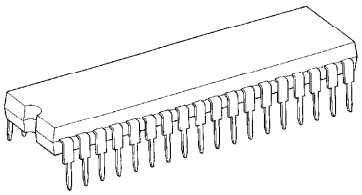
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8801AN

VIDEO / CHROMA / DEFLECTION PROCESSOR IC FOR NTSC COLOR TV

TA8801AN is an integrated circuit for NTSC color TV, which has a function of Video / Chroma / Deflection Processor inside a 36-pin shrink DIP plastic package. This is most suitable for high-definition, large-screen televisions.



SDIP36-P-500-1.78

Weight : 2.98g (Typ.)

FEATURES

Video section

- Black stretch circuit
- Contour improvement by built-in delay lines
- High-brightness color
- DC restoration

On-screen-display section

- OSD by digital R / G / B inputs
- Picture mute
- Contrast controllable

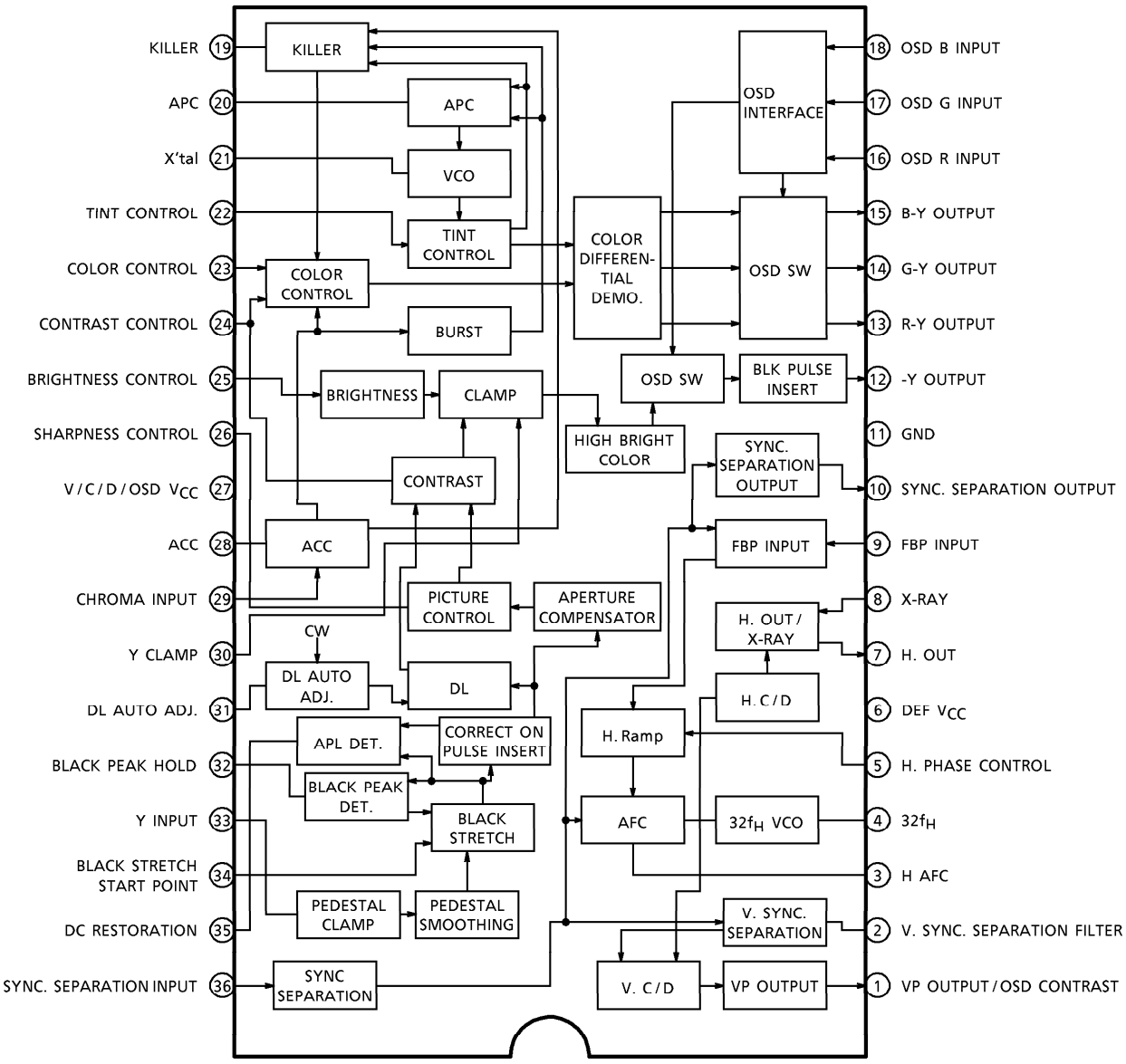
Deflection section

- High-performance sync. separator circuit
- Adjustment-free oscillator circuit based on count-down system
- Horizontal phase adjustable
- X-ray protection circuit

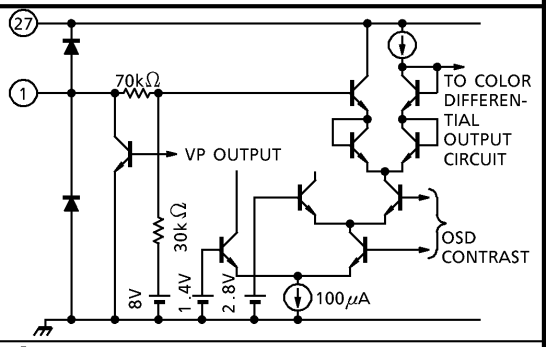
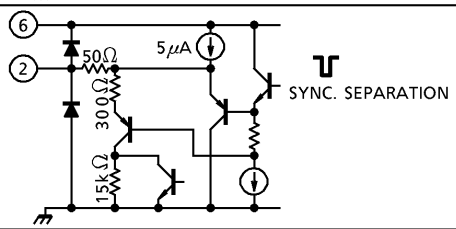
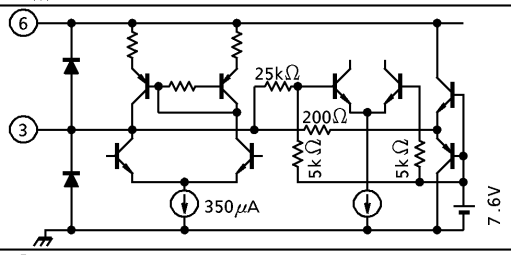
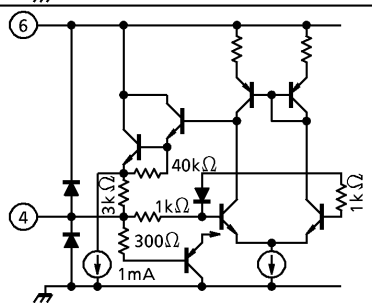
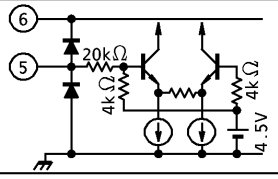
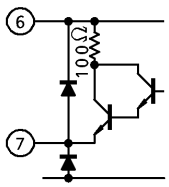
Chroma section

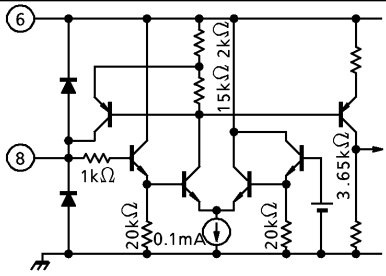
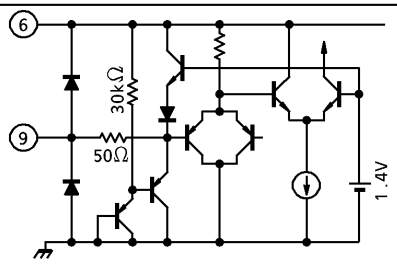
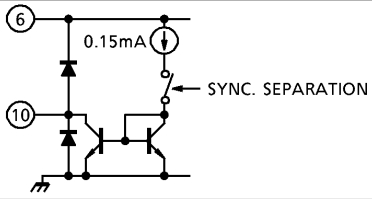
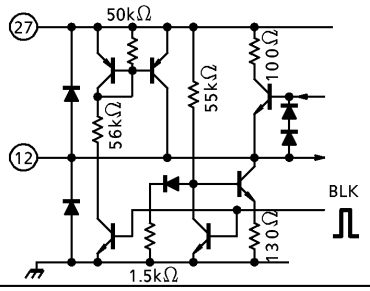
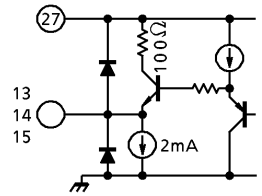
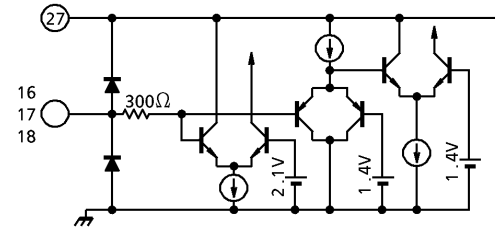
- R-Y, B-Y axes demodulation
- Automatic phase control (Adjustment-free)

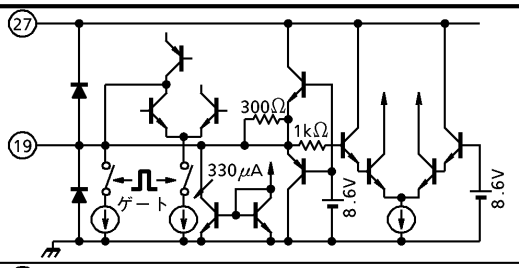
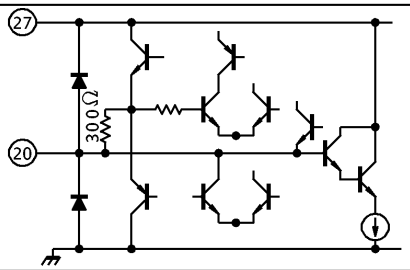
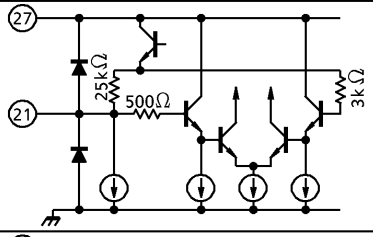
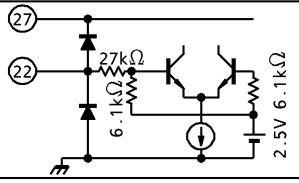
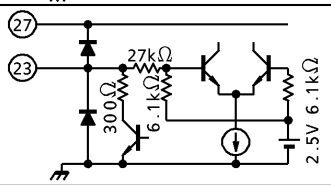
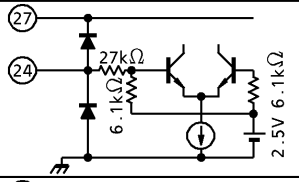
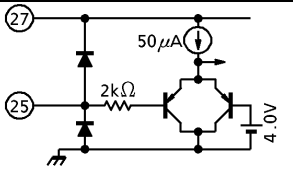
BLOCK DIAGRAM

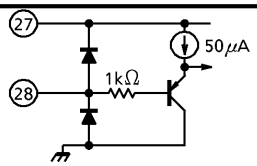
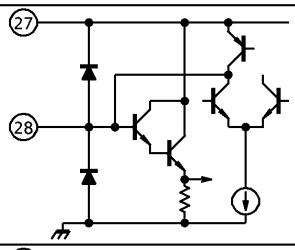
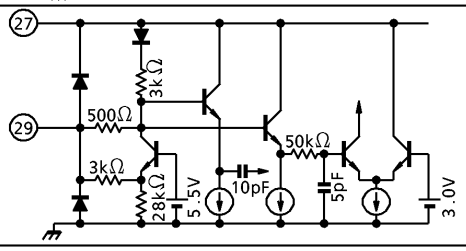
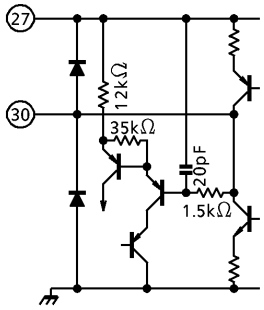
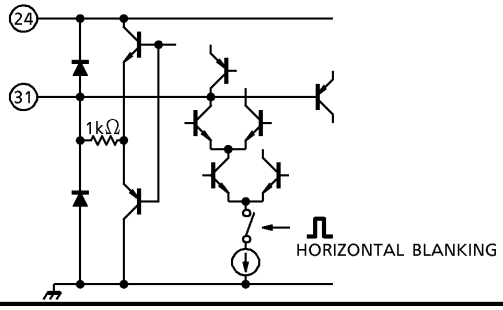


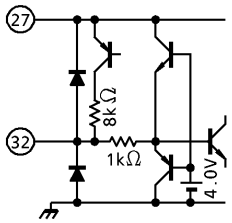
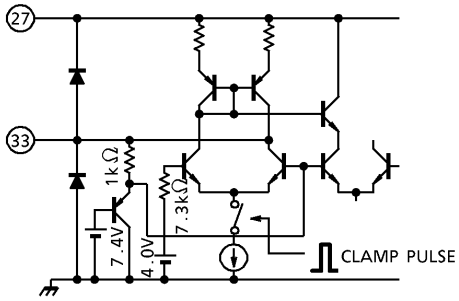
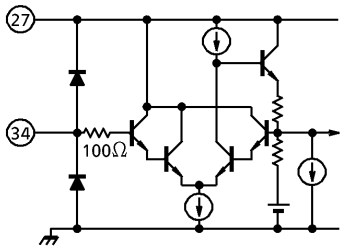
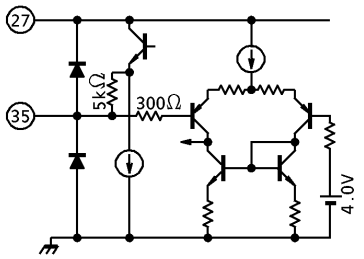
TERMINAL FUNCTION

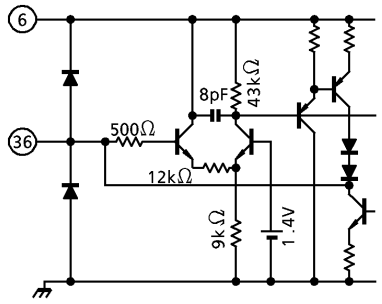
PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	Vertical Pulse Output / OSD Contrast	The terminal for vertical pulse output. And OSD contrast is adjusted by the DC voltage supplied this terminal.	
2	Vertical Sync. Separation Filter	The terminal for vertical sync. separation filter.	
3	H. AFC Filter	The terminal for horizontal AFC filter.	
4	32 f_H VCO	The terminal for 32f_H (503kHz) ceramic resonator. CSB503F30 (Murata Manufacturing Co. product) is recommended.	
5	Horizontal Phase Control	Horizontal phase is adjusted by DC voltage supplied this terminal. The variable range is 2.4μs (Typ.).	
7	Horizontal Pulse Output	Horizontal pulse is outputted from this terminal. Its amplitude is 5.0V_{p-p} (typ.) and duty is 43% (typ). Output form is emitter follower. And keep the output current less than 12mA.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
8	X-ray Protection	The terminal for an overvoltage protection circuit. The threshold level is 3.65V (typ.). The horizontal output terminal (pin 9) is pulled Low when a voltage applied to this pin is greater than the threshold level.	
9	FBP Input	The terminal for flyback pulse input.	
10	Sync. Separation Output	The terminal for a sync. signal output. Output form is an open-collector. And the current flowing into is 0.15mA (typ.).	
12	-Y Output	The terminal for -Y output. Blanking can be disabled by connecting a resistor between this pin and GND and flowing a current more than 0.2mA. And keep the output current less than 2.5mA.	
13 14 15	R-Y Output G-Y Output B-Y Output	The terminals for color-difference signals output. Keep the output current less than 4.8mA.	
16 17 18	R Input G Input B Input	The terminals for OSD signals input. The threshold voltage is 0.75V (typ.).	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
19	Killer Filter	The terminal to be connected a killer filter.	
20	APC Filter	The terminal to be connected an APC filter.	
21	X'tal	The terminal to be connected a 3.58MHz crystal resonator for the VCXO.	
22	Tint Control	The terminal for tint control. Control voltage is 0V to 5V.	
23	Color Control	The terminal for color control. Control voltage is 0V to 5V. The voltage of this terminal turns to low level while the color killer is on.	
24	Contrast Control	The terminal for contrast control. Control voltage is 0V to 5V.	
25	Brightness Control	The terminal for brightness control. Control voltage is 0V to 5V.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
26	Sharpness Control	The terminal for sharpness control. Control voltage is 0V to 5V.	
28	ACC	The terminal to be connected the ACC filter.	
29	Chroma Input	The terminal for chroma input. The standard input level is 286mV$_{p-p}$ in burst amplitude.	
30	Y Clamp	The terminal to be connected a Y clamp filter. Use a low leak capacitor for this filter.	
31	Delay Time Automatic Adjustment	The terminal to be connected a filter for a delay time automatic adjustment circuit for the internal delay line. Use a low leak capacitor for this filter.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
32	Black Peak Hold	The terminal for a filter to hold black peak. The voltage of this terminal can control the gain of black stretch amplifier. When the voltage is higher than pedestal level, the gain goes up and when the voltage is lower, the gain goes down. Black stretch is turned off by supplying 5V or more to this terminal.	
33	Y Input	The terminal for input of luminance signal (negative sync., $1.0V_{p-p}$). -Y output turns out $4.0V_{p-p}$ with contrast max. Because the pedestal level is clamped at the input pin, the signal source's impedance must be sufficiently low. The pedestal voltage is clamped to 4.0V (typ.).	
34	Black Stretch Start Point	The terminal for setting the start point of black stretch. The higher the voltage of this terminal is. The higher the start point is.	
35	DC Restoration	The terminal to adjust DC restoration ratio. The DC restoration ratio (T_{DC}) is determined by the equation below. $T_{DC} = \frac{5k\Omega}{5k\Omega + R\Omega} \times 30 + 100\ [\%]$ The smaller the value of external resistance R, the greater the amount of correction. You can monitor a black-stretched Y signal with the sync. signal eliminated by leaving this terminal open.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
36	Sync Separation Input	The terminal for input of the sync. separation circuit. Input a $2V_{p-p}$ video signal with negative sync. Because the coupling capacitor also functions as a sync separation filter, make sure the signal source's impedance is sufficiently low. Use a low leak capacitor for coupling.	

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	15	V
Power Dissipation	P_{Dmax}	1.8 (Note)	W
Input Signal Voltage	e_{in}	5	V_{p-p}
Operating Temperature	T_{opr}	− 20~65	°C
Storage Temperature	T_{stg}	− 55~150	°C

(Note) When using this device at a temperature higher than 25°C, deduct 14.4mW from the above rated value for each increment of 1°C.

ELECTRICAL CHARACTERISTICS

DC VOLTAGE CHARACTERISTICS (Unless otherwise specified V_{CC} = 12V, H.V_{CC} = 9V, Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	PIN VOLTAGE (V)			MEASURING CONDITION
			MIN.	TYP.	MAX.	
1	VP output / OSD contrast	V_1	7.40	7.70	8.00	—
3	H AFC	V_3	7.00	7.50	8.00	—
4	$32f_H$	V_4	5.70	6.00	6.30	—
5	Horizontal position adjustment	V_5	4.25	4.50	4.75	—
7	Horizontal output	V_7	2.30	2.50	2.70	—
9	Flyback pulse input	V_9	0.48	0.53	0.58	—
10	Sync separation output	V_{10}	—	9.00	—	R_L = 10kΩ (to V_{CC})
12	-Y output	V_{12}	6.90	7.20	7.50	—
13	R-Y output	V_{13}	7.00	7.50	8.00	—
14	G-Y output	V_{14}	7.00	7.50	8.00	—
15	B-Y output	V_{15}	7.00	7.50	8.00	—
19	Killer filter	V_{19}	7.70	7.90	8.10	With no input
20	APC filter	V_{20}	8.60	8.90	9.20	—
21	3.58MHz X'tal	V_{21}	5.75	5.95	6.15	With this terminal open
22	Tint control	V_{22}	2.30	2.50	2.70	—

PIN No.	PIN NAME	SYMBOL	PIN VOLTAGE (V)			MEASURING CONDITION
			MIN.	TYP.	MAX.	
23	Color control	V_{23}	2.30	2.50	2.70	Killer turned off
24	Contrast control	V_{24}	2.30	2.50	2.70	—
25	Bright control	V_{25}	—	2.50	—	—
26	Picture quality adjustment	V_{26}	—	2.50	—	—
28	ACC filter	V_{28}	10.60	11.30	12.00	With no input
29	Chroma input	V_{29}	4.50	4.70	4.90	—
30	Y clamp	V_{30}	5.40	6.40	7.40	Bright 2.5V / FBP inputted
31	Delay time automatic adjustment	V_{31}	6.60	7.40	8.20	—
32	Black peak hold	V_{32}	4.20	4.50	4.80	—
33	Bright input	V_{33}	3.80	4.00	4.20	—
34	Black stretch	V_{34}	3.80	4.00	4.20	—
35	DC restoration	V_{35}	3.80	4.00	4.20	—
36	Sync separation input	V_{36}	2.00	2.25	2.50	AC GND / FBP inputted

Current consumption
(Unless otherwise specified, V_{CC} = 12V, H.V_{CC} = 9V at Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	CURRENT CONSUMPTION (mA)		
			MIN.	TYP.	MAX.
6	DEF V_{CC}	I_{CC} 6pin	8.5	20.0	33.0
27	V / C / OSD V_{CC}	I_{CC} 27pin	43.5	56.5	93.0

AC CHARACTERISTICS (Unless otherwise specified, V_{CC} = 12V, H.V_{CC} = 9V, Ta = 25°C)
Video and OSD section

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Y Input Pedestal Clamp Voltage	V_{33}	1	(Note 1)	3.8	4.0	4.2	V
Input Pedestal Clamp Pulse Phase	T_{CL1}	1	(Note 2)	7.20	7.65	8.10	μs
	T_{CL2}			8.35	8.80	9.25	
DC Restoration Amp Gain	A_{V35}	1	(Note 3)	0.28	0.34	0.40	
Black Stretch Amp Maximum Gain	G_{VBE}	1	(Note 4)	1.35	1.45	1.55	
Y Input / Output Delay Time	T_Y	1	(Note 5)	110	120	130	ns
Y Input Dynamic Range	D_{R33}	1	(Note 6)	0.9	1.1	1.3	V_{p-p}
Sharpness Control Range	G_{SMAX}	1	(Note 7)	+ 6.5	+ 8.5	+ 10.5	dB
	G_{SMIN}			− 2.5	− 4.5	− 6.5	
Sharpness Control Center Characteristic	G_{SCT}	1	(Note 8)	+ 2.0	+ 3.5	+ 5.0	dB
Black Stretch Start Point	V_{ST1}	1	(Note 9)	225	260	295	mV_{p-p}
	V_{ST2}			385	420	455	

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Black Peak Detection Period (Other Than Horizontal Blanking Interval)	T_{BPH}	1	(Note 10)	20	22	24	H
AC Gain	G_V	1	(Note 11)	4.6	5.2	5.8	
Frequency Characteristics	G_f	1	(Note 12)	− 3	0	+ 3	dB
Contrast Adjustment Voltage Range	ΔV_{ct}	1	(Note 13)	0.29	0.44	0.66	V
Contrast Adjustment Center Voltage	V_{cto}	1	(Note 14)	2.30	2.50	2.72	V
Brightness Adjustment Voltage	V_{br}	1	(Note 15)	2.2	2.5	2.8	V
Brightness Adjustment Sensitivity	Gbr	1	(Note 16)	− 1.5	− 1.7	− 1.9	
DC Restoration	TDC	1	(Note 17)	—	0	50	mV
Minimum Output	V_{do1}	1	(Note 18)	—	0.6	0.9	V
Maximum Output	V_{do2}	1	(Note 19)	8.3	8.7	—	V
Vertical Blanking Output Level	V_V	1	(Note 20)	11.0	11.8	12.0	V
Sink Current During Vertical Blanking	I_V	1	(Note 21)	0.4	0.6	0.85	mA
High Bright Color Gain	G_{HBC}	1	(Note 22)	0.08	0.10	0.12	
OSD Output DC Voltage	V_{DCY}	2	(Note 23)	4.3	4.6	4.9	V
	V_{DCC}			4.7	5.0	5.3	V
OSD Output Maximum Voltage	V_{OSDMAX}	2	(Note 24)	8.2	8.4	8.6	V
OSD Mode Switching Threshold Voltage	V_{OSDSW}	2	(Note 25)	0.65	0.75	0.85	V
OSD High Voltage Switching Threshold Voltage	$V_{OSDHISW}$	2	(Note 26)	1.9	2.1	2.3	V
OSD Mode Switching Rise Time	τR_{OSDY}	2	(Note 27)	—	35	100	ns
	τR_{OSDC}			—	45	100	
OSD Mode Switching Rise Transfer Time	tR_{OSDY}	2	(Note 28)	—	30	100	ns
	tR_{OSDC}			—	40	100	
OSD Mode Switching Fall Time	τF_{OSDY}	2	(Note 29)	—	20	100	ns
	τF_{OSDC}			—	45	100	
OSD Mode Switching Fall Transfer Time	tF_{OSDY}	2	(Note 30)	—	25	100	ns
	tF_{OSDC}			—	45	100	
OSD High Voltage Switching Rise Time	τR_{OSDHI}	2	(Note 31)	—	40	100	ns
OSD High Voltage Switching Rise Transfer Time	tR_{OSDHI}	2	(Note 32)	—	50	100	ns
OSD High Voltage Switching Fall Time	τF_{OSDHI}	2	(Note 33)	—	45	100	ns
OSD High Voltage Switching Fall Transfer Time	tF_{OSDHI}	2	(Note 34)	—	50	100	ns

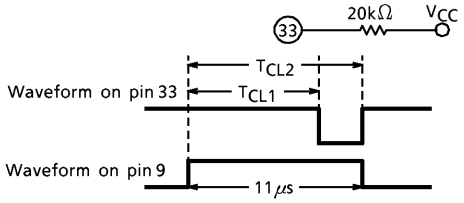
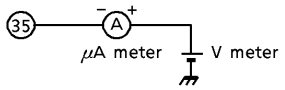
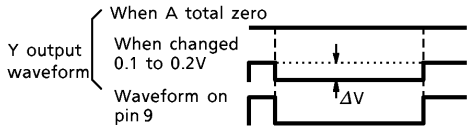
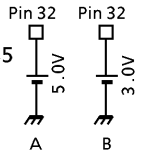
Chroma section

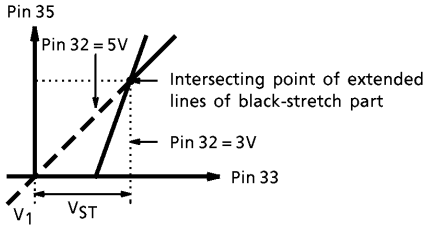
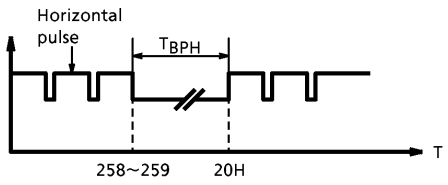
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
ACC Characteristic	F_1	3	(Note 35)	2.04	2.65	3.44	V_{p-p}
	e_a			0.34	0.67	1.00	
	A			0.90	1.00	1.30	
Color Control Characteristic	V_{23}	3	(Note 36)	2.30	2.50	2.72	V
	ΔV_{23}			0.29	0.44	0.66	
Contrast Control Characteristic	V_{24}	3	(Note 37)	2.30	2.50	2.72	V
	ΔV_{24}			0.29	0.44	0.66	
	e_u			15.9	18.0	20.1	dB
Maximum Input Level	E_{MAX}	3	(Note 38)	0.88	1.10	2.00	V_{p-p}
Killer On Input Level	e_{BK}	3	(Note 39)	1.12	2.24	5.62	mV_{p-p}
APC Frequency Control Sensitivity	β	3	(Note 40)	1.0	1.7	2.9	Hz / mV
APC Pull-In / Hold Range	f_{PH}	3	(Note 41)	250	500	1000	Hz
	f_{PL}						
	f_{HH}						
	f_{HL}						
Color-Difference Output Level	e_R	3	(Note 42)	1.72	2.23	2.90	V_{p-p}
	e_G			0.63	0.82	1.06	
	e_B			2.04	2.65	3.44	
Color-Difference Output Relative Amplitude	e_R / e_B	3	(Note 43)	0.73	0.84	0.97	
	e_G / e_B			0.26	0.31	0.36	
Color-Difference Output Relative Phase	θ_{R-B}	3	(Note 44)	88	95	102	°
	θ_{G-B}			230	240	250	
Tint Control Characteristic	θ_1	3	(Note 45)	35	45	55	°
	θ_2			35	45	55	
	θ			80	90	100	
	V_{37}			2.30	2.50	2.72	V
	ΔV_{37}			0.29	0.44	0.66	
Color-Difference Maximum Output Level	E_R	3	(Note 46)	3.65	4.45	5.56	V_{p-p}
	E_G			1.35	1.65	2.06	
	E_B			4.35	5.30	6.62	
Residual Carrier Level	v_{13e}	3	(Note 47)	—	—	15	mV_{p-p}
	v_{14e}						
	v_{15e}						
Residual Harmonic Level	v_{13eH}	3	(Note 48)	—	—	75	mV_{p-p}
	v_{14eH}						
	v_{15eH}						

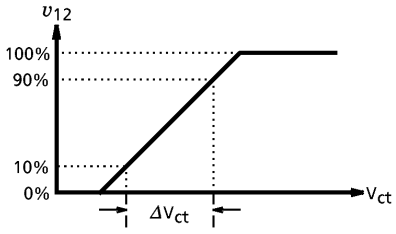
Deflection section

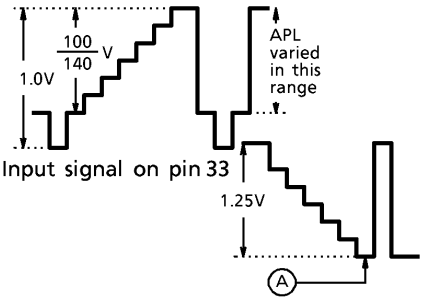
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Sync Separation Input Sensitive Current	I_{IN36}	4	(Note 49)	15	25	40	μA
H. AFC Phase Detection Current	I_{DET}	4	(Note 50)	230	330	470	μA
Phase Detection Stop Period	T_{CO3}	4	(Note 51)	—	258~6	—	H
$32f_H$ VCO Oscillation Start Voltage	V_{ON}	4	(Note 52)	—	—	4.0	V
Horizontal Output Start Voltage	V_{HON}	4	(Note 53)	4.3	4.9	5.3	V
Horizontal Free-Running Frequency	f_{HO}	4	(Note 54)	15.584	15.734	15.884	kHz
Horizontal Oscillation Frequency Variable Range	f_{HMAX}	4	(Note 55)	16.500	16.700	16.900	kHz
	f_{HMIN}			14.700	15.000	15.300	
Horizontal Oscillation Control Sensitivity	β_H	4	(Note 56)	2.2	2.5	2.8	kHz / V
Horizontal Output Pulse Duty Cycle	T_{H7}	4	(Note 57)	41	43	45	%
Horizontal Output Voltage	V_{H7}	4	(Note 58)	4.7	5.0	5.3	Hz
	V_{L7}			—	0	100	mV
Overvoltage Protection Detection Voltage	V_{SON}	4	(Note 59)	3.55	3.65	3.75	V
Overvoltage Protection Retention Voltage	V_{H6}	4	(Note 60)	—	—	2.5	V
Horizontal Sync Phase	S_{PH1}	4	(Note 61)	2.6	2.8	3.0	μs
Gate Pulse Start Phase	GP1	4	(Note 62)	5.2	5.5	5.8	μs
Gate Pulse Width	GP2	4	(Note 63)	1.8	2.1	2.4	μs
Horizontal Screen Phase Adjustment Variable Range	ΔG5	4	(Note 64)	2.2	2.4	2.7	μs
Vertical Free-Running Frequency	f_{VO}	4	(Note 65)	48	53	58	Hz
Vertical Output Pulse Width	Tr1	4	(Note 66)	—	10	—	H
	Tr2	4	(Note 67)	—	10	—	
Vertical Pull-In Range	f_{PV1}	4	(Note 68)	—	224.5	—	H
	f_{PV2}			—	296.5	—	

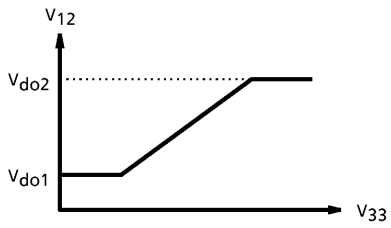
TEST CONDITION

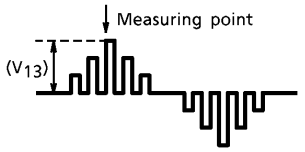
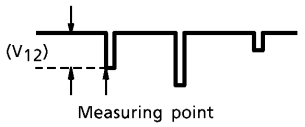
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}·V_{CC} = 12V, Ta = 25 ± 3°C)								MEASUREMENT METHOD
			SW & VR MODE								
			SW_{02}	SW_{24}	SW_{26}	SW_{32}	SW_{33}		VR24	VR26	
1	Y input pedestal clamp voltage	V_{33}	ON	ON	OFF	A	A		Max.	Open	(1) Set Y input AC GND. (2) Set sync. separation input AC GND. (3) Connect 10kΩ between the vertical sync separation filter terminal (pin 2) and H.V_{CC} (to set the V. free-run to 262.5H). (4) Measure the DC voltage on pin 33.
2	Y input pedestal clamp pulse phase	T_{CL1} T_{CL2}	↑	↑	↑	↑	↑		↑	↑	(1) Adjust VRH15 so that the HIGH level width of the waveform on pin 9 is 11μs. (2) Observe the waveform on pin 33. 
3	DC transmission rate compensation amp gain	A_{V35}	↑	↑	↑	↑	↑		↑	↑	(1) Under Note 1's condition adjust V meter to set μA meter reading 0A.  (2) While changing V meter's value, measure the variation of -Y output in picture period.  (3) $A_{V35} = \Delta V \div 0.1 \div$ Y Gain (G_V)
4	Black stretch amp maximum gain	G_{VBE}	↑	↑	↑	↑	B		↑	↑	(1) Input a 0.1V_{p-p}, 500kHz sine wave into the Y input. (2) Apply 4.2V to pin 34. (3) Measure the amplitude on pin 35 under condition A. [V_A (V_{p-p})] (4) Measure the amplitude under condition B. [V_B (V_{p-p})]. (5) $G_{VBE} = V_B \div V_A$ 
5	Y input / output delay time	T_Y	OFF	↑	↑	↑	↑		↑	↑	(1) Input 2T pulse into Y input. (2) Measure the delay time between Y input (pin 33) and -Y output (pin 12).
6	Y input dynamic range	D_{R33}	ON	↑	↑	↑	A		Min.	↑	(1) Connect the power supply to pin 33. (2) While raising the voltage from the value measured in Note 1, measure the voltage where -Y output voltage (pin 12) stops increasing. [V] $D_{R33} = V - V_{33}$

NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}·V_{CC} = 12V, Ta = 25 ± 3°C)								MEASUREMENT METHOD
			SW & VR MODE								
			SW_{02}	SW_{24}	SW_{26}	SW_{32}	SW_{33}		VR24	VR26	
7	Sharpness control range	G_{SMAX}	ON	ON	ON	A	B		Max.	Max.	(1) Input a 50mV_{p-p} sine wave into Y input. (2) Set the Sharpness control to the maximum. (3) Measure the Y output amplitude at 10kHz [V_{10K}] and 2.4MHz [V_{PK}] and calculate. $G_{SMAX} = 20\ell og\ (V_{PK} / V_{10K})$
		G_{SMIN}	↑	↑	↑	↑	↑		↑	Min.	(1) Input a 50mV_{p-p} sine wave into Y input. (2) Set the Sharpness control to the minimum. (3) Measure the Y output amplitude at 10kHz [V_{10K}] and 2.4MHz [V_{PK}] and calculate. $G_{SMIN} = 20\ell og\ (V_{PK} / V_{10K})$
8	Sharpness control center characteristic	G_{SCT}	↑	↑	↑	↑	↑		↑	Adj.	(1) Input a 50mV_{p-p} sine wave into Y input. (2) Set the sharpness control to center (2.5V). (3) Measure the Y output amplitude at 10kHz [V_{10K}] and 2.4MHz [V_{PK}] and calculate. $G_{SCT} = 20\ell og\ (V_{PK} / V_{10K})$
9	Black stretch start point	V_{ST1}	OFF	↑	OFF	↑	A		↑	Open	(1) Connect the power supply to pin 33. (2) While raising the supply voltage from the voltage obtained in Note 1, measure the variation of voltage on pin 33 and read V_{ST}. (3) Do (2) when the voltage of pin 34 is Note 1's voltage [V_{ST1}] and Note 1 plus 0.5V [V_{ST2}]. 
		V_{ST2}									
10	Black peak detection period (other than horizontal blanking interval)	T_{BPH}	ON	↑	↑	B	↑		↑	↑	(1) Set Y input and sync. separation input AC GND. (2) Observe the waveform on pin 32. 

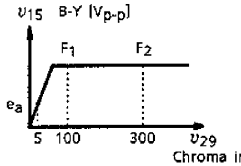
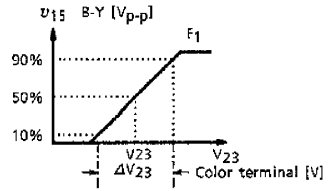
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
				SW_{02}	SW_{16}	SW_{17}	SW_{18}	SW_{24}	SW_{25}	SW_{33}	VR24	VR25	
11	AC gain	G_V		A	ON	ON	ON	ON	ON	B	Max.	Adj.	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6V. (2) Input a 10kHz, 0.3V_{p-p} sine wave into pin 33. (3) Measure the amplitude on pin 12. (V_{12}) (4) $G_V = V_{12}$ (V_{p-p}) / 0.3
12	Frequency characteris-tics	G_f		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6V. (2) Input a 0.3V_{p-p} sine wave into pin 33. (3) Adjust sharpness so that the amplitude of Y output for 10kHz input is same as for 2.4MHz input. (4) Measure the amplitude of Y output for 100kHz input [V_{12}^{100kHz}] and for 6MHz input [V_{12}^{6MHz}]. (5) $G_f = 20\ell og\ (V_{12}^{6MHz} + V_{12}^{100kHz})$
13	Contrast adjustment voltage range	ΔV_{ct}		↑	↑	↑	↑	↑	↑	↑	Adj.	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6V. (2) Input a 10kHz, 0.3V_{p-p} sine wave into pin 33. (3) Consider that the maximum contrast is 100% and the minimum contrast is 0%, then measure the difference of contrast control voltage between 10% and 90%. 
14	Contrast adjustment center voltage	V_{cto}		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6V. (2) Measure the contrast control voltage for 50%.
15	Brightness adjustment voltage	V_{br}		A	ON	ON	ON	OFF	ON	A	Open	Adj.	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Measure the voltage at the brightness terminal.

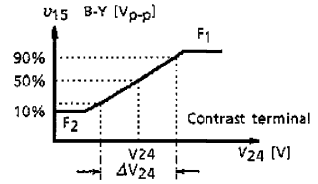
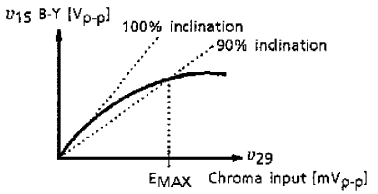
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
				SW_{02}	SW_{16}	SW_{17}	SW_{18}	SW_{24}	SW_{25}	SW_{33}	VR24	VR25	
16	Brightness adjustment sensitivity	G_{br}		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Raise the voltage at the brightness terminal by 1V. (3) Measure the picture-period voltage on pin 12. (V_{12H}) (4) $G_{br} = (V_{12H} - 6.8)$
17	DC restoration	T_{DC}		B	↑	↑	↑	ON	↑	B	Adj.	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Input a stairstep signal into pins 33 and 36. (3) Adjust contrast so that the amplitude of stairstep output from pin 12 is 1.25V. (4) Measure the variation of point A when APL is varied from 10% to 90%. 

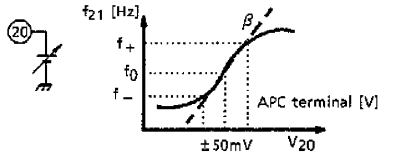
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
				SW_{02}	SW_{16}	SW_{17}	SW_{18}	SW_{24}	SW_{25}	SW_{33}	VR24	VR25	
18	Minimum output	V_{do1}		A	ON	ON	ON	ON	ON	A	Max.	Adj.	(1) Apply 0V to pin 25. (2) Measure the DC voltage (V_{30}) on pin 30. (3) Apply a DC voltage (V_{30}) to pin 30. (4) While varying the DC voltage on pin 33, measure the maximum of the picture-period voltage on pin 12. (V_{do2}) (5) Apply 5V to pin 25. (6) Repeat (2) and (3). (7) While varying the DC voltage on pin 33, measure the minimum of the picture-period voltage on pin 12. (V_{do1}) 
19	Maximum output	V_{do2}											
20	Vertical blanking pulse output level	V_V		B	↑	↑	↑	↑	↑	↑	↑	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Measure the voltage of the vertical blanking pulse on pin 12.
21	Sink current during vertical blanking	I_V		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Connect pin 12 to GND via 16kΩ. (3) Measure the voltage on pin 12 during vertical blanking interval. (V_{12BLK}) (4) $I_V = V_{12BLK} / 16k\Omega$

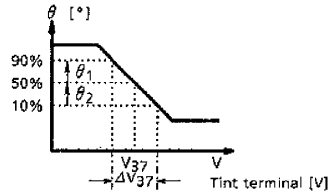
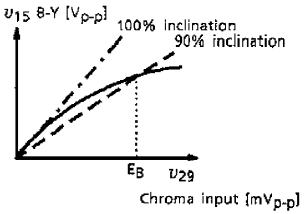
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
				SW_{02}	SW_{16}	SW_{17}	SW_{18}	SW_{24}	SW_{25}	SW_{33}	VR24	VR25	
22	High bright color gain	G_{HBC}		B	ON	ON	ON	ON	ON	A	Max.	Adj.	(1) Set pin 33 AC GND. (2) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (3) Input a rainbow color bar of $0.1V_{p-p}$ into pin 29. (4) Input a sync. separation pulse into pin 36. (5) Measure the amplitude at the R-Y terminal (pin 13) shown in Figure A. (V_{13}) (6) Measure the amplitude at the Y output terminal (pin 12) shown in Figure B. (V_{12}) (7) $G_{H\cdot B\cdot C}$ = (V_{12}) ÷ (V_{13})  (Figure A) Output waveform on pin 13  (Figure B) Output waveform on pin 12
23	OSD output DC voltage	V_{DCY} V_{DCC}		A	ON or OFF	ON or OFF	ON or OFF	OFF	↑	↑	Open	Min.	(1) Apply 1.5V to pin 16. (2) Measure the picture-period voltage on pin 12. (V_{DCY}) (3) Measure the DC voltages on pins 13, 14, and 15. (V_{DCC}) (4) For pin 17 and 18, repeat (1)~(3).
24	OSD output maximum voltage	$V_{OSD\ MAX}$		A	ON or OFF	ON or OFF	ON or OFF	OFF	ON	A	Open	Min.	(1) Apply 12V to pin 1. (2) Apply 5V to pin 16. (3) Measure the DC voltage on pin 13. (V_{OSDMAX}) (4) For pin 17 (measuring at pin 14) and pin 18 (measuring at pin 15), repeat (1)~(3).
25	OSD mode switching threshold voltage	V_{OSDSW}		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Increase the voltage of pin 16 from 0V. (2) Measure the voltage on pin 16 at which the picture-period voltage on pin 12 changes. (3) Measure the voltage on pin 16 at which the DC voltages on pins 13, 14 and 15 change. (4) For pin 17 and pin 18, repeat (1)~(3).

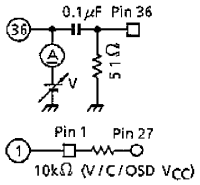
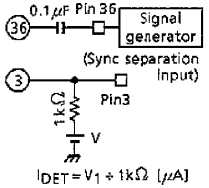
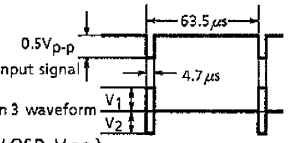
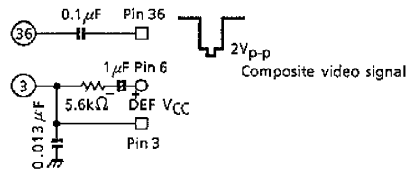
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}·V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
				SW_{02}	SW_{16}	SW_{17}	SW_{18}	SW_{24}	SW_{25}	SW_{33}	VR24	VR25	
26	OSD HIGH voltage switching threshold voltage	$V_{OSDHISW}$		↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Decrease the voltage of pin 16 from 5V. (2) Measure the voltage on pin 16 at which the DC voltage on pin 13 changes. (3) For pin 17 (at which voltage on pin 14 changes) and pin 18 (at which voltage on pin 15 changes), repeat (1) and (2).
27	OSD mode switching rise time	τR_{OSDY} τR_{OSDC}		A	ON or OFF	ON or OFF	ON or OFF	OFF	ON	A	Open	Adj.	(1) Adjust brightness so that the picture-period voltage on pin 12 is 6.8V. (2) Input the signal in Figure A of $1.4V_{p-p}$ into pin 16. (3) Measure τR_{OSDY}, tPF_{OSDY}, τF_{OSDY} and tPF_{OSDY} on pin 12 according to Figure B. (4) Measure τR_{OSDC}, tPR_{OSDC}, τF_{OSDC} and tPF_{OSDC} on pins 13, 14 and 15 according to Figure B. (5) In the same way, measure the rise / fall times in (3) and (4) after applying the signal in (2) into pins 17 and 18, respectively.
28	OSD mode switching rise transfer time	tPR_{OSDY} tPR_{OSDC}											
29	OSD mode switching fall time	τF_{OSDY} τF_{OSDC}											
30	OSD mode switching fall transfer time	tPF_{OSDY} tPF_{OSDC}											
31	OSD HIGH voltage switching rise time	τR_{OSDHI}		↑	↑	↑	↑	↑	↑	↑	↑	Min.	(1) Input the signal in Figure A of $4.2V_{p-p}$ into pin 16. (2) Measure τOSDHI, tPROSDHI, τOSDHI, and tPFOSDHI on pin 13 according to Figure C. (3) Input the signal in (1) into pin 17. (4) Repeat (2) on pin 14. (5) Input the signal in (1) into pin 18. (6) Repeat (2) on pin 15.
32	OSD HIGH voltage switching rise transfer time	tR_{OSDHI}											
33	OSD HIGH voltage switching fall time	τF_{OSDHI}											
34	OSD HIGH voltage switching fall transfer time	tPF_{OSDHI}											

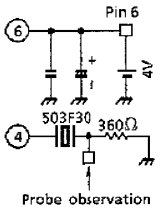
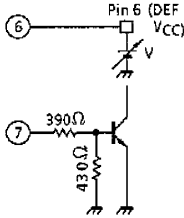
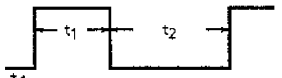
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										
			SW & VR MODE										MEASUREMENT METHOD
			SW_{19}	SW_{22}	SW_{23}	SW_{24}	S_{29a}	S_{29b}	VR22	VR23	VR24		
35	ACC characteristic	F_1 e_a A	Open / B	ON	Open	ON	A	A	Variable	—	Max.		(1) Input rainbow color bar into chroma input. (Chroma amplitude is equal burst amplitude.) (2) Adjust tint so that 6th bar of B-Y is the maximum. (3) Measure B-Y amplitude for 5mV_{p-p} input with killer off (SW_{19} : B). [e_a] (4) Measure B-Y amplitude for 100 and 300mV_{p-p} input. [F_1 and F_2] (5) Calculate : $A = F_1 / F_2$ 
36	Color control characteristic	V_{23} ΔV_{23}	Open	↑	↑	↑	↑	↑	↑	Variable	↑		(1) Input 100mV_{p-p} rainbow color bar into chroma input. (Chroma amplitude is equal burst amplitude.) (2) Adjust tint so that 6th bar of B-Y is the maximum. (3) Adjust color and measure V_{23} and ΔV_{23} according to following figure. 

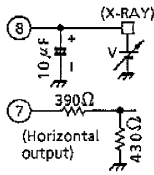
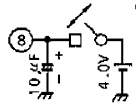
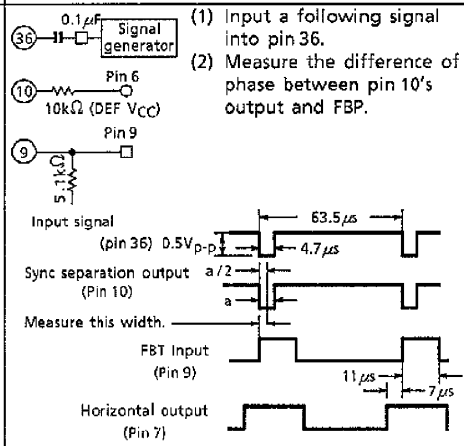
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}·V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
			SW_{19}	SW_{22}	SW_{23}	SW_{24}	S_{29a}	S_{29b}	VR22	VR23	VR24		
37	Contrast control characteristic	V_{24} ΔV_{24} e_u	Open	ON	ON	ON	A	A	Variable	Max.	Variable		(1) Input 100mV$_{p-p}$ rainbow color bar into chroma input. (2) Adjust tint so that 6th bar of B-Y is maximum. (3) Adjust contrast and measure V_{24} and ΔV_{24} according to following figure. (4) Measure F_1 and F_2, then calculate : $e_u = 20\log (F_1 / F_2)$ 
38	Maximum input level	E_{MAX}	Open	ON	Open	ON	A	A	Variable	—	Min.		(1) Input rainbow color bar into chroma input with burst fixed to 500mV$_{p-p}$. (2) Adjust tint so that 6th bar of B-Y is maximum. (3) While varying chroma amplitude from 200mV$_{p-p}$ to 1.5V$_{p-p}$, measure E_{MAX} according to following figure. 
39	Killer ON input level	e_{BK}	↑	Open	↑	Open	*	—	—	—	—		(1) Input rainbow color bar into chroma input. (Chroma and burst have same amplitude.) (2) Decreasing input amplitude, then measure the amplitude at which B-Y signal disappears. [e_{BK}]

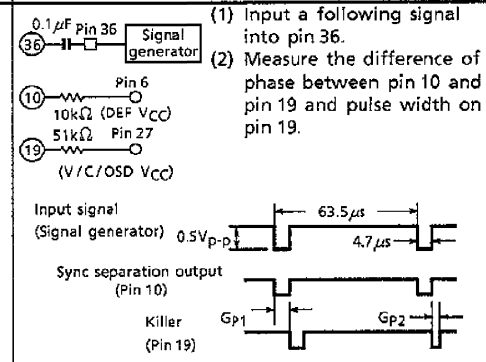
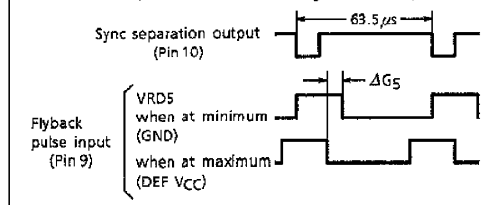
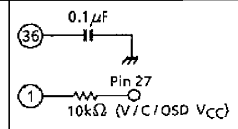
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}·V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
			SW_{19}	SW_{22}	SW_{23}	SW_{24}	S_{29a}	S_{29b}	VR22	VR23	VR24		
40	APC frequency control sensitivity	β	↑	↑	↑	↑	B	—	—	—	—		(1) No signal inputted into chroma input. (2) Measure f_0 at pin 21. (3) Measure the pin 20 voltage for f_0. [V_{20}] (4) Measure the frequency for V_{20} + 50mV and V_{20} − 50mV. [f_+ and f_-] (5) Calculate : $\beta = (f_+ - f_-)/100$ 
41	APC pull-in/ hold range	f_{PH} f_{PL} f_{HH} f_{HL}	Open	Open	Open	*	A	A	—	—	—		(1) Input 3.58MHz sine wave into chroma input. (2) While bringing chroma frequency close to 3.58MHz from upper and lower side, measure the frequency at which B/W mode turns to color mode. [f_{PH} and f_{PL}] (3) While increasing and decreasing chroma frequency from 3.58MHz, measure the frequency at which color mode turns to B/W mode. [f_{HH} and f_{HL}]
42	Color differential output level	e_R e_G e_B	↑	ON	↑	ON	↑	↑	Variable	↑	Max.		(1) Input 100mV_{p-p} rainbow color bar into chroma input. (2) Adjust tint so that one bar is maximum at R-Y, B-Y and G-Y each. (3) Measure the amplitudes of R-Y, B-Y and G-Y at maximum bars. [e_R, e_B and e_G]
43	Color differential output relative amplitude	e_R/e_B e_G/e_B	↑	↑	↑	↑	A	A	↑	↑	↑		Calculate : e_R/e_B and e_G/e_B
44	Color differential output relative phase	$\theta_{R\text{-}B}$ $\theta_{G\text{-}B}$	Open	Open	ON	ON	A	A	—	Max.	Variable		(1) Input a 100mV_{p-p}, 95° red signal into chroma input. (2) Increase burst phase to make the B-Y waveform flat on pin 15. This phase is θ_B. (3) Decrease burst phase to make the R-Y waveform flat on pin 13. This phase is θ_R. (4) Increase burst phase to make the G-Y waveform flat on pin 14. This phase is θ_G. (5) Calculate : $\theta_{R\text{-}B} = \theta_B - \theta_R$ $\theta_{G\text{-}B} = 360 - (\theta_G - \theta_B)$

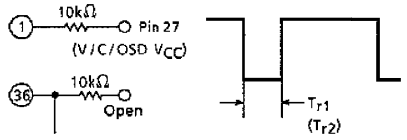
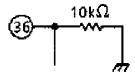
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
			SW_{19}	SW_{22}	SW_{23}	SW_{24}	S_{29a}	S_{29b}	VR22	VR23	VR24		
45	Tint control characteristic	θ_1 θ_2 θ V_{37} ΔV_{37}	Open	ON	ON	ON	A	A	Variable	Max.	Variable		(1) Input 100mV_{p-p}, 3.58MHz sine wave into chroma input. (2) While varying tint control voltage, measure the B-Y amplitude (A_{B-Y}). And max. of A_{B-Y} is A_{B-Y}^{max}. (3) Calculate : $\chi = A_{B-Y} / A_{B-Y}^{max}$ $\theta = \cos^{-1}\chi$ And draw a following graph of tint control characteristics. (4) Read θ_1, θ_2, V_{37} and ΔV_{37}. And calculate : $\theta = \theta_1 + \theta_2$ 
46	Color differential maximum output level	E_R E_G E_B	Open	ON	ON	ON	A	A	Variable	Max.	Max.		(1) Input rainbow color bar into chroma input with its burst fixed 100mV_{p-p}. (2) Adjust tint so that one bar of B-Y at which its amplitude is measured becomes maximum. (3) While varying chroma amplitude, measure the B-Y amplitude on pin 15. (4) Draw a following graph and read E_B. (5) For R-Y and G-Y, repeat (2)~(4). These are E_R and E_G. 

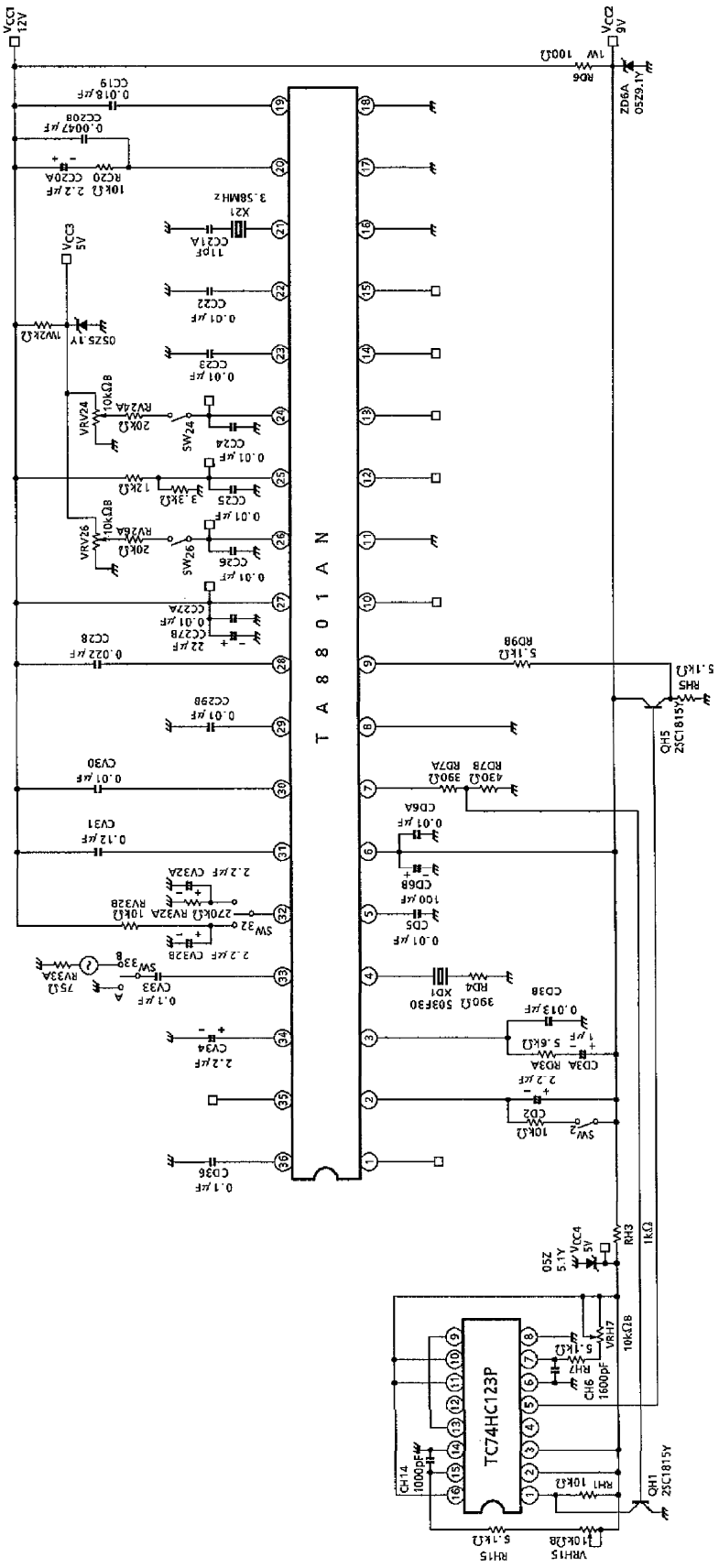
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (V_{CD}.V_{CC} = 12V, Ta = 25 ± 3°C)										MEASUREMENT METHOD
			SW & VR MODE										
			SW_{19}	SW_{22}	SW_{23}	SW_{24}	S_{29a}	S_{29b}	VR22	VR23	VR24		
47	Residual carrier level	v_{13e} v_{14e} v_{15e}	A	↑	Open	Open	↑	↑	↑	—	—		(1) Input rainbow color bar into chroma input with its burst and chroma 100mV_{p-p}. (2) While adjusting tint, measure the maximum leak from color sub-carrier to color difference output on pin 13, 14 and 15. These are v_{13e}, v_{14e} and v_{15e}.
48	Residual harmonic level	v_{13He} v_{14He} v_{15He}	↑	↑	↑	ON	↑	↑	↑	Max.	Min. Max.		(1) Input rainbow color bar into chroma input with its burst and chroma 100mV_{p-p}. (2) While adjusting tint, measure the maximum residual harmonic level on pin 13, 14 and 15. These are v_{13He}, v_{14He} and v_{15He}.
49	Sync separation input sensitive current	I_{IN36}	ON	ON	OFF	ON	ON	ON	ON	OFF	A		 While decreasing V from 3V down, measure the value of Ⓐ at which the frequency of the waveform on pin 1 changes from 297H to 250H.
50	H.AFC phase detection current	I_{DET}	OFF	OFF	↑	↑	↑	↑	↑	↑	OFF		 (1) Measure the DC voltage on pin 3 with no load and then set V to above voltage. (2) Input following signal into pin 36 and observe the pin 3 waveform. (3) Calculate : $I_{DET} = V_1 \div 1k\Omega$ [μA]  (Do not apply V/C/OSD V_{CC}.)
51	Phase detection stop period	T_{CO3}	↑	ON	↑	↑	↑	↑	↑	↑	↑		 (1) Apply a 60Hz composite video signal to pin 36. (2) Measure the phase det. stop period by pin 3 waveform.

NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (DEF V_{CC} = 9V, Ta = 25 ± 3°C)									
			SW & VR MODE									MEASUREMENT METHOD
			SW_1	SW_3	SW_5	SW_{6A}	SW_{7A}	SW_8	SW_9	SW_{10}	SW_{36}	
52	32f_H VCO oscillation start voltage	V_{ON}	↑	↑	↑	OFF	OFF	↑	OFF	↑	B	 Check to see that an oscillation waveform Ⓐ pears at pin 4 (32 x f_H VCO) when 4V is applied to pin 6 (DEF V_{CC}). (Do not apply V/C/OSD V_{CC}.)
53	Horizontal output start voltage	V_{HON}	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	B	 While raising V, measure the value of V at which a horizontal pulse (its frequency is 1.5kHz ± 1kHz) is generated from pin 7. (Do not apply V/C/OSD V_{CC}.)
54	Horizontal free-running frequency	f_{HO}	↑	↑	↑	↑	↑	↑	↑	↑	↑	Measure the oscillation frequency on pin 7 (horizontal output).
55	Horizontal oscillation frequency variable range	f_{HMAX}	↑	↑	↑	↑	↑	↑	↑	↑	↑	Measure the oscillation frequency on pin 7 when pin 3 is connected to H.V_{CC} via 10kΩ.
		f_{HMIN}	↑	↑	↑	↑	↑	↑	↑	↑	↑	Measure the oscillation frequency on pin 7 when pin 3 is connected to GND via 68kΩ.
56	Horizontal oscillation control sensitivity	β_H	↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Measure the voltage on pin 3 at which the horizontal oscillating frequency is 15.734kHz. (2) While varying pin 3 voltage ± 0.05V from above voltage, measure the H osc. frequency. (3) Calculate frequency change rate.
57	Horizontal output pulse duty cycle	T_{H7}	↑	↑	↑	↑	↑	↑	↑	↑	↑	While observing the waveform on pin 7, measure t_1 and t_2.  $T_7 = \frac{t_1}{t_1 + t_2} \times 100$ [%]
58	Horizontal output voltage	V_{H7}	↑	↑	↑	↑	↑	↑	↑	↑	↑	Measure the HIGH-level voltage of the output waveform on pin 7.
		V_{L7}	↑	↑	↑	↑	↑	↑	↑	↑	↑	Measure the LOW-level voltage of the output waveform on pin 7.

NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (DEF V_{CC} = 9V, Ta = 25 ± 3°C)									
			SW & VR MODE									MEASUREMENT METHOD
			SW_1	SW_3	SW_5	SW_{6A}	SW_{7A}	SW_8	SW_9	SW_{10}	SW_{36}	
59	Overvoltage protection detection voltage	V_{SON}	↑	↑	↑	↑	↑	OFF	↑	↑	↑	 While increasing the pin 8 voltage, measure the voltage at which horizontal output pulse from pin 7 disappears.
60	Overvoltage protection retention voltage	V_{H6}	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	B	(1) Apply a voltage of 4V to pin 8 to make H out pulse disappear and then remove the power supply.  (2) When setting the pin 6 voltage to 2.5V once, and to 9.0V again, check to see that H out does not appear.
61	Horizontal sync phase	S_{PHI}	↑	↑	↑	ON	ON	ON	ON	ON	OFF	 (1) Input a following signal into pin 36. (2) Measure the difference of phase between pin 10's output and FBP.

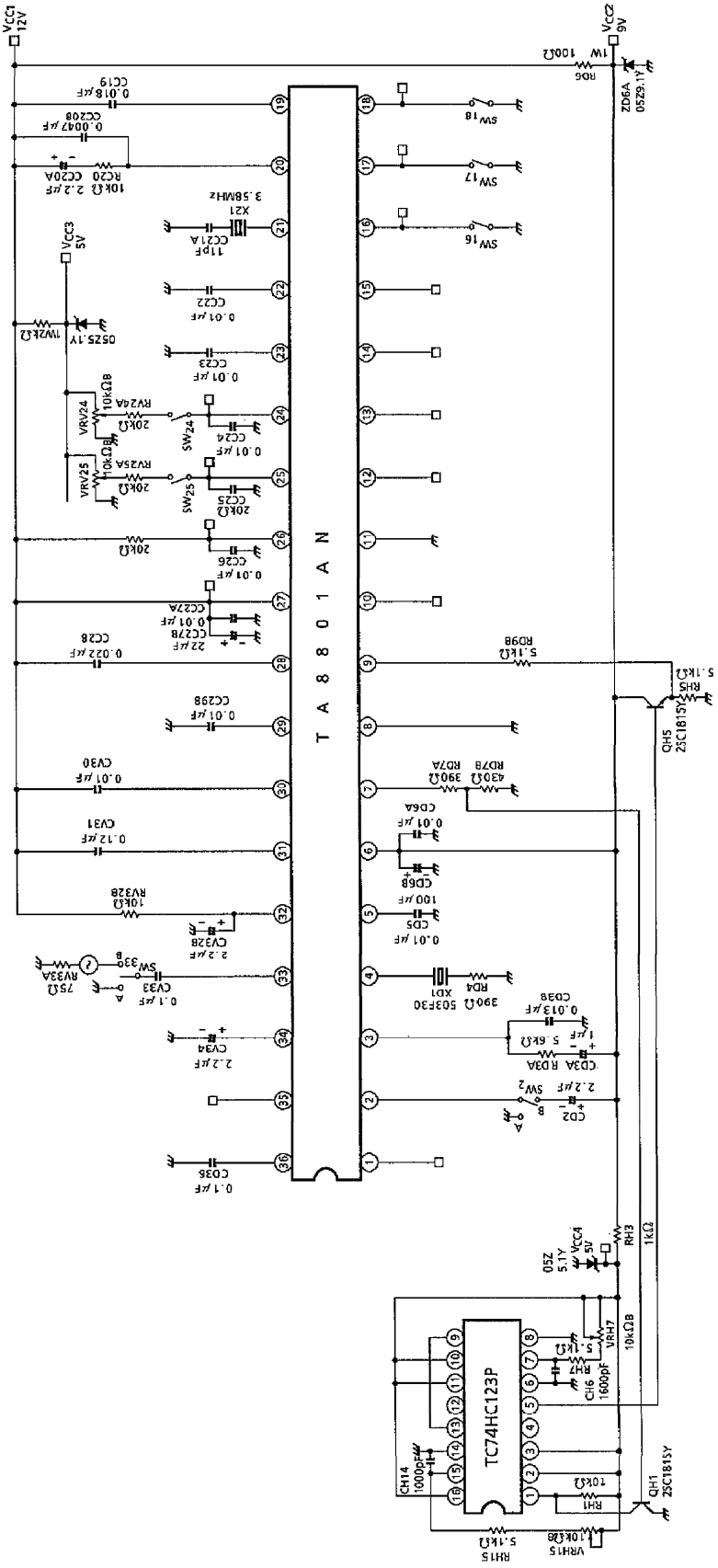
NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (DEF V_{CC} = 9V, Ta = 25 ± 3°C)									
			SW & VR MODE									MEASUREMENT METHOD
			SW_1	SW_3	SW_5	SW_{6A}	SW_{7A}	SW_8	SW_9	SW_{10}	SW_{36}	
62	Gate pulse start phase	G_{P1}	↑	↑	↑	↑	↑	↑	↑	↑	↑	(1) Input a following signal into pin 36. (2) Measure the difference of phase between pin 10 and pin 19 and pulse width on pin 19. 
63	Gate pulse pulse width	G_{P2}										
64	Horizontal screen phase adjustment variable range	ΔG_5	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	(1) Same as Note 63's (1). (2) While varying VRD5 from minimum to maximum, measure the change of FBP phase. 
65	Vertical free-running frequency	f_{VO}	ON	↑	OFF	↑	↑	↑	↑	OFF	B	Measure the oscillation frequency on pin 1. 

NOTE	ITEM	SYMBOL	MEASUREMENT CONDITION (H.V_{CC} = 9V, Ta = 25 ± 3°C)										
			SW & VR MODE										MEASUREMENT METHOD
			SW_1	SW_3	SW_5	SW_{6A}	SW_{7A}	SW_8	SW_9	SW_{10}	SW_{36}		
66	Vertical output pulse width	T_{r1}	↑	↑	↑	↑	↑	↑	↑	↑	OFF		 Measure T_{r1} from the waveform on pin 1.
67		T_{r2}	↑	↑	↑	↑	↑	↑	↑	↑	↑		 Measure T_{r2} from the waveform on pin 1.
68	Vertical pull-in range	f_{PV1} f_{PV2}	↑	↑	↑	↑	↑	↑	↑	↑	↑		(1) Input a 60Hz composite video signal into pin 36 (sync. separation input). (2) While varying the vertical frequency in 0.5H steps, measure the vertical pull-in range.



TEST CIRCUIT1.

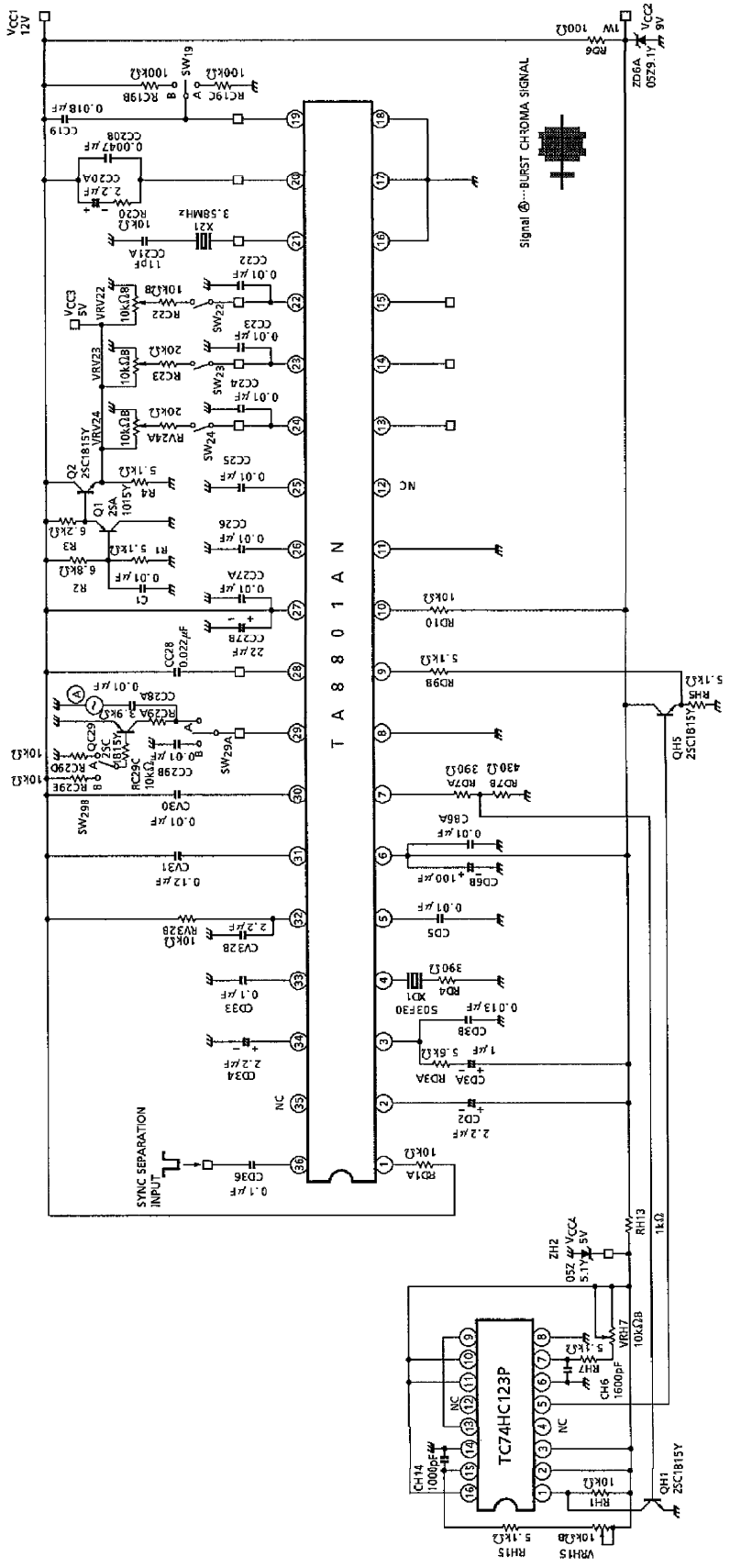
Video section



TEST CIRCUIT2.

OSD section

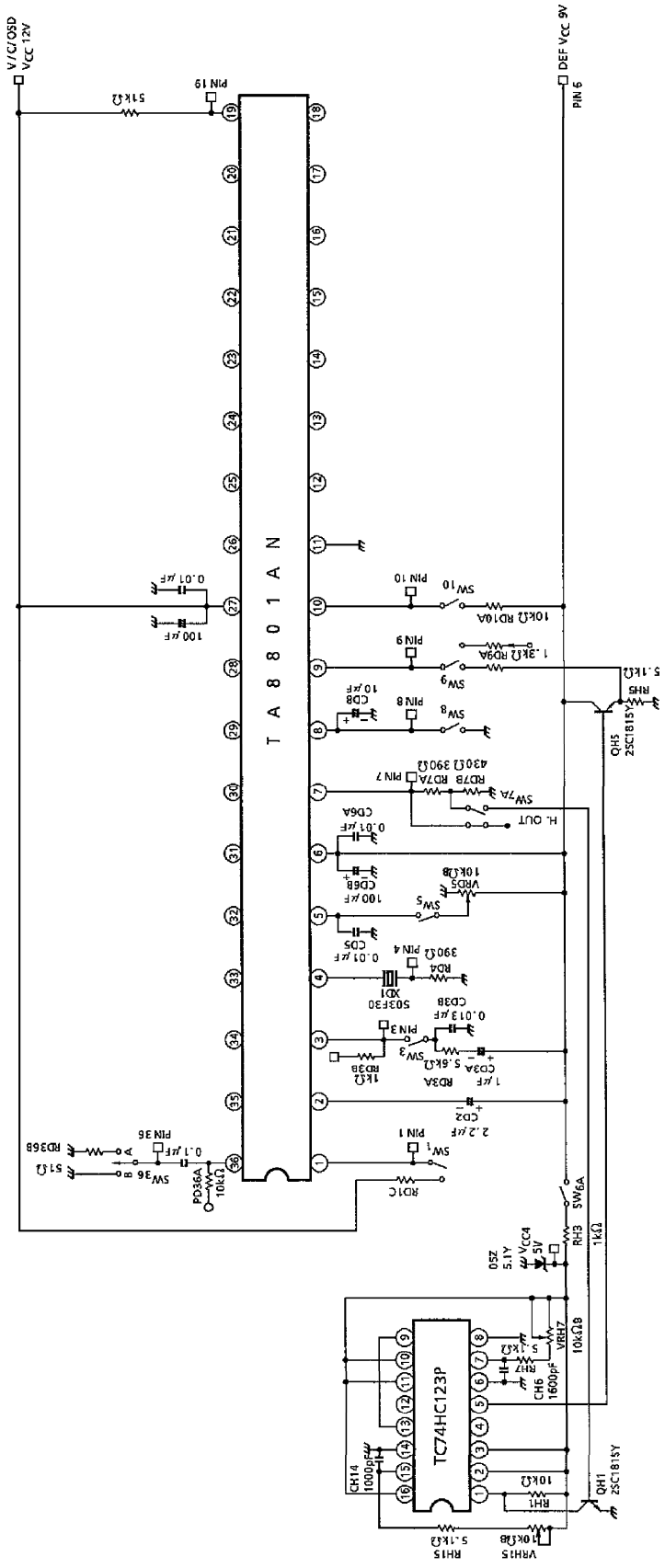
TA8801AN – 30



TEST CIRCUIT3.

Chroma section

TA8801AN – 31

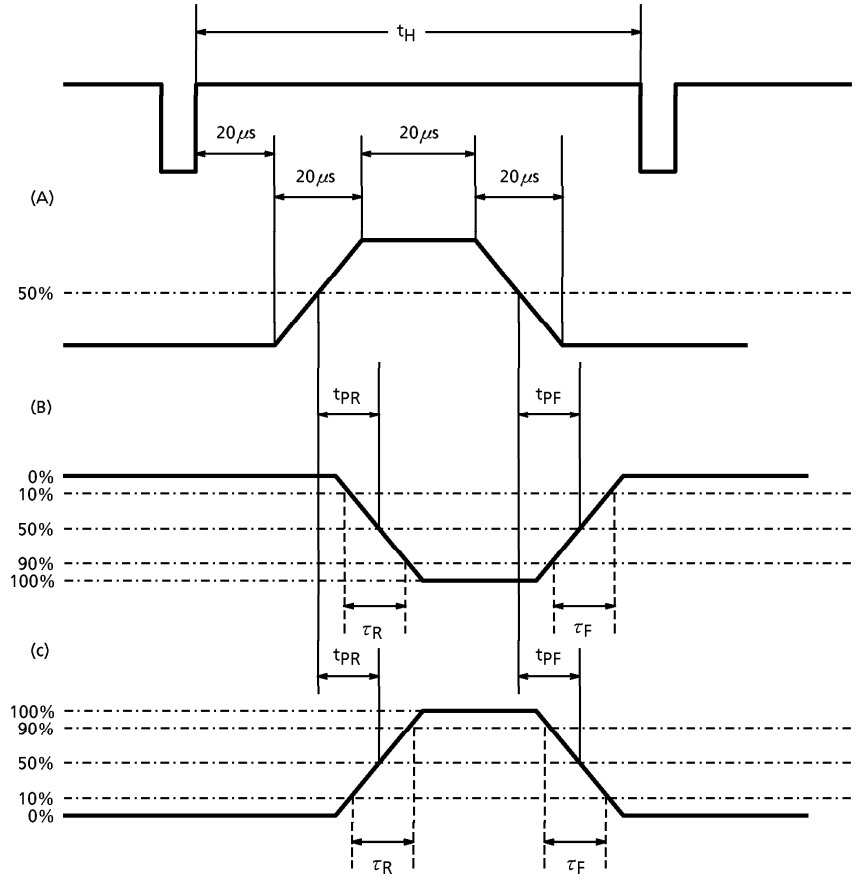


TEST CIRCUIT4.

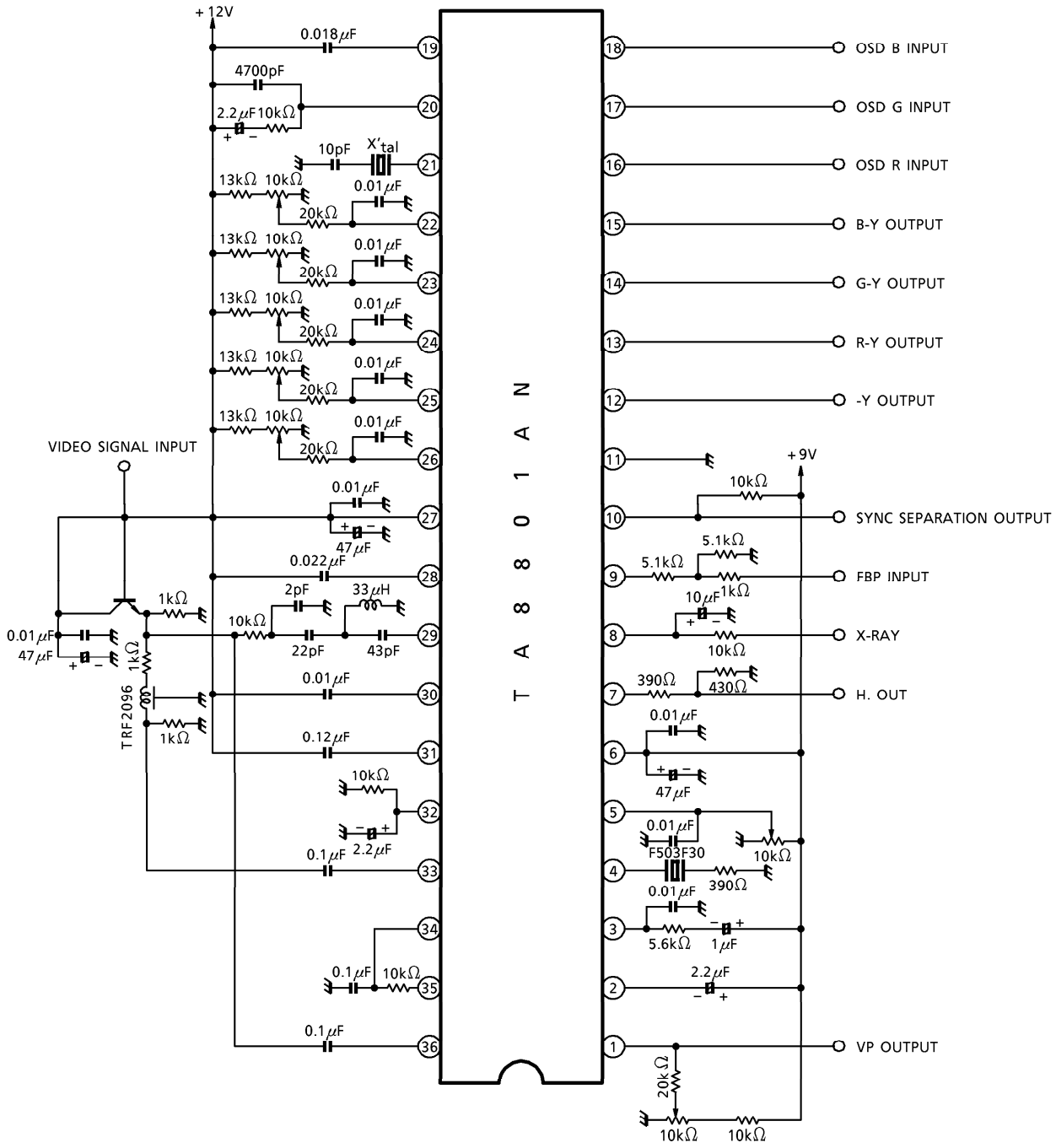
Deflection section

TA8801AN – 32

SIGNAL FOR MEASUREMENT

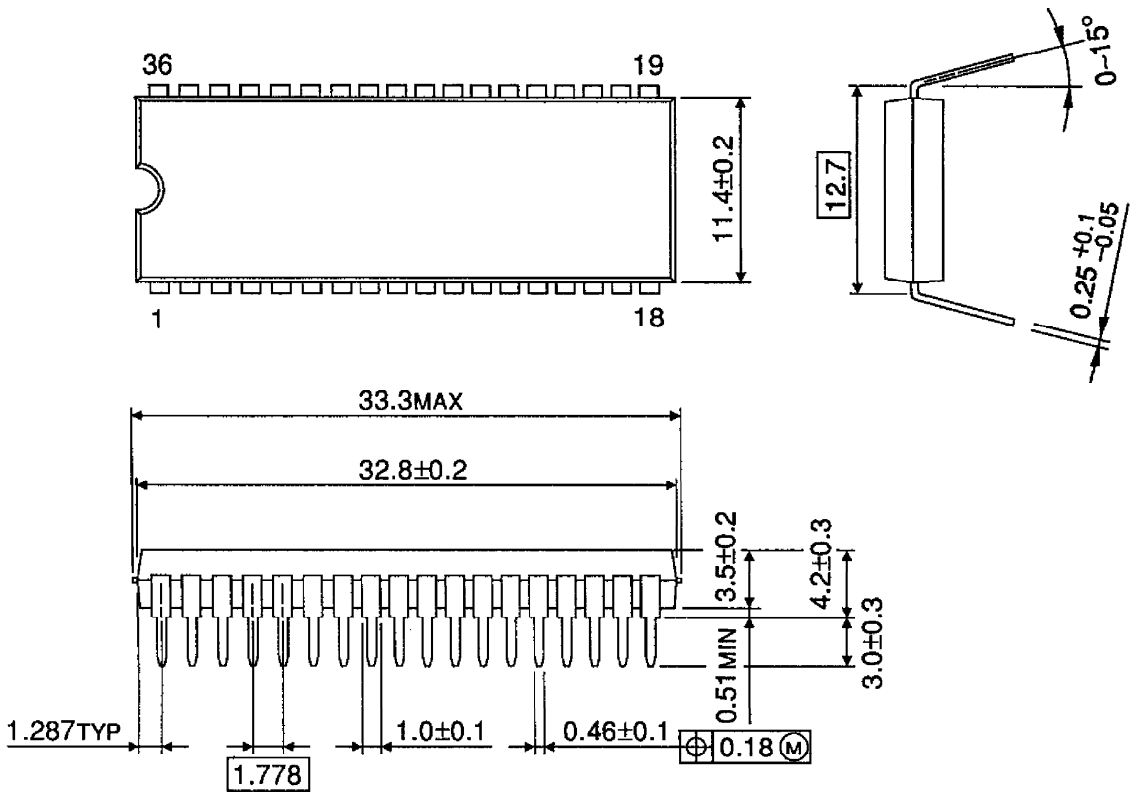


APPLICATION CIRCUIT



PACKAGE DIMENSIONS

SDIP36-P-500-1.78 Unit : mm



Weight : 2.98g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.