

IR3P60B

Y/C Switch IC

(Model No.: IR3P60B)

Spec No.: EL082048

Issue Date: February 15, 1996

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ISSUE: Feb. 15 1996	

To: _____

S P E C I F I C A T I O N S

Product Type _____ Y/C SWITCH IC _____

Model No. _____ I R 3 P 6 0 B _____

※This specifications contains 23 pages including the cover and appendix.
If you have any objections, please contact us before issuing purchasing order.

CUSTOMERS ACCEPTANCE

DATE: _____

BY: _____

PRESENTED

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PREPARED BY:

K. Natanaka H. Fujita

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SHARP CORPORATION

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(1) The products covered herein are designed and manufactured for the following application areas. When using the products covered herein for the equipment listed in Paragraph (2), even for the following application areas, be sure to observe the precautions given in Paragraph (2). Never use the products for the equipment listed in Paragraph (3).

- Office electronics
- Instrumentation and measuring equipment
- Machine tools
- Audiovisual equipment
- Home appliances
- Communication equipment other than for trunk lines

(2) Those contemplating using the products covered herein for the following equipment which demands high reliability, should first contact a sales representative of the company and then accept responsibility for incorporating into the design fail-safe operation, redundancy, and other appropriate measures for ensuring reliability and safety of the equipment and the overall system.

- Control and safety devices for airplanes, trains, automobiles, and other transportation equipment
- Mainframe computers
- Traffic control systems
- Gas leak detectors and automatic cutoff devices
- Rescue and security equipment
- Other safety devices and safety equipment, etc.

(3) Do not use the products covered herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.

- Aerospace equipment
- Communications equipment for trunk lines
- Control equipment for the nuclear power industry
- Medical equipment related to life support, etc.

(4) Please direct all queries and comments regarding the interpretation of the above three Paragraphs to a sales representative of the company.

●Please direct all queries regarding the products covered herein to a sales representative of the company.

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1. Description

The IR3P60B is a signal switching IC for the TV Y/C separation input (S terminal) that switches 3-line external S input and the internal signal to the luminance signal (Y) and the chrominance signal (C) simultaneously.

Synchronizing signal switching circuit is built-in.

As well as CA and CB switching the input, S1, S2, and S3 selects the external S input and the internal signal.

2. Features

- i) Good frequency characteristics
- ii) Reduced crosstalk
- iii) Built-in 6dB amplifier
- iv) Built-in synchronizing signal switching circuit
- v) Chrominance signal delay line connector terminal provided

Not designed or rated as radiation hardened.

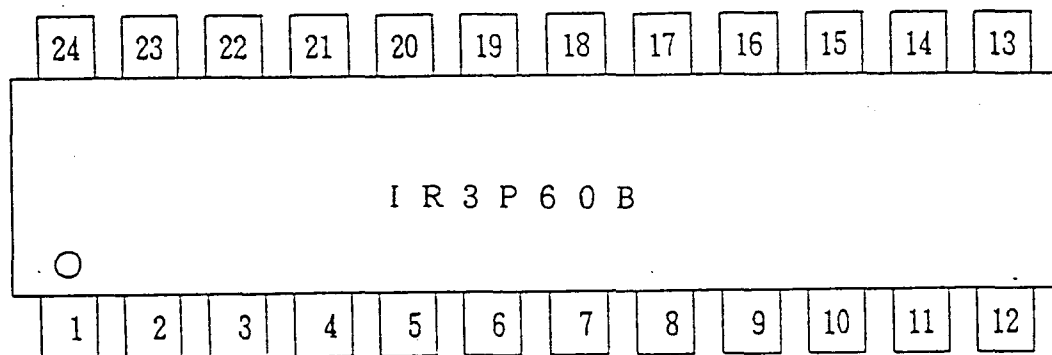
Package material: Plastic

Chip material: P-type silicon substrate

Number of pins: 24-pin shrink dual-in-line package

Process: Bipolar

3. Terminal Connections



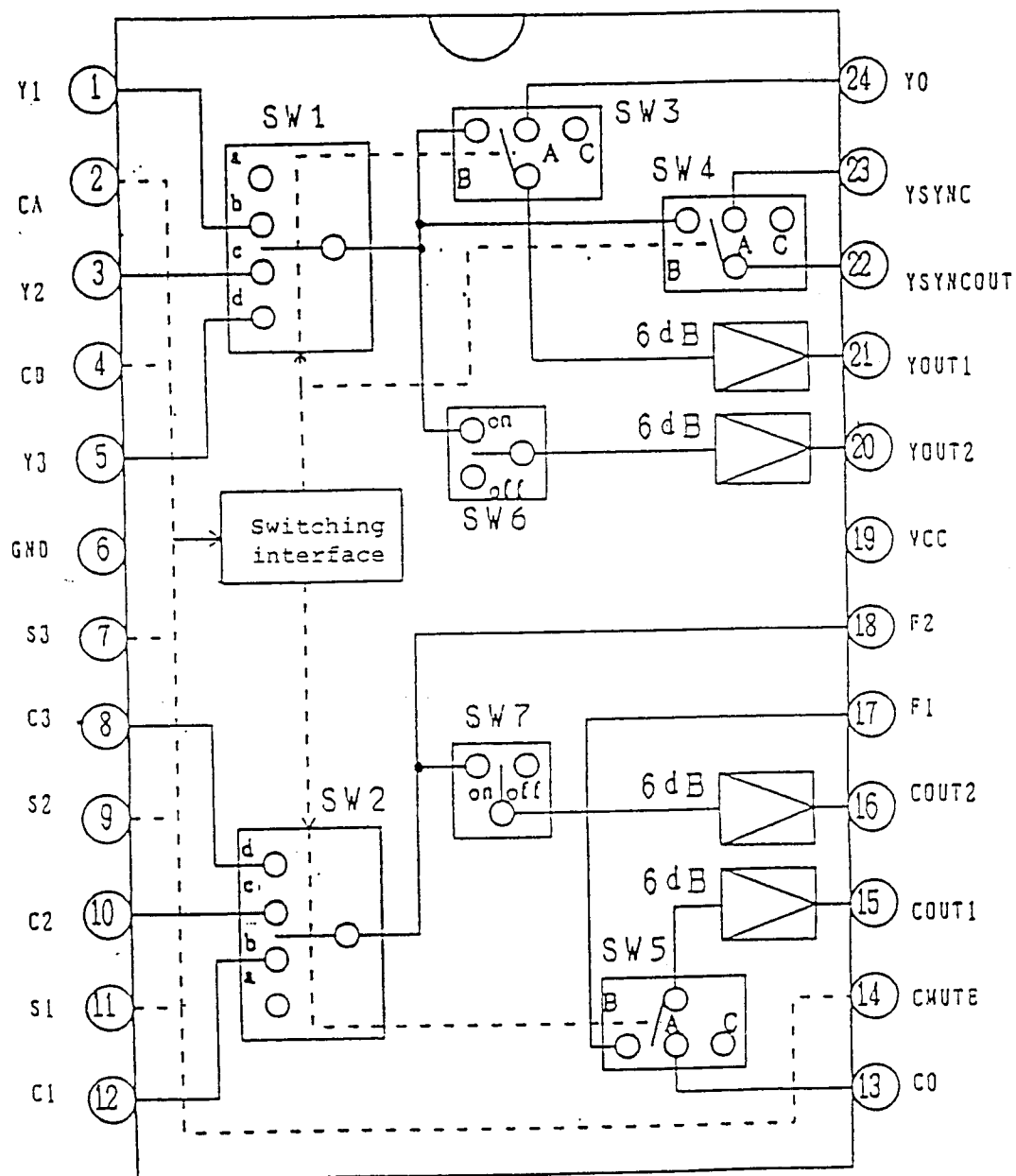
Package 24-pin shrink DIP (TOP VIEW)

4. Terminal Name

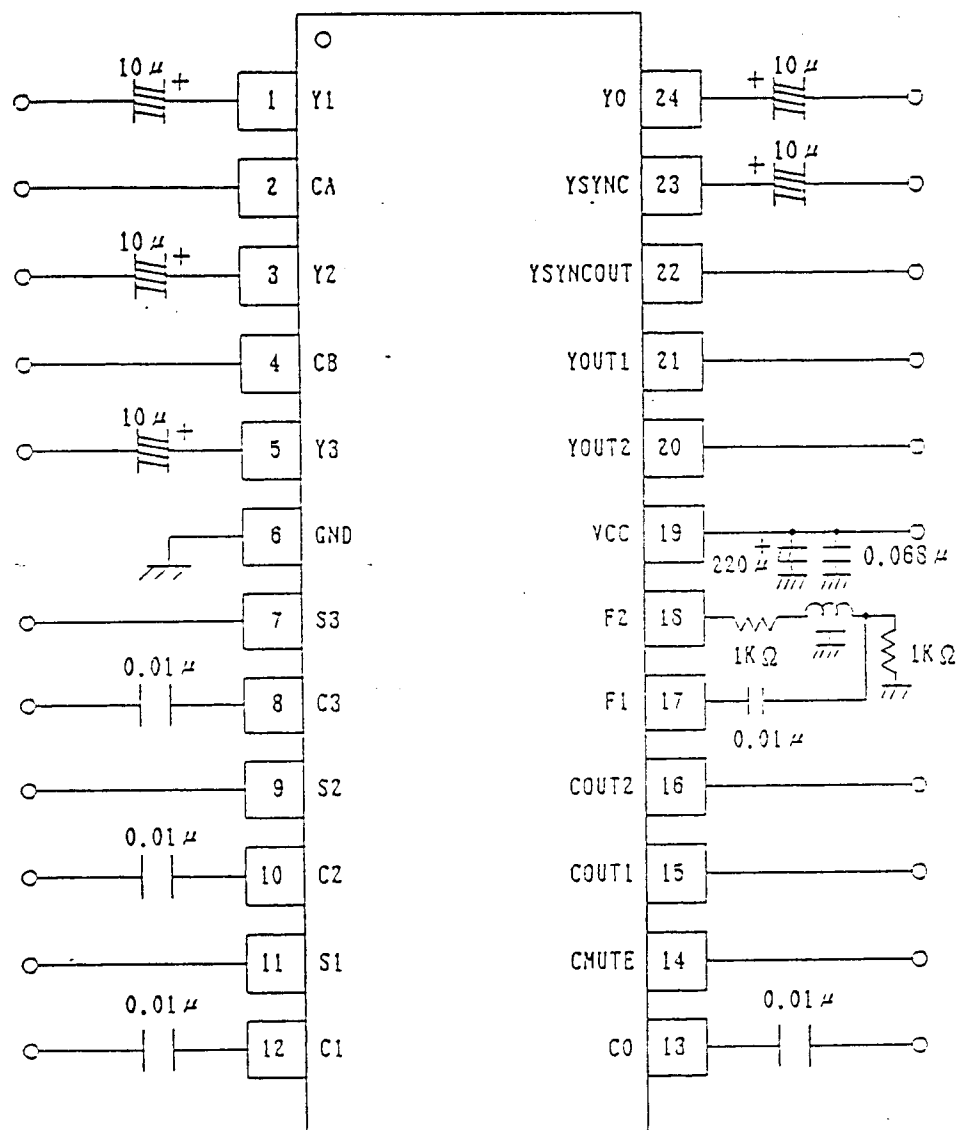
No.	Symbol	Name
1	Y1	External luminance signal input 1
2	CA	Input select pin A
3	Y2	External luminance signal input 2
4	CB	Input select pin B
5	Y3	External luminance signal input 3
6	GND	GND pin
7	S3	Input select pin 3
8	C3	External chrominance signal input 3
9	S2	Input select pin 2
10	C2	External chrominance signal input 2

No.	Symbol	Name
11	S1	Input select pin 1
12	C1	External chrominance signal input 1
13	C0	Internal chrominance signal input
14	CMUTE	Mute pin
15	COU1	Chrominance signal output 1
16	COU2	Chrominance signal output 2
17	F1	Delay line 1
18	F2	Delay line 2
19	VCC	Power supply pin
20	YOUT2	Luminance signal output 2
21	YOUT1	Luminance signal output 1
22	YSYNCOU	Synchronizing signal output
23	YSYNC	Synchronizing signal input
24	Y0	Internal luminance signal input

5. Block Diagram



6. Basic Connection Diagram



7. Description of Functional Operation

i) Terminal function

Pin	I/O	Description
1	I	External luminance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
2	I	Input select pin. Selects an input in conjunction with Pins 4, 7, 9, and 11.
3	I	External luminance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
4	I	Input select pin. Selects an input in conjunction with Pins 2, 7, 9, and 11.
5	I	External luminance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
6	I	Ground pin
7	I	Input select pin. Selects the external signal input 3 or the internal signal input.
8	I	External chrominance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
9	I	Input select pin. Selects the external signal input 2 or the internal signal input.
10	I	External chrominance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
11	I	Input select pin. Selects the external signal input 1 and the internal signal input.
12	I	External chrominance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.

Pin	I/O	Description
13	I	Internal chrominance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
14	I	Mute pin. Turning this pin "High" mutes the outputs from Pins 15, 21, and 22. (YOUT1, YSYNCOUT, COUT1)
15	O	Chrominance signal output pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11. Muted by Pin 14 going "High".
16	O	Chrominance signal output pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
17	I	Input pin from the delay line
18	O	Output pin to the delay line. If the delay line is out of use, connect Pins 17 and 18 via a capacitor.
19		Power supply pin
20	O	Luminance signal output pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
21	O	Luminance signal output pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11. Muted by Pin 14 going "High".
22	O	Synchronizing and external signal output pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11. Muted by Pin 14 going "High".
23	I	Synchronizing signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.
24	I	Internal luminance signal input pin. The input signal is selected according to the voltages applied to Pins 2, 4, 7, 9, and 11.

ii) Description of functional operation

Control mode table

When CMUTE is "Low"

CB	CA	S3	S2	S1	YOUT1	YOUT2	YSYNCOU	COUT1	COUT2
L	L	*	*	*	Y0	-	YSYNC	C0	-
L	H	*	*	L	Y0	-	YSYNC	C0	-
L	H	*	*	H	Y1	-	Y1	C1	-
H	L	*	L	*	Y0	Y2	YSYNC	C0	C2
H	L	*	H	*	Y2	Y2	Y2	C2	C2
H	H	L	*	*	Y0	Y3	YSYNC	C0	C3
H	H	H	*	*	Y3	Y3	Y3	C3	C3

Note) Pins S3, S2, S1 OPEN="High"

When CMUTE is "High", each output of YOUT1, YSYNCOU, and COUT1 will be muted, meaning no signal output will be made. But YOUT2, and COUT2 will not be muted, so that signal outputs will be made on these pins.

Control mode table for each switch

(Each alphabet letter corresponds to one switch location shown in the block diagram.)

When CMUTE is "Low"

CB	CA	S3	S2	S1	SW1	SW2	SW3	SW4	SW5	SW6,SW7
L	L	*	*	*	a	a	A	A	A	ON
L	H	*	*	L	b	b	A	A	A	OFF
L	H	*	*	H	b	b	B	B	B	OFF
H	L	*	L	*	c	c	A	A	A	ON
H	L	*	H	*	c	c	B	B	B	ON
H	H	L	*	*	d	d	A	A	A	ON
H	H	H	*	*	d	d	B	B	B	ON

When CMUTE is "High"

SW3	SW4	SW5
C	C	C

Note that the modes of the switches SW1, SW2, SW6, and SW7 are determined by the states of CA, CB, S1, S2, and S3.

8. Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	Remark
Supply voltage	V _{CC}	15.0	V	
Input signal voltage	V _{in}	5.0	V _{p-p}	
Control voltage	V _{IN}	0 ~ V _{CC}	V	
Power dissipation	P _d	1500	mW	T _a ≤ 25°C
derating ratio		12	mW/°C	T _a > 25°C
Operating temperature	T _{opr}	-20 ~ +75	°C	
Storage temperature	T _{stg}	-55 ~ +150	°C	

9. Electrical Characteristics

(Unless otherwise specified, $T_a = -20^{\circ}\text{C} \sim +75^{\circ}\text{C}$, $V_{CC} = 8.0\text{V} \sim 12.0\text{V}$)

Parameter	Symbol	Condition	Rating			Unit
			MIN.	TYP.	MAX.	
Operating voltage range	I_{CC}		8	9	12	V
Current dissipation	I_{CC}	$V_{CC} = 9\text{V}$	30	42	65	mA
Switching threshold I (CA, CB, CMUTE)	V_{thc}		1.5	1.9	2.5	V
Select pin impedance I (CA, CB, CMUTE)	R_c		22	35		k Ω
Switching threshold II (S1, S2, S3)	V_{ths}	$V_{CC} = 9.0\text{V}$	1.0	2.0	2.5	V
		$V_{CC} = 9.0\text{V} - 12.0\text{V}$	0.8	2.0	3.7	V
Select pin impedance II (S1, S2, S3)	R_s		33	55		k Ω
Gain (1) (YOUT1,2, COUT1,2)	G_1		5	6	7	dB
Gain (2) (YSYNCOUT)	G_2		-1	0	1	dB
Frequency characteristics	f	Sine wave 1Vp-p V_{opp}/V_{ipp} Point which is -3dB away from 100kHz	20	40		MHz
Output through- rate	$\frac{YOUT, COUT}{YSYNCOUT}$	SR Rectangular wave 5MHz, 1Vp-p	0.06	0.1		V/nsec
			0.03	0.06		V/nsec

Parameter	Symbol	Condition	Rating			Unit
			MIN.	TYP.	MAX.	
Mute characteristics YOUT1, YSYNCOUT COUT1	MUTE	1 - 5MHz	50	55		dB
Crosstalk (1) Y - C	CYC	1 - 5MHz	55	60		dB
Crosstalk (2) Mode - mode	Cmod	1 - 5MHz	55	60		dB
Input impedance Y input C input	Zin	Sine wave 100kHz	10	15	20	k Ω
		Sine wave 100kHz	10	15	20	k Ω
		Sine wave 3.58MHz		8		k Ω
Output impedance YOUT, COUT YSYNCOUT /F2	Zou	Sine wave 100kHz		20	40	
		Sine wave 100kHz		35	60	
		Sine wave 100kHz		45	90	
Allowable Y0 - Y3 input C0 - C3	Vin	Vcc=9.0V APL10-90%	1.4	1.8		Vp-p
		Vcc=9.0V Sine wave 100kHz	1.8	2.3		Vp-p
		Vcc=9.0V Sine wave 3.58MHz	1.8	2.3		Vp-p
Differentiation gain	DG	Input 1Vp-p			3	%
Differentiation phase	DP	Input 1Vp-p			3	deg

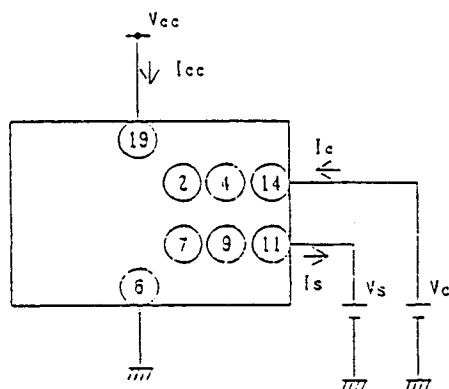
Reference input signal

Y signal: 1Vp-p, Sync negative (SYNC: 0.286Vp-p)

C signal: Burst 0.286Vp-p

YSYNC: 1Vp-p Composite signal or Y component signal
Sync negative (SYNC: 0.286Vp-p)

○ Test circuit for current dissipation, switching pin impedance



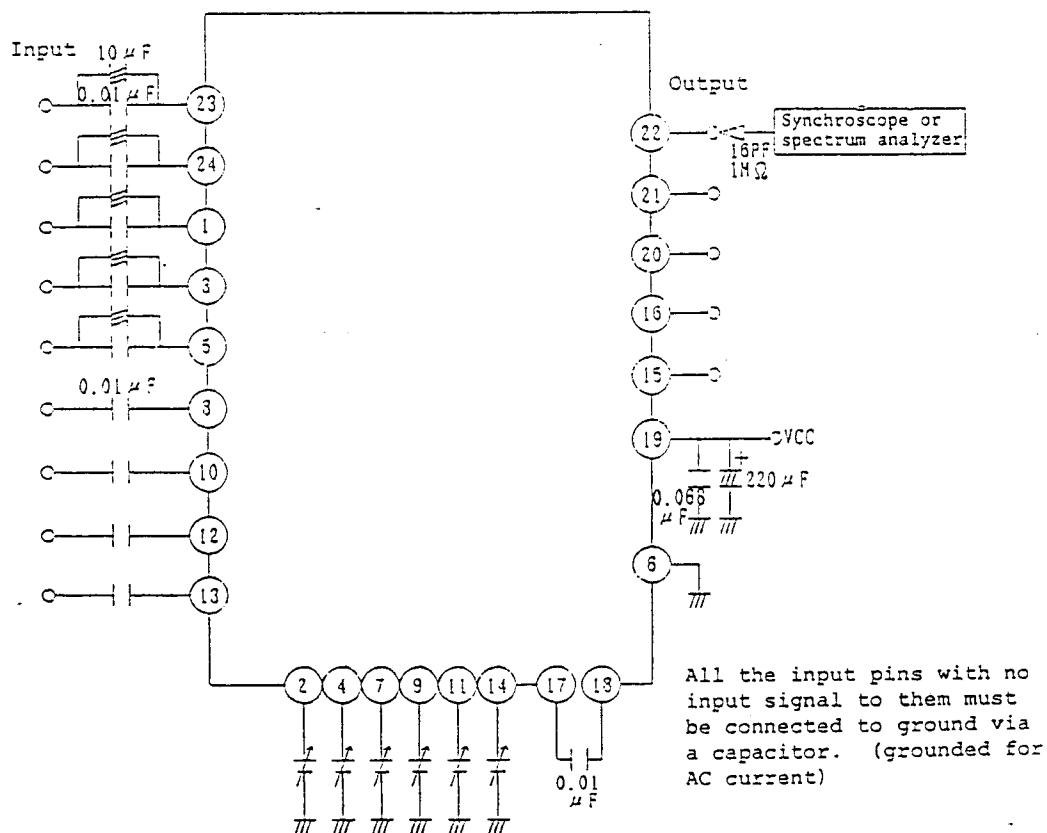
Current dissipation I_{cc}

Switching pin impedance

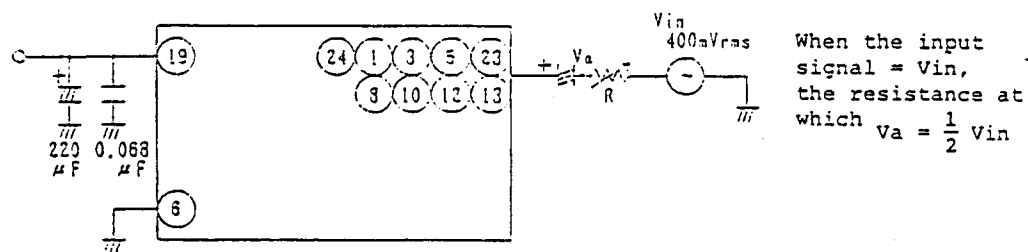
$$R_c = \frac{V_c}{I_c}$$

$$R_s = \frac{V_s}{I_s}$$

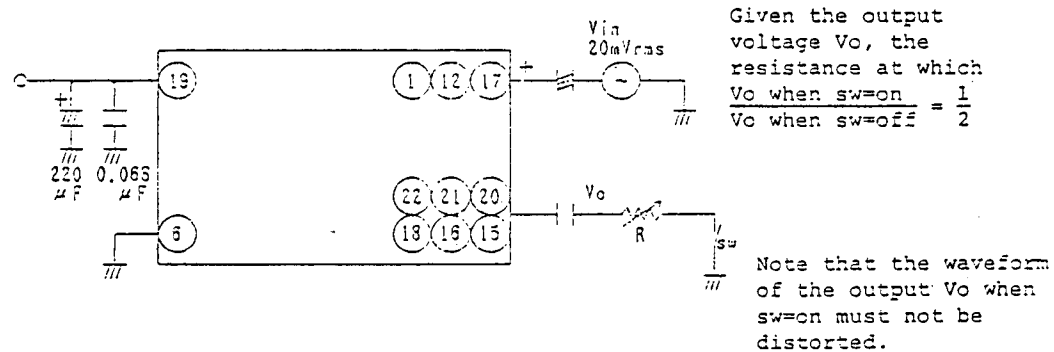
○ Test circuit for AC characteristics



○ Test circuit for input impedance

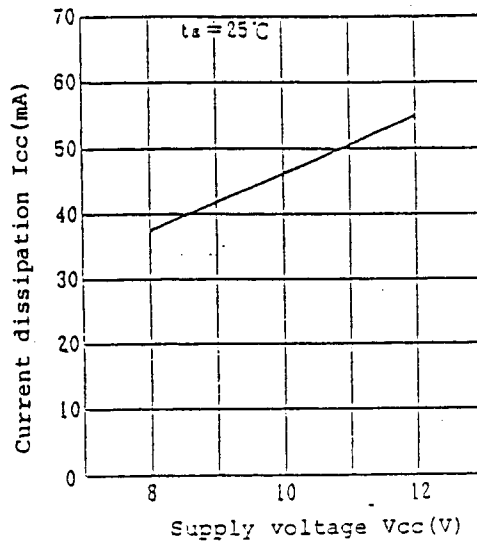


○ Test circuit for output impedance

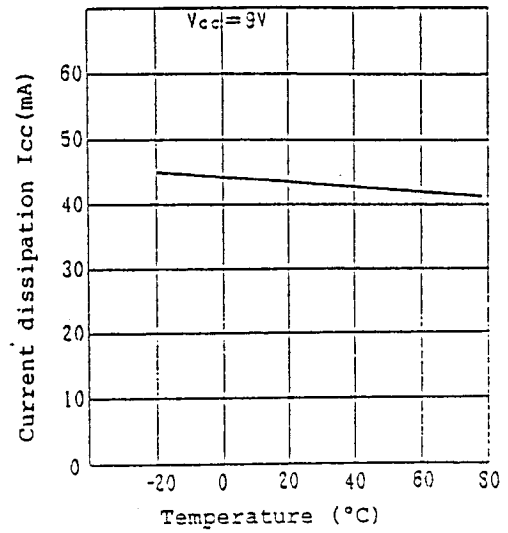
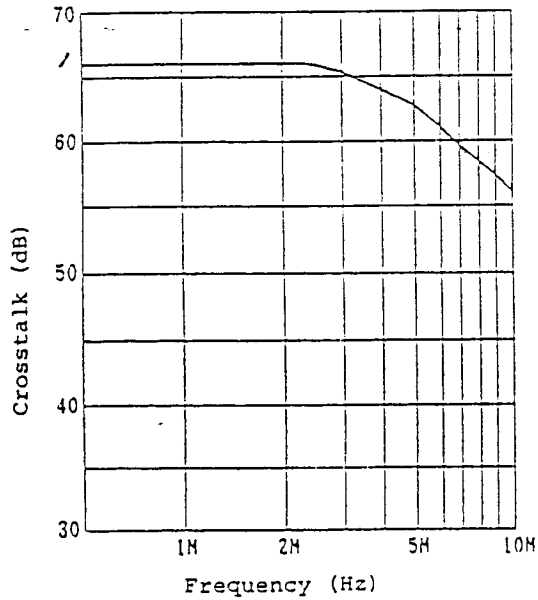
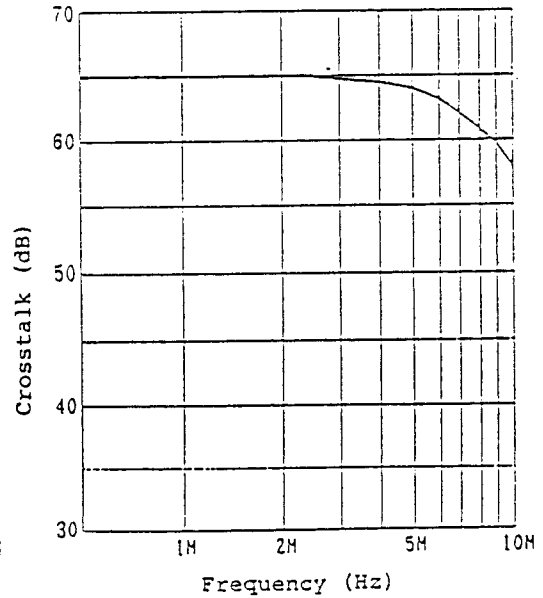


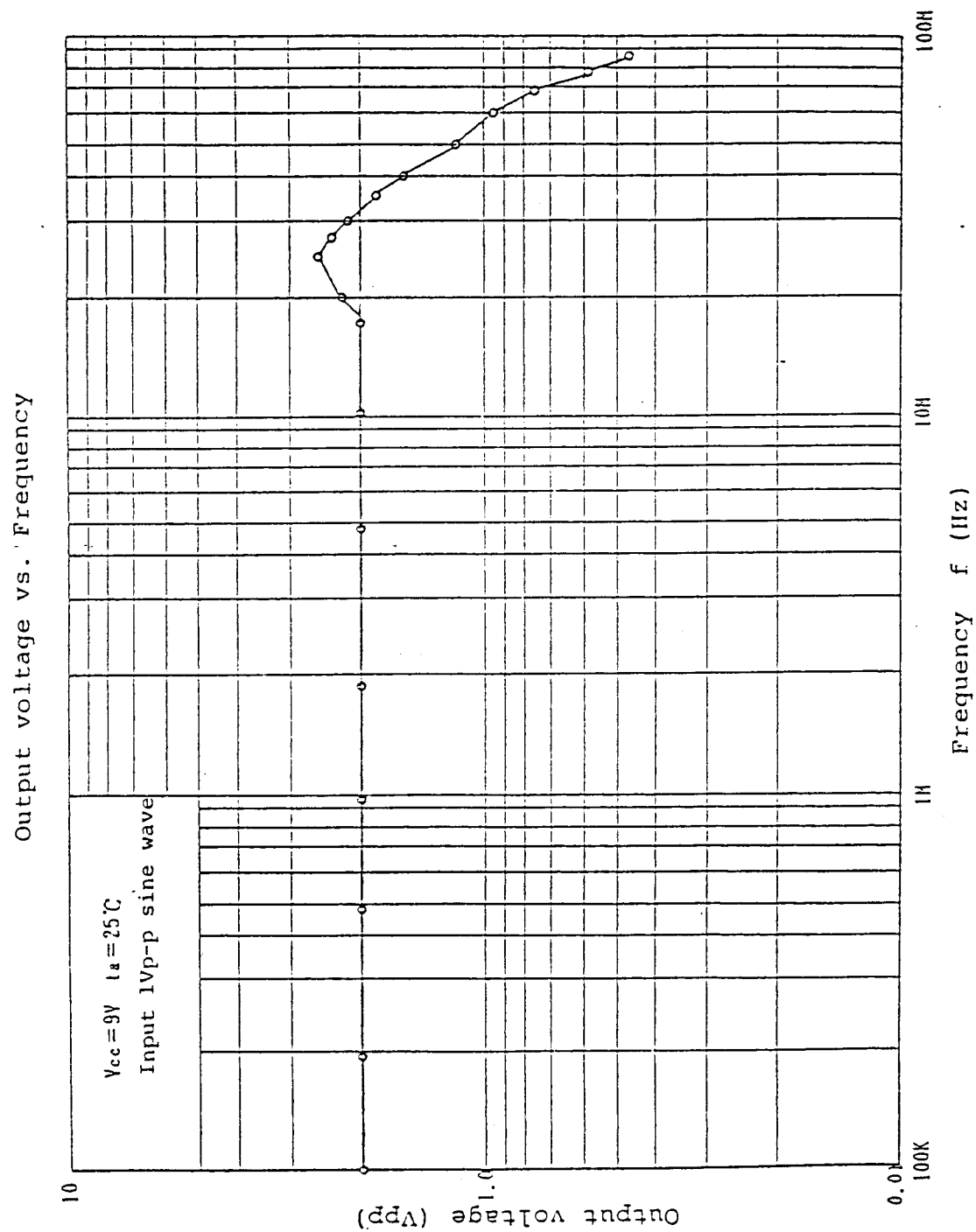
10. Typical Characteristic Examples

Current dissipation vs. Supply voltage



Current dissipation vs. Temperature

Crosstalk vs. Frequency
(Mode - mode) $V_{cc} = 9\text{V}$, $T_a = 25^\circ\text{C}$ Crosstalk vs. Frequency
(Y - C) $V_{cc} = 9\text{V}$, $T_a = 25^\circ\text{C}$ 



The diagram illustrates the internal circuitry of a color television receiver. Key components include:

- Tuner Section:** Consists of an IF (Intermediate Frequency) stage, an OTV (Output Transformer Valve) stage, and an IR3P76 (Integrated Receiver) stage.
- X/C Separation:** A section for separating the Y (luminance) and C (chrominance) signals, featuring a BPF (Band Pass Filter) and a Y/C separation block.
- Control Section:** Includes a Controller, a DELAY line, and a LIME (Line Impulse Modulation) control.
- Signal Processing:** The Y/C signal processing circuit, which includes a Synchronizing circuit and a Y/C signal processing circuit.
- Output:** The final output is connected to a light bulb.

The diagram is labeled with various components and their connections, including Y0, Y1, Y2, Y3, Y0U1, Y0U2, Y1U1, Y1U2, Y2U1, Y2U2, Y3U1, Y3U2, and Y3U3.

12 Package and packing specification

1. Package Outline Specification

Refer to drawing No. AA 8 5 7

2. Markings

2-1. Marking contents

(1) Product name : IR3P60B

(2) Company name : SHARP

(3) Date code

(Example) YY WW XXX

Indicates the product was manufactured in the WWth week of 19YY.

Denotes the production ref. code (1-3)

Denotes the production week. (01, 02, 03, 52, 53)

Denotes the production year. (Lower two digits of the year.)

(4) The marking of "JAPAN" indicates the country of origin.

2-2. Marking layout

Refer to drawing No. AA 8 5 7

(This layout do not define the dimensions of marking character and marking position.)

3. Packing Specification

3-1. Packing materials

Material Name	Material Specification	Purpose
Magazine	Anti-static treated plastic (22devices/magazine)	Packing of device
Stopper	Plastic or rubber	Fixing of device
Label	Paper	Indication of product name, quantity and date of manufacture.
Inner case	Cardboard (880devices/case)	Fixing of magazine
Outer case	Cardboard	Outer packing of magazine

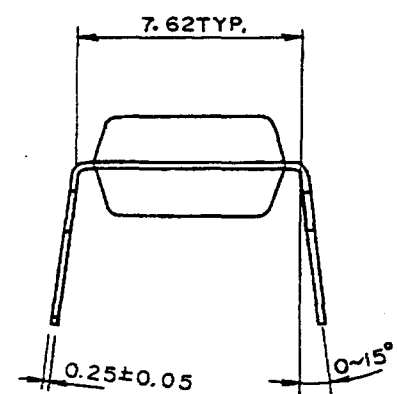
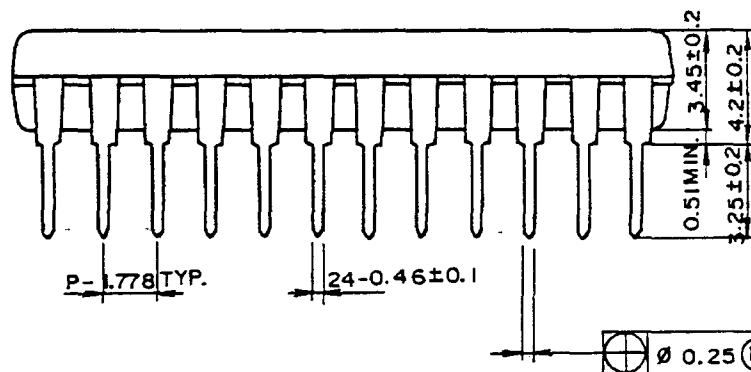
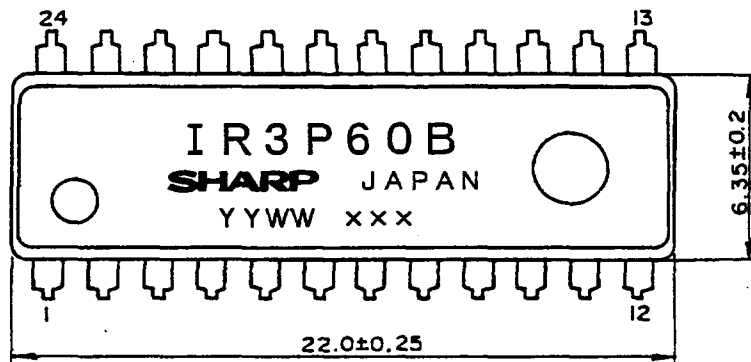
(Devices shall be inserted into a magazine (sleeve) in the same direction.)

3-2. Outline dimension of magazine (sleeve)

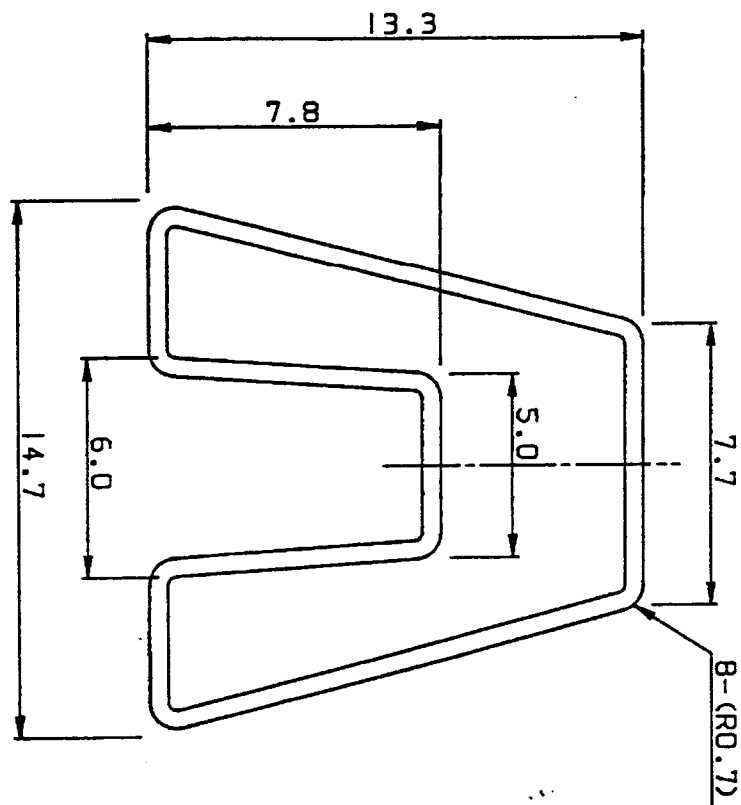
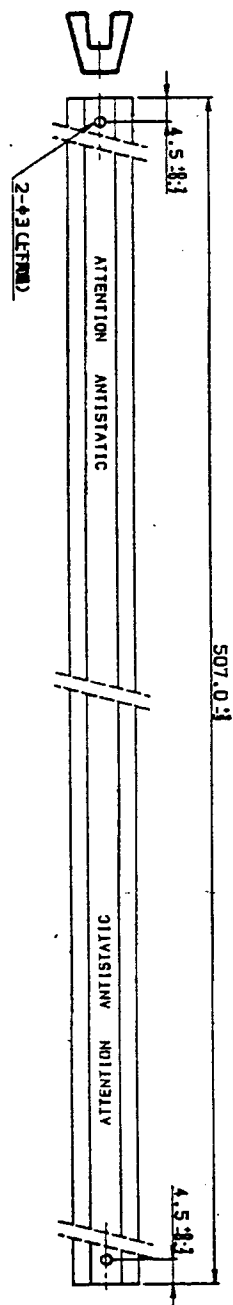
Refer to attached drawing.

4. Precaution For Unpacking

- (1) Unpacking should be done on the stand as well as human body treated with anti-ESD.
- (2) Anti-ESD treatment is given to a magazine.
Use the equivalent magazine, if it is changed to another one.
- (3) Be sure to fix two stoppers to both ends of a magazine when storage to prevent the devices from slipping.



名称	SDIP24-P-300	リード仕上	TIN-LEAD	備考	プラスチックパッケージ外形寸法は、バリを含まないものとする。
NAME	SDIP24-P-300	LEAD FINISH	PLATING	NOTE	Plastic body dimensions do not include burr of resin.
DRAWING NO.	AA857	単位	mm		
		UNIT			



注記 : 片側ピンストッパー, 片側ゴムストッパーとする。
指示無き寸法公差は全て±0.4とする。

NOTES : One end of magazine (sleeve) is plugged by stopper which is made of rubber, and another end of magazine (sleeve) is plugged by plastic pin-stoppper.
All tolerances are ±0.4mm unless otherwise specified

名称 NAME	DP300SPB			備考 NOTE
DRAWING NO.	CV503	単位 UNIT	mm	

IC Switch