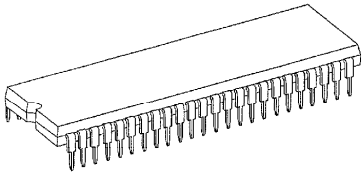
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8867AN

VIDEO, CHROMA, AND SYNC. SIGNAL PROCESSING IC FOR PAL / NTSC-SYSTEM COLOR TELEVISIONS.

The TA8867AN is Video, Chroma, and Sync. Signal processing IC for PAL / NTSC-system color televisions integrated in a 48pin shrink DIP package.
The TA8867AN can correct gain and phase error in 1H glass delay line of PAL-system color demodulator automatically.



SDIP48-P-600-1.78

Weight : 4.81g (Typ.)

FEATURES

Video

- Black stretching circuit
- Sharpness control circuit with internal delay lines
- DC restoration control
- Video noise reduction circuit

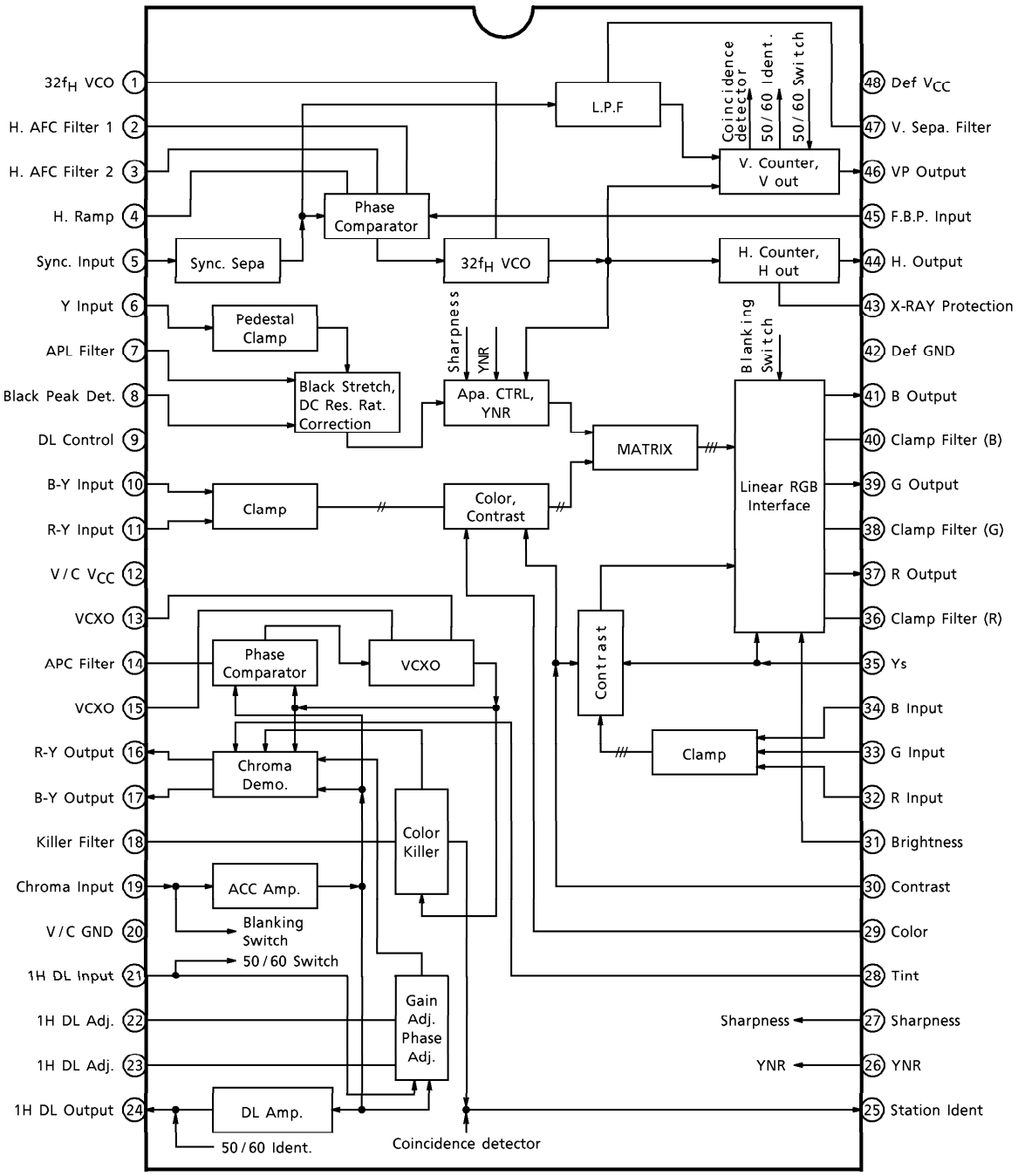
Chroma

- Automatic adjustment circuit for 1H glass delay line of PAL-system color demodulator
- Color differential signal output (R-Y, B-Y)
- RGB primaly color signal output
- Linear RGB input

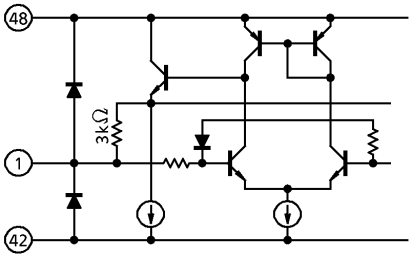
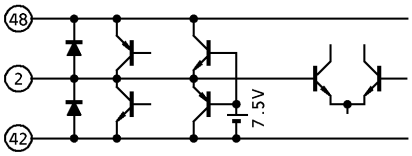
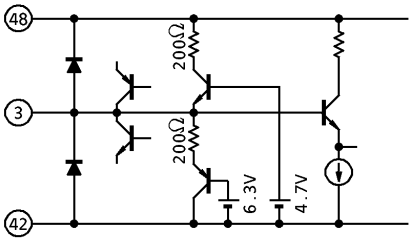
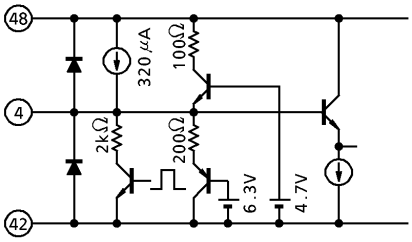
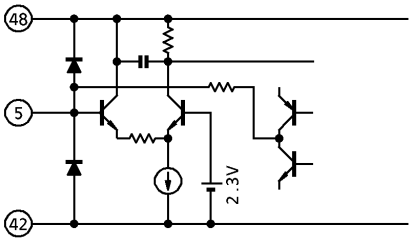
Sync. processing

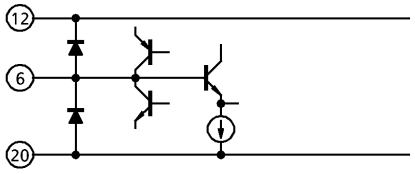
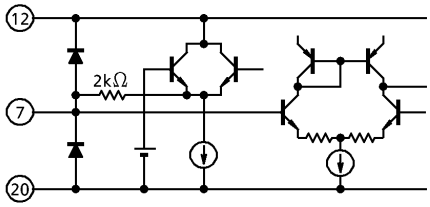
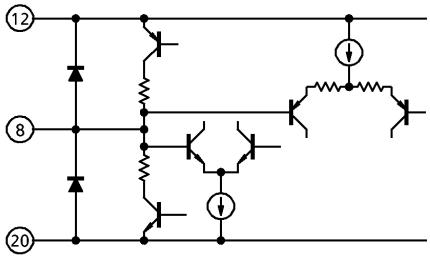
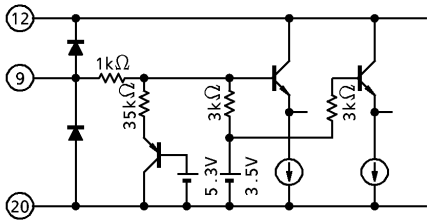
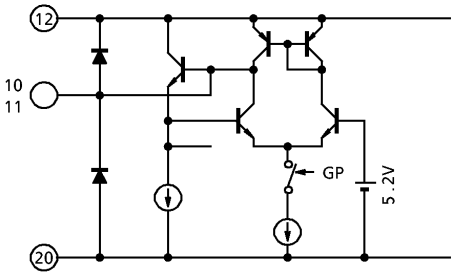
- Sync. separation circuit with automatic separation level control
- Dual loop AFC
- Ajustment-free horizontal and vertical oscillation based on count-down system
- Automatic vertical frequency identification (50 / 60Hz)
- Forced Switch (50 / 60Hz)
- X-ray protection circuit

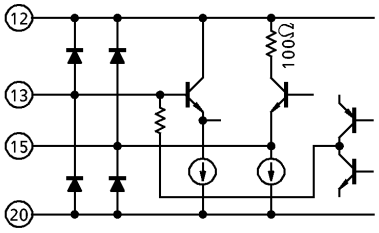
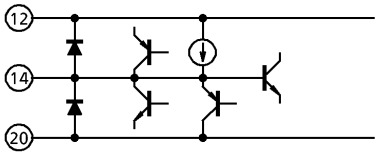
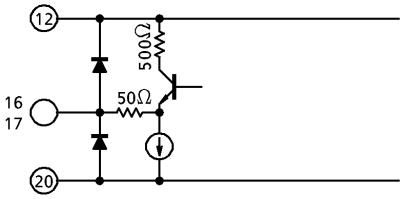
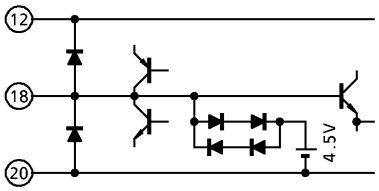
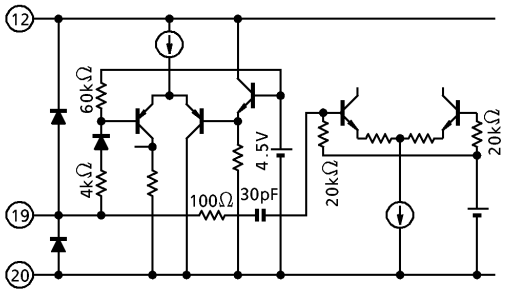
BLOCK DIAGRAM

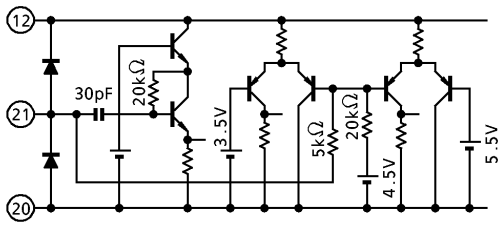
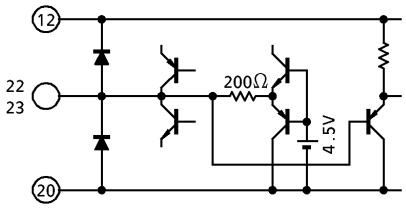
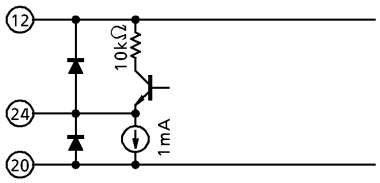
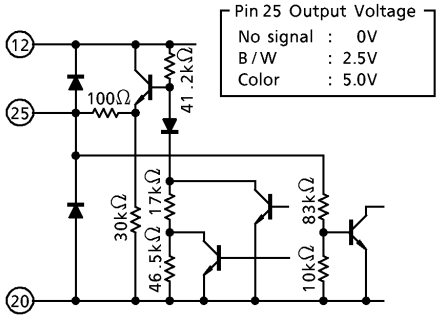


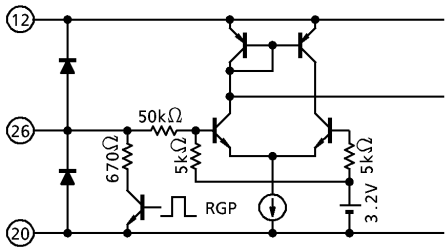
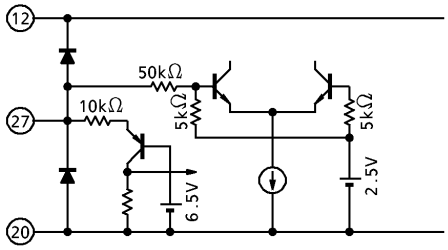
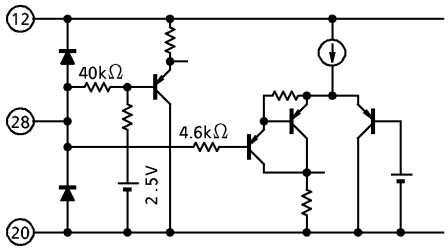
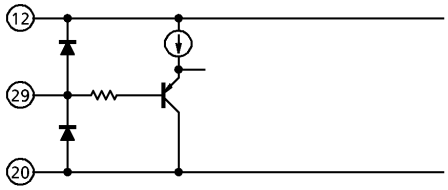
TERMINAL FUNCTION

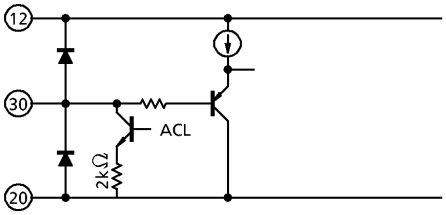
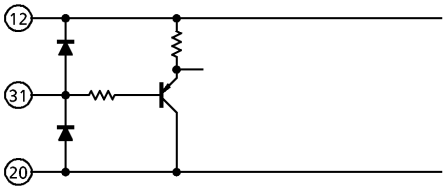
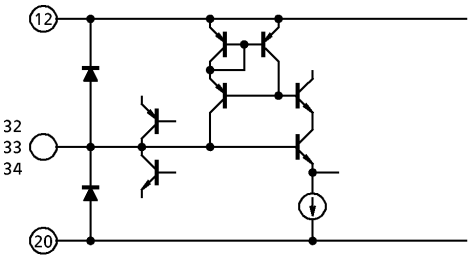
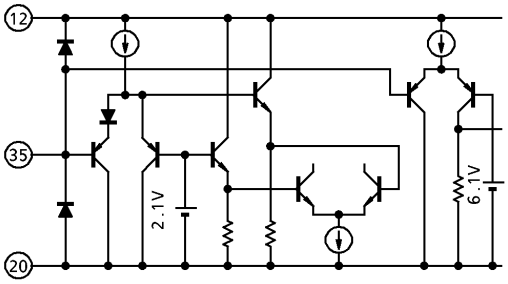
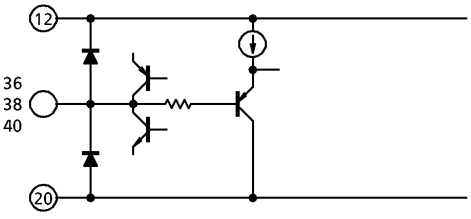
PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	$32f_H$ VCO	This terminal is for adjustment free $32f_H$ voltage controlled oscillator. A ceramic resonator is connected. Recommended ceramic resonator is CSB503F30 (Murata Electronics).	
2	H. AFC Filter 1	A lag-lead type filter is connected to this terminal. Horizontal oscillator frequency is controlled by this terminal voltage.	
3	H. AFC Filter 2	A capacitor is connected to this terminal. Horizontal pulse phase is controlled by this terminal voltage.	
4	H. Ramp	This terminal is for H. Ramp wave generater. H. Ramp wave is reference for sync. signal processing circuit.	
5	Sync. Input	This terminal is for input terminal of sync. signal. Typical sync. signal amplitude is $2V_{p\text{-}p}$ (from sync. top to 100IRE). It is necessary for a signal souce to drive with low impedance. When a resistor ($\geqq 500k\Omega$) connect between this terminal and GND, sync. separation level is higher than at normal condition.	

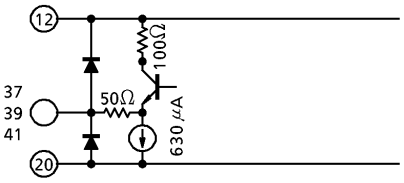
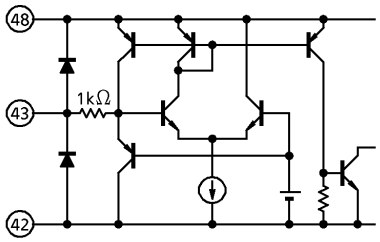
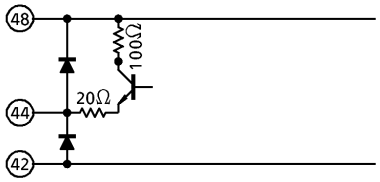
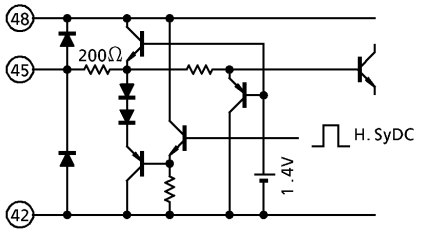
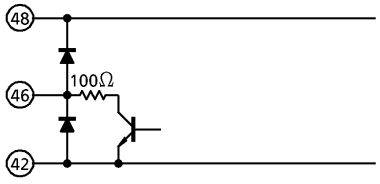
PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
6	Y Input	This is Y Input terminal. Typical Y signal amplitude is $1V_{p-p}$ (from sync. top to 100IRE). It is necessary for a signal souce to drive with low impedance.	
7	APL Filter	This terminal is for APL Filter for DC restoring circuit. Theoricaly, the DC restoring level (T_{DC}) is shown as follows, $T_{DC} = \frac{2k\Omega}{2k\Omega + R} \times 50 + 100$ [%] External capacitor is about 10μF. In order to set DC restoring level to be 100%, this terminal is kept open.	
8	Black Peak Det.	This terminal is for black peak detection filter for black stretching circuit. In order to cancel black stretching function, this terminal is fixed on 3~5V.	
9	DL Control	Delay line in sharpness circuit is controlled by this terminal. If voltage 0~5V is applied to this terminal, delay time of the delay line will be change 125ns~210ns (Typ.). If this terminal is open, delay time of the delay line is 150ns (Typ.).	
10 11	B-Y Input R-Y Input	Color differential signal input terminal. The signal goes into color-matrix circuit after clamping.	

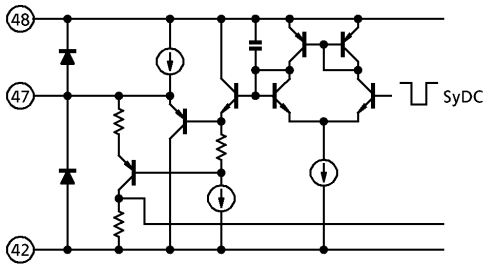
PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
12	V/C V_{CC}	V_{CC} for Video and Chroma stage. Recommend applied voltage is 9V.	—
13 15	VCXO	These terminals are for a Xtal oscillator for chroma demodulator. It is necessary for P.C.B pattern to be nea between the terminal and Xtal.	
14	APC Filter	This terminal is for APC filter. It is necessary for relative error between resisters in APC Filter to be less than ±1%.	
16 17	R-Y Output B-Y Output	These terminals are for color differential signal output.	
18	Killer Filter	This terminal is for color killer filter. When killer active, this terminal voltage is 4.5V. When PAL is identified, this terminal voltage goes to 3.8V or 5.2V. When NTSC is identified, this terminal voltage goes to 3.8V.	
19	Chroma Input	This terminal is for chroma signal input. When AKB IC is used with TA8867AN, a resister (about 56kΩ) connected between this terminal and GND, so horizontal and vertical blanking do not appear.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
20	V/C GND	GND for Video and Chroma circuits.	—
21	1H DL Input	This is input terminal of chroma signal through 1H glass delay line. Another function of this terminal is vertical frequency force switch. When applied voltage to the terminal is more than 5.8V, vertical pull-in range is 261.5H~353H (50Hz Mode). When applied voltage is lower than 3.8V, vertical pull-in range is 232H~297H (60Hz Mode). When open or applied voltage is 4.5V, vertical pull-in range is 232H~353H (Automatic Mode).	
22 23	1H DL Adj.	These terminals are for a capacitor for 1H glass delay line automatic adjustment circuit. The phase is controlled by voltage of pin 22. The gain is controlled by voltage of pin 23.	
24	1H DL Output	This terminal is for chroma signal output for 1H glass delay line. Another function of this terminal is vertical frequency identification output. When vertical frequency is 50Hz, DC level of this terminal is 5.3V. When vertical frequency is 60Hz, DC level is 3.3V.	
25	Station Ident	This terminal is for station identification and color identification output. When vertical sync. isn't detected, TA8867AN identifies as no signal input, and this terminal will be 0V. When vertical sync. is detected and color signal isn't detected, this terminal will be 2.5V. When vertical sync. and color signal is detected, this terminal will be 5V.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
26	YNR	This terminal is for Y noise reduction level control. Control voltage range is 0~5V. When applied voltage to this terminal is increase, Y noise reduction level will be high. This terminal is pulled down to 0V when B.G.P is high. So, connect a limiting current resister between this terminal and output terminal of a controller if it will be necessary.	
27	Sharpness	This terminal is for sharpness control. Control voltage range is 0~5V. When applied voltage to this terminal is increase, sharpness level will be high. When this terminal is pulled up to V_{CC}, RGB output is fixed to 3.3V. This function is for AKB IC.	
28	Tint	This terminal is for Tint control. Control voltage range is 0~5V. When applied voltage to this terminal increases, color demodulation phase will increase. When applied voltage is less than 1.0V, TA8867AN will be PAL Mode, and Tint control circuit will not operate.	
29	Color	This terminal is for Color control. Control voltage range is 0~5V. When applied voltage to this terminal increases, color level will be high.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
30	Contrast	This terminal is for contrast control. Control voltage range is 0~5V. When applied voltage to this terminal increases, contrast level will be high.	
31	Brightness	This terminal is for brightness control. Control voltage range is 0~5V. When applied voltage to this terminal increases, brightness level will be high.	
32 33 34	R Input G Input B Input	These terminals are for Linear RGB input. Typical input signal level is 0.72V (0~100IRE) when terminated by 75Ω. It is necessary for a signal souce to drive with low impedance.	
35	Ys	This terminal is for Fast blanking switch. When applied voltage to this terminal is less than 0.5V, TV signal is outputted to RGB output. When applied voltage is more than 1.0V, linar RGB signal is outputted to RGB output. When applied voltage is more than 6.5V, contrast of linear RGB is limited to −6dB (vs on contrast maximum condition).	
36 38 40	Clamp Filter (R) Clamp Filter (G) Clamp Filter (B)	These terminals are for Clamp filter for RGB output.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
37 39 41	R Output G Output B Output	These terminals are for primaly color output. Maximum souce current is 4mA.	
42	Def GND	GND for sync. signal processing circuit.	—
43	X-RAY Protection	This terminal is for X-RAY protection input. When applied voltage to this terminal is more than 3.3V, horizontal output is fixed to 0V. And this condition is held until Def V_{CC} (pin 48) is less than 3.0V.	
44	H. Output	This terminal is for horizontal pulse output. Output pulse level is 0V (low), and 5.0V (high). Output pulse duty is 40% (Typ). Output type of this terminal is open emitter. So, it is necessary to connect a resistor between this terminal and GND.	
45	F.B.P. Input	This terminal is F.B.P. input. It is necesarry for F.B.P. amplitude to limit to be less than H. V_{CC} voltage at this terminal by using resisters or a zoner diode. Result of sync. separation circuit can be observed at waveform of this terminal.	
46	VP Output	This terminal is for vertical pulse output. Negative pulse is outputted this terminal. Output type of this terminal is open collector.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
47	V. Sepa. Filter	This terminal is for vertical sync. separation filter.	
48	Def V_{CC}	V_{CC} for sync. signal processing circuit. Recommend voltage is 9V.	—

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	14	V
Power Dissipation	$P_{D\ max}$	1.7 (Note)	W
Applied Voltage	e_{in}	4.0	V_{p-p}
Operating Temperature	T_{opr}	− 20~65	°C
Storage Temperature	T_{stg}	− 55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 13.5mW.

RECOMMENDED OPERATING CONDITION

PIN No.	PIN NAME	SYMBOL	MIN.	TYP.	MAX.	UNIT
12	V / C V_{CC}	V_{CC} #12	8.1	9.0	9.9	V
48	Def V_{CC}	V_{CC} #48	8.1	9.0	9.9	

ELECTRICAL CHARACTERISTICS

DC voltage characteristics (Unless otherwise specified. V_{CC} (#12) = 9V, V_{CC} (#48) = 9V, Ta = 25°C)

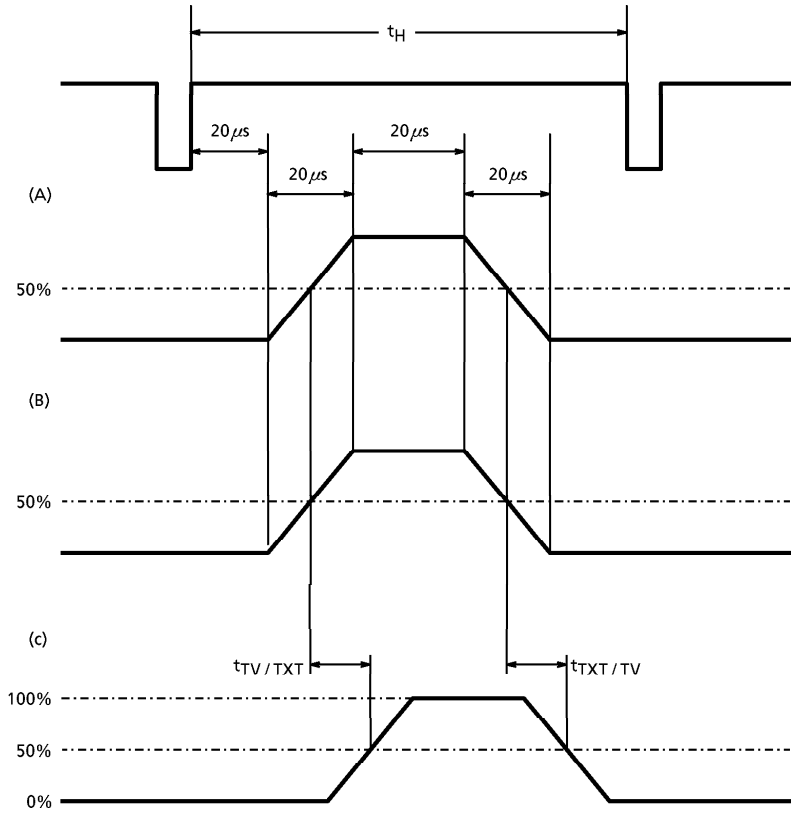
PIN No.	PIN NAME	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
1	$32f_H$ VCO	V1	5.0	5.9	7.0	V	
2	H. AFC Filter 1	V2	6.5	7.5	8.5		
3	H. AFC Filter 2	V3	3.0	3.9	4.8		
5	Sync. In	V5	1.5	2.3	3.1		No signal input
6	Y Input	V6	3.0	3.8	4.5		Clamping Level
8	Black Peak Det.	V8	5.0	5.9	6.8		
9	DL Control	V9	2.5	3.5	4.5		
10	B-Y Input	V10	4.5	5.2	6.1		Clamping Level
11	R-Y Input	V11	4.5	5.2	6.1		Clamping Level
13	VCXO	V13	3.5	5.0	6.5		
15	VCXO	V15	5.5	6.5	7.5		
16	R-Y Output	V16	4.0	4.8	5.6		
17	B-Y Output	V17	4.0	4.8	5.6		
18	Killer Filter	V18	3.7	4.5	5.3		No signal input
19	Chroma Input	V19	3.0	3.8	4.6		
21	1H DL Input	V21	3.7	4.5	5.2		
24	1H DL Output	V24	4.5	5.2	6.0		No signal input
25	Station Ident	V25	—	—	0.2		No signal input
32	R Input	V32		4.3			AC GND, pin 30 : 2.5V
33	G Input	V33		4.3			AC GND, pin 30 : 2.5V
34	B Input	V34		4.3			AC GND, pin 30 : 2.5V
37	R Output	V37		3.5			In trace period, pin 31 : 2.5V
39	G Output	V39		3.5			In trace period, pin 31 : 2.5V
41	B Output	V41		3.5			In trace period, pin 31 : 2.5V

DC CURRENT CHARACTERISTICS

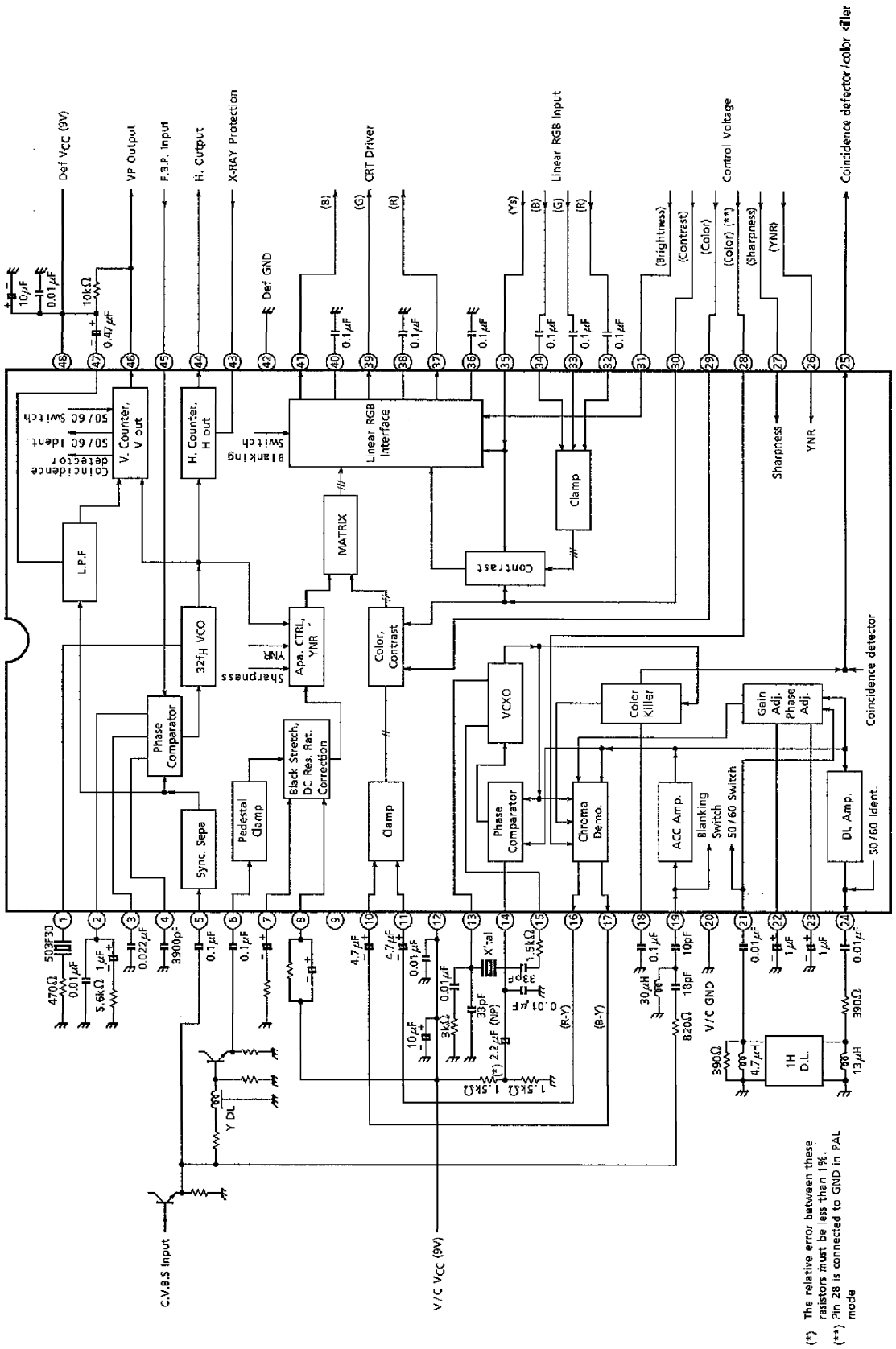
(Unless otherwise specified. V_{CC} (#12) = 9V, V_{CC} (#48) = 9V, Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	MIN.	TYP.	MAX.	UNIT
12	V/C V_{CC}	I_{CC} #12	45	75	100	mA
48	Def V_{CC}	I_{CC} #48	12	23	35	

INPUT SIGNAL FOR MEASUREMENT OF OSD PERFORMANCE



APPLICATION EXAMPLE CIRCUIT



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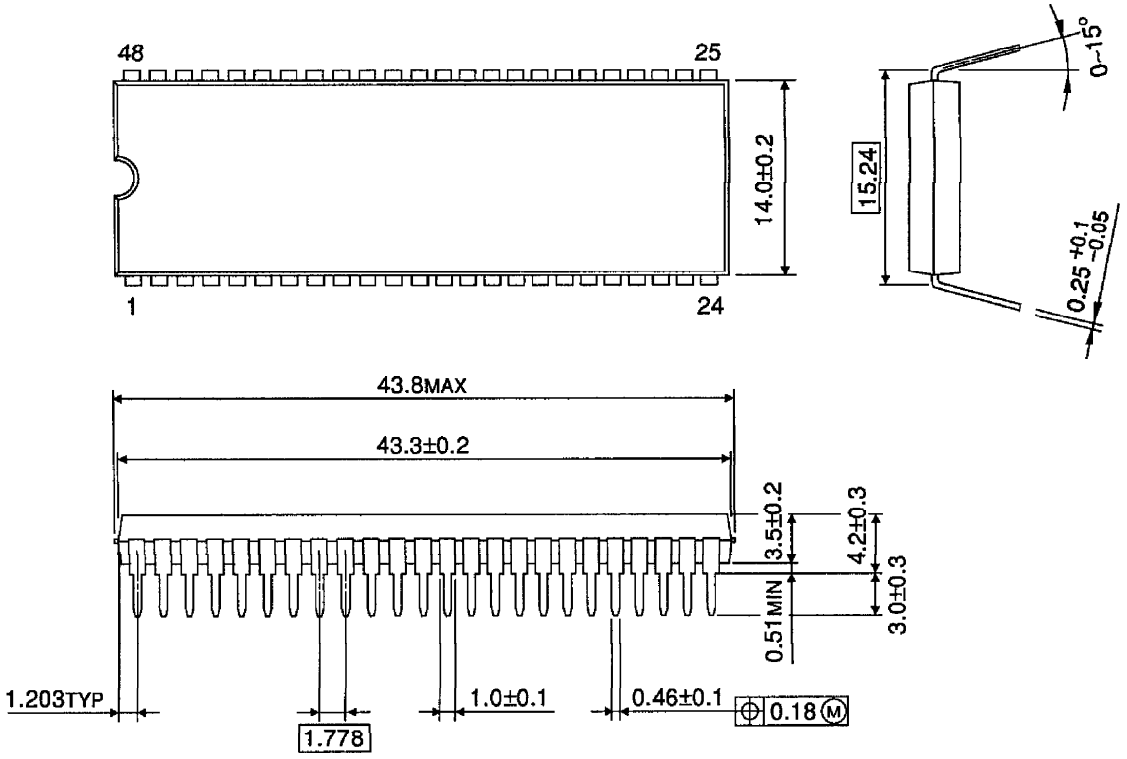
OUTLINE DRAWING

SDIP48-P-600-1.78 Unit : mm



Weight : 4.81g (Typ.)