

# SANYO Semiconductors

## DATA SHEET

# LA73054 — For DVD Player Video Signal Driver

#### Overview

The LA73054 is a video signal driver for DVD player.

#### **Functions**

- 6 Channel
- Clamp
- Amplifier
- 75Ω driver

- Y/C-MIX
- Output Mute
- DC voltage output for S1 and S2
- 7MHz/14MHz LPF

#### **Specifications**

#### **Maximum Ratings** at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max		7.0	V
Allowable power dissipation	Pd max	Ta ≤ 75°C *	800	mW
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

<sup>\*</sup> Mounted on a board : 114.3×76.1×1.6mm³, glass epoxy board.

#### **Recommended Operating Conditions** at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	Vcc		5.0	V
Operating supply voltage range	V <sub>CC</sub> opg		4.75 to 5.25	V
Input pin voltage application range	VIN	V <sub>CC</sub> opg + 0.3 ≤ 7V	-0.3 to V <sub>CC</sub> opg + 0.3	V

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## **Electrical Characteristics** at Ta = 25°C, $V_{CC} = 5V$

			Inpu	ıt Signal				F	Rating	s				Cont	rol Vo	oltage	. Uni	t : V			SW C	ontrol
Parameter	Symbol	Point	Signal	Freq [Hz]	Ampli- tude	Output Point	Test Conditions	min	typ	max	Unit	V3	V4	V5	V9	V10	V12	V13	V15	V36	S21 S23	S28 S31
Current drain	Icc				[p-p]	V <sub>CC</sub> 1 V <sub>CC</sub> 21 V <sub>CC</sub> 22	The sum of current flowing through V <sub>CC</sub> 1, V <sub>CC</sub> 21 and V <sub>CC</sub> 22 at no signal	52	65	78	mA	3.3	0	0	0	0	0	0	0	0	S25 ON	ON
GAIN at 6dB	G33L	V <sub>IN</sub> 2	SG5		1V	T33	Measure GAIN for input	5.6	5.9	6.4	dB			0	0	0	0	0	0	0	ON	ON
For two drives	G31L	V <sub>IN</sub> 6	SG6		714mV	T31	at each output.															
	G28L	V <sub>IN</sub> 8	SG5		1V	T28																
	G25L	V <sub>IN</sub> 11	SG5		1V	T25																
	G23L	V <sub>IN</sub> 14	SG6		1V	T23																
	G21L	V <sub>IN</sub> 16	SG6		1V	T21																
GAIN at 9dB	G33H	V <sub>IN</sub> 2	SG5		709mV	T33	Measure GAIN for input	8.55	8.9	9.45	dB			0	0	0	0	0	0	3.3	ON	ON
For two drives	G31H	V <sub>IN</sub> 6	SG6		507mV	T31	at each output.															
	G28H	V <sub>IN</sub> 8	SG5		709mV	T28																
	G25H	V <sub>IN</sub> 11	SG5		709mV	T25													3.3	0		
	G23H	V <sub>IN</sub> 14	SG6		709mV	T23																
	G21H	V <sub>IN</sub> 16	SG6		709mV	T21																
GAIN at 6dB	G33L1	V <sub>IN</sub> 2	SG5		1V	T33	Measure GAIN for input	5.6	6.1	6.4	dB			0	0	0	0	0	0	0	ON	OFF
For one drive	G31L1	V <sub>IN</sub> 6	SG6		714mV	T31	at each output.															
Two-drive mode	G28L1	V <sub>IN</sub> 8	SG5		1V	T28																
	G25L1	V <sub>IN</sub> 11	SG5		1V	T25															OFF	ON
	G23L1	V <sub>IN</sub> 14	SG6		1V	T23																
	G21L1	V <sub>IN</sub> 16	SG6		1V	T21																
GAIN at 9dB	G33H1	V <sub>IN</sub> 2	SG5		709mV	T33	Measure GAIN for input	8.55	9.1	9.45	dB			0	0	0	0	0	0	3.3	ON	OFF
For one drive	G31H1	V <sub>IN</sub> 6	SG6		507mV	T31	at each output.															
Two-drive mode	G28H1	V <sub>IN</sub> 8	SG5		709mV	T28																
	G25H1	V <sub>IN</sub> 11	SG5		709mV	T25													3.3	0	OFF	ON
	G23H1	V <sub>IN</sub> 14	SG6		709mV	T23																
	G21H1	V <sub>IN</sub> 16	SG6		709mV	T21																
Output GAIN	Δ33/31	$V_{IN}^2$	SG5		709mV	T33	Calculate the GAIN ratio	-0.5	0	0.5	%			0	0	0	0	0	0	3.3	ON	OFF
ratio (composite/S)	Δ33/28	V <sub>IN</sub> 6	SG6		507mV	T31	at two outputs.															
(composite/s)	Δ31/28	V <sub>IN</sub> 8	SG5		709mV	T28																
Output GAIN	Δ25/23	V <sub>IN</sub> 11	SG5		709mV	T25	Calculate the GAIN ratio	-0.5	0	0.5	%			0	0	0	0	0	3.3	0	OFF	ON
ratio (component)	Δ25/21	V <sub>IN</sub> 14	SG6		709mV	T23	at two outputs.															
(component)	Δ23/21	V <sub>IN</sub> 16	SG5		709mV	T21																
f characteristic	F33L	V <sub>IN</sub> 2	SG3	7M	1V	T33	Measure GAIN for input	-2	-0.8	0.4	dB			0	0	0	0	0	0	0	ON	ON
7MHz Attenuation	F31L	V <sub>IN</sub> 6	SG2	7M	714mV	T31	at each output and calcualte the attenuation															
amount	F28L	V <sub>IN</sub> 8	SG1	7M	1V	T28	amount for "6dB GAIN."															
	F25L1	V <sub>IN</sub> 11	SG1	7M	1V	T25																
	F23L1	V <sub>IN</sub> 14	SG4	7M	1V	T23																
	F21L1	V <sub>IN</sub> 16	SG4	7M	1V	T21																
f characteristic	F33H	V <sub>IN</sub> 2	SG3	27M	1V	T33	Measure GAIN for input		-29	-22	dB			0	0	0	0	0	0	0	ON	ON
27MHz Attenuation	F31H	V <sub>IN</sub> 6	SG2	27M	714mV	T31	at each output and calcualte the attenuation															
amount	F28H	V <sub>IN</sub> 8	SG1	27M	1V	T28	amount for "6dB GAIN."															
	F25H1	V <sub>IN</sub> 11	SG1	27M	1V	T25																
	F23H1	V <sub>IN</sub> 14	SG4	27M	1V	T23																
	F21H1	$V_{IN}$ 16	SG4	27M	1V	T21																

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## LA73054

Continued from preceding page.

			Inpu	ıt Signal				F	Rating	s				Con	trol V	'oltag	e Ur	nit : V			SW C	Control
Parameter	Symbol	Point	Signal	Freq [Hz]	Ampli- tude [p-p]	Output Point	Test Conditions	min	typ	max	Unit	V3	V4	V5	V9	V10	V12	V13	V15	V36		S28 S31 S33
f characteristic	F25L2	V <sub>IN</sub> 11	SG1	14M	1V	T25	Measure GAIN for input	-1.9	-0.7	0.5	dB			0	0	0	0	3.3	0	0	ON	ON
of GAIN 14MHz Attenuation	F23L2	V <sub>IN</sub> 14	SG4	14M	1V	T23	at each output and calcualte the attenuation															
amount	F21L2	V <sub>IN</sub> 16	SG4	14M	1V	T21	amount for "6dB GAIN."															
f characteristic	F25H2	V <sub>IN</sub> 11	SG1	54M	1V	T25			-39	-30	dB			0	0	0	0	3.3	0	0	ON	ON
of GAIN 54MHz Attenuation	F23H2	V <sub>IN</sub> 14	SG4	54M	1V	T23																
amount	F21H2	V <sub>IN</sub> 16	SG4	54M	1V	T21																
MUTE voltage	V21MD					T21	Measure the pin voltage.	2.1	2.5	2.9	٧			3.3	0	0	0	0	0	0	ON	ON
	V23MD					T23																
	V25MD					T25																
	V28MD					T28								0			3.3					
	V31MD					T31																
	V33MD					T33																
DC for SQ	VSQ					T30	Measure the pin voltage	4.1	4.4	4.7	V	3.3	0	0	0	0	0	0	0	0	ON	ON
DC for LB	VLB					T30	at V <sub>CC</sub> = 4.75 to 5.25V	2.05	2.2	2.35	٧	0	3.3	0	0	0	0	0	0	0	ON	ON
DC for 4:3	V43					T30	7.73 10 3.23 1	0	0	0.35	V	0	0	0	0	0	0	0	0	0	ON	ON

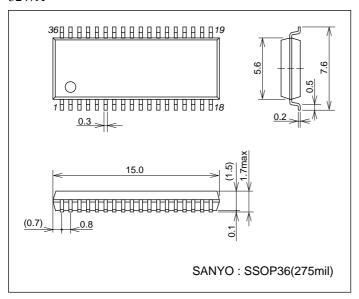
# Design Guarantee Items at Ta = 25°C, $V_{CC} = 5V$

- J			Inni	ut Signal			,		Rating	19		1		Con	trol \/	oltag	e Un	it · \/			SW C	ontro
		Daint		-	A ma m li		T . O . IV			1			I			_						1
Parameter	Symbol	Point	Signal	Freq [Hz]	Ampli- tude [p-p]	Output Point	Test Conditions	min	typ	max	Unit	V3	V4	V5	V9	V10	V12	V13	V15	V36	S21 S23 S25	S31
f characteristic	GD33	V <sub>IN</sub> 2	SG3	7M	1V	T33	Difference in group delay		±10	±15	ns			0	0	0	0	0	0	0	0	0
at group delay	GD31	V <sub>IN</sub> 6	SG2	7M	714mV	T31	at 7MHz for 100kHz of															
At 7MHz (Interlace)	GD28	V <sub>IN</sub> 8	SG1	7M	1V	T28	each output															
(	GD25-1	V <sub>IN</sub> 11	SG1	7M	1V	T25																
	GD23-1	V <sub>IN</sub> 14	SG4	7M	1V	T23																
	GD21-1	V <sub>IN</sub> 16	SG4	7M	1V	T21																
f characteristic	GD25-2	V <sub>IN</sub> 11	SG1	14M	1V	T25	Difference in group delay		±15	±20	ns			0	0	0	0	3.3	0	0	0	0
of group delay	GD23-2	V <sub>IN</sub> 14	SG4	14M	1V	T23	at 14MHz for 100kHz of															
At 14MHz (progressive)	GD21-2	V <sub>IN</sub> 16	SG4	14M	1V	T21	each output															
(progressive)																						
DG	DG33	V <sub>IN</sub> 2	SG7	3.58M	1V	T33	Calculate, in percentage,		1	2	%			0	0	0	0	0	0	0	0	0
	DG28	V <sub>IN</sub> 8	SG7	3.58M	1V	T28	the amplitude of SIN															
	DG25	V <sub>IN</sub> 11	SG7	3.58M	1V	T25	wave on the white level relative to that of SIN															
	DGMIX	V <sub>IN</sub> 6	SG2	3.58M	286mV	T33	wave on the black level								3.3							
		V <sub>IN</sub> 8	SG7	Y com-	1V		of each output signal.															
				ponent																		L.
DP	DP33	V <sub>IN</sub> 2	SG7	3.58M	1V	T33	Measure the difference in phase of SIN wave on	-1	0.5	1	deg			0	0	0	0	0	0	0	0	0
	DP28	V <sub>IN</sub> 8	SG7	3.58M	1V	T28	the white level relative to															
	DP25	V <sub>IN</sub> 11	SG7	3.58M	1V	T25	that of SIN wave on the															
	DPMIX	V <sub>IN</sub> 6	SG2	3.58M	286mV	T33	black level of each output signal.								3.3							
		V <sub>IN</sub> 8	SG7	Y com- ponent	1V		output signal.															
Cross-talk	CT33	V <sub>IN</sub> 2	SG3	4M	1V	T33	Measure the 4MHz		-60	-55	dB			0	0	0	0	0	0	0	0	0
	CT31	V <sub>IN</sub> 6	SG2	4M	1V	T31	component of output in															
	CT28	V <sub>IN</sub> 8	SG1	4M	1V	T28	the no-input route and specify this in a															
	CT25	V <sub>IN</sub> 11	SG1	4M	1V	T25	percentage relative to															
	CT23	V <sub>IN</sub> 14	SG4	4M	1V	T23	the magnitude of 4MHz															
	CT21	V <sub>IN</sub> 16	SG4	4M	1V	T21	of other outputs.															
Video S/N ratio	SN33	V <sub>IN</sub> 2	SG5		1V	T33	Measure S/N of the		-79	-77	dB			0	0	0	0	0	0	0	0	0
	SN28	V <sub>IN</sub> 8	SG5		1V	T28	output signal with a noise															
	SN25	V <sub>IN</sub> 11	SG5		1V	T25	meter (LPF 10MHz, HPF 100kHz) and specify this															
	SNMIX	V <sub>IN</sub> 8	SG5		1V	T33	in dB.		-73	-71	dB				3.3							
Linearity of RGB	LN25	V <sub>IN</sub> 11	SG8		0.7V	T25	Measure GAIN of the	95	99	100	%			0	0	3.3	0	0	0	0	0	0
signal	LN23	V <sub>IN</sub> 14	SG8		0.7V	T23	output signal and specify															
	LN21	V <sub>IN</sub> 16	SG8		0.7V	T21	this in a percentage															
		V <sub>IN</sub> 2	SG5		1V		relative to GAIN at 0.35Vp-p input.															
ı	i	i .	i	1	1	1	1	ı	ı	1	1	ı	i	i	ı	1	1	1	ı			

 $Caution: The \ control \ voltage \ of \ V19 \ and \ V35 \ is \ 0 \ V \ for \ all \ of \ above \ items. \ SG8 \ is \ the \ signal \ determined \ by \ removing \ SYNC \ from \ SG5.$ 

## **Package Dimensions**

unit : mm 3247A



#### **Control Pin Function Table**

Pin No.	Contro	l	0 to 0.7V (LOW)	2.6 to 5V (HIGH)		
36	AMP-GAIN changeover for comp	osite/S	6dB	9dB		
15	AMP-GAIN changeover for comp	onent	6dB	9dB		
35	Drive current changeover for com	posite/S	Two-system drive	Single-system drive		
19	Drive current changeover for com	ponent	Two-system drive	Single-system drive		
5	Mute control for composite/S	With pin 10 at LOW	No mute	Mute of pins 33, 31, and 28		
		With pin 10 at HIGH	No mute	Mute of pins 31 and 28		
12	Component mute control		No mute	Mute of pins 25, 32, and 21		
9	Y/C-MIX control		At composite	At Y/C-MIX		
10	Pin 11 input form changeover		Clamp input	Pedestal clamp input		
13	Component LPF characteristics of	hangeover	Interlace compatible Progressive compatible			

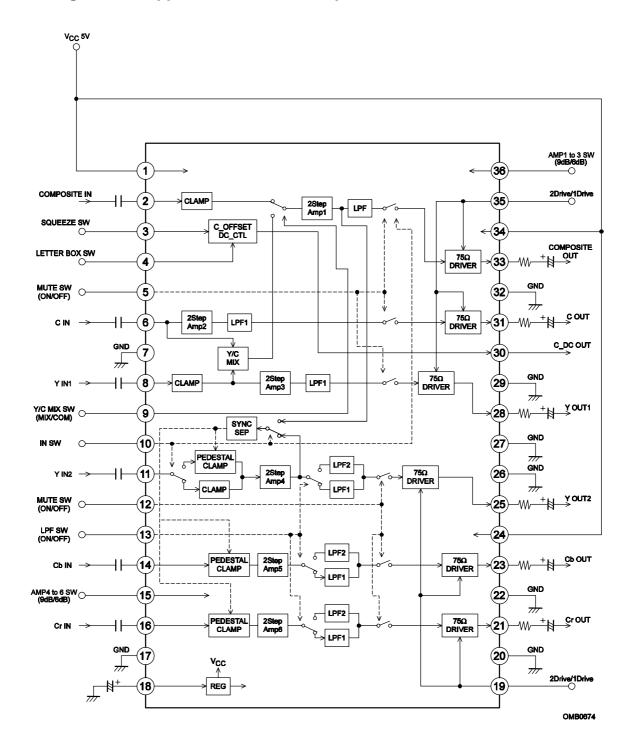
<sup>\*</sup> Pin 2 is connected to GND at Y/C-MIX.

Pin 3	Pin 4	Pin 30 output DC
0 to 0.7V	0 to 0.7V	LOW (0V) → For 4:3 mode
0 to 0.7V	2.6 to 5V	MIDDLE (2.2V) $\rightarrow$ For the letter box mode
2.6 to 5V	0 to 0.7V	HIGH (5V) → For the squeeze mode
2.6 to 5V	2.6 to 5V	Prohibited

 $<sup>^*</sup>$  The voltage to be applied to all control pins must not be higher than the one applied to  $V_{CC}$  and lower than the one applied to GND.

 $<sup>\</sup>ensuremath{^{*}}$  All of control pins must not be used in the OPEN state.

## **Block Diagram and Application Circuit Example**



#### **Pin Functions**

	unctions				
Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
1 24 34	V <sub>CC</sub> 1 V <sub>CC</sub> 22 V <sub>CC</sub> 21	Р	5V	Vcc	
2	COMPOSITE.IN	I	2.3V	When selecting Y/C-MIX off and gain (L)	VCC
3 4 5 9 10 12 13 15 19 35 36	SQUEEZE.SW LETTER-BOX.SW MUTE.SW1 Y/C-MIX.SW RGB.SW MUTE.SW2 LPF.SW AMP.SW2 DRIVE.SW2 DRIVE.SW1 AMP.SW1	I	2V	OPEN	VCC You SkΩ  OMP06186
6	CHROMA.IN	1	2.8V	Always	VCC
7 17 20 22 26 27 29 32	GND11 GND12 GND26 GND25 GND24 GND23 GND22 GND21	Р	0V	GND	
8	Y.IN1	I	2.3V	When selecting gain (L)	VCC

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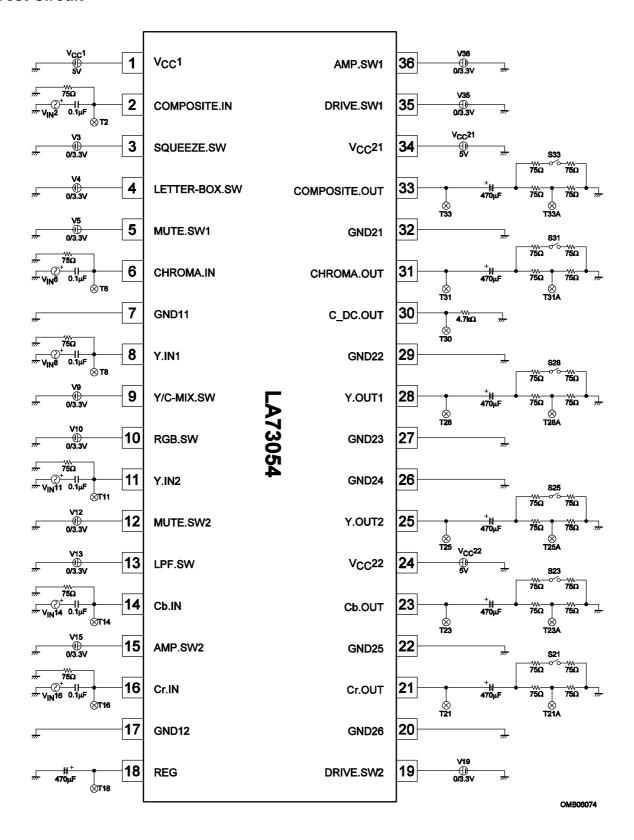
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Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
11	Y.IN2	I	2.3V	When selecting component and gain (L)	VCC
14 16	Cb.IN Cr.IN	I	2.9V	When selecting gain (L)	VCC VCC VCC VCC VCC CLAMP PULSE IN CLAMP PULSE OMP06190
18	REG	0	2V	470μF toward to GND.	12kΩ 6.75kΩ 12kΩ 6.75kΩ 10kΩ 1.3kΩ
21 23 25 28 33	Cr.OUT Cb.OUT  Y.OUT2 Y.OUT1 COMPOSITE.OUT	0	2.5V 1.35V	Except mute	VCC TO CLAMP VCC WW OUT  WOOS WOOD  OUT  OUT  OUT  OUT  OUT  OUT  OUT
					OMP06192
30	C_DC.OUT	0	4.4V	When squeeze mode	VCC

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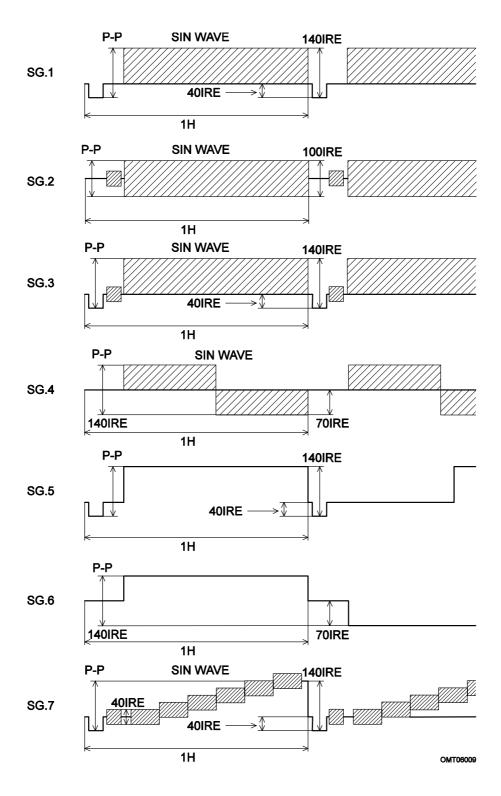
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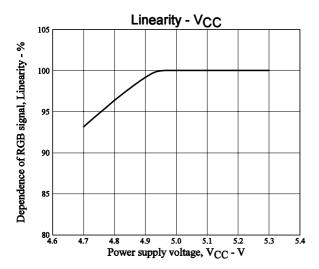
	1 010				
Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
31	CHROMA.OUT	0	2.4V	When selecting gain (L) Except mute	VCC VCC VCC VCC OUT OMP06194

#### **Test Circuit**



# Test input signal





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