

M51414BSP

NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION

The M51414BSP is a semiconductor integrated circuit that processes video, color, and vertical/horizontal sync signals for NTSC system television sets of average class to top of the line.

FEATURES

- Equipped with delay-line contour adjustment for sharper images.
- Features improved 9MHz (-3dB) video signal circuit frequency characteristics for higher picture quality.
- Employs RGB primary color output; with 9V supply voltage, achieves dynamic range equivalent to that of 12V model. It also has a built-in, on-screen character display circuit and features easy connection with external RGB input, dramatically reducing required peripheral components such as switch circuits, etc.
- Vertical/horizontal count-down by 32fH oscillator eliminates need for adjustment.
- Enables toggling between digital and linear output by vertical output count-down.

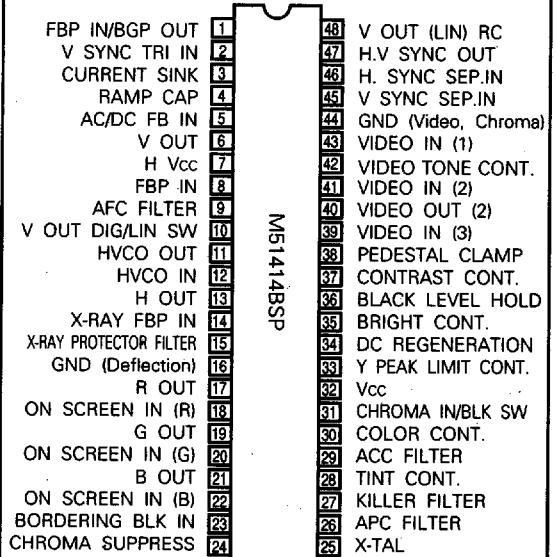
APPLICATION

NTSC System Color Televisions

RECOMMENDED OPERATING CONDITION

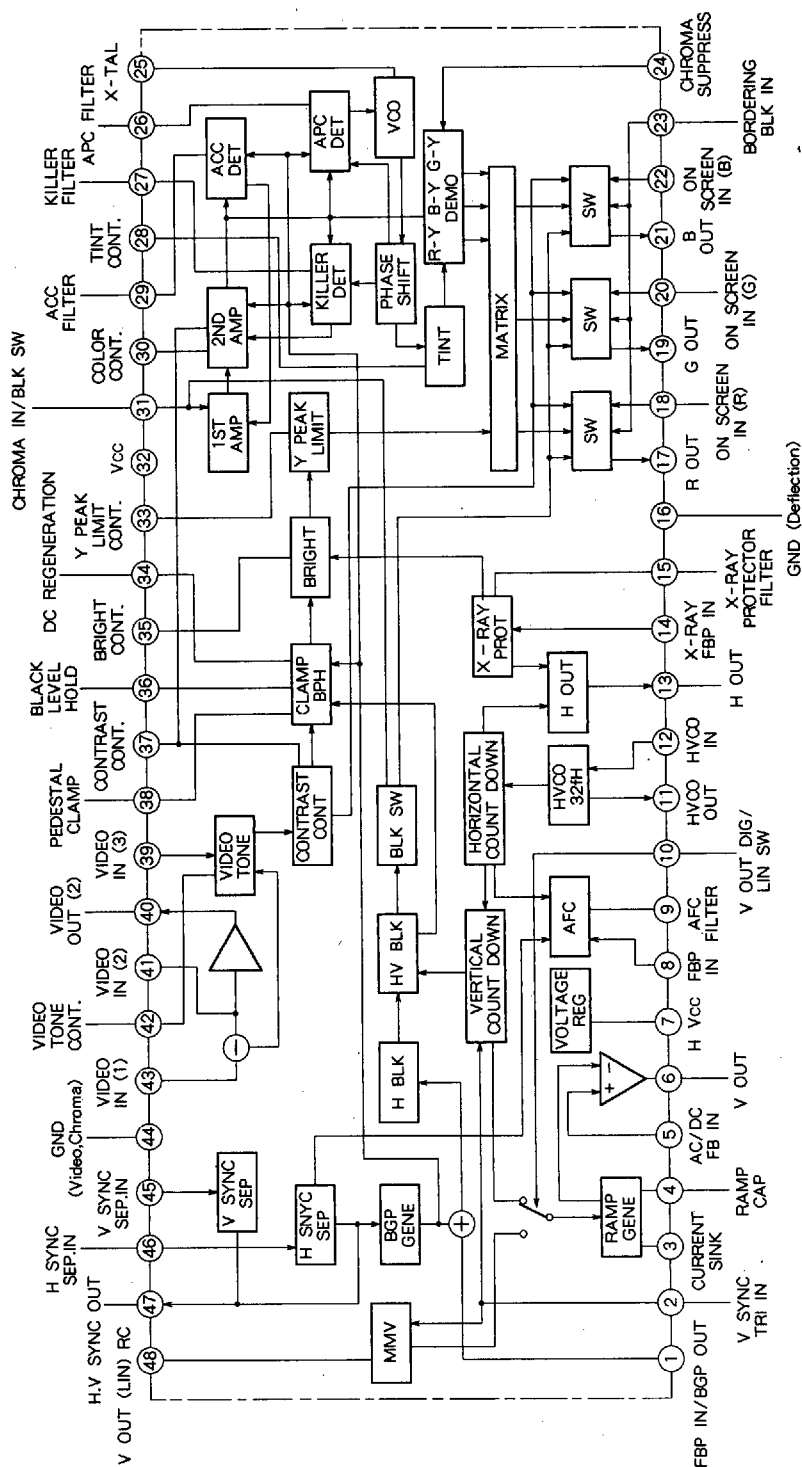
Supply Voltage Range	8.5~9.5V
Rated Supply Voltage	9.0V(Pin②)
Rated Input Current	20mA(Pin⑦)

PIN CONFIGURATION (TOP VIEW)



Outline 48P4B

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Unit
V _{CC}	Supply Voltage	12 V
P _a	Power Dissipation	1.4 W
Surge	Surge Voltage Resistance	±200 V
T _{opr}	Operating Temperature	-20~65 °C
T _{stg}	Storage Temperature	-40~125 °C

ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise noted)

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																										Limits			Unit
				18	20	22	23	28 A	30 A	31 A	32 A	33 A	35 A	37 A	38 A	42 A	S 24	S 27	S 34	S 36	S 38	S 39	S 41	S 43	SD	1A	Min.	Typ.	Max.				
fz	Circuit Current	A1	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Ymax	Video Maximum Output	21	SG1+20dB	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	2	2	2	1	9V	29	42	55	mA			
GY	Video Standard Gain	21	SG1	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V	4.0	5.0		V _{P-P}			
GYmid	Video Gain Variation Characteristics-1	21	SG1	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V	-3	0	+3	dB			
GYmin	Video Gain Variation Characteristics-2	21	SG1	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V		-40	-30	dB			
GYmax	Video Gain Variation Characteristics-3	21	SG1	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V	3	6	9	dB			
YBrmid	Brightness Variation Characteristics-1	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	2	2	2	1	9V	1.2	1.5	1.8	Vo _P			
YBrmin	Brightness Variation Characteristics-2	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	2	2	2	1	9V	0.4	0.65	1.0	Vo _P			
YBrmax	Brightness Variation Characteristics-3	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	2	2	2	1	9V	2.5	2.9	3.3	Vo _P			
YH	Video Output Maximum Voltage	21	SG2	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V	4.7	5.2	5.7	Vo _P			
Yalc 1	Black Level Correction Variations-1	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	1	1	2	2	2	1	9V	1.5	1.8	2.1	Vo _P			
Yalc 2	Black Level Correction Variations-2	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	1	1	2	2	2	1	9V	0.8	1.1	1.4	Vo _P			
DG	Video Differential Gain Characteristics	21	SG1	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	1	2	2	1	9V			10	%			
GY _{Hi}	Video High-Range Standard Gain	21	SG13	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	2	2	1	1	9V	20	23	26	dB			
GTmid	Video Tone Control Characteristics-1	21	SG3	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	3	1	2	1	9V	-3	0	+3	dB			
GTmin	Video Tone Control Characteristics-2	21	SG3	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON OFF	OFF	2	1	3	1	2	1	9V	-21	-18	-15	dB			

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NTSC VIDEO CHROMA DEFLECTION

VIDEO/CHROMA SECTION (cont.)

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																		Limits				Unit					
				18	20	22	23	28	30	31	32	33	35	36	37	38	42	S	S	S	S	S	SD	1A	Min.		Typ.	Max.			
GTmax	Video Tone Control Characteristics-3	21	SG3	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	3V	0V	ON	OFF	OFF	2	1	3	1	2	1	9V	1.0	4.0	7.0	dB
Gf	Video Frequency Characteristics	21	SG1 SG4	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	3V	—	ON	OFF	OFF	2	1	1	2	2	1	9V	7	9		MHz
YHBLK	Horizontal Blanking Voltage	21 1A	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	Variable	2.9	3.3	3.7	V
YVBLK	Vertical Blanking Voltage	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V		0.3	0.6	Vo-P
YDREG	DC Playback Ratio Correction Alteration Characteristics	21	SG2	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	1	2	2	1	9V	0.05	0.1	0.2	V
YPLmid	Video Peak Limiter Characteristics-1	21	SG2	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	1	2	2	1	9V	3.1	3.6	4.1	Vo-P
YPLmax	Video Peak Limiter Characteristics-2	21	SG2	0V	0V	0V	0V	—	—	—	9V	7V	—	—	—	—	—	ON	OFF	OFF	2	1	1	2	2	1	9V	2.0	2.5	3.0	Vo-P
V37	Pin ⑤ Voltage	37	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	4.1	4.5	4.9	V
V42	Pin ⑫ Voltage	42	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	4.1	4.5	4.9	V
TBLK V	V Blanking Amplitude	21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	0.95	1.10	1.25	ms
Y8TH	Black Level Replacement Threshold Voltage	21	—	0V	0V	0V	0V	—	—	—	Variable 9V	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	4.0	4.4	4.8	V
Cmax	Demodulated Maximum Output	21	SG5	0V	0V	0V	0V	—	9V	—	9V	—	Variable	—	—	9V	—	ON	OFF	OFF	2	1	2	2	2	1	9V	5.4	6.0	6.6	Vo-P
Cnorm	Demodulated Standard Output	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	2.0	2.5	3.0	Vo-P
ACC 1	ACC Characteristics-1	21	SG5 -21dB	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	-6	-3	0	dB
ACC 2	ACC Characteristics-2	21	SG5 +6dB	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	-2	0	+2	dB
Ccmid	Color Control Variation Characteristics-1	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	-3	0	+3	dB
Ccmin	Color Control Variation Characteristics-2	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V		-40	-30	dB
Ccmax	Color Control Variation Characteristics-3	21	SG5	0V	0V	0V	0V	—	9V	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	3	6	9	dB
Cumid	Color Tracking Variation Characteristics-1	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	4.5V	—	ON	OFF	OFF	2	1	2	2	2	1	9V	-3	0	+3	dB
Cumin	Color Tracking Variation Characteristics-2	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	0V	—	ON	OFF	OFF	2	1	2	2	2	1	9V		-40	-30	dB
Cumax	Color Tracking Variation Characteristics-3	21	SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	9V	—	ON	OFF	OFF	2	1	2	2	2	1	9V	3	6	9	dB
fpc 1	APC Pull-In Range-1	21	SG7	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	500	1000		Hz
fpc 2	APC Pull-In Range-2	21	SG7	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	1	9V	-700	-1400		Hz

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VIDEO/CHROMA SECTION (cont.)

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																								Limits			Unit		
				18	20	22	23	28	30	31	32	33	35	36	37	38	42	S	S	S	S	S	S	S	S	S	S	S	SD	1A		Min.	Typ.
KIL	Killer Operation Input Level	21	SG6 Variable	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—45	—39	—33	dB
DKIL	Killer Color Residual	21	SG6 No burst	0V	0V	0V	0V	—	9V	—	9V	—	7V	—	9V	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	—	60	mVp-p
R/B	Demodulated Output Amplitude Ratio-1	17	SG8	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	0.8	0.9	1.0	—
G/B	Demodulated Output Amplitude Ratio-2	19	SG8	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	0.25	0.3	0.35	—
Rdc Gdc Bdc	R, G, B Output DC Voltage	17 19 21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	1.3	1.7	2.1	V
Doffset	R, G, B Output DC Offset	17 19 21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	—	0.3	V
Cleak	Demodulated Output Carrier Leak	17 19 21	SG5	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	—	200	mVp-p
T	Tint Control Variance	17 21	SG6	0V	0V	0V	0V	0V	0V	0V	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	66	86	106	deg.
Tmin	Tint Control Characteristics-1	17 21	SG6	0V	0V	0V	0V	0V	0V	0V	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—23	—43	—63	deg.
Tmax	Tint Control Characteristics-2	17 21	SG6	0V	0V	0V	0V	0V	0V	0V	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	+23	+43	+63	deg.
R/Ta G/Ta B/Ta	R, G, B Output Pin Voltage Temperature Coefficient	17 19 21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	—	—	mV/°C
Doffset/Ta	Voltage Difference Temperature Coefficient Between R, G, B Output Pins	17 19 21	—	0V	0V	0V	0V	—	—	—	9V	—	—	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	—	0	mV/°C
θ R-Y	Demodulated Phase Angle-1	17 21	SG8	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	106	—	deg.
θ G-Y	Demodulated Phase Angle-2	19 21	SG8	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—	240	—	deg.
ΔVv-c	Color Tracking Characteristics	21	SG1(B) SG5	0V	0V	0V	0V	—	—	—	9V	—	7V	—	4.0V 4.5V	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	—3	0	+3	dB
V28	Pin ② Voltage	28	—	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	4.1	4.5	4.9	V
V30	Pin ③ Voltage	30	—	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	ON	OFF	OFF	2	1	2	2	2	2	1	9V	4.1	4.5	4.9	V
CS	Color Signal Suppression Characteristics	21	A: SG5 B: SG14	0V	0V	0V	0V	—	—	—	9V	—	7V	—	—	—	—	—	OFF	OFF	OFF	2	1	1	2	2	2	1	9V	—4.5	—3.3	—1.5	dB

VIDEO/CHROMA SECTION (cont.)

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																												Limits		
				18	20	22		23	28	30	31	32	33	35	36	37	38	42	S	S	S	S	S	S	S	S	SD	1A	Min.	Typ.	Max.			
OS	On-Screen Characteristics	17	—	0V	0V	0V	—	0V	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
		19		↓	↓	—					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
		21		3V	3V	3V					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BLKON	On-Screen Blanking Threshold Voltage	17 19 21	—	Var-Var-Var-able	0V	—	—	—	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
B-BLK	Trim-Blanking Threshold Voltage	17 19 21	—	0V	0V	0V	Var-able	—	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
TBLK-F	On-Screen Blanking Amplitude-1	21	D: SG15	0V	0V	—	0V	—	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
TBLK-B	On-Screen Blanking Amplitude-2	21	D: SG15	0V	0V	—	0V	—	—	—	9V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				

DEFLECTION SECTION

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																Limits			Unit				
				1	5	7	8	10	14	S1	S	S	S	S	S	S	S	S	S	32	Min.	Typ.		Max.			
I7	Pin ⑦ Recommended Input Current	A2	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	1	1	9V	25		mA		
V7	Pin ⑦ Voltage	7	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	9.2	9.5	V	
VOSH	Horizontal/Vertical Sync Output Amplitude	47	SG10	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	5.7	6.2	V _{P-P}	
fH	Oscillator Frequency	13	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	9V	15.55	16.05	kHz	
fH/fa	Oscillator Frequency Temperature Coefficient	13	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	9V	—	—	Hz/°C	
Vrmin	Oscillator Starting Pin ⑦ Voltage	7	—	9V	—	Variable	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	—	3.6	4.5	V	
fPH-1	Pull-in Range 1	13	SG11	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	300 -1800	520	Hz	
TH	H. Pulse Amplitude	13	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	21	25	29	μs
VHmin	H. Output Voltage	13	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	—	0	0.3	V
VHmax										ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	5.5	6.1	6.7	V
fV	Oscillator Frequency (Vertical Free Run)	6	—	9V	—	12V	9V	—	—	ON	ON	2	ON	ON	ON	ON	ON	ON	ON	ON	3	3	9V	51.5	53.1	55.5	Hz
TV1	V. Pulse Amplitude-1	6	SG9	9V	5V	12V	9V	—	—	ON	OFF	3	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	600	670	730	μs
TV2	V. Pulse Amplitude-2	6	SG9	9V	5V	12V	9V	5V	—	ON	OFF	3	OFF	ON	ON	OFF	ON	ON	ON	ON	1	1	9V	660	730	800	μs
VODLV	VOUT Digital/Linear Switching Voltage	48	SG9	9V	5V	12V	9V	Variable	—	ON	OFF	3	OFF	ON	ON	OFF	ON	ON	ON	ON	1	1	9V	1.0	2.1	3.0	V
fPV	Pull-In Range	6	SG12	9V	—	12V	9V	—	—	ON	ON	2	ON	ON	ON	ON	ON	ON	ON	ON	1	1	9V	71	73.5	76	Hz
VOH4	Ramp Maximum Output Voltage	4	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	9V	5.8	6.3	6.8	V _{OP}
VOL4	Ramp Minimum Output Voltage	4	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	9V	3.5	4.0	4.5	V _{OP}
V3	Pin ③ Voltage	3	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	3	3	9V	2.4	2.8	3.2	V
TGP	Burst Gate Pulse Position	1	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	6.4	6.9	7.4	μs
TGP1	Burst Gate Pulse Timing-1	1	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	0.4	0.7	1.0	μs
TGP2	Burst Gate Pulse Timing-2	1	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	1.0	1.4	1.8	μs
VFBP	FBP Clamp Voltage	1	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	3.6	4.1	4.6	V _{OP}
VAGP	Burst Gate Pulse Voltage	1	SG9	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	7.5	8.0	8.5	V _{OP}
VTHAFC	AFC Detector Voltage	1	SG9	9V	—	12V	Variable	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	—	0.4	1.0	V
Vmax	Vertical Output Maximum Voltage	1	SG9	9V	5V	12V	9V	—	—	ON	ON	3	OFF	ON	ON	ON	ON	ON	ON	ON	1	1	9V	4.0	4.7	5.4	V _{OP}

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NTSC VIDEO CHROMA DEFLECTION

DEFLECTION SECTION (cont.)

Symbol	Parameter	Test point	Input	Test conditions ("—" indicates OPEN.)																			Limits			Unit
				1 A	5 A	7 A	8 A	10	14	S1	S4	S5	S6	S8	S9	S10	S13	S14	S45	S46	32 A	Min.	Typ.	Max.		
Issh	Sync Separation Input Sensitivity Current (Horizontal)	47	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	3	2	9V	10	40	100	μA	
Issv	Sync Separation Input Sensitivity Current (Vertical)	47	—	9V	—	12V	9V	—	—	ON	ON	1	OFF	ON	ON	ON	ON	ON	2	3	9V	10	40	100	μA	
V14P	Overvoltage Protector Circuit Operating Voltage	14, 21 13, 6	—	9V	—	12V	9V	—	Variable	ON	ON	2	ON	ON	ON	ON	ON	OFF	3	3	9V	0.4	0.7	1.0	V	
V32P1	Supply Voltage Detector Circuit Operating Voltage-1	32A, 21 13, 6	—	32A	—	12V	32A	—	—	ON	ON	2	ON	ON	ON	ON	ON	ON	3	3	Variable	11.3	11.65	12.0	V	
V32P2	Supply Voltage Detector Circuit Operating Voltage-2	32A 6	—	32A	—	12V	32A	—	—	ON	ON	2	ON	ON	ON	ON	ON	ON	3	3	Variable	1.5	2.0	2.5	V	

ELECTRICAL CHARACTERISTICS TEST METHOD

Y_{max} Video Maximum Output

1. Make SG1 input level +20dB.
2. Test amplitude of ㉑ when not blanking.

GY Video Standard Gain

1. Test amplitude of ㉑ when not blanking and make V_{co} the obtained value.

2. $GY=20 \log \frac{V_{co}(mV_{p-p})}{200(mV_{p-p})}$ (dB)

GY_{mid} Video Gain Variation Characteristics-1

GY_{min} Video Gain Variation Characteristics-2

GY_{max} Video Gain Variation Characteristics-3

1. Make V_{c1}, V_{c2}, and V_{c3} the output amplitude of ㉑ when 37A is 4.5V, 0V, and 9V.

2. $GY_{mid}=20 \log \frac{V_{c1}}{V_{co}}$ (dB),

$$GY_{min}=20 \log \frac{V_{c2}}{V_{co}} \text{ (dB),}$$

$$GY_{max}=20 \log \frac{V_{c3}}{V_{co}} \text{ (dB)}$$

Y_{BRTmid} Brightness Variation Characteristics-1

Y_{BRTmin} Brightness Variation Characteristics-2

Y_{BRTmax} Brightness Variation Characteristics-3

1. Test DC voltage of ㉑ when not blanking.

Y_H Video Output Maximum Voltage

1. Test DC voltage of ㉑ when not blanking.

Y_{BLC1} Black Level Correction Variation Characteristics-1

Y_{BLC2} Black Level Correction Variation Characteristics-2

1. Test DC voltage of ㉑ when not blanking.

DG Video Differential Gain Characteristics

1. Make V_{G1} and V_{G2} the output amplitude of ㉑ when ㉑ is 3.2V and 2.9V.

2. $DG=\frac{|V_{G1}-V_{G2}|}{V_{G2}} \times 100$ (%)

GY_{HI} Video High-Pass Standard Gain

1. Test amplitude of ㉑ when not blanking and make V_{HI} the obtained value.

2. $GY_{HI}=20 \log \frac{V_{HI}(mV_{p-p})}{100(mV_{p-p})}$ (dB)

GT_{mid} Video Tone Variation Characteristics-1

GT_{min} Video Tone Variation Characteristics-2

GT_{max} Video Tone Variation Characteristics-3

1. Make V_{T0}, V_{T1}, V_{T2}, and V_{T3} the output amplitude of ㉑ when 42A is changed to open, 4.5V, 9V, and 0V.

2. $GT_{mid}=20 \log \frac{V_{T1}}{V_{T0}}$ (dB),

$$GT_{min}=20 \log \frac{V_{T2}}{V_{T0}} \text{ (dB),}$$

$$GT_{max}=20 \log \frac{V_{T3}}{V_{T0}} \text{ (dB)}$$

Gf Video Frequency Characteristics

1. Input SG4 and change the frequency. Make SG4 input frequency the frequency when ㉑ output amplitude is -3dB less than when SG1 was being input.

Y_{HBLK} Horizontal Blanking Operation Voltage

1. Make voltage of 1A the voltage where horizontal blanking for ㉑ ceases as the voltage of 1A is gradually dropped below 9V.

Y_{VBLK} Vertical Blanking Voltage

1. Test DC voltage during vertical blanking of ㉑.

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NTSC VIDEO CHROMA DEFLECTION

YDCREG DC Playback Ratio Correction Variation Characteristics

1. Test DC voltage variance when ㉑ is not blanking and switch 34 is turned from ON to OFF.

YPLmid Video Peak Limiter Variation Characteristics-1

YPLmax Video Peak Limiter Variation Characteristics-2

1. Test DC voltage of ㉑ when not blanking.

TBLKV V Blanking Amplitude

1. Test DC voltage during vertical blanking of ㉑.

YBTH Black Level Replacement Threshold Voltage

1. Increase voltage of ㉑ from 2.5V.
2. Make YBTH the voltage of ㉑ when blanking of ㉑ is replaced by black level voltage.

Cmax Demodulated Maximum Output

1. Test demodulated output amplitude (P-P) of ㉑. (Maximize the output with 35A.)

Cnorm Demodulated Typical Output

1. Test demodulated output amplitude (P-P) of ㉑.

ACC1 ACC Characteristics-1

ACC2 ACC Characteristics-2

1. Make VA0, VA1, and VA2 the demodulated output amplitude of ㉑ when SG5 input level is 0dB, -21dB, and +6dB.

$$2. ACC1 = 20 \log \frac{VA1}{VA0} \text{ (dB)}$$

$$ACC2 = 20 \log \frac{VA2}{VA0} \text{ (dB)}$$

Cemid Color Control Variation Characteristics-1

Cemin Color Control Variation Characteristics-2

Cemax Color Control Variation Characteristics-3

1. Make VCL0, VCL1, VCL2, and VCL3 the demodulated output amplitude of ㉑ when 30A is open, 4.5V, 0V, and 9V.

Cumid Color Tracking Variation Characteristics-1

$$2. Cemid = 20 \log \frac{VCL1}{VCL0} \text{ (dB)}$$

$$Cemin = 20 \log \frac{VCL2}{VCL0} \text{ (dB)}$$

$$Cemax = 20 \log \frac{VCL3}{VCL0} \text{ (dB)}$$

CUmin Color Tracking Variation Characteristics-2

CUmax Color Tracking Variation Characteristics-3

1. Make VU0, VU1, VU2 and VU3 the demodulated output amplitude ㉑ when 37A is open, 4.5V, 0V, 9V.

$$2. CUmid = 20 \log \frac{VU1}{VU0} \text{ (dB)}$$

$$CUmin = 20 \log \frac{VU2}{VU0} \text{ (dB)}$$

$$CUmax = 20 \log \frac{VU3}{VU0} \text{ (dB)}$$

fpc1 APC Pull-In Range-1

fpc2 APC Pull-In Range-2

1. Frequency range where the ㉑ output signal changes from off to on as the burst and chroma frequency (fsb=fsc) are altered during SG7 input. The standard value is 3.579545MHz.

KIL Killer Operation Input Level

1. SG6 input level where the ㉑ output signal changes from off on as SG6 input level is gradually decreased.

DKIL Killer Color Residual

1. Output signal amplitude for ㉑ when eb=0mVp-p, ec=100mVp-p, and frequency fsc=3.579545MHz during SG6 input.

R/B Demodulated Output Amplitude Ratio-1

G/B Demodulated Output Amplitude Ratio-2

1. Make DB-y, DR-y, and DG-y the output amplitude of ㉑, ㉒, and ㉓.

$$2. R/B = \frac{DR-y}{DB-y}, \quad G/B = \frac{DG-y}{DB-y}$$

Roc, Goc, Boc

R, G, B Output DC Voltage

1. Test DC voltage for ㉒, ㉓, and ㉑ when not blanking.

Doffset R, G, B Output DC Offset

1. Calculate the electric potential differences of ㉒ and ㉓, ㉓ and ㉑, and ㉑ and ㉒, using the testing values obtained in C-17.

Cleak Demodulated Output Carrier Leak

1. Test the carrier element output by ⑰, ⑱, and ㉑.

T Tint Control Variance

1. Using an oscilloscope (X-Y display), test the variation of amplitude phase of the ⑱ and ㉑ output signals when 28A is 0V and 9V.

T_{min} Tint Control Characteristics-1

T_{max} Tint Control Characteristics-2

1. Using an oscilloscope (X-Y display), test the variation of amplitude phase of the ⑱ and ㉑ output signals when 28A is 4.5V, 0V, and 9V. Use the phase at 4.5V as reference.

R_{Ta}, G_{Ta}, B_{Ta}

R, G, B Output Pin Voltage Temperature Coefficient

D_{offset/Ta} Voltage Difference Temperature Coefficient Between R, G, B Output Pins

1. The temperature variation range should be of -20 ~ +65°C.

θ_{R-Y} Demodulated Phase Angle-1

1. Make θ_{R-Y} the phase difference of ⑰ and ㉑.

θ_{G-Y} Demodulated Phase Angle-2

2. Make θ_{G-Y} the phase difference of ⑱ and ㉑.

ΔV_{Y-C} Color Tracking Characteristics

1. Input SG1 from B, and make V_{CT1} and V_{CT2} the output amplitude of ㉑ when 37A is 4.0V and 4.5V.
2. Input SG5 from A, and make V_{CT3} and V_{CT4} the output amplitude of ㉑ when 37A is 4.0V and 4.5V.

$$3. \Delta V_{Y-C} = 20 \log \frac{V_{CT1}}{V_{CT2}} - 20 \log \frac{V_{CT3}}{V_{CT4}} \text{ (dB)}$$

CS Color Signal Suppression Characteristics

1. Input APL 10% SG14 from B, and make V_{CS1} the demodulated output amplitude of ㉑.
2. Input APL 35% SG14 from B, and make V_{CS2} the demodulated output amplitude of ㉑.

$$3. CS = 20 \log \frac{V_{CS1}}{V_{CS2}} \text{ (dB)}$$

OS On-Screen Characteristics

1. DC voltage variance of ⑰, ⑱, and ㉑ when not blanking and when the voltages of ⑱, ㉑, and ㉒ are changed from 0V to 3V.

BLK_{on} On-Screen Blanking Threshold Voltage

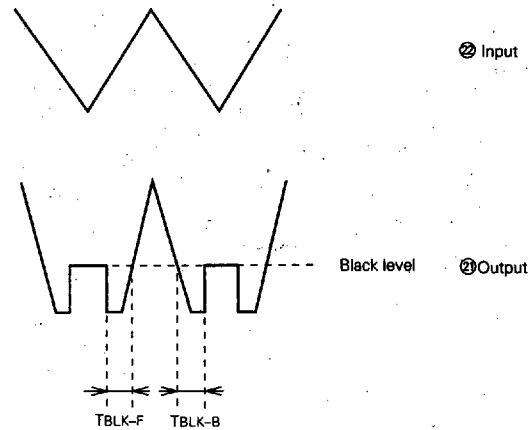
B-BLK Trim-Blanking Threshold Voltage

1. Applied voltage of each pin when ⑰, ⑱, and ㉑ are engaged in the full period of blanking as voltage of ⑱, ㉑, ㉒, and ㉓ is increased from 0V.

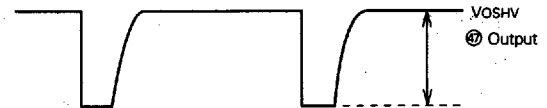
TBLK-F On-Screen Blanking Amplitude-1

TBLK-B On-Screen Blanking Amplitude-2

1. Input SG15 from D.



V_{OSHV} Horizontal/Vertical Sync Output Amplitude



f_H/T_a Oscillator Frequency Temperature Coefficient

1. The temperature variation range should be of -20 ~ +65°C.

V_{7min} Oscillator Starting Pin ⑦ Voltage

1. Gradually increase the applied voltage of 7A.
2. V_{7min} is the voltage of ⑦ when the cycle of ⑬ output waveform becomes approx. 63.5μs.

f_{PH-1} Pull-In Range 1

1. Increase the SG11 input signal frequency gradually so that the input signal and ⑬ output become unsynchronized.
2. Decreasing the input signal frequency, make this the difference between the input signal frequency and oscillator frequency (f_H) precisely when the input signal and ⑬ output become synchronized.
3. Perform the same procedure for the lower side pull-in range.

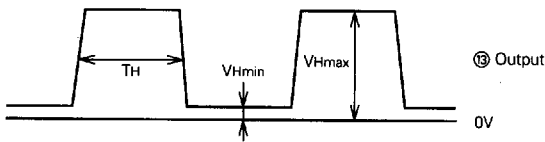
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NTSC VIDEO CHROMA DEFLECTION

TH H. Pulse Amplitude

VHmin, VHmax

H. Output Voltage



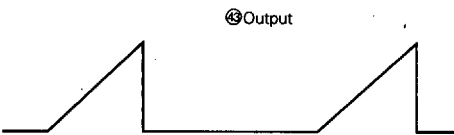
Tv1 V. Pulse Amplitude-1

Tv2 V. Pulse Amplitude-2



VOD/LV Vout Digital/Linear Switching Voltage

1. Set voltage of ⑩ to 0V.
2. Make VOD/LV the applied voltage of ⑩ precisely when waveform shown on the right is obtained from ⑬ output as voltage of ⑩ is increased.

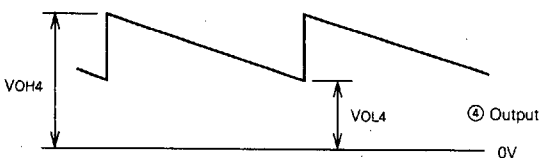


fPV Pull-In Range

1. Increase the input signal frequency so that the SG12 input signal and ⑥ output become unsynchronized.
2. Decrease the input signal gradually and make fPV the input signal frequency precisely when input signal and ⑥ output become synchronized.

VOH4 Ramp Maximum Output Voltage

VOL4 Ramp Minimum Output Voltage



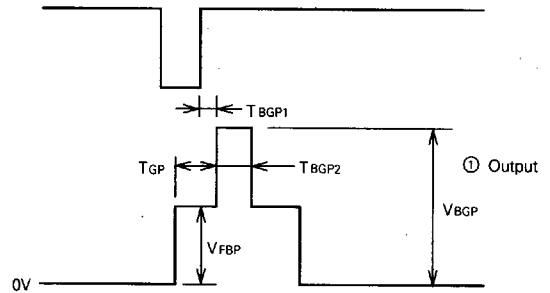
TGP Burst Gate Pulse Position

TBGP1 Burst Gate Pulse Timing-1

TBGP2 Burst Gate Pulse Timing-2

VFBP FBP Clamp Voltage

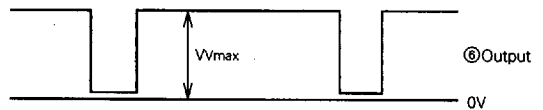
VGBP Burst Gate Pulse Voltage



VTHAFC AFC Detector Voltage

1. Set voltage of 8A to 9V.
2. Make VTHAFC the applied voltage of 8A precisely when AFC begins to behave abnormally as voltage of 8A is gradually increased.

VVmax Vertical Output Maximum Voltage



ISSH Sync Separation Input Sensitivity Current (Horizontal)

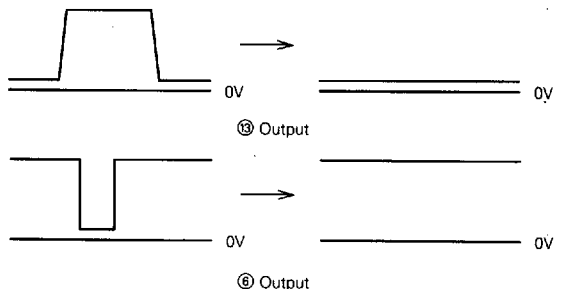
1. Set ISI to 0mA.
2. Make ISSH the value of ISI when the voltage of ④ is in the area of 3V as ISI is gradually increased.

ISSV Sync Separation Input Sensitivity Current (Vertical)

1. Same as ISSH.

V14P Overvoltage Protector Circuit Operating Voltage

1. Set voltage of ⑭ to 0V.
2. As voltage of ⑭ is gradually increased, ② begins blanking and output waveform of ⑬ ceases. Make V14P the applied voltage of ⑭ when output waveform of ⑬ ceases.



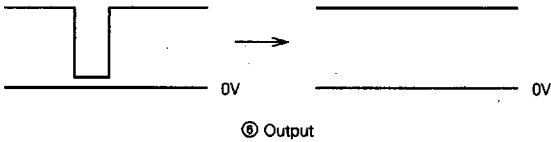
3. In order to perform the following test, first turn off all applied voltages.

V_{32P1} Supply Voltage Detector Circuit Operating Voltage-1

1. Set voltage of 32A to 9V.
2. Gradually increase voltage of 32A and make V_{32P1} the applied voltage of 32A when status becomes as described in step 2 of item V_{14P}.
3. In order to perform the following test, first turn OFF all applied voltages.

V_{32P2} Supply Voltage Detector Circuit Operating Voltage-2

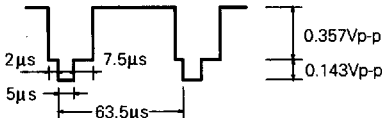
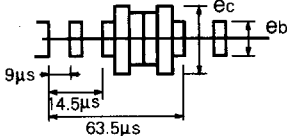
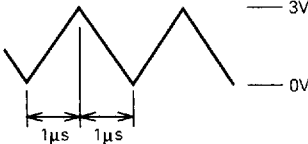
1. Set voltage of 32A to 9V.
2. As voltage of 32A is gradually decreased, ⑥ output ceases. Make V_{32P2} the applied voltage of 32A when DC voltage becomes approx. 1.3V.



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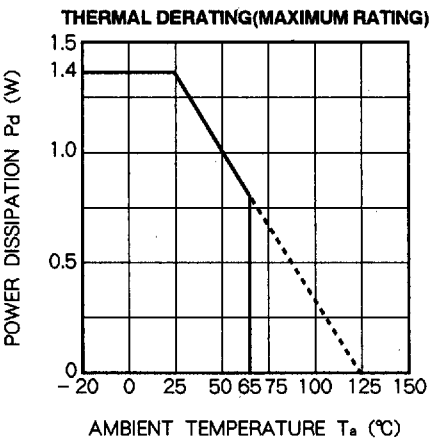
INPUT SIGNAL

SG No.	Signal Name	Signals
SG1	200 kHz Sine Wave	Establish 0 dB as 200 mVp-p.
SG2	APL 100% Standard Signal	 0.357Vp-p 0.143Vp-p
SG3	2 MHz Sine Wave	Establish 0 dB as 100 mVp-p.
SG4	Sine Wave	Sine wave with variable frequency where 0 dB is set to 200 mVp-p.
SG5	Chroma Standard Signal (Color Bar)	 fsb: Burst Signal Frequency fsc: Chroma Signal Frequency fsb = fsc = 3.579545 MHz 0 dB: eb = 50 mVp-p ec = 100 mVp-p
SG6	Chroma Signal 1	 fsb = fsc = 3.579545 MHz (Same Phase) 0 dB: eb = 50 mVp-p ec = 100 mVp-p
SG7	Chroma Signal 2	Chroma signal with variable frequency where all burst and chroma signals are the same phase with respect to chroma signal 1 of SG6.
SG8	Chroma Signal 3	Chroma signal where fsb = 3.579545 MHz, fsc = 3.529545 MHz (fsb - 50 kHz) with respect to chroma signal 1 of SG6.
SG9	Standard Sync Signal	 0.143Vp-p
SG10	APL 50% Standard Signal	 0.179Vp-p 0.143Vp-p
SG11	Sync Signal 1	 1Vp-p Duty 90% Pulse Signal
SG12	Sync Signal 2	 1Vp-p Duty 95% Pulse Signal
SG13	5MHz Sine Wave	Establish 0 dB as 100 mVp-p.
SG14	Variable APL Standard Signal	 Variable (0.357 Vp-p should be APL 100%.)
SG15	Delta Wave (Input signal for on-screen character display)	 3V 0V

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NTSC VIDEO CHROMA DEFLECTION

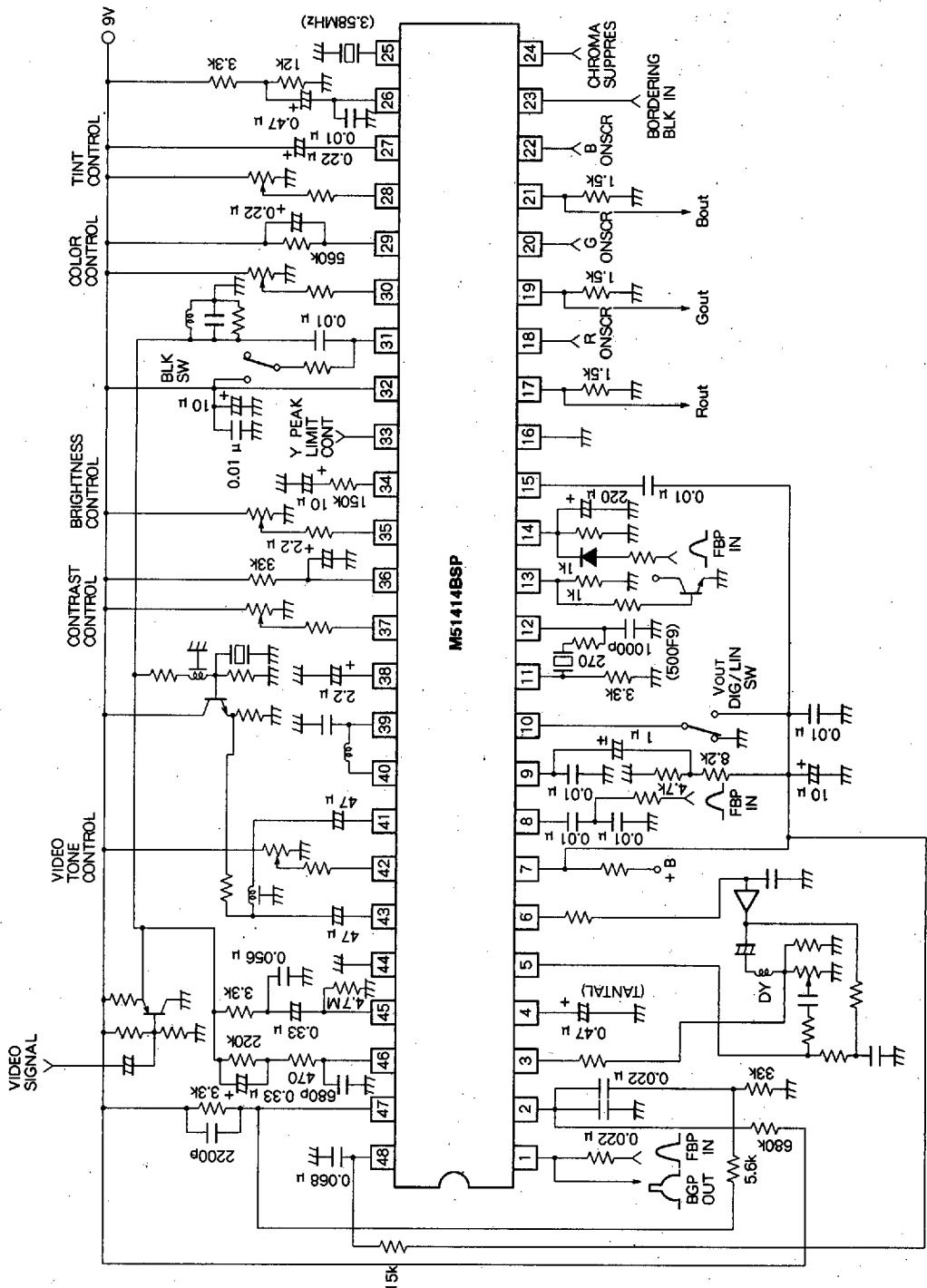
TYPICAL CHARACTERISTICS



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NTSC VIDEO CHROMA DEFLECTION

APPLICATION EXAMPLE

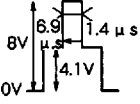
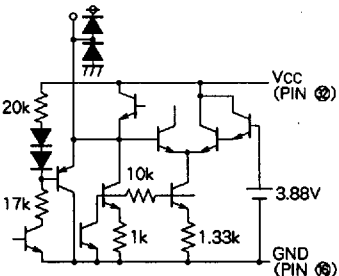
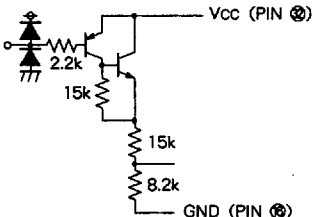
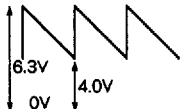
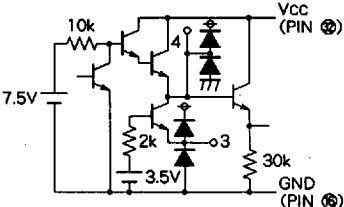
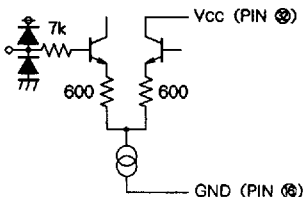
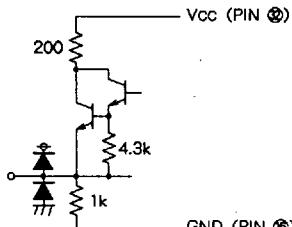


Units Resistance: Ω
Capacitance: F

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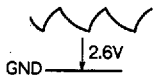
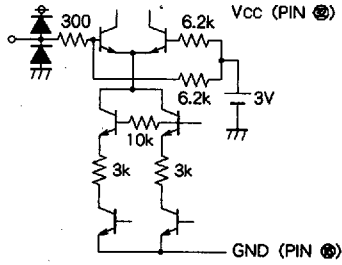
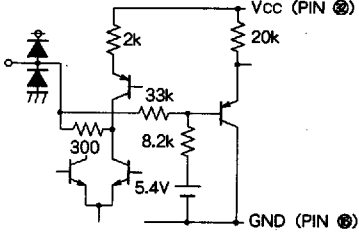
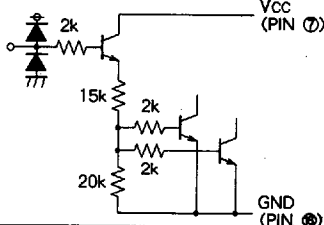
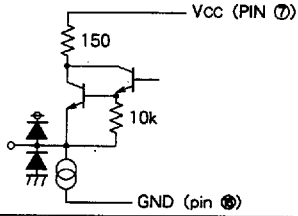
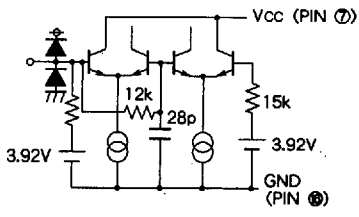
DESCRIPTION OF PIN

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage(V)
①	FBP IN/ BGP OUT	 Output as sand castle of BGP and FBP.		—
②	V SYNC TRI IN			—
③ ④	CURRENT SINK RAMP CAP	Amplitude of ramp is altered by external R. 		2.75 —
⑤	AC/DC FB IN	—		—
⑥	V OUT			—

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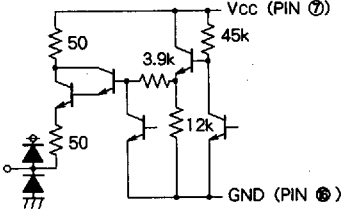
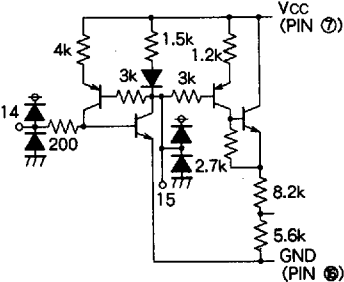
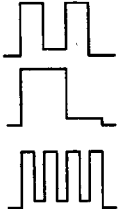
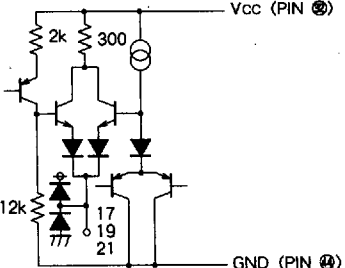
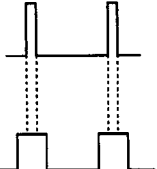
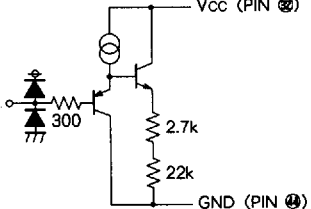
DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage (V)
⑦	H Vcc	Set external r so that 25 mA is input to ic component.	—	—
⑧	FBP IN			3.0
⑨	AFC FILTER	—		5.4
⑩	V OUT DIG/LIN SW	2.1V or higher : lin operation 2.1V or lower : dig operation		—
⑪	HVCO OUT	—		7
⑫	HVCO IN	—		3.9

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NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage(V)
13	H OUT			—
14	X - RAY PROTECTOR	—		—
15	X - RAY PROTECTOR FILTER	—		—
16	GND (Deflection)	—	—	—
17	R OUT			—
19	G OUT			—
21	B OUT			—
18	ON SCREEN IN (R)			—
20	ON SCREEN IN (G)			—
22	ON CSREEN IN (B)			—
23	BORDERING BLK IN			—

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NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage(V)
②	CHROMA SUPPRESS	With pin open and low luminance, color saturation becomes - 3dB. There is no suppression if grounded.		—
⑤	X-TAL	Connect to 3.58MHz X'tal.		—
⑥	APC FILTER	—		—
⑦	KILLER FILTER	—		—
⑧	TINT CONT.	Tint control pin		4.5

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NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Periphera circuit of pins	DC voltage (V)
②	ACC FILTER	—		—
③	COLOR CONT.	Color control pin		4.5
⑪	CHROMA IN/BLK SW	If pin voltage is raised above 4.5V, BLK is not engaged for RGB output.		2.65
⑫	Vcc	—	—	—
⑮	Y PEAK LIMIT CONT.	Controls peak of Y. If pin voltage is increased, limiter is engaged on the black side.		0 5 8
⑳	DC REGENERATION	Dc playback ratio can be varied by external CR.		—
㉔	BRIGHT CONT.	Bright control pin		3.1

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NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage(V)
③	BLACK LEVEL HOLD	Detects the blackest part of image.		—
⑦	CONTRAST CONT.	Contrast control pin		4.5
⑧	PEDESTAL CLAMP	—		—
③	VIDEO IN (3)			—
④	VIDEO OUT (2)	—		1.6
④	VIDEO IN (2)	—		2.4
④	VIDEO IN (1)	—		2.4

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NTSC VIDEO CHROMA DEFLECTION

DESCRIPTION OF PIN (cont.)

Pin No.	Name	Description	Peripheral circuit of pins	DC voltage(V)
42	VIDEO TONE CONT.	If voltage of tone control pin is decreased, high frequency increases.		4.5
44	GND (Video, Chroma)	—	—	—
45 46	Y SYNC SEP.IN H SYNC SEP.IN	—		6.5
47	H.V SYNC OUT			—
48	V OUT (LIN) RC	Vout pulse amplitude is determined by external CR.		—