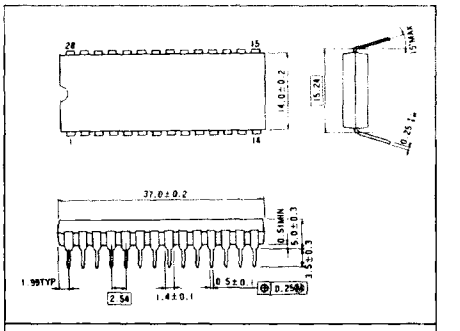
TA7608CP

TV VIDEO, CHROMA SIGNAL PROCESSOR

Unit: mm



JEDEC	—
TOSHIBA	DIP28-P-600

FUNCTION:

. Video Signal Reverse Output
. Contrast DC Control in Cooperation with Uni-Color Control
. Pedestal Clamp
. Brightness Control Input
. Chroma Signal Trap Terminal
. ACC Chroma AMP
. Hue DC Control
. Gain DC Control
. Uni-(Sub)-Color DC Control
. 3.58MHz Voltage Controlled Oscillator
. Killer Detector
. APC Phase Detector
. Demodulator
. Matrix Circuit

FEATURES:

. Minimum Numbers of Required External Parts
. Stabilized with Respect to Variation of Temperature and Power Supply Voltage
. A Few Initial Adjustment Required

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	15	V
Power Dissipation	P_D	1.8 ※	W
Signal Level at Input Pin	e_{in}	5	V_{p-p}
Demodulator Load Resistance	R_{LD}	1.8 MIN.	kΩ
Gate Pulse Input Voltage	e_p	-10 ~ 6	V
Contrast Amp Load Resistance	R_{LC}	800 MIN.	Ω
Operating Temperature	T_{opr}	-20 ~ 65	°C
Storage Temperature	T_{stg}	-55 ~ 150	°C

※ Derated above Ta=25°C in the proportion of 14.4mW/°C.

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STATIC CHARACTERISTICS ($Ta=25\pm3^{\circ}C$, $V_{CC}=12V$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
			S1					
Recommended Supply Voltage	V_{CC}	-	-		10.8	12.0	13.2	V
Supply Current	I_{CC}	2	1		53	66	87	mA
Terminal-1 Voltage	V_1	2	1		7.0	7.6	8.2	V
Terminal-5 Voltage	V_5	2	1		5.2	5.8	6.4	V
Terminal-7 Voltage	V_7	2	2		5.2	5.8	6.4	V
Terminal-12, 13, 14 Voltage	V_{12} V_{13} V_{14}	2	1		7.1	7.7	8.3	V
Terminal 12, 13, 14 Def. Voltage	$V_{12}-V_{13}$ $V_{13}-V_{14}$ $V_{14}-V_{12}$	2	1		-0.3	0	0.3	V
Terminal 20 Voltage	V_{20}	2	1		4.6	6.1	7.6	V
Terminal 21 Input Current	I_{21}	2	1		-120	-	0	μA
Terminal 22 Input Current	I_{22}	2	1		-15	-	0	μA
Terminal 26 Input Current	I_{26}	2	1		0	-	42	μA
V_{20} Temperature-Drift	$\partial V_{20}/\partial T$	2	1		+2	+4	+6	$mV/^{\circ}C$
V_{12}, V_{13}, V_{14} Temperature Drift	$\partial V_{12}/\partial T$ $\partial V_{13}/\partial T$ $\partial V_{14}/\partial T$	2	1		-3	0	+2	$mV/^{\circ}C$
$V_{12}-V_{13}$, $V_{13}-V_{14}$, $V_{14}-V_{12}$ Temperature-Drift	$\partial V_{12}-V_{13}/\partial T$ $\partial V_{13}-V_{14}/\partial T$ $\partial V_{14}-V_{13}/\partial T$	2	1		-2	0	+2	$mV/^{\circ}C$

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DYNAMIC CHARACTERISTICS ($Ta=25\pm3^{\circ}C$, $V_{CC}=12V$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reverse Amp. Gain	G_r	3	e_{in} 1 400Hz, 100mV_{p-p} E1 3.3V, S1 OFF	2.3	3.5	4.6	dB
Reverse Amp. D.P	$\Delta\phi_R$	3	e_{in} 1 3.58MHz, 100mV S1 ON, E1 20V~6.5V	-	-	5	deg
Reverse Amp. Max. Output	v_{RMAX}	3	Note 1	5.0	-	-	V_{p-p}
S.C. Maximum Output	v_{SCMAX}	3	Note 2	1.6	-	-	V_{p-p}
Contrast Amp. Gain	G_C	3	e_{in} 1 400Hz, 100mV_{p-p} E1 3.3V, V1 12.0V	-3.9	-	-2.3	dB
Contrast Amp. Gain Reduction	∂G_C	3	e_{in} 1 400Hz, 100mV_{p-p} E1 3.3V	11.4	12.2	13.0	dB
Contrast Amp. Max. Output	v_{CMAX}	3	Note 3	2.5	-	-	V_{p-p}
DC Variation by Contrast Control	∂V_{24}	3	Note 4	-120	0	120	mV
Reverse Amp. Frequency Characteristic	∂G_{pf}	3	Note 5	-	-	2.0	dB
Contrast Amp. Frequency Characteristic	∂G_{cf}	3	Note 5	-	-	1.0	dB
Video Amp. Gain	G_V	3	Note 6	11.2	-	14.1	dB
Video Amp. Max. Output	v_{VMAX}	3	Note 7	6.0	-	-	V_{p-p}
Video Amp. Frequency Characteristic	∂G_V	3	Note 8	-	-	2.5	dB
3.58MHz Trap Reduction	G_T	3	Note 9	11	-	-	dB
Max. Chroma Output	e_C	4	Note 10	0.49	0.67	0.92	V_{p-p}
Burst Output	e_B	4	Note 11	0.54	0.72	1.02	V_{p-p}
ACC Range	e_a	4	Note 12	0.2	-	-	V_{p-p}
Killered Chroma Output	e_{CLK}	4	Note 13	-	-	3	mV_{p-p}
Min. Gain Chroma Output	e_{CLG}	4	Note 14	-	-	3	mV_{p-p}
Uni-Color Gain Reduction	∂G_U	4	Note 5	7.5	8.5	9.5	dB
Phase Shift by Color Control	$\partial\phi_G$	4	Note 16	-	-	10	deg
Phase Shift by Uni-Color Control	$\partial\phi_U$	4	Note 17	-	-	5	deg

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CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Phase Shift by Hue-Control		$\partial\phi_H$	4	Note 18	±25	±45	-	deg
Burst Output Variation by Hue-Control		∂G_B	4	Note 19	1.2	3.0	9.3	dB
Sub-Carrier Leak		e_{CWL}	4	Note 20	-	-	20	mV_{p-p}
APC Pull-In Range		f_p	5	Note 21	±220	±300	-	Hz
APC Hold-In Range		f_k	5	Note 21	±300	±400	-	Hz
Phase Error (Static)		ϕ_e	5	f : ±240Hz	-	±0.03	±0.05	deg/Hz
Killer Off Burst Input Level		e_{bk}	5	Note 22	15	30	50	mV_{p-p}
B-Y Demodulator Output		e_{OB}	5	Note 23	1.7	2.1	2.6	V_{p-p}
Demo Ratio	R-B Demo Ratio	e_{OR}/e_{OB}			0.9	1.0	1.1	
	G-B Demo Ratio	e_{OG}/e_{OB}			0.30	0.38	0.48	
Demo Phase	R-B Phase	ϕ_{R-B}			97	105	113	deg
	G-B Phase	ϕ_{G-B}			225	235	245	
Max. Demodulator Output	R-Y	e_{ORM}	5	Note 24	4.5	5.5	-	V_{p-p}
	G-Y	e_{OGM}			1.6	2.0	-	
	B-Y	e_{OBM}			4.5	5.5	-	
Residual Carrier		e_{carr}	5	Note 25	-	-	0.3	V_{p-p}
Residual Harmonics		e_{harm}	5	Note 26	-	-	2.2	V_{p-p}
Demodulator Band Width		f_D	5	Note 27	1.1	1.8	3.2	MHz
ACC Characteristic		G_A	4	Note 28	-1	0	2.6	dB
Burst-Chroma Phase Error		ϕ_{B-C}	4	Note 29	-8	0	+8	deg
OSC Frequency Drift by V_{CC}		∂f_{OSC}	5	V_{CC}=12±1V	-20	-	+20	Hz/V
Gate Input ON Voltage		e_{GON}	-		-	-	2.7	V
Gate Input OFF Voltage		e_{GOFF}	-		1.2	-	-	V

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Ta=25±3°C, V_{CC}-12V

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Pin 26 Input Impedance	Parallel Resistance	r_{ip26}	6		20	-	-	kΩ
	Parallel Capacitance	c_{ip26}			-	0.5	-	pF
Pin 22 Input Impedance	Parallel Resistance	r_{op22}	7		-	-	-	kΩ
	Parallel Capacitance	c_{ip22}			-	-	-	pF
Pin 24 Output Impedance	Parallel Resistance	r_{op24}	8		-	110	-	Ω
	Parallel Capacitance	c_{op24}			-	-	-	
Pin 23 Output Impedance	Parallel Resistance	r_{op23}	9		100	-	-	kΩ
	Parallel Capacitance	c_{op23}			-	3.5	-	pF
Pin 20 Output Impedance	Parallel Resistance	r_{op20}	10		-	100	-	Ω
	Parallel Capacitance	c_{op20}			-	-	-	
Pin 2 Input Impedance	Parallel Resistance	r_{ip2}	11		-	3.0	-	kΩ
	Parallel Capacitance	c_{ip2}			-	3.0	-	pF
Pin 8 Output Impedance	Parallel Resistance	r_{op8}	12		-	200	-	Ω
	Parallel Capacitance	c_{op8}			-	-	-	
Pin 9 Input Impedance	Parallel Resistance	r_{ip9}	13	S1 ON	-	1.0	-	kΩ
	Parallel Capacitance	c_{ip9}			-	-	-	pF

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CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Pin 10 Input Impedance	Parallel Resistance	r_{ip10}	14	S1 ON	20	-	-	kΩ
	Parallel Capacitance	c_{ip10}			-	-	-	pF
Pin 12 Output Impedance	Parallel Resistance	r_{op12}	15	S1=1	-	130	-	Ω
	Parallel Capacitance	c_{op12}			-	-	-	
Pin 13 Output Impedance	Parallel Resistance	r_{op13}	15	S1=2	-	130	-	Ω
	Parallel Capacitance	c_{op13}			-	-	-	
Pin 14 Output Impedance	Parallel Resistance	r_{op14}	15	S1=3	-	130	-	Ω
	Parallel Capacitance	c_{op14}			-	-	-	
Pin 15 Input Impedance	Parallel Resistance	r_{ip15}	16		-	2.0	-	kΩ
	Parallel Capacitance	c_{ip15}			-	-	-	pF
Pin 16 Input Impedance	Parallel Resistance	r_{ip16}	17		20	-	-	kΩ
	Parallel Capacitance	c_{ip16}			-	-	-	pF
Pin 17 Output Impedance	Parallel Resistance	r_{op17}	18		-	150	-	Ω
	Parallel Capacitance	c_{op17}			-	-	-	

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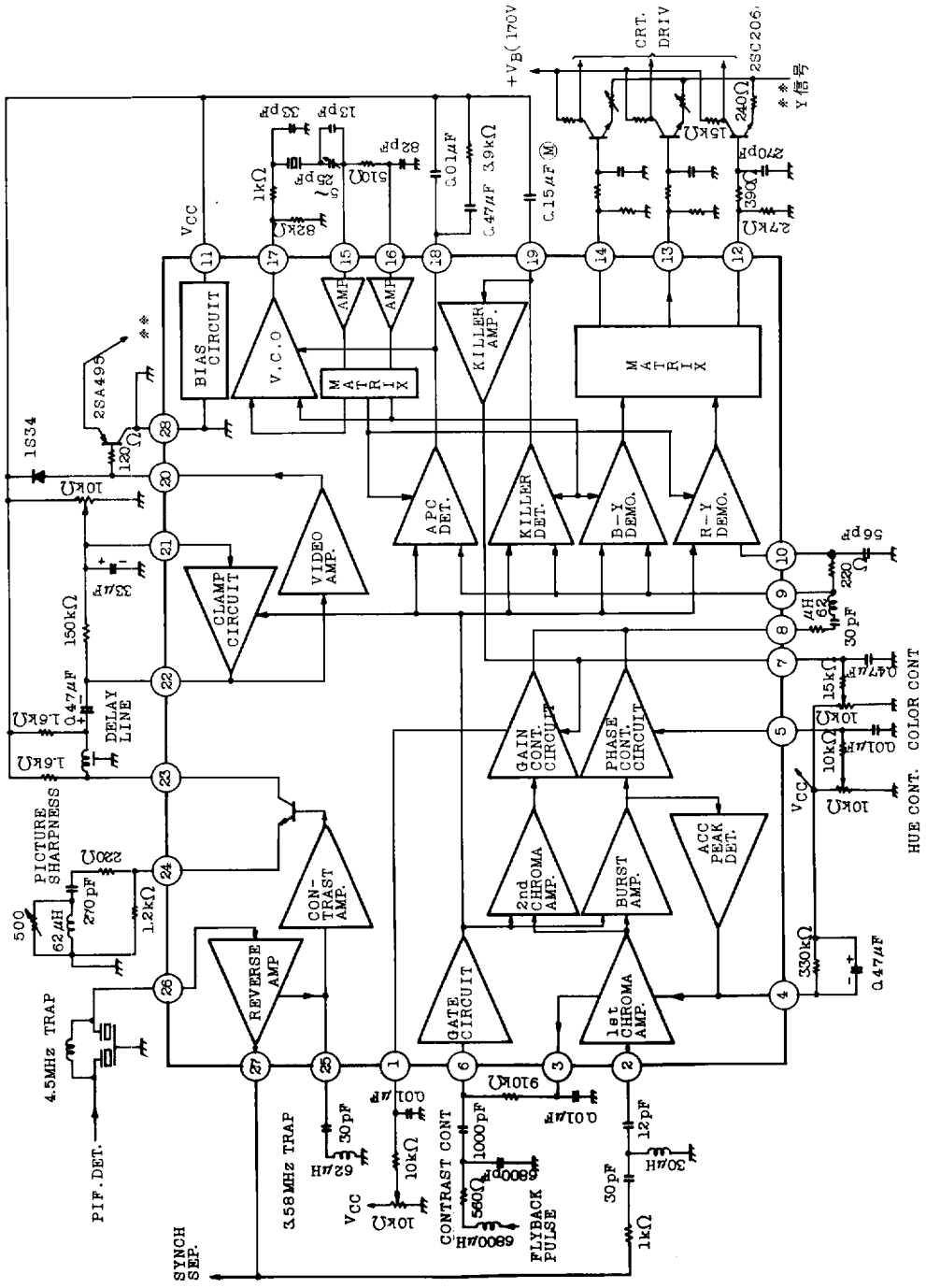


Fig. 1 BLOCK DIAGRAM TA7608CP

TA7608CP

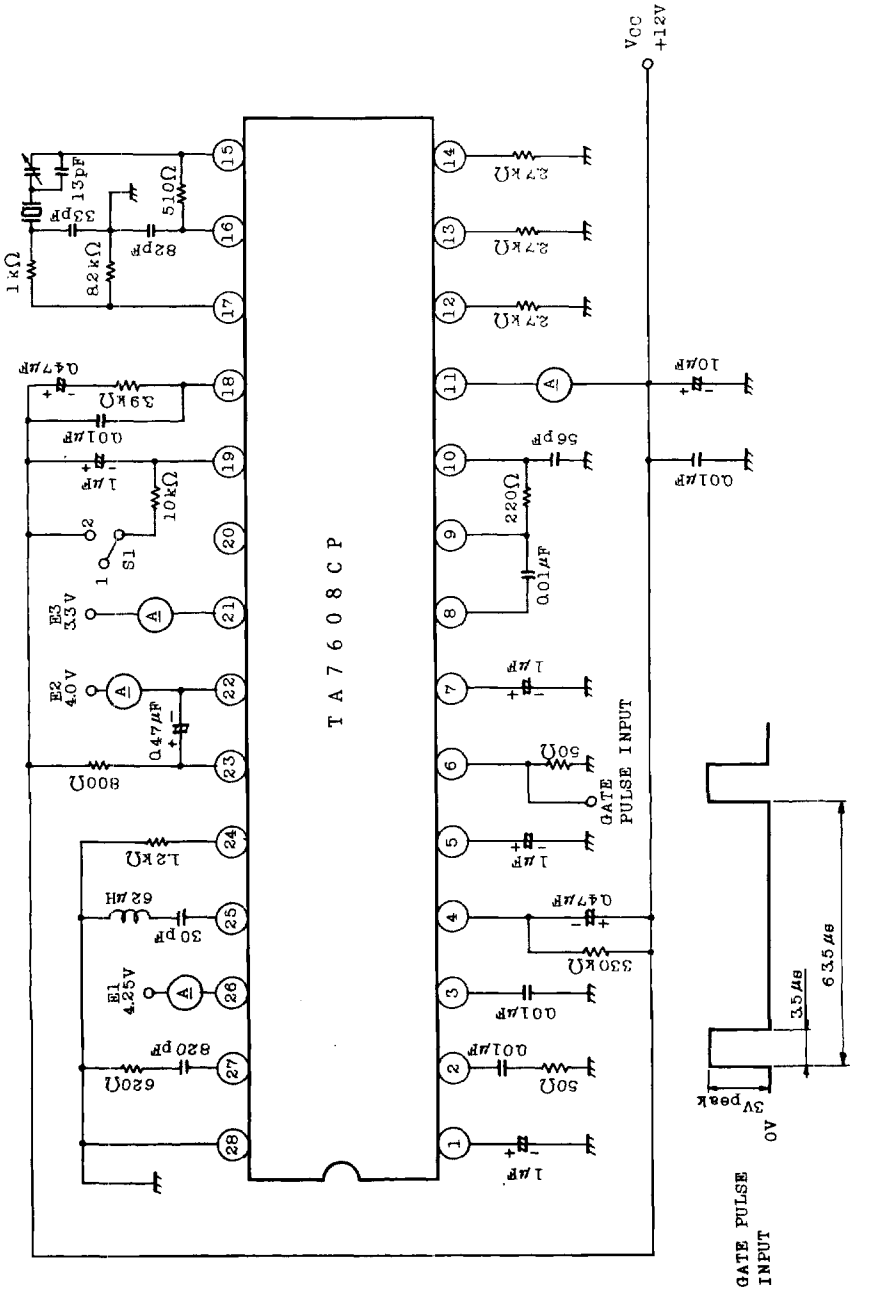


Fig. 2 STATIC CHARACTERISTIC TEST CIRCUIT

TA7608CP

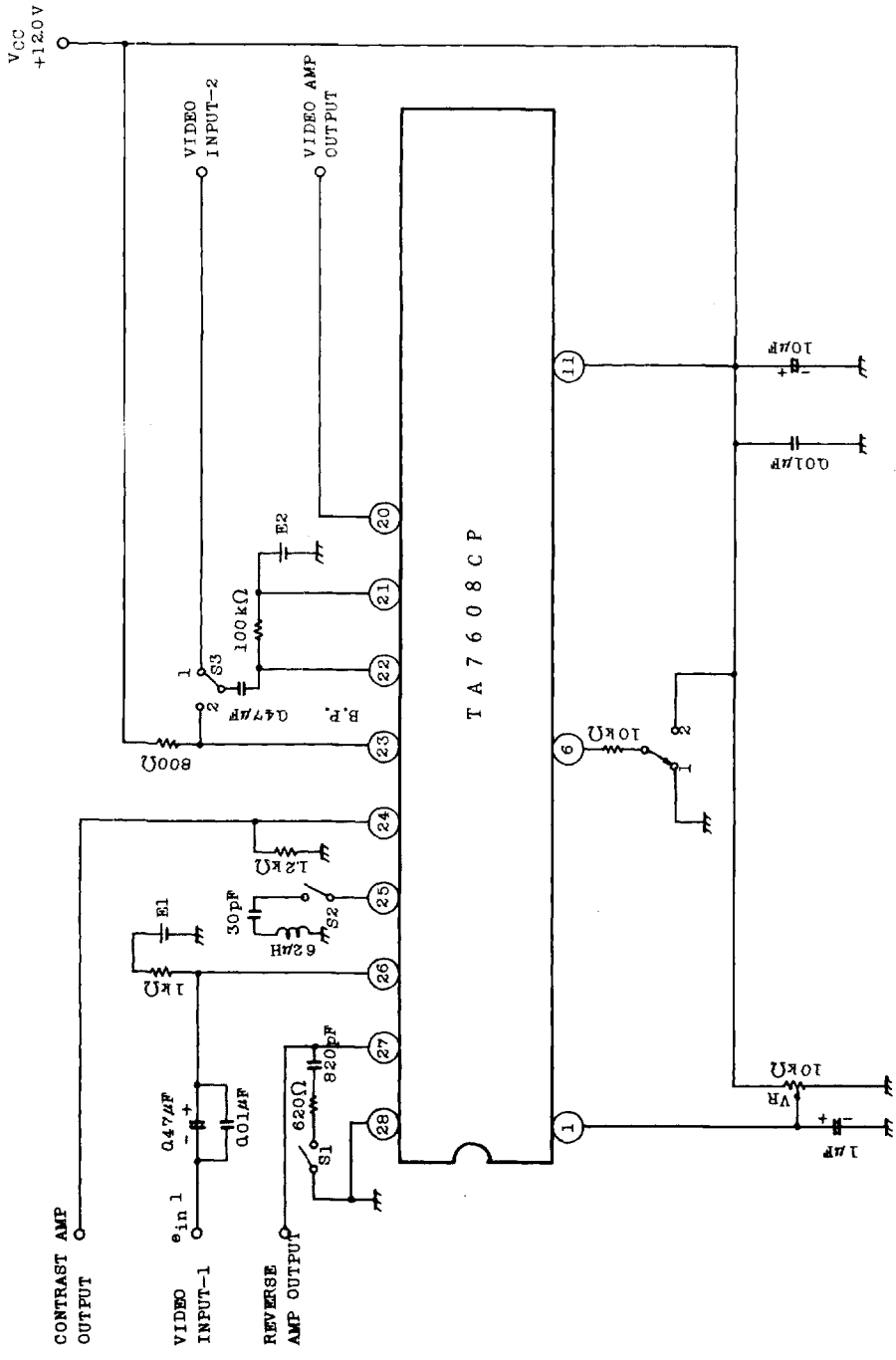


Fig. 3 DYNAMIC CHARACTERISTIC TEST CIRCUIT

TA7608CP

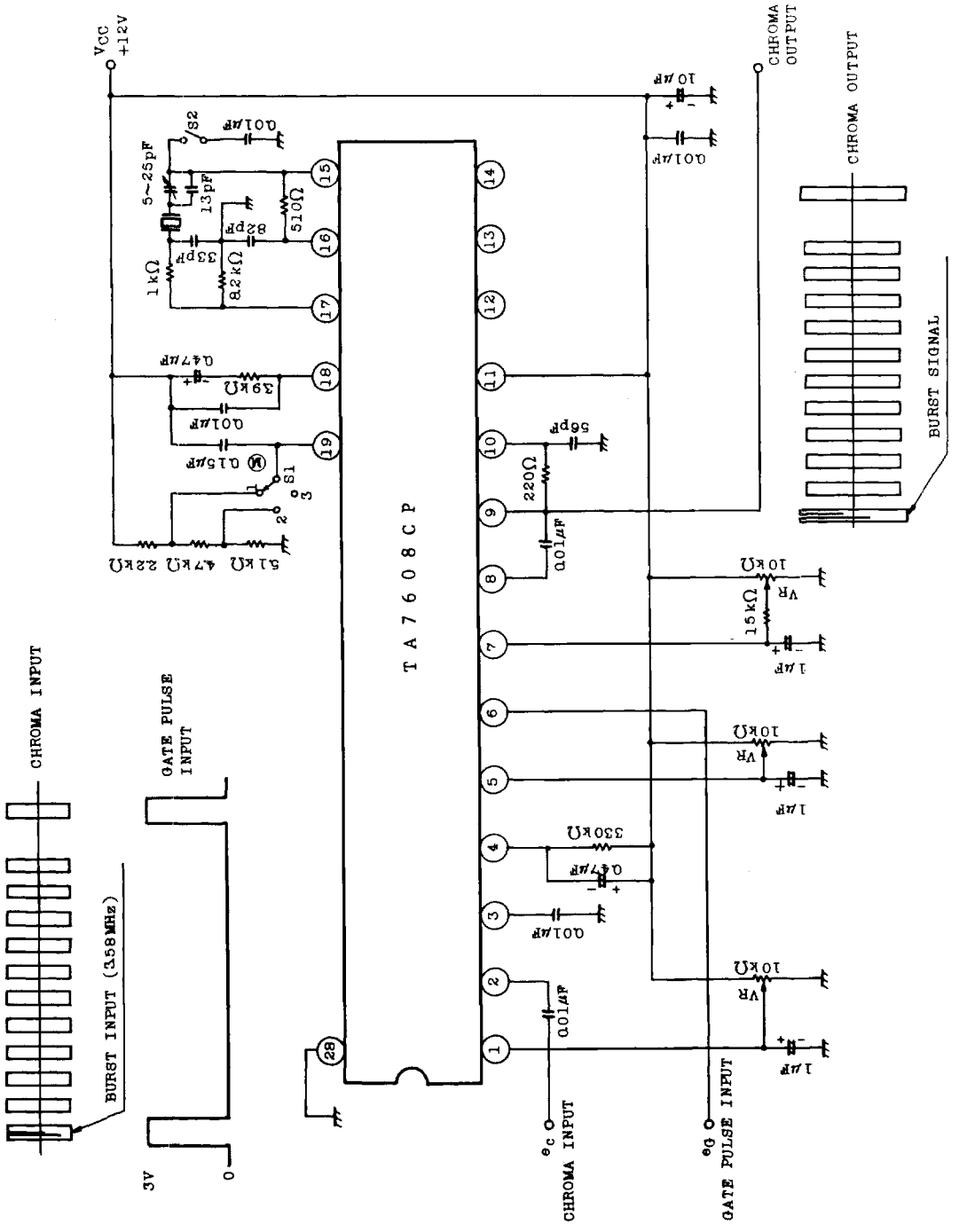


Fig. 4 DYNAMIC CHARACTERISTIC TEST CIRCUIT

TA7608CP

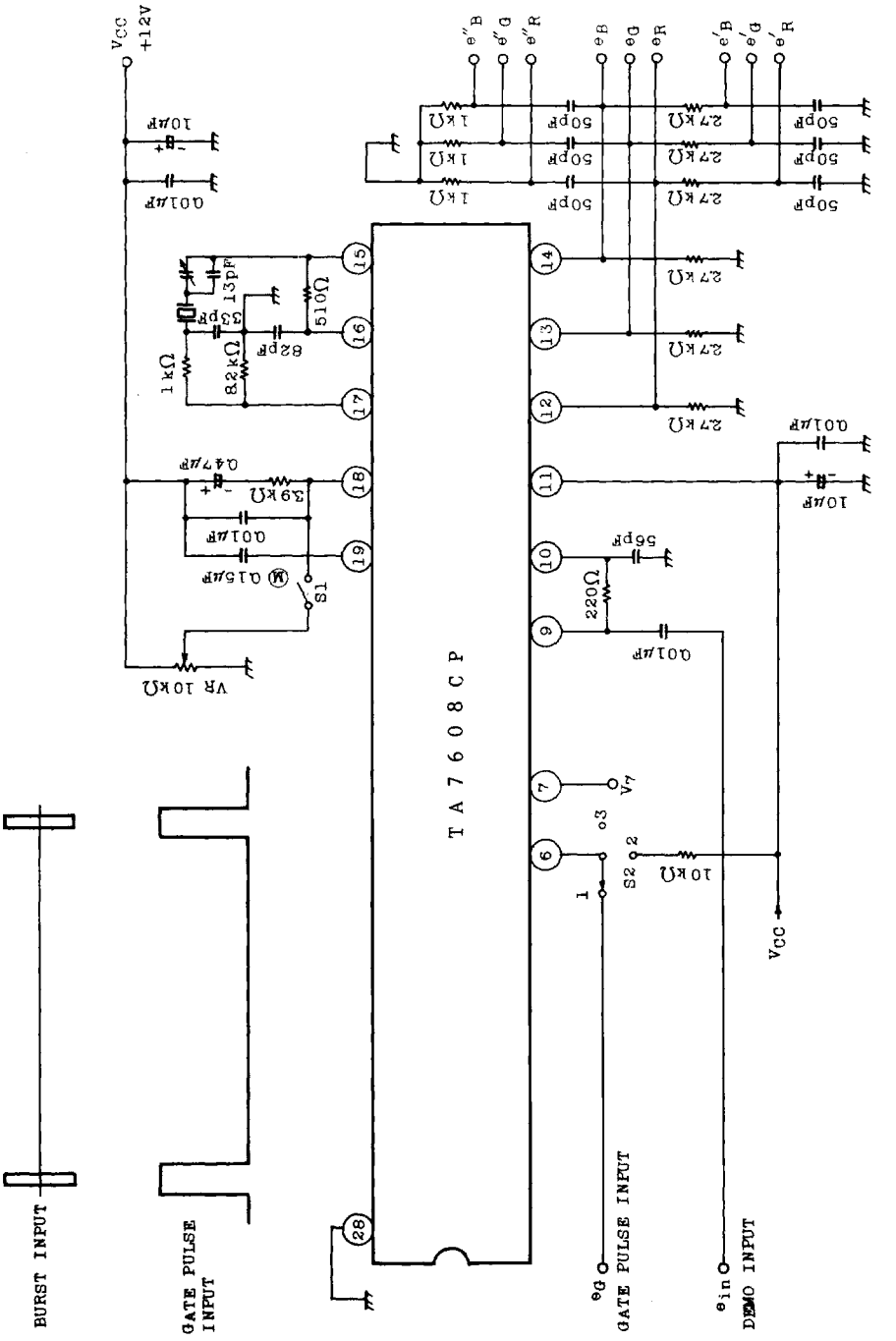


Fig. 5 DYNAMIC CHARACTERISTIC TEST CIRCUIT

TA7608CP

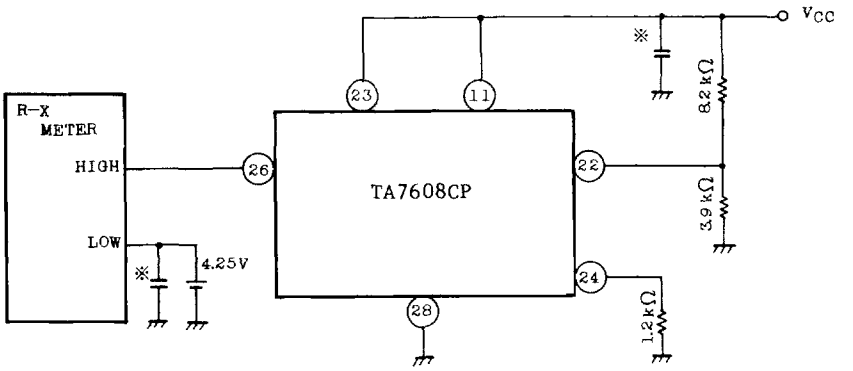


Fig. 6

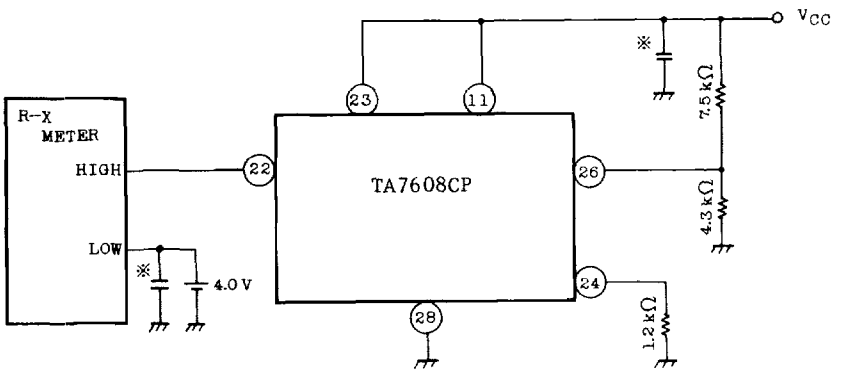


Fig. 7

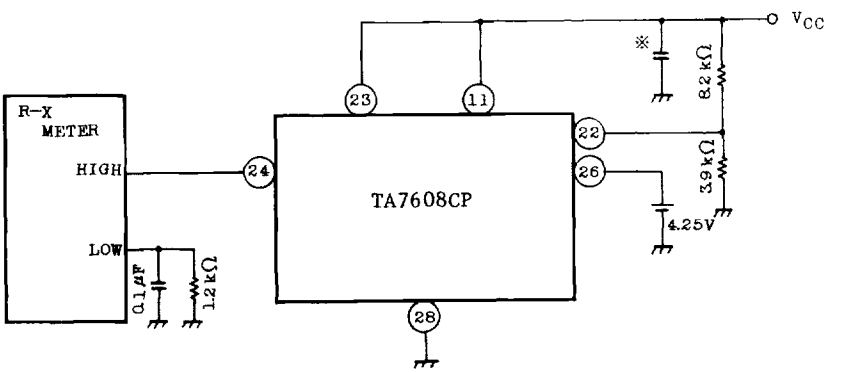


Fig.8 (※ Capacitor : 0.005~0.1μF)

TA7608CP

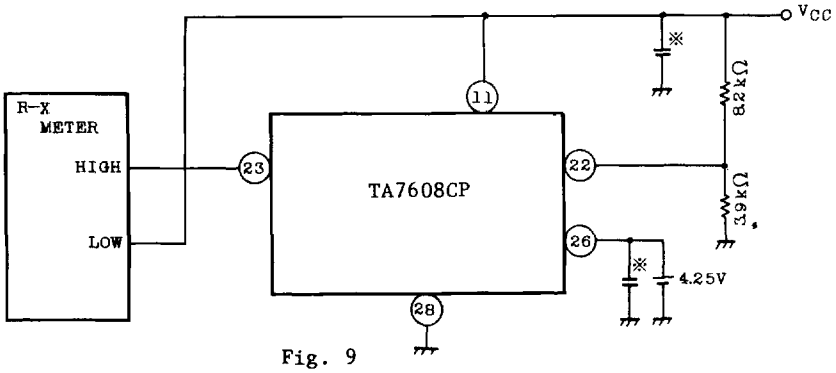


Fig. 9

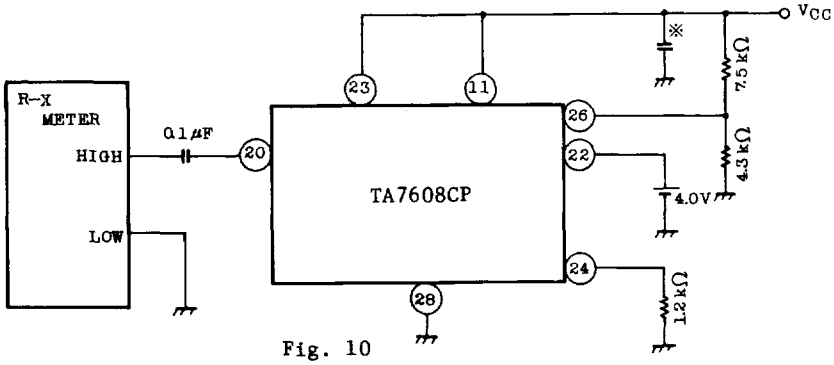


Fig. 10

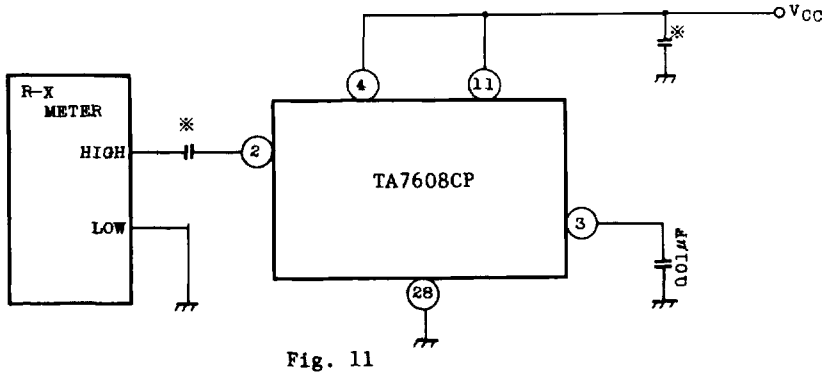


Fig. 11

(※ Capacitor : 0.005~0.1μF)

TA7608CP

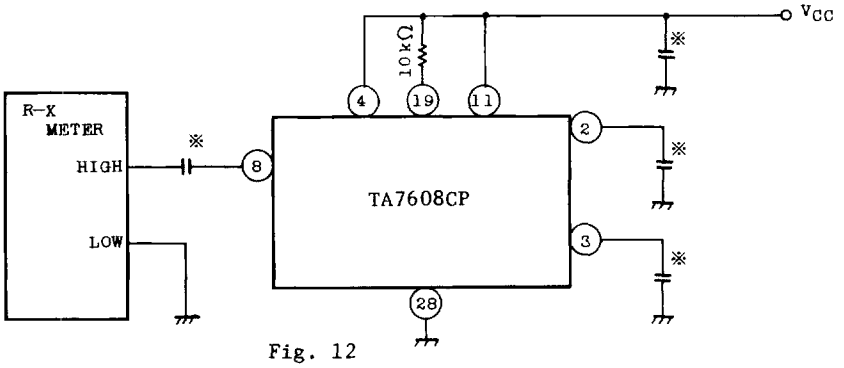


Fig. 12

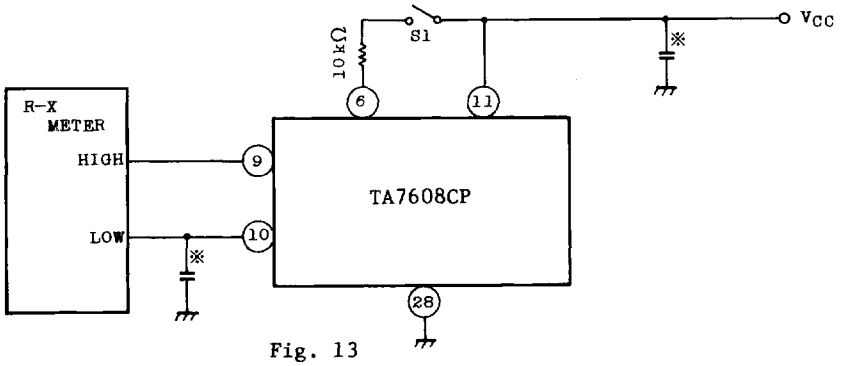


Fig. 13

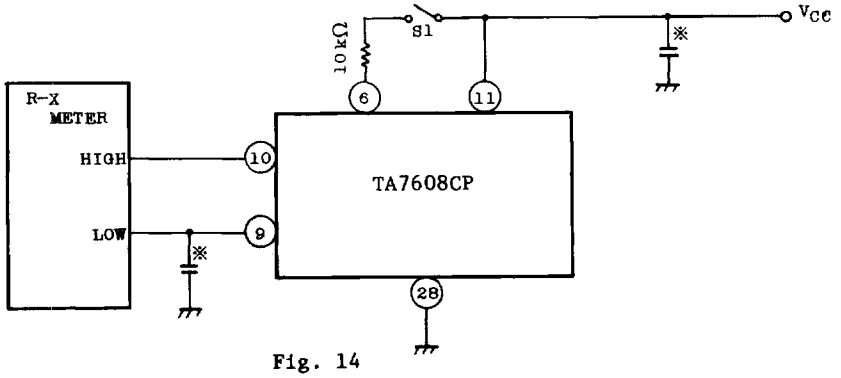


Fig. 14

(※ Capacitor : 0.005～0.1μF)

TA7608CP

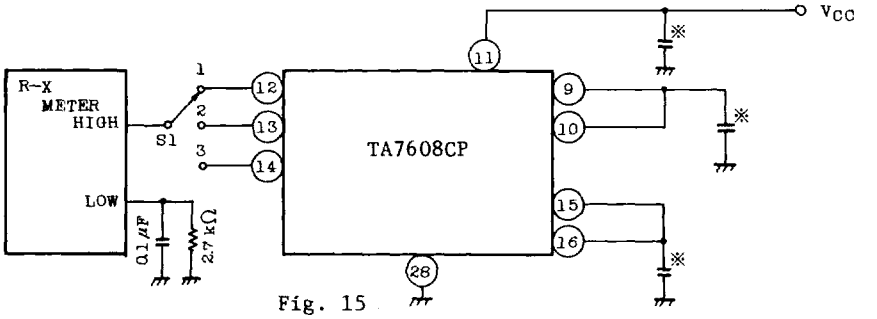


Fig. 15

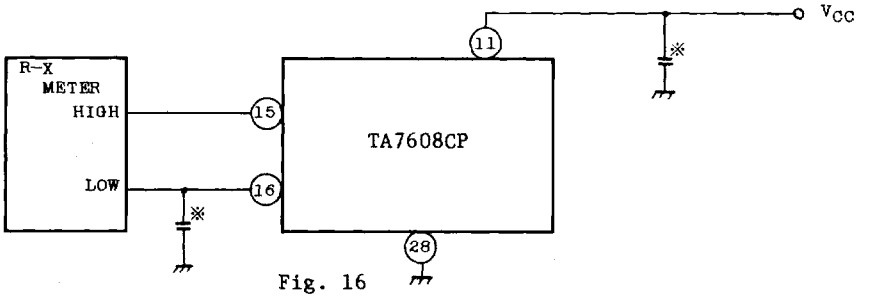


Fig. 16

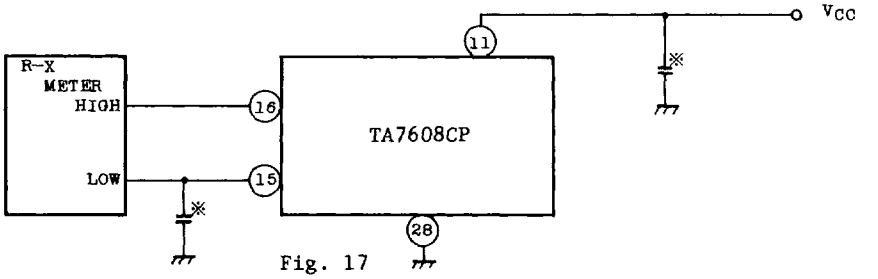


Fig. 17

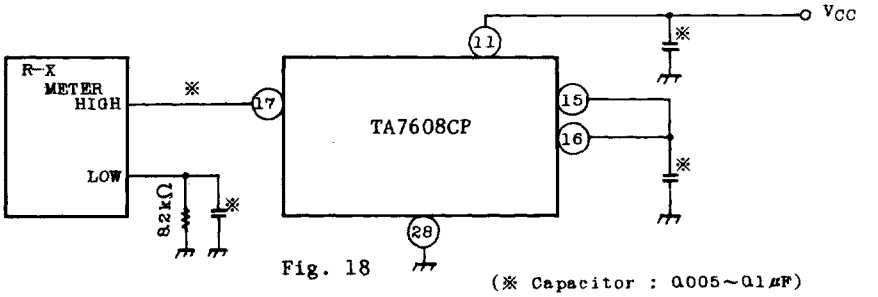


Fig. 18

(※ Capacitor : 0.005~0.1μF)

Note 1. E_1=4.0V, $e_{in\ 1}$ (Video input 1);400Hz Increase and adjust input level so that the Reverse Amp. Gain will be -1dB refer to G_r (100mV$_{p-p}$ input level).
Measure terminal 27 output level.

Note 2. E_1=4.0V, $e_{in\ 1}$;3.58MHz
Measure terminal 27 output level when output distortion is 10%.

Note 3. E_1=4.0V, $e_{in\ 1}$;400Hz Increase and adjust input level so that the Contrast Amp. Gain will be -1dB refer to G_C.
Measure terminal 24 output level.

Note 4. E_1=3.3V, V_1=0~12V
Measure voltage variation of terminal 24.

Note 5. S_1,S_2;OFF, E_1=3.3V, $e_{in\ 1}$;100mV$_{p-p}$ 0.5MHz, 4MHz

$$\partial G_{pf} = 20 \log \frac{v_{o27}\ (0.5MHz)}{v_{o27}\ (4MHz)}$$

Note 6. S_3;1,V_{22}=4.0V, Video Input 2;100mV$_{p-p}$ 400Hz
Measure terminal 20 output level $v_{o20(p-p)}$

$$G_V = 20 \log \frac{v_{o20(p-p)}\ (mV)}{100mV}$$

Note 7. Conditions are the same as Note 6. Increase and adjust input level so that the Video Amp. Gain will be -1dB refer to G_V.
Measure terminal 20 output level.

Note 8. S_3;2, E_1=3.3V, V_{22}=4.0V,
Video Input 2;1.0V$_{p-p}$ 0.5MHz, 4MHz

$$\partial G_V = 20 \log \frac{v_{o20}\ (0.5MHz)}{v_{o20}\ (4MHz)}$$

Note 9. E_1=3.75V $e_{in\ 1}$;100mV$_{p-p}$, 3.58MHz (Tuned)

$$G_T = 20 \log \frac{v_{o24}\ (S_2\ OFF)}{v_{o24}\ (S_2\ ON)}$$

Note 10. S_1;2, S_2;ON (OSC STOP)
Chroma input;120mV$_{p-p}$ Color Bar Signal
V_1, V_7;Max. Terminal 5;OPEN
Measure terminal 9 chroma output.

Note 11. Conditions are the same as Note 10.
Measure terminal 9 Burst output.

Note 12. Conditions are the same as Note 11 except chroma input level ($15mV_{p-p}$).

Note 13. Chroma input;$100mV_{p-p}$ S_1;2, S_2;ON V_1, V_7;Max.
Measure terminal 9 output level.

Note 14. Chroma input;$100mV_{p-p}$ S_1;1, S_2;ON V_1;Max. V_7=0
Measure terminal 9 output level.

Note 15. Chroma input;$100mV_{p-p}$ S_1;1, S_2;ON V_7;Max. V_1=0~12V

$$\partial G_V = 20 \log \frac{v_{o9}\ (V_1=12V)}{v_{o9}\ (V_1=0V)}$$

Note 16. Chroma input;$100mV_{p-p}$, S_1;1, S_2;ON V_1;Max.
V_7;Decrease V_7 from V_{CC} to V_7' which gives -20dB output level refer to $V_7=V_{CC}$.

Measure phase shift of the chroma output signal.

Note 17. Chroma input;$100mV_{p-p}$ S_1=1, S_2;ON V_7;Max.
Measure phase shift of the chroma output signal, when V_1=0 to V_{CC}.

Note 18. Burst input ; $100mV_{p-p}$ S_1;1, S_2;ON V_5;0~12V
Measure phase shift of the Burst output signal.
The reference is the output when V_5 is OPEN.

Note 19. Conditions are the same as Note 18.
Measure output variation of Burst signal.

Note 20. S_1;1, S_2;OFF V_1, V_7;Max.
Measure 3.58MHz component of the terminal 8.

Note 21. Burst input;$500mV_{p-p}$

Note 22. Burst input level so that V_7 will be 2.0V.

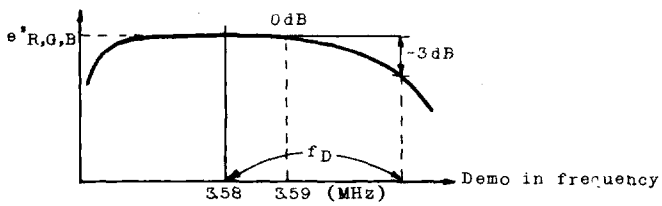
Note 23. Demo input;$200mV_{p-p}$ 3.59MHz
S_1;ON, S_2;3 Set V_{18} to V_{18} open voltage with gate pulse input.
f_{OSC}=3.579545MHz
Measure e_B', e_G' and e_R'

Note 24. Demo input;1.2V_{p-p}, 3.59MHz
other conditions are the same as Note 23.

Note 25. Demo input;0
Measure 3.58MHz component of e'_B, e'_G, e'_R.

Note 26. Demo input;1.2V_{p-p}
Measure harmonic components of e'_B, e'_G, e'_R.

Note 27. Demo input;200mV_{p-p}
Demo input frequency offset when the output level will be -3dB refer to 3.59MHz.



Note 28. V_1, V_7;Max. Burst input;100mV_{p-p}, 300mV_{p-p}
S_1;1, S_2;ON Terminal 5;OPEN.

$$G_A = 20 \log \frac{v_{o9}\ (300mV_{p-p})}{v_{o9}\ (100mV_{p-p})}$$

Note 29. V_1, V_7;Max. Burst input;100mV_{p-p}
Terminal 5;OPEN.
Measure phase difference between Burst signal and Chroma signal at terminal 8.

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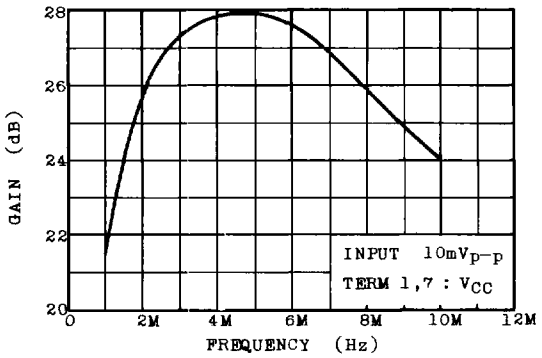
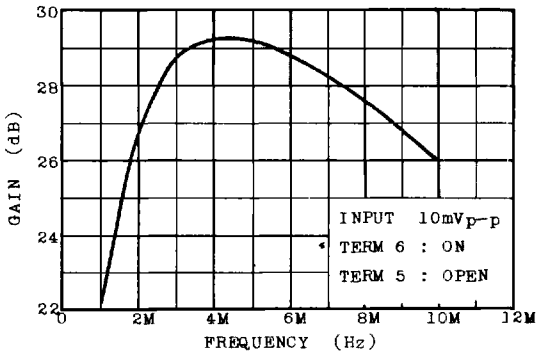
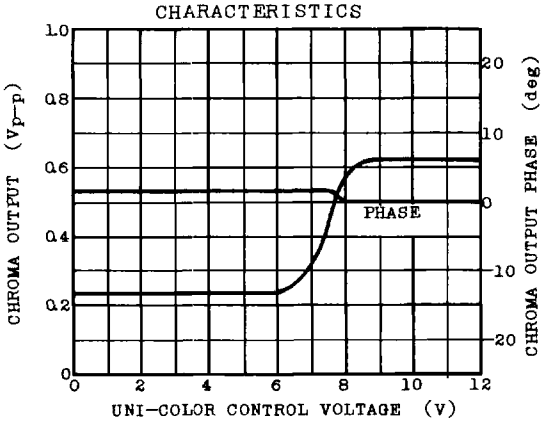
CHROMA AMP FREQUENCY CHARACTERISTIC



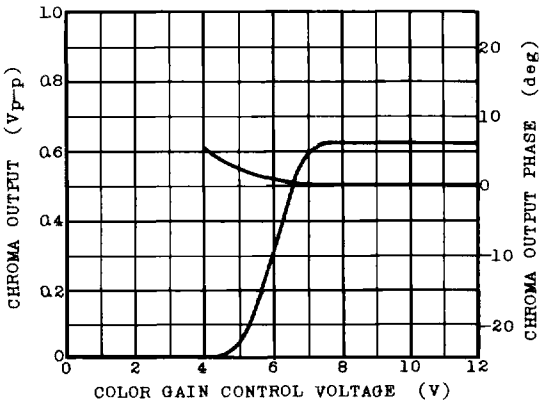
BURST AMP FREQUENCY CHARACTERISTIC



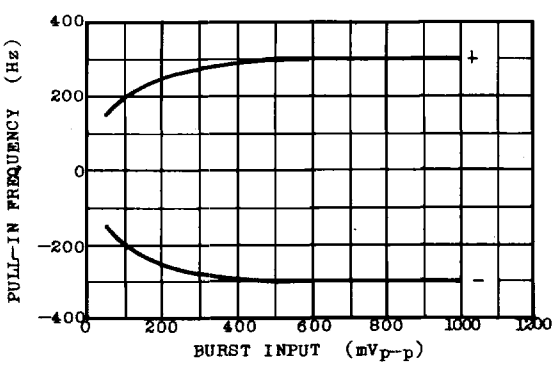
UNI-COLOR CONTROL CHARACTERISTICS



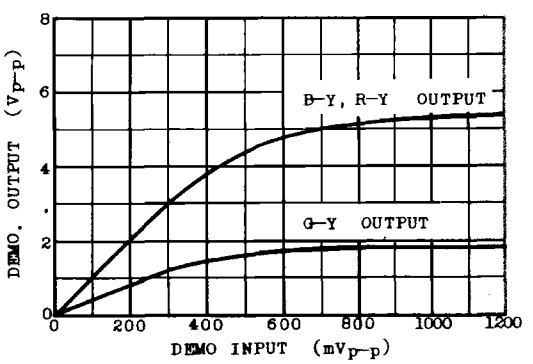
COLOR CONTROL CHARACTERISTICS



APC PULL-IN CHARACTERISTIC



DEMO CHARACTERISTIC



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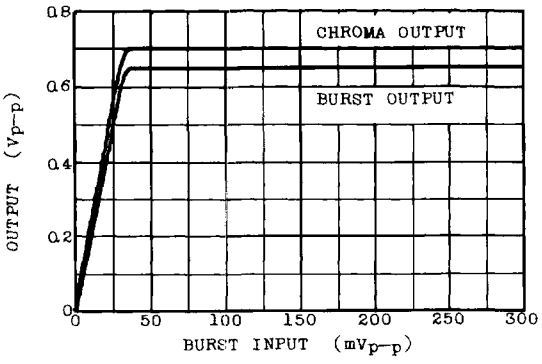
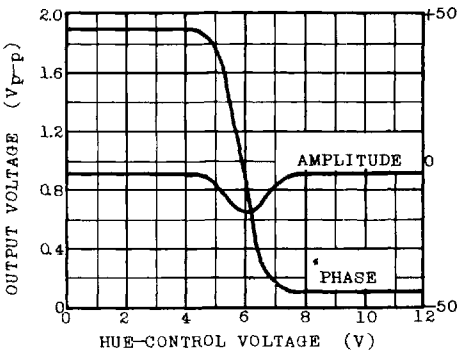
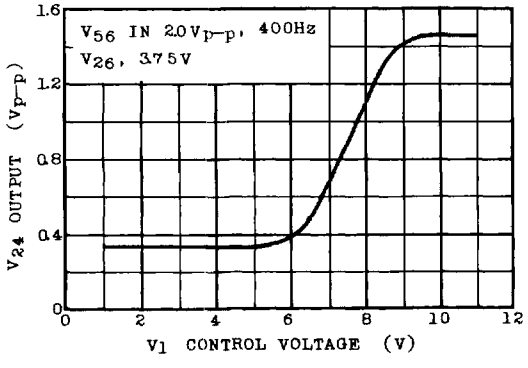
ACC CHARACTERISTIC



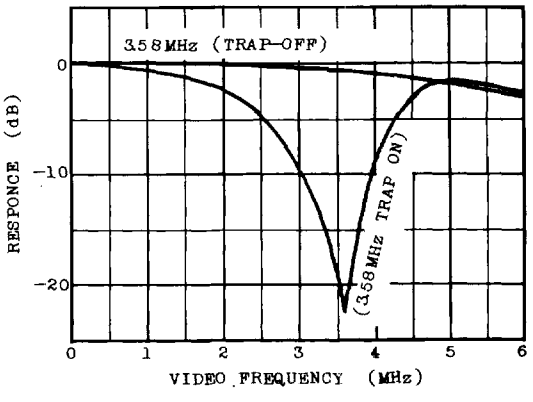
HUE-CONTROL CHARACTERISTIC



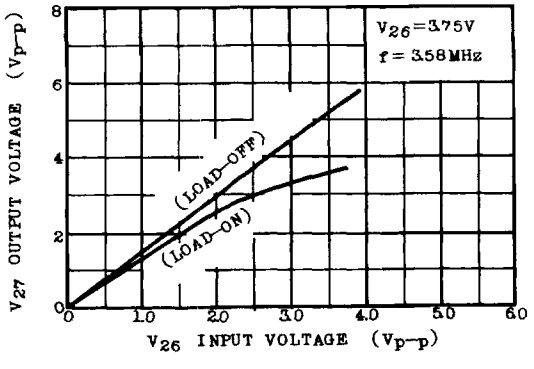
UNI-COLOR (CONTRAST) CHARACTERISTIC



VIDEO CIRCUIT FREQUENCY CHARACTERISTIC (OVER ALL)



REVERSE AMP OUTPUT vs INPUT



REVERSE AMP FREQUENCY CHARACTERISTIC