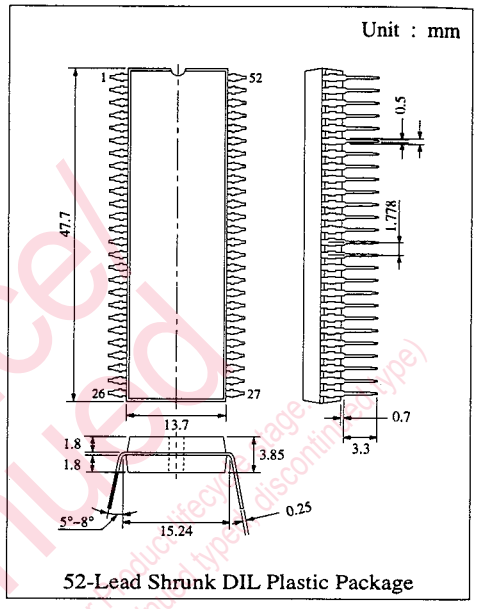
AN5606K

PAL/NTSC Video, Chrominance, and Deflection Signal Processing IC with I^2C Bus Interface

■ Description

The AN5606K is an integrated circuit consisting of a Video, Chroma, and Synchronous Signal Processing (with I^2C Bus) for use in the PAL/NTSC Colour TV

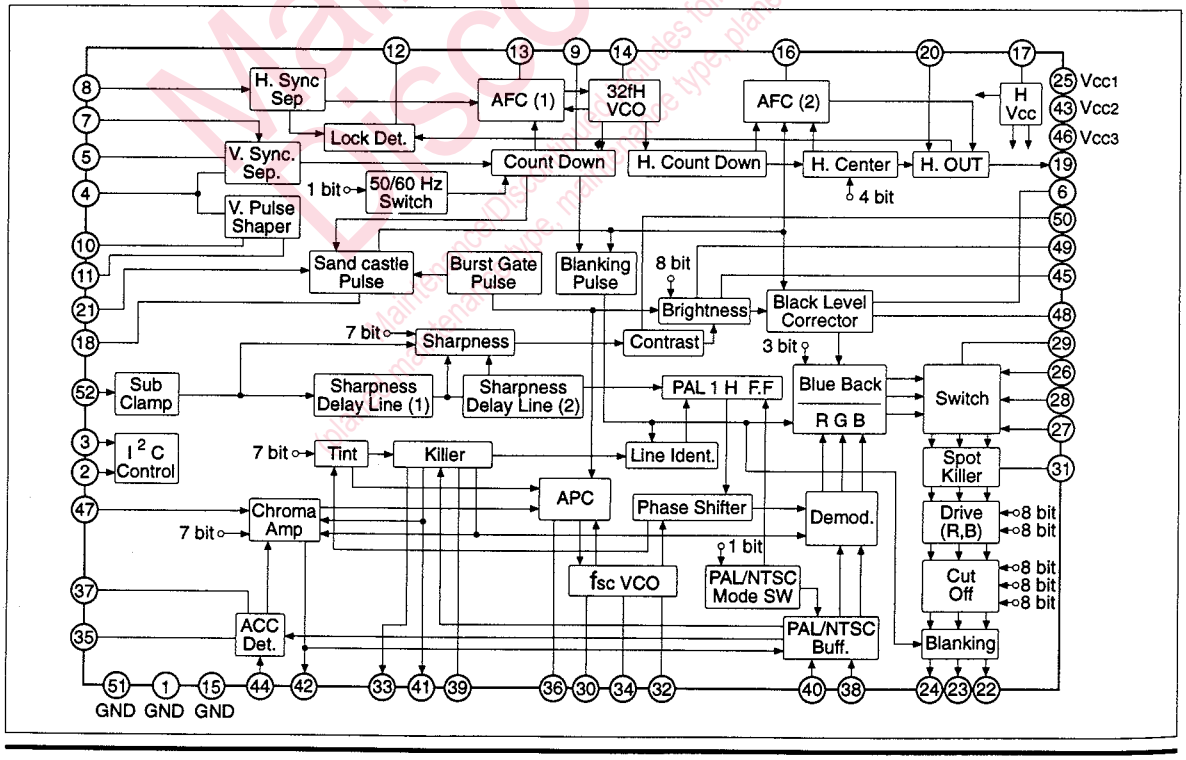


52-Lead Shrunk DIL Plastic Package

■ Features

- PAL/NTSC Signal Processing
- External R G B Signal Input
- Can be easily combined with SECAM Decoder IC (AN5636K)
- I^2C bus control for the following 11 DAC Inputs (including Sub-level Adjusts) :
  Colour, Tint (NTSC Only), Brightness, Contrast, Sharpness, H-center, RB-Drives, & RGB Cut-off
- I^2C bus control for the following 8 switches : PAL/NTSC Mode Switch, 50/60Hz switch, R-Back ON/OFF, G-Back ON/OFF, B-Back ON/OFF, Blanking Switch, 3.58/4.43MHz VCO Switch
- Built-in Y-Delay (Luminance Delay), Black-Level Expander, X-Ray Protection, ACL, ABL, Colour-Killer & Spot Killer functions

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating			Unit
Supply Voltage	V_{CC}	V_{CC1} = 10.0	V_{CC2} = 5.6	V_{CC3} = 6.9	V
Supply Current	I_{CC}	I_{CC1} = 75.0	I_{CC2} = 83.0	I_{CC3} = 17.0	mA
Power Dissipation (Ta = 70°C)	P_D	1350			mW
Operating Ambient Temperature	Topr	-20 ~ +70			°C
Storage Temperature	Tstg	-55 ~ +150			°C

■ Recommended Operating Range (Ta=25°C)

Item	Symbol	Range
Operating Supply Voltage Range	V_{CC1}	8.1V ~ 9.9V
Operating Supply Voltage Range	V_{CC2}	4.5V ~ 5.5V
Operating Supply Voltage Range	V_{CC3}	5.58V ~ 6.82V
Operating Supply Current Range	I_{17}	13mA ~25mA

■ Electrical Characteristics (Ta=25°C)

Item	Symbol	Test cct	Condition	min.	typ.	max.	Unit
Circuit Current 1	I_{CC1}	1	V_{CC1}=9V Sync, Input V_{CC2}=5V V_{CC3}=6.2V	39.0	49.0	58.0	mA
Circuit Current 2	I_{CC2}	1	V_{CC1}=9V Sync, Input V_{CC2}=5V V_{CC3}=6.2V	56.0	68.0	82.0	mA
Circuit Current 3	I_{CC3}	1	V_{CC1}=9V Sync, Input V_{CC2}=5V V_{CC3}=6.2V	8.0	12.0	16.0	mA
Circuit Voltage	V_{17}	1	I_{17}=12mA	5.8	6.3	6.9	V
Constant Voltage Operating Resistance	R_{17}	1	V_{CC1}=9V , V_{CC2}=5V, I_{17}=12~30mA			30	Ω
Pin 47 Voltage	$V_{47\text{-}51}$	1	V_{CC1}=9V , V_{CC2}=5V, V_{CC3}=6.2V	1.7	2	2.3	V
Pin 52 Voltage	$V_{52\text{-}51}$	1	V_{CC1}=9V , V_{CC2}=5V, V_{CC3}=6.2V	2.7	3.0	3.3	V
Pin 38 Voltage	$V_{38\text{-}51(PAL)}$	1	V_{CC1}=9V V_{CC3}=6.2V V_{CC2}=5V (PAL MODE)	1.9	2.2	2.5	V
Pin 40 Voltage	$V_{40\text{-}51(PAL)}$	1	V_{CC1}=9V V_{CC3}=6.2V V_{CC2}=5V (PAL MODE)	1.9	2.2	2.5	V
I^2C • DAC							
Acknowledge Suction Current	V_{Ack}	1	I_3=2mA			0.5	V
SCL-SDA Signal Input LOW Level	V_{LOW}	1				0.5	V
SCL-SDA Signal Input HIGH Level	V_{HIGH}	1		4.5			V
Input Signal	f_{in}	1				100	k bit/s
Y-Signal Processing							
Video Input Pin Voltage	V_{52}	1	V_{CC1}=9V V_{CC3}=6.2V V_{CC2}=5V I_{17}=15mA	2.7	3.0	3.3	V
Pedestal Variation with Drive	$Y_{PL\text{-}D}$	1	No input, Drive : MIN/MAX Cutoff : "18", Bright : TYP	-400	0	400	mV
RGB Output Pedestal Level	Y_{PL}	1	No input, Drive : TYP Cutoff : "18", Bright : TYP	1.5	2.1	2.47	V
Video Voltage Gain	A_V	1	Input 0.4Vpp, Contrast : TYP Sharpness : MIN, Brightness : TYP	5.1	6.3	7.5	Times
Video Frequency Characteristics	f_{YC}	1	Attenuation at input f=6MHz to output level at input f=2MHz	-7	-3		dB
Black Level Variable with Aperture Control Change	$Y_{PL\text{-}S}$	1	No Input, Pedestal measurement Sharpness = MAX/MIN	-50		50	mV
Contrast Ratio	e_{MAX}, e_{MIN}	1	Input Sinewave 0.4Vpp, f=2MHz, Contrast=MAX/MIN	15	18	21	dB
RGB Output Tracking	e_{OT}	1	Contrast=10→70	7	10	13	dB
Brightness Variable Range	B	1	Input 0.4Vpp, Brightness=MIN~MAX, Measure pedestal level	2.3	2.8	3.3	V

■ Electrical Characteristics (Ta=25°C) (Continue)

Item	Symbol	Test cct	Condition	min.	typ.	max.	Unit
Brightness Control Sensitivity	B_G	1	Brightness = 5F → 9F	0.55	0.85	1.15	V
DC Restoration Rate	T_{DC}	1	Input 0.4Vpp, Contrast=MAX, Sharpness:MIN, APL 10 ~ 90%	91	95	105	%
RGB Output BLK Level	Y_{BL}	1	Vcc1=9V, Vcc2=5V, H, VBLK level when Vcc3=6.2V, I17=15mA	0.5	1.0	1.5	V
Black Level Correction							
Correction Quantity (Amplitude Var.)	V_{BL} (a)-(b)	1	Input Signal : All Black (a) Pin 48 : External RC (b) Pin 48 : 9V	100	100	100	mV
Y-signal Delay Time	τ_D	1	Input Stair step 0.4Vpp	120	180	240	nsec
ACL Characteristic	ACL	1	Input Stair step Pin 50 = 3.0~4.3V	6.5	8.5	10.5	dB/V
ABL Characteristic	ABL	1	Pedestal level variation with Pin 49 = 3.0~3.4V	0.9	1.4	1.9	V/V
ON Screen Circuit							
Ys Threshold	e_{STH}	1	Switch level of Pin 26	0.55	0.7	0.85	V
External RGB Freq. Characteristic	ef_{RGB}	1	Input Sinewave 0.2Vpp, Ys=1V, f=2MHz ~ 10MHz	-2	0	2	dB
External RGB Output DC Voltage	E_{OEXT}	1	Input/No input Ys=1V Cutoff="18", Measure B	1.2	1.9	2.7	V
Int./Ext. Pedestal Difference Voltage	E_{OYS}	1	Measure pedestal level difference at Ys=0.4(OFF)/1.2V(ON)	0	200	350	mV
External RGB Output Signal Level	E_{EXT}	1	Input Sinewave 0.2Vpp f=2MHz, Contrast=MAX, Measure B	4.6	6.6	8.6	dB
Internal/External Crosstalk	E_{CT}	1	Input Sinewave Ys=0.4Vpp, f=10MHz (1Vpp), External/Internal crosstalk			-50	dB
External RGB Output Blanking Voltage	Y_{BLK} (RGB)	1	No input when Vcc1=9V, Vcc2=5V Vcc3=6.2V, I17=15mA	0.5	1.0	1.5	V
External RGB Contrast Control Characteristic	E_{EXT-C}	1	Input 2Vpp, Output ratio when Contrast=MAX/MIN	8.4	11.4	14.4	dB
Colour Signal Processing Circuit							
PAL Colour Difference Output (B-Y)	e_O	1	Colour Bar signal, Burst 150mVpp Contrast=Colour=TYP	2.08	2.60	3.12	Vpp
PAL ACC Characteristic	A_{CC}	1	Colour Bar Signal, Burst 300mVpp (+6dB)	0.8	1.0	1.2	Times
PAL Demodulation Output Ratio (1)	R/B	1	Colour Bar Signal, Burst 150mVpp Contrast=Colour=TYP	0.72	0.83	0.90	Times
PAL Demodulation Output Ratio (2)	G/B	1	Colour Bar Signal, Burst 150mVpp Contrast=Colour=TYP	0.31	0.37	0.42	Times
PAL Demodulation Angle R	∠R	1	Colour Bar Signal, Burst 150mVpp Contrast=Colour=TYP	84	90	96	deg
PAL Demodulation Angle G	∠G	1	Colour Bar Signal, Burst 150mVpp Contrast=Colour=TYP	229	237	244	deg
PAL Demodulation Output Residual Carrier	e_{car}	1	No signal input, 4.43MHz component of each output pin			90	mVpp
Colour Difference Output Contrast Ratio	Δe_{OC}	1	Colour Bar Signal, Burst 150mVpp, Contrast = MIN→MAX, Colour = TYP	15	18	21	dB
NTSC Tint Center	T_C	1	Colour Bar Signal, Burst 150mVpp, Measure phase displacement at Tint data 37	-7	0	+7	deg
NTSC Tint Variable Range	$\Delta\theta_T$	1	Colour Bar Signal, Burst 150mVpp, Measure phase displacement at Tint = MIN ~ MAX	70	90	120	deg
PAL Colour Variable Range	Δe_{O-COL}	1	Colour Bar Signal, Burst 150mVpp, Contrast=TYP, Colour=Variation at 10→7F	17	19	23	dB
PAL APC Pull-in Range	f_{PCP}	1	Burst frequency is variable	±450	±500		Hz
NTSC APC Pull-in Range	f_{PCN}	1	Burst frequency is variable	±450	±500		Hz
PAL VCO Free-run Frequency	f_{COP}	1	No Signal Acc = OFF	-150	0	+150	Hz
NTSC VCO Free-run Frequency	f_{CON}	1	No Signal Acc = OFF	-150	0	+150	Hz
PAL VCO Output Level	e_{CW-P}	1	Pin 30 output level when Vcc1=9V, Vcc2=5V, Vcc3=6.2V, I17=15mA	0.3	0.4	0.5	Vpp
NTSC VCO Output Level	e_{CW-N}	1	Pin 30 output level when Vcc1=9V, Vcc2=5V, Vcc3=6.2V, I17=15mA	0.3	0.4	0.5	Vpp

■ Electrical Characteristics (Ta=25°C) (Continue)

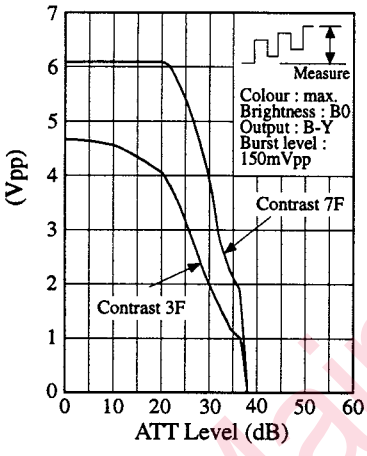
Item	Symbol	Test cct	Condition	min.	typ.	max.	Unit
PAL Colour Killer Tolerance	e_{KP}	1	Colour Bar Signal, Burst 150mVpp =0dB, Colour=Contrast=MAX	-30	-36	-41	dB
NTSC Colour Killer Tolerance	e_{KN}	1	Colour Bar Signal, Burst 150mVpp= 0dB, Colour=Contrast=MAX	-37	-41	-46	dB
PAL/SECAM Changeover Voltage	$V_{47\text{-}P/S}$	1	Pin 47 PAL/SECAM changeover threshold	2.35	2.5	2.65	V
RGB Output Circuit							
Drive Adjustment Range	A_{VD}	1	External input 0.2Vpp input, Ys=1V, Drive: MIN~MAX, R, B output	3	6	9	dB
Cutoff Adjustment Range	V_{CUT}	1	No input, Pedestal level variation with cutoff:MIN~MAX	1.0	1.3	1.6	V
Deflection Signal Processing							
Horizontal Free-run Osc. Frequency	f_{HO}	1	No input Pin 19 output frequency	15.45	15.75	16.05	kHz
Horizontal Free-run Osc. Frequency Dependency with Supply Voltage	$\frac{\Delta f_{HO}}{V_{CC3}}$	1	f_{HO}(I17=30mA), f_{HO}(I17=15mA)	-100	0	100	Hz
Hor. Oscillation Starting Voltage	$V_{fH(S)}$	1	Horizontal osc. output is 1Vpp or more and f=10k~20kHz			5.2	V
Hor. Oscillation Pulse Duty Ratio	τ_{HO}	1	I17=15mA, Vcc1=9V Vcc2=5V, Vcc3=6.2V	35.0	38.0	41.0	%
Hor. Pull-in Range	f_{PH}	1	f_{HO}=15.75kHz	±400			Hz
Hor. Pulse Output Voltage	V_{19}	1	Vcc=TYP	2.3	2.8	3.3	V
High-tension Detection Circuit Operating Voltage (Shutdown)	V_{sth}	1	I20=50µA	0.63	0.68	0.73	V
Shutdown Leakage Current	I_{sth}	1	Measure I20 when Pin 20=0V			5.0	µA
Vertical Signal Processing							
PAL Vertical Free-run Osc. Frequency	$f_{VO\text{-}P}$	1	$\left(\frac{2}{625} f_{H\text{-}P}\right)$	48.5	50	51.5	Hz
NTSC Vertical Free-run Osc. Freq.	$f_{VO\text{-}N}$	1	$\left(\frac{2}{525} f_{H\text{-}N}\right)$	58.5	60	61.5	Hz
Vertical Free-run Osc. Pulse Width	τ_{VO}	1	PAL : f_H=15.625kHz NTSC : f_H=15.75kHz	9.5	10.0	10.5	1/fH
PAL Vertical Pull-in Enable Freq.	$f_{PV\text{-}P}$	1	$f_{V\text{-}P}$=50Hz	45	50	55	Hz
NTSC Vertical Pull-in Enable Freq.	$f_{PV\text{-}N}$	1	$f_{V\text{-}N}$=60Hz	55	60	65	Hz
Vout Output Voltage	V_9	1	I17=15mA, Vcc1=9V Vcc2=5V, Vcc3=6.2V	0	0.2	0.5	V
Ver. Pulse Shaper Output Pulse Width	τ_{10}	1		1.4	2.2	3.0	msec
Sandcastle Pulse							
PAL Burst Gate Pulse Width	$\tau_{BGP\text{-}P}$	1	Pin 18 PAL Burst gate pulse width	3.4	4.0	4.6	µsec
NTSC Burst Gate Pulse Width	$\tau_{BGP\text{-}N}$	1	Pin 18 NTSC Burst gate pulse width	2.5	3.0	3.5	µsec
PAL V-Blanking Width	$\tau_{VBLK}^{\text{-P}}$	1	Pin 18 PAL blanking pulse width (21±1)H	1.28	1.34	1.41	msec
NTSC V-Blanking Width	$\tau_{VBLK}^{\text{-N}}$	1	Pin 18 NTSC blanking pulse width (17±1)H	1.01	1.08	1.14	msec
Burst Gate Pulse Output Voltage	V_{BGP}	1	I17=15mA, Vcc1=9V Vcc2=5V, Vcc3=6.2V	3.7	4.1	4.6	V
H-Blanking Pulse Output Voltage	V_{HBLK}	1	I17=15mA, Vcc1=9V Vcc2=5V, Vcc3=6.2V	2.5	2.9	3.4	V
V-Blanking Pulse Output Voltage	V_{VBLK}	1	I17=15mA, Vcc1=9V Vcc2=5V, Vcc3=6.2V	1.0	1.5	2.0	V
H Center Circuit							
H Center Variable Range (1)	$\tau_{\text{-DH(1)}}$	1	H center : TYP→MIN Hsync. rise and HBLK delay	-2.2	-1.6	-1.3	µsec
H Center Variable Range (2)	$\tau_{\text{-DH(2)}}$	1	H center : TYP→MAX Hsync. rise and HBLK delay	1.3	1.6	2.2	µsec
Lock Detector Circuit							
Lock Detector Output Voltage (Hi)	$V_{12\text{-Hi}}$	1	In Hor. Loop ON state, Pin 12 voltage at input of Hor. sync. signal	7.9	8.5	9.0	V
Lock Detector Output Voltage (Lo)	$V_{12\text{-Lo}}$	1	In Hor. Loop On state, Pin 12 voltage at no input		0.2	0.5	V

■ Electrical Characteristics (Ta=25°C) (Continue)

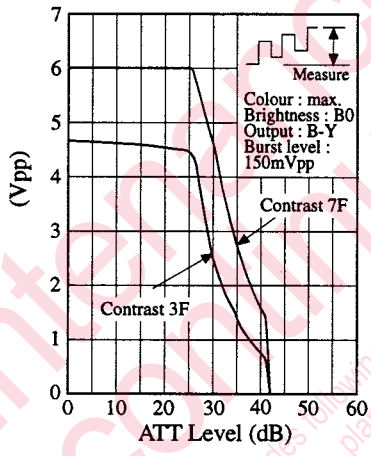
Item	Symbol	Test cct	Condition	min.	typ.	max.	Unit
Service Switch Circuit							
Service Switch Threshold	V_{sth}	1		0.35	0.65	1.10	V
Service SW Operation	e_{ser}	1	Input : Stair step 0.4Vpp, Measure amplitude at Pin 50 (SCL)=00			150	mVpp
Spot Killer							
Spot Killler Operation	K_{SP}	1	Measure each output pedestal level when the current of 1mA is applied to Pin 31	6.8	7.5	8.2	V

■ Characteristics Curve Diagrams

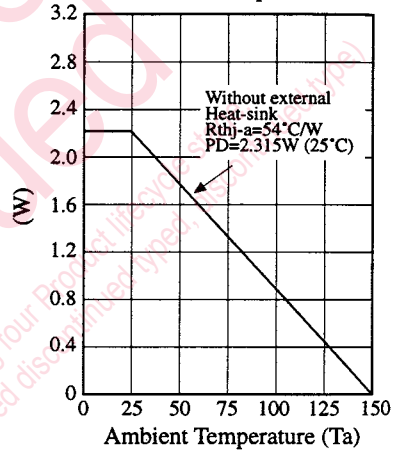
ACC Characteristic PAL



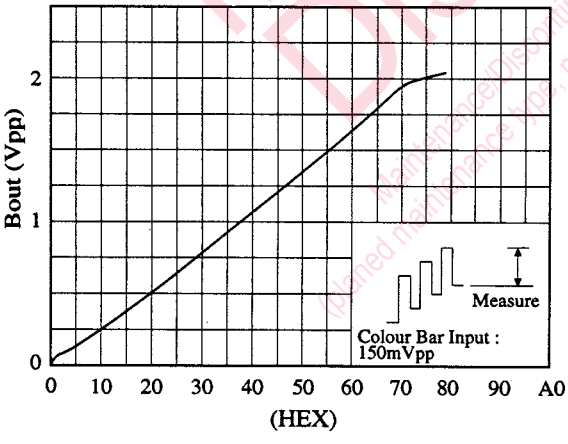
ACC Characteristic NTSC



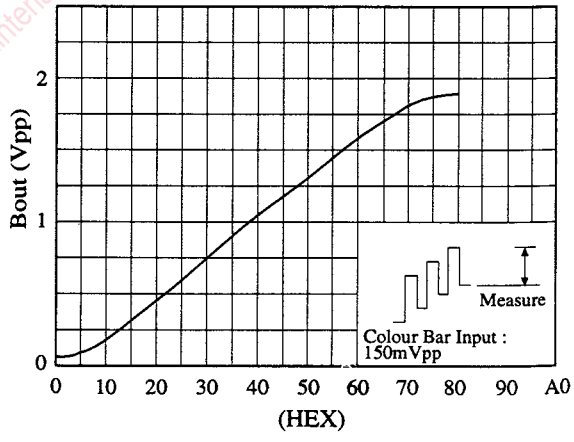
Power Dissipation



Colour Control Characteristic

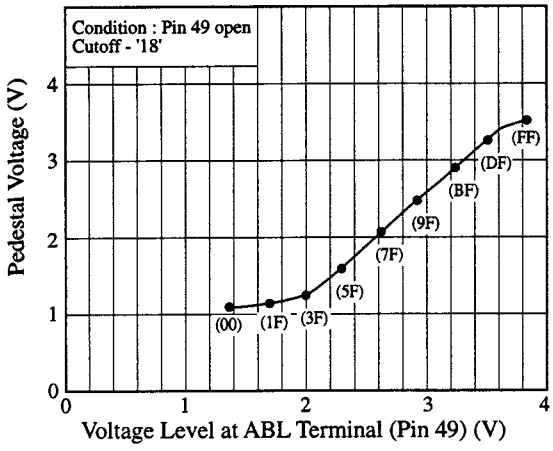


Contrast Control Characteristic

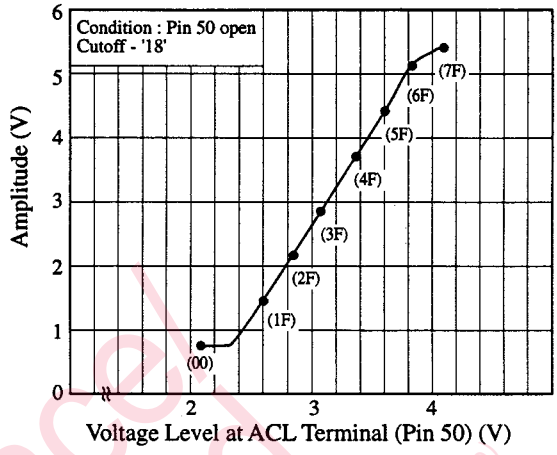


● Characteristics Curve Diagrams (Continue)

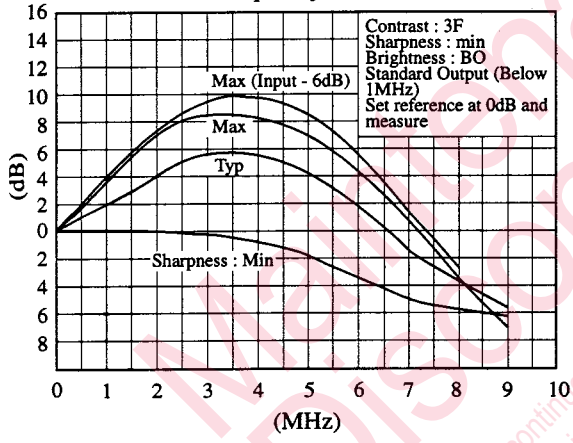
ABL Characteristic



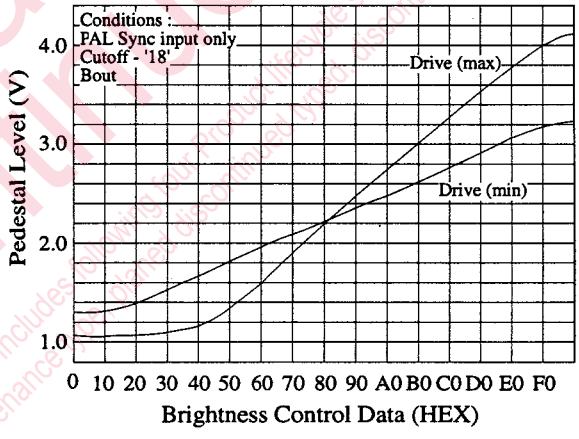
ACL Characteristic



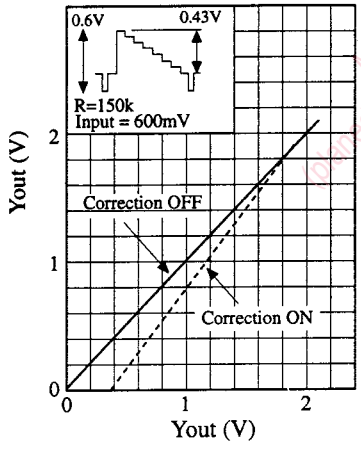
Video Frequency Characteristic



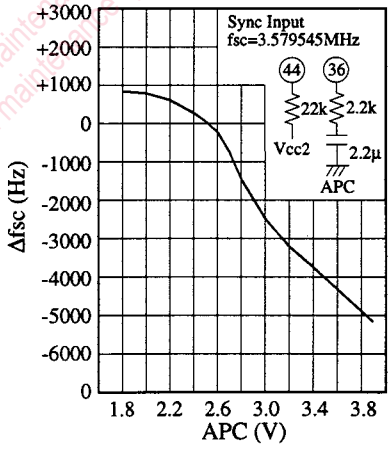
Brightness Control Characteristic



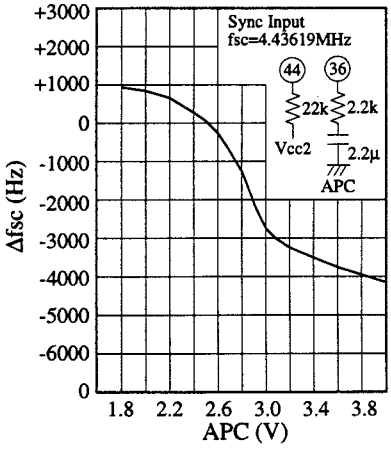
Black Level Correction Characteristic



ß Curve NTSC



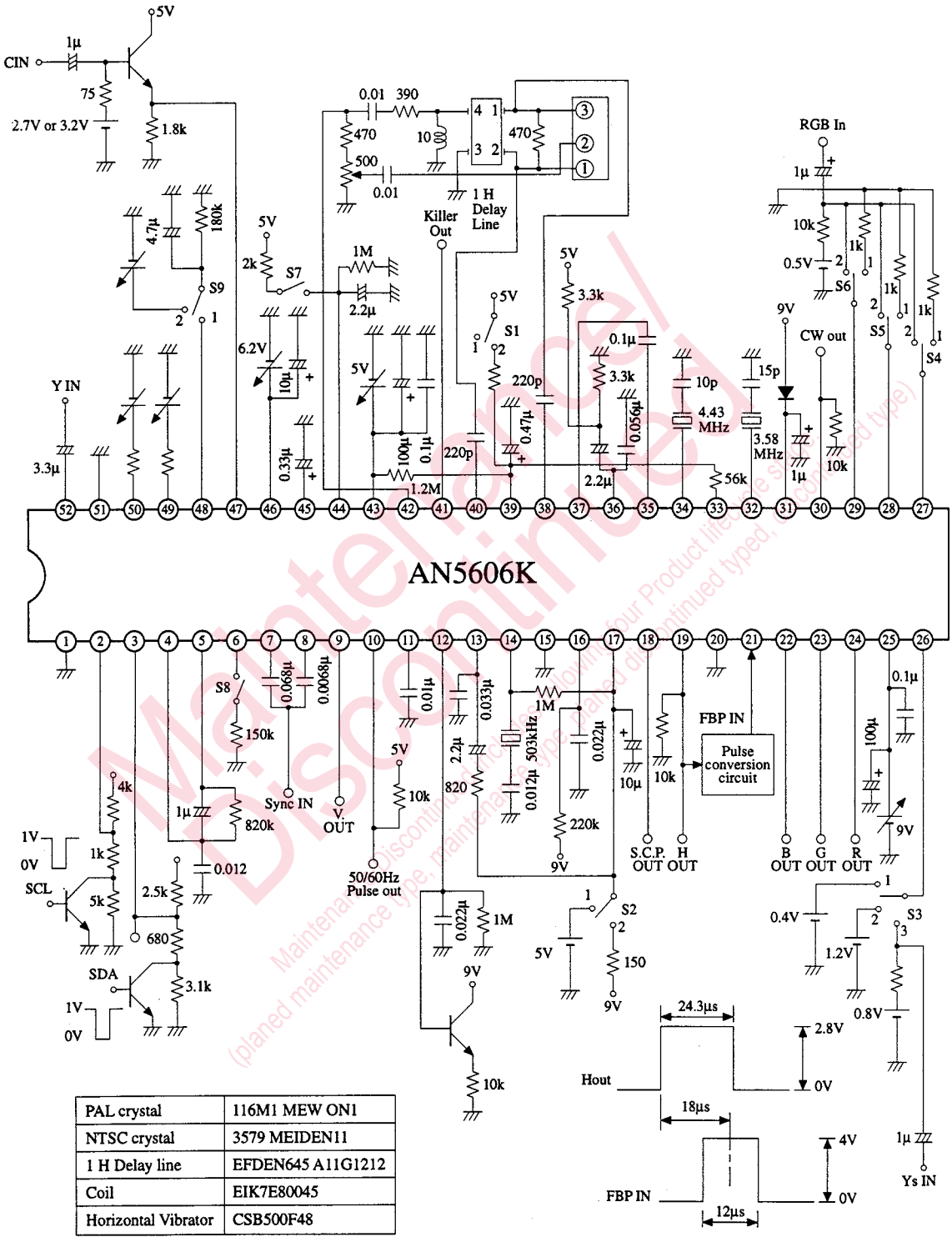
ß Curve PAL



■ Pin Descriptions

Pin No.	Pin Name	Pin No.	Pin Name
1	GND (I^2C)	27	B input
2	SCL input	28	G input
3	SDA input	29	R input
4	Vertical integration filter	30	CW output
5	Vertical sync. separation input	31	Spot Killer input
6	Black level correction starting point adjustment	32	3.58MHz oscillation
7	Vertical sync. input	33	Killer bypass
8	Horizontal sync. input	34	4.43MHz oscillation
9	Vertical output	35	ACC filter 1
10	50/60Hz pulse output	36	APC filter
11	50/60Hz shaper	37	ACC filter 2
12	Horizontal sync. detection filter	38	R-Y input
13	Horizontal AFC 1 filter	39	Killer filter
14	503kHz (32fH) oscillation	40	B-Y input
15	GND (Vertical)	41	Killer output
16	Horizontal AFC 2 filter	42	Chroma signal output
17	Supply voltage 4 (Horizontal)	43	Supply voltage 2 (Chroma)
18	Sandcastle pulse output	44	ACC detection filter
19	Horizontal drive pulse output	45	Y Clamp capacitor
20	High tension detection (shutdown) input	46	Supply voltage 3 (Video)
21	Flyback pulse input	47	Chroma signal input
22	B output	48	Black level detection filter
23	G output	49	Automatic brightness limiter, ABL
24	R output	50	Automatic contrast limiter, ACL
25	Supply voltage 1 (Video/RGB output)	51	GND (Video/Chroma)
26	Ys input	52	Video signal input

Test Circuit 1



PAL crystal	116M1 MEW ON1
NTSC crystal	3579 MEIDEN11
1 H Delay line	EFDEN645 A11G1212
Coil	EIK7E80045
Horizontal Vibrator	CSB500F48

● I²C Bus protocol (1)

I²C Bus Formats

(1) Slave address : 1 0 0 0 1 0 1 0

(2) Slave address format :

S	SLAVE ADDR	0	A	SUB ADDR	A	DATA BYTE	A	P

Start condition — Write — Acknowledge bit — Stop condition

(3) Subaddress byte and data byte format :

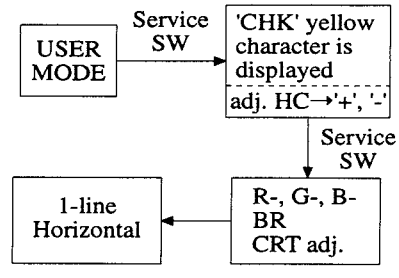
Sub-addr (H)	Functions	Data Byte								Initial Setting at Power ON
		D7	D6	D5	D4	D3	D2	D1	D0	
00	Colour	0	A06	A05	A04	A03	A02	A01	A00	3F (TYP)
01	Tint	0	A16	A15	A14	A13	A12	A11	A10	3F (TYP)
02	Brightness	A27	A26	A25	A24	A23	A22	A21	A20	7F (TYP)
03	Contrast	0	A36	A35	A34	A33	A32	A31	A30	3F (TYP)
04	Sharpness	0	A46	A45	A44	A43	A42	A41	A40	3F (TYP)
05	Cutoff R	A57	A56	A55	A54	A53	A52	A51	A50	7F (TYP)
06	Cutoff G	A67	A66	A65	A64	A63	A62	A61	A60	7F (TYP)
07	Cutoff B	A77	A76	A75	A74	A73	A72	A71	A70	7F (TYP)
08	Drive R	A87	A86	A85	A84	A83	A82	A81	A80	7F (TYP)
09	Drive B	A97	A96	A95	A94	A93	A92	A91	A90	7F (TYP)
0A	H Center	0	0	0	0	AA3	AA2	AA1	AA0	08 (TYP)
0B	MODE SW (PAL/NTSC)								PNS	Refer to I²C Bus protocol (2)
0B	50/60Hz SW							VFS		Refer to I²C Bus protocol (2)
0B	RGB Back MODE						RGB			Refer to I²C Bus protocol (2)
0B	RGB Back			R	G	B				Refer to I²C Bus protocol (2)
0B	Blanking SW		BLK							Refer to I²C Bus protocol (2)
0B	VCO SW	VCO								Refer to I²C Bus protocol (2)

● I²C Bus protocol (1)

Data byte Condition at Sub-addr. ($0B_H$)

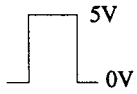
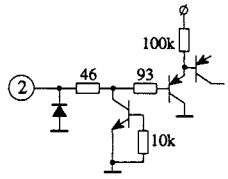
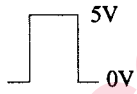
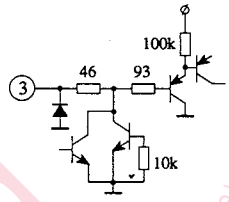
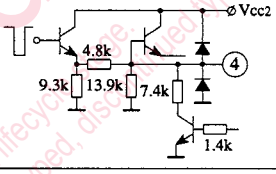
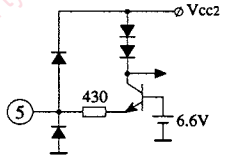
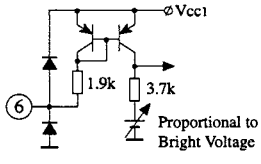
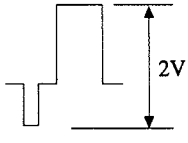
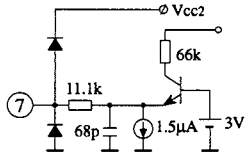
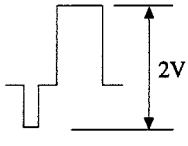
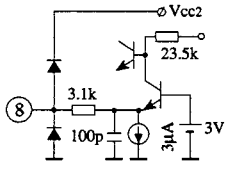
Functions	Data (* mark shows SW ON)		Condition
Mode SW	PNS	*1	PAL
		0	NTSC
50/60Hz	VFS	*0	50Hz
		1	60Hz
RGB Back MODE	RGB	1	Without Vsync. Lock
		*0	With Vsync. Lock
RGB Back	B	1	ON
		*0	OFF
	G	1	ON
		*0	OFF
	R	1	ON
		*0	OFF
Blanking SW	BLK	1	Without Blanking
		*0	With Blanking
VCO SW	VCO	1	3.58MHz
		*0	4.43MHz

● For TV set (Service mode)

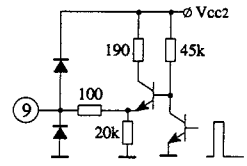
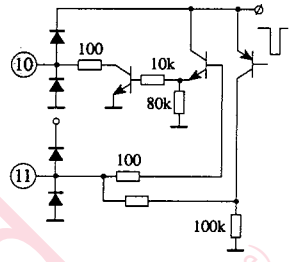
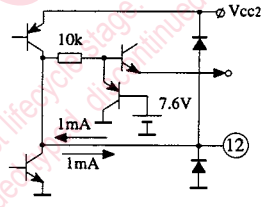
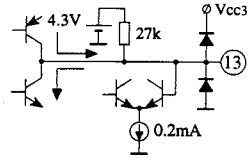
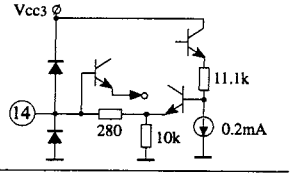
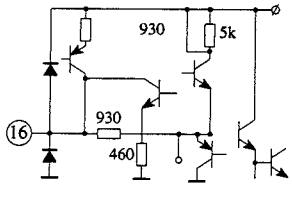
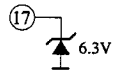


Press 'NORM' twice to go back to user mode.

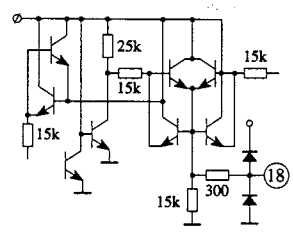
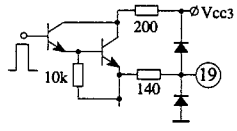
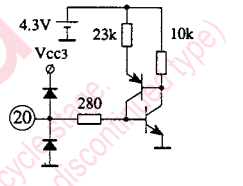
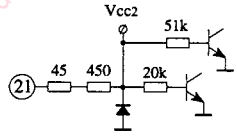
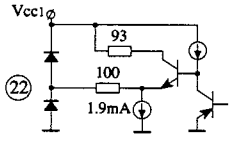
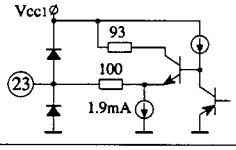
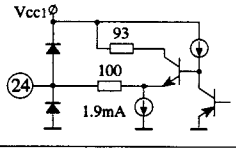
■ Pin Descriptions

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP.	Equivalent Circuit
1	GND	GND for DAC and I^2C		0	
2	I^2C SCL input	Pin for connection to MICOM (High Impedance connection)		∞	
3	I^2C SDA input	Pin for connection to MICOM (High Impedance connection)		∞	
4	V Sync. Sep Integration filter	V. Sync-signal integration filter (LPF) pin. Negative-polarity composite sync-signal is output from the V. sync-sep. circuit. DC 8.3V		3.6kΩ	
5	V Sync. Sep Input	V. sync-signal input pin. From the integration filter is obtained the V. sync-signal which is then input to the IC at this pin for sync. DC 5.9V		430Ω	
6	Black Level Correction Start Point	Black Level correction circuit. Start-point adjustment pin. R is connected between this pin and GND	DC	1.9kΩ	
7	Sync. in (V)	Input pin for Sync. Sep. DC = 2.3V 2V ±3dB D-range 3.3V Composite input		11.1kΩ	
8	Sync. in (H)	Input pin for Sync. Sep. DC = 2.3V 2V ±3dB D-range 3.3V Composite input		3.1kΩ	

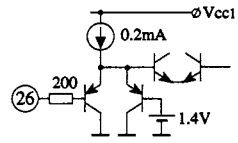
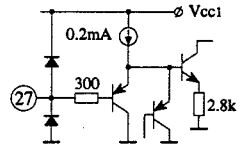
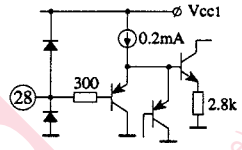
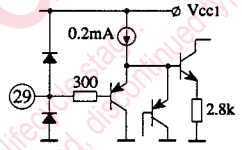
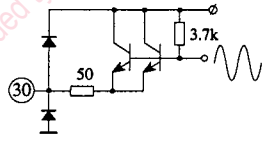
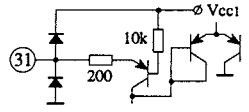
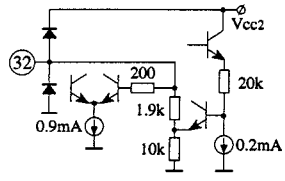
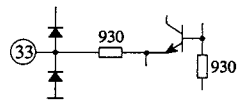
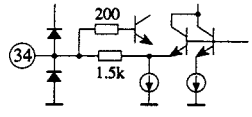
■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP.	Equivalent Circuit
9	Vout	Output pin for vertical osc. pulse signal. Hi : 4.3V Lo : 0 V (Can connect to AN5534)	4.3V 0V	100Ω	
10	V Pulse Shaper Output	For 50/60Hz discrimination by the MICOM. This circuit is used to stretch the V pulse Collector Output : Hi : 5.0V Lo : 0.2 (sat)V MICOM Connection	5V 0.2(sat)	Open Collector	
11	V Pulse Shaper Condenser	Pin for connecting V-pulse shaper condenser		100kΩ	
12	Lock Det. Filter	Filter Pin for detection of sync. between H osc. and input sync. RC filter is connected to this pin Hi : 8.3V Lo : 0.2 (sat)V, MICOM connection	Synchronous 9V Unsynchronised 0V	10kΩ	
13	AFC1 Filter	H. AFC current output pin. The RC filter connected to this pin cause the H AFC to operate Freq. adjustment Hi : Freq. is low Lo : Freq. is high		27kΩ	
14	503kHz Vcc	H. osc. pin. Oscillations by connection of 503kHz resonator at this pin. DC 2.2V	0.2Vpp 503kHz	280	
15	GND2	GND for sync-circuits		0	
16	AFC2 Filter	Filter pin for phase detection in the adjustment of the position of the picture Phase Adjustment : Hi : Phase Lead Lo : Phase Lag		∞	
17	H Vcc	Vcc pin for the sync-circuit Vcc = 6.3V	DC	0	

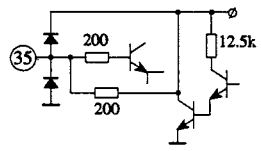
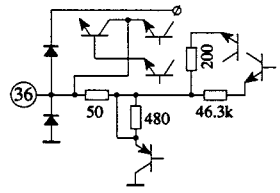
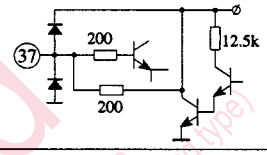
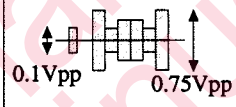
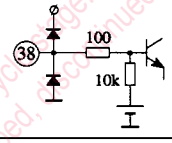
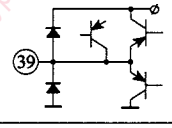
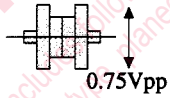
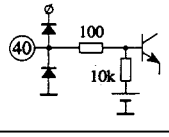
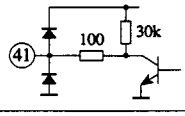
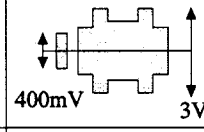
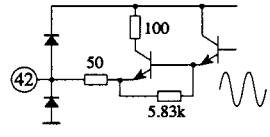
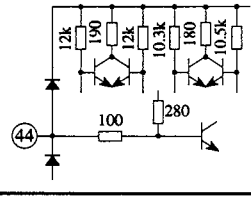
■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP.	Equivalent Circuit
18	Sand castle pulse output	Pin for producing the layered pulse that consists of the V, H, blanking and burst-gate pulse for synchronisation of AN5606K with other ICs Threshold Voltage Burst Gate Pulse 3.6V H. Blanking Pulse : 2.2V V. Blanking Pulse : 0.8V	4.3V 3.0V 1.5V 0V	300	
19	Horizontal drive pulse output	Horizontal drive pulse output. Emitter output : Hi : (5V-2D) Lo : 0V	63.5µs 3.6V 0V 24µs	140	
20	High voltage detection input (shut down input)	Pin for shutdown input When 0.6~0.8V or more is input, then shutdown occur and the H. output signal is cut off If shutdown is not used, then connect this pin to ground	DC	∞	
21	Horizontal blanking pulse input	H. Blanking pulse input pin. Blanking pulse is used not only for clamp-generation circuit, but also for Colour blanking, Y-blanking, Black-level correction circuits, and Picture Position Control H. Blanking Pulse : Threshold Voltage 0.7V AFC2 pulse : Threshold voltage 2.0V	63.5µs 10~13µs	∞	
22	B Output	B Output pin	Measure	100Ω	
23	G Output	G Output pin	Measure	100Ω	
24	R Output	R Output pin	Measure	100Ω	
25	Vcc1	Video, Chroma Vcc pin Typ. 9V		0	

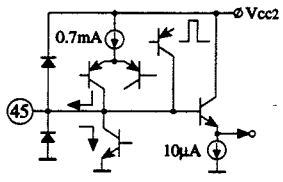
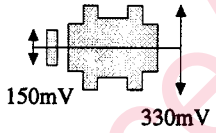
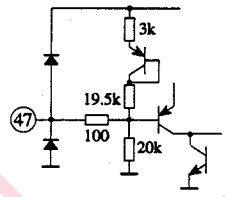
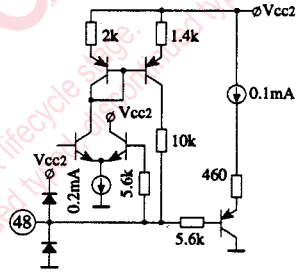
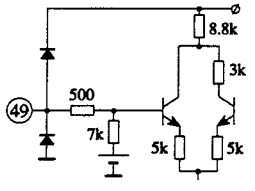
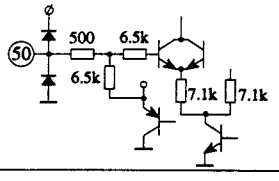
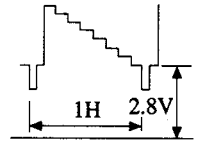
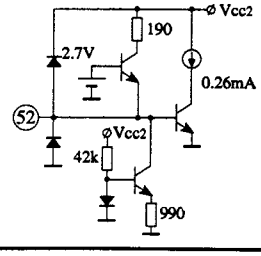
■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP	Equivalent Circuit
26	Ys Input	Input pin for switching pulse to switch between internal signal and external RGB signal	1V or more 0V	∞	
27	External B Input	External B input pin DC coupling	1V	∞	
28	External G Input	External G input pin DC coupling	1V	∞	
29	External R Input	External R input pin DC coupling	1V	∞	
30	CW Out	Carrier output pin for processing the Chroma signal of AN5606K By means of VCO switch-over, the output freq. is changed 3.579545 MHz 4.433619 MHz	400mVpp	50Ω	
31	Spot-Killer	Pin for necessarily fast discharge of the residual voltage at the CRT Diode, Transistor, Condenser are connected	Vcc = 9V-V_{BE} Operating	Open Emit -ter	
32	3.58MHz Oscillation	Chroma 3.58MHz Osc. pin Externally connected crystal-resonator and capacitor DC 2.2V (ON) DC 3.5V (OFF)	f=3.58MHz	1.9kΩ	
33	Killer-Bias	Standard bias voltage output for the killer-circuit	DC	930Ω	
34	4.43 MHz Oscillation	Chroma 4.43MHz Osc. pin. Ext. connected crystal-resonator and condenser DC 2.2V (ON) DC 3.5V (OFF)	f=4.43MHz	1.5kΩ	

■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP.	Equivalent Circuit
35	ACC Filter 1	Chroma ACC circuit noise-removal filter pin	DC	12.7kΩ	
36	Chroma Phase Detection Filter Pin	Phase detection filter pin for chroma-osc. frequency DC 2.5V	DC	46.3kΩ	
37	ACC Filter 2	Chroma ACC circuit noise-removal filter pin	DC	12.7kΩ	
38	R-Y Input	PAL Chroma (R-Y) input pin DC 2.2V in the burst signal for every 1H interval, the carrier phase is inverted		10.1kΩ	
39	Killer Filter	Killer-detection filter pin	DC	∞	
40	B-Y Input	PAL Chroma (B-Y) input pin DC 2.2V In the burst signal, for every 1H interval, the carrier phase is inverted		10.1kΩ	
41	Killer detection output	Killer ON/OFF output Hi : 5.0V (Burst present) Lo : 0.2V (sat)	DC	30.1kΩ	
42	Chroma output	Output pin for ACC-adjusted chroma signal DC 4.2V		50Ω	
43	Vcc2	Video, Chroma Vcc pin for circuit Typ 5.0V	DC	0	
44	ACC Detection filter	ACC detection filter pin Between Vcc2 and this pin is connected the RC in parallel	DC	∞	

■ Pin Descriptions (Continue)

Pin No.	Pin Name	Pin Description	Typical Waveform	I/O IMP.	Equivalent Circuit
45	Y Clamp Condenser	Y clamp-condenser pin DC 1.5V (Center)	DC	∞	
46	Vcc3	Vcc pin for video circuit Typ. 6.2V	DC	0	
47	Chroma Signal Input	External Chroma Input pin Burst signal typ 150mVpp, 330mVpp ± 3 dB D-range 1.0V DC input to switch between PAL/SECAM : PAL 2.0V, SECAM 3.0V, Open DC 2.0V		10kΩ	
48	Black Level Detection Filter	Black Level Detection pin	DC	2.8kΩ	
49	Brightness Control Automatic Brightness Limiter (ABL)	Brightness control pin for automatic control of Brightness of the CRT 1.4V/V Variable range 3V DC 3.0V	DC	7.5kΩ	
50	Contrast Control (ACL) Automatic Contrast Limiter	Contrast control pin for automatic control of the CRT contrast. 2~4V positive polarity ACL DC 3.0V	DC	7.0kΩ	
51	GND	GND for Video/Chroma/RGB	DC	0	
52	Video Signal Input	Video signal input pin		0	

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