

# M52303ASP

## NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

### DESCRIPTION

The M52303ASP is a single-chip semiconductor integrated circuit that processes color NTSC system television signals. It features a variety of signal processing functions including video IF, sound IF, picture, color, and deflection signal processing. It also combines tuner and simple transistor output level to facilitate practical PAL/NTSC system color television set design.

### FEATURES

- With the exception of tuner and output level, all color television signal processing functions are built-in, enhancing practicality and reliability of the television set itself while contributing to lower power consumption.
- The intermediate frequency input pins consist of two pins for actuation input and feature high-stability toward oscillation.
- Horizontal oscillation can be counted down from 32 times the horizontal frequency using a ceramic oscillator, and requires no adjustment of free run frequency.
- Vertical oscillation can be counted down from 2 times the horizontal frequency produced by horizontal count-down and requires no vertical sync volume. Because count-down is used, the number of external components required for the vertical circuit is minimized.
- Enables use of AFT defeat, picture muting, and sound muting.
- Features direct current control for picture quality, contrast, luminance, color saturation, and volume.
- Equipped with built-in on-screen character display circuit.

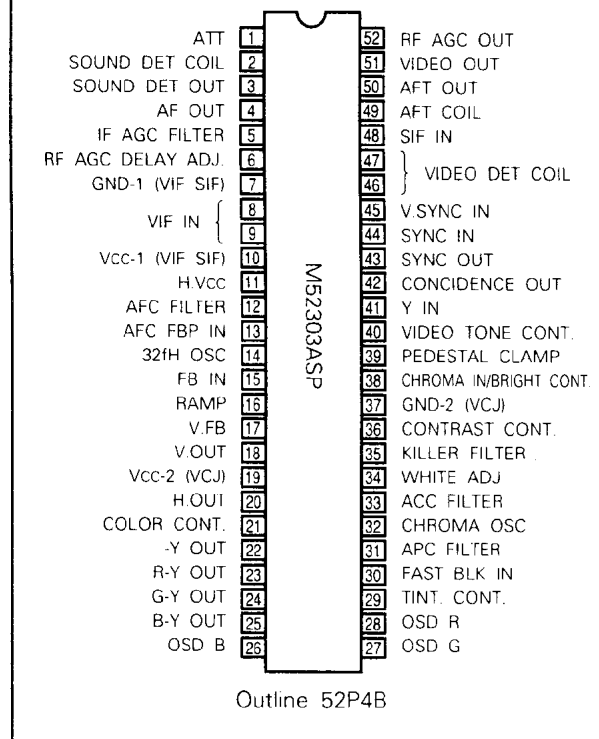
### APPLICATION

NTSC CTV

### RECOMMENDED OPERATING CONDITION

Supply voltage range .....	8.5 ~ 9.5V (V10, V19)
Rated supply voltage .....	9.0V (V10, V19)
Current range .....	15 ~ 22mA (I11)
Rated current .....	18mA (I11)

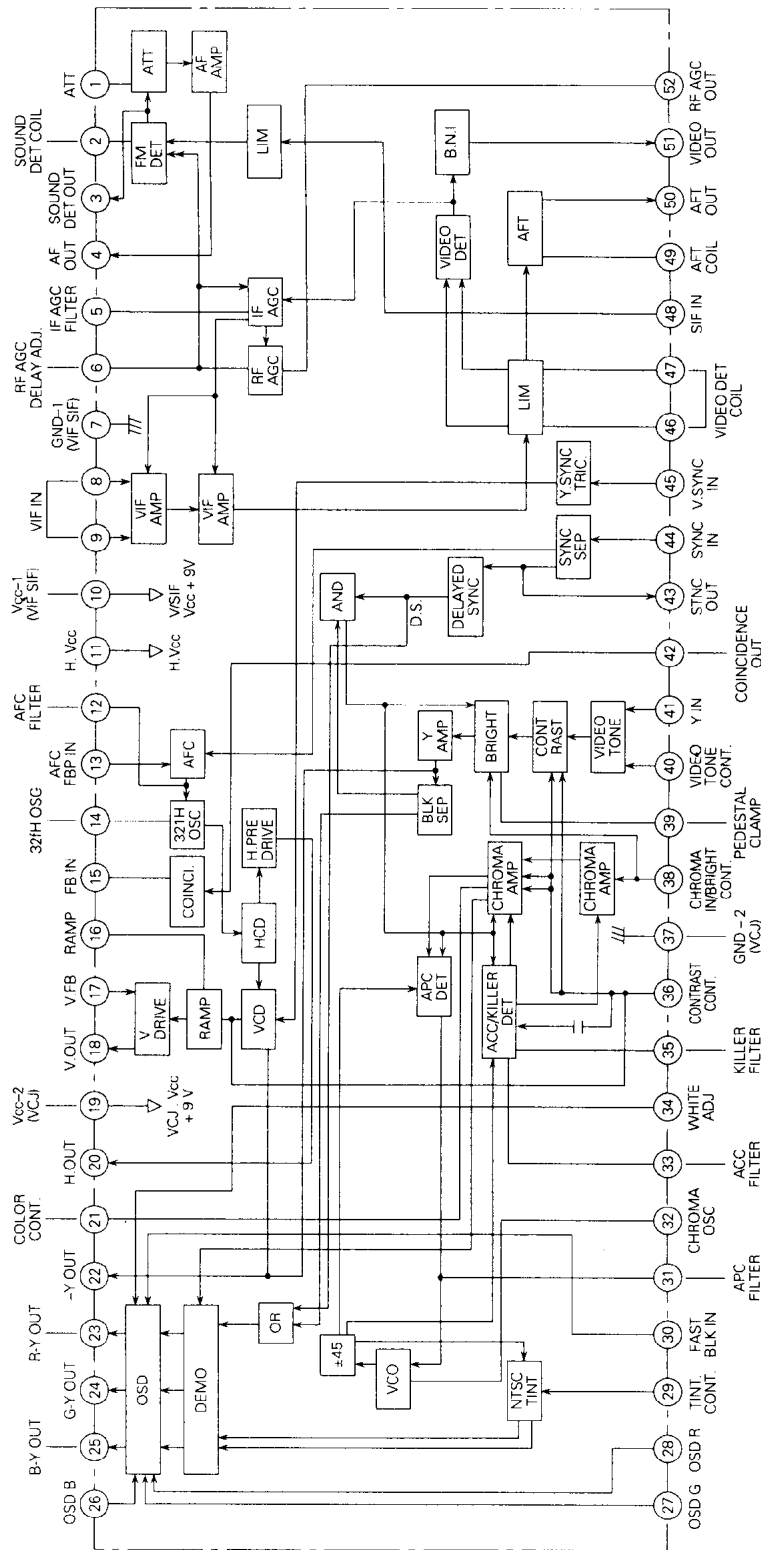
### PIN CONFIGURATION (TOP VIEW)



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### BLOCK DIAGRAM



NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V <sub>CC</sub>	Supply voltage	10.8	V
P <sub>d</sub>	Power dissipation	1.4	W
T <sub>opr</sub>	Operating temperature	-20-65	°C
T <sub>stg</sub>	Storage temperature	-40-125	°C

ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, unless otherwise noted)

Symbol	Parameter	Test point	Input ( )	Test conditions ("—" in the table below denotes "OPEN".)																Limits			Unit	
				1	5	6	V <sub>CC</sub>	10	2	5	6	6A	10	10A	47	48	48A	49	51	52	52A	Min.		Typ.
I <sub>CC10</sub>	Circuit current	A10	-	-	-	-	9.0	-	-	-	○	-	-	-	-	-	-	-	-	-	27	3G	50	mA
V <sub>51</sub>	Video output DC voltage	51	-	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	4.55	4.0	5.35	V
V <sub>o51</sub>	Video output signal voltage	51	A SG.1	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	1.7	2.0	2.3	V <sub>p-p</sub>
V <sub>51L</sub>	Sync. tip voltage	51	A SG.2	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	2.3	2.6	2.9	V
V <sub>in min.</sub>	Input sensitivity	51A	A SG.3	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	37	45	51	dBμ
V <sub>in max.</sub>	Maximum allowable input	51A	A SG.4	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	103	110	-	dBμ
V <sub>BTH</sub>	Black spot noise inverter	51	A SG.2 SG.5	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	1.7	2.0	2.3	V
V <sub>BCL</sub>																								
BW	Video frequency characteristics	51	A SG.8	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	5.6	8	-	MHz
IM	Intermodulation	51	A SG.9	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	32	45	-	dB
S/N	Video noise	51A	A SG.2	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	50	56	-	dB
V <sub>50</sub>	AFT output DC voltage	50	-	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	3.0	4.0	5.0	V
V <sub>50H</sub>	AFT output Maximum voltage	50	A SG.6	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	8.0	8.7	-	V
V <sub>50L</sub>	AFT output Minimum voltage	50	A SG.7	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	-	0.3	1.0	V
μAFT	AFT sensitivity	50	A SG.5	-	-	-	9.0	○	-	-	○	-	-	-	-	-	-	-	-	-	40	60	120	mV/kHz

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point ( )	Input ( )	Test conditions ("—" in the table below denotes "OPEN".)												Limits			Unit		
				1	5	6	Vcc	S	S	S	S	S	S	S	S	S	S	S		Min.	Typ.
V50D	AFT defeat voltage	50	A SG.5	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	4.35	4.5	4.65	V
V52H	RF AGC maximum voltage	52	A SG.11	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	7.0	8.0	-	V
V52L	RF AGC minimum voltage	52	A SG.10	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	-	0.01	0.3	V
V.S MUTE1	Video/sound mute starting voltage	5	-	9.0	V	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	1.2	V
V3	AF direct output DC voltage	3	-	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	3.4	3.9	4.5	V
V0AF	AF direct output signal voltage	3	C SG.12	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	540	630	720	mVrms
LIM	Limiting sensitivity	3	C SG.14	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	-	42	50	dBμ
AMR	AMR	3	C SG.15	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	50	60	-	dB
V04	AF driver output	4	C SG.12	-	-	-	9.0	○	-	-	-	-	-	-	-	-	-	250	460	650	mVrms
V04 max	AF driver maximum output	4	C SG.12	9.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	700	930	1200	mVrms
ATT	Maximum attenuation	4	C SG.12	1.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	70	80	-	dB
GAF	AF driver gain																	2.1	4.3	5.2	dB
S/N AF	Sound S/N	4	C SG.16	9.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	55	66	-	dB
S MUTE	Sound mute voltage	2	C SG.12	9.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	-	0.4	1.0	mVrms
V.S MUTE2	Sound output at video/sound mute	4	C SG.12	9.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	-	0.3	1.0	V
THD AF	AF driver maximum output distortion	4	C SG.12	9.0	V	-	9.0	○	-	-	-	-	-	-	-	-	-	-	1	5	X
V <sub>i</sub>	Terminal 1 voltage	1	-	M	-	-	9.0	○	-	-	-	-	-	-	-	-	-	4.8	5.3	5.8	V

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ( )	Test conditions ("—" in the table below denotes "OPEN".)																			Limits			Unit					
				11	11A	15	16A	17	19	11	S	11A	11B	12	12A	13	S	16	17	S	19	S	20	S	22		36	44	S	44A	Min.
I <sub>SS</sub>	Sync. separation input sensitivity current	I <sub>SS</sub> 43	I <sub>SS</sub> Variable	-	-	-	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.1	0.2	mA
V <sub>43H</sub>	Sync. separation output maximum voltage	43	D SG.17	-	-	-	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	8.9	-	Vo-p
V <sub>43L</sub>	Sync. separation output minimum voltage	43	D SG.17	-	-	-	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	3.0	3.5	Vo-p
I <sub>CC11</sub>	H. Vcc inflow current	A11	-	12 V	0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.0	16.0	20.0	mA	
f <sub>H</sub>	Horizontal free-run frequency	20	-	12 V	0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.20	15.625	15.95	kHz	
V <sub>11 min</sub>	Horizontal oscillation starting voltage	11	-	Variable	0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	5.4	V
f <sub>PHL</sub>	Horizontal pull-in range	D 20	D SG.18	9.0 V	9.0 V	0 V	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-500	-600	-	Hz	
f <sub>PHH</sub>	Horizontal pull-in range	D 20	D SG.18	9.0 V	9.0 V	0 V	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+500	+600	-	Hz	
V <sub>20H</sub>	Horizontal output maximum voltage	20	D SG.18	9.0 V	9.0 V	0 V	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.2	3.8	-	Vo-p	
V <sub>20L</sub>	Horizontal output minimum voltage	20	D SG.18	9.0 V	9.0 V	0 V	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.3	Vo-p	
T <sub>H</sub>	Horizontal output pulse width	20	D SG.18	9.0 V	9.0 V	0 V	-	-	-	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	24	26	μS	
V <sub>20H</sub> (6V)	Horizontal output maximum voltage at terminal 11 - 6 V	20	-	6.0 V	0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.8	2.4	Vo-p	
f <sub>H</sub> (Vcc)	Free-run frequency increase/decrease supply voltage	20	-	9V	0 V	15V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.20	15.625	15.95	kHz	
V <sub>FPO</sub>	Overvoltage detection operating voltage	15	-	9.0 V	Variable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.63	0.73	0.83	V	

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ( )	Test conditions ("-" in the table below denotes "OPEN".)																	Limits			Unit			
				11	11A	15	16A	17	19	36	S 11	S 11A	S 11B	S 12	S 12A	S 13	S 16	S 17	S 19	S 20	S 22	S 36	S 44		S 44A	Min.	Typ.
V <sub>18H</sub>	Vertical output maximum voltage	18	D SG.17 9.0 V	9.0	9.0	0	3.7	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	5	-	Vo-p
V <sub>18L</sub>	Vertical output minimum voltage	18	D SG.17 9.0 V	9.0	9.0	0	3.7	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0.3	Vo-p
G <sub>VV</sub>	Vertical open loop gain	17 18	E SG.19 -	-	-	4.5	4.5	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	22	28	dB	
V <sub>19 min</sub>	Vertical oscillation starting voltage	16 19	-	9.0	9.0	0	0	Var- iable	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	-	-	5	6.5	V
V <sub>RAMP</sub>	Ramp peak voltage	16	D SG.17 9.0 V	9.0	9.0	0	0	9.0	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	4.60	4.90	5.30	Vo-p	
V <sub>RAMP</sub>	Ramp amplitude	16	D SG.17 9.0 V	9.0	9.0	0	-	9.0	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	1.20	1.45	1.85	Vp-p	
f <sub>v60</sub>	Vertical free-run frequency 60	16	D SG.18 9.0 V	9.0	9.0	0	0	9.0	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	51.8	52.8	53.8	Hz	
f <sub>v60</sub>	Vertical pull-in frequency 60	16	D SG.20 9.0 V	9.0	9.0	0	0	9.0	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	65.7	66.7	67.7	Hz	
T <sub>v60</sub>	Vertical output pulse width 60	16	D SG.17 9.0 V	9.0	9.0	0	0	9.0	4.5	9.0	4.5	0	0	0	0	0	0	0	0	0	0	0	494	544	594	μs	
V <sub>z2Hi</sub>	Coincidence output maximum voltage	42	D SG.18 9.0 V	9.0	9.0	5	-	9.0	-	9.0	-	0	0	0	0	0	0	0	0	0	0	0	7.0	7.4	-	V	
V <sub>z2Lo</sub>	Coincidence output minimum voltage	42	-	9.0	9.0	5	-	9.0	-	9.0	-	0	0	0	0	0	0	0	0	0	0	0	-	0	0.5	V	



M52303ASP

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point ( )	Input ( )	Test conditions ("—" in the table below denotes "OPEN".)																Limits			Unit		
				11A	16A	19	21	22A	29	36	38	39	40	42	S 19	S 19A	S 22	S 44	S 35	S 36	S 39	Min.		Typ.	Max.
Icc19	Circuit current	A19	-	-	-	9.0 V	-	-	-	-	4.5 V	-	2.7 V	-	-	-	-	-	-	-	36	46	56	mA	
Ymax	Maximum output	22	F SG.21	-	-	9.0 V	-	-	-	-	9.0 V	-	Variable	-	-	-	-	-	-	-	5.0	6.2	-	Vp-p	
Gy	Standard gain	22	F SG.22	-	-	9.0 V	-	-	-	-	4.5 V	-	Variable	-	-	-	-	-	-	-	11	15	19	dB	
Gy min	Contrast control characteristics	22	F SG.22	-	-	9.0 V	-	-	-	2.5 V	Variable	-	Variable	-	-	-	-	-	-	-	-	-45	-30	dB	
Gy max				-	-	9.0 V	-	-	6.5 V	-	-	-	Variable	-	Variable	-	-	-	-	-	-	-	2	6	8.5
VBRT II norm	Brightness control characteristics II	22	D SG.18	-	-	12 V	-	-	-	.5 V	Variable	-	Variable	-	-	-	-	-	-	-	2.95	3.3	3.65		
VBRT II L				-	-	9.0 V	-	-	4.5 V	.4 V	-	9.0 V	-	Variable	-	-	-	-	-	-	-	2.05	2.4	2.75	Vo-p
VBRT II H				-	-	9.0 V	-	-	4.5 V	.4 V	-	4.5 V	-	Variable	-	Variable	-	-	-	-	-	-	3.75	4.1	4.45
Gp	Peaking value	22	F SG.23 SG.24	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	7.5	11	14.5	dB	
GT norm	Video tone control characteristics	22	F SG.24	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	-1.3	-0.5	1.2		
GT min				-	-	9.0 V	-	-	4.5 V	Variable	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-21	-15	-11	dB
GT max				-	-	9.0 V	-	-	4.5 V	Variable	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	3.0	6.0	10.0
fb Y	Frequency characteristics	22	F SG.25	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	7	8	-	MHz	
DG Y	Differential gain	22	F SG.22	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	-	1	6	X	
V40	Terminal 40 voltage	40	-	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	4.15	4.45	4.75	V	
VBLK Y	Vertical blanking voltage	22	-	-	-	9.0 V	-	-	-	2.5 V	Variable	-	Variable	-	-	-	-	-	-	-	7.3	7.7	-	Vo-p	
VBLK TV	Vertical blanking pulse width	22	-	-	-	9.0 V	-	-	-	2.5 V	Variable	-	Variable	-	-	-	-	-	-	-	1.31	1.38	1.44	mS	
VBLK H	Horizontal blanking threshold voltage	22 25A	H SG.28 0.5Vp-p	-	-	9.0 V	-	-	-	2.5 V	Variable	-	Variable	-	-	-	-	-	-	-	6.35	6.8	-	Vo-p	
Y DC REG	DC regeneration control characteristics	22	F SG.17	-	-	9.0 V	-	-	-	4.5 V	Variable	-	Variable	-	-	-	-	-	-	-	-1.2	-0.2	1.0	V	

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ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ( )	Test conditions ("—" in the table below denotes "OPEN".)																Limits			Unit												
				11A	16A	19	21	22A	29	36	38	39	40	S	19A	S	22	S	30	34	26	27		28	S	35	S	36	S	39	Min.	Typ.	Max.		
C <sub>max</sub>	Demodulation output maximum amplitude	25A	G SG.26 0dB	12 V	9.0 V	9.0 V	6.5 V	-	6.5 V	-	9.0 V	9.0 V	-	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	5.5	-	Vp-p		
ACC-I	ACC characteristics	25A	G SG.26 -20dB	12 V	9.0 V	9.0 V	-	4.5 V	-	9.0 V	9.0 V	-	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-8	-3.8	0.5	dB			
ACC-II			G SG.26 +6dB	12 V																									-3.0	0	3.0				
V <sub>K</sub>	Killer operation input level	G 21	G SG.26 Input variable	12 V	9.0 V	9.0 V	-	4.5 V	-	9.0 V	9.0 V	-	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-59	-52	-46	dB				
V <sub>OK</sub>	Killer color residual	25A	G SG.29 0dB	12 V	9.0 V	9.0 V	-	9.0 V	-	9.0 V	9.0 V	-	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	35	mVp-p			
C <sub>norm</sub>	Demodulation standard output	25A	G SG.26 0dB	12 V	9.0 V	9.0 V	-	4.5 V	-	9.0 V	9.0 V	-	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.7	2.4	Vp-p			
C <sub>U min</sub>	Color control characteristics I	25A	G SG.26 0dB	12 V	9.0 V	2.5 V	6.5 V	4.5 V	4.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-62	-52	-46	dB				
C <sub>U max</sub>																																3.8	7.3	10.8	
C <sub>S min</sub>	Color control characteristics II	25A	G SG.26 0dB	12 V	9.0 V	2.5 V	6.5 V	2.5 V	6.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-48	-38	-30	dB				
C <sub>S max</sub>																																1.7	5.2	8.7	
f <sub>bc L</sub>	APC pull-in range	21 G	G SG.27 0dB	12 V	9.0 V	-	-	4.5 V	4.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.9	-	kHz			
f <sub>bc H</sub>																																	0.5	0.9	-
f <sub>pc</sub>																																	1.0	1.8	-
V <sub>23</sub>	Demodulation output DC voltage	23A	-	12 V	9.0 V	-	-	4.5 V	4.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6	5.0	5.4	V				
V <sub>24</sub>		24A	-	12 V	9.0 V	-	-	4.5 V	4.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
V <sub>25</sub>		25A	-	12 V	9.0 V	-	-	4.5 V	4.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
V <sub>23,24</sub>	Demodulation output DC offset voltage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
V <sub>24,25</sub>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
V <sub>25,23</sub>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CL B-Y	Demodulation output carrier leak	25A	-	12 V	9.0 V	2.5 V	2.5 V	2.5 V	2.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CL R-Y		23A	-	12 V	9.0 V	2.5 V	2.5 V	2.5 V	2.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CL G-Y		24A	-	12 V	9.0 V	2.5 V	2.5 V	2.5 V	2.5 V	9.0 V	9.0 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





M52303ASP

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

ELECTRICAL CHARACTERISTICS (cont.)

Symbol	Parameter	Test point	Input ( )	Test conditions ("-" in the table below denotes "OPEN".)												Limits			Unit									
				11A	16A	19	21	22A	29	36	38	39	40	S 19	S 19A	S 22	30	34		26	27	28	35	36	39	Min.	Typ.	Max.
V <sub>21</sub>	Terminal 21 voltage	21	G SG.26 0dB	-	9.0	M	-	4.5	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	4.2	4.6	5.0	V		
		21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.35			
SS Y	Service switch operation	22	F SG.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	90	mVp-p		
SS C		34	G SG.26 0dB	0	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	10	90	mVp-p	
SS V	Video chroma mute switch operation	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.3	Vo-p		
VMS		22	F SG.17	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	5.7	6.2	6.8	Vo-p		
CMS R-Y	Demodulation ratio at NTSC action	23A	G	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	10	90	mVp-p	
CMS G-Y		24A	SG.26 0dB	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CMS B-Y		25A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R-Y B-Y	Demodulation angle at NTSC action	23A	G	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
C-Y B-Y		24A	SG.31 0dB	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CR-Y-N		25A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CB-Y-N	NTSC TINT control characteristics	23A	G	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T <sub>min</sub>		25A	SG.32 0dB	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T <sub>max</sub>	On screen threshold voltage	23A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSR		24A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSG		25A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSB	On screen threshold voltage	23A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSG		24A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OSB		25A	-	12	9.0	-	4.5	-	9.0	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

## M52303ASP

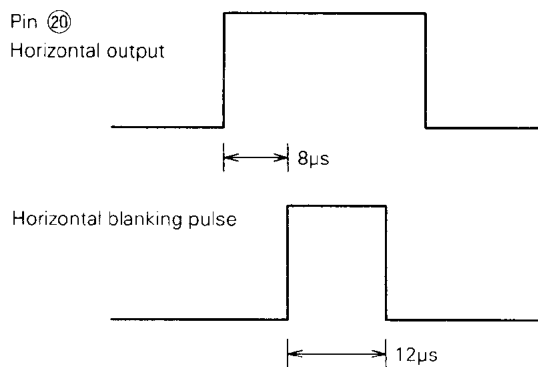
## NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

## ELECTRICAL CHARACTERISTICS TEST METHOD

- Note 1. Set SG to  $f_0 = 45.75\text{MHz}$ ,  $25\text{m Vrms}$ , CW.  
Adjust the voltage of pin ⑤ so that the voltage of pin ⑤ is 1 (V) lower than in item "V511."  
Set SG to  $f_0 = 45.75\text{ MHz}$ ,  $12.5\text{m Vrms}$ , CW.  
Test the voltage of pin ⑤ and make it V51a.

$$\text{LIN} = \frac{V511 - V51a}{1(\text{V})} \times 100(\%)$$

- Note 2. Adjust the one-shot multivibrator's potentiometer so that the timing of the horizontal blanking pulse and pulse amplitude are as shown in the figure below.



Set to  $8\mu\text{s}$  with the TTL IC M74LS221P's pin ⑮ potentiometer. Also set to  $12\mu\text{s}$  with the pin ⑦ potentiometer.

## Precautions When Testing Items Related to Chroma

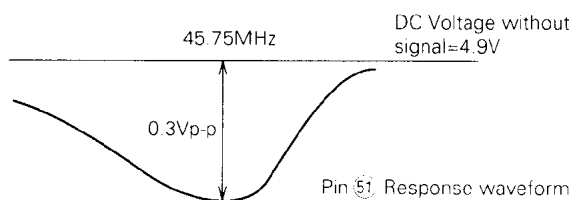
The conditions listed below are usually set when testing items related to chroma (Items C1 ~ C54).

- 1) Input signal SG.A into D input.
- 2) Turn switches S5, S11A, S12, S12A, S13, S20, and S44 on.

## Coil and Potentiometer Adjustment

## VIF/SIF Type Coil Adjustment

1. Set  $V_{\text{BTH}}$  test conditions described in item "V10."
2. Detune AFT coil.
3. Then adjust the applied voltage of pin ⑤ so that the tank response of pin ⑤ is  $0.3\text{Vp-p}$ .
4. Adjust the DET coil so that the peak is  $45.75\text{ MHz}$ .
  - 1) DC Voltage without Signal =  $4.9\text{V}$
  - 2) Pin ⑤ Response Waveform



5. Set  $\mu\text{AFT}$  test conditions of item "V22" and adjust the AFT coil so that the electric potential is  $4.5\text{V}$  at  $45.75\text{ MHz}$  as shown on the next page.

## V8 Input Sensitivity "Vin min"

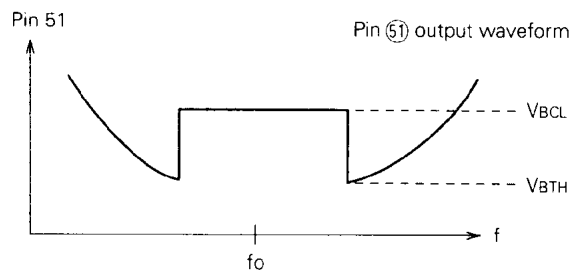
Expressed as input level 3 dB down from the test value of "video output signal voltage" as the level of SG.3 is decreased.

## V9 Maximum Allowable Input "Vin max"

1. SG.4 is input as  $90\text{ dB}\mu$ .
2. Make  $V_A$  the output level of pin ⑤ at this time.
3. Expressed as input level 3 dB down from output level of pin ⑤ being  $V_A$  as the level of SG.4 is increased.

V10 Black Spot Noise Inverter " $V_{\text{BTH}}$ ,  $V_{\text{BCL}}$ "

1. Input SG.2 and adjust the applied voltage of pin 5 so that the voltage of pin ⑤ is  $2.5\text{V}$ .
2. Input SG.5 and test  $V_{\text{BTH}}$  and  $V_{\text{BCL}}$  as shown in the figure below.

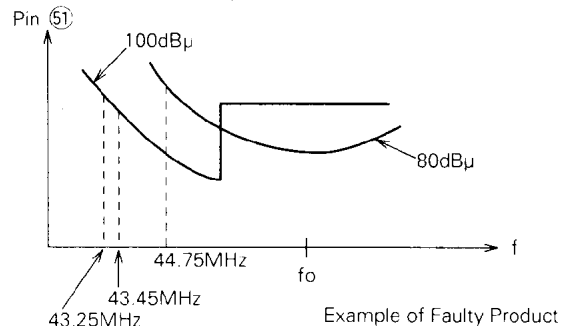


## V11 Tank Response at Time of Large Input "TRA"

1. Input SG.2 and adjust the applied voltage of pin ⑤ so that the voltage of pin ⑤ is  $2.5\text{V}$ .  
(Apply the applied voltage of pin ⑤ when item V10 "Black Spot Inverter" was tested.)
2. Input SG.6, test the output voltage of pin ⑤ and make it  $V_A$ .
3. Input SG.8, test the output voltage of pin ⑤ and make it  $V_B$ .
4. Input SG.9, test the output voltage of pin ⑤ and make it  $V_C$ .

Standard: The following is considered to be a faulty product. The tank response of a faulty product is given in the figure below.

- 1) Example of Faulty Product



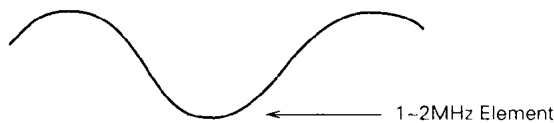
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

**V12Tank Response "TR"**

1. Input SG.2 and adjust the applied voltage of pin ⑤ so that the voltage of pin ⑤ is 2.5V.  
(Apply the applied voltage of pin ⑤ when item V10 "Black Spot Inverter" was tested.)
2. Input SG.6, test the output voltage of pin ⑤ and make it  $V_A$ .  
(Same  $V_A$  as tested in item V11 "Tank Response at Time of Large Input.")
3. Input SG.7, test the output voltage of pin ⑤ and make it  $V_B$ .
4. Standard value is expressed as  $TR = V_A - V_B$ .

**V15Ringing "RG"**

Test the p-p value via HPF of the 1~2MHz in the 16kHz low part of the pin ⑤ output signal as shown in the figure below.



**V16Noise Canceller Level "V<sub>NC</sub>"**

Standard is expressed as  $V_{NC} = V_{51L}$  (sync signal tip voltage) -  $V_{BTH}$  (black spot noise inverter threshold voltage).

**V17Sync Ratio "S/P"**

1. Input SG1, test p-p value of the pin ⑤ output signal and make it  $V_A$ .
2. Input SG15, test p-p value of the pin ⑤ output signal and make it  $V_B$ .
3. Standard is expressed as  $S/P = \frac{V_B}{V_A} \times 100$  [%]

**V18Video Noise "S/N"**

1. Input SG2 and test rms value of the ⑤ A output signal.
2. Standard is expressed as

$$S/N = 20 \log \frac{V_{051} \text{ Test Value } (V_{p-p}) \times 10^3}{\text{Test Value (mVrms)}} \text{ [dB]}$$

**S3 Limiting Sensitivity "LIM"**

Decreasing the level of SG19, test the input level at test point 3 when the 400Hz element is 3 dB down from AF output "AF direct output signal voltage"  $V_{OAF}$ .

**S4 AMR "AMR"**

Test the 400Hz element at test point 3 and make it  $V_{am}$ . Standard is expressed as

$$AMR = 20 \log \frac{V_{OAF} \text{ (mVrms)}}{V_{am} \text{ (mVrms)}} \text{ [dB]}$$

**S7 Maximum Attenuation "ATT"**

1. Test 400Hz element at pin ④ output.
2. Standard Value  $ATT = \frac{V_{04max}}{\text{Test Value}}$  [dB]

**S8 AF Driver Gain "G<sub>AF</sub>"**

Expressed as  $G_{AF} = 20 \log \frac{V_{04max}}{V_{OAF}}$  [dB]

**S9 Sound S/N "S/N AF"**

1. Test 20Hz~100kHz noise at pin ④ output.
2. Expressed as  $S/N \text{ AF} = 20 \log \frac{V_{04max}}{\text{Test Value}}$  [dB]

**S10AF Driver Pop Noise "N<sub>AFP</sub>"**

Test 20 times at 5ms amplitude.

**DS1 Sync Separation Input Sensitivity Current "I<sub>SS</sub>"**

The current value is expressed as the value of constant current source  $I_{SS}$  where low electric potential (approx. 3V) can be obtained for pin ④ output as current of constant current source  $I_{SS}$  is gradually increased.

**DS2 Minimum Horizontal Sync Separation Input Voltage "H.SYNC min"**

**DS3 Minimum Vertical Sync Separation Input Voltage "V.SYNC min"**

Expressed as input level where a high electrical potential can be obtained for pin ④ output as input level of SG.B or SG.E is gradually decreased. The reference level (0 dB) is 1Vp-p for both SG.B and SG.E.

**DH3 Horizontal Oscillator Starting Voltage "V<sub>11</sub> min"**

Expressed as applied voltage of pin ① where pin output waveform can be generated as the applied voltage of pin ① is gradually increased from low voltage (approx. 3V).

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

**DH4 Horizontal Pull-In Range "f<sub>PHL</sub> f<sub>PHH</sub>"**

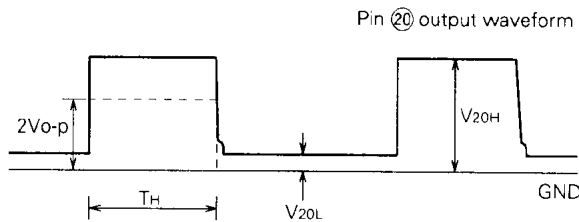
1. Decrease the frequency of input signal SG.B the proper amount and set while the input signal and output waveform of pin ⑳ are not in sync.
2. Next, gradually increase the input frequency and test the input signal frequency exactly when the input signal and output waveform of pin ⑳ become synchronized.
3. Perform in the same manner for pull-in range for upper side.
4. Expressed as difference from reference value of 15625 Hz.

**DH5 Horizontal Output Maximum Voltage "V<sub>20H</sub>"**

**DH6 Horizontal Output Minimum Voltage "V<sub>20L</sub>"**

**DH7 Horizontal Output Pulse Amplitude "T<sub>H</sub>"**

V<sub>20H</sub>, V<sub>20L</sub>, and T<sub>H</sub> are shown in the figure below.



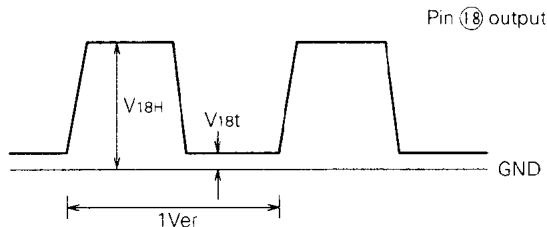
**DH8 AFC Output Voltage "V<sub>AFC</sub>"**

Test p-p value of the pin ⑫ output waveform.

**DV4 Vertical Output Maximum Voltage "V<sub>18H</sub>"**

**DV5 Vertical Output Minimum Voltage "V<sub>18L</sub>"**

V<sub>18H</sub> and V<sub>18L</sub> are shown in the figure below.



**DV6 Vertical Open Loop Gain "G<sub>v</sub>"**

1. Input SG.C (2 kHz, 100m VP-P, CW) into pin ⑰ and test the output amplitude of pin ⑱.

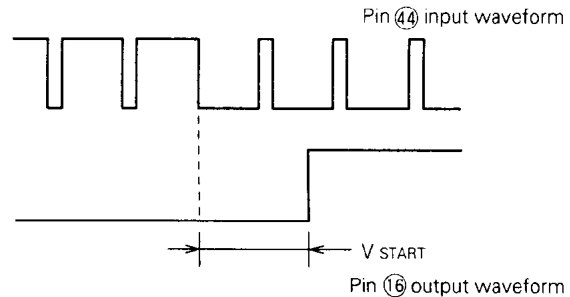
$$2. \text{Standard Value} = 20 \log \frac{\text{Pin 18 Output Amplitude(mV}_{p-p})}{100\text{mV}_{p-p}} \text{ [dB]}$$

**DV7 Vertical Oscillator Starting Voltage "V<sub>19min</sub>"**

Expressed as applied voltage of pin ⑲ where pin output waveform can be generated as the applied voltage of pin ⑲ is gradually increased from low voltage (approx. 3V).

**DV8 Vertical Output Pulse Start Position "V<sub>START</sub>"**

"V<sub>START</sub>" is shown in the figure below.



**DV9 Minimum Vertical Sync Detection Amplitude "TV<sub>min</sub>"**

Expressed as vertical sync signal amplitude of input signal where pin ⑱ output waveform can be generated as the vertical sync signal amplitude of SG.D is changed.

**Y2 Maximum Output "Y<sub>max</sub>"**

Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 4.5V.

**Y3 Standard Gain "G<sub>Y</sub>"**

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.
2.  $G_Y = 20 \log \frac{\text{Test Value mV}_{p-p}}{200\text{mV}_{p-p}} \text{ [dB]}$

**Y4 Contrast Control Characteristics "GY<sub>min</sub> GY<sub>max</sub>"**

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.  
(Apply voltage of pin ⑳ described in item Y3.)
2. Change 36 applied voltage to 2.5V, 6.5V and make V<sub>A</sub> and V<sub>B</sub> the test values of pin ㉒ output signal.

$$3. G_{Ymin} = 20 \log \frac{V_A \text{ (mV}_{p-p})}{G_Y \text{ Test Value(mV}_{p-p})} \text{ [dB]}$$

$$G_{Ymax} = 20 \log \frac{V_B \text{ (mV}_{p-p})}{G_Y \text{ Test Value(mV}_{p-p})} \text{ [dB]}$$

**Y7 Peaking Value "G<sub>p</sub>"**

1. Adjust applied voltage of pin ⑳ so that the DC potential of pin ㉒ is 3.0V.  
(Apply voltage of pin ⑳ described in item Y3.)
2. Make V<sub>A</sub> the output signal voltage of pin ㉒ at time of SG.H input, and make V<sub>B</sub> the output signal voltage of pin ㉒ at time of SG.J input.

$$3. G_p = 20 \log \frac{V_B}{V_A} \text{ [dB]}$$

## NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

**Y8 Video Tone Control Characteristics "GT norm, GT min, GT max"**

1. Adjust applied voltage of pin ③⑨ so that the DC potential of pin ②② is 3.0V.  
(Apply voltage of pin ③⑨ described in item Y3.)
2. Change(40) applied voltage to 4.5V, 6.5V, 2.5V and make  $V_A$ ,  $V_B$ , and  $V_C$  the output signal voltages of pin ②②.
3.  $G_{T \min} = 20 \log \frac{V_B}{V_A}$  [dB],  $G_{T \max} = 20 \log \frac{V_C}{V_A}$  [dB],

$G_{T \text{norm}}$  (dB) is the amount of change with  $V_B$  when  $G_P$  was tested in item Y7.

**Y9 Frequency Characteristics "fb.(Y)"**

1. Adjust applied voltage of pin ③⑨ so that the DC potential of pin ②② is 3.0V.  
(Apply voltage of pin ③⑨ described in item Y3.)
2. Test the frequency of SG.K 3 dB down from the  $V_A$  value when  $G_P$  was tested in item Y3.

**Y10 Differential Gain "DGY"**

1. Adjust applied voltage of pin ③⑨, change DC potential of pin ②② to 4.0V and 2.0V, and make  $V_A$  and  $V_B$  the output signal voltages of pin ②②.

$$2. DGY = \frac{|V_A - V_B|}{V_B} \times 100\%$$

**Y12 Vertical Blanking Voltage "VBLK v"****Y15 DC Playback Ratio Adjustability Characteristic "VDC REG"**

1. Make  $V_A$  the output pedestal electrical potential of pin ②② when S42 is off, and make  $V_B$  the output pedestal electrical potential of pin ②② when S42 is on.
2.  $YDC \text{ REG} = V_A - V_B$  [V]

**Y14 Horizontal Blanking Threshold Voltage "VBLK H"**

1. In order to facilitate testing, apply 3.0V of applied voltage to pin ③⑨ so that scanning period potential of pin ②② decreases.
2. Expressed as electric potential of pin ②② where no 25A output signal is obtained while gradually increasing the 22A applied voltage.

**C2 Chroma Maximum Gain "Gc"**

1. Set SG.L to -26dB (Burst: 2.5mV<sub>p-p</sub>, Chroma: 5.0mV<sub>p-p</sub>) and test the output signal voltage of pin ③④.

$$2. G_C = 20 \log \frac{\text{Test Value (mV}_{p-p})}{5\text{mV}_{p-p}} \text{ [dB]}$$

**C3 ACC Characteristics "ACC-I, ACC-II"**

1. Change the SG.L input level to 0, -20, +6dB and make pin 25A output signal voltages  $V_A$ ,  $V_B$ , and  $V_C$  respectively.
2.  $ACC-I = 20 \log \frac{V_B}{V_A}$  [dB],  $ACC-II = 20 \log \frac{V_C}{V_A}$  [dB]

**C4 Killer Operation Input Level "Vik"**

Expressed as the input level where direct current voltage of pin ②① becomes low when SG.L input level is decreased.

**C5 Killer Color Residual "Vok"**

Input SG.Q and test output signal voltage of pin ②⑤A.

**C6 Chroma Normal Output "Cnorm"**

Input SG.L and test the output signal voltage of pin 25A when pin ③⑥ applied voltage is 4.5V.

**C7 Color Control Characteristics I "Cs min Cs max"**

1. Change applied voltage of pin ②① to 2.5V, 6.5V and make  $V_A$  and  $V_B$  the output signal voltages of pin 25A.

$$2. C_{s \min} = 20 \log \frac{V_A}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

$$C_{s \max} = 20 \log \frac{V_B}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

**C8 Color Control Characteristics II "Cu min, Cu max"**

1. Change pin ③⑥ applied voltage to 2.5V, 6.5V and make  $V_A$  and  $V_B$  the output signal voltages of pin ②⑤A.

$$2. C_{u \min} = 20 \log \frac{V_A}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

$$C_{u \max} = 20 \log \frac{V_B}{C_{\text{norm}} \text{ Test Value}} \text{ [dB]}$$

**C9 APC Pull-In Range "fpc L, fpc H"**

1. Input SG.M, increase burst and chroma frequency ( $f_{sb} = f_{sc}$ ) the proper amount and set so that the DC voltage of pin ②① is low.
2. Test the input frequency where the DC voltage of pin ②① changes from low to high ( $\approx 4.5$ ) while gradually increasing the frequency.
3. Test upper side pull-in frequency in the same manner.
4. Standard value is expressed as difference from reference value 3.579545MHz.

**NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR**

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**C10 Total APC Range "f<sub>PC</sub>"**

$f_{PC} = f_{PCL} + f_{PCH}$  [kHz]

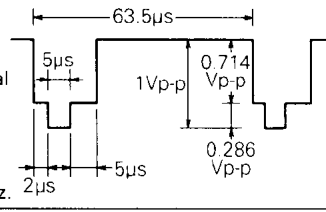

**C23 Chroma CW Phase Difference "ø<sub>CW</sub>"**

1. Carry out item 1 of item C22 "Phase Alteration by Color Control."
2. Apply input signal the contains 90° phase in relation to burst and make the deviation from reference phase the standard value of ø<sub>CW</sub>.


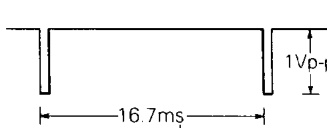
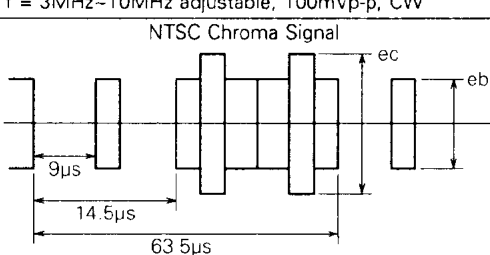
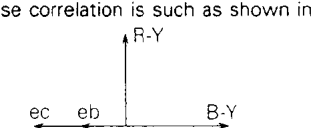
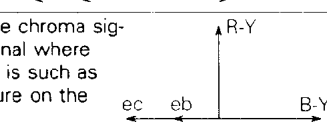
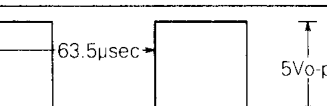
# M52303ASP

## NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

### INPUT SIGNAL

SG. No.	Signals (50Ω termination)
SG. 1	$f_o = 45.75\text{MHz}$ , 90dBμ, $f_m = 16\text{kHz}$ , AM77.8%
SG. 2	$f_o = 45.75\text{MHz}$ , 80dBμ, CW
SG. 3	$f_o = 45.75\text{MHz}$ , CW, Adjustable Level
SG. 4	$f_o = 45.75\text{MHz}$ , $f_m = 16\text{kHz}$ , AM16.0%, Adjustable Level
SG. 5	$f_o = 45.75\text{MHz} \pm 5\text{MHz}$ , 80dBμ, Sweep signal
SG. 6	$f_o = 44.75\text{MHz}$ , 80dBμ, CW
SG. 7	$f_o = 46.75\text{MHz}$ , 80dBμ, CW
SG. 8	$f_o = 43.25\text{MHz}$ , 100dBμ, CW
SG. 9	$f_o = 43.45\text{MHz}$ , 100dBμ, CW
SG. 10	$f_1 = 45.75\text{MHz}$ , 90dBμ, CW $f_2 = 40 \pm 5\text{MHz}$ , 70dBμ, CW } mixed signal
SG. 11	$f_1 = 45.75\text{MHz}$ , 90dBμ, CW $f_2 = 42.17\text{MHz}$ , 70dBμ, CW $f_3 = 41.25\text{MHz}$ , 70dBμ, CW } mixed signal
SG. 12	$f_o = 45.75\text{MHz}$ , 110dBμ, CW
SG. 13	$f_o = 45.75\text{MHz}$ , 60dBμ, CW
SG. 14	$f_o = 45.75\text{MHz}$ , 89dBμ
SG. 15	$f_o = 45.75\text{MHz}$ , 92dBμ, $f_m = 16\text{kHz}$ , AM16.0%
SG. 16	$f_1 = 45.75\text{MHz}$ , 90dBμ, CW $f_2 = 41.25\text{MHz}$ , 70dBμ, CW } mixed signal
SG. 17	$f_o = 4.5\text{MHz}$ , 90dBμ, $f_m = 400\text{Hz}$ , FM $\pm 25\text{kHz}$ dev.
SG. 18	$f_o = 45.75\text{MHz}$ , 90dBμ, 10-Stage Wave, 87.5% TV Modulation ( $f_{sc} = 4.43\text{MHz}$ )
SG. 19	$f_o = 4.5\text{MHz}$ , $f_m = 400\text{Hz}$ , FM $\pm 25\text{kHz}$ dev. Adjustable Level
SG. 20	$f_o = 4.5\text{MHz}$ , 90dBμ, $f_m = 400\text{Hz}$ , AM30%
SG. 21	$f_o = 4.5\text{MHz}$ , 90dBμ, CW
SG. 22	$f_1 = 45.75\text{MHz}$ , 90dBμ, $f_m = 16\text{kHz}$ , AM77.8% } mixed signal $f_2 = 41.25\text{MHz}$ , 70dBμ, CW
SG. 23	$f_1 = 45.75\text{MHz}$ , 90dBμ, $f_m = 16\text{kHz}$ , AM77.8% } mixed signal $f_2 = 41.25\text{MHz}$ , 50dBμ, CW
SG. 24	$f_o = 45.75\text{MHz}$ , 90dBμ, CW
SG. 25	$f_o = 45.75\text{MHz}$ , 84dBμ, CW
SG. 26	$f_o = 400\text{Hz}$ , 20mVp-p, CW
SG. 27	$f_o = 40.75\text{MHz}$ 80dBμ, CW
SG. 28	$f_o = 40.75\text{MHz}$ 45dBμ, CW
SG. A	Make input for sync separation NTSC system APL 100% normal video signal shown in the figure on the right. Vertical must be interlaced at 50Hz. 
SG. B	Horizontal sync signal duty 92% input level and sync are adjustable. 
SG. C	$f = 2\text{kHz}$ , 100mVp-p, CW

### INPUT SIGNAL

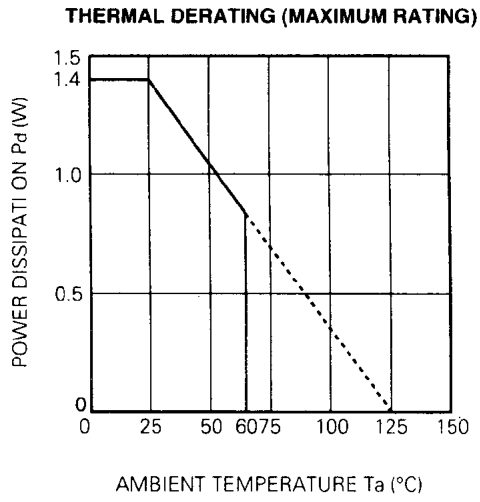
SG. No.	Signals (50Ω termination)
SG. D	Change SGA vertical sync signal amplitude. Start position does not change. 
SG. E	Vertical Sync Signal Vertical sync signal duty 92% input level and sync are adjustable. 
SG. F	$f = 200\text{kHz}$ , 2Vp-p, CW
SG. G	$f = 200\text{kHz}$ , 200mVp-p, CW
SG. H	$f = 200\text{kHz}$ , 100mVp-p, CW
SG. J	$f = 3\text{MHz}$ , 100mVp-p, CW
SG. K	$f = 3\text{MHz} - 10\text{MHz}$ adjustable, 100mVp-p, CW
SG. L	NTSC Chroma Signal  $f_{sb}$ : Frequency of Burst Signal $f_{sc}$ : Frequency of Chroma Signal $f_{sb} = f_{sc} = 3.579545\text{MHz}$ 0dB: $e_b = 50\text{mVp-p}$ $e_c = 100\text{mVp-p}$
SG. M	With NTSC simple chroma signals for SG.L, the phase of burst and chroma signals should be the same and the frequency should be adjustable.
SG. P	$f = 3.68\text{MHz}$ , CW, Adjustable Level
SG. Q	With NTSC simple chroma signals for SG.L, signal where: burst signal $e_b = 0\text{mVp-p}$ , chroma signal amplitude $e_c = 100\text{mVp-p}$ .
SG. R	$f = 3 - 5\text{MHz}$ , CW, 0.3Vp-p
SG. S	With NTSC simple chroma signals for SG.L, $f_{sb}$ (Burst) = 3.579545MHz $f_{sc}$ (Chroma) = 3.68MHz Signal where phase correlation is such as shown in the figure below. 
SG. T	With NTSC simple chroma signals for SG.L, signal where phase correlation is such as shown in the figure on the right. 
SG. U	DUTY 50% 





**NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR**

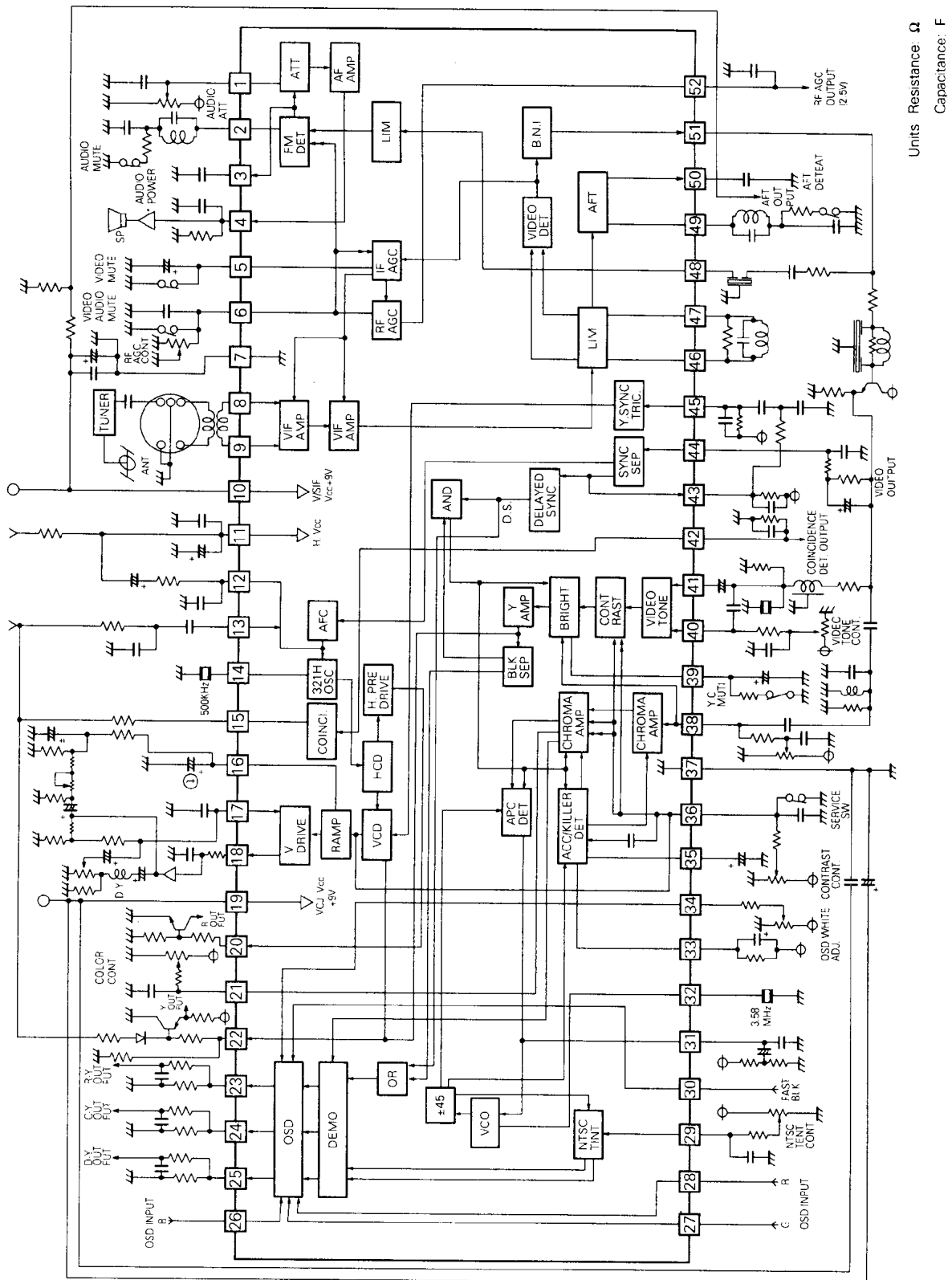
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**TYPICAL CHARACTERISTICS**

# M52303ASP

## NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

### APPLICATION EXAMPLE



NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
①	ATT	DC 5.3	
②	SOUND DET COIL	DC 3.5 AC 250 	
③	SOUND DET OUT	DC 4.6 AC 2100 	
④	AF OUT	DC 3.9 AC 1600 	

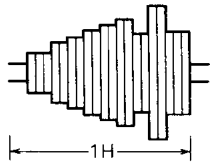
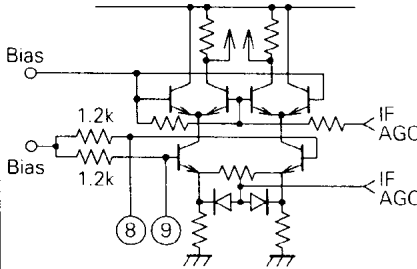
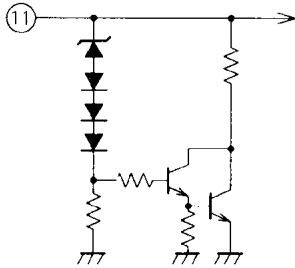
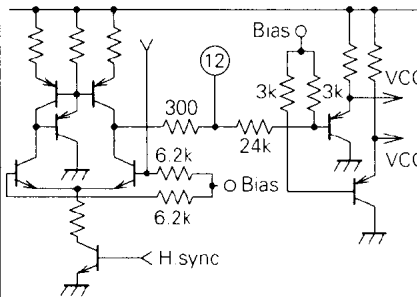
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑤	IF AGC FILTER	DC 4.1	
⑥	RF AGC DELAY ADJ.	DC 2.0	
⑦	GND - 1 (VIF SIF)		
⑧	VIF IN	DC 2.35 AC 89 	

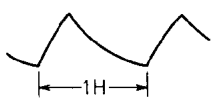
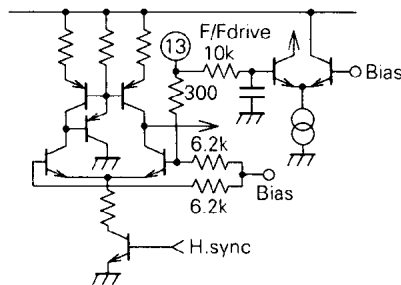

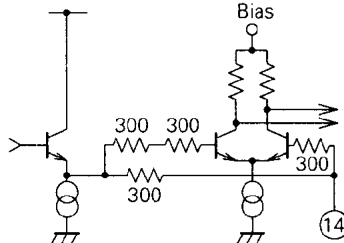
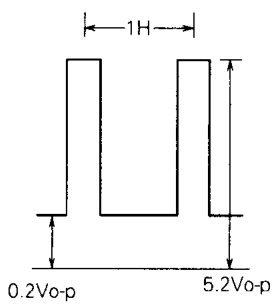
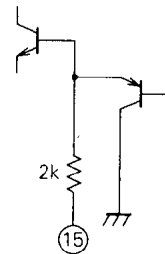
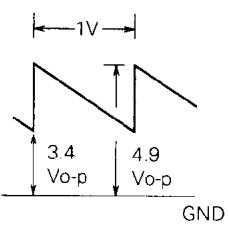
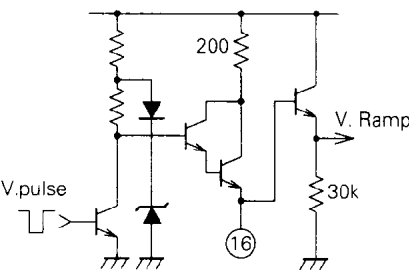
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑨	VIF IN	DC 2.35 AC 89 	
⑩	Vcc - 1 (VIF SIF)	Vcc 9.0	
⑪	H. Vcc	Vcc 9.0	
⑫	AFC FILTER	DC6.3	

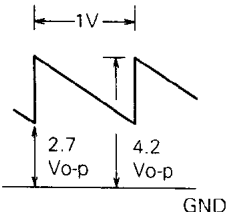
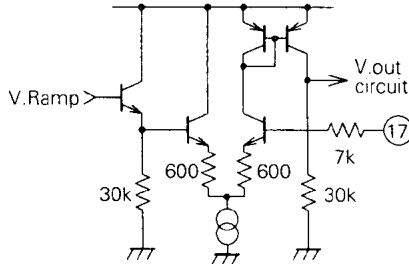
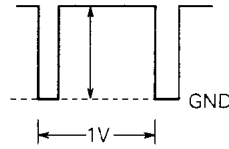
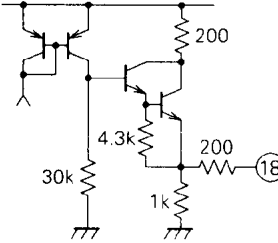
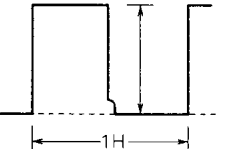
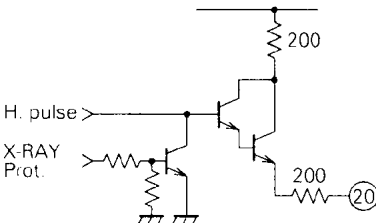
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑬	AFC FBP IN	DC 3.0 AC 1100 	
⑭	32th OSC	DC 3.7 AC 310 	
⑮	FBP IN		
⑯	RAMP	AC 1500 	

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑰	V. FB	AC 1500 	
⑱	V. OUT	AC 750Vo-p 	
⑲	Vcc - 2 (VCJ)	Vcc 9.0	
⑳	H. OUT	AC 3400mVo-p 	

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

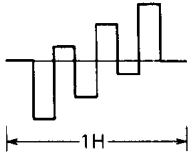
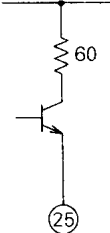
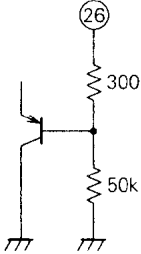
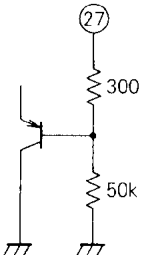
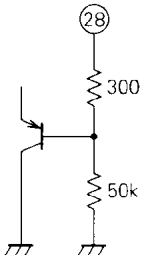
Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
⑳	COLOR CONT.	DC 4.5	
㉑	-Y OUT		
㉒	R - Y OUT	DC 5.25 AC 1300 	
㉓	G - Y OUT	DC 5.25 AC 750 	



M52303ASP

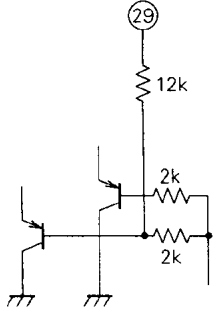
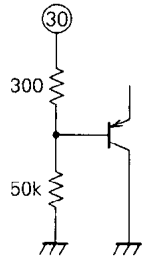
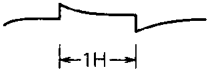
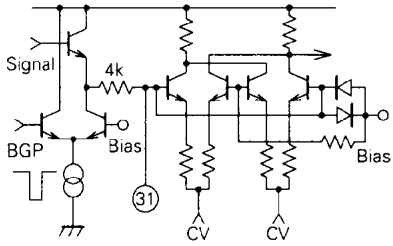
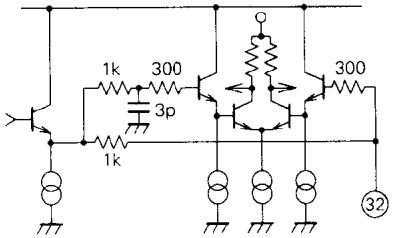
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
25	B - Y OUT	DC 5.25 AC 1600 	
26	OSD B		
27	OSD G		
28	OSD R		

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
②⑨	TINT. CONT.	DC 4.5V	
③⑩	FAST BLK IN		
③①	APC FILTER	DC 6.8 AC 60  	
③②	CHROMA OSC		

M52303ASP

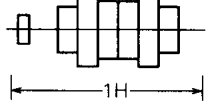
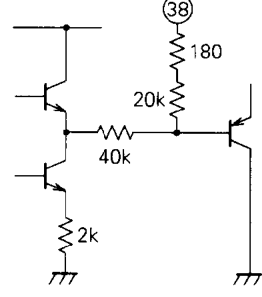
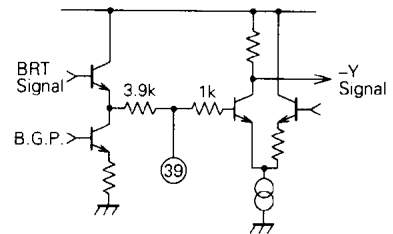
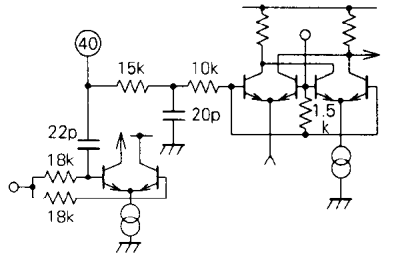
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
③③	ACC FILTER	DC 8.0	
③④	WHITE ADJ.	DC 8.0V	
③⑤	KILLER FILTER	DC 6.9	
③⑥	CONTRAST CONT.	DC 4.5V	

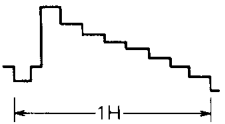
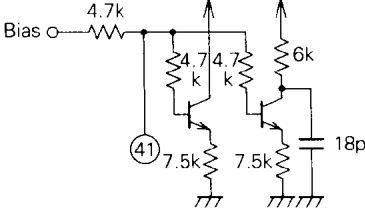
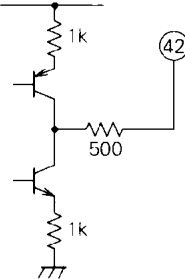
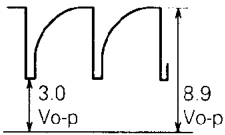
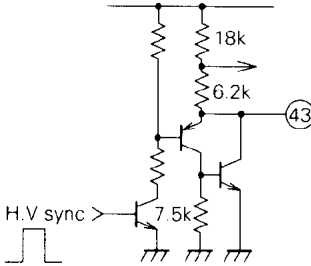
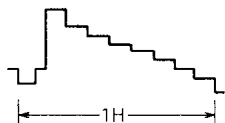
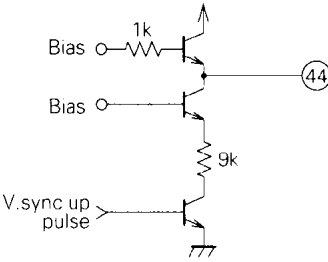
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
37	GND - 2 (VCJ)		
38	CHROMA IN/BRIGHT	DC 4.5V DC 4.5V AC Burst 50 AC Chroma 100 	
39	PEDESTAL CLAMP		
40	VIDEO TONE CONT.	DC 4.5	

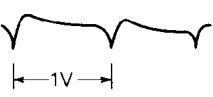
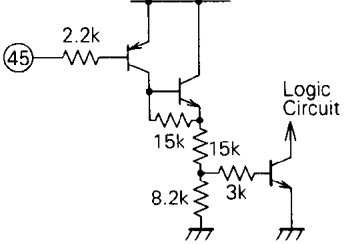
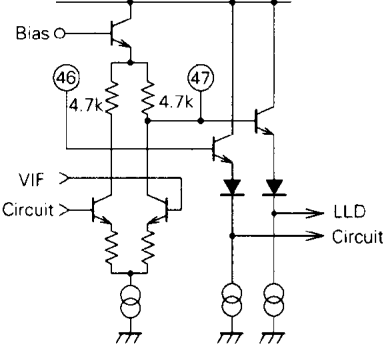
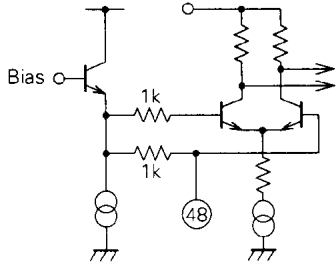
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④①	Y IN	DC 1.5 AC 500 	
④②	COINCIDE - - NCE OUT		
④③	SYNC OUT		
④④	SYNC IN	DC 6.7 AC 700 	

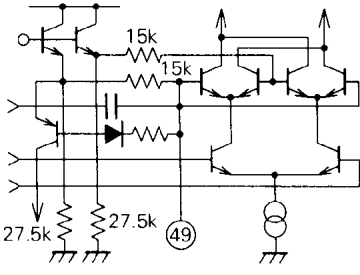
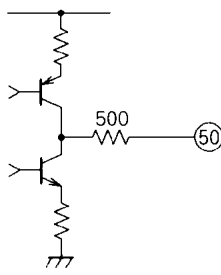
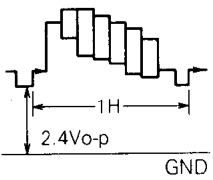
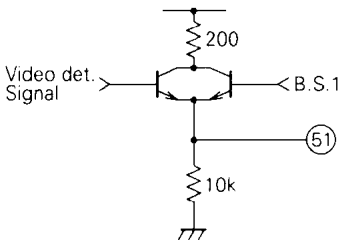
NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④⑤	V. SYNC IN	DC 9.0 AC 1600 	
④⑥	VIDEO DET COIL	DC 4.8	
④⑦	VIDEO DET COIL		
④⑧	SIF IN	DC 2.7 AC 89 $f_0 = 5.5\text{MHz}$	

NTSC SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Voltage and wave information	Peripheral circuit of pins
④9	AFT COIL	DC 5.3	
⑤0	AFT OUT	DC 3.3	
⑤1	VIDEO OUT	AC 2000 	
⑤2	RF AGC OUT	DC 0	