TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT   SILICON MONOLITHIC

TA8751AN

AUTOMATIC KINE BIAS (AKB)
RGB INTERFACE

TA8751AN possesses functions that optimize the CRT drive conditions in televisions, and is an IC that automates the previously complex cutoff adjustment and drive adjustment non-adjustment.
It has an RGB TEXT input pin, so TV signal and TEXT signal can be switched between rapidly.
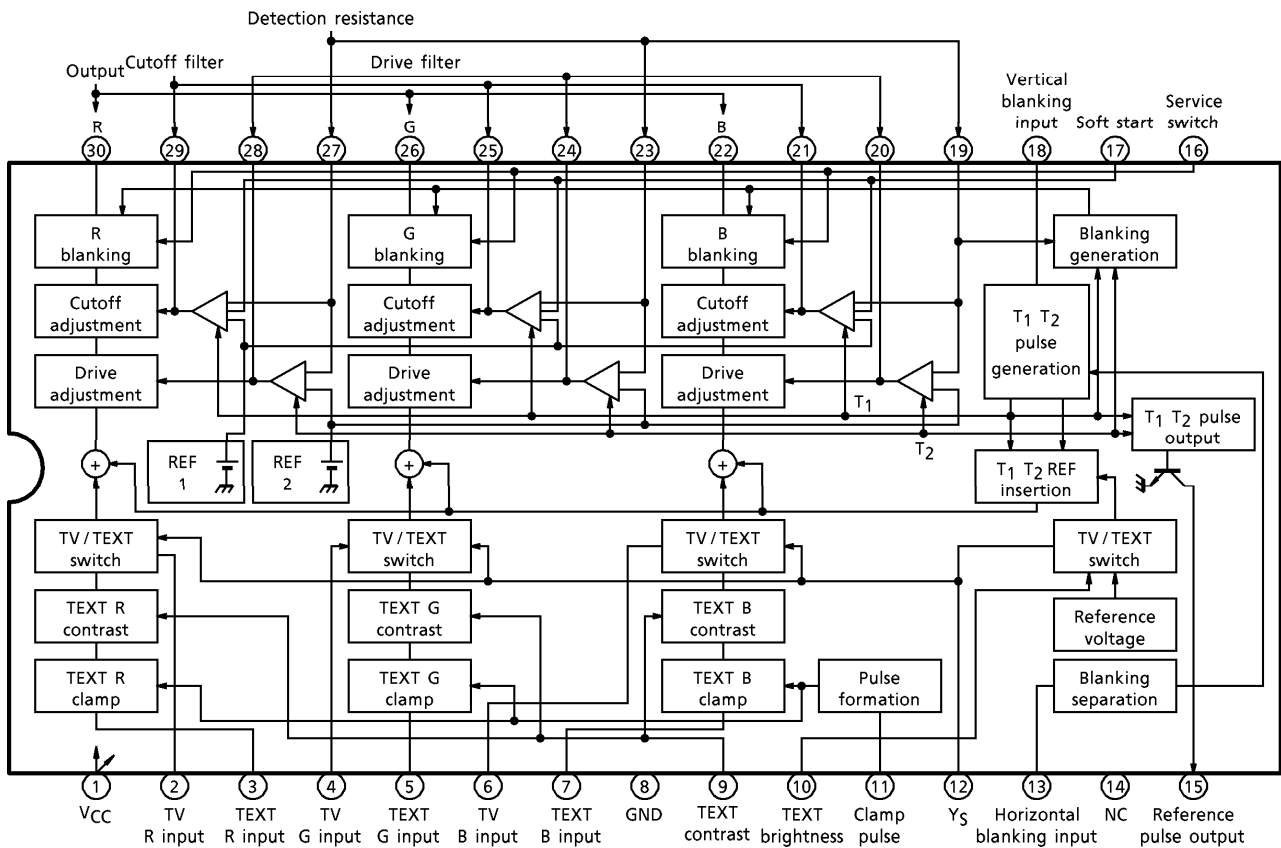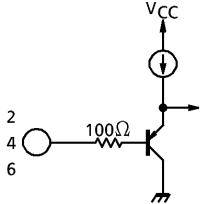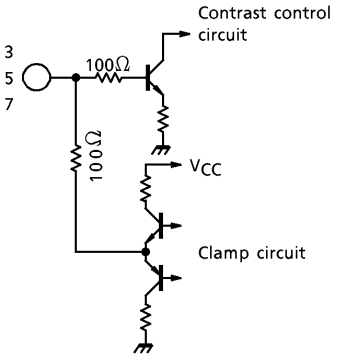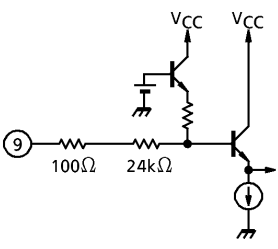The TV's primary colors are DC coupled, so brightness control from previous stages can be utilized.
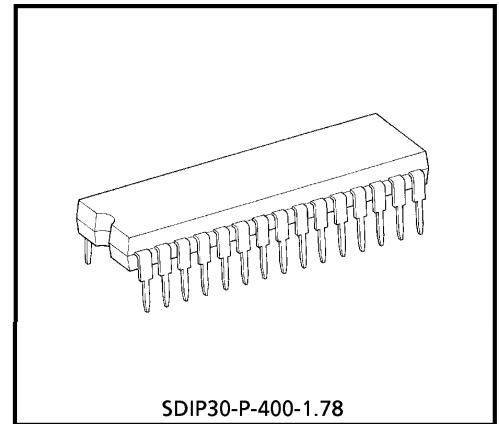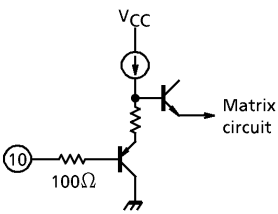
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Weight : 1.99g (Typ.)
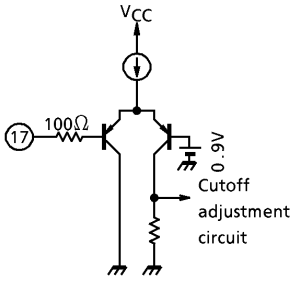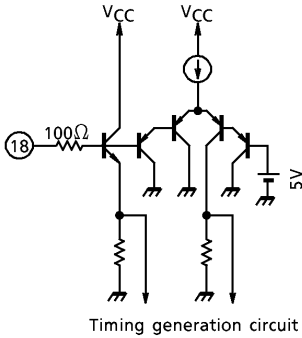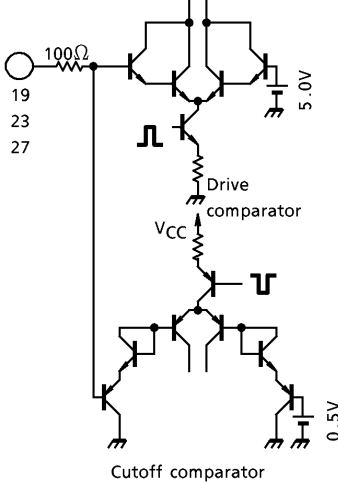
BLOCK DIAGRAM
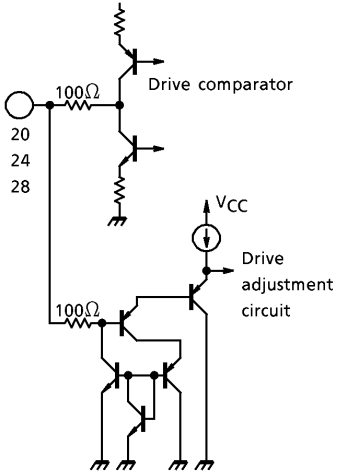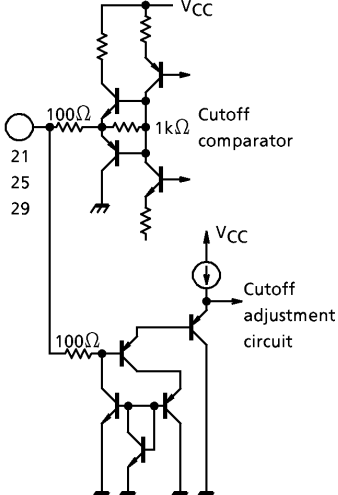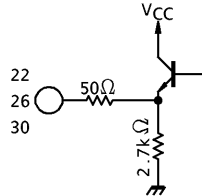
TERMINAL FUNCTION

PIN No.	NAME	FUNCTION	INTERFACE
1	V_{CC}	$V_{CC} = 12V$ (Standard) Please use voltage between 11 and 13V.	—

2
 4
 6
	TV signal input
	   R input
	   G input
	   B input
		Input pin for TV primary color signals.
		 Used with DC direct-coupling.
		 Used with a standard black level of 3.0V (Standard).	

3
 5
 7
	TEXT signal input
	   R input
	   G input
	   B input
		Input pin for TEXT primary color signals.
		 Used with AC direct-coupling.
		 The DC voltage for the clamp interval of the TEXT primary color signals and the DC voltage for the clamp interval of the TV primary color signals are joggled by an input clamp circuit inside the IC.
		 After that the DC voltage determined by the TEXT brightness control from the internal matrix circuit is added.	

8	GND	—	—
9	TEXT contrast control	Pin that controls the amplitudes of the RGB signals input from pins 3, 5 and 7.	
10	TEXT brightness control	Pin that controls the DC voltage added to the RGB signals input from pins 3, 5 and 7.	

PIN No.	NAME	FUNCTION	INTERFACE
11	Clamp pulse input	Input pin for the clamp pulse that adjusts the black level of the TEXT signal and the black level of the TV signal. Detection level is 2V (Standard). Please ensure peak value is (V_{CC} − 3V) or less.	
12	Y_S input	Switches at high speed between TV signal (Pins 2, 4 and 6) and TEXT signal (Pins 3, 5 and 7). At high levels TEXT signal and at low levels TV signal can be selected.	
13	Horizontal blanking input	Input pin for horizontal blanking pulse. Horizontal blanking pulse and is used in the blanking of output signal and creation of reference pulse.	
14	N.C.	—	—
15	Reference pulse output	Output pin for reference pulse (T_1, T_2). This is open collector output. Using the reference pulse output from this pin, please set the reference pulse interval output from the V / C / D IC in the previous stage so it is the black level.	
16	Service switch	Pin used to set the service mode. Service mode fixes RGB output at T_1 pulse level. Used for adjustment.	

PIN No.	NAME	FUNCTION	INTERFACE
17	Soft start	When the power is off and the CRT is not warmed up, as a beam current does not flow to cutoff and drive detection interval, voltage is not obtainable from the sense pin. Accordingly, for operation so that current flows to the CRT for both cut adjustment and drive adjustment, the CRT starts from a white screen the instant it warms up. In order to prevent this, the soft start circuit returns the output DC voltage and operates so that if pin 17 exceeds a fixed value, cutoff adjustment is fixed on the black side. The set value is 0.9V.	
18	Vertical blanking input	Input pin for the vertical blanking pulse that determines the timing of the reference pulse for the cutoff adjustment and drive adjustment. The first 2H interval after the leading edge of the vertical blanking is the cutoff reference level, while the next 2H interval is the drive reference level. H timing is created by the horizontal blanking of pin 14.	Timing generation circuit
19 23 27	B sense G sense R sense	Detection pin for the CRT beam current. The current that flows to the CRT cathode as a result of the reference pulse inserted for cutoff adjustment and drive adjustment is converted to a voltage and detected by detection resistance. White balance can be changed by varying detection resistance. The internal comparator operates in tune with the timing of the reference pulse.	Cutoff comparator

PIN No.	NAME	FUNCTION	INTERFACE
20 24 28	B drive filter G drive filter R drive filter	The comparator output over the reference pulse interval is held for a 1V interval. RGB gain is controlled by this voltage, and operates so that the sense voltages of pins 19, 23 and 27 are 5V. Please use filter capacitance that has as little leak current as possible.	
21 25 29	B cutoff filter G cutoff filter R cutoff filter	The comparator output over the reference pulse interval is held for a 1V interval. The quantity of DC level shift for RGB is controlled by this voltage, and operates so that the sense voltages of pins 19, 23 and 27 are 0.5V. Please use a filter that has as little leak current as possible.	
22 26 30	B output G output R output	Primary color signal output pin. DC and gain determine the sense pin voltage of the cutoff detection interval is 0.5V and the sense pin voltage of the drive detection interval is 5V. These become approximately 1V during horizontal blanking and vertical blanking intervals.	

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	15	V
Input Signal Voltage	e_{IN}	5	V
Primary Color Output Current	I_{OUT}	3.5	mA
TV / TEXT Switching Voltage	V_{12}	− 0.5~7.0	V
Blanking Pulse Input Voltage	V_{18}	5~10	V
Adjustment Pin Voltage	V_{CONT}	0~V_{CC}	V
Dissipating Power	P_D (Note)	1.6	W
Operating Temperature	T_{opr}	− 20~65	°C
Storage Temperature	T_{stg}	− 55~150	°C

(Note) When used at temperatures of 25°C or above, please reduce the power by 12.8mW for each 1°C over 25°C.
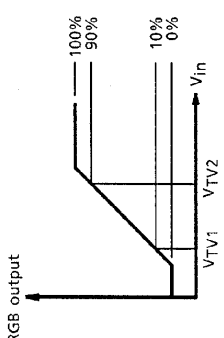
ELECTRICAL CHARACTERISTICS

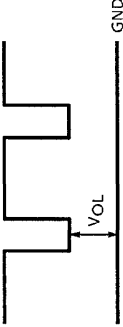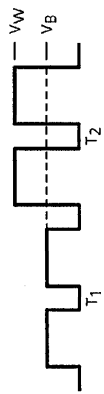AC CHARACTERISTICS (When not specified otherwise, V_{CC} = 12V, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I_{CC}	—	V_{CC} = 12V	50	65	85	mA
TV Input Dynamic Range	V_{TV}	—	(Note 1)	5.0	7.0	—	V_{p-p}
Maximum Gain	G_m	—	(Note 2)	1.0	3.0	5.0	dB
Gain Variable Width	G_r	—	(Note 3)	10	12	13	dB
Cutoff Control Variable Range	ΔV_{CUT}	—	(Note 4)	1.5	2.0	—	V
Cutoff Control Control Sensitivity	β_C	—	(Note 5)	− 0.4	− 0.7	− 1.0	
TV Frequency Characteristics	f_{TV}	—	(Note 6)	10	15	—	MHz
Crosstalk Between Channels	C_{PTV}	—	(Note 7)	—	− 50	− 40	dB
Horizontal Blanking Detection Level	V_{HBLK}	—	(Note 8)	1.5	1.7	1.9	V
Vertical Blanking Detection Level	V_{VBLK}	—	(Note 9)	4.0	5.0	6.0	V
Output Blanking Level	V_{OL}	—	(Note 10)	—	1.0	1.5	V
Black Detection Voltage	V_B	—	(Note 11)	0.4	0.55	0.7	V
White Detection Voltage	V_W			4.0	5.0	6.0	
Black Detection Level Temperature Drift	$\Delta V_B / \Delta T$	—	(Note 12)	—	0	± 1	mV / °C
White Detection Level Temperature Drift	$\Delta V / \Delta T$			—	0	± 2	
Difference in Black Detection Voltage Between Channels	ΔV_B	—	(Note 13)	—	0	± 10	mV
Difference in White Detection Voltage Between Channels	ΔV_W			—	0	± 100	
Output Voltage Vertical Interval Sag	V_{OS}	—	(Note 14)	—	0	± 100	mV
Difference in Vertical Interval Sag between Channels	ΔV_{OS}			—	0	± 50	
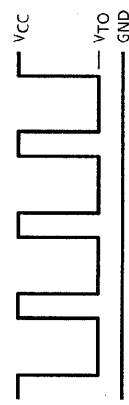
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
T_1, T_2 Pulse Output Voltage	V_{TO}	—	(Note 15)	—	0	0.3	V
Output Voltage when Service Switch is on	V_{SV}	—	(Note 16)	2.6	3.1	3.6	V
Soft Start Detection Voltage	V_{SS}	—	(Note 17)	0.8	0.9	1.0	V
TV→TEXT Crosstalk	C_{PTVTX}	—	(Note 18)	—	−50	−40	dB
Output DC Voltage	V_{OUT}	—	(Note 19)	2.5	3.0	3.5	V
Dependence of Black Detection Level on V_{CC}	V_{BVcc}	—	(Note 20)	—	0	10	mV
Dependence of White Detection Level on V_{CC}	V_{WVcc}			—	0	0.1	V
Vertical Blanking Delay Time	Δt_{V1}	—	(Note 21)	—	0	200	ns
	Δt_{V2}			—	0	200	
Horizontal Blanking Delay Time	Δt_{H1}	—	(Note 22)	—	0	200	ns
	Δt_{H2}			—	0	200	
TEXT Maximum Gain	G_{TXM}	—	(Note 23)	7.0	9.0	10.0	dB
TEXT Contrast Variable Width	GR_{TX}	—	(Note 24)	8.0	9.5	11.0	dB
TEXT Bright Voltage	V_{TXB}	—	(Note 25)	5.4	6.4	7.4	V
TEXT Contrast Voltage	V_{TXC}	—	(Note 26)	5.4	6.0	6.6	V
TEXT Frequency Characteristics	f_{TX}	—	(Note 27)	10	15	—	MHz
Gate Input Detection Level	V_{GT}	—	(Note 28)	1.1	1.4	1.7	V
TEXT Crosstalk Between Channels	C_{PTX}	—	(Note 29)	—	−50	−40	dB
TEXT→TV Crosstalk	C_{PTXTV}	—	(Note 30)	—	−50	−40	dB
TEXT Bright Variable Width	ΔV_{TXB}	—	(Note 31)	—	3.0	—	V
TEXT, TC Differential Voltage Change	ΔV_{def}	—	(Note 32)	−50	0	50	mV
TEXT RGB Relative Gain Differential	ΔG_V	—	(Note 33)	−1.0	0	1.0	dB
TV / TEXT Switching Level	V_{YS}	—	(Note 34)	0.4	0.7	1.0	V
TV→TEXT Switching Delay Time	t_{pTD}	—	(Note 35)	—	20	100	ns
TV→TEXT Switching Delay Time 3-Color Differential	Δt_{pTD}			—	0	±25	
TEXT→TV Switching Delay Time	t_{pDT}			—	20	100	
TEXT→TV Switching Delay Time 3-Color Differential	Δt_{pDT}			—	0	±25	

TEST CONDITIONS

TEST CONDITIONS V_{CC} = 12V, Ta = 25 ± 1°C

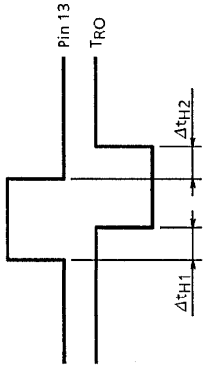| NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
1	TV Input Dynamic Range	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) Cutoff filter voltage V_C = 6.5V, Drive filter voltage V_D = 6.0V (2) Measure RGB output voltage when TV input voltage is varied from 0V to V_{CC}. (3) With the maximum change in RGB output voltage is 100%, V_{TV1} is when the change is 10% and V_{TV2} is when the change is 90%. $V_{TV} = V_{TV2} - V_{TV1}$ (V)
2	Maximum Gain	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) V_D = 12V, V_C = 6.5V, V_{in} = 6V (2) Input 0.5Vp-p, 500kHz signal from TV input. (3) Measure RGB output signal amplitude Vout. $G_m = 20\ell og\,10\dfrac{V_{out}}{0.5Vp\text{-}p}$ (dB)
3	Gain Variable Width	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) V_C = 6.5V, V_{in} = 6V (2) Input 0.5Vp-p, 500kHz signal from TV input. (3) V_{min} is defined as the RGB output signal amplitude when V_D = 0V, and V_{max} is defined as the RGB output signal amplitude when V_D = 12V. (4) $G_r = 20\ell og\,10\dfrac{V_{max}}{V_{min}}$ (dB)

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TEST CONDITIONS $V_{CC}=12V$, Ta=25±1°C

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		S_C	S_D	S_O	S_S	S_{SV}	S_{HBL}	S_{VBL}	S_{in}	S_{SS}	S_{YS}	
4	Cutoff Control Variable Range	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) $V_{in}=6V$, $V_D=6V$ (2) Vomax is defined as the output DC voltage when $V_C=0V$ (3) Vomin is defined as the output DC voltage when $V_C=12V$ (4) $\Delta V_{CUT}=V_{omax}-V_{omin}$ (V)
5	Cutoff Control Control Gain	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) $V_{in}=6V$, $V_D=6V$ (2) V_1 is defined as the output DC voltage when $V_C=5.5V$ (3) V_2 is defined as the output DC voltage when $V_C=6.5V$ (4) $\beta C=\dfrac{V_1-V_2}{1V}$
6	TV Frequency Characteristics	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) $V_C=6.5V$, $V_D=6V$, $V_{in}=6V$ (2) The output level when a 1.0Vp-p, 500kHz signal is input from TV input is 0dB. (3) Measure the 3dB band.
7	Crosstalk Between Channels	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) $V_C=6.5V$, $V_D=6V$, $V_{in}=6V$ (2) The R output level when a 1.0Vp-p, 500kHz signal is input from TV's R input is 0dB. (3) Measure crosstalk to G and B channels.
8	Horizontal Blanking Detection Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	(1) $V_C=6.5V$, $V_D=6V$, $V_{in}=3V$ (2) Vary the peak value of the horizontal blanking pulse and measure the levels at which V_1, V_2 pulses are generated in the output.

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TEST CONDITIONS $V_{CC} = 12V$, $Ta = 25 \pm 1°C$

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
9	Vertical Blanking Detection Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	(1) $V_C = 6.5V$, $V_D = 6V$, $V_{in} = 3V$ (2) Vary the peak value of the vertical blanking pulse and measure the levels at which V_1, V_2 pulses are generated in the output.
10	Output Blanking Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	(1) $V_C = 6.5V$, $V_D = 6V$, $V_{in} = 3V$ (2) Measure the level of blanking pulse that appears in output.
11	Black Detection Voltage White Detection Voltage	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) $V_{in} = 3.0V$ (2) Measure T_1, T_2 pulse level at sense pins.
12	Black Detection Voltage Temperature Drift White Detection Voltage Temperature Drift	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) $V_{in} = 3.0V$ (2) Measure temperature drift in black detection voltage level and white detection voltage level when Ta is varied from −20~70°C.

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TEST CONDITIONS V_{CC} = 12V, Ta = 25 ± 1°C

| NOTE | CHARACTERISTIC | SW & VR MODE | | | | | | | | | | TEST METHOD |
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
13	Difference in Black Detection Voltage Between Channels / Difference in White Detection Voltage Between Channels	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) V_{in} = 3.0V (2) Measure voltage differential between RGB channels of T_1, T_2 pulse levels at sense pins.
14	Output Voltage Vertical Interval Sag / Differential in Vertical Interval Sag Between Channels	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) V_{in} = 3.0V (2) Observe measurement pin T_{RO} waveform using an oscilloscope. (3) Measure vertical interval sag V_{OS} of output waveform. (4) Observe T_{GO} and T_{BO} in the same way. (5) Observe waveforms of T_{RO}, T_{GO} and T_{BO} simultaneously using an oscilloscope, and observe the difference in vertical sag between channels.
15	T_1, T_2 Pulse Output Voltage	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) Observe measurement pin T_{TO} waveform using an oscilloscope. (2) Measure the low level voltage of T_1, T_2 pulse that appears in T_{TO}. [waveform: V_{CC}, V_{TO}, GND]
16	Output Voltage when Service Switch is on	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	a	(1) V_{in} = 3.0V, V_C = 6.5V, V_D = 6.0V (2) Measure T_{RO} voltage. (3) Measure T_{GO}, T_{RO} voltage in the same way.

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TEST CONDITIONS VCC = 12V, Ta = 25 ± 1°C

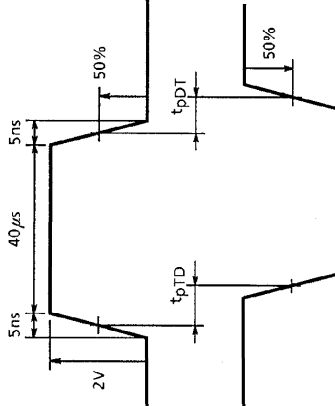| NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
17	Soft Start Detection Voltage	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	a	(1) $V_{in} = 3.0V$ (2) Observe T_1, T_2 pulse that appears in RGB output, and while increasing V_S from 0V, observe V_S when the T_1, T_2 pulse fluctuates.
18	TV→TEXT Crosstalk	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a or b	(1) $V_{in} = 6.0V$, $V_D = 6.0V$, $V_C = 6.5V$ (2) Input a 1.0Vp-p, 500kHz signal from the TV input. (3) The output signal level when S_{YS} is a is defined as 0dB. (4) Measure the output signal level when S_{YS} is b.
19	Output DC Voltage	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) $V_{in} = 3.0V$, $V_D = 6.0V$, $V_C = 6.5V$ (2) Measure DC voltage of RGB output pin.
20	Dependence of Black Detection Level on VCC / Dependence of White Detection Level on VCC	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) $V_{in} = 3.0V$ (2) Measure fluctuations in the T_1, T_2 pulse level that occur in the measurement pin T_{RS} when VCC is varied from 11~13V. (3) Make measurements for T_{GS} and T_{BS} in the same way.
21	Vertical Blanking Delay Time	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	(1) $V_{in} = 3.0V$, $V_D = 6.0V$, $V_C = 6.5V$ (2) Measure the input waveform of pin 18's vertical blanking. (3) Measure the vertical blanking pulse that appears in T_{RO}. (4) Make measurements for T_{GO} and T_{BO} in the same way. Pin 18, T_{RO}, Δt_{V1}, Δt_{V2}

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TEST CONDITIONS V_{CC} = 12V, Ta = 25 ± 1°C

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		S_C	S_D	S_O	S_S	S_{SV}	S_{HBL}	S_{VBL}	S_{in}	S_{SS}	S_{YS}	
22	Horizontal Blanking Delay Time	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	(1) V_{in} = 3.0V, V_D = 6.0V, V_C = 6.5V (2) Measure horizontal blanking input waveform of pin 13. (3) Measure the horizontal blanking pulse that appears in T_{RO}. (4) Make measurements for T_{GO} and T_{BO} in the same way. Pin 13 / T_{RO} / Δt_{H1} / Δt_{H2}
23	TEXT Maximum Gain	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) V_{in} = 3.0V, V_{BR} = 6.4V, V_C = 6.5V, V_D = 6.0V, V_{CONT} = 12V (2) Input a 500kHz, 0.5Vp-p signal at TEXT input. 0.5Vp-p (3) Input clamp pulse at pin 11. (4) Measure signal pulse width V_O of RGB output. (5) $G_{TXM} = 20\log \dfrac{V_O}{0.5V}$ (dB)

TEST CONDITIONS $V_{CC} = 12V$, $Ta = 25 \pm 1°C$

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
24	TEXT Contrast Variable Width	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) $V_{in} = 3.0V$, $V_{BR} = 6.4V$, $V_C = 6.5V$, $V_D = 6.0V$ (2) Input a 500kHz, 0.5Vp-p signal at TEXT input. (3) Input clamp pulse at pin 11. (4) VO1 is defined as the output signal amplitude when $V_{CONT} = 0V$. VO2 is defined as the output signal amplitude when $V_{CONT} = 12V$. (5) $G_{RTX} = 20 log \dfrac{VO2}{0.5V} - 20 log \dfrac{VO1}{0.5V}$ (dB)
25	TEXT Bright Voltage	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a or b	(1) $V_{in} = 3.0V$, $V_{CONT} = OPEN$, $V_C = 6.5V$, $V_D = 6.0V$ (2) Input clamp pulse at pin 11. (3) Measure the V_{BR} where the black level voltage for TV mode and TEXT mode is the same when switching between TV/TEXT.
26	TEXT Contrast Voltage	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	Measure voltage when pin 9 is open.
27	TEXT Frequency Characteristics	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) $V_{in} = 3.0V$, $V_{BR} = 6.4V$, $V_C = 6.5V$, $V_D = 6.0V$, $V_{CONT} = OPEN$ (2) Input a 500kHz, 0.5Vp-p signal at TEXT input (3) Input clamp pulse at pin 11. (4) The output signal level is 0dB at this time. (5) Increase signal frequency and measure the input signal frequency at $-3dB$.

TA8751AN−14

TEST CONDITIONS Vcc=12V, Ta=25±1°C

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		Sc	SD	SO	SS	Ssv	SHBL	SvBL	Sin	Sss	Sys	
28	Gate Input Detection Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) Vin=3.0V, VCONT=OPEN VBR=6.4V, VC=6.5V, VD=6.0V (2) Observe DC voltage at TEXT input pin. (3) Increase input voltage V11 at pin 11 from 0V and measure the V11 when DC voltage at the TEXT input pin changes from low to high.
29	Crosstalk Between TEXT Channels	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) Vin=3.0V, VCONT=OPEN VBR=6.4V, VC=6.5V, VD=6.0V (2) Input clamp pulse at pin 11. (3) Input a 500kHz, 0.5Vp-p signal at R input. (4) Measure G and B output levels when signal level at R output is 0dB.
30	TEXT→TV Crosstalk	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) Vin=3.0V, VCONT=OPEN VBR=6.4V, VC=6.5V, VD=6.0V (2) Input clamp pulse at pin 11. (3) Input a 500kHz, 0.5Vp-p signal at TEXT R input. (4) Signal level of R output is 0dB. (5) Measure signal level of R output when SYS is a.
31	TEXT Bright Variable Width	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) Vin=3.0V, VCONT=OPEN VBR=6.4V, VC=6.5V, VD=6.0V (2) Input clamp pulse at pin 11. (3) Input a 500kHz, 0.5Vp-p signal at TEXT R input. (4) Measure change in output DC voltage when VBR is changed from 0V to 12V.

TA8751AN – 15

TEST CONDITIONS $V_{CC} = 12V$, $Ta = 25 \pm 1°C$

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		S_C	S_D	S_O	S_S	S_{SV}	S_{HBL}	S_{VBL}	S_{in}	S_{SS}	S_{YS}	
32	Change in TEXT, TV Differential Voltage	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) $V_{in} = 3.0V$, $V_D = 6.0V$ $V_C = 6.5V$ (2) Input clamp pulse at pin 11. (3) Adjust V_{BR} and black level of TV / TEXT. (4) Measure the change in the black level of the TEXT signal when V_{CONT} is changed from 0~12V.
33	TEXT RGB Relative Gain Differential	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	(1) $V_{in} = 3.0V$, $V_{CONT} = OPEN$ $V_{BR} = 6.4V$, $V_C = 6.0V$, $V_D = 6.5V$ (2) Input clamp pulse at pin 11. (3) Input a 500kHz, 0.5Vp-p signal at TEXT input. (4) I/O gain. Measure RGB 3-color differential.
34	TV / TEXT Switching Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	—	(1) $V_{in} = 3.0V$, $V_{CONT} = OPEN$ $V_{BR} = 6.4V$, $V_C = 6.0V$, $V_D = 6.5V$ (2) Input clamp pulse at pin 11. (3) Input a 500kHz, 0.5Vp-p signal at TEXT input. (4) Change V_{12} from 0~2V, and measure V_{12} when the output signal changes from TV→TEXT.

TA8751AN – 16

TEST CONDITIONS $V_{CC} = 12V$, $Ta = 25 \pm 1°C$

NOTE	CHARACTERISTIC	SW & VR MODE										TEST METHOD
		SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	SYS	
35	TV→TEXT Switching Delay Time TV→TEXT Switching Delay Time 3-Color Differential TEXT→TV Switching Delay Time TEXT→TV Switching Delay Time 3-Color Differential	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	—	(1) $V_{in} = 3.0V$, $V_{CONT} = OPEN$, $V_{BR} = 6.4V$ (2) Input the signal shown below at pin 11. (3) Observe RGB output and measure t_{pTD}, t_{pDT}.

TEST CIRCUIT
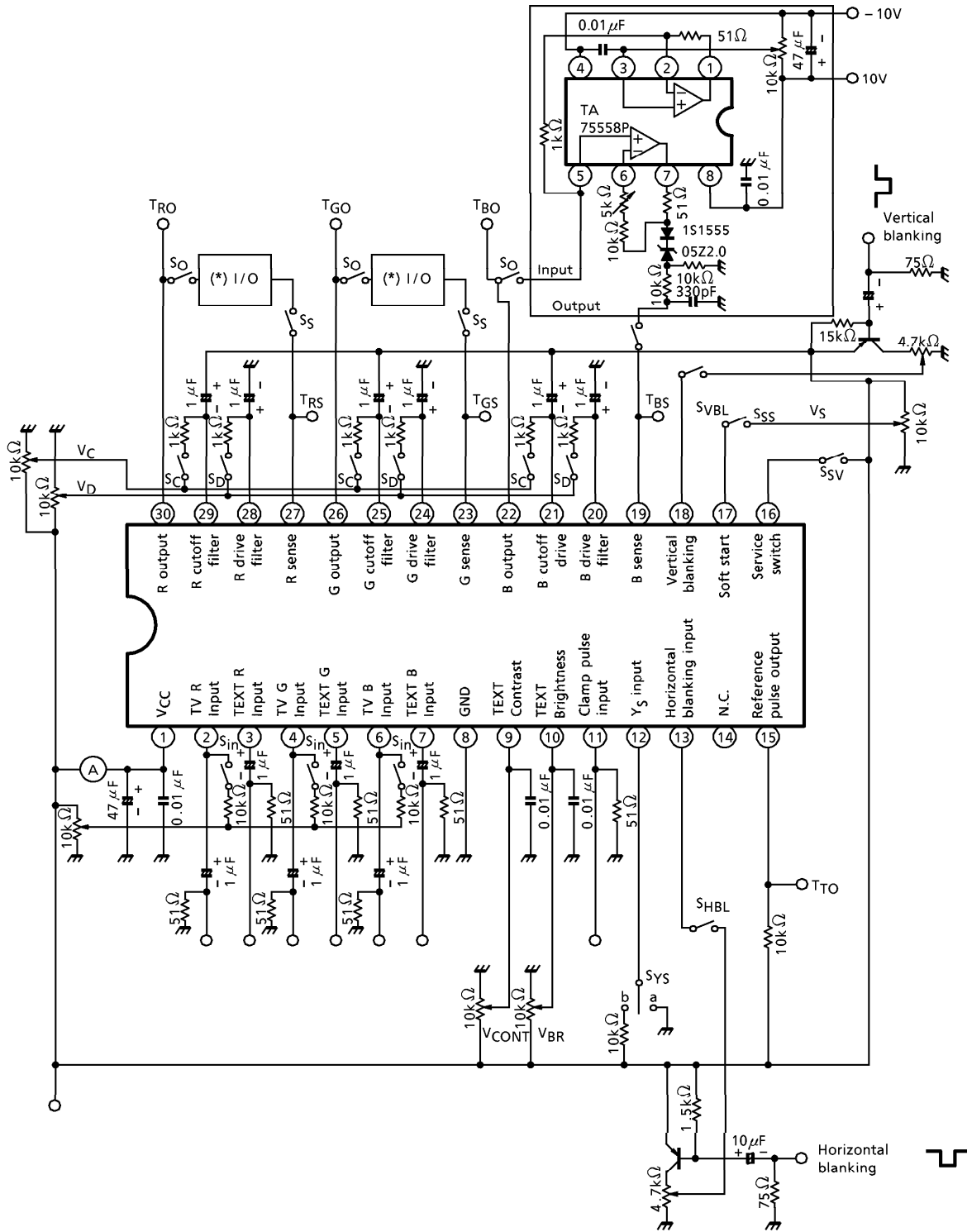
CRT DRIVE DESIGN METHOD

1. Initialization

   (1)   AKB (AUTOMATIC KINE BIAS) Circuits take the previously complex adjustment of CRT drive circuits and automates by absorbing the 3-color dispersion of the CRT. It is therefore necessary to design the CRT drive circuit in an AKB centered state to allow efficient absorption of the CRT's dispersion.

   (2)   The primary color input on the TV side takes the form of DC coupling, so please set input levels so that the contrast control and brightness control in previous stages are under the following conditions in the center.
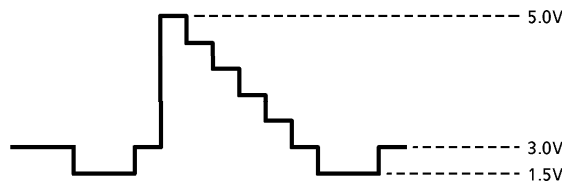
   (3)   Cutoff control and drive control characteristics are shown in Fig.1 and Fig.2 respectively. Please forcibly center the AKB cutoff filter voltage and drive filter voltage using the external power supply. The I/O characteristics for TA8751AN when the various filter pins are centered (CUTOFF : 4.5V, DRIVE : 5.5V) are shown in Fig.3.

   (4)   Please leave the AKB sense pins OPEN at this time.

2. Design of CRT drive circuit

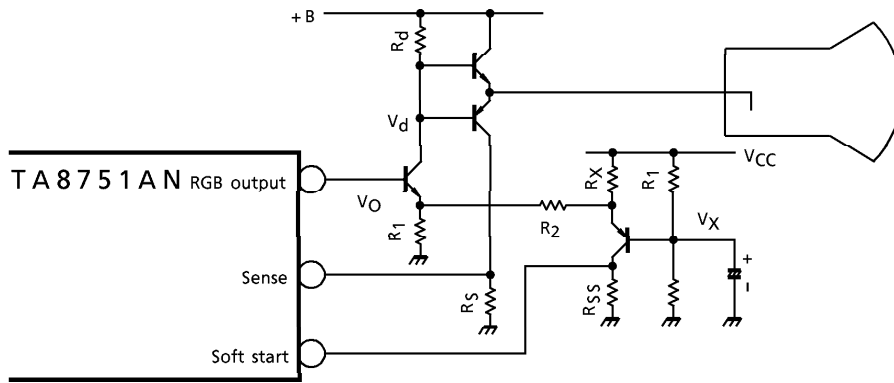   (1)   The basic structure of the CRT drive circuit is shown in Fig.4.

   (2)   Drive circuit gain : G is defined by the formula :

   $$G = \frac{R_d}{(R_1 // R_2)} \quad \cdots\cdots\cdots ①$$

   R_2 mainly determines gain, while R_1 mainly determines the operating voltage of the load side. Taking the signal amplitude required at the CRT cathode vc (V_{p-p}), RGB output signal amplitude vo is determined by initialization, so the gain necessary for the CRT drive circuit is determined by itself.

   $$G = \frac{vc}{vo}$$

   And so

   $$\frac{vc}{vo} = \frac{R_d}{(R_1 // R_2)}$$

   G is defined by the set.

(3) Next the black level is set. Turn the AKB's service switch on. T_1 pulse level is output from the AKB. Taking that voltage as V_O and the cathode voltage set as V_d,

$$V_d = +B - R_d \times \left(\frac{V_O - V_f}{R_1} + \frac{V_O - 2V_f - V_X}{R_2} \right) \cdots\cdots\cdots ②$$

In order that the black level is not crushed by bright control, a value for V_O that satisfies the following equation should be chosen.

$$V_O > V_X + 2V_f$$

Note : When the service switch is on, please supply the cutoff filter with a center voltage from the external power supply.

(4) The unknowns in equations (1) and (2) are R_d, R_1 and R_2. When R_d is selected using frequency characteristics, R_1 and R_2 are determined by the above equations.
  $G = 24$, $V_O = 3.2V$, $V_X = 0.5V$, $V_d = 140V$
  when $R_d = 15k\Omega$, $+B = 180V$, $V_f = 0.7V$
  $R_1 = 2k\Omega$ and $R_2 = 910\Omega$

3. Setting sensing resistance

(1) Sensing resistance R_S is set for the CRT drive circuit set in 2.
  Fig.5 shows CRT drive amplifier characteristics and CRT characteristics.

(2) When there is a T_1 pulse in the AKB circuit, current I_{k1} that flows to the CRT results in feedback so that the voltage generated in R_S is 0.5V. Therefore,

$$R_S = \frac{0.5V}{I_{k1}} \cdots\cdots\cdots ③$$

(3) In the same way, when there is a T_2 pulse in the AKB circuit, current K_2 that flows to the CRT results in feedback so that the voltage generated in R_S is 0.5V, so

$$R_S = \frac{5.0V}{I_{k2}} \cdots\cdots\cdots ④$$

I_{k1} and I_{k2} are determined when setting the CRT drive circuit in 2, so a value for R_S is selected that satisfies equations (3) and (4).

Note : Please make selection giving priority to equation (4).

4. Soft start circuit

(1) When power is turned on with the CRT in a cooled state, current does not flow to the sensing resistance until the CRT warms up, so the AKB tries to start at DC level shift Max and the screen starts from the white side.
  The soft start circuit reduces this, and when the soft start pin has a T_1 pulse interval of 0.9V or more, works to control the DC level shift circuit to the Min side.

(2) The T_1 pulse level V_{SS} at the RGB output pin that turns soft start on is

$$\frac{0.9V}{R_{SS}} = \frac{V_{SS} - 2V_f - V_X}{R_2} + \frac{V_{CC} - V_f - V_X}{R_X}$$

$$\therefore V_{SS} = \left(\frac{0.9V}{R_{SS}} - \frac{V_{CC} - V_f - V_X}{R_X} \right) R_2 + 2V_f + V_X$$

Please set R_X and R_{SS} to satisfy the conditions above.

Fig.1 Cutoff control characteristics

DRIVE FILTER VOLTAGE = 5.5V
INPUT VOLTAGE = 3.0V
V_{CC} = 12V

OUTPUT VOLTAGE (V)

CUTOFF FILTER VOLTAGE (V)

Fig.2 Drive control characteristics

CUTOFF FILTER VOLTAGE
= 4.5V
INPUT VOLTAGE = 2.0V_{p-p}
(10kHz, 5V CENTER)
V_{CC} = 12V

GAIN (dB)

DRIVE FILTER VOLTAGE (V)

Fig.3 I / O characteristics

CUTOFF FILTER VOLTAGE = 4.5V
DRIVE FILTER VOLTAGE = 5.5V
V_{CC} = 12V

OUTPUT VOLTAGE (V)

INPUT VOLTAGE (V)
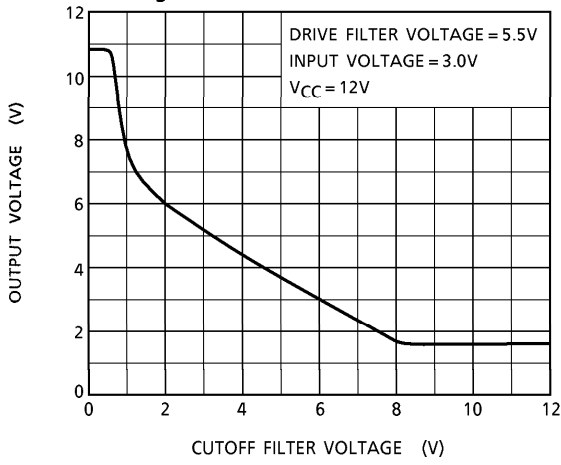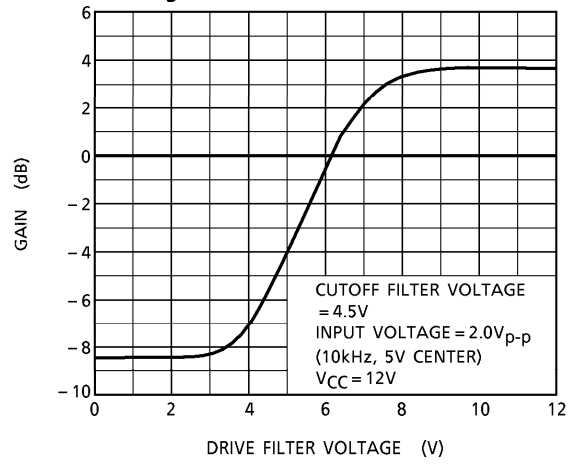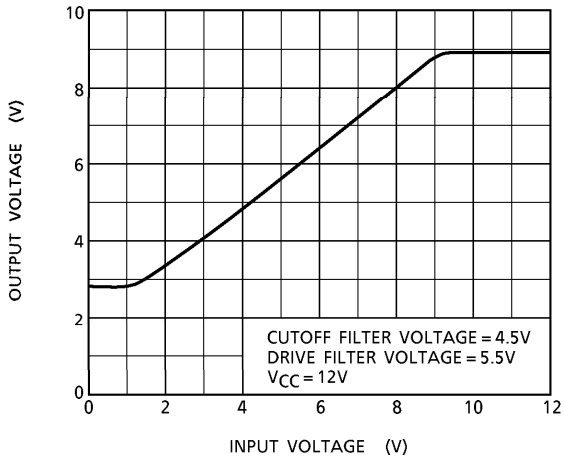
Fig.4 Basic structure of CRT drive circuit
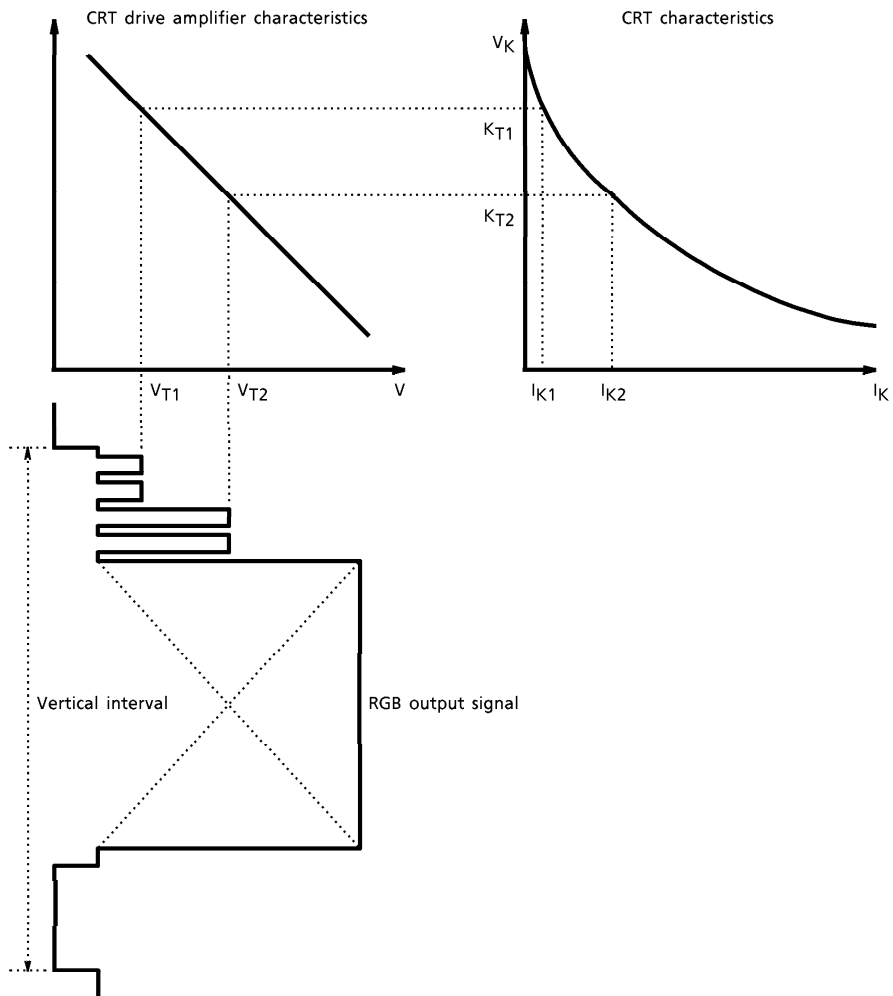
Fig.5 CRT drive amplifier characteristics and CRT characteristics

APPLICATION CIRCUIT
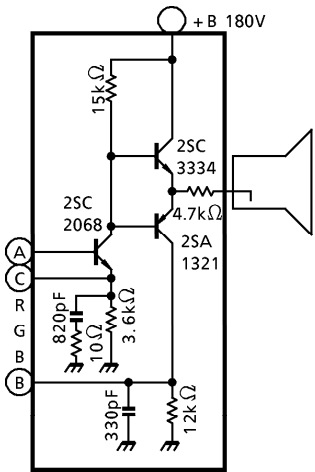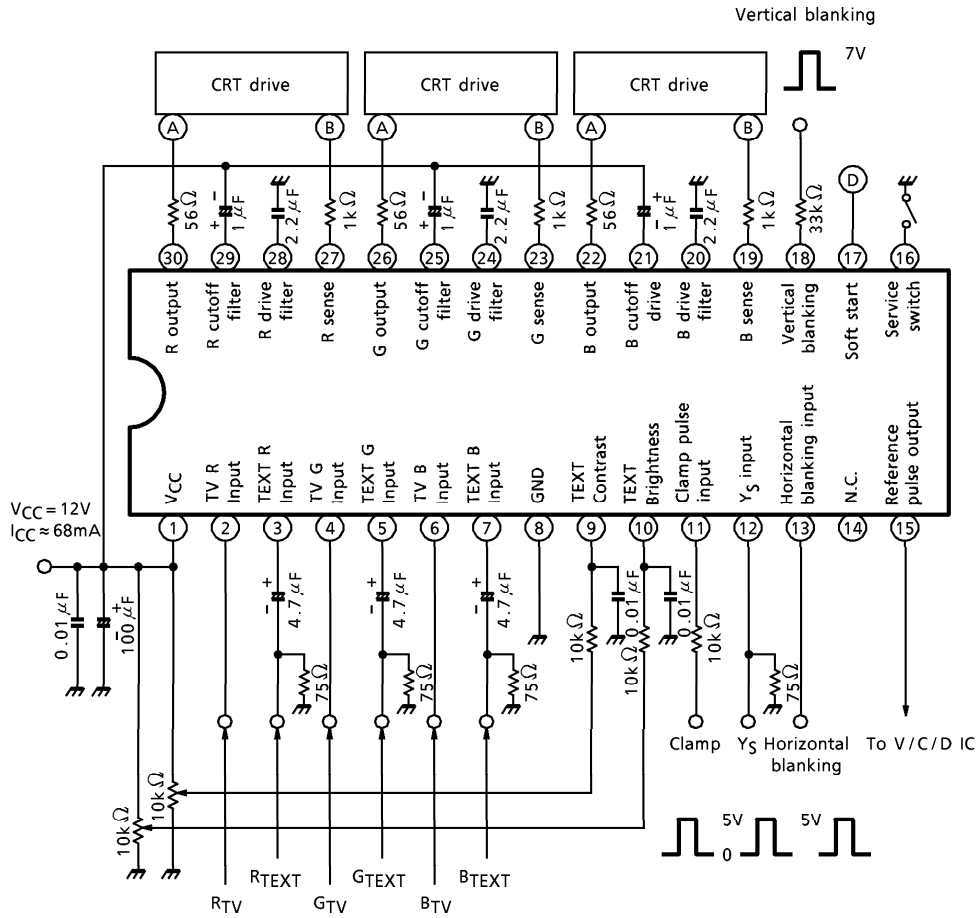
CRT drive
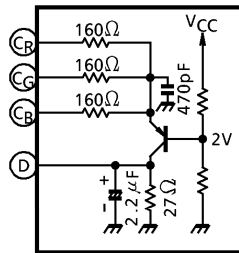
PACKAGE DIMENSIONS
SDIP30-P-400-1.78

Unit : mm
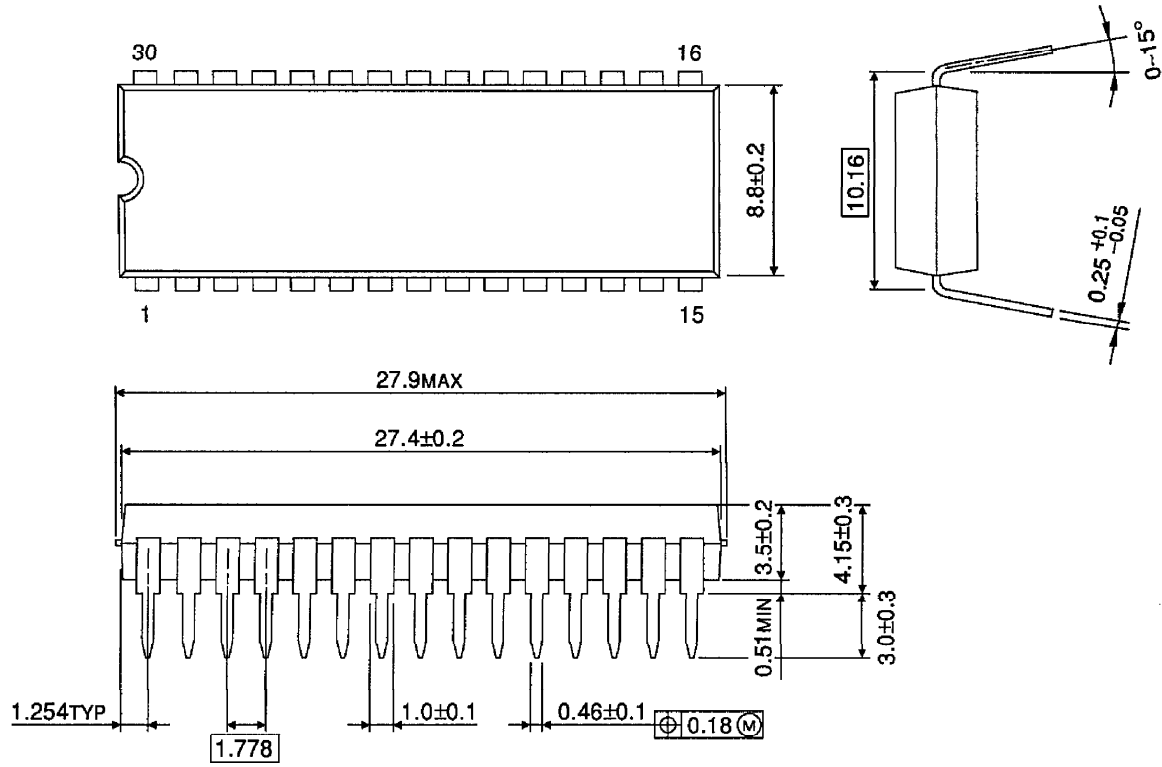
Weight : 1.99g (Typ.)

RESTRICTIONS ON PRODUCT USE