

**TOSHIBA**

**TA8751AN**

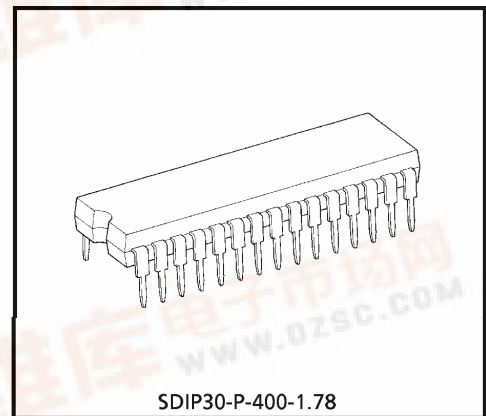
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA8751AN

## AUTOMATIC KINE BIAS (AKB)

## RGB INTERFACE

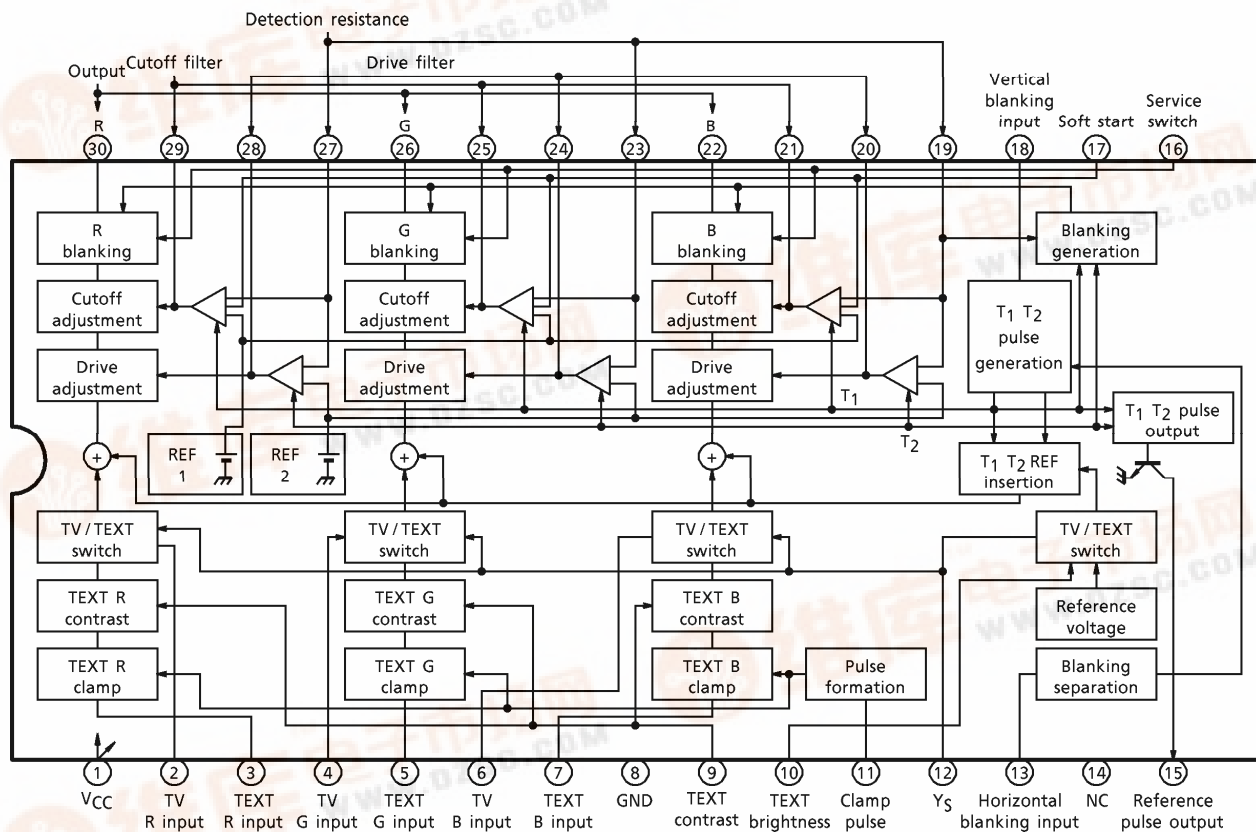
TA8751AN possesses functions that optimize the CRT drive conditions in televisions, and is an IC that automates the previously complex cutoff adjustment and drive adjustment non-adjustment. It has an RGB TEXT input pin, so TV signal and TEXT signal can be switched between rapidly. The TV's primary colors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



SDIP30-P-400-1.78

Weight : 1.99g (Typ.)

## BLOCK DIAGRAM



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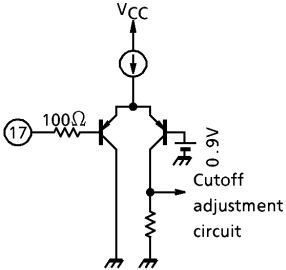
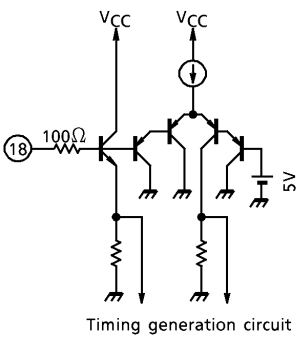
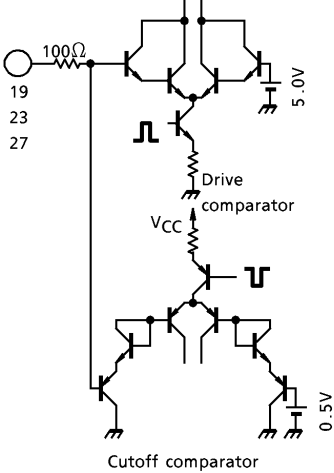
**TERMINAL FUNCTION**

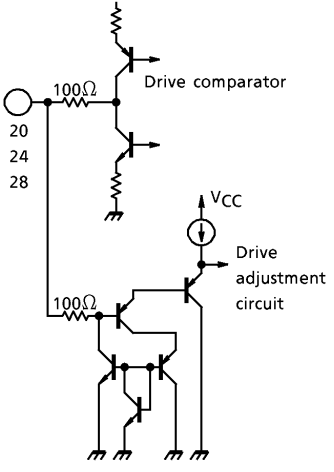
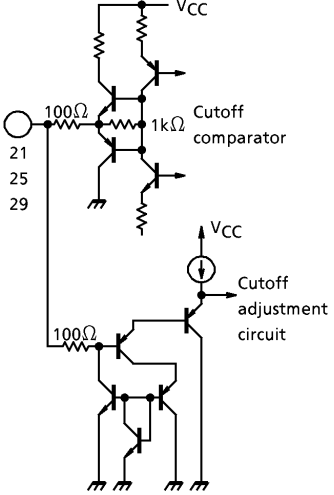
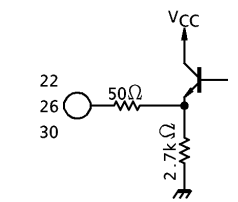
PIN No.	NAME	FUNCTION	INTERFACE
1	V <sub>CC</sub>	V <sub>CC</sub> = 12V (Standard) Please use voltage between 11 and 13V.	—
2 4 6	TV signal input R input G input B input	Input pin for TV primary color signals. Used with DC direct-coupling. Used with a standard black level of 3.0V (Standard).	
3 5 7	TEXT 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.	

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- The information contained herein is subject to change without notice.

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	<p>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.</p>	
18	Vertical blanking input	<p>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.</p>	
19 23 27	B sense G sense R sense	<p>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.</p>	

PIN No.	NAME	FUNCTION	INTERFACE
<p>20 24 28</p>	<p>B drive filter G drive filter R drive filter</p>	<p>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.</p>	
<p>21 25 29</p>	<p>B cutoff filter G cutoff filter R cutoff filter</p>	<p>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.</p>	
<p>22 26 30</p>	<p>B output G output R output</p>	<p>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.</p>	

**MAXIMUM RATINGS** (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>CC</sub>	15	V
Input Signal Voltage	e <sub>IN</sub>	5	V
Primary Color Output Current	I <sub>OUT</sub>	3.5	mA
TV/TEXT Switching Voltage	V <sub>12</sub>	-0.5~7.0	V
Blanking Pulse Input Voltage	V <sub>18</sub>	5~10	V
Adjustment Pin Voltage	V <sub>CONT</sub>	0~V <sub>CC</sub>	V
Dissipating Power	P <sub>D</sub> (Note)	1.6	W
Operating Temperature	T <sub>opr</sub>	-20~65	°C
Storage Temperature	T <sub>stg</sub>	-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<sub>CC</sub> = 12V, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Current	I <sub>CC</sub>	—	V <sub>CC</sub> = 12V	50	65	85	mA
TV Input Dynamic Range	V <sub>TV</sub>	—	(Note 1)	5.0	7.0	—	V <sub>p-p</sub>
Maximum Gain	G <sub>m</sub>	—	(Note 2)	1.0	3.0	5.0	dB
Gain Variable Width	G <sub>r</sub>	—	(Note 3)	10	12	13	dB
Cutoff Control Variable Range	ΔV <sub>CUT</sub>	—	(Note 4)	1.5	2.0	—	V
Cutoff Control Control Sensitivity	β <sub>C</sub>	—	(Note 5)	-0.4	-0.7	-1.0	
TV Frequency Characteristics	f <sub>TV</sub>	—	(Note 6)	10	15	—	MHz
Crosstalk Between Channels	C <sub>P</sub> TV	—	(Note 7)	—	-50	-40	dB
Horizontal Blanking Detection Level	V <sub>HBLK</sub>	—	(Note 8)	1.5	1.7	1.9	V
Vertical Blanking Detection Level	V <sub>VBLK</sub>	—	(Note 9)	4.0	5.0	6.0	V
Output Blanking Level	V <sub>OL</sub>	—	(Note 10)	—	1.0	1.5	V
Black Detection Voltage	V <sub>B</sub>	—	(Note 11)	0.4	0.55	0.7	V
White Detection Voltage	V <sub>W</sub>			4.0	5.0	6.0	
Black Detection Level Temperature Drift	ΔV <sub>B</sub> / ΔT	—	(Note 12)	—	0	±1	mV / °C
White Detection Level Temperature Drift	ΔV / ΔT			—	0	±2	
Difference in Black Detection Voltage Between Channels	ΔV <sub>B</sub>	—	(Note 13)	—	0	±10	mV
Difference in White Detection Voltage Between Channels	ΔV <sub>W</sub>			—	0	±100	
Output Voltage Vertical Interval Sag	V <sub>OS</sub>	—	(Note 14)	—	0	±100	mV
Difference in Vertical Interval Sag between Channels	ΔV <sub>OS</sub>			—	0	±50	

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
T <sub>1</sub> , T <sub>2</sub> Pulse Output Voltage	V <sub>TO</sub>	—	(Note 15)	—	0	0.3	V
Output Voltage when Service Switch is on	V <sub>SV</sub>	—	(Note 16)	2.6	3.1	3.6	V
Soft Start Detection Voltage	V <sub>SS</sub>	—	(Note 17)	0.8	0.9	1.0	V
TV→TEXT Crosstalk	C <sub>pTVTX</sub>	—	(Note 18)	—	-50	-40	dB
Output DC Voltage	V <sub>OUT</sub>	—	(Note 19)	2.5	3.0	3.5	V
Dependence of Black Detection Level on V <sub>CC</sub>	V <sub>BVcc</sub>	—	(Note 20)	—	0	10	mV
Dependence of White Detection Level on V <sub>CC</sub>	V <sub>WVcc</sub>			—	0	0.1	V
Vertical Blanking Delay Time	Δt <sub>v1</sub>	—	(Note 21)	—	0	200	ns
	Δt <sub>v2</sub>			—	0	200	
Horizontal Blanking Delay Time	Δt <sub>H1</sub>	—	(Note 22)	—	0	200	ns
	Δt <sub>H2</sub>			—	0	200	
TEXT Maximum Gain	G <sub>TXM</sub>	—	(Note 23)	7.0	9.0	10.0	dB
TEXT Contrast Variable Width	G <sub>RTX</sub>	—	(Note 24)	8.0	9.5	11.0	dB
TEXT Bright Voltage	V <sub>TXB</sub>	—	(Note 25)	5.4	6.4	7.4	V
TEXT Contrast Voltage	V <sub>TXC</sub>	—	(Note 26)	5.4	6.0	6.6	V
TEXT Frequency Characteristics	f <sub>TX</sub>	—	(Note 27)	10	15	—	MHz
Gate Input Detection Level	V <sub>GT</sub>	—	(Note 28)	1.1	1.4	1.7	V
TEXT Crosstalk Between Channels	C <sub>P TX</sub>	—	(Note 29)	—	-50	-40	dB
TEXT→TV Crosstalk	C <sub>pT XTV</sub>	—	(Note 30)	—	-50	-40	dB
TEXT Bright Variable Width	ΔV <sub>TXB</sub>	—	(Note 31)	—	3.0	—	V
TEXT, TC Differential Voltage Change	ΔV <sub>def</sub>	—	(Note 32)	-50	0	50	mV
TEXT RGB Relative Gain Differential	ΔG <sub>V</sub>	—	(Note 33)	-1.0	0	1.0	dB
TV / TEXT Switching Level	V <sub>YS</sub>	—	(Note 34)	0.4	0.7	1.0	V
TV→TEXT Switching Delay Time	t <sub>pTD</sub>	—	(Note 35)	—	20	100	ns
TV→TEXT Switching Delay Time 3-Color Differential	Δt <sub>pTD</sub>			—	0	±25	
TEXT→TV Switching Delay Time	t <sub>pDT</sub>			—	20	100	
TEXT→TV Switching Delay Time 3-Color Differential	Δt <sub>pDT</sub>			—	0	±25	

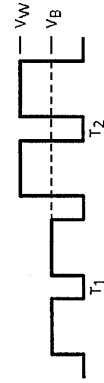
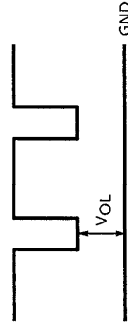
TEST CONDITIONS

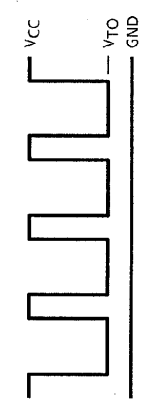
NOTE		CHARACTERISTIC		TEST CONDITIONS $V_{CC} = 12V, T_a = 25 \pm 1^\circ C$										TEST METHOD
				SW & VR MODE							SW & VR MODE			
		SC	SD	SO	SS	Ssv	SHBL	SVBL	Sin	SSS	SYS			
1	TV Input Dynamic Range	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a		<p>(1) Cutoff filter voltage <math>V_C = 6.5V</math>, Drive filter voltage <math>V_D = 6.0V</math></p> <p>(2) Measure RGB output voltage when TV input voltage is varied from 0V to <math>V_{CC}</math>.</p> <div style="text-align: center;"> <p>The graph plots RGB output against input voltage <math>V_{in}</math>. The output is 0% at <math>V_{in} = 0</math>. It rises to 10% at <math>V_{in} = V_{TV1}</math> and reaches 100% at <math>V_{in} = V_{TV2}</math>. The region between <math>V_{TV1}</math> and <math>V_{TV2}</math> is a linear ramp.</p> </div> <p>(3) With the maximum change in RGB output voltage is 100%, <math>V_{TV1}</math> is when the change is 10% and <math>V_{TV2}</math> is when the change is 90%.</p> <p><math>V_{TV} = V_{TV2} - V_{TV1}</math> (V)</p>	
2	Maximum Gain	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a		<p>(1) <math>V_D = 12V, V_C = 6.5V, V_{in} = 6V</math></p> <p>(2) Input 0.5V<sub>p-p</sub>, 500kHz signal from TV input.</p> <p>(3) Measure RGB output signal amplitude <math>V_{out}</math>.</p> <p><math>G_m = 20 \log 10 \frac{V_{out}}{0.5V_{p-p}}</math> (dB)</p>	
3	Gain Variable Width	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a		<p>(1) <math>V_C = 6.5V, V_{in} = 6V</math></p> <p>(2) Input 0.5V<sub>p-p</sub>, 500kHz signal from TV input.</p> <p>(3) <math>V_{min}</math> is defined as the RGB output signal amplitude when <math>V_D = 0V</math>, and <math>V_{max}</math> is defined as the RGB output signal amplitude when <math>V_D = 12V</math>.</p> <p>(4) <math>G_r = 20 \log 10 \frac{V_{max}}{V_{min}}</math> (dB)</p>	



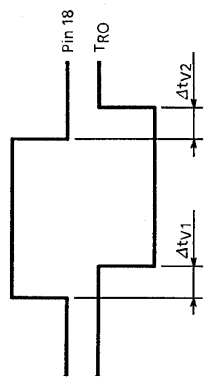
NOTE	CHARACTERISTIC	TEST CONDITIONS V <sub>CC</sub> = 12V, T <sub>a</sub> = 25 ± 1°C										
		SW & VR MODE							TEST METHOD			
		SC	SD	SO	SS	S <sub>SV</sub>	SHBL	SVBL	S <sub>in</sub>	S <sub>SS</sub>	SYS	
4	Cutoff Control Variable Range	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) V <sub>in</sub> = 6V, V <sub>D</sub> = 6V (2) V <sub>omax</sub> is defined as the output DC voltage when V <sub>C</sub> = 0V (3) V <sub>omin</sub> is defined as the output DC voltage when V <sub>C</sub> = 12V (4) ΔV <sub>CUT</sub> = V <sub>omax</sub> - V <sub>omin</sub> (V)
5	Cutoff Control Control Gain	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) V <sub>in</sub> = 6V, V <sub>D</sub> = 6V (2) V <sub>1</sub> is defined as the output DC voltage when V <sub>C</sub> = 5.5V (3) V <sub>2</sub> is defined as the output DC voltage when V <sub>C</sub> = 6.5V (4) β <sub>C</sub> = $\frac{V_1 - V_2}{1V}$
6	TV Frequency Characteristics	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	a	(1) V <sub>C</sub> = 6.5V, V <sub>D</sub> = 6V, V <sub>in</sub> = 6V (2) The output level when a 1.0V <sub>p-p</sub> , 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 <sub>C</sub> = 6.5V, V <sub>D</sub> = 6V, V <sub>in</sub> = 6V (2) The R output level when a 1.0V <sub>p-p</sub> , 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	OFF	OFF	ON	OFF	a	(1) V <sub>C</sub> = 6.5V, V <sub>D</sub> = 6V, V <sub>in</sub> = 3V (2) Vary the peak value of the horizontal blanking pulse and measure the levels at which V <sub>1</sub> , V <sub>2</sub> pulses are generated in the output.

NOTE		TEST CONDITIONS $V_{CC} = 12V$ , $T_a = 25 \pm 1^\circ C$										TEST METHOD
		SW & VR MODE										
		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 $T_a$ is varied from $20 \sim 70^\circ C$ .

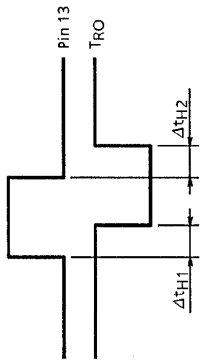



TEST CONDITIONS $V_{CC} = 12V$ , $T_a = 25 \pm 1^\circ C$												
NOTE	CHARACTERISTIC	SW & VR MODE							TEST METHOD			
		SC	SD	SO	S5	S5V	SHBL	SVBL	Sin	SS	SYS	
13	Difference in Black Detection Voltage Between Channels Difference in White Detection Voltage Between Channels	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) $V_{in} = 3.0V$ (2) Measure voltage differential between RGB channels of T1, T2 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 TRO waveform using an oscilloscope. (3) Measure vertical interval sag VOS of output waveform. (4) Observe TGO and TBO in the same way. (5) Observe waveforms of TRO, TGO and TBO simultaneously using an oscilloscope, and observe the difference in vertical sag between channels.
15	T1, T2 Pulse Output Voltage	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	a	(1) Observe measurement pin TTO waveform using an oscilloscope. (2) Measure the low level voltage of T1, T2 pulse that appears in TTO.  
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 TRO voltage. (3) Measure TGO, TRO voltage in the same way.

NOTE	CHARACTERISTIC	TEST CONDITIONS V <sub>CC</sub> = 12V, T <sub>a</sub> = 25 ± 1°C											TEST METHOD	
		SW & VR MODE								SYS				
		SC	SD	SO	SS	Ssv	SHBL	SVBL	Sin	SSS	SS	SYS		
17	Soft Start Detection Voltage	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	ON	ON	a	(1) V <sub>in</sub> = 3.0V (2) Observe T <sub>1</sub> , T <sub>2</sub> pulse that appears in RGB output, and while increasing V <sub>S</sub> from 0V, observe V <sub>S</sub> when the T <sub>1</sub> , T <sub>2</sub> pulse fluctuates.
18	TV→TEXT Crosstalk	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	a or b	(1) V <sub>in</sub> = 6.0V, V <sub>D</sub> = 6.0V, V <sub>C</sub> = 6.5V (2) Input a 1.0Vp-p, 500kHz signal from the TV input. (3) The output signal level when SYS is a is defined as 0dB. (4) Measure the output signal level when SYS is b.
19	Output DC Voltage	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	a	(1) V <sub>in</sub> = 3.0V, V <sub>D</sub> = 6.0V, V <sub>C</sub> = 6.5V (2) Measure DC voltage of RGB output pin.
20	Dependence of Black Detection Level on V <sub>CC</sub> Dependence of White Detection Level on V <sub>CC</sub>	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	ON	ON	a	(1) V <sub>in</sub> = 3.0V (2) Measure fluctuations in the T <sub>1</sub> , T <sub>2</sub> pulse level that occur in the measurement pin TRS when V <sub>CC</sub> is varied from 11~13V. (3) Make measurements for TGS and TBS in the same way.
21	Vertical Blanking Delay Time	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	a	(1) V <sub>in</sub> = 3.0V, V <sub>D</sub> = 6.0V, V <sub>C</sub> = 6.5V (2) Measure the input waveform of pin 18's vertical blanking. (3) Measure the vertical blanking pulse that appears in TR0. (4) Make measurements for TGO and TBO in the same way.



TA8751AN - 12

NOTE		TEST CONDITIONS VCC = 12V, Ta = 25 ± 1°C										TEST METHOD
		SW & VR MODE										
CHARACTERISTIC	SC	SD	SO	SS	S5V	SHBL	S/VBL	Sin	S5S	SYS		
22 Horizontal Blanking Delay Time	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	a	<p>(1) Vin = 3.0V, Vd = 6.0V, Vc = 6.5V</p> <p>(2) Measure horizontal blanking input waveform of pin 13.</p> <p>(3) Measure the horizontal blanking pulse that appears in TRO.</p> <p>(4) Make measurements for TGO and TBO in the same way.</p> 	
23 TEXT Maximum Gain	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	b	<p>(1) Vin = 3.0V, VBR = 6.4V Vc = 6.5V, Vd = 6.0V, VCONT = 12V</p> <p>(2) Input a 500kHz, 0.5Vp-p signal at TEXT input.</p>  <p>(3) Input clamp pulse at pin 11.</p> <p>(4) Measure signal pulse width VO of RGB output.</p> <p>(5) <math>GTXM = 20 \log \frac{VO}{0.5V}</math> (dB)</p>	

NOTE	CHARACTERISTIC	TEST CONDITIONS VCC = 12V, Ta = 25 ± 1°C										TEST METHOD	
		SW & VR MODE						S <sub>SS</sub>	S <sub>IN</sub>	S <sub>SS</sub>	S <sub>YS</sub>		
		S <sub>C</sub>	S <sub>D</sub>	S <sub>O</sub>	S <sub>S</sub>	S <sub>SV</sub>	S <sub>HBL</sub>						S <sub>VBL</sub>
24	TEXT Contrast Variable Width	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	b	(1) V <sub>in</sub> = 3.0V, V <sub>BR</sub> = 6.4V V <sub>C</sub> = 6.5V, V <sub>D</sub> = 6.0V (2) Input a 500kHz, 0.5V <sub>p-p</sub> signal at TEXT input. (3) Input clamp pulse at pin 11. (4) V <sub>O1</sub> is defined as the output signal amplitude when V <sub>CONT</sub> = 0V. V <sub>O2</sub> is defined as the output signal amplitude when V <sub>CONT</sub> = 12V. (5) $GRTX = 20 \log \frac{VO2}{0.5V} - 20 \log \frac{VO1}{0.5V}$ (dB)
25	TEXT Bright Voltage	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	a or b	(1) V <sub>in</sub> = 3.0V, V <sub>CONT</sub> = OPEN V <sub>C</sub> = 6.5V, V <sub>D</sub> = 6.0V (2) Input clamp pulse at pin 11. (3) Measure the V <sub>BR</sub> 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	ON	ON	ON	ON	OFF	OFF	b	Measure voltage when pin 9 is open.
27	TEXT Frequency Characteristics	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	b	(1) V <sub>in</sub> = 3.0V, V <sub>BR</sub> = 6.4V V <sub>C</sub> = 6.5V, V <sub>D</sub> = 6.0V, V <sub>CONT</sub> = OPEN (2) Input a 500kHz, 0.5V <sub>p-p</sub> 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.

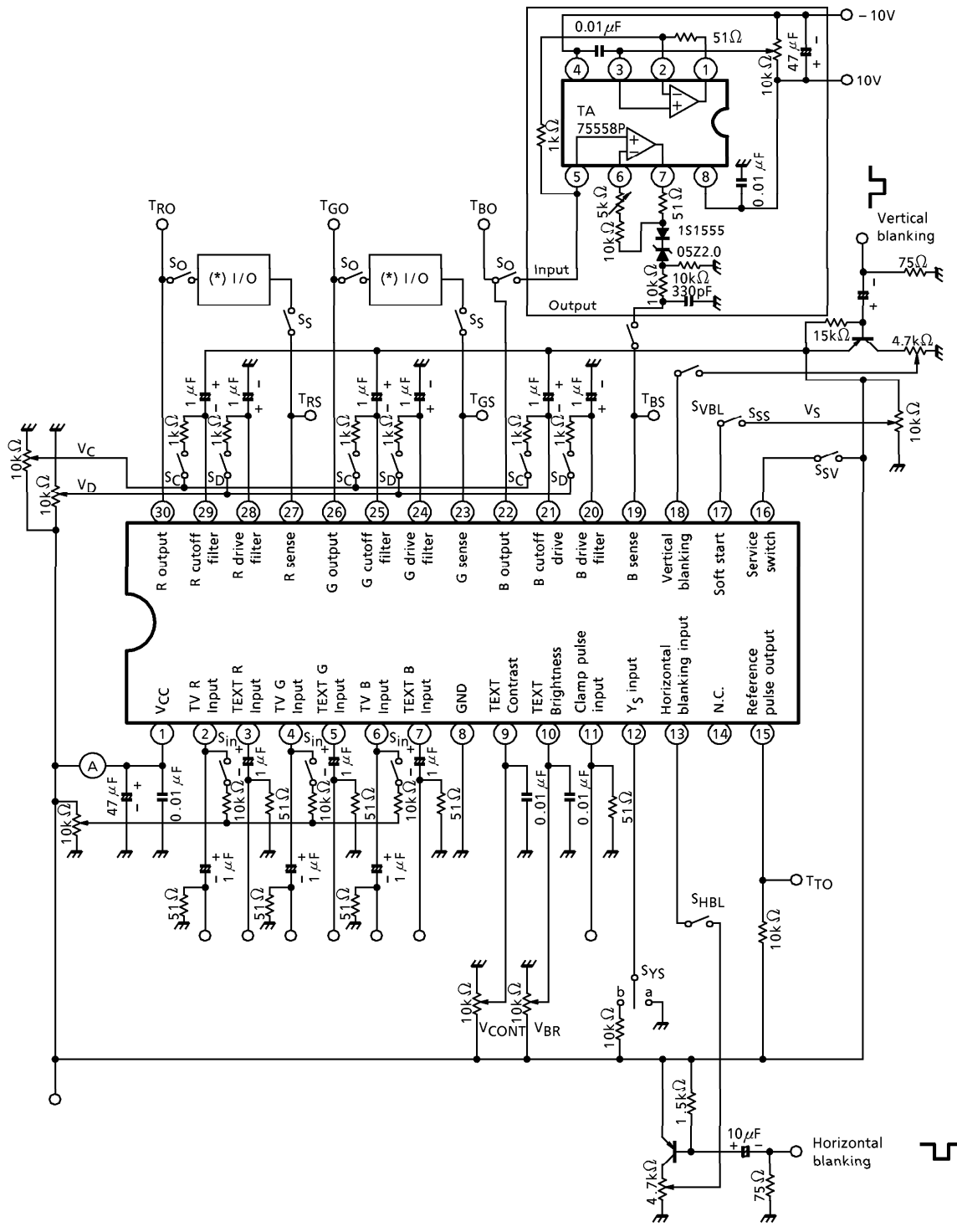
NOTE	CHARACTERISTIC	TEST CONDITIONS VCC = 12V, Ta = 25 ± 1°C												
		SW & VR MODE							TEST METHOD					
		SC	SD	SO	SS	SHBL	SVBL	Sin	Sss	Sys				
28	Gate Input Detection Level	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	OFF	b	(1) Vin = 3.0V, VCONT = OPEN VBR = 6.4V, VC = 6.5V, VD = 6.0V (2) Observe DC voltage 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	ON	ON	ON	OFF	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	ON	ON	ON	OFF	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	ON	ON	ON	OFF	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.	

TEST CONDITIONS $V_{CC} = 12V$ , $T_a = 25 \pm 1^\circ C$												
NOTE	CHARACTERISTIC	SW & VR MODE							TEST METHOD			
		SC	SD	SO	S5	SSV	SHBL	SVBL	Sin	SSS	SYS	
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.



NOTE		TEST CONDITIONS $V_{CC} = 12V$ , $T_a = 25 \pm 1^\circ C$										
		SW & VR MODE							TEST METHOD			
CHARACTERISTIC		SC	SD	SO	S5	S5V	SHBL	SVBL	Sin	S5S	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	—	<p>(1) <math>V_{in} = 3.0V</math>, <math>V_{CONT} = OPEN</math>, <math>V_{BR} = 6.4V</math>                      (2) Input the signal shown below at pin 11.</p> <p>(3) Observe RGB output and measure <math>t_{pDT}</math>, <math>t_{pDT}</math>.</p>

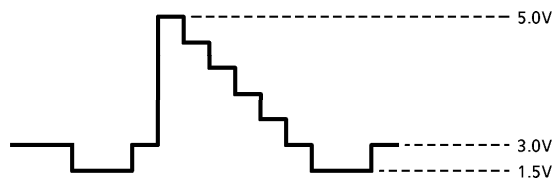
## TEST CIRCUIT



**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 :

$$G = \frac{R_d}{(R_1 // R_2)} \dots\dots\dots \textcircled{1}$$

R<sub>2</sub> mainly determines gain, while R<sub>1</sub> mainly determines the operating voltage of the load side. Taking the signal amplitude required at the CRT cathode v<sub>c</sub> (V<sub>p-p</sub>), RGB output signal amplitude v<sub>o</sub> is determined by initialization, so the gain necessary for the CRT drive circuit is determined by itself.

$$G = \frac{v_c}{v_o}$$

And so

$$\frac{v_c}{v_o} = \frac{R_d}{(R_1 // R_2)}$$

G is defined by the set.

- (3) Next the black level is set. Turn the AKB's service switch on. T<sub>1</sub> pulse level is output from the AKB. Taking that voltage as V<sub>O</sub> and the cathode voltage set as V<sub>d</sub>,

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

In order that the black level is not crushed by bright control, a value for V<sub>O</sub> 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<sub>d</sub>, R<sub>1</sub> and R<sub>2</sub>. When R<sub>d</sub> is selected using frequency characteristics, R<sub>1</sub> and R<sub>2</sub> are determined by the above equations.

$$\begin{aligned} G = 24, V_O = 3.2V, V_X = 0.5V, V_d = 140V \\ \text{when } R_d = 15k\Omega, +B = 180V, V_f = 0.7V \\ R_1 = 2k\Omega \text{ and } R_2 = 910\Omega \end{aligned}$$

**3. Setting sensing resistance**

- (1) Sensing resistance R<sub>S</sub> 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<sub>1</sub> pulse in the AKB circuit, current I<sub>k1</sub> that flows to the CRT results in feedback so that the voltage generated in R<sub>S</sub> is 0.5V. Therefore,

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

- (3) In the same way, when there is a T<sub>2</sub> pulse in the AKB circuit, current I<sub>k2</sub> that flows to the CRT results in feedback so that the voltage generated in R<sub>S</sub> is 0.5V, so

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

I<sub>k1</sub> and I<sub>k2</sub> are determined when setting the CRT drive circuit in 2, so a value for R<sub>S</sub> 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<sub>1</sub> pulse interval of 0.9V or more, works to control the DC level shift circuit to the Min side.
- (2) The T<sub>1</sub> pulse level V<sub>SS</sub> at the RGB output pin that turns soft start on is

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

Please set R<sub>X</sub> and R<sub>SS</sub> to satisfy the conditions above.

Fig.1 Cutoff control characteristics

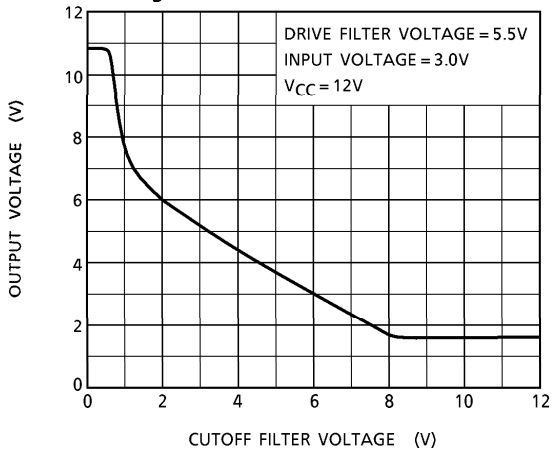


Fig.2 Drive control characteristics

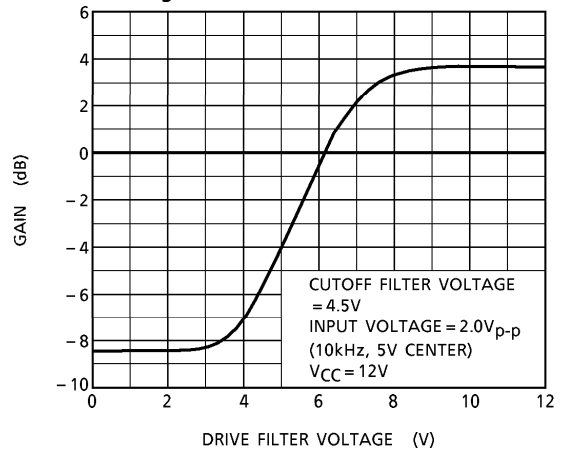
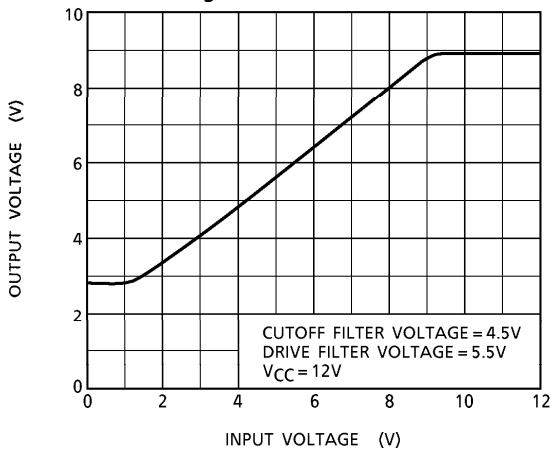


Fig.3 I/O characteristics



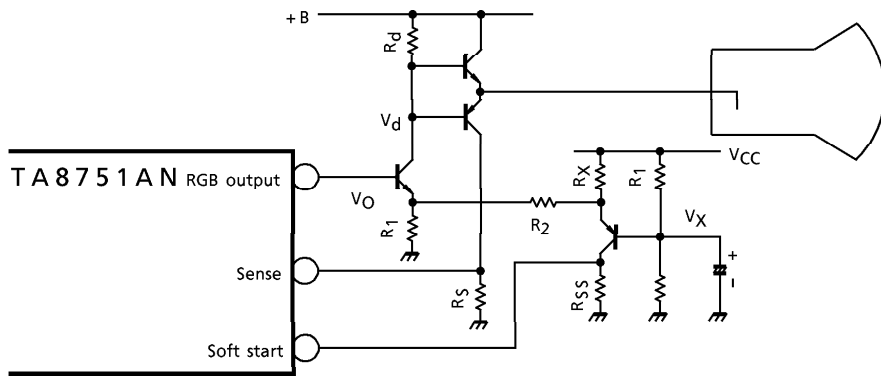


Fig.4 Basic structure of CRT drive circuit

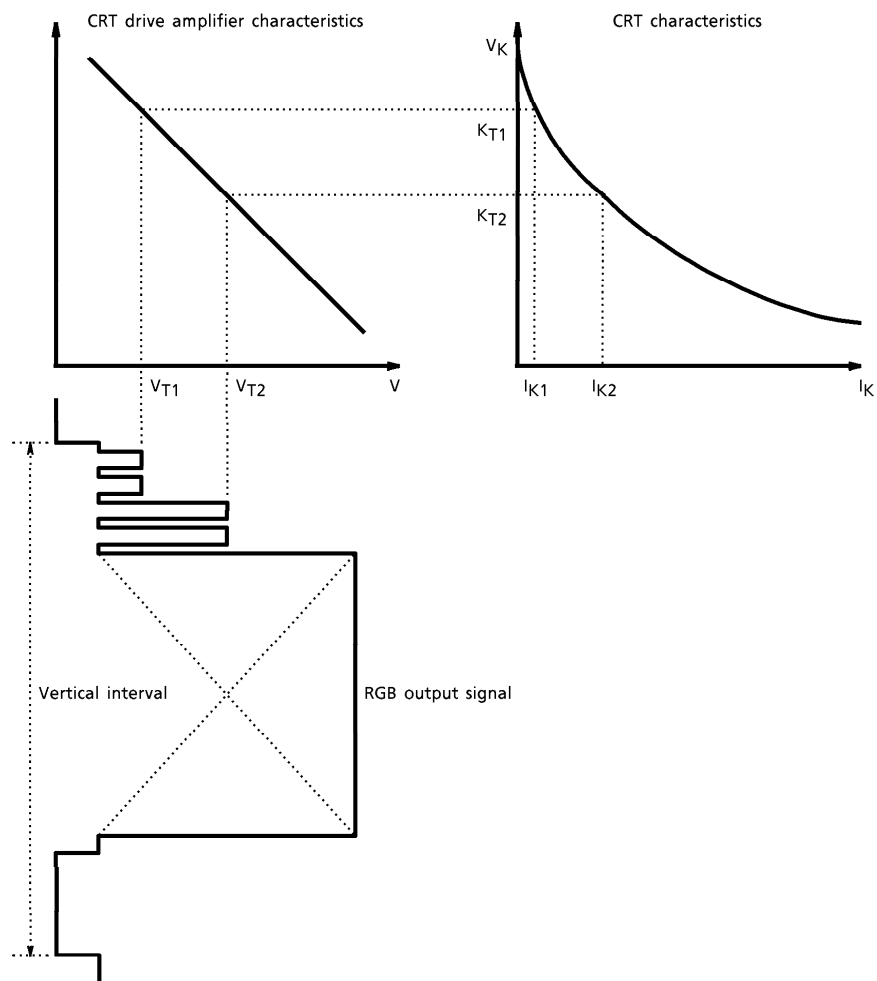
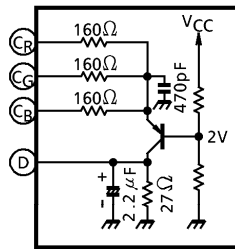
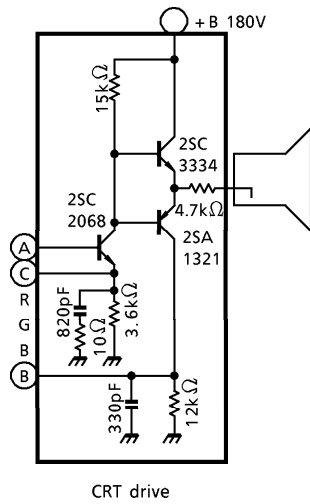
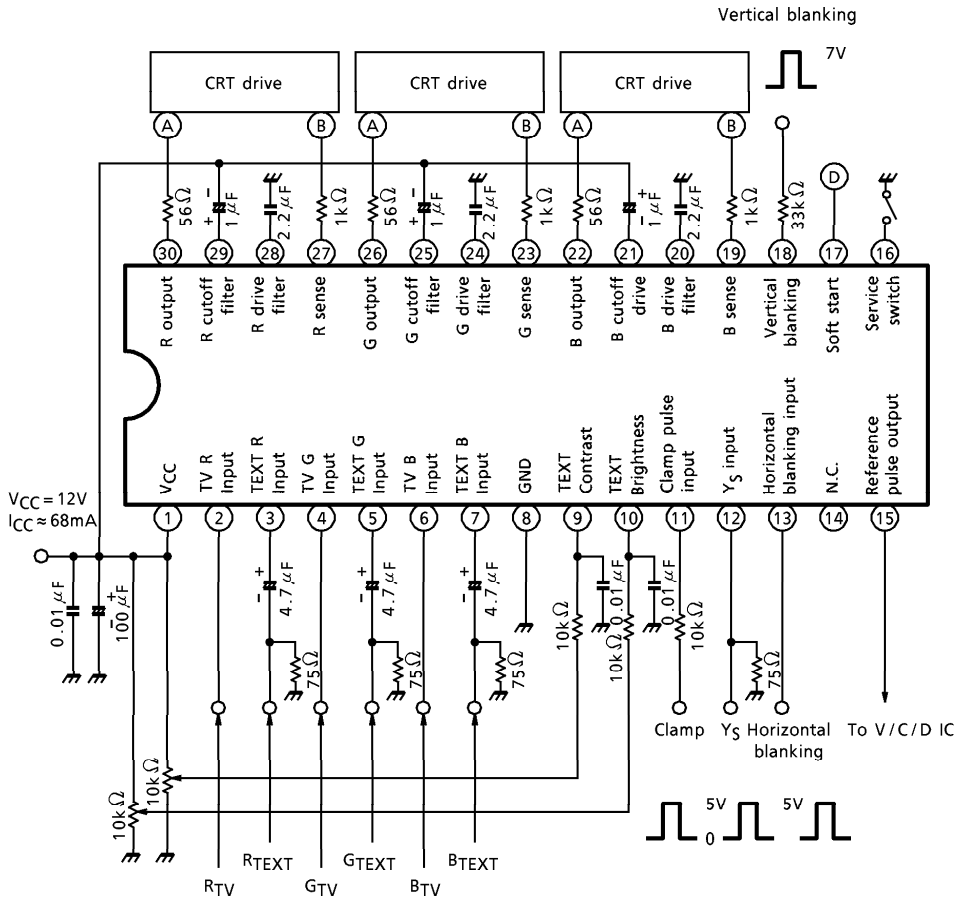


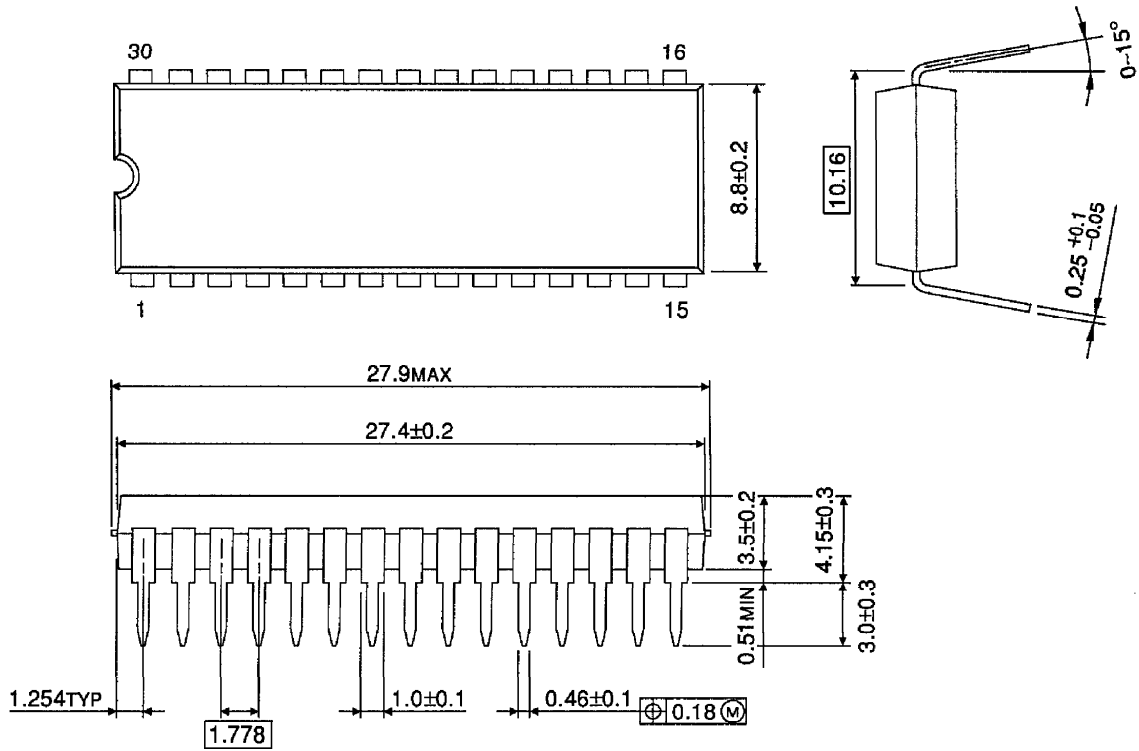
Fig.5 CRT drive amplifier characteristics and CRT characteristics

APPLICATION CIRCUIT



OUTLINE DRAWING  
SDIP30-P-400-1.78

Unit : mm



Weight : 1.99g (Typ.)