Ordering number : ENN4265A

Monolithic Linear IC

LA7672

Color TV Single-Chip Signal Processor for NTSC Systems (PLL Detection)

Overview

The LA7672 is a single-chip IC for color TVs based on the NTSC system with on-chip circuit for all VIF, SIF, video, chroma and deflection signal processing.

Features

[VIF]

- PLL detection (high video and audio quality)
- High-gain VIF amplifier
- High speed AGC
- On-chip APC time constant switch

[SIF]

- Simultaneous sound IN/OUT
- Video/audio simultaneous muting, or audio-only muting possible

[Audio-visual switch]

- Internal/external audio-visual switch (V_{CC} = 9 V)

Delay line	Video external, audio external	Switch rating
OFF	IN	6.9 to 9.0 V
OFF	EXT	4.7 to 6.6 V
ON	EXT	2.4 to 4.3 V
ON	IN	0 to 2.1 V

[OSD]

- RGB 3 input
- RGB linear up (– 6 dB input: 2 V to 5 V)
- Fast blanking (B input combined use)

[Chroma]

- On-chip ACC filter, On-chip killer filter, Killer-circuit hysteresis operation
- On-chip carrier filter

[Video]

- Black enhancement
- On-chip delay line
- Wide band width (9 MHz): delay line short
- Duel rank on-chip differentiation circuit also available for soft also
- S input supported (VCR application)
- Variable DC transmission volume available (externally attached circuit adjustment)

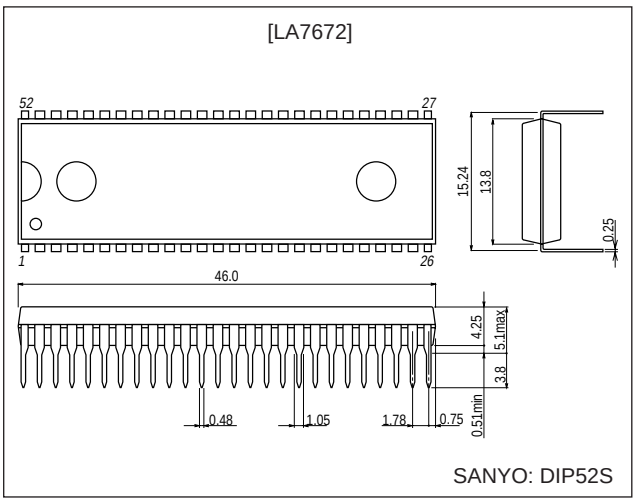
[Deflection]

- Adjustment-free horizontal, vertical synchronization
- Duel AFC system with excellent anti-noise characteristics
- External adjustment of vertical synchronization sensitivity
- Vertical size is constant with no-signal
- Highly stable image during playback of copy protected tapes (macro-vision tape)
- High stability against VCR skew distortion

Package Dimensions

unit : mm

3128-DIP52S



SANYO Electric Co.,Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	V11 max		11	V
	V14 max		11	V
Maximum Supply Current	I30max		16	mA
Allowable Power dissipation	Pd max	Ta ≤ 60°C	1.35	W
Operating Temperature Range	Topr		–10 to +65	°C
Storage Temperature Range	Tstg		–55 to +150	°C
Circuit Current	I44		–6	mA
	I6		–3	mA
FBP Input Current	I22 max	Peak current	5	mA
	I21 max	Peak current	10	mA

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V11		9	V
	V14		9	V
Recommended Supply Current	I30		13	mA
Operating Voltage Range	V11op		8 to 9.5	V
	V14op		8 to 9.5	V
Operating Current Range	I30op		10 to 16	mA

Operating Characteristics at Ta = 25°C, V_{CC} = V11 = V14 = 9 V, I_{CC} = I30 = 13 mA

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Circuit Voltage and Current]						
Horizontal Supply Voltage	V30	V_{CC} = 9V, I_{CC} = 13mA	7.3	7.8	8.3	V
Supply Current	I11 + 14	V_{CC} = 9V, I_{CC} = 13mA, I_F AGC 4V	102	120	138	mA
[VIF]						
Quiescent Video Output Voltage	V44	Quiescent	4.3	4.7	5.1	V
Quiescent AFT Output Voltage	V47	Quiescent	3.1	4.7	6.1	V
Maximum RFAGC Voltage	V49H	CW = 85dBμ, RFAGCVR = min	7.6	8.0	8.3	V
Minimum RFAGC Voltage	V49L	CW = 85dBμ, RFAGCVR = max	0	0.01	0.3	V
Input Sensitivity	Vi	VIF input level for video output at 0.8Vp-p (40% mod).	33	39	45	dBμ
AGC Range	GR	Maximum input (V0 = 0.8Vp-p) - input sensitivity	54	62		dB
Maximum Permissible Input	Vi max	VIF input level for video output at +1dB	97	104		dBμ
Video Output Detection	V_O44	Vi = 80dBμ, AM = 78% mod	1.7	2.0	2.3	Vp-p
Differential Gain	DG	Vi = 80dBμ, AM = 87.5%, video mod		3.0	10	%
Differential Phase	DP	Vi = 80dBμ, AM = 87.5%, video mod		1.0	10	deg
Video S/N	S/N	Vi = 80dBμ, 20 log $\frac{1.46\ (Vp\text{-}p)}{noise\ (Vrms)}$	47	54		dB
Synchronization Signal Tip Level	V44 TIP	CW = 80dBμ	2.1	2.4	2.7	V
Frequency Characteristic	f_C	Frequency at video output of –3dB	6.0	9.0		MHz
920 kHz VIF Intermodulation	I920	V3.58MHz/V920kHz, Vi = 80dBμ	35	42		dB
Maximum AFT Output Voltage	V47H	CW = 80dBμ, frequency change	8.3	8.7	9.0	V
Minimum AFT Output Voltage	V47L	CW = 80dBμ, frequency change	0.1	0.3	0.8	V
AFT Detection Sensitivity	Sf	CW = 80dBμ, frequency change	45	70	100	mV/kHz
AFT Switch Operation Start Voltage	V_{AFTSW}	Measuring with sweep signal	0.5	1.0		V
Black Noise Threshold Level	V_{BTH}	Measuring with sweep signal	1.1	1.4	1.7	V
APC Pull-in Range (U)2	$f_{PU\text{-}2}$	CW = 80dBμ, f_P = 53MHz to 64MHz	0.8	1.7		MHz
APC Pull-in Range (L)2	$f_{PL\text{-}2}$	CW = 80dBμ, f_P = 53MHz to 64MHz		–2	–1	MHz
VCO Maximum Variable Range	Δf_U	Quiescent	0.9	1.7		MHz
	Δf_L	Quiescent		–2	–1	MHz
VCO Control Sensitivity	b	Quiescent	1.5	3.0	5.5	kHz/mV

Continued on next page.

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Audio-visual Switches]						
Video Output DC Voltage	V38	Quiescent	3.0	3.4	3.8	V
Internal Video Input Voltage	V42	Quiescent	4.4	4.8	5.2	V
External Video Input Voltage	V40	Quiescent	4.4	4.8	5.2	V
External Audio Input Voltage	V3	Quiescent	5.2	5.6	6.0	V
[SIF AF]						
SIF Limiting Voltage	Vi lim	SIF output level for detection output at –3dB		40	47	dBμ
FM Detection Output Voltage	V_O1	Vi = 100dBμ, Δf = ±25kHz	380	550	750	mVrms
FM Detection Output Distortion Ratio	THD	Vi = 100dBμ, Δf = ±25kHz		0.4	1.0	%
AM Rejection	AMR	Vi = 100dBμ, FM : Δf = ±25kHz / AM : 30 %	40	60		dB
AF Amplifier Voltage Gain	G_{AF}	Vi = 100mVrms, f = 400Hz	18	20	22	dB
AF Maximum Output Voltage	V_O6 max	Output level for AF amplifier output distortion at 10%	2.0	2.8		Vrms
AF Electronic Attenuator Range	ATT	Vi = 200mVrms, f = 400Hz	70	80		dB
[Video]						
Black Enhancement Threshold	B_{STH}	APL variable	40	50	60	IRE
Maximum Black Enhancement Gain	BS max	APL variable	–35	–27	–20	IRE
Soft Video Tone Variable Range	ΔSoft	f = 2MHz, 100mVp-p video tone VR: 4V → 0V	–6	–4	–2	dB
Sharp Video Tone Variable Range	ΔSharp	f = 2MHz, 100mVp-p video tone VR: 4V → 9V, contrast VR: 6V	7	10	13	dB
Video Voltage Gain Audio-visual Switch 9V	GV9V	f = 100kHz, 100mVp-p, contrast VR: 9V, video tone VR: 4V	15	18	21	dB
Video Voltage Gain Audio-visual Switch 0V	GV0V	f = 100kHz, 100mVp-p, contrast VR: 0V, video tone VR: 4V	15	18	21	dB
Contrast Control Center	C_{CEN}	f = 100kHz, 100mVp-p, contrast VR: 6V	0.4	0.48	0.57	Vp-p
Contrast Variable Control Range	ΔC_V	Contrast VR: 3V → 9V	18	20	22	dB
Bright Control	B R_H	Bright VR: 1.5V	5.5	6.5	7.5	V
	B R_{CEN}	Bright VR: 4.5V	2.3	2.8	3.3	V
	B R_L	Bright VR: 7V		0.3	1.2	V
DL Off Frequency Characteristics	f_V 9V	Contrast VR: 6V, video tone VR: 4V, 3dB down	7	9		MHz
DL On Frequency Characteristics	f_V 0V	Contrast VR: 6V, video tone VR: 4V, 3dB down	2.5	3		MHz
DC Transmission	R_{DC}	Input: stair step signal, 500mVp-p	100	103	106	%
Delay Line Delay	T_{DL}	Input: white 100%	290	340	390	ns
[Chroma]						
ACC Amplitude Characteristics	$A_{CC}1$	+6dB	–3	0	+3	dB
	$A_{CC}2$	–20dB	–7		+2	dB
ACC Phase Characteristics	$A_{CCP}1$	+6dB	–3	0	+3	deg
	$A_{CCP}2$	–20dB	–7		+7	deg
Killer Operation Point	E_K		–35	–28	–21	dB
Color Control Color Residual	E_C min	Color VR: 0V, contrast VR: 9V			30	mVp-p
Color Control Center	$E_{C\ CEN}$	Color VR: 4.5V, contrast VR: 6V	1.2	1.8	2.4	Vp-p
Maximum Demodulation Output	E_C max	Color VR: 9V, contrast VR: 9V	3.2	4.0		Vp-p
Color Contrast Variable Range	ΔC_C	Color VR: B – Y = 2.5Vp-p, contrast VR: 3V → 9V	17.5	19.5	21.5	dB
Tint Control Center	T_{CEN}	Tint VR: 4.5V, color VR: 4.5V, contrast VR: 6V	0	12	24	deg
Tint Variable Range	ΔT	Tint VR: 0V ← 4.5V → 8V, color VR: 4.5V, contrast VR: 6V	±40			deg
APC Pull-in Range	Δf_{APC}		±300			Hz
Demodulator Output Ratio	R/B	Monochrome signal, contrast VR: 6V, color VR: B – Y = 1Vpo	0.81	0.90	0.98	
	G/B	Monochrome signal, contrast VR:6V, color VR: B – Y = 1Vpo	0.24	0.30	0.38	

Continued on next page.

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Demodulator Phase Angle	RB	Monochrome signal, contrast VR: 6V, color VR: B – Y = 1Vpo	97	105	113	deg
	GB	Monochrome signal, contrast VR: 6V, color VR: B – Y = 1Vpo	–130	–120	–110	deg
Demodulator Output DC Voltage	V_{C-Y}	Burst signal only, color VR: 0V	4.7	5.2	5.7	V
Demodulator Output DC Offset Voltage	ΔV_{C-Y}	Burst signal only, color VR: 0V	–200	0	+200	mV
Demodulator Output Residual Carrier	E car	Quiescent, killer off, color VR: 0V			0.03	Vp-p
[OSD]						
Blanking Pulse Threshold Level	TH_{BL}	C – IN: color bar, B – IN: variable	0.5	0.8	1.1	V
– Y Out DC Voltage (OSD mode)	V_{-Y}	B–IN : 1.5V	2.5	2.8	3.1	V
RGB – In Threshold Level	TH_R	R – IN: variable, B – IN: 1.5V	1.9	2.2	2.5	V
	TH_G	G – IN: variable, B – IN: 1.5V				
	TH_B	B – IN, variable				
RGB – Y Out DC Voltage (3 V)	V_{R3V}	R, G, B – IN :3V	5.2	5.5	5.8	V
	V_{G3V}					
	V_{B3V}					
RGB – Y Out DC Voltage (4 V)	V_{R4V}	R, G, B – IN : 4V	5.7	6.0	6.3	V
	V_{G4V}					
	V_{B4V}					
RGB – Y Out DC Voltage (5 V)	V_{R5V}	R, G, B – IN : 5V	6.2	6.5	6.8	V
	V_{G5V}					
	V_{B5V}					
[Deflection]						
Synchronization Separator Input DC Level	V_{SDC}		6.0	6.3	6.6	V
Vertical Free-Running Period	T_V free		262	262.5	263	H
Maximum Vertical Synchronization Period	T_V max	Input: horizontal synchronization signal only	296.5	297	297.5	H
Minimum Vertical Synchronization Period	T_V min		224.5	225	225.5	H
Vertical Blanking Pulse Width	$P_{W\ VBL}$		20.25	20.5	20.75	H
Vertical Blanking Pulse Wave Height Value	$P_{H\ VBL}$		7.0	7.5		V
Vertical Output Pulse Width	$P_{W\ VOUT}$		8.25	8.5	8.75	H
Vertical Output Voltage	$V_{OUT\ H}$		5.7	6	6.3	V
	$V_{OUT\ M}$		4.2	4.5	4.8	V
	$V_{OUT\ L}$				0.3	V
Vertical External Trigger Load Resistance	R_{TR}		2.7	3.6		kΩ
Vertical Automatic Synchronization Stop Voltage	V_{SAS}			1.9	2.4	V
Vertical Output Pulse Start V_{CC} Voltage	S_{VV}				4	V
Horizontal Free-Running Frequency Deviation	Δf_H	Deviation from 15.734kHz	–90	+30	+150	Hz
Dependence of Horizontal Free-Running Frequency on V_{CC}	$\Delta f_{H\ VCC}$	V30 = 6.7V, reference value		2		Hz
Horizontal Pull-in Range	$f_{H\ PULL}$	Deviation from 15.734kHz	±400			Hz
Horizontal Output Pulse Width	$P_{WH\ OUT}$		21.8	23.8	25.8	µs
Horizontal Output Pulse Phase	H_{PF}		12			µs
	$H_{P\ CEN}$		3.4	4.4	5.4	µs
	H_{PR}				0	µs
Horizontal Output Pulse Start V_{CC} Voltage	S_{HV}			4.5	5.3	V
AFC II FBP Peak Voltage	F_{BPH}		4.1	4.6	5.1	V
Burst Gate Pulse Delay Time	Td_{BGP}		0.2	0.6	1.2	µs
Burst Gate Pulse Width	$P_{W\ BGP}$		2.7	3.7	4.7	µs
VCR SW Input Voltage	VCR			1.3	2.0	V
X-ray Protector Circuit Operation Input Voltage	V_{HD}		0.64	0.74	0.84	V
Horizontal Synchronization Detection Threshold Level	H coin		4.2	4.5	4.8	V

Sample Application Circuit