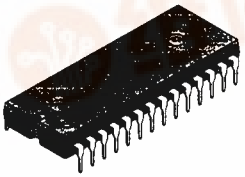
SONY CXK5864BP/BSP/BM -70L/10L/12L/ -70LL/10LL/12LL

8,192-word × 8-bit High Speed CMOS Static RAM *Maintenance Only*

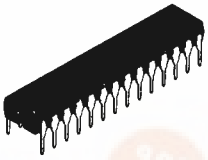
Description

CXK5864BP／BSP／BM are 65,536 bits high speed CMOS static RAMs organized as 8,192 words by 8 bits and operates from a single 5V supply. These IC are suitable for use in high speed and low power applications in which battery back up for nonvolatility is required.

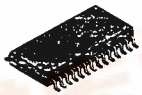
CXK5864BP
28 pin DIP (Plastic)



CXK5864BSP
28 pin DIP (Plastic)



CXK5864BM
28 pin SOP (Plastic)



Features

- Fast access time (Access time)
  CXK5864BP/BSP/BM-70L, 70LL 70ns(Max.)
  CXK5864BP/BSP/BM-10L, 10LL 100ns(Max.)
  CXK5864BP/BSP/BM-12L, 12LL 120ns(Max.)
- Low power operation :
  CXK5864BP/BSP/BM-70LL, 10LL, 12LL ;
  Standby/Operation : 5 µW (Typ.) /40mW (Typ.)
  CXK5864BP/BSP/BM-70L, 10L, 12L ;
  Standby/Operation : 10 µW (Typ.) /40mW (Typ.)
- Single power supply 5V : +5V ± 10%
- Fully static memory ··· No clock or timing strobe required
- Equal access and cycle time
- Common data input and output : three state output
- Directly TTL compatible : All inputs and outputs
- Low voltage data retention : 2.0V (Min.)
- Available in 28 pin 600mil DIP, 300mil DIP and 450mil SOP

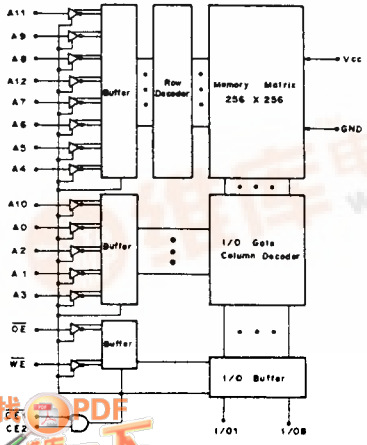
Function

8,192-word × 8-bit static RAM

Structure

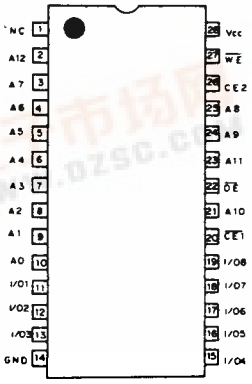
Silicon gate CMOS IC

Block Diagram



Pin Configuration

(Top View)



Pin Description

Symbol	Description
A0 to A12	Address input
I/O1 to I/O8	Data input output
$\overline{CE1}$, CE2	Chip enable 1, 2 input
$\overline{WE}$	Write enable input
$\overline{OE}$	Output enable input
Vcc	+5V 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 to + 7.0	V
Input voltage	V_{IN}		− 0.5* to V_{CC} + 0.5	V
Input and output voltage	$V_{I/O}$		− 0.5* to V_{CC} + 0.5	V
Allowable power dissipation	P_D	CXK5864BP/BSP	1.0	W
		CXK5864BM	0.7	
Operating temperature	Topr		0 to + 70	°C
Storage temperature	Tstg		− 55 to + 150	°C
Soldering temperature • time	Tsolder		260 • 10	°C • sec

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

Truth Table

$\overline{CE1}$	CE2	$\overline{OE}$	$\overline{WE}$	Mode	I/O1 to I/O8	V_{CC} Current
H	X	X	X	Not selected	High Z	I_{SB1}, I_{SB2}
X	L	X	X	Not selected	High Z	I_{SB1}, I_{SB2}
L	H	H	H	Output disable	High Z	I_{CC1}, I_{CC2}
L	H	L	H	Read	Data out	I_{CC1}, I_{CC2}
L	H	X	L	Write	Data in	I_{CC1}, I_{CC2}

X : "H" or "L"

DC Recommended Operating Conditions (Ta = 0 to + 70°C, GND = 0V)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Input high voltage	V_{IH}	2.2	—	V_{CC} + 0.3	V
Input low voltage	V_{IL}	− 0.3*	—	0.8	V

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

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Electrical Characteristics

• DC and operating characteristics (V_{CC} = 5V ± 10%, GND = 0V, Ta = 0 to +70°C)

Item	Symbol	Test conditions		−70L/10L/12L −70LL/10LL/12LL			Unit
				Min.	Typ.*	Max.	
Input leak current	I_{LI}	V_{IN} = GND to V_{CC}		−500	—	500	nA
Output leak current	I_{LO}	$V_{I/O}$ = GND to V_{CC} $\overline{CE1}$ = V_{IH} or CE2 = V_{IL} or $\overline{OE}$ = V_{IH} or $\overline{WE}$ = V_{IL}		−500	—	500	nA
Operating supply current	I_{CC1}	$\overline{CE1}$ = V_{IL}, CE2 = V_{IH}, V_{IN} = V_{IH} or V_{IL}, I_{OUT} = 0mA		—	8	15	mA
Average operating current	I_{CC2}	Min. cycle Duty = 100%, I_{OUT} = 0mA		—	30	50	mA
Standby current	I_{SB1}	CE2 ≦ 0.2V or $\begin{cases}\overline{CE1} \geqq V_{CC} - 0.2V \\ CE2 \geqq V_{CC} - 0.2V\end{cases}$	−L	—	2	60	µA
			−LL	—	1	30	
	I_{SB2}	$\overline{CE1}$ = V_{IH} or CE2 = V_{IL}		—	0.1	2	mA
Output high voltage	V_{OH}	I_{OH} = −1.0mA		2.4	—	—	V
Output low voltage	V_{OL}	I_{OL} = 2.1mA		—	—	0.4	V

* V_{CC} = 5V, Ta = 25°C

Pin capacitance (Ta = 25°C, f = 1MHz)

Item	Symbol	Test conditions	Min.	Max.	Unit
Input capacitance	C_{IN}	V_{IN} = 0V	—	7	pF
Input/Output capacitance	$C_{I/O}$	$V_{I/O}$ = 0V	—	7	pF

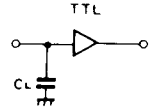
Note) This parameter is sampled and is not 100% tested.

AC characteristics

• AC test conditions (V_{CC} = 5V ± 10%, Ta = 0 to +70°C)

Item		Conditions
Input pulse high level		V_{IH} = 2.2V
Input pulse low level		V_{IL} = 0.8V
Input rise time		tr = 5ns
Input fall time		tf = 5ns
Input and output reference level		1.5V
Output load conditions	10L/10LL/12L/12LL	C_L* = 100pF, 1TTL
	70L/70LL	C_L* = 30pF, 1TTL

* C_L includes scope and jig capacitances.



● **Read cycle**

Item	Symbol	−70L/70LL		−10L/10LL		−12L/12LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Read cycle time	t_{RC}	70	—	100	—	120	—	ns
Address access time	t_{AA}	—	70	—	100	—	120	ns
Chip enable access time ($\overline{CE1}$, CE2)	t_{CO1} t_{CO2}	—	70	—	100	—	120	ns
Output enable to output valid	t_{OE}	—	35	—	50	—	60	ns
Output hold from address change	t_{OH}	10	—	10	—	10	—	ns
Chip enable to output in low Z ($\overline{CE1}$, CE2)	t_{LZ1} t_{LZ2}	10	—	10	—	10	—	ns
Output enable to output in low Z ($\overline{OE}$)	t_{OLZ}	5	—	5	—	5	—	ns
Chip disable to output in high Z ($\overline{CE1}$, CE2)	t_{HZ1}* t_{HZ2}*	0	30	0	35	0	45	ns
Output disable to output in high Z ($\overline{OE}$)	t_{OHZ}*	0	30	0	35	0	45	ns

* t_{HZ1}, t_{HZ2} and t_{OHZ} are defined as the time at which the outputs become the high impedance state and are not referred to output voltage levels.

● **Write cycle**

Item	Symbol	−70L/70LL		−10L/10LL		−12L/12LL		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Write cycle time	t_{WC}	70	—	100	—	120	—	ns
Address valid to end of write	t_{AW}	60	—	80	—	85	—	ns
Chip enable to end of write	t_{CW}	60	—	80	—	85	—	ns
Data to write time overlap	t_{DW}	30	—	35	—	50	—	ns
Data hold from write time	t_{DH}	0	—	0	—	0	—	ns
Write pulse width	t_{WP}	40	—	60	—	70	—	ns
Address setup time	t_{AS}	0	—	0	—	0	—	ns
Write recovery time ($\overline{WE}$)	t_{WR}	0	—	0	—	0	—	ns
Write recovery time ($\overline{CE1}$, CE2)	t_{WR1}	0	—	0	—	0	—	ns
Output active from end of write	t_{OW}	5	—	5	—	5	—	ns
Write to output in high Z	t_{WHZ}*	0	30	0	35	0	45	ns

* t_{WHZ} is defined as the time at which the outputs become the high impedance state and are not referred to output voltage levels.

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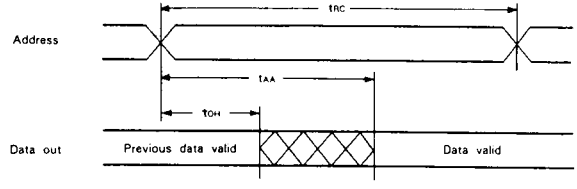
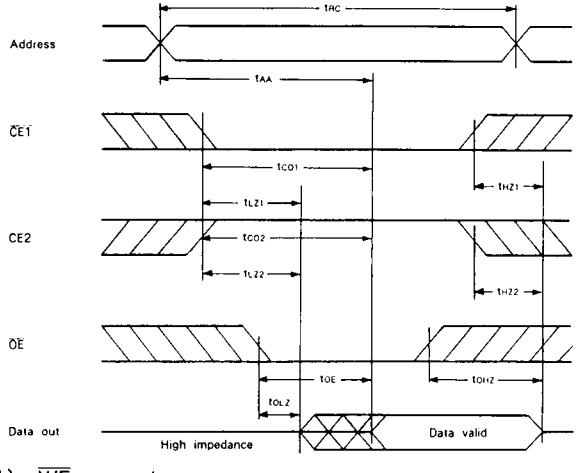
Timing Waveform

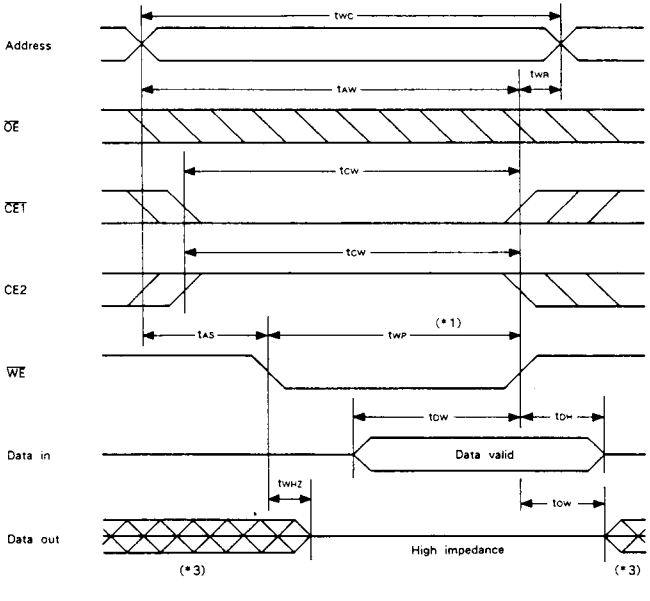
• Read cycle (1) : $\overline{CE1} = \overline{OE} = V_{IL}$, CE2 = V_{IH}, $\overline{WE} = V_{IH}$



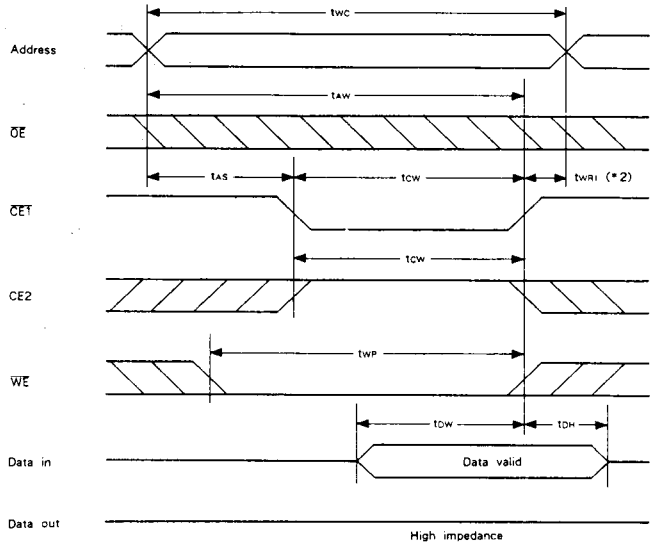
• Read cycle (2) : $\overline{WE} = V_{IH}$



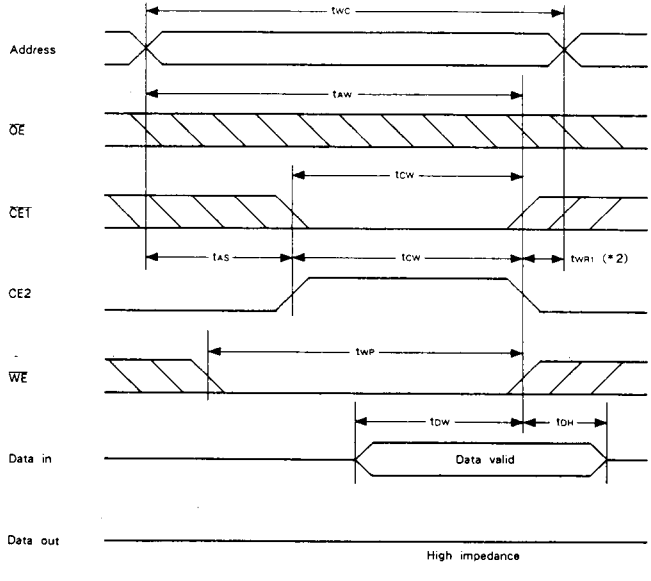
• Write cycle (1) : $\overline{WE}$ control



• Write cycle (2) : $\overline{CE1}$ control



• Write cycle (3) : CE2 control



Note)

*1. Write is executed when both $\overline{CE1}$ and $\overline{WE}$ are at low and CE2 is at high simultaneously.

*2. t_{WR1} is tested from either the rising edge of $\overline{CE1}$ or the falling edge of CE2, whichever comes earlier, until the end of the write cycle.

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

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Data Retention Characteristics

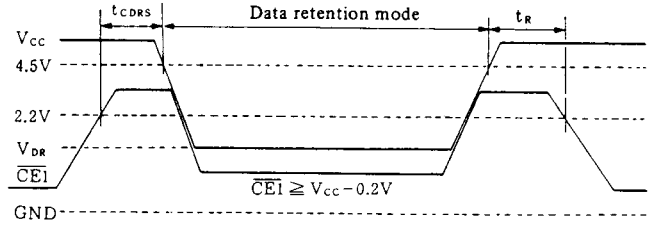
(Ta = 0 to + 70°C)

Item	Symbol	Test conditions		-70L/10L/12L			-70LL/10LL/12LL			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Data retention voltage	V_{DR}	*1		2.0	—	5.5	2.0	—	5.5	V
Data retention current	I_{CCDR1}	*1 Vcc = 3.0V	Ta = 0°C to 70°C	—	1	35	—	0.5	15	μA
			Ta = 0°C to 40°C	—	—	—	—	—	3	
	I_{CCDR2}	Vcc = 2.0 to 5.5V, *1		—	2	60	—	1	30	μA
Data retention setup time	t_{CDRS}	Chip disable to data retention mode		0	—	—	0	—	—	ns
Recovery time	t_R			t_{RC}*2	—	—	t_{RC}*2	—	—	ns

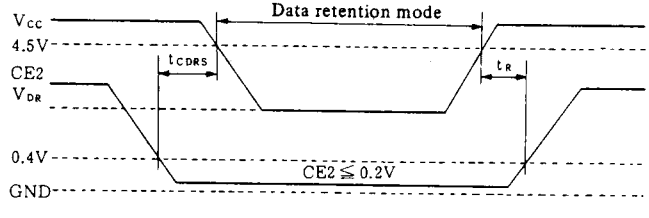
* 1. $\overline{CE1} \geqq Vcc - 0.2V$, $CE2 \geqq Vcc - 0.2V$ [$\overline{CE1}$ Control] or $CE2 \leqq 0.2V$ [CE2 Control]
* 2. t_{RC} : Read cycle time

Data Retention Waveform

1. $\overline{CE1}$ control

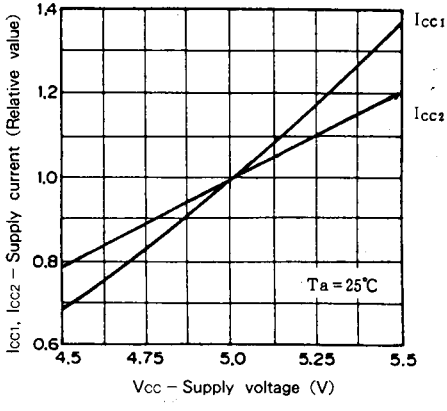


2. CE2 control

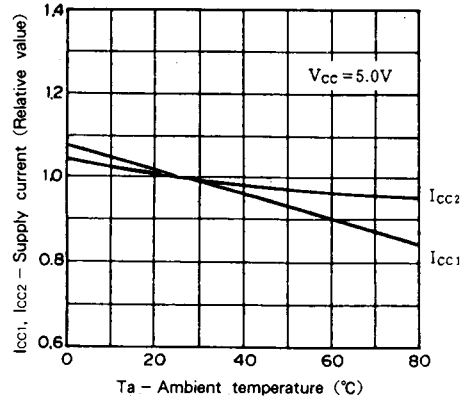


Example of Representative Characteristics

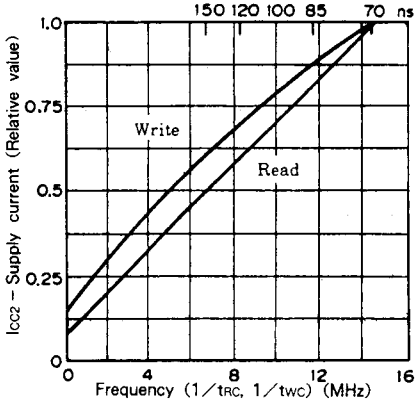
Supply current vs. Supply voltage



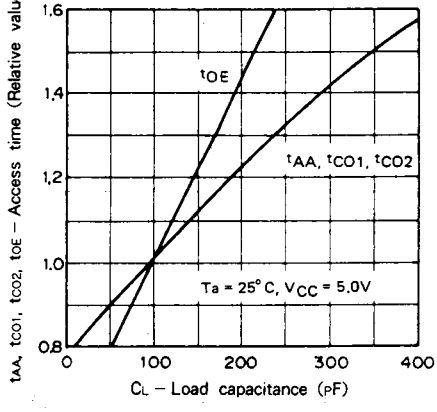
Supply current vs. Ambient temperature



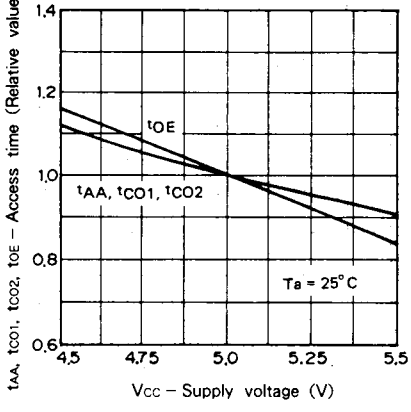
Supply current vs. Frequency



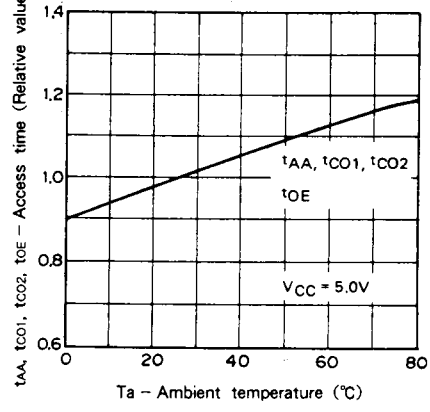
Access time vs. Load capacitance



Access time vs. Supply voltage



Access time vs. Ambient temperature



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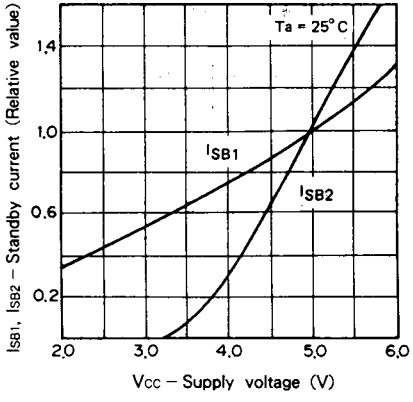
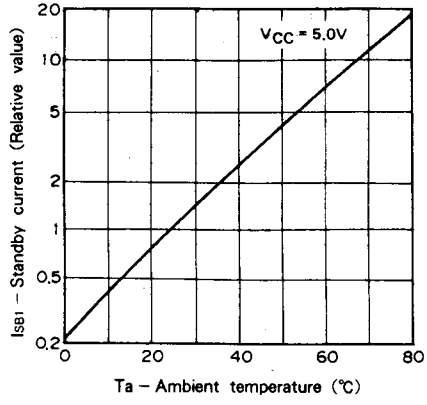
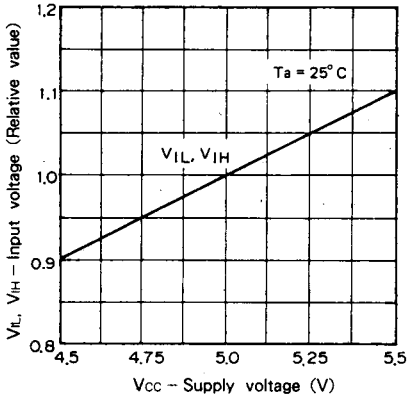
Standby current vs. Supply voltage



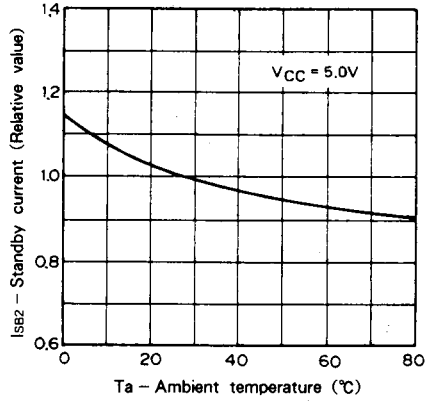
Standby current vs. Ambient temperature



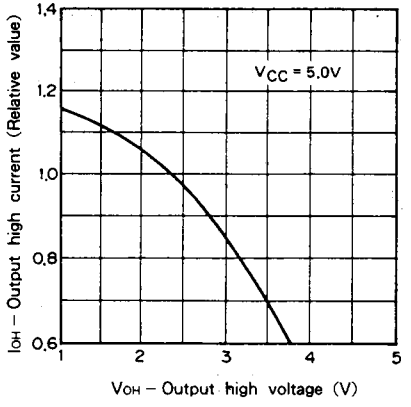
Input voltage level vs. Supply voltage



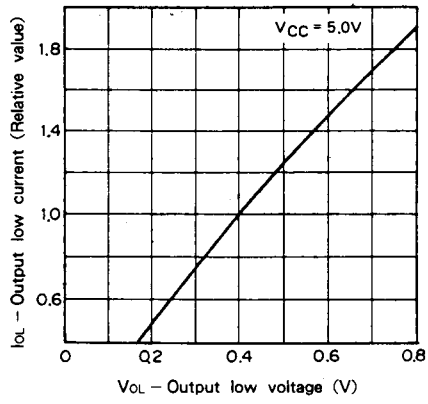
Standby current vs. Ambient temperature



Output high current vs. Output high voltage

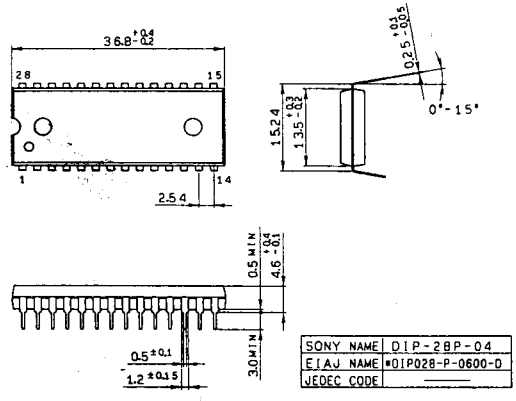


Output low current vs. Output low voltage

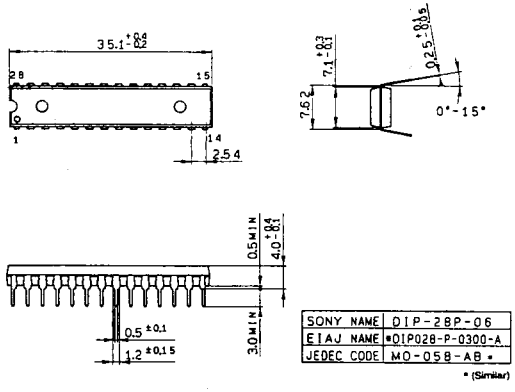


Package Outline Unit : mm

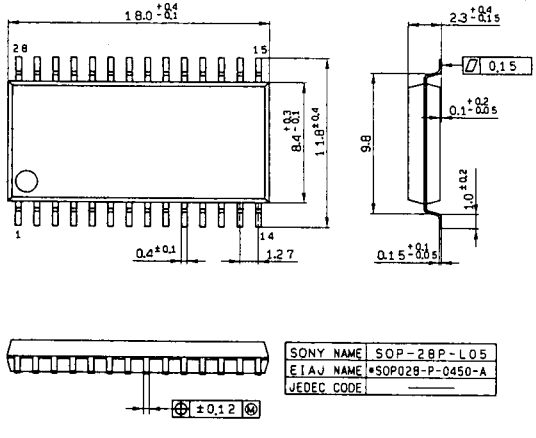
CXK5864BP 28 pin DIP (Plastic) 600mil 4.2g



CXK5864BSP 28 pin DIP (Plastic) 300mil 2.0g



CXK5864BM 28 pin SOP (Plastic) 450mil 0.7g



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