



# 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 <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

\* Mounted on a board : 114.3×76.1×1.6mm<sup>3</sup>, glass epoxy board.

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

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

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# LA73054

## Electrical Characteristics at Ta = 25°C, VCC = 5V

Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V										SW Control								
		Point	Signal	Freq [Hz]	Amplitude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21	S28	S23	S31	S25	S33				
Current drain	I <sub>CC</sub>					V <sub>CC1</sub> V <sub>CC21</sub> V <sub>CC22</sub>	The sum of current flowing through V <sub>CC1</sub> , V <sub>CC21</sub> and V <sub>CC22</sub> at no signal	52	65	78	mA	3.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ON	ON	
GAIN at 6dB For two drives	G33L	V <sub>IN2</sub>	SG5		1V	T33	Measure GAIN for input at each output.	5.6	5.9	6.4	dB			0	0	0	0	0	0	0	0	0	0	0	0	0	ON	ON		
	G31L	V <sub>IN6</sub>	SG6		714mV	T31																								
	G28L	V <sub>IN8</sub>	SG5		1V	T28																								
	G25L	V <sub>IN11</sub>	SG5		1V	T25																								
	G23L	V <sub>IN14</sub>	SG6		1V	T23																								
	G21L	V <sub>IN16</sub>	SG6		1V	T21																								
GAIN at 9dB For two drives	G33H	V <sub>IN2</sub>	SG5		709mV	T33	Measure GAIN for input at each output.	8.55	8.9	9.45	dB			0	0	0	0	0	0	0	0	0	0	0	3.3	0	ON	ON		
	G31H	V <sub>IN6</sub>	SG6		507mV	T31																								
	G28H	V <sub>IN8</sub>	SG5		709mV	T28																								
	G25H	V <sub>IN11</sub>	SG5		709mV	T25																								
	G23H	V <sub>IN14</sub>	SG6		709mV	T23																								
	G21H	V <sub>IN16</sub>	SG6		709mV	T21																								
GAIN at 6dB For one drive Two-drive mode	G33L1	V <sub>IN2</sub>	SG5		1V	T33	Measure GAIN for input at each output.	5.6	6.1	6.4	dB			0	0	0	0	0	0	0	0	0	0	0	0	0	ON	OFF		
	G31L1	V <sub>IN6</sub>	SG6		714mV	T31																								
	G28L1	V <sub>IN8</sub>	SG5		1V	T28																								
	G25L1	V <sub>IN11</sub>	SG5		1V	T25																						OFF	ON	
	G23L1	V <sub>IN14</sub>	SG6		1V	T23																								
	G21L1	V <sub>IN16</sub>	SG6		1V	T21																								
GAIN at 9dB For one drive Two-drive mode	G33H1	V <sub>IN2</sub>	SG5		709mV	T33	Measure GAIN for input at each output.	8.55	9.1	9.45	dB			0	0	0	0	0	0	0	0	0	0	0	3.3	0	ON	OFF		
	G31H1	V <sub>IN6</sub>	SG6		507mV	T31																								
	G28H1	V <sub>IN8</sub>	SG5		709mV	T28																								
	G25H1	V <sub>IN11</sub>	SG5		709mV	T25																								
	G23H1	V <sub>IN14</sub>	SG6		709mV	T23																								
	G21H1	V <sub>IN16</sub>	SG6		709mV	T21																								
Output GAIN ratio (composite/S)	Δ33/31	V <sub>IN2</sub>	SG5		709mV	T33	Calculate the GAIN ratio at two outputs.	-0.5	0	0.5	%			0	0	0	0	0	0	0	0	0	0	3.3	0	ON	OFF			
	Δ33/28	V <sub>IN6</sub>	SG6		507mV	T31																								
	Δ31/28	V <sub>IN8</sub>	SG5		709mV	T28																								
Output GAIN ratio (component)	Δ25/23	V <sub>IN11</sub>	SG5		709mV	T25	Calculate the GAIN ratio at two outputs.	-0.5	0	0.5	%			0	0	0	0	0	0	0	0	3.3	0	OFF	ON					
	Δ25/21	V <sub>IN14</sub>	SG6		709mV	T23																								
	Δ23/21	V <sub>IN16</sub>	SG5		709mV	T21																								
f characteristic 7MHz Attenuation amount	F33L	V <sub>IN2</sub>	SG3	7M	1V	T33	Measure GAIN for input at each output and calculate the attenuation amount for "6dB GAIN."	-2	-0.8	0.4	dB			0	0	0	0	0	0	0	0	0	0	0	0	0	ON	ON		
	F31L	V <sub>IN6</sub>	SG2	7M	714mV	T31																								
	F28L	V <sub>IN8</sub>	SG1	7M	1V	T28																								
	F25L1	V <sub>IN11</sub>	SG1	7M	1V	T25																								
	F23L1	V <sub>IN14</sub>	SG4	7M	1V	T23																								
	F21L1	V <sub>IN16</sub>	SG4	7M	1V	T21																								
f characteristic 27MHz Attenuation amount	F33H	V <sub>IN2</sub>	SG3	27M	1V	T33	Measure GAIN for input at each output and calculate the attenuation amount for "6dB GAIN."		-29	-22	dB			0	0	0	0	0	0	0	0	0	0	0	0	0	ON	ON		
	F31H	V <sub>IN6</sub>	SG2	27M	714mV	T31																								
	F28H	V <sub>IN8</sub>	SG1	27M	1V	T28																								
	F25H1	V <sub>IN11</sub>	SG1	27M	1V	T25																								
	F23H1	V <sub>IN14</sub>	SG4	27M	1V	T23																								
	F21H1	V <sub>IN16</sub>	SG4	27M	1V	T21																								

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# LA73054

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Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V								SW Control				
		Point	Signal	Freq [Hz]	Amplitude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21	S28	S23	S31
f characteristic of GAIN 14MHz Attenuation amount	F25L2	V <sub>IN11</sub>	SG1	14M	1V	T25	Measure GAIN for input at each output and calculate 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 <sub>IN14</sub>	SG4	14M	1V	T23																		
	F21L2	V <sub>IN16</sub>	SG4	14M	1V	T21																		
f characteristic of GAIN 54MHz Attenuation amount	F25H2	V <sub>IN11</sub>	SG1	54M	1V	T25			-39	-30	dB			0	0	0	0	3.3	0	0	ON	ON		
	F23H2	V <sub>IN14</sub>	SG4	54M	1V	T23																		
	F21H2	V <sub>IN16</sub>	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 <sub>CC</sub> = 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		

# LA73054

## Design Guarantee Items at Ta = 25°C, VCC = 5V

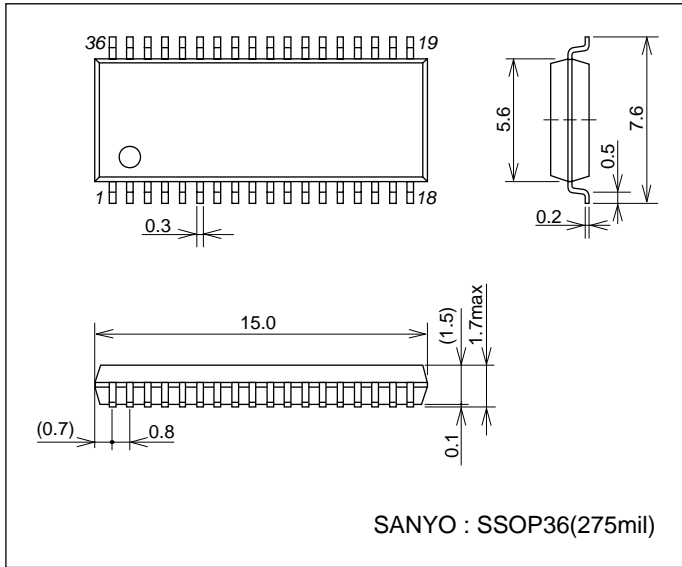
Parameter	Symbol	Input Signal				Output Point	Test Conditions	Ratings			Unit	Control Voltage Unit : V										SW Control					
		Point	Signal	Freq [Hz]	Amplitude [p-p]			min	typ	max		V3	V4	V5	V9	V10	V12	V13	V15	V36	S21	S28	S23	S31	S25	S33	
f characteristic at group delay At 7MHz (Interlace)	GD33	V <sub>IN2</sub>	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	0	0	0	
	GD31	V <sub>IN6</sub>	SG2	7M	714mV	T31																					
	GD28	V <sub>IN8</sub>	SG1	7M	1V	T28																					
	GD25-1	V <sub>IN11</sub>	SG1	7M	1V	T25																					
	GD23-1	V <sub>IN14</sub>	SG4	7M	1V	T23																					
	GD21-1	V <sub>IN16</sub>	SG4	7M	1V	T21																					
f characteristic of group delay At 14MHz (progressive)	GD25-2	V <sub>IN11</sub>	SG1	14M	1V	T25	Difference in group delay at 14MHz for 100kHz of each output		±15	±20	ns				0	0	0	0	0	3.3	0	0	0	0	0	0	
	GD23-2	V <sub>IN14</sub>	SG4	14M	1V	T23																					
	GD21-2	V <sub>IN16</sub>	SG4	14M	1V	T21																					
DG	DG33	V <sub>IN2</sub>	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	0	0	0	
	DG28	V <sub>IN8</sub>	SG7	3.58M	1V	T28																					
	DG25	V <sub>IN11</sub>	SG7	3.58M	1V	T25																					
	DGMIX	V <sub>IN6</sub>	SG2	3.58M	286mV	T33																					
		V <sub>IN8</sub>	SG7	Y component	1V																						
DP	DP33	V <sub>IN2</sub>	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	0	0	0	
	DP28	V <sub>IN8</sub>	SG7	3.58M	1V	T28																					
	DP25	V <sub>IN11</sub>	SG7	3.58M	1V	T25																					
	DPMIX	V <sub>IN6</sub>	SG2	3.58M	286mV	T33																					
		V <sub>IN8</sub>	SG7	Y component	1V																						
Cross-talk	CT33	V <sub>IN2</sub>	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	0	0	0	
	CT31	V <sub>IN6</sub>	SG2	4M	1V	T31																					
	CT28	V <sub>IN8</sub>	SG1	4M	1V	T28																					
	CT25	V <sub>IN11</sub>	SG1	4M	1V	T25																					
	CT23	V <sub>IN14</sub>	SG4	4M	1V	T23																					
	CT21	V <sub>IN16</sub>	SG4	4M	1V	T21																					
Video S/N ratio	SN33	V <sub>IN2</sub>	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	0	0	0	
	SN28	V <sub>IN8</sub>	SG5		1V	T28																					
	SN25	V <sub>IN11</sub>	SG5		1V	T25																					
	SNMIX	V <sub>IN8</sub>	SG5		1V	T33																					
Linearity of RGB signal	LN25	V <sub>IN11</sub>	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	0	0	0	
	LN23	V <sub>IN14</sub>	SG8		0.7V	T23																					
	LN21	V <sub>IN16</sub>	SG8		0.7V	T21																					
		V <sub>IN2</sub>	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
		With pin 10 at HIGH	No mute
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.

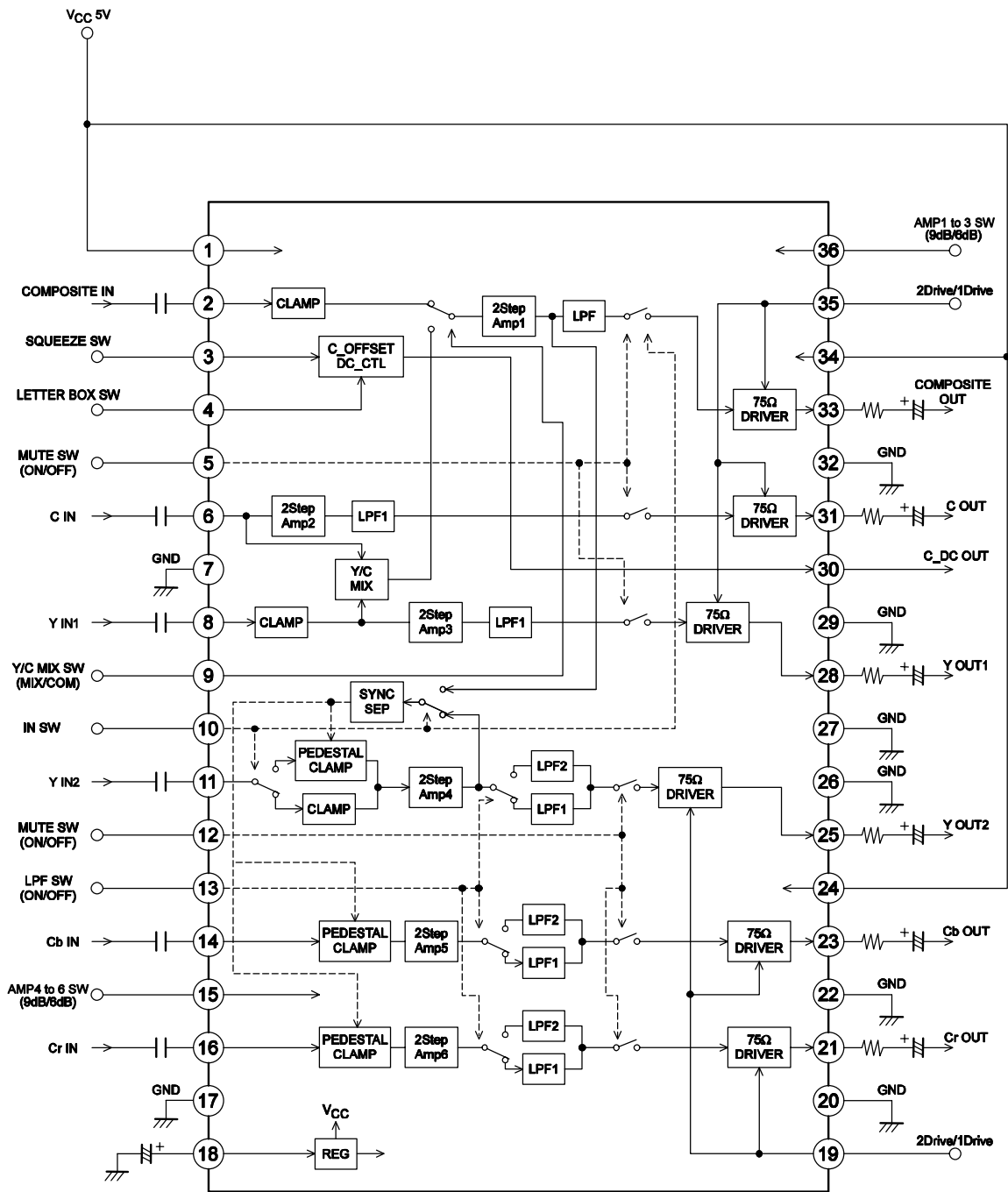
Pin 3	Pin 4	Pin 30 output DC
0 to 0.7V	0 to 0.7V	LOW (0V) → For 4:3 mode
0 to 0.7V	2.6 to 5V	MIDDLE (2.2V) → For the letter box mode
2.6 to 5V	0 to 0.7V	HIGH (5V) → For the squeeze mode
2.6 to 5V	2.6 to 5V	Prohibited

\* The voltage to be applied to all control pins must not be higher than the one applied to V<sub>CC</sub> and lower than the one applied to GND.

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

# LA73054

## Block Diagram and Application Circuit Example



OMB0674

# LA73054

## Pin Functions

Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
1 24 34	V <sub>CC1</sub> V <sub>CC22</sub> V <sub>CC21</sub>	P	5V	V <sub>CC</sub>	
2	COMPOSITE.IN	I	2.3V	When selecting Y/C-MIX off and gain (L)	<p style="text-align: right;">OMP06185</p>
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	<p style="text-align: right;">OMP06186</p>
6	CHROMA.IN	I	2.8V	Always	<p style="text-align: right;">OMP06187</p>
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)	<p style="text-align: right;">OMP06188</p>

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# LA73054

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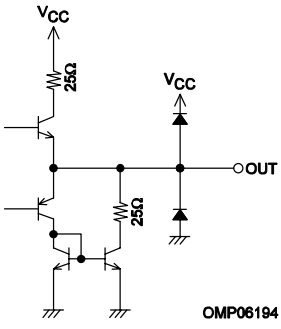
Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
11	Y.IN2	I	2.3V	When selecting component and gain (L)	
14 16	Cb.IN Cr.IN	I	2.9V	When selecting gain (L)	
18	REG	O	2V	470μF toward to GND.	
21 23	Cr.OUT Cb.OUT	O	2.5V	Except mute	
25 28 33	Y.OUT2 Y.OUT1 COMPOSITE.OUT		1.35V		
30	C_DC.OUT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

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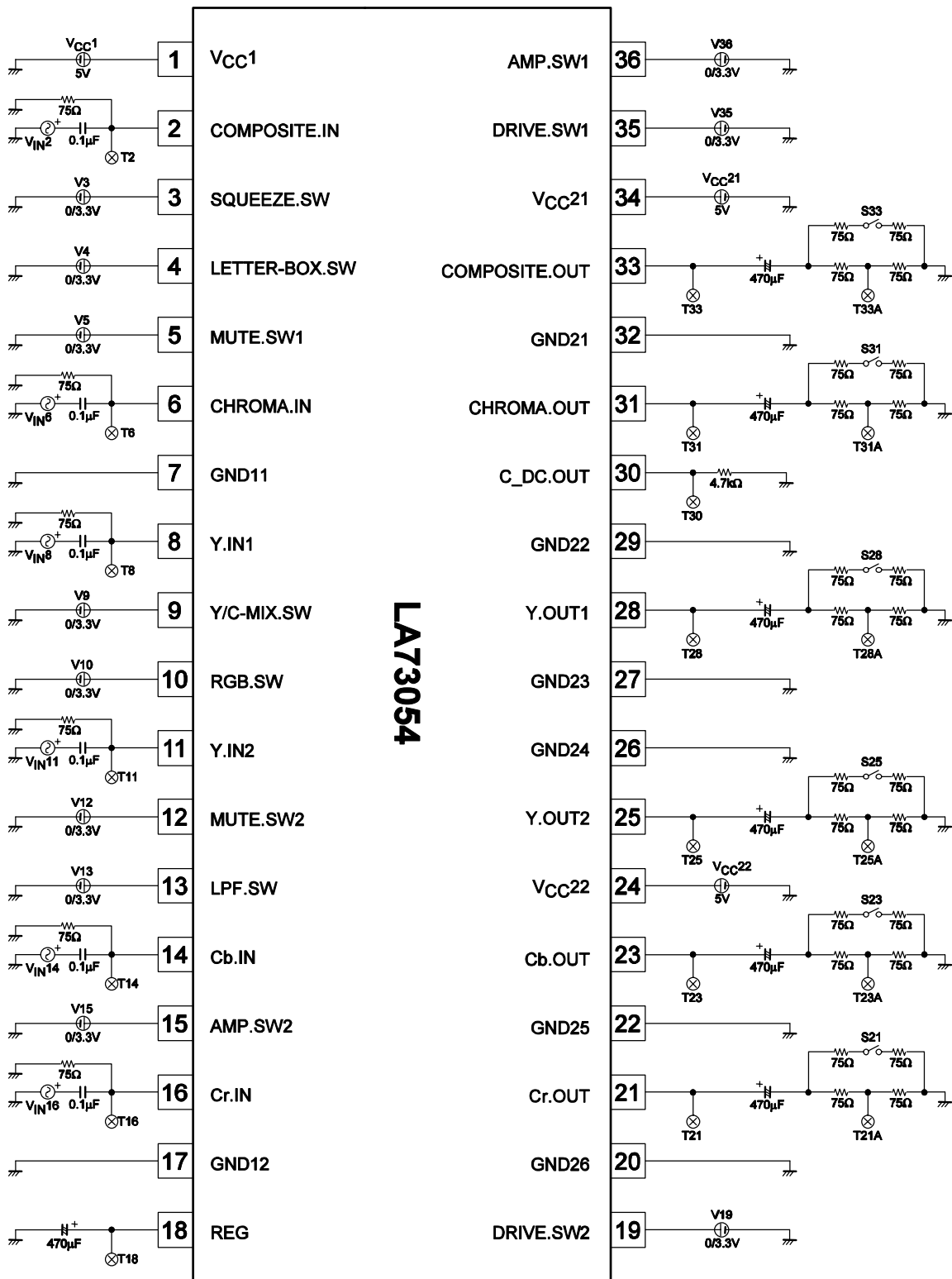
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Pin No.	Pin Name	I/O	Terminal Voltage	Conditions	Equivalent Circuit
31	CHROMA.OUT	O	2.4V	When selecting gain (L) Except mute	

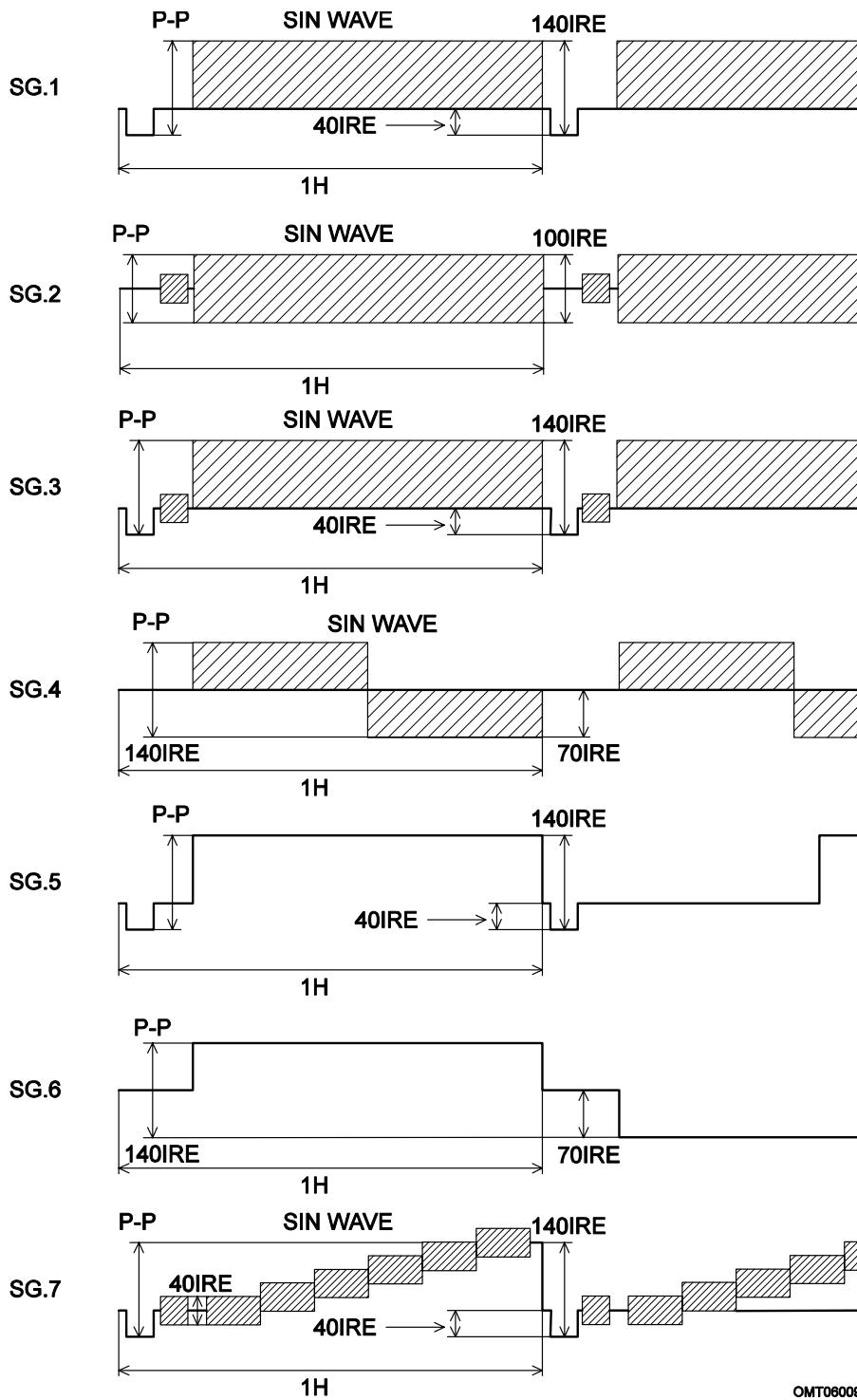
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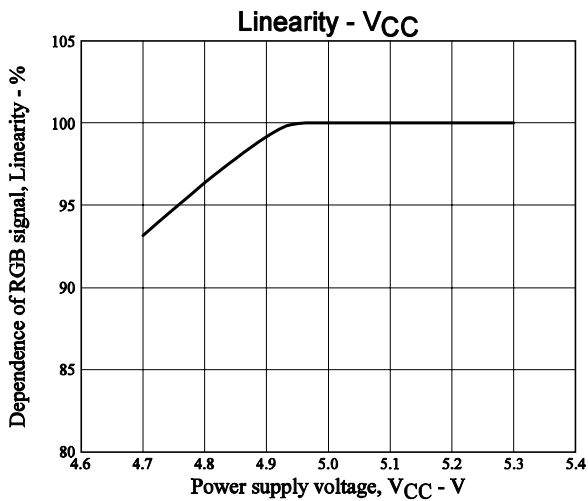
## Test Circuit



OMB06074

Test input signal





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