

TOSHIBA

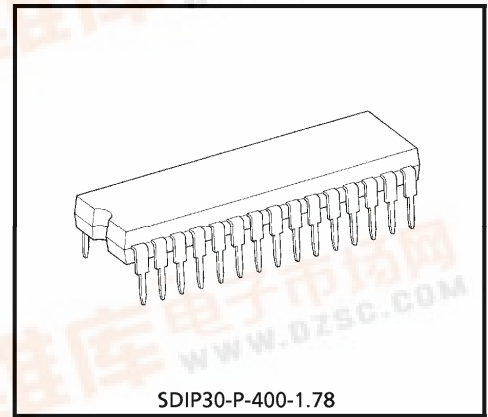
TA8891N

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8891N

AKB (AUTOMATIC KINESCOPE BIAS) IC

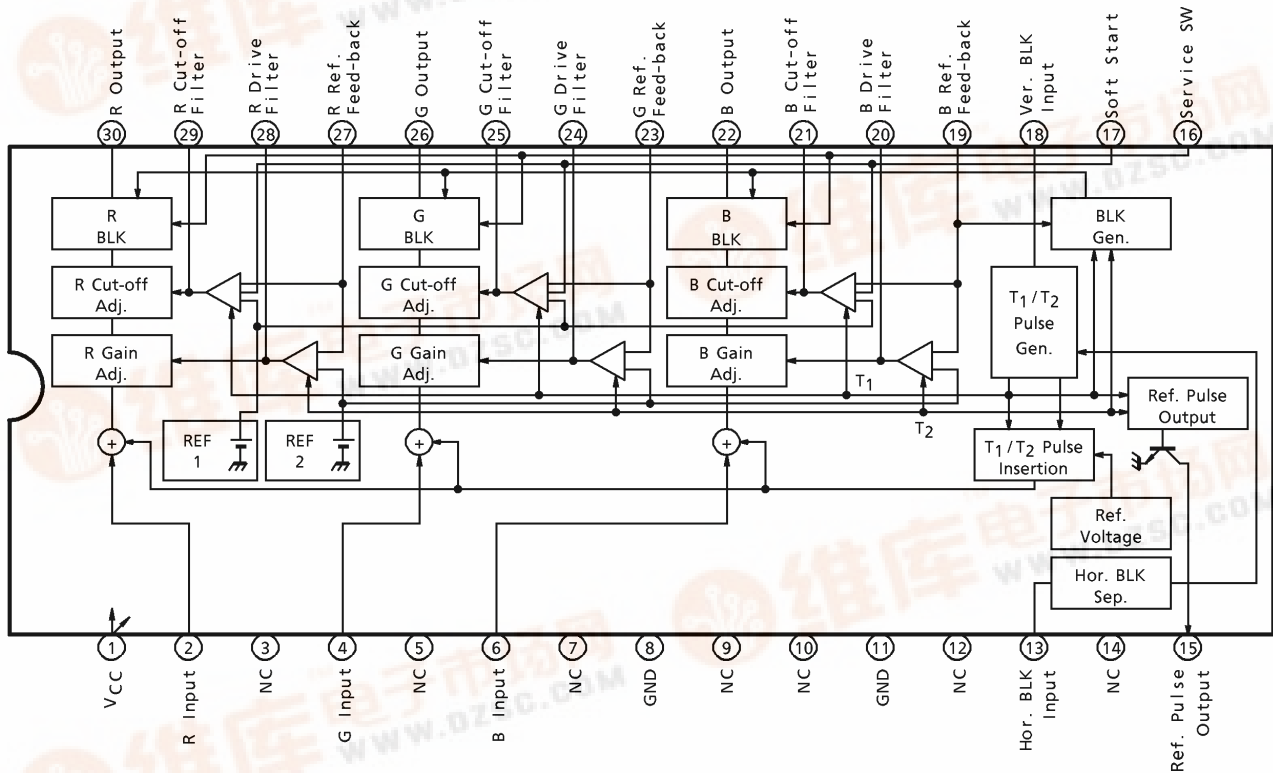
TA8891N makes cut-off voltages and gains of R/G/B outputs free from adjustment, and adjusts the white balance of CRT automatically. R/G/B inputs are DC coupling. Therefore, the brightness which has been controlled on previous stage is effective.



SDIP30-P-400-1.78

Weight : 2.98g (Typ.)

BLOCK DIAGRAM



980910EBA2

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TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
1	VCC	Supply 12V.	—
2 4 6	R Input G Input B Input	The terminals for R/G/B inputs. Input signals with DC coupling, whose pedestal levels are 3.0V.	
3 5 7 9 10 12 14	NC	Non-connected pins. Leave these pins open or grounded.	—
8 11	GND	—	—
13	Horizontal Blanking Input	The terminal for horizontal blanking input. Hor. BLK pulse is used to blank R/G/B outputs and to generate T ₁ /T ₂ pulses.	
15	Reference Pulse Output	The terminal for Ref. pulse output (open collector). Ref. Pulse turn to low during T ₁ /T ₂ pulse period. T ₁ pulse is reference for cut-off, and T ₂ is for gain.	
16	Service SW	The terminal for service mode SW. Supplied 1.5V or more to this terminal, TA8891N turns to service mode. On service mode, R/G/B outputs turn to T ₁ pulse levels.	

980910EBA2'

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

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
17	Soft Start	<p>The terminal for SOFT START. Supplied 0.9V or more to this terminal, cut-off is set minimum.</p> <p>While cathode currents are not enough right after POWER ON, supply 0.9V or more and prevent that the screen starts with white.</p>	
18	Vertical Blanking Input	<p>The terminal for Vertical blanking pulse. From the end of this pulse, T₁ pulse are outputted during 1H, and next 1H T₂ pulses come out of R/G/B outputs.</p>	
19 23 27	B Ref. Feed-back G Ref. Feed-back R Ref. Feed-back	<p>The terminals for R/G/B references feed-back. The reference voltages, that are transformed from cathode currents by detection resistances, are fed-back.</p>	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
<p>20 24 28</p>	<p>B Drive Filter G Drive Filter R Drive Filter</p>	<p>The terminals for drive filters. These filters hold the output of drive comparators during 1V. Voltages of these terminals adjust R / G / B gains so that feed-back voltages during T₂ become 5V. Please use low leakage capacitors for these filters.</p>	
<p>21 25 29</p>	<p>B Cut-off Filter G Cut-off Filter R Cut-off Filter</p>	<p>The terminals for cut-off filters. These filters hold the output of cut-off comparators during 1V. Voltages of these terminals adjust R / G / B cut-off voltages so that feed-back voltages during T₁ become 0.5V. Please use low leakage capacitors for these filters.</p>	
<p>22 26 30</p>	<p>B Output G Output R Output</p>	<p>The terminals for R / G / B outputs. Output levels during BLK period is 1.0V.</p>	

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V _{CC}	15	V
Inputted Signal Level	e _{IN}	0~V _{CC}	V
R/G/B Output Current	I _{OUT}	3.5	mA
Power Dissipation	P _D (Note)	1.6	W
Operating Temperature	T _{opr}	-20~65	°C
Storage Temperature	T _{stg}	-55~150	°C

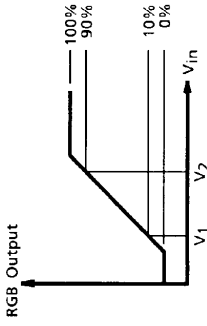
(Note) When using the device at above Ta = 25°C, decrease the power dissipation by 12.8mW for each increase of 1°C.

ELECTRICAL CHARACTERISTICS

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

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption	I _{CC}	—	V _{CC} = 12V	50	65	85	mA
Input Dynamic Range	V _{IN}	—	(Note 1)	5.0	7.0	—	V _{p-p}
Maximum Gain	G _m	—	(Note 2)	1.0	3.0	5.0	dB
Gain Variable Range	G _r	—	(Note 3)	10	12	13	dB
Cut-off Control Variable Range	ΔV _{CUT}	—	(Note 4)	1.5	2.0	—	V
Cut-off Control Sensitivity	β _C	—	(Note 5)	-0.4	-0.7	-1.0	
Frequency Characteristics	f	—	(Note 6)	10	15	—	MHz
Cross-talk Among Channels	C _P TV	—	(Note 7)	—	-50	-40	dB
H. BLK Detection Level	V _{HBLK}	—	(Note 8)	1.5	1.7	1.9	V
V. BLK Detection Level	V _{VBLK}	—	(Note 9)	4.0	5.0	6.0	V
BLK Output Level	V _{OL}	—	(Note 10)	—	1.0	1.5	V
Black Detection Level	V _B	—	(Note 11)	0.4	0.55	0.7	V
White Detection Level	V _W			4.0	5.0	6.0	
Thermal Drift Of Black Det. Level	ΔV _B / ΔT	—	(Note 12)	—	0	±1	mV / °C
Thermal Drift Of White Det. Level	ΔV _W / ΔT			—	0	±2	
Cross-talk Of Black Det. Level	ΔV _B	—	(Note 13)	—	0	±10	mV
Cross-talk Of White Det. Level	ΔV _W			—	0	±100	
Output Sag During a Vertical Period	V _{OS}	—	(Note 14)	—	0	±100	mV
Difference Of Output Sag Among Channels	ΔV _{OS}			—	0	±50	
Reference Pulse Output Level	V _{TO}	—	(Note 15)	—	0	0.3	V
Output Level On Service Mode	V _{SV}	—	(Note 16)	2.6	3.1	3.6	V
Soft Start Det. Level	V _{SS}	—	(Note 17)	0.8	0.9	1.0	V
Output DC Level	V _{OUT}	—	(Note 18)	2.5	3.0	3.5	V

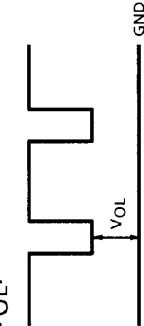
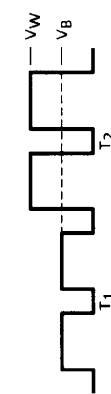
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Dependence Of Black Det. Level Upon V_{CC}	$V_{BV_{CC}}$	—	(Note 19)	—	0	10	mV
Dependence Of White Det. Level Upon V_{CC}	$V_{WV_{CC}}$			—	0	0.1	V
Delay Of Ver. BLK	Δt_{V1}	—	(Note 20)	—	0	200	ns
	Δt_{V2}			—	0	200	
Delay Of Hor. BLK	Δt_{H1}	—	(Note 21)	—	0	200	ns
	Δt_{H2}			—	0	200	

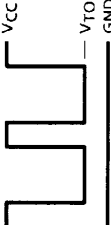
TEST CONDITION		MEASUREMENT CONDITION (VCC = 12V, Ta = 25±1°C)												
		NOTE No.	ITEM	SW & VR MODE										
				SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS	MEASUREMENT METHOD	
1	Input Dynamic Range	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	<p>(1) Cut-off Filter Voltage : VC = 6.5V Drive Filter Voltage : VD = 6.0V</p> <p>(2) Measure R/G/B outputs while increasing R/G/B inputs from 0 to 12V.</p>  <p>(3) Measure V1 and V2, and calculate ; VIN = V2 - V1</p>
2	Maximum Gain	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	<p>(1) VD = 12V, VC = 6.5V, Vin = 6V</p> <p>(2) Input a 0.5Vp-p, 500kHz signal into R/G/B input.</p> <p>(3) Measure R/G/B output amplitude, which is Vout.</p> <p>(4) Calculate ;</p> $G_m = 20 \log 10 \frac{V_{out}}{0.5V_{p-p}} \text{ (dB)}$
3	Gain Variable Range	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	<p>(1) VC = 6.5V, Vin = 6V</p> <p>(2) Input a 0.5Vp-p, 500kHz signal into R/G/B input.</p> <p>(3) Measure R/G/B output amplitude with VD = 0V, which is Vmin. And measure the amplitude with VD = 12V, which is Vmax.</p> <p>(4) Calculate ;</p> $G_r = 20 \log 10 \frac{V_{max}}{V_{min}} \text{ (dB)}$

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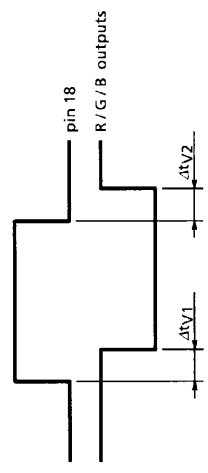
MEASUREMENT CONDITION (V _{CC} = 12V, T _a = 25±1°C)													
NOTE No.	ITEM	SW & VR MODE								MEASUREMENT METHOD			
		SC	SD	SO	Ss	Ssv	SHBL	SVBL	Sin		Sss		
4	Cut-off Control Variable Range	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _{in} = 6V, V _D = 6V (2) Measure the R/G/B output DC with V _C = 0V, which is V _{omax} . (3) Measure the output DC with V _C = 12V, which is V _{omin} . (4) Calculate ; $\Delta V_{CUT} = V_{omax} - V_{omin} \text{ (V)}$
5	Cut-off Control Sensitivity	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _{in} = 6V, V _D = 6V (2) Measure the R/G/B output DC with V _C = 5.5V, which is V ₁ . (3) Measure the output DC with V _C = 6.5V, which is V ₂ . (4) Calculate ; $\beta_C = \frac{V_1 - V_2}{1V}$
6	Frequency Characteristics	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _C = 6.5V, V _D = 6V, V _{in} = 6V (2) Input a 1.0V _{p-p} , 500kHz signal into R/G/B input, and measure the R/G/B output amplitude. (3) Increase input frequency and measure the frequency at which output amplitude is 3dB down against the output for 500kHz input.
7	Cross-talk Among Channels	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _C = 6.5V, V _D = 6V, V _{in} = 6V (2) Input a 1.0V _{p-p} , 500kHz signal into R input, and measure the R output amplitude. (3) Measure cross-talk levels from R to G and B.
8	H. BLK Detection Level	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _C = 6.5V, V _D = 6V, V _{in} = 3V (2) Increasing H. BLK pulse level, measure the pulse level at which T ₁ /T ₂ pulses appear on R/G/B outputs.
9	V. BLK Detection Level	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	(1) V _C = 6.5V, V _D = 6V, V _{in} = 3V (2) Increasing V. BLK pulse level, measure the pulse level at which T ₁ /T ₂ pulses appear on R/G/B outputs.

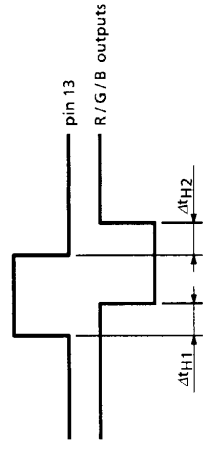
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NOTE No.	ITEM	MEASUREMENT CONDITION (V _{CC} =12V, T _a =25±1°C)											
		SW & VR MODE						MEASUREMENT METHOD					
		SC	SD	SO	Ss	Ssv	SHBL	SVBL	Sin	Sss			
10	BLK Output Level	ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	<p>(1) V_C = 6.5V, V_D = 6V, V_{in} = 3V (2) Measure the R/G/B output level during BLK period, which is V_{OL}.</p> 
11	Black Detection Level White Detection Level	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	<p>(1) V_{in} = 3.0V (2) Measure the T₁/T₂ pulse levels on R/G/B feed-back terminal.</p> 
12	Thermal Drift of Black Det. Level Thermal Drift of White Det. Level	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	<p>(1) V_{in} = 3.0V (2) While varying T_a from -20°C to 70°C, measure the thermal drift of black/white det. level.</p>
13	Cross-talk of Black Det. Level Cross-talk of White Det. Level	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	<p>(1) V_{in} = 3.0V (2) Measure the cross-talk of T₁/T₂ pulses among R/G/B channels.</p>

NOTE No.		MEASUREMENT CONDITION (V _{CC} = 12V, T _a = 25 ± 1°C)											
		ITEM	SW & VR MODE						MEASUREMENT METHOD				
			SC	SD	SO	SS	SSV	SHBL	SVBL	Sin	SSS		
14	Output Sag During a Vertical Period Difference of Output Sag Among Channels	OFF	OFF	ON	ON	OFF	ON	ON	ON	OFF	(1) V _{in} = 3.0V (2) Observe R/G/B outputs by oscilloscope, and measure the output sag during a vertical period on each channel. (3) Measure the differences of output sag among channels.		
15	Reference Pulse Output Level	OFF	OFF	ON	OFF	ON	ON	ON	ON	OFF	(1) Observe the reference pulse on terminal T _{TO} by oscilloscope, and measure the low level of that pulse. 		
16	Output Level on Service Mode	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	(1) V _{in} = 3.0V, V _C = 6.5V, V _D = 6.0V (2) Measure R/G/B output DC level.		
17	SOFT START Det. Level	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	(1) V _{in} = 3.0V (2) While observing T ₁ /T ₂ pulses on R output, increase the V _S from 0V and measure the V _S level at which T ₁ /T ₂ pulses have some change.		

NOTE No.	ITEM	MEASUREMENT CONDITION (V _{CC} = 12V, T _a = 25 ± 1°C)										
		SW & VR MODE								MEASUREMENT METHOD		
		SC	SD	SO	SS	SSV	SHBL	SVBL	S _{in}			
18	Output DC Level	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	(1) V _{in} = 3.0V, V _D = 6.0V, V _C = 6.5V (2) Measure R/G/B output DC levels.
19	Dependence of Black Det. Level Upon V _{CC} Dependence of White Det. Level Upon V _{CC}	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON	OFF	(1) V _{in} = 3.0V (2) While varying V _{CC} from 11V to 13V, measure the changes of T ₁ /T ₂ pulses on R/G/B outputs.
20	Delay of Ver. BLK	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	(1) V _{in} = 3.0V, V _D = 6.0V, V _C = 6.5V (2) Observe the vertical BLK input pulse on pin 18 and ver. BLK output on R/G/B outputs. (3) Measure ΔtV ₁ and ΔtV ₂ .



NOTE No.	ITEM	MEASUREMENT CONDITION (V _{CC} = 12V, T _a = 25 ± 1 °C)										
		SW & VR MODE										
		SC	SD	SO	SS	SSV	SHBL	SVBL	S _{in}	SSS	MEASUREMENT METHOD	
21	Delay of Hor. BLK	ON	ON	OFF	OFF	ON	ON	ON	OFF	ON	OFF	<p>(1) V_{in} = 3.0V, V_D = 6.0V, V_C = 6.5V (2) Observe the horizontal BLK input pulse on pin 13 and hor. BLK output on R/G/B outputs. (3) Measure Δt_{H1} and Δt_{H2}.</p> 

TEST CIRCUIT

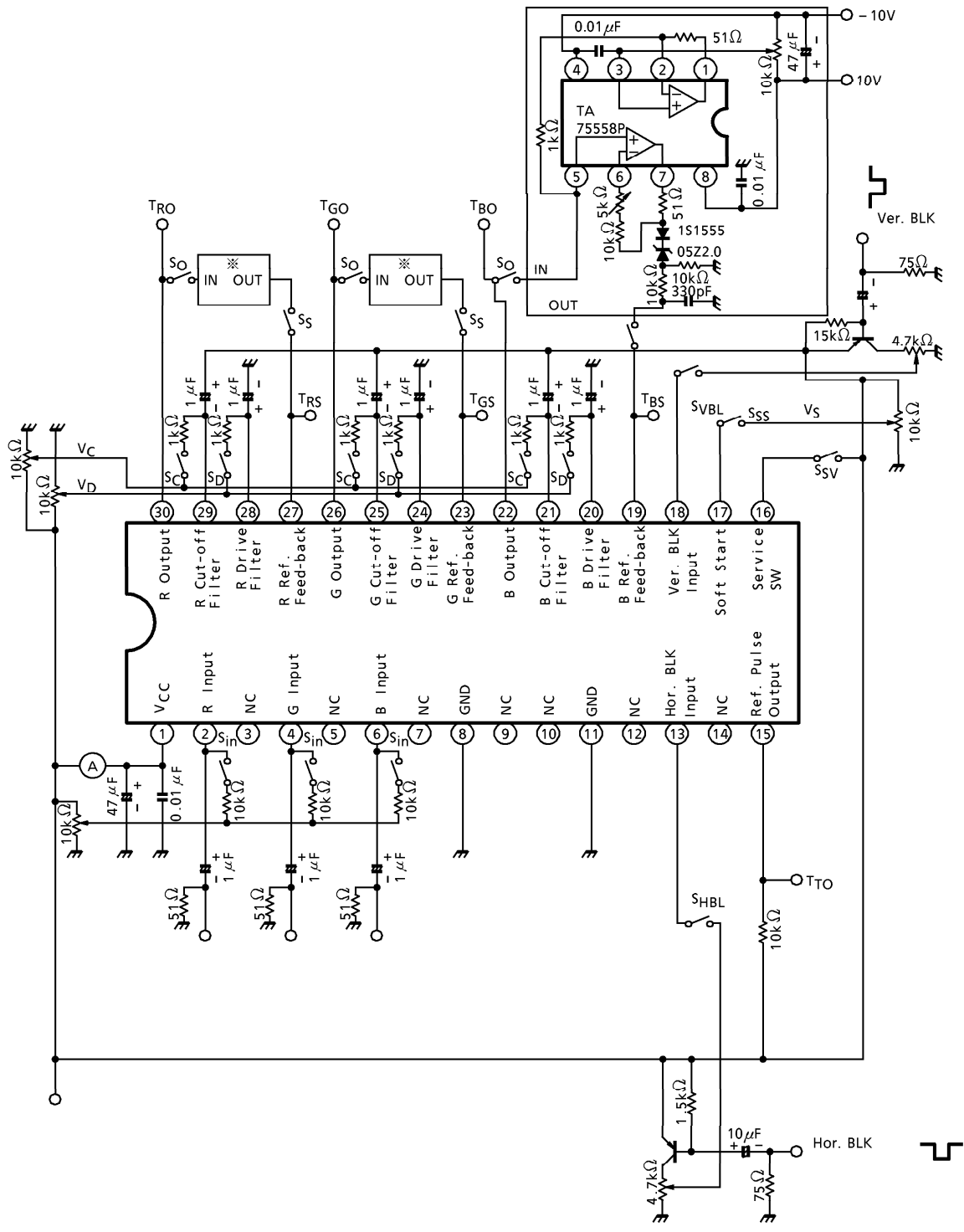


Fig.1
CUT-OFF CONTROL CHARACTERISTICS

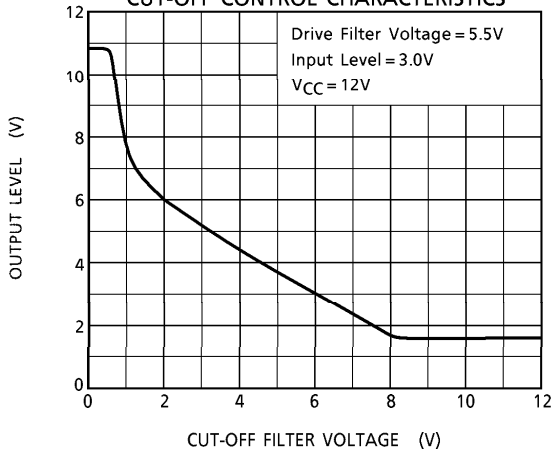


Fig.2
DRIVE CONTROL CHARACTERISTICS

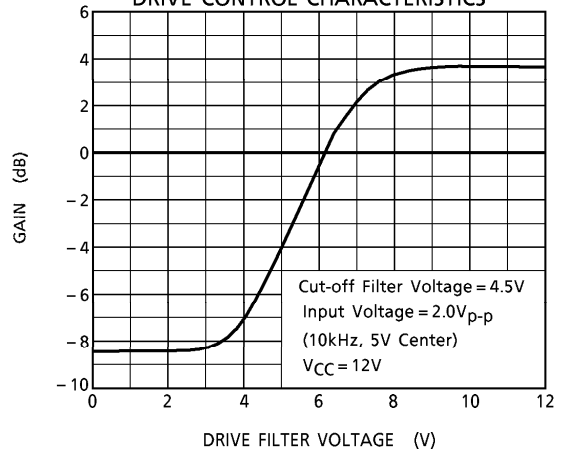
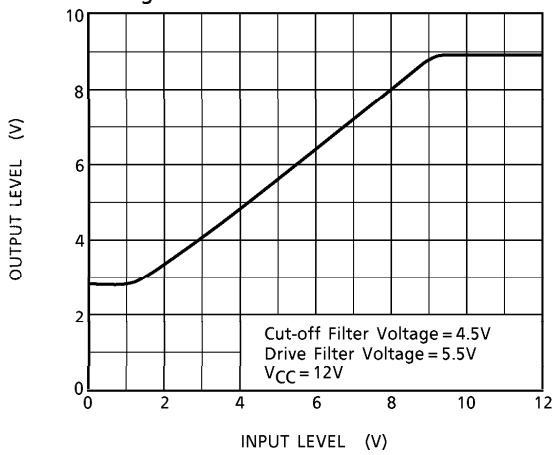
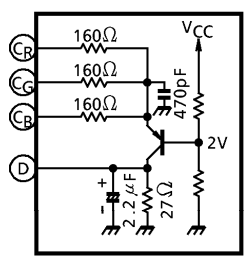
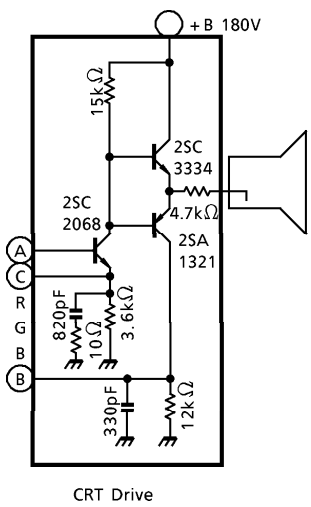
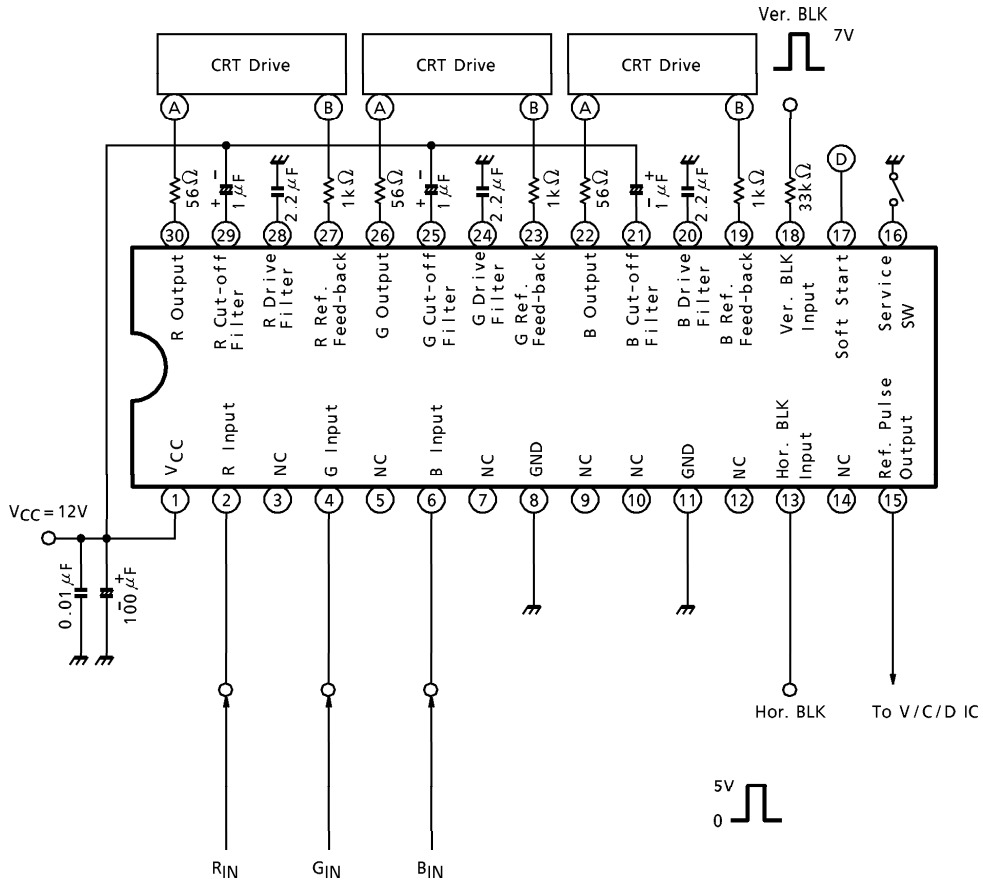


Fig.3 IN / OUTPUT CHARACTERISTICS

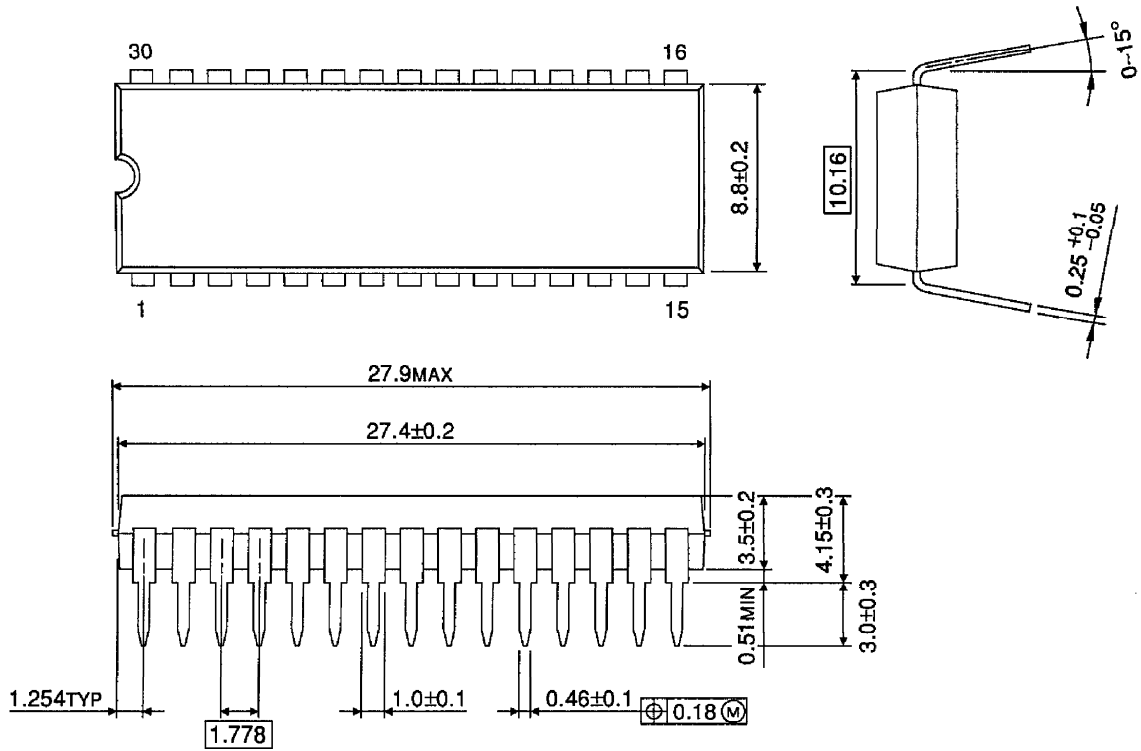


APPLICATION CIRCUIT



OUTLINE DRAWING
SDIP30-P-400-1.78

Unit : mm



Weight : 1.99g (Typ.)