



SANYO Semiconductors

DATA SHEET

LA6548NH — Monolithic Linear IC For CD Players and Recorders Four-Channel Driver IC

Overview

The LA6548NH is a four-channel driver IC for CD players and recorders (four BTL amplifier channels).

Functions

- Four BTL connection power amplifier channels
- I_O max 0.7A
- Built-in level shifters
- Muting circuit (on/off control of all outputs)
(This circuit applies to the BTL amplifier circuits. It does not control operation of the regulator.)
- Built-in regulator (provides a 3.3V output using an external pnp transistor)
- Thermal protection circuit (thermal shutdown circuit)

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC} max		14	V
Maximum output current	I_O max	For each of the channel 1 to 4 outputs	0.7	A
Maximum input voltage	V_{IN}		13	V
Muting pin application voltage	VMUTE		13	V
Allowable power dissipation	Pd max	Independent IC	0.8	W
		Specified circuit board *	1.8	W
Operating temperature	Topr		-20 to +75	$^\circ\text{C}$
Storage temperature	Tstg		-55 to +150	$^\circ\text{C}$

* Specified substrate : 76.1mm×114.3mm×1.6mm, glass epoxy board.

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SANYO Semiconductor Co., Ltd.

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

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Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage 1	V_{CC1}		4.6 to 13	V
Supply voltage 2	V_{CC2}	Only used by the BTL amplifiers (Not used by the 3.3V regulator circuit)	3.9 to 13	V

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC1} = V_{CC2} = 6\text{V}$, $V_{REF} = 1.65\text{V}$, unless otherwise specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Overall Characteristics						
No-load current drain, on state	I_{CCON}	All outputs on, MUTE : high		20	40	mA
No-load current drain, off state	I_{CCOFF}	All outputs off, MUTE : low		15	35	mA
Thermal shutdown circuit operating temperature	TSD	(Design guarantee value *1)	150	175	200	$^\circ\text{C}$
Output Amplifier Block						
Output offset voltage	V_{OFF}	The voltage difference between each of the + or - outputs.	-50		50	mV
V_{REF} input voltage range	$V_{IN}V_{REF}$		1.3		$V_{CC}-1.5$	V
Output voltage	V_O	The voltage across the outputs when $R_L = 8\Omega$	2.6	3		V
Voltage gain, input to output	VG	The voltage gain from an input to the corresponding +/- outputs.*2		9		dB
Slew rate	SR	(Design guarantee value *1)		0.15		V/ μs
Muting on voltage	V_{MUTE}	The voltage at which the output on/off state changes		1.2		V
Power Supply Block (Using a 2SB632K)						
3.3V power supply voltage		$I_O = 200\text{mA}$	3.13	3.3	3.47	V
Line regulation	ΔV_{OLIN}	$4.6\text{V} \leq V_{CC} \leq 12\text{V}$		40	100	mV
Load regulation	ΔV_{OLOAD}	$5\text{mA} \leq I_O \leq 200\text{mA}$		50	150	mV
Reset Block						
RESET pin high-level voltage	V_{ORH}		3.08	3.25	3.42	V
RESET pin low-level voltage	V_{ORL}	$I_{SRL} = 2\text{mA}$, Cd-GND		100	200	mV
RESET pin threshold voltage	V_{RT}	*4		2.8		V
RESET pin hysteresis	V_{HYS}	*5	40	80	160	mV
RESET pin output delay time	td	Cd = 0.1 μF		10		ms

*1 : These parameters are not tested.

2 : The gain from input to output when only the V_{IN}^ pins are used.

*3 : The MUTE pin voltage when the output changes between the on and off states. When the MUTE pin is high, all the BTL amplifiers will be on, and when the MUTE pin is low, all the BTL amplifiers will be off.

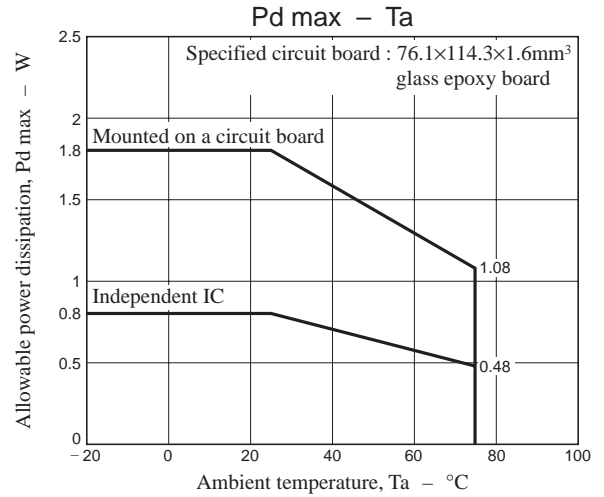
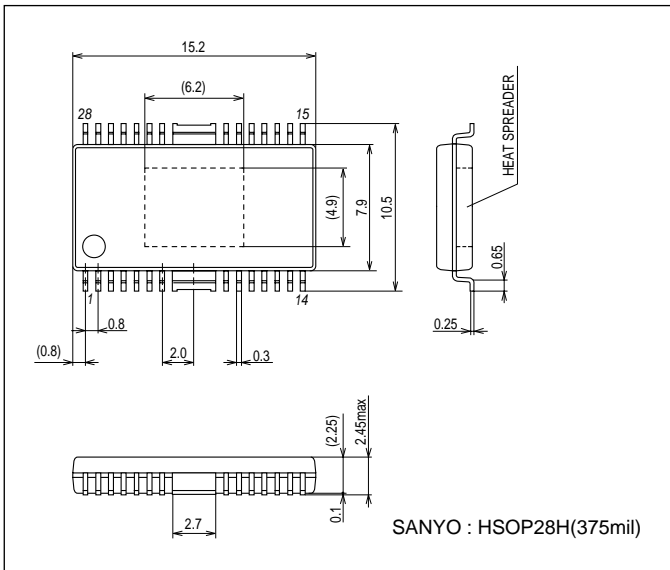
*4 : The 3.3V regulator voltage when the RESET pin goes from high to low.

*5 : The 3.3V regulator voltage difference between the RESET pin going from high to low and the RESET pin going from low to high. That is, the hysteresis.

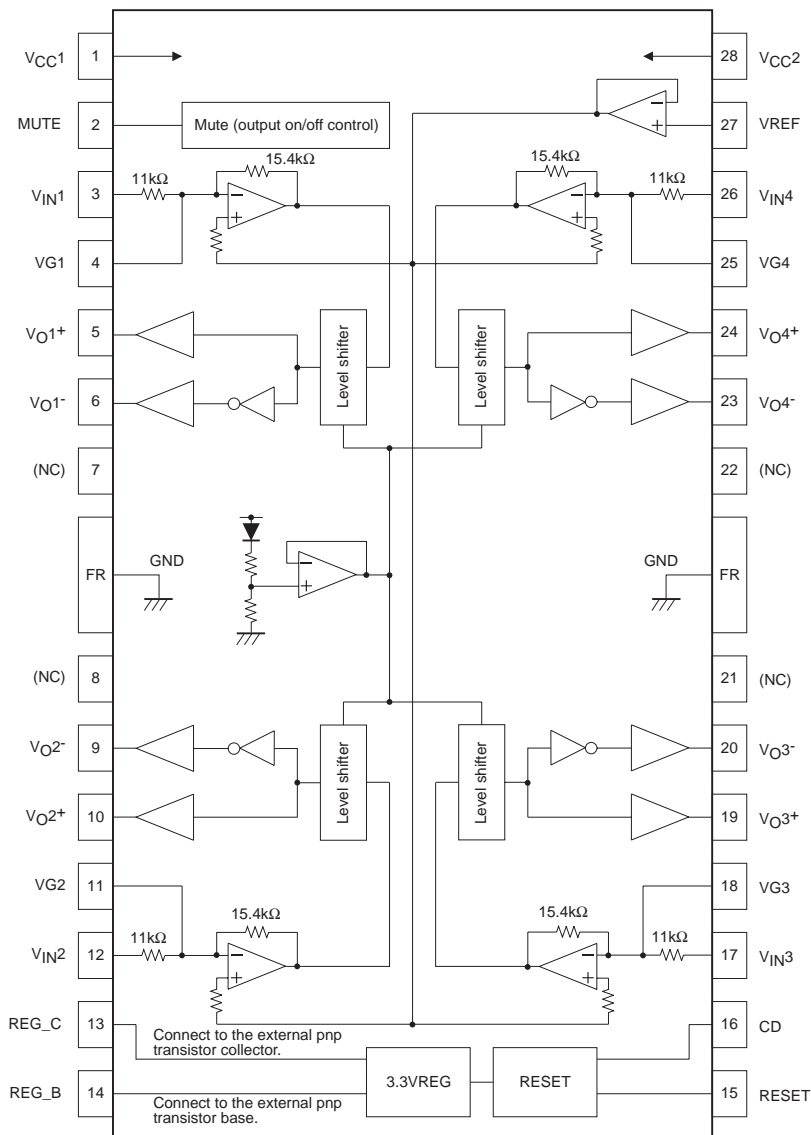
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Package Dimensions

unit : mm (typ)
3233B



Block Diagram



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Pin Functions

Pin No.	Pin	Description
1	V _{CC} 1	Power supply (This pin is shorted to V _{CC} 2 (pin 28))
2	MUTE	Output on/off control
3	V _{IN} 1	Channel 1 input
4	VG1	Channel 1 input (Gain setting)
5	V _O 1 ⁺	Channel 1 output (+)
6	V _O 1 ⁻	Channel 1 output (-)
7	(NC)	(This pin must not be used.)
8	(NC)	(This pin must not be used.)
9	V _O 2 ⁻	Channel 2 output (-)
10	V _O 2 ⁺	Channel 2 output (+)
11	VG2	Channel 2 input (Gain setting)
12	V _{IN} 2	Channel 2 input
13	REG_C	Connect this pin to the external pnp transistor collector. (This is the 3.3V regulator output)
14	REG_B	Connect this pin to the external pnp transistor base.
15	RESET	Reset output
16	CD	Connection for the reset delay time setting capacitor
17	V _{IN} 3	Channel 3 input
18	VG3	Channel 3 input (Gain setting)
19	V _O 3 ⁺	Channel 3 output (+)
20	V _O 3 ⁻	Channel 3 output (-)
21	(NC)	(This pin must not be used.)
22	(NC)	(This pin must not be used.)
23	V _O 4 ⁻	Channel 4 output (-)
24	V _O 4 ⁺	Channel 4 output (+)
25	VG4	Channel 4 input (Gain setting)
26	V _{IN} 4	Channel 4 input
27	VREF	Reference voltage input
28	V _{CC} 2	Power supply (This pin is shorted to V _{CC} 1 (pin 1))

Equivalent Circuits

Pin No.	Pin	Description	Equivalent circuit
3 4 12 11 17 18 26 25	V _{IN} 1 VG1 V _{IN} 2 VG2 V _{IN} 3 VG3 V _{IN} 4 VG4	Input pins.	
5 6 10 9 19 20 24 23	V _O 1 ⁺ V _O 1 ⁻ V _O 2 ⁺ V _O 2 ⁻ V _O 3 ⁺ V _O 3 ⁻ V _O 4 ⁺ V _O 4 ⁻	Output pins.	

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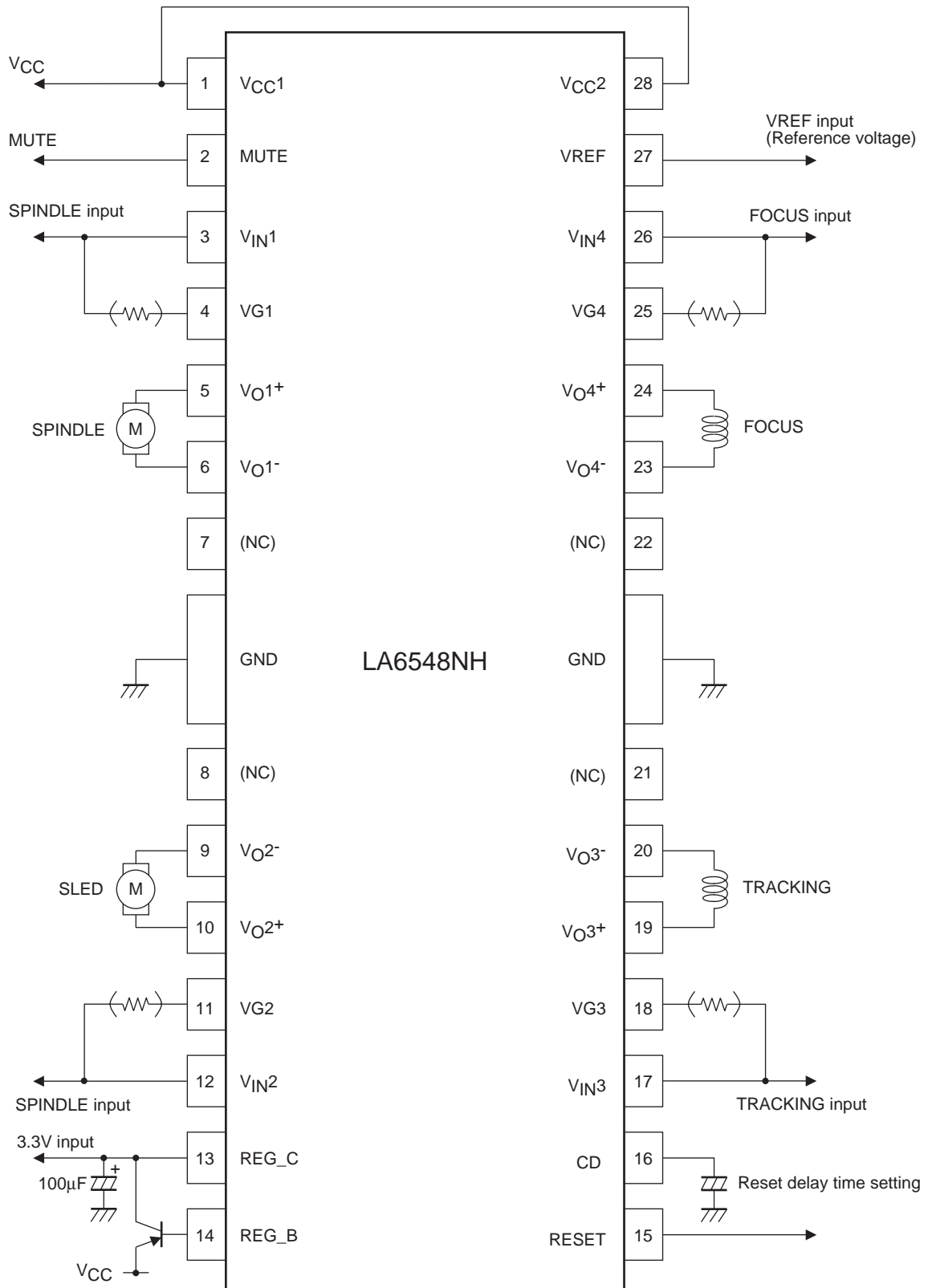
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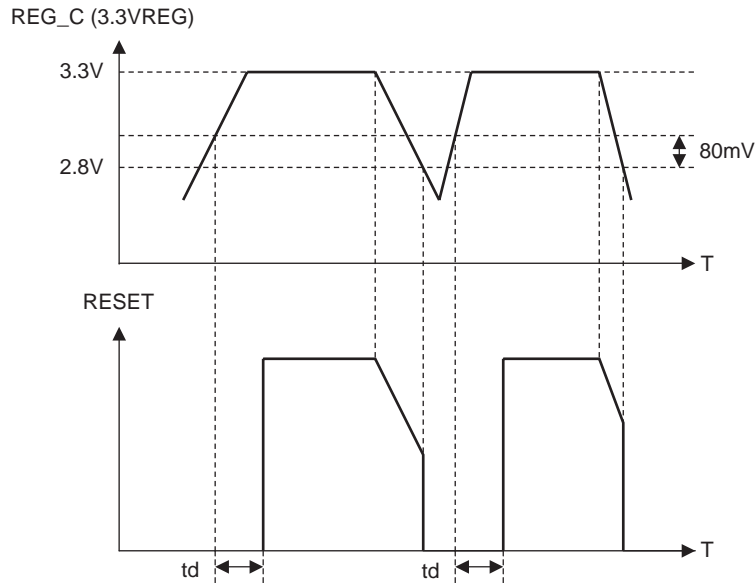
Pin No.	Pin	Description	Equivalent circuit
2	MUTE	<p>Muting control input.</p> <p>The outputs will be on when the MUTE pin is at the high level.</p> <p>The outputs will be off when the MUTE pin is at the low level ; in particular, the outputs go to the high-impedance state at this time.</p>	
27	VREF	Reference voltage input.	
15	RESET	<p>Reset output.</p> <p>When REG C (3.3VREG) is high, RESET will be high.</p> <p>When REG C (3.3VREG) is low, RESET will be low.</p> <p>Details of Operating voltage see section Reset operation.</p>	
16	CD	<p>Reset output delay time setting.</p> <p>The delay time until the point the reset output switches from low to high is set by the capacitor connected between this pin and ground.</p> <p>Reference to Reset operation.</p>	

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Application Circuit Example



Reset Operation



*1 : t_d is the delay time. It is set by an external capacitor connected between the CD pin and ground).

*2 : The voltage at which RESET changes state is a typical value (voltage).

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