Ordering number : ENA0245

SANYO Semiconductors
DATA SHEET

LA73054 — Monolithic Linear IC 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_{CC} 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

* Mounted on a board : 114.3×76.1×1.6mm^3, glass epoxy board.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
Operating supply voltage range	V_{CC} opg		4.75 to 5.25	V
Input pin voltage application range	V_{IN}	V_{CC} opg + 0.3 ≤ 7V	-0.3 to V_{CC} opg + 0.3	V

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

Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V									SW Control	
		Point	Signal	Freq [Hz]	Ampli-tude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21 S23 S25	S28 S31 S33
Current drain	I_{CC}					$V_{CC}1$ $V_{CC}21$ $V_{CC}22$	The sum of current flowing through $V_{CC}1$, $V_{CC}21$ and $V_{CC}22$ at no signal	52	65	78	mA	3.3	0	0	0	0	0	0	0	0	ON	ON
GAIN at 6dB For two drives	G33L	$V_{IN}2$	SG5		1V	T33	Measure GAIN for input at each output.	5.6	5.9	6.4	dB			0	0	0	0	0	0	0	ON	ON
	G31L	$V_{IN}6$	SG6		714mV	T31																
	G28L	$V_{IN}8$	SG5		1V	T28																
	G25L	$V_{IN}11$	SG5		1V	T25																
	G23L	$V_{IN}14$	SG6		1V	T23																
	G21L	$V_{IN}16$	SG6		1V	T21																
GAIN at 9dB For two drives	G33H	$V_{IN}2$	SG5		709mV	T33	Measure GAIN for input at each output.	8.55	8.9	9.45	dB			0	0	0	0	0	0	3.3	ON	ON
	G31H	$V_{IN}6$	SG6		507mV	T31																
	G28H	$V_{IN}8$	SG5		709mV	T28																
	G25H	$V_{IN}11$	SG5		709mV	T25													3.3	0		
	G23H	$V_{IN}14$	SG6		709mV	T23																
	G21H	$V_{IN}16$	SG6		709mV	T21																
GAIN at 6dB For one drive Two-drive mode	G33L1	$V_{IN}2$	SG5		1V	T33	Measure GAIN for input at each output.	5.6	6.1	6.4	dB			0	0	0	0	0	0	0	ON	OFF
	G31L1	$V_{IN}6$	SG6		714mV	T31																
	G28L1	$V_{IN}8$	SG5		1V	T28																
	G25L1	$V_{IN}11$	SG5		1V	T25															OFF	ON
	G23L1	$V_{IN}14$	SG6		1V	T23																
	G21L1	$V_{IN}16$	SG6		1V	T21																
GAIN at 9dB For one drive Two-drive mode	G33H1	$V_{IN}2$	SG5		709mV	T33	Measure GAIN for input at each output.	8.55	9.1	9.45	dB			0	0	0	0	0	0	3.3	ON	OFF
	G31H1	$V_{IN}6$	SG6		507mV	T31																
	G28H1	$V_{IN}8$	SG5		709mV	T28																
	G25H1	$V_{IN}11$	SG5		709mV	T25													3.3	0	OFF	ON
	G23H1	$V_{IN}14$	SG6		709mV	T23																
	G21H1	$V_{IN}16$	SG6		709mV	T21																
Output GAIN ratio (composite/S)	Δ33/31	$V_{IN}2$	SG5		709mV	T33	Calculate the GAIN ratio at two outputs.	-0.5	0	0.5	%			0	0	0	0	0	0	3.3	ON	OFF
	Δ33/28	$V_{IN}6$	SG6		507mV	T31																
	Δ31/28	$V_{IN}8$	SG5		709mV	T28																
Output GAIN ratio (component)	Δ25/23	$V_{IN}11$	SG5		709mV	T25	Calculate the GAIN ratio at two outputs.	-0.5	0	0.5	%			0	0	0	0	0	3.3	0	OFF	ON
	Δ25/21	$V_{IN}14$	SG6		709mV	T23																
	Δ23/21	$V_{IN}16$	SG5		709mV	T21																
f characteristic 7MHz Attenuation amount	F33L	$V_{IN}2$	SG3	7M	1V	T33	Measure GAIN for input at each output and calcualte the attenuation amount for “6dB GAIN.”	-2	-0.8	0.4	dB			0	0	0	0	0	0	0	ON	ON
	F31L	$V_{IN}6$	SG2	7M	714mV	T31																
	F28L	$V_{IN}8$	SG1	7M	1V	T28																
	F25L1	$V_{IN}11$	SG1	7M	1V	T25																
	F23L1	$V_{IN}14$	SG4	7M	1V	T23																
	F21L1	$V_{IN}16$	SG4	7M	1V	T21																
f characteristic 27MHz Attenuation amount	F33H	$V_{IN}2$	SG3	27M	1V	T33	Measure GAIN for input at each output and calcualte the attenuation amount for "6dB GAIN."		-29	-22	dB			0	0	0	0	0	0	0	ON	ON
	F31H	$V_{IN}6$	SG2	27M	714mV	T31																
	F28H	$V_{IN}8$	SG1	27M	1V	T28																
	F25H1	$V_{IN}11$	SG1	27M	1V	T25																
	F23H1	$V_{IN}14$	SG4	27M	1V	T23																
	F21H1	$V_{IN}16$	SG4	27M	1V	T21																

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Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V									SW Control	
		Point	Signal	Freq [Hz]	Ampli-tude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21 S23 S25	S28 S31 S33
f characteristic of GAIN 14MHz Attenuation amount	F25L2	$V_{IN}11$	SG1	14M	1V	T25	Measure GAIN for input at each output and calcualte the attenuation amount for "6dB GAIN."	-1.9	-0.7	0.5	dB			0	0	0	0	3.3	0	0	ON	ON
	F23L2	$V_{IN}14$	SG4	14M	1V	T23																
	F21L2	$V_{IN}16$	SG4	14M	1V	T21																
f characteristic of GAIN 54MHz Attenuation amount	F25H2	$V_{IN}11$	SG1	54M	1V	T25			-39	-30	dB			0	0	0	0	3.3	0	0	ON	ON
	F23H2	$V_{IN}14$	SG4	54M	1V	T23																
	F21H2	$V_{IN}16$	SG4	54M	1V	T21																
MUTE voltage	V21MD					T21	Measure the pin voltage.	2.1	2.5	2.9	V			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 at V_{CC} = 4.75 to 5.25V	4.1	4.4	4.7	V	3.3	0	0	0	0	0	0	0	0	ON	ON
DC for LB	VLB					T30		2.05	2.2	2.35	V	0	3.3	0	0	0	0	0	0	0	ON	ON
DC for 4 : 3	V43					T30		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

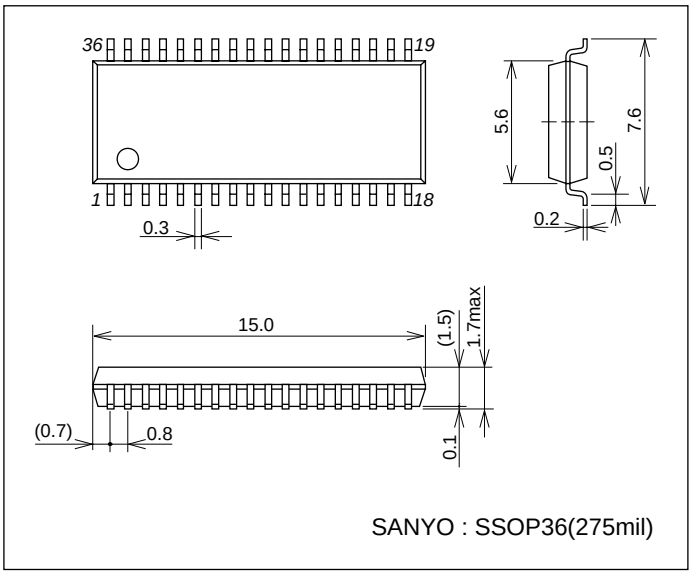
Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V									SW Control	
		Point	Signal	Freq [Hz]	Ampli-tude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21 S23 S25	S28 S31 S33
f characteristic at group delay At 7MHz (Interlace)	GD33	V_{IN}2	SG3	7M	1V	T33	Difference in group delay at 7MHz for 100kHz of each output		±10	±15	ns			0	0	0	0	0	0	0	0	0
	GD31	V_{IN}6	SG2	7M	714mV	T31																
	GD28	V_{IN}8	SG1	7M	1V	T28																
	GD25-1	V_{IN}11	SG1	7M	1V	T25																
	GD23-1	V_{IN}14	SG4	7M	1V	T23																
	GD21-1	V_{IN}16	SG4	7M	1V	T21																
f characteristic of group delay At 14MHz (progressive)	GD25-2	V_{IN}11	SG1	14M	1V	T25	Difference in group delay at 14MHz for 100kHz of each output		±15	±20	ns			0	0	0	0	3.3	0	0	0	0
	GD23-2	V_{IN}14	SG4	14M	1V	T23																
	GD21-2	V_{IN}16	SG4	14M	1V	T21																
DG	DG33	V_{IN}2	SG7	3.58M	1V	T33	Calculate, in percentage, the amplitude of SIN wave on the white level relative to that of SIN wave on the black level of each output signal.		1	2	%			0	0	0	0	0	0	0	0	0
	DG28	V_{IN}8	SG7	3.58M	1V	T28																
	DG25	V_{IN}11	SG7	3.58M	1V	T25																
	DGMIX	V_{IN}6	SG2	3.58M	286mV	T33									3.3							
		V_{IN}8	SG7	Y com-ponent	1V																	
DP	DP33	V_{IN}2	SG7	3.58M	1V	T33	Measure the difference in phase of SIN wave on the white level relative to that of SIN wave on the black level of each output signal.	-1	0.5	1	deg			0	0	0	0	0	0	0	0	0
	DP28	V_{IN}8	SG7	3.58M	1V	T28																
	DP25	V_{IN}11	SG7	3.58M	1V	T25																
	DPMIX	V_{IN}6	SG2	3.58M	286mV	T33									3.3							
		V_{IN}8	SG7	Y com-ponent	1V																	
Cross-talk	CT33	V_{IN}2	SG3	4M	1V	T33	Measure the 4MHz component of output in the no-input route and specify this in a percentage relative to the magnitude of 4MHz of other outputs.		-60	-55	dB			0	0	0	0	0	0	0	0	0
	CT31	V_{IN}6	SG2	4M	1V	T31																
	CT28	V_{IN}8	SG1	4M	1V	T28																
	CT25	V_{IN}11	SG1	4M	1V	T25																
	CT23	V_{IN}14	SG4	4M	1V	T23																
	CT21	V_{IN}16	SG4	4M	1V	T21																
Video S/N ratio	SN33	V_{IN}2	SG5		1V	T33	Measure S/N of the output signal with a noise meter (LPF 10MHz, HPF 100kHz) and specify this in dB.		-79	-77	dB			0	0	0	0	0	0	0	0	0
	SN28	V_{IN}8	SG5		1V	T28																
	SN25	V_{IN}11	SG5		1V	T25																
	SNMIX	V_{IN}8	SG5		1V	T33			-73	-71	dB				3.3							
Linearity of RGB signal	LN25	V_{IN}11	SG8		0.7V	T25	Measure GAIN of the output signal and specify this in a percentage relative to GAIN at 0.35Vp-p input.	95	99	100	%			0	0	3.3	0	0	0	0	0	0
	LN23	V_{IN}14	SG8		0.7V	T23																
	LN21	V_{IN}16	SG8		0.7V	T21																
		V_{IN}2	SG5		1V																	

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.	Control		0 to 0.7V (LOW)	2.6 to 5V (HIGH)
36	AMP-GAIN changeover for composite/S		6dB	9dB
15	AMP-GAIN changeover for component		6dB	9dB
35	Drive current changeover for composite/S		Two-system drive	Single-system drive
19	Drive current changeover for component		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 changeover		Interlace compatible	Progressive compatible

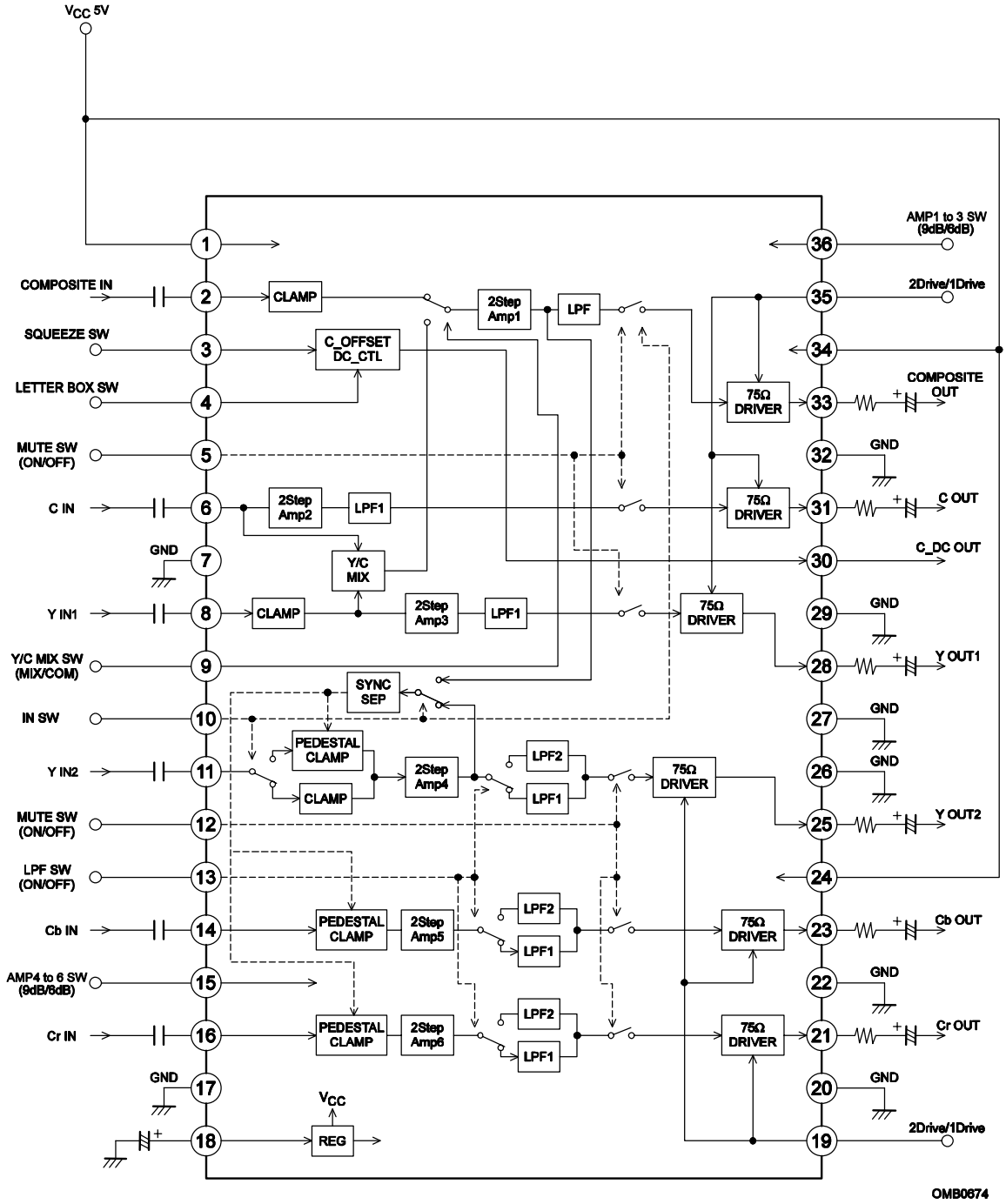
* Pin 2 is connected to GND at Y/C-MIX.

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) → 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

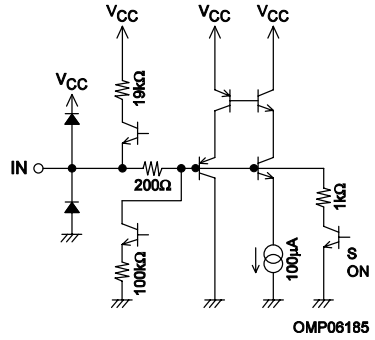
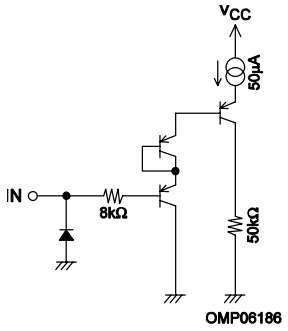
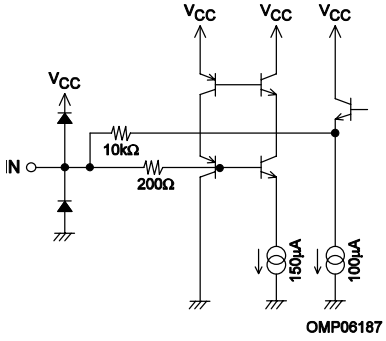
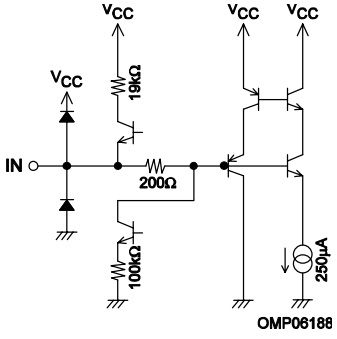
* The voltage to be applied to all control pins must not be higher than the one applied to V_{CC} and lower than the one applied to GND.

* All of control pins must not be used in the OPEN state.

Block Diagram and Application Circuit Example



Pin Functions

Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
1 24 34	$V_{CC}1$ $V_{CC}22$ $V_{CC}21$	P	5V	V_{CC}	
2	COMPOSITE.IN	I	2.3V	When selecting Y/C-MIX off and gain (L)	
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	
6	CHROMA.IN	I	2.8V	Always	
7 17 20 22 26 27 29 32	GND11 GND12 GND26 GND25 GND24 GND23 GND22 GND21	P	0V	GND	
8	Y.IN1	I	2.3V	When selecting gain (L)	

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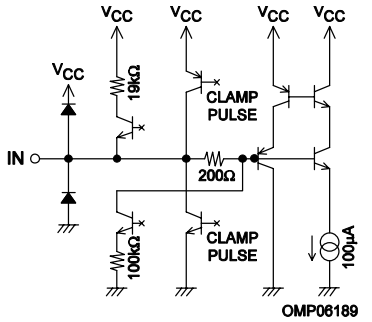
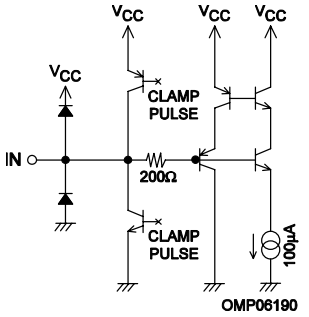
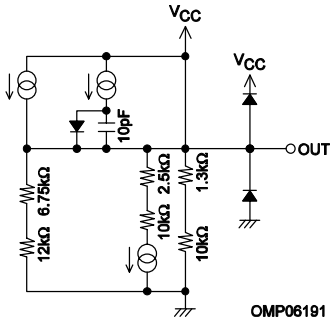
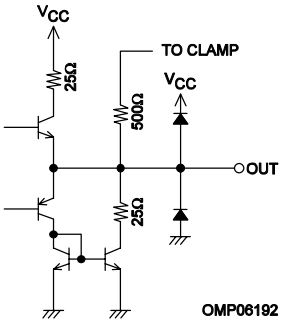
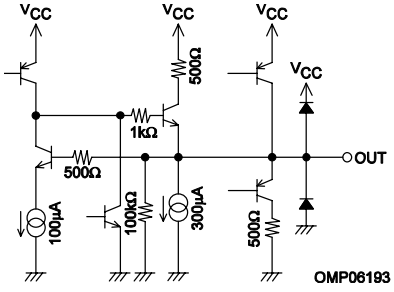
Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
11	Y.IN2	I	2.3V	When selecting component and gain (L)	
14 16	Cb.IN Cr.IN	I	2.9V	When selecting gain (L)	
18	REG	O	2V	470µF toward to GND.	
21 23	Cr.OUT Cb.OUT	O	2.5V	Except mute	
25 28 33	Y.OUT2 Y.OUT1 COMPOSITE.OUT		1.35V		
30	C_DC.OUT	O	4.4V	When squeeze mode	

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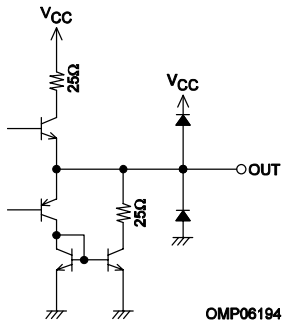
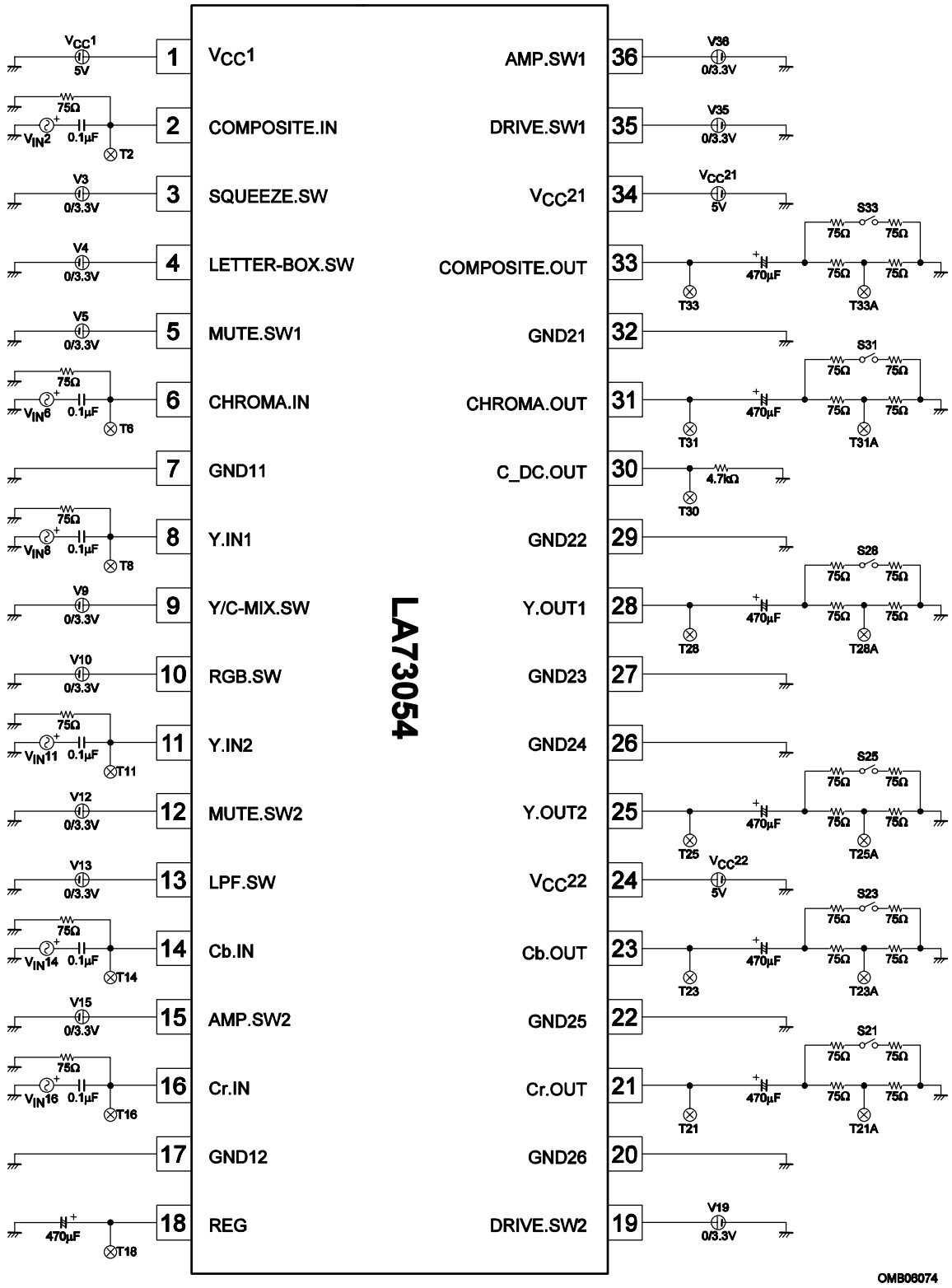
Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
31	CHROMA.OUT	O	2.4V	When selecting gain (L) Except mute	

Test Circuit



Test input signal