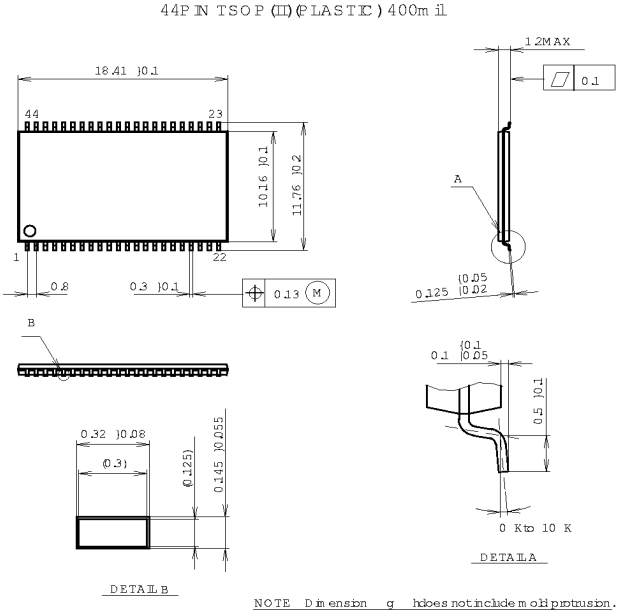


PACKAGE STRUCTURE

SONY CODE	SOJ-44P-01
EIAJ CODE	*SOJ044-P-0400-A
JEDEC CODE	————

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE WEIGHT	1.9g

CXK5B18120TM



NOTE Dimension g does not include mold protrusion.

PACKAGE STRUCTURE

SONY CODE	TSOP(II)-44P-L01
EIAJ CODE	TSOP(II)044-P-0400-A
JEDEC CODE	————

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42 ALLOY
PACKAGE WEIGHT	0.5g