

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

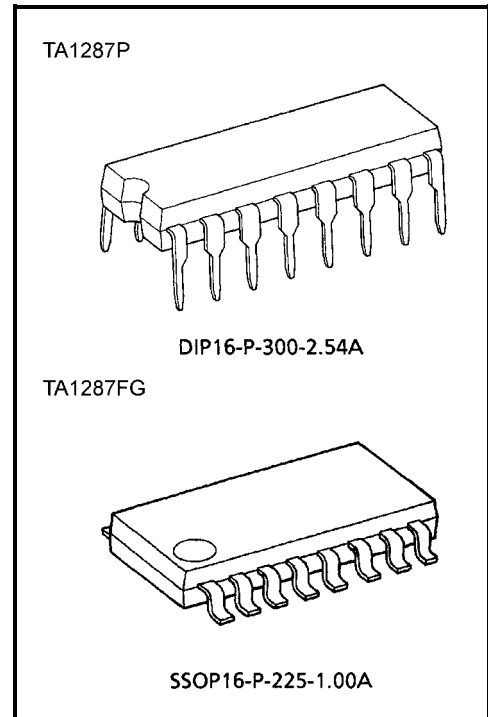
# TA1287P,TA1287FG

## RGB TO YUV / IQ HIGH-SPEED MATRIX IC

TA1287P, TA1287FG are a high-speed switching IC which have 2-channel inputs circuit and a RGB to YUV / IQ matrix circuit. Another feature, TA1287P, TA1287FG have a signals mixing circuit, which are enable to mix a main signal with an external input signal and outputs the mixed signal. The mixing circuit has 8 combinations of mixing gain ratio of a main to an external signals, which is controlled by high-speed switch.

### FEATURES

- RGB to YUV / IQ matrix circuit
- The mixing circuit for a main signal and an external signal
- The high-speed switching circuit of a main signal an external signal
- Band Width : 30MHz at -3dB point.

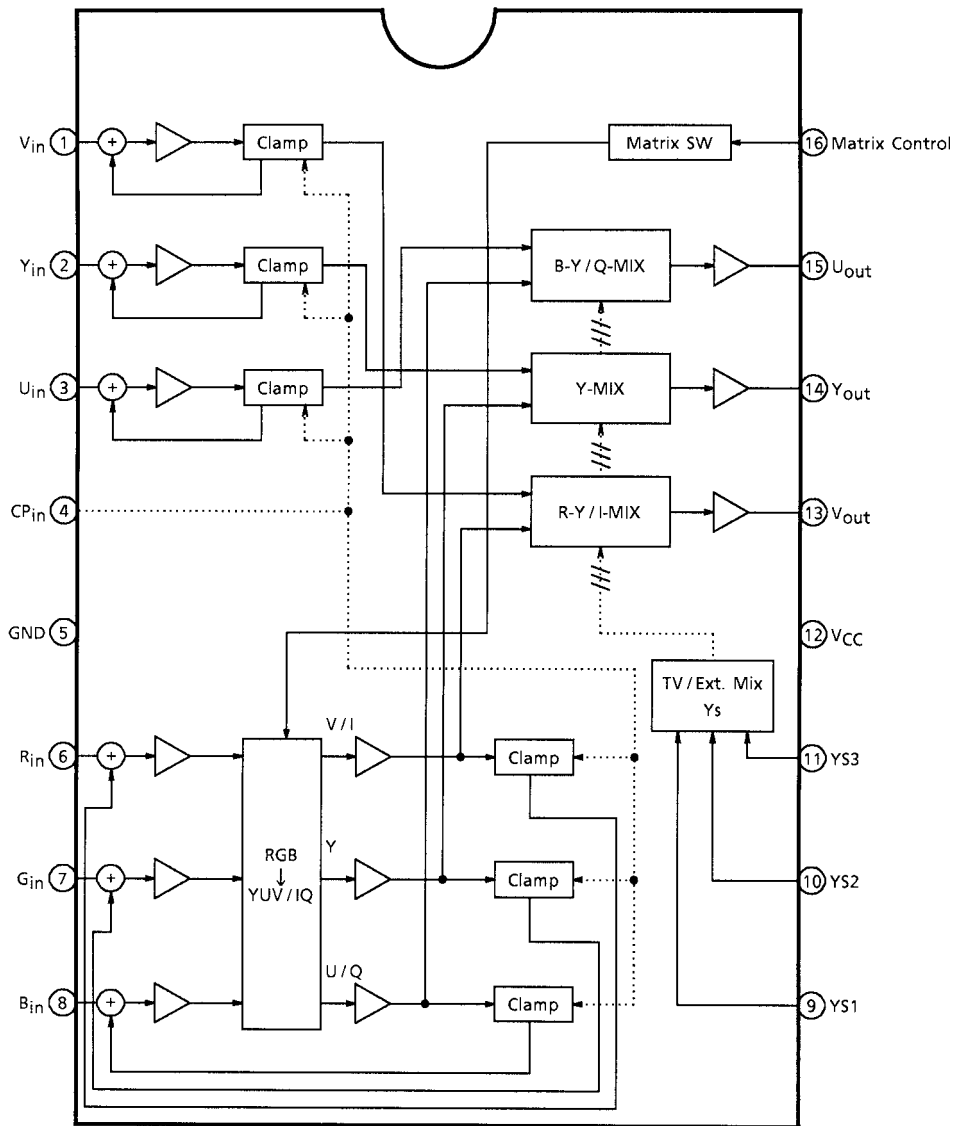


Weight

DIP16-P-300-2.54A : 1.0 g (Typ.)

SSOP16-P-225-1.00A : 0.14 g (Typ.)

**BLOCK DIAGRAM**



## TERMINAL FUNCTIONS

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT	INPUT / OUTPUT SIGNAL
1	V <sub>IN</sub>	Input R-Y (V) or R signal through a clamping capacitor.		DC : 6.2 V Y : 1 V <sub>p-p</sub> (with sync) U / V : 0.3 V <sub>p-p</sub> (B : C = 1 : 1) R / G / B : 0.7 V <sub>p-p</sub> (100% white)
2	Y <sub>IN</sub>	Input Y or G signal through a clamping capacitor.		
3	U <sub>IN</sub>	Input B-Y (U) or B signal through a clamping capacitor.		
4	CP <sub>IN</sub>	Input clamping pulse. Threshold : 0.75 V		
5	GND	GND.	—	—
6	R <sub>IN</sub>	Input R or R-Y (V) signal through clamping capacitor.		DC : 6.2 V Y : 1 V <sub>p-p</sub> (with sync) U / V : 0.3 V <sub>p-p</sub> (B : C = 1 : 1) R / G / B : 0.7 V <sub>p-p</sub> (100% white)
7	G <sub>IN</sub>	Input G or Y signal through a clamping capacitor.		
8	B <sub>IN</sub>	Input B or B-Y (U) signal through a clamping capacitor.		

PIN No	PIN NAME	FUNCTION	INTERFACE CIRCUIT	INPUT / OUTPUT SIGNAL								
9 10 11	YS1,2, 3	Selector to switch mixing ratios. Threshold : 0.75 V										
12	V <sub>CC</sub>	Supply 9 V.	—	DC : 9 V								
13	V <sub>OUT</sub>	Outputs R-Y (V) or R signal.		DC : 4.7 V Y : 1 V <sub>p-p</sub> (with sync) U / V : 0.3 V <sub>p-p</sub> (B : C = 1 : 1) R / G / B : 0.7 V <sub>p-p</sub> (100% color bar)								
14	Y <sub>OUT</sub>	Outputs Y or G signal.										
15	U <sub>OUT</sub>	Outputs B-Y (U) or B signal.										
16	Matrix Control	This terminal's voltage control the matrix coefficient for output signals. Selects the output mode.		<table border="0"> <tr> <td>RGB → YIQ</td> <td>3.8 V</td> </tr> <tr> <td>RGB → YUV (NTSC)</td> <td>2.3 V</td> </tr> <tr> <td>RGB → YUV (PAL)</td> <td>0.7 V</td> </tr> <tr> <td>Through</td> <td>0 V</td> </tr> </table>	RGB → YIQ	3.8 V	RGB → YUV (NTSC)	2.3 V	RGB → YUV (PAL)	0.7 V	Through	0 V
RGB → YIQ	3.8 V											
RGB → YUV (NTSC)	2.3 V											
RGB → YUV (PAL)	0.7 V											
Through	0 V											

## FUNCTION DESCRIPTION

### MIXING RATIO

TA1287P, TA1287FG have a circuit, which mixes a main signal with an external input signal and outputs the mixed signal. The mixing circuit has 8 combinations of mixing gain ratio of a main to an external signals.

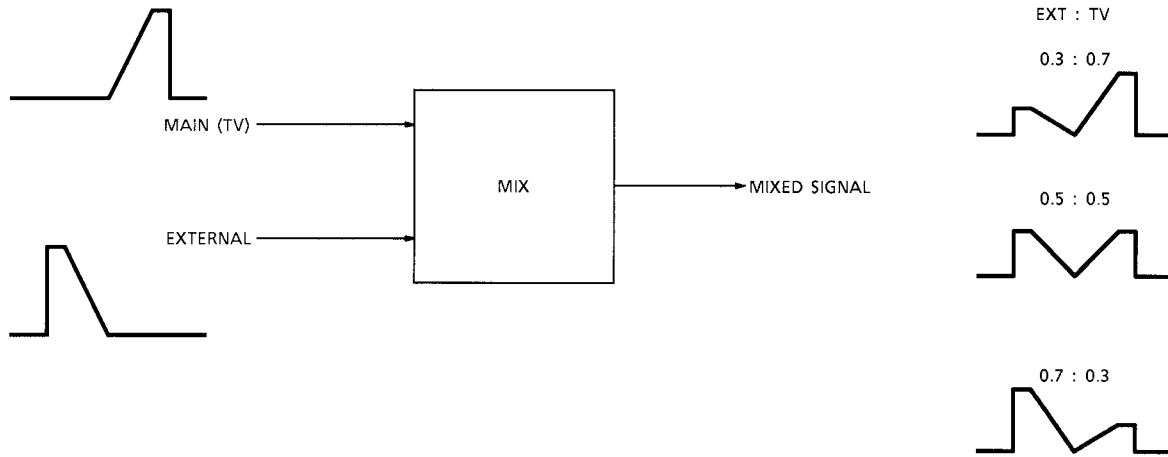


Table The mixing ratio of external to main (TV)

YS1	YS2	YS3	THE MIXING RATIO	
			EXTERNAL	MAIN (TV)
L	L	L	0	1
H	L	L	0.3	0.7
L	H	L	0.4	0.6
H	H	L	0.5	0.5
L	L	H	0.6	0.4
H	L	H	0.7	0.3
L	H	H	0.8	0.2
H	H	H	1	0

### MATRIX CONTROL

Pin 16 is a high-speed switch to control the matrix mode for output signals.

Table Matrix mode depending on by the voltage of pin 16

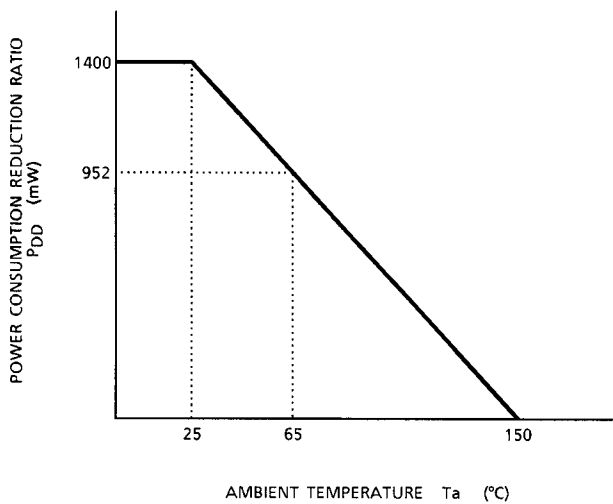
VOLTAGE OF PIN 16 [V]	MODE
0 ~ 0.7	Through
~ 2.3	RGB to YUV (PAL)
~ 3.8	RGB to YUV (NTSC)
3.8 ~	RGB to YIQ

## MAXIMUM RATINGS (Ta = 25°C)

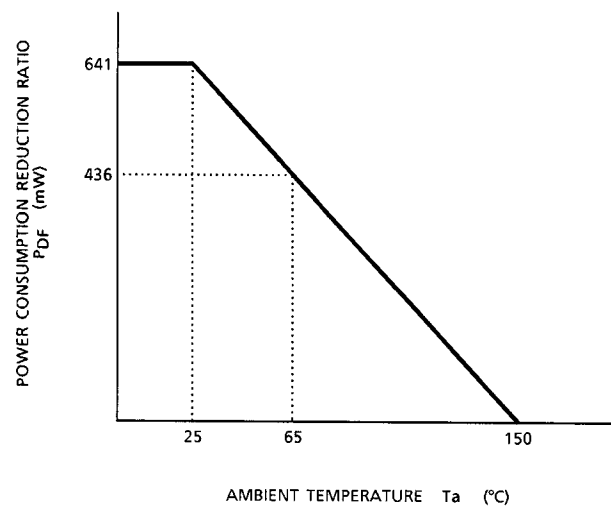
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V <sub>CCmax</sub>	14	V
Signal Voltage at Each Input Pin		e <sub>inmax</sub>	9	V <sub>p-p</sub>
Power Consumption	TA1287P	P <sub>DD</sub> (Note 1)	1400	mW
	TA1287FG	P <sub>DF</sub> (Note 1)	641	
Power Consumption Reduction Ratio	TA1287P	1 / θ <sub>jaD</sub>	-11.2	mW / °C
	TA1287FG	1 / θ <sub>jaF</sub>	-5.13	
Operating Temperature		T <sub>opr</sub>	-20~65	°C
Storage Temperature		T <sub>stg</sub>	-55~150	°C

Note 1: Refer to the figure below.

Note 2: It is possible that TA1287FG function faultily caused by leak problems according to a field intensity from CRT. Put IC lay-out position to CRT be far more than 20 cm. If there is not a enough distance, intercept it by a shield.



(a) TA1287P



(b) TA1287FG

Fig. Power consumption reduction against ambient temperature

## OPERATING CONDITIONS

CHARACTERISTIC	DESCRIPTION	MIN	TYP.	MAX	UNIT
Supply Voltage	Pin 12	8.1	9.0	9.9	V
Y Input Signal Level	White : 100% with sync.	—	1.0	—	V <sub>p-p</sub>
U Input Signal Level	B : C = 1 : 1	—	300	—	mV <sub>p-p</sub>
V Input Signal Level	B : C = 1 : 1	—	300	—	mV <sub>p-p</sub>
R Input Signal Level	100% white	—	700	—	mV <sub>p-p</sub>
G Input Signal Level	100% white	—	700	—	mV <sub>p-p</sub>
B Input Signal Level	100% white	—	700	—	mV <sub>p-p</sub>
CP Input Level	Pin 4	1.1	1.5	5.0	V
YS1, YS2, YS3, Input Level	Pin 9, 10, 11	1.1	1.5	5.0	V

## ELECTRICAL CHARACTERISTICS

(V<sub>CC</sub> = 9V and Ta = 25°C, unless otherwise specified)

### Current consumption

PIN NAME	SYMBOL	TEST CIRCUIT	MIN	TYP.	MAX	UNIT
V <sub>CC</sub>	I <sub>CC</sub>	—	20.0	26.0	32.0	mA

### Terminal voltages

PIN No.	PIN NAME	SYMBOL	TEST CIRCUIT	MIN.	TYP.	MAX.	UNIT
1	V <sub>IN</sub>	V <sub>1</sub>	—	6.0	6.2	6.4	V
2	Y <sub>IN</sub>	V <sub>2</sub>	—	6.0	6.2	6.4	
3	U <sub>IN</sub>	V <sub>3</sub>	—	6.0	6.2	6.4	
6	R <sub>IN</sub>	V <sub>6</sub>	—	6.0	6.2	6.4	
7	G <sub>IN</sub>	V <sub>7</sub>	—	6.0	6.2	6.4	
8	B <sub>IN</sub>	V <sub>8</sub>	—	6.0	6.2	6.4	
13	V <sub>OUT</sub>	V <sub>13</sub>	—	4.5	4.7	4.9	
14	Y <sub>OUT</sub>	V <sub>14</sub>	—	4.5	4.7	4.9	
15	U <sub>OUT</sub>	V <sub>15</sub>	—	4.5	4.7	4.9	

## AC CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
YUV Gain (Through Mode)	GTRY	—	(Note A <sub>1</sub> )	-0.5	0	0.5	dB
	GTY			-0.5	0	0.5	
	GTBY			-0.5	0	0.5	
RGB Gain (Through Mode)	GRR	—	(Note A <sub>2</sub> )	-0.5	0	0.5	dB
	GRG			-0.5	0	0.5	
	GRB			-0.5	0	0.5	
R Gain (Input to Pin 6) (Matrix Mode)	GRRYP	—	(Note A <sub>3</sub> )	-4.7	-4.2	-3.7	dB
	GRYP			-10.3	-9.8	-9.3	
	GRBYP			-17.3	-16.8	-16.3	
	GRRYN			-4.3	-3.8	-3.3	
	GRYN			-10.3	-9.8	-9.3	
	GRBYN			-18.4	-17.9	-17.4	
	GRRYI			-4.6	-4.1	-3.6	
	GRYI			-10.3	-9.8	-9.6	
	GRBYI			-13.0	-12.5	-12.0	
G Gain (Input to Pin 7) (Matrix Mode)	GGRYP	—	(Note A <sub>4</sub> )	-6.3	-5.8	-5.3	dB
	GGYP			-4.5	-4.0	-3.5	
	GGBYP			-11.5	-11.0	-10.5	
	GGRYN			-5.9	-5.4	-4.9	
	GGYN			-4.5	-4.0	-3.5	
	GGBYN			-10.9	-10.4	-9.9	
	GGRYI			-11.5	-11.0	-10.5	
	GGYI			-4.5	-4.0	-3.5	
	GGBYI			-5.6	-5.1	-4.6	
B Gain (Input to Pin 8) (Matrix Mode)	GBRYP	—	(Note A <sub>5</sub> )	-21.1	-20.6	-20.1	dB
	GBYP			-19.1	-18.6	-18.1	
	GBBYP			-7.7	-7.2	-6.7	
	GBRYN			-20.3	-19.8	-19.3	
	GBYN			-19.1	-18.6	-18.1	
	GBBYN			-7.9	-7.4	-6.9	
	GBRYI			-10.2	-9.7	-9.2	
	GBYI			-19.1	-18.6	-18.1	
	GBBYI			-10.7	-10.2	-9.7	
R-Y Gain (Input to Pin 1) (Matrix Mode)	GTRY73	—	(Note A <sub>6</sub> )	-3.7	-3.2	-2.7	dB
	GTRY64			-5.0	-4.5	-4.0	
	GTRY55			-6.6	-6.1	-5.6	
	GTRY46			-8.5	-8.0	-7.5	
	GTRY37			-11.0	-10.5	-10.0	
	GTRY28			-14.3	-13.8	-13.3	



CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Y Gain (Input to Pin 2) (Mixing Mode)	GTY73	—	(Note A <sub>7</sub> )	-3.7	-3.2	-2.7	dB
	GTY64			-5.0	-4.5	-4.0	
	GTY55			-6.6	-6.1	-5.6	
	GTY46			-8.5	-8.0	-7.5	
	GTY37			-11.0	-10.5	-10.0	
	GTY28			-14.3	-13.8	-13.3	
B-Y Gain (Input to Pin 3) (Mixing Mode)	GTBY73	—	(Note A <sub>8</sub> )	-3.7	-3.2	-2.7	dB
	GTBY64			-5.0	-4.5	-4.0	
	GTBY55			-6.6	-6.1	-5.6	
	GTBY46			-8.5	-8.0	-7.5	
	GTBY37			-11.0	-10.5	-10.0	
	GTBY28			-14.3	-13.8	-13.3	
R Gain (Input to Pin 6) (Mixing Mode)	GRR37	—	(Note A <sub>9</sub> )	-3.7	-3.2	-2.7	dB
	GRR46			-5.0	-4.5	-4.0	
	GRR55			-6.6	-6.1	-5.6	
	GRR64			-8.5	-8.0	-7.5	
	GRR73			-11.0	-10.5	-10.0	
	GRR82			-14.3	-13.8	-13.3	
G Gain (Input to Pin 7) (Mixing Mode)	GRG37	—	(Note A <sub>10</sub> )	-3.7	-3.2	-2.7	dB
	GRG46			-5.0	-4.5	-4.0	
	GRG55			-6.6	-6.1	-5.6	
	GRG64			-8.5	-8.0	-7.5	
	GRG73			-11.0	-10.5	-10.0	
	GRG82			-14.3	-13.8	-13.3	
B Gain (Input to Pin 8) (Mixing Mode)	GRB37	—	(Note A <sub>11</sub> )	-3.7	-3.2	-2.7	dB
	GRB46			-5.0	-4.5	-4.0	
	GRB55			-6.6	-6.1	-5.6	
	GRB64			-8.5	-8.0	-7.5	
	GRB73			-11.0	-10.5	-10.0	
	GRB82			-14.3	-13.8	-13.3	
YUV Input Dynamic Range (Through Mode)	DTV	—	(Note A <sub>12</sub> )	1.2	1.5	1.7	V <sub>p-p</sub>
	DTY			1.2	1.5	1.7	
	DTU			1.2	1.5	1.7	
RGB Input Dynamic Range (Through Mode)	DRR	—	(Note A <sub>13</sub> )	1.2	1.5	1.7	V <sub>p-p</sub>
	DRG			1.2	1.5	1.7	
	DRB			1.2	1.5	1.7	
R Input Dynamic Range (Input to Pin 6) (Matrix Mode)	DRP	—	(Note A <sub>14</sub> )	1.2	1.5	1.7	V <sub>p-p</sub>
	DRNU			1.2	1.5	1.7	
	DRNI			1.2	1.5	1.7	
G Input Dynamic Range (Input to Pin 7) (Matrix Mode)	DGP	—	(Note A <sub>15</sub> )	1.2	1.5	1.7	V <sub>p-p</sub>
	DGNU			1.2	1.5	1.7	
	DGNI			1.2	1.5	1.7	

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
B Input Dynamic Range (Input to Pin 8)  (Matrix Mode)	DBP	—	(Note A <sub>16</sub> )	1.2	1.5	1.7	V <sub>p-p</sub>
	DBNU			1.2	1.5	1.7	
	DBNI			1.2	1.5	1.7	
YUV Input and Output Frequency Characteristic  (At -3 dB Point) (Through Mode)	GfTRY	—	(Note A <sub>17</sub> )	30	—	—	MHz
	GfTY			30	—	—	
	GfTBV			30	—	—	
RGB Input and Output Frequency Characteristic  (At -3 dB Point) (Through Mode)	GfRR	—	(Note A <sub>18</sub> )	30	—	—	MHz
	GfRG			30	—	—	
	GfRB			30	—	—	
Ys Switching Delay Time	YsRYR	—	(Note A <sub>19</sub> )	—	25.0	40.0	ns
	YsRRY			—	20.0	40.0	
	YsYG			—	25.0	40.0	
	YsGY			—	20.0	40.0	
	YsBYB			—	25.0	40.0	
	YsBBY			—	20.0	40.0	
Crosstalk between Each Input	—	—	(Note A <sub>20</sub> )	—	-50	-40	dB

**TEST CONDITION**

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, V <sub>CC</sub> = 9 V and Ta = 25 ± 3°C)							MEASURING METHOD
		SW MODE							
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>		
									<Common test condition> 1) V <sub>CC</sub> = 9 V and Ta = 25 ± 3°C. 2) ALL switch modes are B, unless otherwise specified.
A <sub>1</sub>	YUV Gain (Through Mode)	B	B	B	B	B	B	B	1) Input Signal 1 into pin 4 2) Supply DC 0 V to YS1 (pin 9), YS2 (pin 10), YS (pin 11). 3) Input Signal 2 (f <sub>0</sub> = 100 kHz, V <sub>0</sub> = 0.2 Vp-p) into V-IN (pin 1, SW <sub>1</sub> = A). 4) Measure the amplitude of V-OUT at pin 13. Calculate the gain. (GTRY) 5) Calculate gains of Y-IN to Y-OUT and U-IN to U-OUT, in the same way as 3) to 4) GTY : Y-IN (pin 2) to Y-OUT (pin 14) GTBY : U-IN (pin 3) to U-OUT (pin 15)
A <sub>2</sub>	RGB Gain (Through Mode)	A	A	A	B	B	B	B	1) Calculate gains against R, G and B, in the same way as NOTE A <sub>1</sub> . GRR : SW <sub>6</sub> = A, R-IN (pin 6) to V-OUT (pin 13) GRG : SW <sub>7</sub> = A, R-IN (pin 7) to Y-OUT (pin 14) GRB : SW <sub>8</sub> = A, R-IN (pin 8) to U-OUT (pin 15)

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9\text{ V}$ and $T_a = 25 \pm 3^\circ\text{C}$ )							MEASURING METHOD
		SW MODE							
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>		
A <sub>3</sub>	R Gain (Input to Pin 6)  (Matrix Mode)	A	A	A	B	B	A	A	1) Calculate gains against each item, in the same way as NOTE A <sub>1</sub> .  (PAL) GRRYP : R-IN (pin 6) to V-OUT (pin 13) GRYP : R-IN (pin 6) to Y-OUT (pin 14) GRBYP : R-IN (pin 6) to U-OUT (pin 15)  (NTSC, UV) GRRYN : R-IN (pin 6) to V-OUT (pin 13) GRYN : R-IN (pin 6) to Y-OUT (pin 14) GRBYN : R-IN (pin 6) to U-OUT (pin 15)  (NTSC, IQ) GRRYI : R-IN (pin 6) to V-OUT (pin 13) GRYI : R-IN (pin 6) to Y-OUT (pin 14) GRBYI : R-IN (pin 6) to U-OUT (pin 15)

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, V <sub>CC</sub> = 9 V and T <sub>a</sub> = 25 ± 3°C)							MEASURING METHOD
		SW MODE							
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>		
A <sub>4</sub>	G Gain (Input to Pin 7) (Matrix Mode)	A	A	A	B	B	A	A	1) Calculate gains against each item, in the same way as NOTE A <sub>1</sub> .  (PAL) GGRYP : G-IN (pin 7) to V-OUT (pin 13) GGYP : G-IN (pin 7) to Y-OUT (pin 14) GGBYP : G-IN (pin 7) to U-OUT (pin 15)  (NTSC, UV) GGRYN : G-IN (pin 7) to V-OUT (pin 13) GGYN : G-IN (pin 7) to Y-OUT (pin 14) GGBYN : G-IN (pin 7) to U-OUT (pin 15)  (NTSC, IQ) GGRYI : G-IN (pin 7) to V-OUT (pin 13) GGYI : G-IN (pin 7) to Y-OUT (pin 14) GGBYI : G-IN (pin 7) to U-OUT (pin 15)

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9\text{ V}$ and $T_a = 25 \pm 3^\circ\text{C}$ )						MEASURING METHOD
		SW MODE						
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>	
A <sub>5</sub>	B Gain (Input to Pin 8) (Matrix Mode)	A	A	A	B	B	B	1) Calculate gains against each item, in the same way as NOTE A <sub>1</sub> .  (PAL) GGRYP : B-IN (pin 8) to V-OUT (pin 13) GGYP : B-IN (pin 8) to Y-OUT (pin 14) GGBYP : B-IN (pin 8) to U-OUT (pin 15)  (NTSC, UV) GGRYN : B-IN (pin 8) to V-OUT (pin 13) GGYN : B-IN (pin 8) to Y-OUT (pin 14) GGBYN : B-IN (pin 8) to U-OUT (pin 15)  (NTSC, IQ) GGRYI : B-IN (pin 8) to V-OUT (pin 13) GGYI : B-IN (pin 8) to Y-OUT (pin 14) GGBYI : B-IN (pin 8) to U-OUT (pin 15)

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9\text{ V}$ and $T_a = 25 \pm 3^\circ\text{C}$ )										MEASURING METHOD
		SW MODE										
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>					
A <sub>6</sub>	R-Y Gain (Input to Pin 1) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Input Signal into pin 4. 2) Supply DC 0V to YS1 (pin 9), YS2 (pin 10), YS3 (pin 11). 3) Input Signal 2 ( $f_0 = 100\text{ kHz}$ , $V_0 = 0.2\text{ V}_{p-p}$ ) into V-IN (pin 1, $SW_1 = A$ ). 4) Measure each amplitude of output signal from V-OUT (pin 13) in each SW MODE. Calculate the gains.
A <sub>7</sub>	Y Gain (Input to Pin 2) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Calculate gains of Y-IN (pin 2) to Y-OUT (pin 14), in the same way as NOTE A <sub>6</sub> . ( $SW_2 = A$ )
A <sub>8</sub>	B-Y Gain (Input to Pin 3) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Calculate gains of U-IN (pin 3) to Y-OUT (pin 15), in the same way as NOTE A <sub>6</sub> . ( $SW_3 = A$ )
A <sub>9</sub>	R Gain (Input to Pin 6) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Calculate gains of R-IN (pin 6) to V-OUT (pin 13), in the same way as NOTE A <sub>6</sub> . ( $SW_6 = A$ )
A <sub>10</sub>	G Gain (Input to Pin 7) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Calculate gains of G-IN (pin 7) to Y-OUT (pin 14), in the same way as NOTE A <sub>6</sub> . ( $SW_7 = A$ )

NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9\text{ V}$ and $T_a = 25 \pm 3^\circ\text{C}$ )								MEASURING METHOD
		SW MODE								
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>			
A11	B Gain (Input to Pin 8) (Mixing Mode)	A B A B A B	B A A B B A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	B B B A A A	1) Calculate gains of B-IN (pin 8) to U-OUT (pin 15), in the same way as NOTE A6. (SW <sub>8</sub> = A)	
A12	YUV Input Dynamic Range (Through Mode)	B	B	B	B	B	B	B	1) Input Signal into pin 4. 2) Supply DC 0V to YS1 (pin 9), YS2 (pin 10), YS3 (pin 11). 3) Input Signal 2 ( $f_0 = 100\text{ kHz}$ , $V_0 = 0.2\text{ V}_{p-p}$ ) into V-IN (pin 1, SW <sub>1</sub> = A). 4) Increase the amplitude of input-signal 2 gradually. Measure the biggest amplitude of input-signal 2 without any distortion on V-OUT wave shape. (DTRY) 5) Measure in the same way as (pin 3) to (pin 4) for Y-IN (pin 2, SW <sub>2</sub> = A) and U-IN (pin 3, SW <sub>3</sub> = A), DTY : Y-IN (pin 2) to Y-OUT (pin 14) DTBY : U-IN (pin 3) to U-OUT (pin 15)	
A13	RGB Input Dynamic Range (Through Mode)	B	B	B	B	B	B	B	1) Measure in the same way as NOTE A12 for R-IN (pin 6, SW <sub>6</sub> = A) G-IN (pin 7, SW <sub>7</sub> = A) and B-IN (pin 8, SW <sub>8</sub> = A).	
A14	R Input Dynamic Range (Input to Pin 6) (Matrix Mode)	A	A	A	B A A	B B A	A A A	A A A	1) For each combination of SW <sub>16A</sub> , 16B and 16C, measure each item in the same way as 1) to 4) of NOTE A12. (SW <sub>6</sub> = A, R-IN (pin 6) to V-OUT (pin 13)) DRP : PAL DRNU : NTSC, UV DRNI : NTSC, IQ	

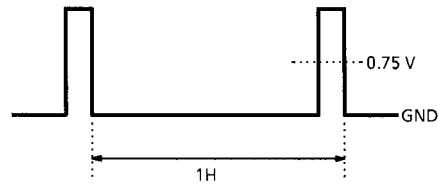


NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, V <sub>CC</sub> = 9 V and Ta = 25 ± 3°C)								MEASURING METHOD
		SW MODE								
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>			
A15	G Input Dynamic Range (Input to Pin 7) (Matrix Mode)	A	A	A	B A A	B B A	B B A	A A A	1) Measure each item in the same way as NOTE A14. (SW <sub>7</sub> = A, G-IN (pin 7) to Y-OUT (pin 14)) DGP : PAL DGNU : NTSC, UV DGNU : NTSC, IQ	
A16	B Input Dynamic Range (Input to Pin 8) (Matrix Mode)	A	A	A	B A A	B B A	B B A	A A A	1) Measure each item in the same way as NOTE A14 (SW <sub>8</sub> = A, B-IN (pin 8) to U-OUT (pin 15)) DBP : PAL DBNU : NTSC, UV DBNI : NTSC, IQ	
A17	YUV Input and Output Frequency Characteristic (At -3 dB Point) (Through Mode)	B	B	B	B	B	B	B	1) Input Signal 1 into pin 4. 2) Supply DC 0V to YS1 (pin 9), YS2 (pin 10), YS3 (pin 11). 3) Input Signal 2 (f <sub>0</sub> = 30 MHz, V <sub>0</sub> = 0.2 V <sub>p-p</sub> ) into V-IN (pin 1, SW <sub>1</sub> = A). 4) Measure the amplitude during picture period on V-OUT (pin 13). (v <sub>13</sub> -30 MHz) 5) Calculate the frequency gain by using the following equation and v <sub>13</sub> , which is measured as the output amplitude in NOTE A1. G <sub>FTRY</sub> = 20 log (v <sub>13</sub> -30 MHz / v <sub>13</sub> ) 6) Calculate following items, in the same way as clause 5). G <sub>FTY</sub> : Y-IN (pin 2) to Y-OUT (pin 14) G <sub>FTBY</sub> : U-IN (pin 3) to U-OUT (pin 15)	

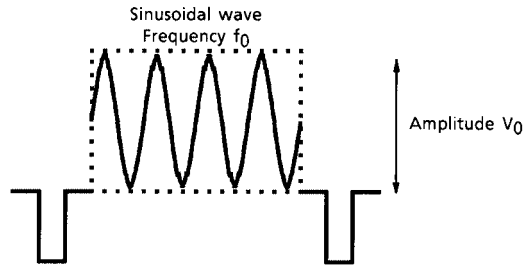
NOTE	ITEM	TEST CONDITION (UNLESS OTHERWISE SPECIFIED, V <sub>CC</sub> = 9 V and Ta = 25 ± 3°C)							
		SW MODE							
		SW <sub>9</sub>	SW <sub>10</sub>	SW <sub>11</sub>	SW <sub>16A</sub>	SW <sub>16B</sub>	SW <sub>16C</sub>	MEASURING METHOD	
A18	RGB Input and Output Frequency Characteristic (At -3 dB Point) (Through Mode)	A	A	A	B	B	B	B	1) In the same way as NOTE A17, calculate items against R-IN (pin 6, SW <sub>6</sub> = A), G-IN (pin 7, SW <sub>7</sub> = A) and B-IN (pin 8, SW <sub>8</sub> = A). GfRR : R-IN (pin 6) to V-OUT (pin 13) GfRG : G-IN (pin 7) to Y-OUT (pin 14) GfRB : B-IN (pin 8) to U-OUT (pin 15)
A19	Ys Switching Delay Time	—	—	—	B	B	B	B	1) Input Signal 1 into pin 4. 2) Input Signal 3 into R-IN (pin 6, SW <sub>6</sub> = A), Input Signal 4 into YS1 (pin 9), YS2 (pin 10), YS3 (pin 11). 3) Measure (I) and (II) periods on V-OUT (pin 13). 4) Measure in the same way as 2) to 3) for G-IN (pin 7, SW <sub>7</sub> = A) and B-IN (pin 8, SW <sub>8</sub> = A). R-IN (I) : YsRYR (II) : YsRYR G-IN (I) : YsYRG (II) : YsYRG B-IN (I) : YsBYB (II) : YsBYB
A20	Crosstalk between Each Input	A or B	A or B	A or B	B	B	B	B	1) Input Signal into pin 4. 2) Supply DC 0V to YS1 (pin 9), YS2 (pin 10), YS3 (pin 11). 3) Input Signal 2 (f <sub>0</sub> = 4 MHz, V <sub>0</sub> = 0.5 V <sub>p-p</sub> ) into V-IN (pin 1, SW <sub>1</sub> = A). 4) Changing SW <sub>9</sub> , SW <sub>10</sub> , and SW <sub>11</sub> against each case, measure each leak levels. 5) Calculate the gains, input level to leak level.

## TEST SIGNALS

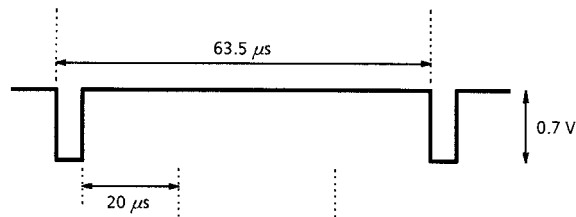
Signal 1



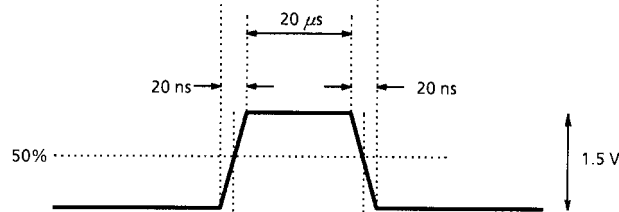
Signal 2



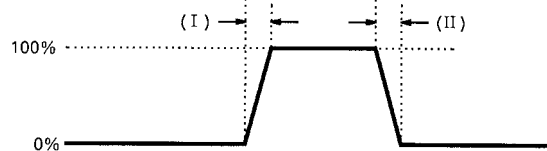
Signal 3



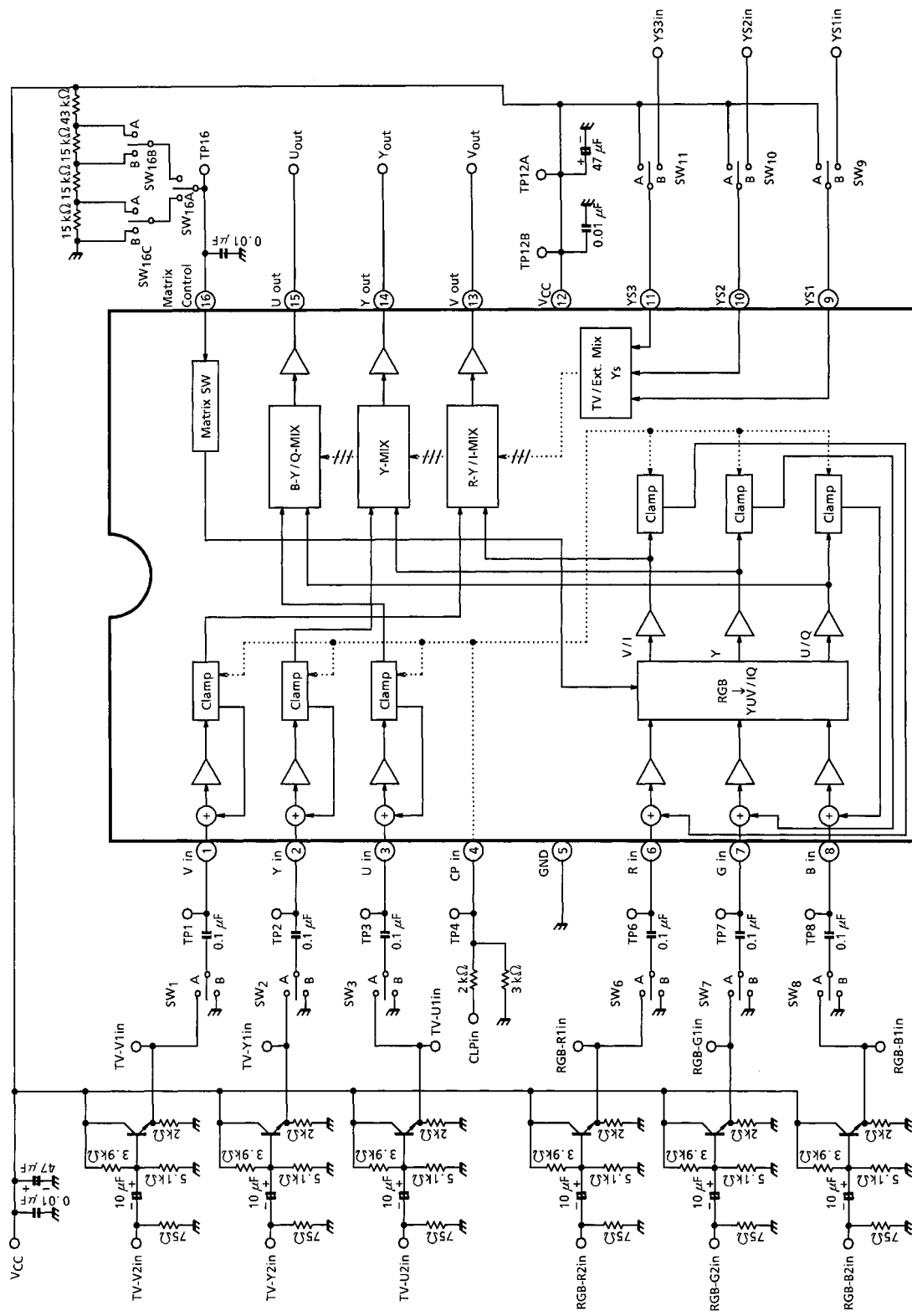
Signal 4



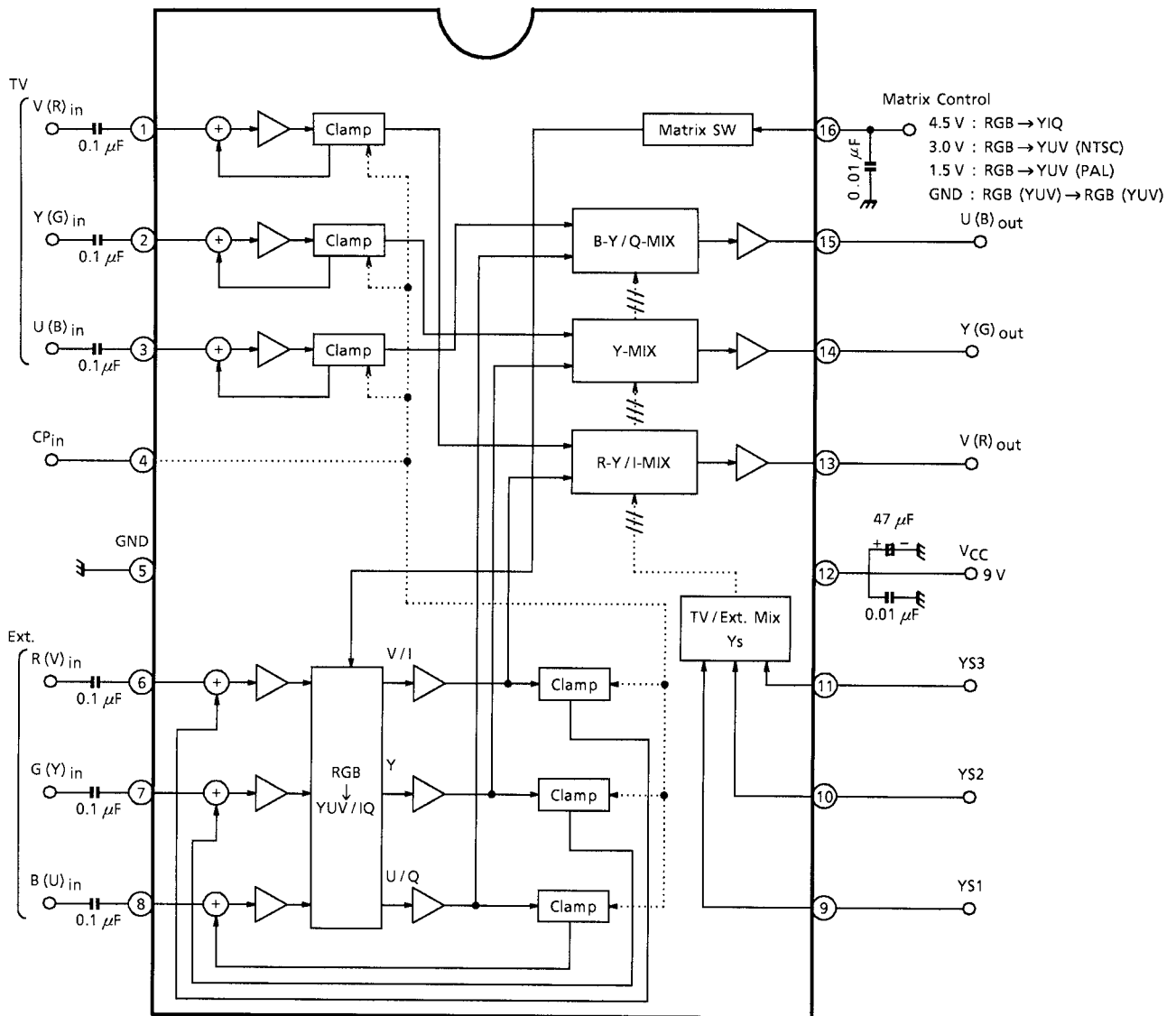
Output wave-form



**TEST CIRCUIT**



## APPLICATION CIRCUIT



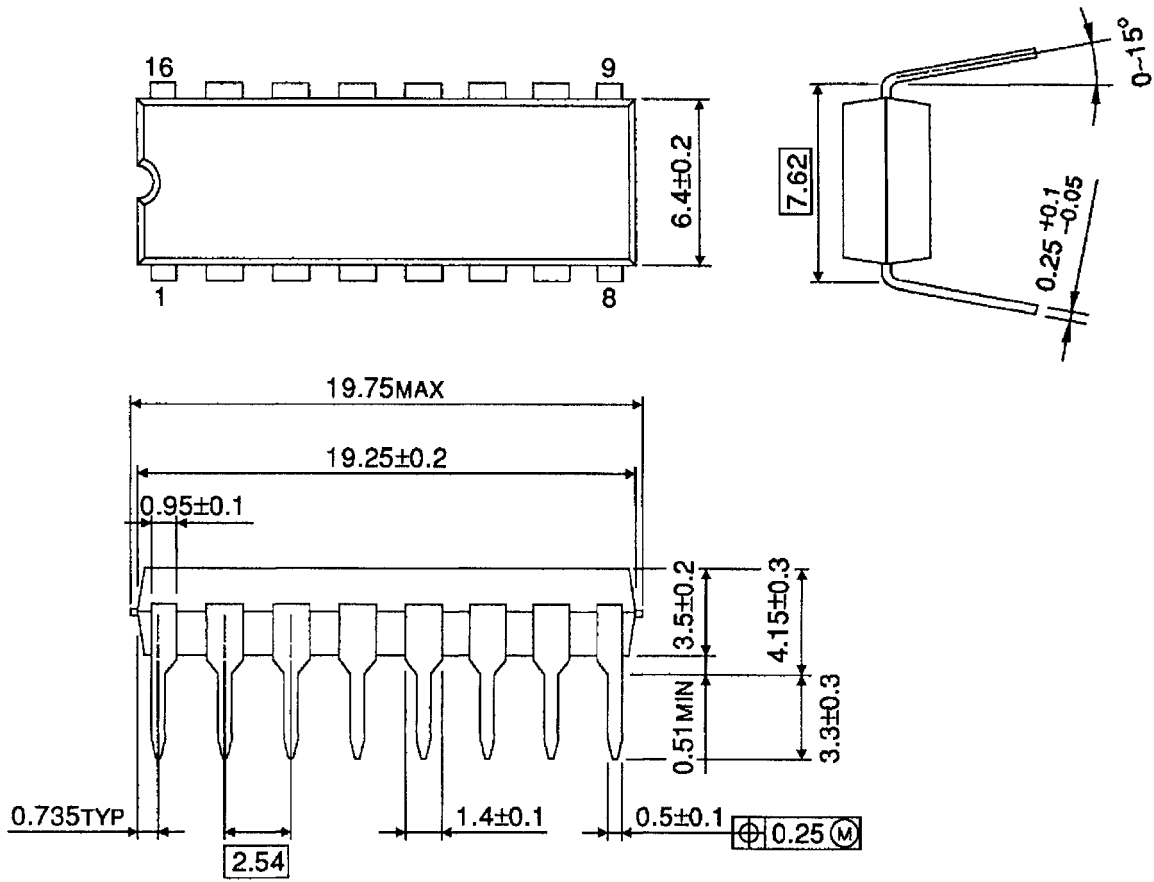
**THE MIXING RATIO TABLE FOR EXTERNAL TO TV**

Ys1	Ys2	Ys3	EXT : TV
L	L	L	0 : 1
H	L	L	0.3 : 0.7
L	H	L	0.4 : 0.6
H	H	L	0.5 : 0.5
L	L	H	0.6 : 0.4
H	L	H	0.7 : 0.3
L	H	H	0.8 : 0.2
H	H	H	1 : 0

**PACKAGE DIMENSIONS**

DIP16-P-300-2.54A

Unit : mm

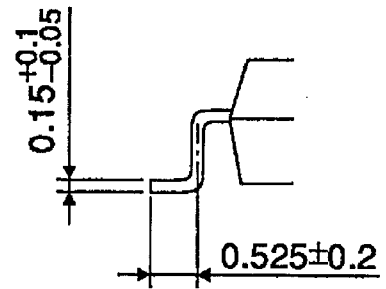
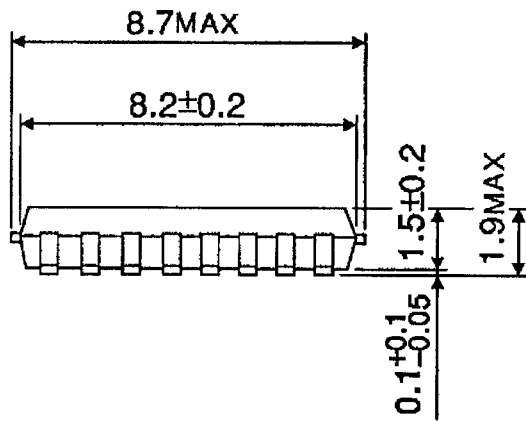
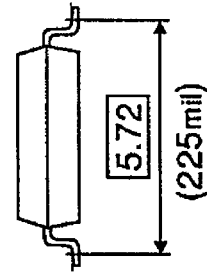
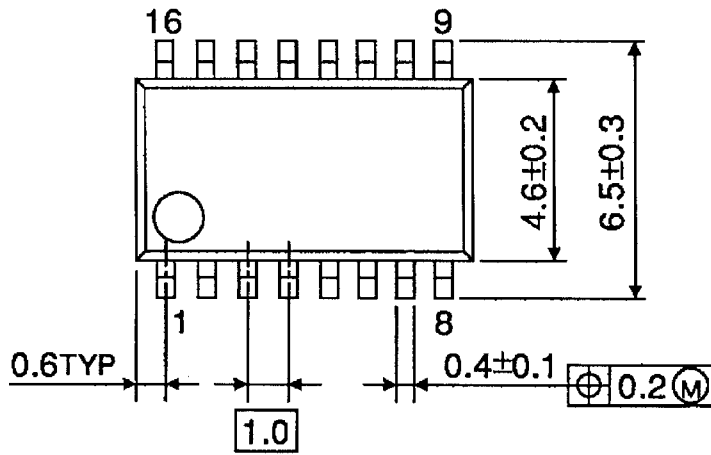


Weight: 1.0g (Typ.)

**PACKAGE DIMENSIONS**

SSOP16-P-225-1.00A

Unit : mm



Weight: 0.14g (Typ.)

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000707EBA

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