

MITSUBISHI ICs (TV)
M52043SP

PAL-M SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION

The M52043SP is an integrated semiconductor circuit which has signal processing functions for video IF, sound IF, video, chroma, deflection signals and a single chip capable of processing PAL-M color TV signals.

Combined with tuner and simple output stage of discrete transistors, it enables more rationalized designs of PAL-M color TV sets.

FEATURES

- Large integration enables rationalization and high equipment reliability with low power consumption.
- Two differential video IF input terminals give parasitic oscillation stability.
- Horizontal free run frequency adjustment free. (Countdown from 32fH oscillator)
- Vertical free run frequency adjustment free. (Countdown from 2fH)
- AFT defeat, video mute and sound mute are available.
- DC control. (sharpness, contrast, brightness, color)

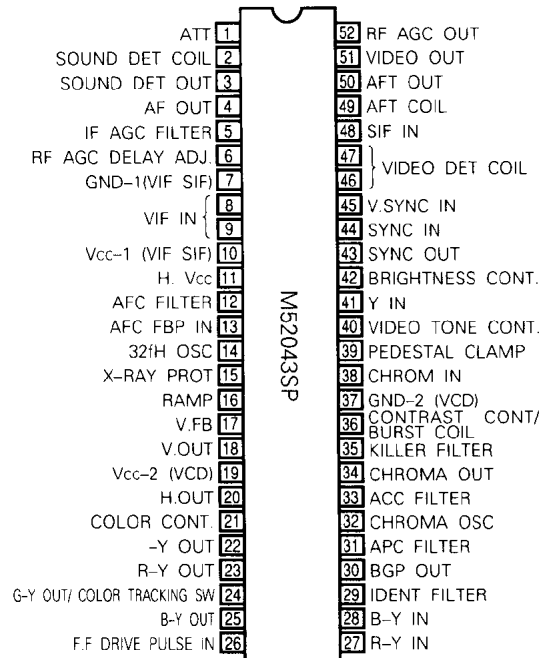
APPLICATION

PAL-M CTV (Vertical 60Hz)

RECOMMENDED OPERATING CONDITION

Supply voltage range8.5~9.5V (V10, V19)
 Rated supply voltage9.0V (V10, V19)
 Supply current range15~22mA (I11)
 Rated supply current18mA (I11)

PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rated	Unit
V _{CC}	Supply voltage	10.8	V
P _d	Power dissipation	1.4	W
T _{opr}	Operating temperature	-20~65	°C
T _{stg}	Storage temperature	-40~125	°C

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

VIF/SIF SECTION

Symbol	Parameter	Test point	Input ()	Test conditions *														Limits			Unit		
				1	5	6	V _{CC} 10	S 2	S 5	S 6	S 6A	S 10	S 10A	S 47	S 48	S 48A	S 49	S 51	S 52	S 52A		Min.	Typ.
I _{CC10}	Circuit current	A10	-	-	-	9.0V	-	-	○	-	-	○	-	-	-	-	-	○	-	27	36	50	mA
V ₅₁	Video output direct current voltage	51	-	-	-	9.0V	○	○	-	○	-	-	-	-	-	-	-	○	-	4.55	4.9	5.35	V
V _{O51}	Video output signal voltage	51	A SG1	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	1.7	2.0	2.3	V _{P-P}
V _{51L}	Sync signal tip voltage	51	A SG2	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	2.3	2.6	2.9	V
V _{in min}	Input sensitivity	51A	A SG3	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	37	45	51	dB μ
V _{in max}	Maximum allowable input	51A	A SG4	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	103	110		dB μ
V _{BTH}	Black spot noise inverter	51	A SG2 SG5	-	-	9.0V	○	○	-	○	-	-	-	-	-	-	-	○	-	1.7	2.0	2.3	V
V _{BCL}																				3.3	3.8	4.3	V
BW	Video frequency characteristics	51	A SG8	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	5.6	8		MHz
IM	Intermodulation	51	A SG9	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	32	45		dB
S/N	Video noise	51A	A SG2	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	50	56		dB
V ₅₀	AFT output direct current	50	-	-	-	9.0V	○	○	-	○	-	-	-	-	-	-	-	○	-	3.0	4.0	5.0	V
V _{50H}	AFT output maximum voltage	50	A SG6	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	8.0	8.7		V
V _{50L}	AFT output minimum voltage	50	A SG7	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-		0.3	1.0	V
μ AFT	AFT sensitivity	50	A SG5	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	40	60	120	mV/kHz
V _{50D}	AFT defeat voltage	50	A SG5	-	-	9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	4.35	4.5	4.65	V
V _{52H}	RF AGC maximum voltage	52	A SG11	-	-	2.5 9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-	7.0	8.0		V
V _{52L}	RF AGC minimum voltage	52	A SG10	-	-	2.5 9.0V	○	-	○	-	-	-	-	-	-	-	-	○	-		0.01	0.3	V
V. S. MUTE1	Sync mute starting voltage	5 6	-	9.0 V	M	9.0V	-	-	-	○	-	-	-	-	-	-	-	○	-		0.7	1.2	V
V ₃	AF direct output direct current voltage	3	-	-	-	9.0V	-	○	○	-	-	-	-	-	-	-	-	○	-	3.4	3.9	4.5	V
V _{OAF}	AF direct output signal voltage	3	C SG12	-	-	9.0V	-	○	○	-	-	-	-	-	-	-	-	○	-	540	630	720	mVrms

* : - Indicates open.

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CHROMA SECTION 1

Symbol	Parameter	Test point	Input ()	Test conditions *																			Limits			Unit						
				11A	16A	19	21	22A	29	36	38	39	40	42	S19A	S19A	S22A	S24A	S27A	S27A	S28A	S28A	S29A	S35A	S36A		S39A	S42A	Min.	Typ.	Max.	
C _{max}	Chroma maximum output	34	G SG26 0dB	12V	-	9.0V	6.5V	-	6.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	0.6	1.0	1.5	V _{P-P}		
G _c	Chroma maximum gain	34	G SG26 -26dB	12V	-	9.0V	6.5V	-	6.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	36	40	46	dB		
Acc - I	ACC Characteristics	34	G SG26 -20dB	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Acc - II																																-4
V _{ik}	Killer operation input level	G 21	G SG26 Variable	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-42	-35	-30	dB			
V _{ok}	Killer color residual	34	G SG26 0dB	12V	-	9.0V	-	-	9.0V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	15	35	mV _{P-P}		
C _{norm}	Chroma normal output	34	G SG26 0dB	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	0.11	0.16	0.27	V _{P-P}		
C _{S min}	Color control characteristics I	34	G SG26 0dB	12V	-	9.0V	2.5V	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
C _{S max}							6.5V																									5
C _{u min}	Color control characteristics II	34	G SG26 0dB	12V	-	9.0V	2.5V	-	6.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C _{u max}							6.5V																									
f _{PC L}	APC Pull-in	21	G SG27 0dB	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f _{PC H}																																
f _{PC}	Total APC range	G	SG27 0dB	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	0.6	1.2	-	kHz			
V ₂₃	Demodulated output DC voltage	23A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	
V ₂₄		24A	-	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	-	-	-	-	-	-	-	-	-	-	-	4.85	5.25	5.65	V		
V ₂₅		25A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V

* : - Indicates open.

CHROMA SECTION 2

Symbol	Parameter	Test point	Input ()	Test conditions *																			Limits			Unit							
				11A	16A	19	21	22A	29	36	38	39	40	42	S19A	S19A	S22A	S24A	S27A	S27A	S28A	S28A	S29A	S35A	S36A		S39A	S42A	Min.	Typ.	Max.		
V ₂₃₋₂₄	Demodulated output DC offset voltage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	
V ₂₄₋₂₅		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.3	0	+0.3	-	V		
V ₂₅₋₂₃		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	
D _{max-P}	Demodulated output maximum amplitude	25A	G SG26 0dB	12V	-	9.0V	6.5V	-	6.5V	-	9.0V	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-	3	4.5	-	-	V _{P-P}		
D _{B-Y}	B-Y Demodulation sensitivity	25A	H SG28 0.2 V _{P-P}	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-	2.1	3.4	4.3	-	V _{P-P}		
$(\frac{R-Y}{B-Y})_P$	Demodulation ratio	23A	H SG28 0.2 V _{P-P}	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-	0.57	0.66	0.73	-	-		
$(\frac{G-Y}{B-Y})_P$		25A	H SG28 0.2 V _{P-P}	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$(\frac{G-Y}{B-Y})_P$		24A	H SG28 0.2 V _{P-P}	12V	-	9.0V	-	-	4.5V	-	9.0V	-	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	0.30	0.37	0.45	-	-	

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CHROMA SECTION 2 (cont.)

Symbol	Parameter	Test point	Input ()	Test conditions *																Limits			Unit								
				11A	16A	19	21	22A	29	36	38	39	40	42	S19	S19A	S22	S24	S27	S27A	S28A	S28A		S35	S36	S39	S42	Min.	Typ.	Max.	
Δ DHR-Y	Demodulated output 1H level	23A	H SG28 0.2 VP-P	12	-	9.0	2.5	-	2.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	mVP-P	
Δ DHG-Y		24A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CLB-Y	Demodulated output carrier leak	25A	-	12	-	9.0	2.5	-	2.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	VP-P	
CLR-Y		23A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CLG-Y		24A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V21	Pin ② voltage	21	G SG26 0dB	12	-	9.0	M	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	4.5	4.8	V
V21K		21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.35	V
DBWR-Y	Demodulated output bandwidth	23	H SG30	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	1	-	MHz
DBG-Y		24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DBWB-Y		25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cin max	Chroma input dynamic range	G 34	G SG26 Variable	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.4	-	VP-P
\angle R-Y-P	Demodulated phase angle	23A	H SG28 0.2 VP-P	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	-	deg.	
\angle G-Y-P		24A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	240	-	deg.

* : - Indicates open.

CHROMA SECTION 3

Symbol	Parameter	Test point	Input ()	Test conditions *																Limits			Unit											
				11A	16A	19	21	22A	29	36	38	39	40	42	S19	S19A	S22	S24	S27	S27A	S28A	S28A		S29	S35	S36	S39	S42	Min.	Typ.	Max.			
Δ VP-C	Color tracking characteristics	22	F SG22	12	-	9.0	-	-	4.0	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		25A	G SG26 0dB	12	-	9.0	-	-	4.0	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SSy	Service switch operation	22	F SG22	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	mVP-P
SSc		34	G SG26 0dB	12	0	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	mVP-P
SSv		16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	VO-P
CTS	Color tracking switch operation	34	G SG26 0dB	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	6	9	dB		
VMS	Video, chroma, muting switch operation	22	F SG17	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	6.2	6.8	VO-P		
CMSR-Y		23A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	mVP-P	
CMSG-Y		24A	G SG26 0dB	12	-	9.0	-	-	4.5	-	-	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	mVP-P
CMSB-Y	25A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	mVP-P	

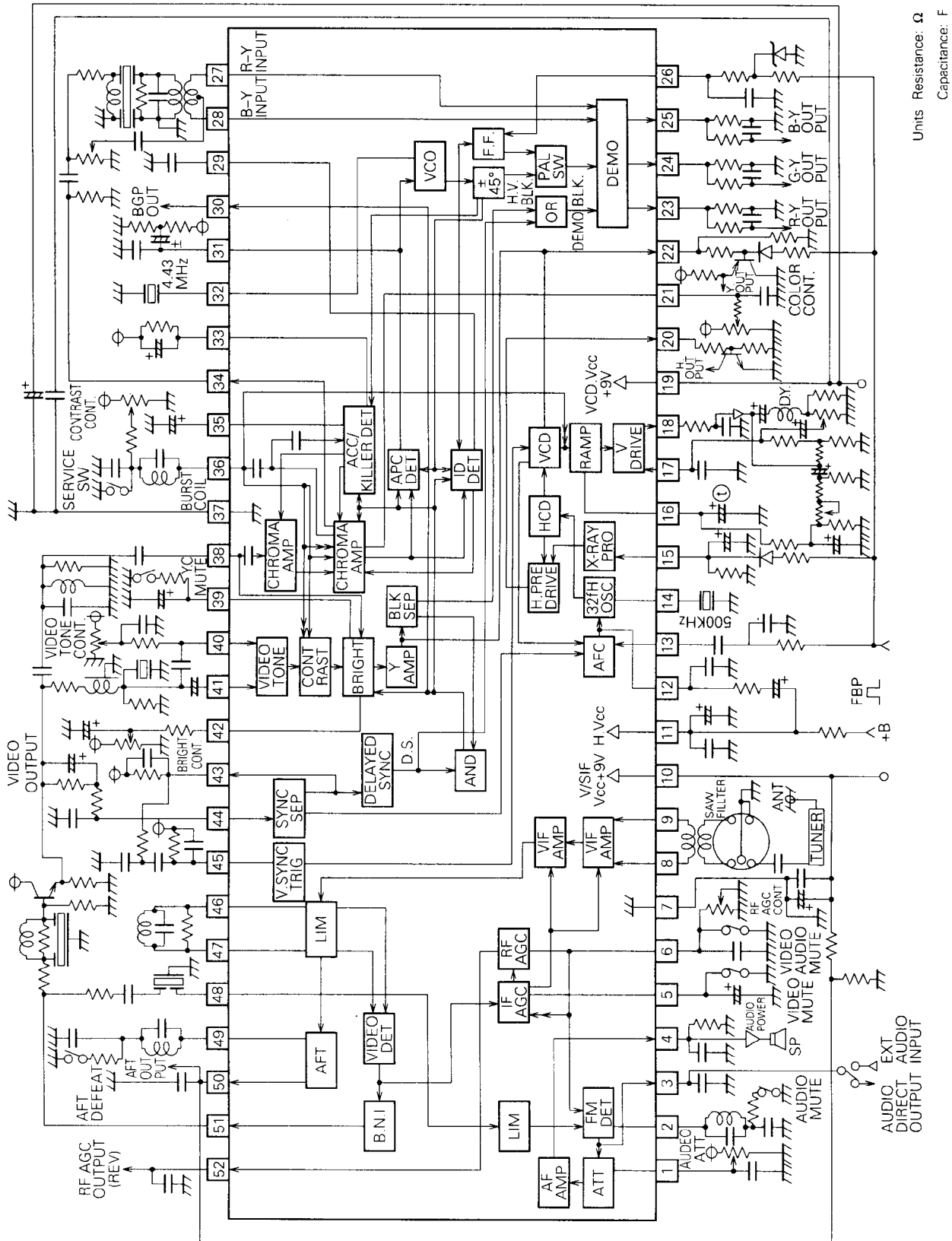
* : - Indicates open.

Electrical characteristics measuring method, input signals, measurement circuits and typical characteristics of this model are the same as those of M51408SP.

M52043SP

PAL-M SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

APPLICATION EXAMPLE



Units Resistance: Ω
Capacitance: F

PAL-M SYSTEM SINGLE-CHIP COLOR TV SIGNAL PROCESSOR

DESCRIPTION OF PIN

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
①	ATT		⑤	IF AGC FILTER	
②	SOUND DET COIL		⑥	RF AGC DELAY ADJ.	
③	SOUND DET OUT		⑦	GND-1 (VIF SIF)	—
④	AF OUT		⑧	VIF IN	
⑨	VIF IN		⑩	Vcc-1 (VIF SIF)	—

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
⑪	H.Vcc		⑮	X-RAY PROT	
⑫	AFC FILTER		⑯	RAMP	
⑬	AFC FBP IN		⑰	V.FB	
⑭	32fh OSC		⑱	V.OUT	
			⑲	Vcc-2 (VCD)	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
20	H.OUT		25	B-Y OUT	
21	COLOR CONT.		26	F. F DRIVE PULSE IN	
22	-Y OUT		27	R-Y IN	
23	R-Y OUT		28	B-Y IN	
24	G-Y OUT/ COLOR TRACKING SW		29	IDENT FILTER/ NTSC SW/ NTSC TINT	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
30	BGP OUT		34	CHROMA OUT	
31	APC FILTER		35	KILLER FILTER	
32	CHROMA OSC		36	CONTRAST CONT. / BURST COIL	
33	ACC FILTER		37	GND-2 (VCD)	---
			38	CHROMA IN	
			39	PEDESTAL CLAMP	

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DESCRIPTION OF PIN (cont.)

Pin No.	Name	Peripheral circuit of pins	Pin No.	Name	Peripheral circuit of pins
40	VIDEO TONE CONT.		44	SYNC IN	
41	Y IN		45	V.SYNC IN	
42	BRIGHTNESS CONT.		46	VIDEO DET COIL	
43	SYNC OUT		47	VIDEO DET COIL	
			48	SIF IN	