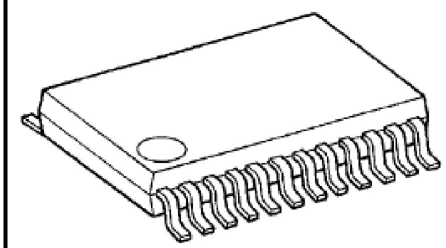
TOSHIBA Bipolar Linear Integrated Circuit
Silicon Monolithic

TA1275BFNG

SECAM Demodulator Processor

The TA1275BFNG is a SECAM demodulation IC, used in combination with the TB1309 series to achieve a multicolor system. This IC requires very few external parts.



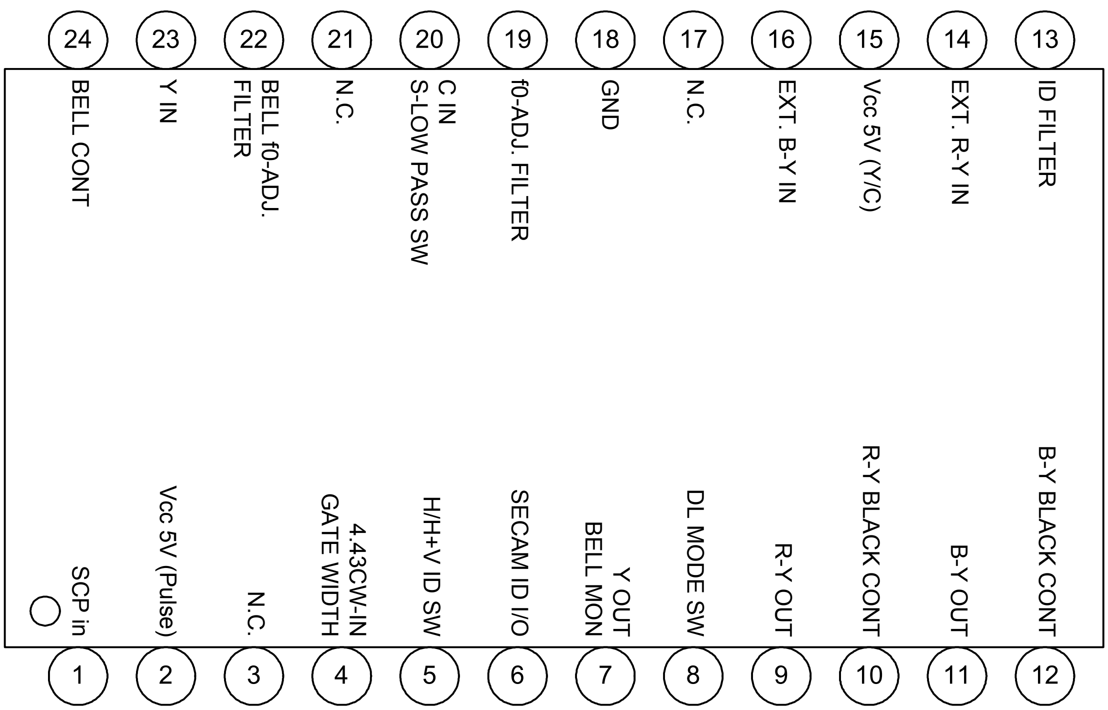
SSOP24-P-300-0.65A

Weight: 0.09 g (typ.)

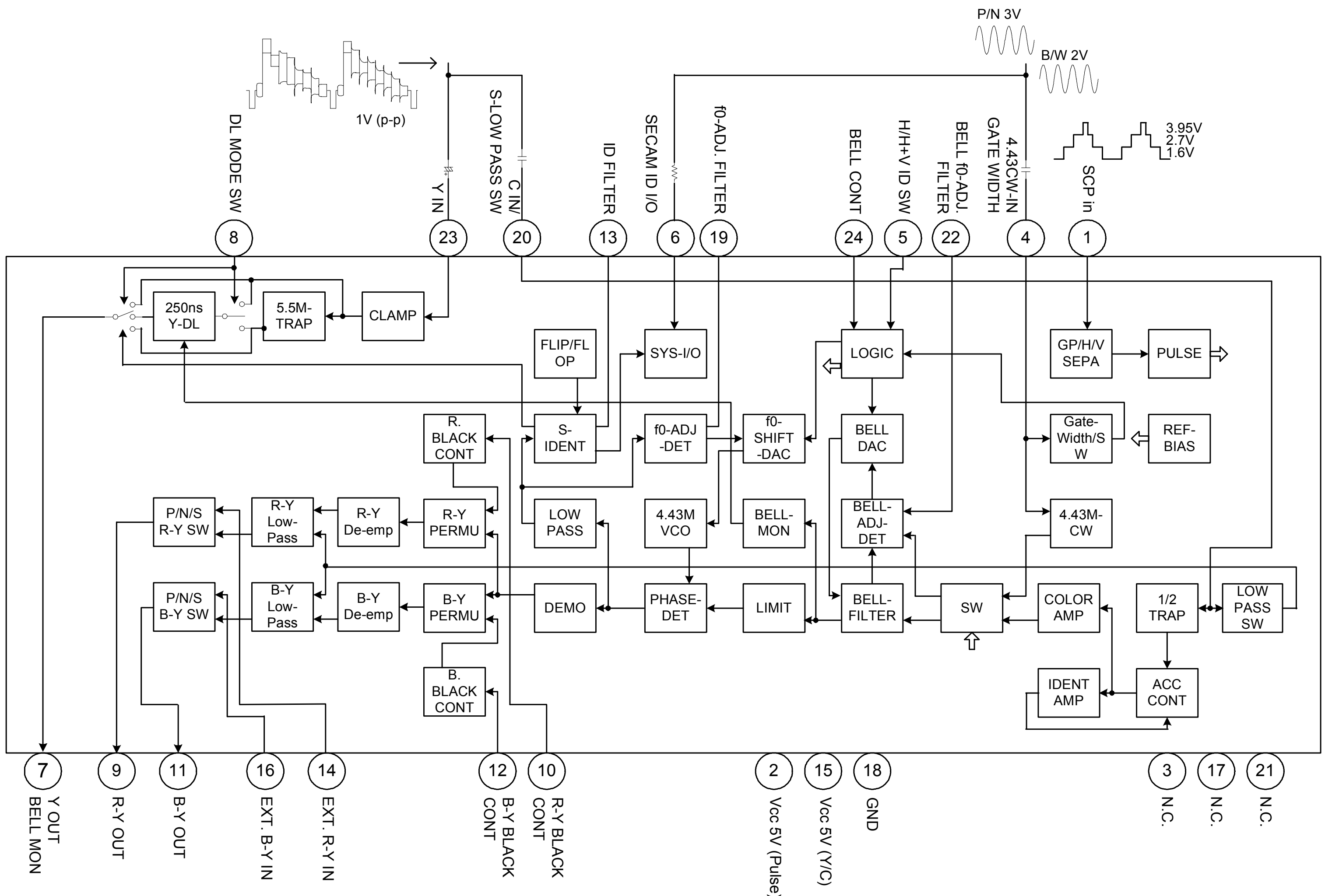
Features

- Combines with the TB1309 series, which is a video processor, timing controller, and PWM pulse processor for analog LCDs
- Built-in bell filter
- Built-in FM demodulator with PLL circuit for color demodulation and SECAM identification
- DC voltage offset for demodulated signal adjuster
- Input terminals for external R-Y / B-Y signals

Pin Connection



Block Diagram



Some functional blocks, circuits or constants may be omitted or simplified in the block diagram for explanatory purposes.

Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{CCmax}	8	V
Input pin voltage	Vin	GND - 0.3 ~ Vcc + 0.3	V
Power consumption	P_D (Note)	780	mW
Power consumption reduction ratio	1 / Qja	6.3	mW / °C
Operating temperature	T_{opr}	−30~85	°C
Storage temperature	T_{stg}	−55~150	°C

Note: When using the device at above TA = 25°C, decrease the power dissipation by 9.1 mW for each increase of 1°C.

The absolute maximum ratings of a semiconductor device are a set of specified parameter values that must not be exceeded during operation, even for an instant.

If any of these ratings are exceeded during operation, the electrical characteristics of the device may be irreparably altered, in which case the reliability and lifetime of the device can no longer be guaranteed.

Moreover, operations with exceeded ratings may cause breakdown, damage and/or degradation in other equipment. Applications using the device should be designed so that no maximum rating will ever be exceeded under any operating conditions.

Before using, creating and/or producing designs, refer to and comply with the precautions and conditions set forth in these documents.

Operating Conditions

Characteristic	Description	Min	Typ.	Max	Unit
Supply voltage	Pin 2, 15	4.75	5.0	5.25	—
Y Input signal level	White: 100%, including sync.	0.9	1.0	1.1	V (p-p)
Color difference input level	Burst level	270	300	330	mV (p-p)
SCP input level	G level	3.25	4.0	5.0	V
	H level	1.95	2.1	2.6	
	V level	1.1	1.25	1.4	
4.43 MHz CW input level	Pin 4	200	—	—	mV (p-p)

Electrical Characteristics

(YC V_{CC} / Pulse V_{CC} = 5 V, Ta = 25°C, unless otherwise specified)

Current Consumption

Pin Name	Symbol	Test Circuit	Min	Typ.	Max	Unit
V_{CC} (Y / C)	I_{CC1}	—	32.0	38.5	48.1	mA
V_{CC} (Pulse)	I_{CC2}	—	5.6	6.7	8.4	

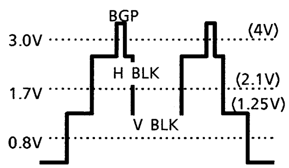
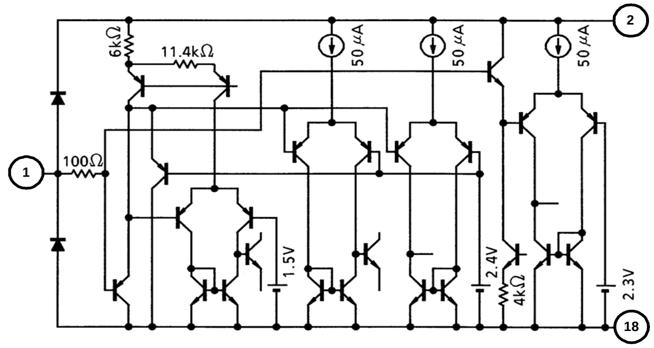
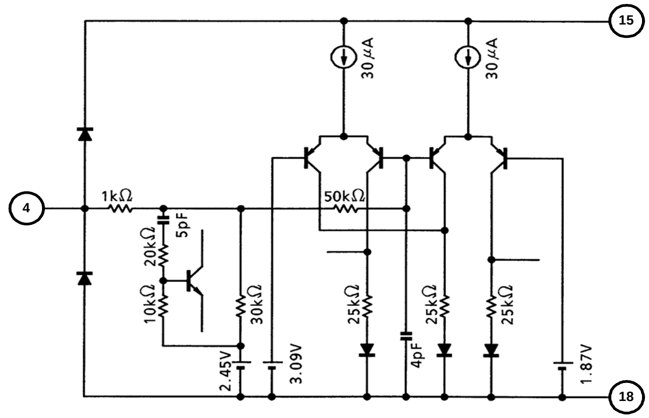
Terminal Voltage

Pin No.	Pin Name	Symbol	Test Circuit	Min	Typ.	Max	Unit
4	4.43 MHz CW-IN	V_4	—	2.50	2.75	3.00	V
5	ID SW	V_5	—	2.30	2.50	2.70	
6	SECAM ID I / O (killer OFF)	V_6	—	0.00	0.20	0.60	
7	Y OUT	V_7	—	2.35	2.55	2.75	
8	MODE SW	V_8	—	1.80	2.00	2.20	
9	R-Y OUT	V_9	—	2.10	2.40	2.70	
10	R-Y BLACK CONTROL	V_{10}	—	2.30	2.50	2.70	
11	B-Y OUT	V_{11}	—	2.10	2.40	2.70	
12	B-Y BLACK CONTROL	V_{12}	—	2.30	2.50	2.70	
13	S-ID FILTER (killer OFF)	V_{13}	—	4.25	4.55	4.85	
14	EXT. R-Y IN	V_{14}	—	2.40	2.60	2.80	
16	EXT. B-Y IN	V_{16}	—	2.40	2.60	2.80	
19	F0-ADJ. FILTER	V_{19}	—	2.55	3.00	3.45	
20	C IN	V_{20}	—	3.50	3.70	3.90	
22	BELL ADJ. FILTER	V_{22}	—	2.20	2.50	2.80	
23	Y IN	V_{23}	—	2.30	2.50	2.70	
24	BELL CONTROL	V_{24}	—	4.80	5.00	5.20	

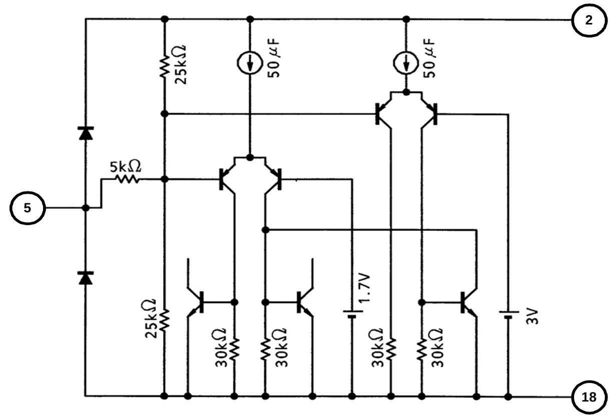
Note: The pins numbered 1, 4, 9, 10, 12, 13, 14, 19, 20 and 24 of this product are sensitive to electrostatic discharge. When handling the product, protect the environment to avoid electrostatic discharge.

Terminal Interface

The equivalent circuit diagrams may be simplified or some parts of them may be omitted for explanatory purposes.

Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
1	SCP IN	The pin for inputting the sand castle pulse (SCP) 		—
2	Vcc 5 V (Pulse)	V_{CC} pin for logic block	—	—
3	N.C. (No Connection)	Connect to GND.	—	—
4	4.43CW-IN GATE WIDTH	The pin for inputting 4.43 MHz of carrier wave for the selfadjustment circuit. Input a 500 mV_{p-p} sine wave through a coupling capacitor. The switch for changing the gate pulse width is overlaid on this pin. +200 nS : to V_{CC} thru 33 kΩ 0ns : open −200 nS : to GND thru 33 kΩ		—

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>Function</th><th>Interface Circuit</th><th>Input/Output Signal</th></tr>
<tr><td>5</td><td>H/H+V ID SW</td><td>The switch pin for selecting the ID detection mode.

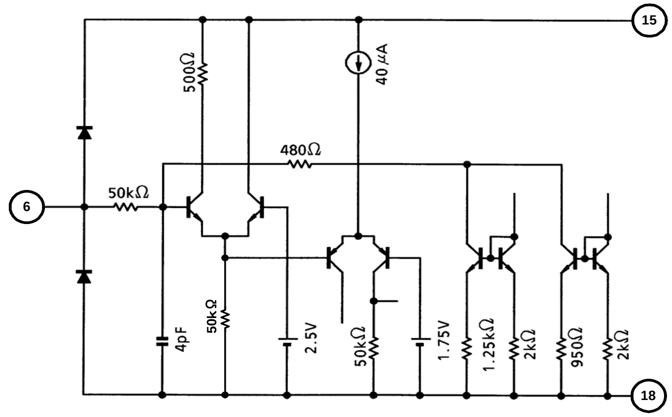
H+V : connected to V_{CC}
Auto search (H, V, H+V)
: opened
H : connected to GND</td><td>
</td><td>—</td></tr>
<tr><td>6</td><td>SECAM ID I / O</td><td>The interface pin to the main processor (i.e., TB1309).

This input/output interface pin sinks two values of current corresponding to the ID level of the SECAM input signal.

Strong SECAM : 420 μA

SECAM : 180 μA
This pin turns the internal/external switch by the input DC voltage.

Internal : GND~2.5 V

External : 2.5 V~V_{CC}</td><td>
</td><td>—</td></tr>
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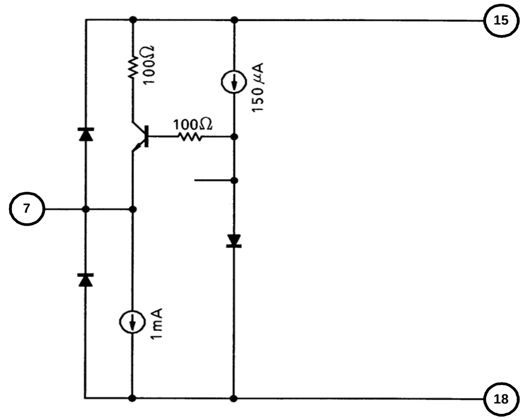
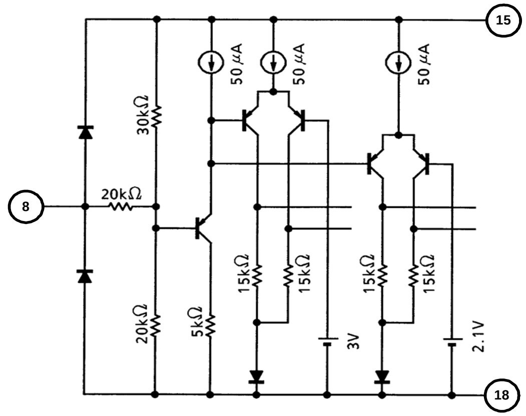
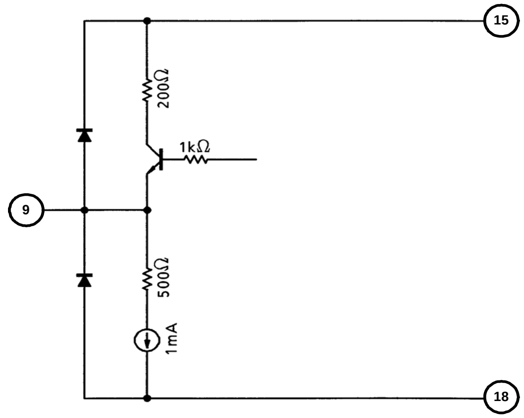
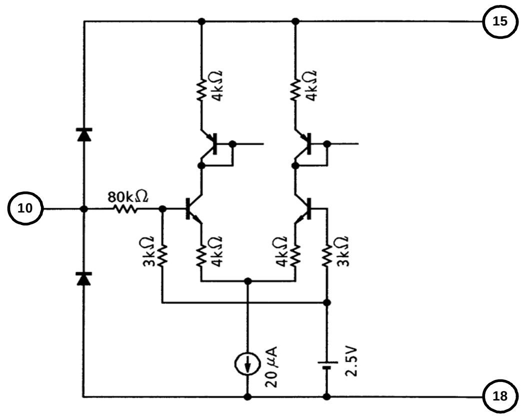
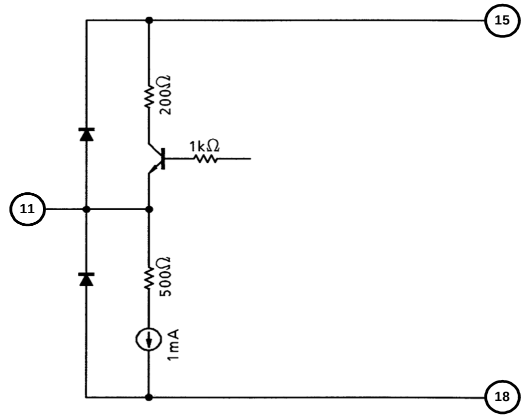
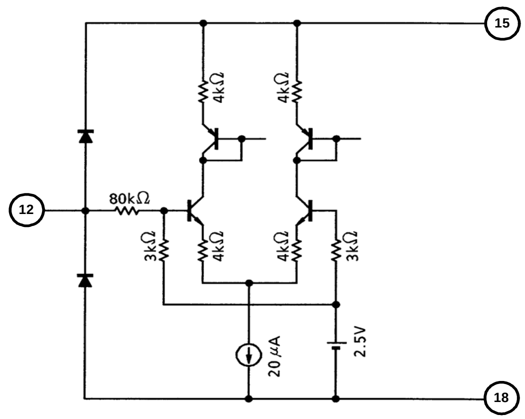
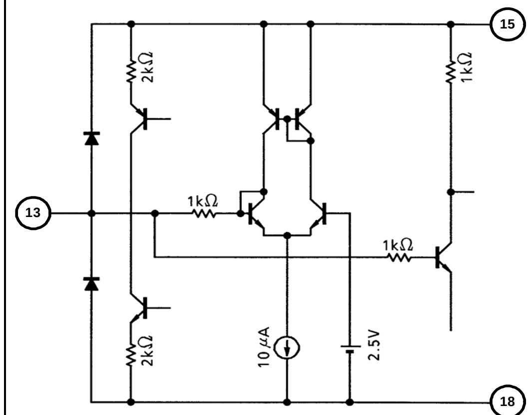
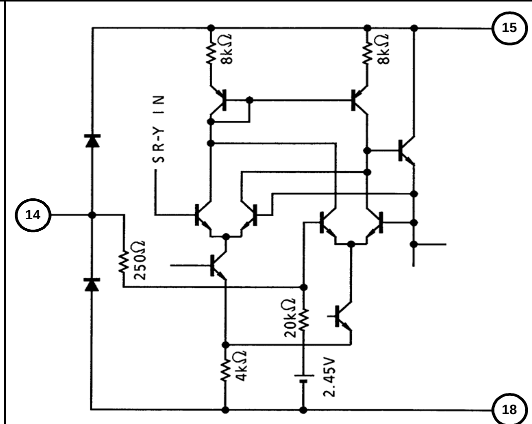
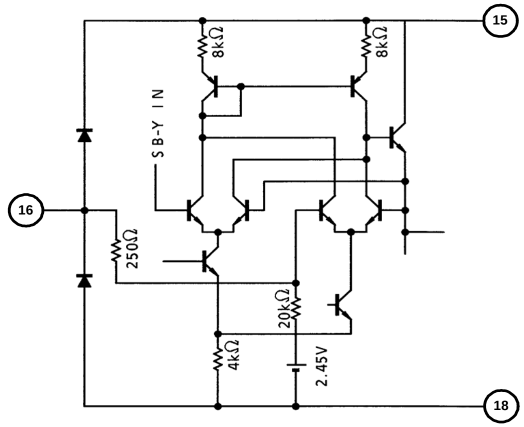
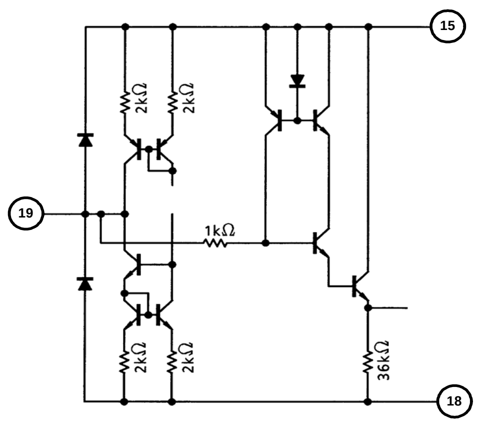
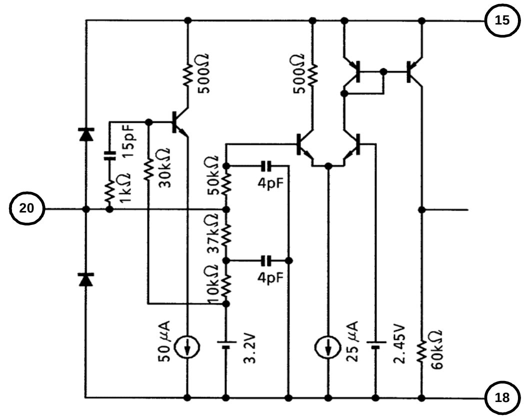
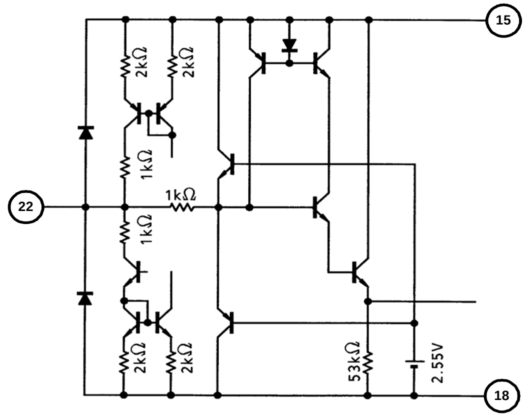
Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
7	Y OUT BELL MON	The output pin for the Y signal. The standard output level is 1.0 V_{p-p}. The 5.5 MHz trap filter and delay line on the Y signal processing is controlled by the switch on Pin 8. The output signal of the bell filter can be monitored on this pin by switching Pin 20 for testing.		—
8	DL MODE SW	The pin for controlling the Y processing mode. To V_{CC} : 5.5 MHz trap Open : 5.5 MHz trap + DL To GND : DL		—

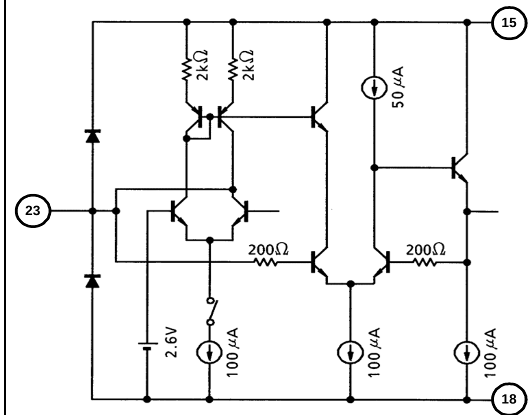
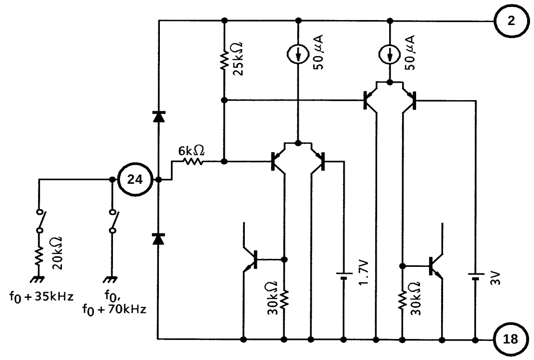
Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
9	R-Y OUT	The output pin for demodulated R-Y signal. Standard output level is 0.7 V_{p-p} with a standard color bar signal. R-Y processor has an LPF to eliminate the carrier components.		—
10	R-Y BLACK CONTROL	The pin for controlling the black offset level. Adjusting range is within ±30 mV. (This pin should be opened in the case of use with the TB1309as the TB1309 has an IIC BUS control for SECAM black alignment.)		—

Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
11	B-Y OUT	The output pin for demodulated B-Y signal. The standard output level is 0.56 V_{p-p}. The B-Y processor has an LPF to eliminate the carrier components.		—
12	B-Y BLACK CONTROL	The pin for controlling the black offset level. The adjusting range is within ±30 mV. (This pin should be opened in the case of use with the TB1309 as the TB1309 has an IIC BUS control for SECAM black alignment.)		—

Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
13	ID FILTER	The pin for connecting the SECAM ident filter capacitor. Too large a capacitor causes a time delay obtaining color signal on a picture. Yet a weak RF signal performancegrows worse if the capacitor is too small.		—
14	EXT. R-Y IN	The input pin for external R-Y signal. The gain of the internal amplifier is 0 dB.		—
15	Vcc 5 V (Y/C)	The V_{CC} pin for the Y/C processing block.	—	—

Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
16	EXT. B-Y IN	The input pin for the external B-Y signal. The gain of the internal amplifier is 0 dB.		—
17	N.C. (No Connection)	Connect to GND.	—	—
18	GND	The GND pin.	—	—
19	f_0-ADJ. FILTER	The pin for connecting a capacitor for the automatic adjustment circuit. Too large a capacitor causes a time delay obtaining a color signal on the picture. Yet picture noise and flickeringoccur if the capacitor is too small.		—

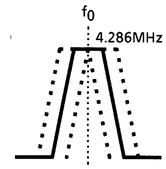
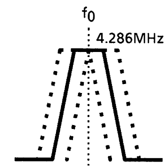
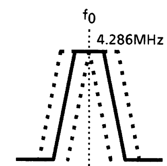
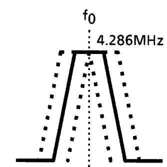
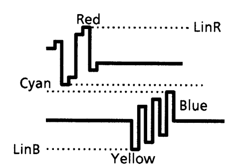
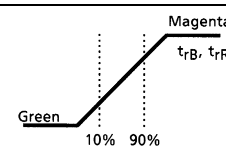
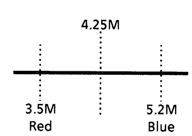
Pin No.	Pin Name	Function	Interface Circuit	Input/Output
20	C IN S-LOW PASS SW	The chroma signal input pin. Apply composite signal through 0.01 μF of coupling capacitor. The standard input signal level is 1 V_{p-p}. The bell monitor switch for testing is overlaid on this pin. When this pin is connected to GND through 27 kΩ, the bell filter output is observed on Pin 7 (Y-OUT).		—
21	N.C. (No Connection)	Connect to GND.	—	—
22	BELL f_0-ADJ. FILTER	The pin for connecting the filter capacitor for the bell filter f_0, 4.286 MHz. Too large a capacitor causes a time delay on the bell filter f_0 adjustment. Yet too small a capacitor causes the picture to be noisy.		—

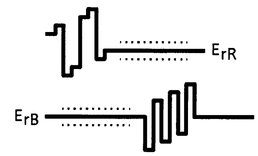
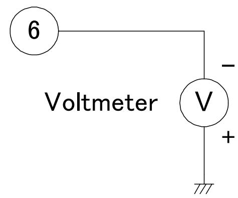
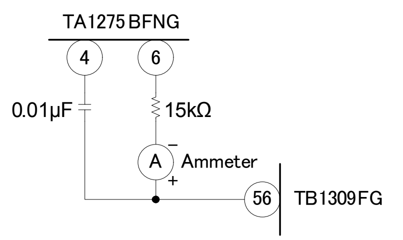
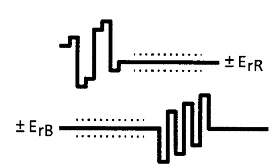
Pin No.	Pin Name	Function	Interface Circuit	Input/Output Signal
23	Y IN	The Y signal input pin. Apply the composite signal into this pin through a coupling capacitor. The standard input level is 1.0 $V_{p\text{-}p}$.		—
24	BELL CONTROL	The pin for selecting the bell filter f_0 f_0+70 kHz : OPEN (≈V_{CC}) f_0+35 kHz : 20 kΩ to GND (≈1.7 V) f_0 : to GND (≈0 V)		—

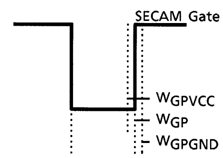
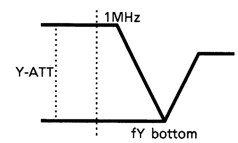
AC Characteristics (Unless otherwise specified, V_{CC} = 5 V (Pins 2 & 15), Ta = 25°C)

No.	Item	Symbol	Test Circuit	Test Condition	Rating			Unit
					Min	Typ.	Max	
1	Bell/Filter f_0	$f_{0B\text{-}C}$	—	(Note 2)	−23	0	30	kHz
2	Bell/Filter f_0 Variable Range	$f_{0B\text{-}H}$ $f_{0B\text{-}L}$	—	(Note 3)	+40 +10	+70 +35	+100 +60	kHz kHz
3	Bell/Filter Q	Q_{BEL}	—	(Note 6)	14	16	18	—
4	Color Difference Output Amplitude	V_{BS} V_{RS}	—	(Note 7)	0.39 0.5	0.56 0.7	0.73 0.99	V (p-p) V (p-p)
5	Color Difference Relative Amplitude	R / B-S	—	(Note 8)	1.24	1.35	1.52	—
6	Linearity	LinB LinR	—	(Note 12)	93 93	100 100	107 107	% %
7	Rising Time	t_{rR} t_{rB}	—	(Note 13)	— —	1.3 1.3	2.0 2.0	μs μs
8	Demodulation Hold Range	H_{RL} H_{BH}	—	(Note 14)	— 4.75	3.5 5.2	3.9 —	MHz MHz
9	Demodulation Capture Range	C_{RL} C_{BH}	—	(Note 15)	— 4.75	3.5 5.2	3.9 —	MHz MHz
10	Killer Operation Input Level	e_{SK} e_{SC}	—	(Note 16)	0.15 0.40	0.30 0.65	0.60 1.20	mV (p-p) mV (p-p)
11	Black Level Offset	E_{rR} E_{rB}	—	(Note 18)	−30 −30	0 0	+30 +30	mV mV
12	ID Voltage	V_{6color} $V_{6B / W}$	—	(Note 19)	0.12 4.8	0.2 4.9	0.6 5.0	V V
13	ID Current	$I_{6strongSE}$ I_{6SE} $I_{6B / W}$	—	(Note 20)	310 133 —	420 180 0	530 225 10	μA μA μA
14	System SW Threshold Level	$V_{6P / N}$ V_{6S}	—	(Note 21)	2.3 2.3	2.5 2.5	2.7 2.7	V V
15	Color Difference Output DC Level	$V_{9P / N}$ $V_{11P / N}$ V_{9S} V_{11S}	—	(Note 22)	2.3 2.3 2.1 2.1	2.6 2.6 2.4 2.4	2.9 2.9 2.7 2.7	V V V V
16	R-Y / B-Y Color Black Level Control Characteristics	ΔE_{rR+} ΔE_{rR-} ΔE_{rB+} ΔE_{rB-}	—	(Note 23)	22 −30 22 −30	26 −26 26 −26	30 −22 30 −22	mV mV mV mV
17	Ext. Color Difference Gain	G_{EXTR} G_{EXTB}	—	(Note 24)	0.8 0.8	1.0 1.0	1.2 1.2	— —
18	Gate Pulse Width Variable Range	W_{GPGND} W_{GP} W_{GPVCC}	—	(Note 26)	1.7 1.9 2.1	1.8 2.0 2.2	1.9 2.1 2.3	μs μs μs
19	Y DL Characteristics (at 3 MHz)	t_{YDL}	—	(Note 27)	180	250	360	—
20	Y Trap Characteristics	$f_{0Y5.5}$ $G_{at}\ f_0$	—	(Note 28)	4.5 —	5.5 -35	6.5 -20	MHz dB
21	Y Input Dynamic Range	DR_{YS} DR_{YBW}	—	(Note 29)	0.9 1.1	1.0 1.25	1.1 1.4	V (p-p) V (p-p)
22	Y Gain	GYS GYBW	—	(Note 30)	0.7 0.8	0.9 1.0	1.1 1.2	— —

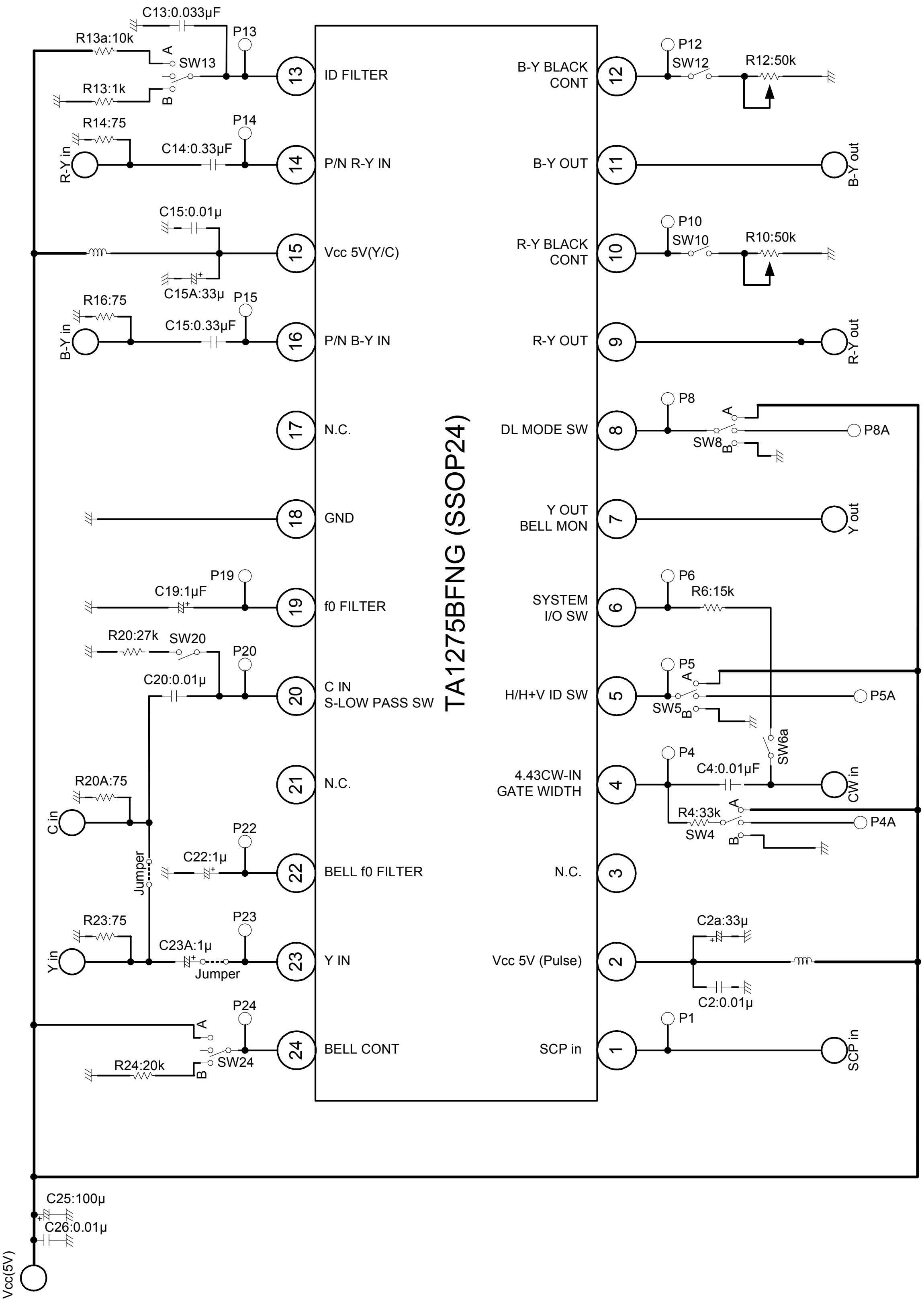
Test Conditions (Unless otherwise specified, V_{CC} = 5 V (Pins 2 & 15), Ta = 25°C)

Note	Item	Test Condition
1	Bell / Filter f_0	(1) : Input a 20 mV_{p-p} sine wave whose frequency is sweep into Pin 20. (2) : Connect Pin 20 to GND through 27 kΩ. (3) : Keep Pin 24 GND. (4) : Measure the frequency at which the Pin 7 output is the greatest, that is, "f_{0BEL}". (5) : Calculate : "f_{0B-C}" = f_{0BEL}−4,286 kHz. 
2	Bell / Filter f_0 Variable Range	(1) : Input a 20 mV_{p-p} sine wave whose frequency is sweep into Pin 20. (2) : Connect pin 20 to GND through 27 kΩ. (3) : Measure the frequency at which the Pin 7 output is the greatest when V_{CC} is 5.5 V / 4.5 V, that is, $f_{0BEL5.5}$ / $f_{0BEL4.5}$. (4) : Calculate : "f_{0B-H}" = f_{0BELH}−4,286 kHz. "f_{0B-L}" = f_{0BELL}−4,286 kHz. 
3	Bell / Filter Q	(1) : Input a 20 mV_{p-p} sine wave whose frequency is sweep into Pin 20. (2) : Connect Pin 20 to GND through 27 kΩ. (3) : Pin 24 is GND. (4) : Observe the frequency response of the Pin 7 output. (5) : Calculate : "Q_{BEL}" = (MAX−3dB Band Width) / f_{0BEL}. 
4	Color Difference Output Amplitude	(1) : Input a 75% color bar (200 mV_{p-p} at R ID) into Pin 20. (2) : Measure the R-Y output amplitude at Pin 9, that is, "V_{RS}". (3) : Measure the B-Y output amplitude at Pin 11, that is, "V_{BS}". 
5	Color Difference Relative Amplitude	Calculate : "R / B-S" = V_{RS} / V_{BS}.
6	Linearity	(1) : Input a 75% color bar (200 mV_{p-p} at R ID) into Pin 20. (2) : Measure the amplitude between Black and Cyan / Red, that is, V_{Cyan} / V_{Red}. (3) : Measure the amplitude between Black and Yellow / Blue, that is, V_{Yellow} / V_{Blue}. (4) : Calculate : "LinR" = V_{Cyan} / V_{Red} "LinB" = V_{Yellow} / V_{Blue} 
7	Rising Time	(1) : Input a 75% color bar (200 mV_{p-p} at R ID) into Pin 20. (2) : Measure the rising time (from 10% to 90%) between Green and Magenta at Pin 9 / Pin 11, that is, "t_{rR}" / "t_{rB}". 
8	Demodulation Hold Range	(1) : Input a 200 mV_{p-p}, 2 MHz sine wave into Pin 20. (2) : Increasing the input frequency, measure the frequencies at which demodulated output appears at Pin 9, that is, "C_{RL}", and at which demodulated output disappears at Pin 11, that is, "H_{BH}". (3) : Input a 200 mV_{p-p}, 7 MHz sine wave into Pin 20. (4) : Decreasing the input frequency, measure the frequencies at which demodulated output appears at Pin 11, that is, "C_{BH}", and at which demodulated output disappears at Pin 9, that is, "H_{RL}". 
9	Demodulation Capture Range	

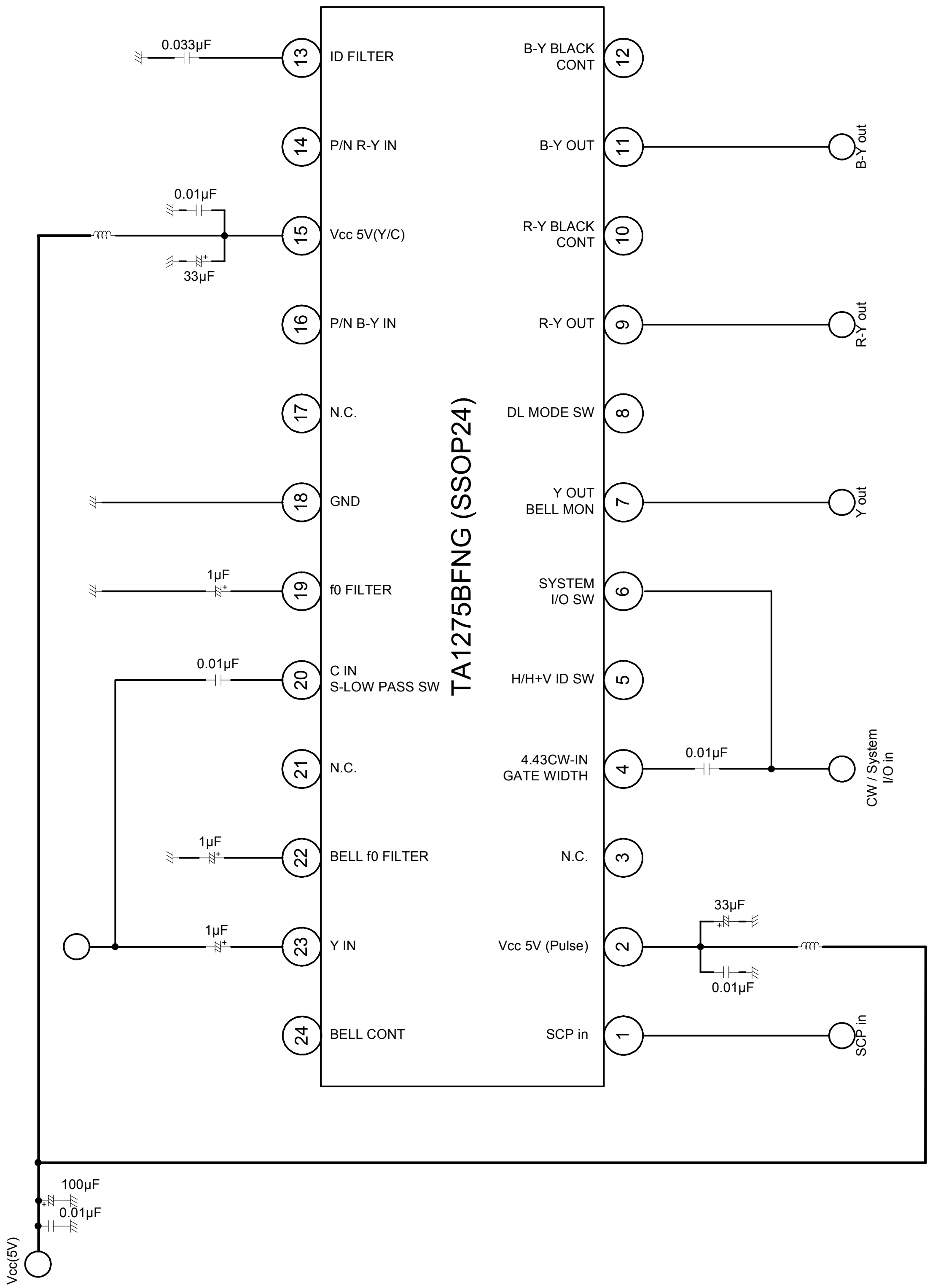
Note	Item	Test Condition
10	Killer ON/OFF Level	(1) : Input a 75% color bar (200 mV_{p-p} at R ID) into Pin 20. (2) : Decreasing the input amplitude, measure the amplitude at which demodulated outputs disappear at Pin 9 and Pin 11, that is, "e_{SK}". (3) : Increasing the input amplitude from 0 mV_{p-p}, measure the amplitude at which demodulated outputs appear at Pin 9 and Pin 11, that is, "e_{SC}".
11	Black Level Offset	(1) : Input a 200 mV_{p-p} non-modulated chrome signal into Pin 20. (2) : Pin 10 and Pin 12 are opened. (3) : Measure the difference between picture period and blanking period at Pin 9 / Pin 11, that is, "E_{rR}" / "E_{rB}". 
12	ID Voltage	(1) : Connect the external power supply to Pin 13, as shown in the figure. (2) : Apply 4.0 V to Pin 13, and measure the Pin 6 voltage, that is, "V_{6color}". (3) : Apply 2.0 V to Pin 13, and measure the Pin 6 voltage, that is, "$V_{6B / W}$". 
13	ID Current	(1) : Connect the external power supply to Pin 13, as shown in the figure. (2) : Apply 5.0 V to Pin 13, and measure the Pin 6 current, that is, "$I_{6strongSE}$". (3) : Apply 4.0 V to Pin 13, and measure the Pin 6 current, that is, "I_{6SE}". (4) : Apply 2.0 V to Pin 13, and measure the Pin 6 current, that is, "$I_{6B / W}$". 
14	System SW Threshold Level	(1) : Input a 200 mV_{p-p}, 15 kHz sine wave into Pin 14 and Pin 16. (2) : No input on Pin 20. (3) : Increasing the Pin 6 voltage from 0 V, measure the voltage at which the 15 kHz sine wave appears at Pin 9 and Pin 11, that is, "V_{6PIN}". (4) : Decreasing the Pin 6 voltage from 4 V, measure the voltage at which the 15 kHz sine wave disappears at Pin 9 and Pin 11, that is, "V_{6S}".
15	Color Difference Output DC Level	(1) : No input on Pin 20. (2) : Measure the DC voltage on Pin 9 / Pin 11 when Pin 6 is 4 V, that is, "V_{9PIN}" / "V_{11PIN}". (3) : Measure the DC voltage on Pin 9 / Pin 11 when Pin 6 is 0 V, that is, "V_{9S}" / "V_{11S}".
16	R-Y B-Y Black Level Control Characteristics	(1) : Input a 75% color bar (200 mV_{p-p} at R ID) into Pin 20. (2) : Measure the difference between the picture period and the blanking period at Pin 9 when Pin 10 is 5 V / 0 V, that is, E_{rR+} / E_{rR-}. (3) : Measure the difference between the picture period and the blanking period at Pin 11 when Pin 12 is 5 V / 0 V, that is, E_{rB+} / E_{rB-}. (4) : Calculate : "ΔE_{rR+}" = $E_{rR+} - E_{rR}$ "ΔE_{rR-}" = $E_{rR-} - E_{rR}$ "ΔE_{rB+}" = $E_{rB+} - E_{rB}$ "ΔE_{rB-}" = $E_{rB-} - E_{rB}$ 

Note	Item	Test Condition
17	Ext. Color Difference Gain	(1) : Input a 200 $mV_{p\text{-}p}$, 15 kHz sine wave into Pin 14 and Pin 16. (2) : Supply 4 V to Pin 6. (3) : Measure the respective output amplitudes at Pin 9 and Pin 11: V_{EXTR} and V_{EXTB}. (4) : Calculate : "G_{EXTR}" = V_{EXTR} / 200 mV "G_{EXTB}" = V_{EXTB} / 200 mV
18	Gate Pulse Width Variable Range	(1) : Input a 75% color bar (200 $mV_{p\text{-}p}$ at R ID) into Pin 20. (2) : Connecting Pin 13 to GND via 1 kΩ, observe the gate pulse at Pin 13. (3) : Measure the respective gate pulse widths for when Pin 4 is opened and for when it is connected to V_{CC} / GND: "W_{GP}", "W_{GPVCC}" and "W_{GPGND}". 
19	Y DL Characteristics	(1) : Connect Pin 13 to V_{CC} via 10 kΩ. (2) : Connect Pin 8 to GND. (3) : Measure the delay time between Pin 23 input and Pin 7 output, that is, "t_{YDL}".
20	Y Trap Characteristics	(1) : Input a sweep signal with sync. (1 $V_{p\text{-}p}$). (2) : Connect Pin 13 to V_{CC} via 10 kΩ. (3) : Connect Pin 8 to V_{CC}. (4) : Observing the frequency response at Pin 7, measure the frequency at which the attenuation is maximum, that is, "$f_{0Y5.5}$"; and measure the attenuation at $f_{0Y5.5}$ against that at 1 MHz, that is, "$G_{Y5.5}$". 
21	Y Input Dynamic Range	(1) : Connect Pin 13 to V_{CC} via 10 kΩ. (2) : Increasing the amplitude of the Y signal input into Pin 23, measure the amplitude at which the output signal from Pin 7 begins to be distorted, that is, "DR_{YS}". (3) : Open Pin 13. (4) : Repeat (2), that is, "DR_{YBW}".
22	Y Gain	(1) : Input a Y signal (picture period amplitude: 0.7 $V_{p\text{-}p}$) into Pin 23. (2) : Connect Pin 13 to V_{CC} via 10 kΩ. (3) : Measure the gain between Pin 23 input and Pin 7 output, that is, "G_{YS}". (4) : Open Pin 13. (5) : Repeat (3), that is, "G_{YBW}".

Test Circuit



Application Circuit

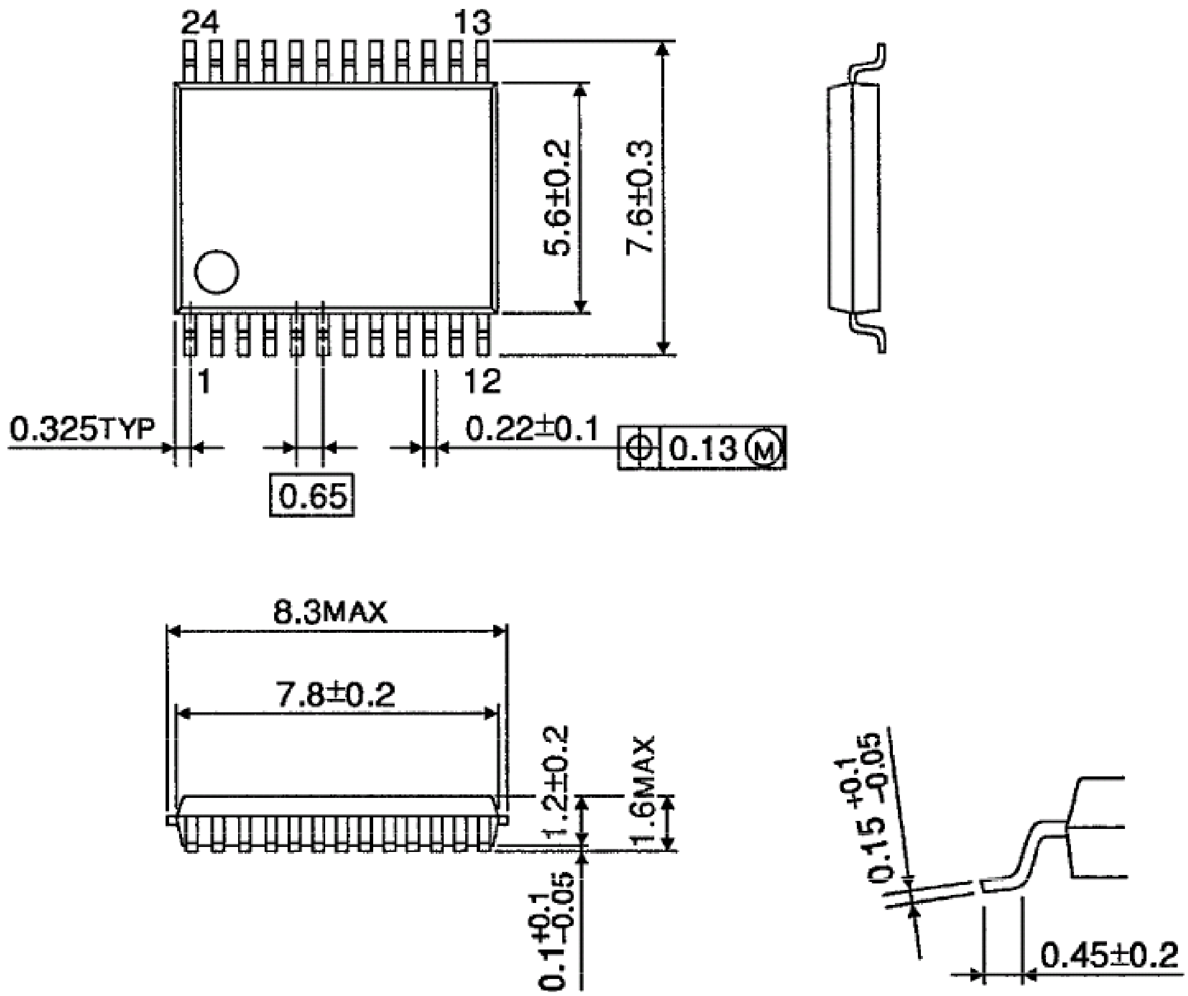


The application circuits shown in this document are examples provided for reference purposes only. Thorough evaluation is required in the mass production design phase. By furnishing these examples of application circuits, Toshiba does not grant the use of any industrial property rights.

Outline Drawing

SSOP24-P-300-0.65A

Unit: mm



Weight: 0.09 g (typ.)

About solderability, following conditions were confirmed

- Solderability

(1) Use of Sn-63Pb solder Bath
- · solder bath temperature = 230°C
- · dipping time = 5 seconds
- · the number of times = once
- · use of R-type flux

(2) Use of Sn-3.0Ag-0.5Cu solder Bath
- · solder bath temperature = 245°C
- · dipping time = 5 seconds
- · the number of times = once
- · use of R-type flux