



LA6541

4-channel Bridge Driver for Compact Discs

Overview

The LA6541 is a 4-channel bridge (BTL) driver with a 5 V power supply (uses an external PNP transistor) developed for compact discs.

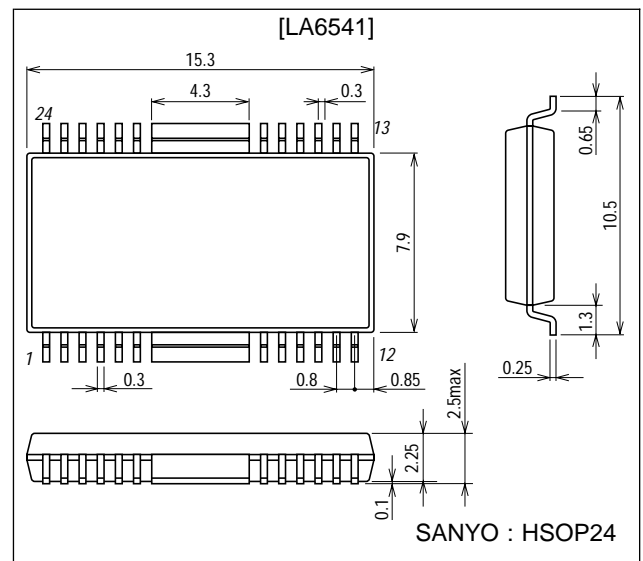
Functions and Features

- 4-channel bridge (BTL) power amplifier.
- I_O max. = 700 mA.
- With mute circuit
(Affects all amplifier outputs, Amp 1 to Amp 8).
(When the mute voltage is low, the outputs turn off;
when the mute voltage is high, the outputs turn on).
- 5.0 V regulator built in (Uses external PNP transistor).
- Reset circuit built in (The reset output delay time can be adjusted through an external capacitor).

Package Dimensions

unit : mm

3227-HSOP24



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		14	V
Maximum input voltage	V_{INB}		13	V
Mute pin voltage	V_{Mute}		13	V
Allowable power dissipation	P_d max	When using standard board 114.3 × 76.1 × 1.5 mm (material: glass epoxy)	2.3	W
Operating temperature	T_{opr}		-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Ratings	Unit
Recommended operating voltage	V_{CC}		5.6 to 13	V
Reset output source current	I_{ORH}		0 to 200	μA
Reset output sink current	I_{ORL}		0 to 2	mA

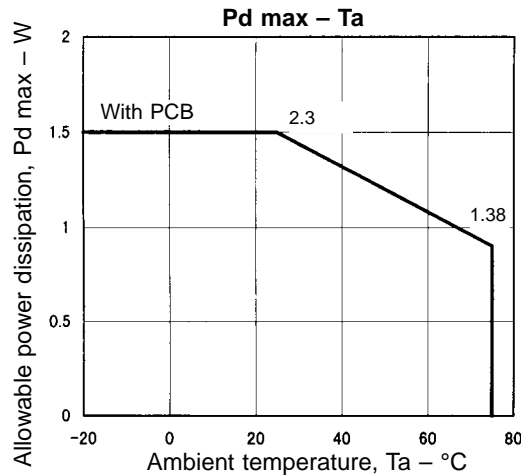
LA6541

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 8.0\text{ V}$, $V_{REF} = 2.5\text{ V}$

Parameter	Symbol	Conditions	min	typ	max	Unit
No-load current drain	I_{CC1}	When all amplifier outputs are on (Mute high)		20	40	mA
	I_{CC2}	When all amplifier outputs are off (Mute low)		15	35	mA
Output offset voltage	V_{OF1}	Amplifier 1 to 2 (V_{O1} to V_{O2}), Amplifier 3 to 4 (V_{O3} to V_{O4})	-50		+50	mV
	V_{OF2}	Amplifier 5 to 6 (V_{O5} to V_{O6}), Amplifier 7 to 8 (V_{O7} to V_{O8})	-50		+50	mV
Buffer amplifier input voltage range	V_{BIN}		1.5		$V_{CC}-1.5$	V
Input voltage range	V_{IN}		1.0		$V_{CC}-1.5$	V
Output source voltage	V_{O1}	Note 1, when $R_L = 8.0\ \Omega$	5.0	5.6		V
Output sink voltage	V_{O2}	Note 2, when $R_L = 8.0\ \Omega$		1.8	2.4	V
Closed-circuit voltage gain	V_G	Between bridge amplifiers		9		dB
Slew rate	SR			0.15		V/ μs
Mute on voltage	V_{Mute}	Note 3		1.2		V
[Power Supply] (with 2SB632K connected externally)						
Output voltage	V_{OUT1}	$I_O = 200\text{ mA}$	4.75	5.0	5.25	V
Line regulation	ΔV_{OLN1}	$5.6\text{ V} \leq V_{IN1} \leq 12\text{ V}$		20	100	mV
Load regulation	ΔV_{OLD1}	$5\text{ mA} \leq I_O \leq 200\text{ mA}$		50	150	mV
[Reset]						
High reset output voltage	V_{ORH}	$I_{ORH} = 200\ \mu\text{A}$, Cd pin open	4.73	4.98	5.23	V
Low reset output voltage	V_{ORL}	$I_{SRL} = 2\text{ mA}$, Cd is shorted to GND		100	200	mV
Reset threshold voltage	V_{RT}	Note 4		4.3		V
Reset hysteresis voltage	V_{hys}	Note 5	40	100	200	mV
Reset output delay time	t_d	Cd = 0.1 μF		10		ms

Notes:

- Source voltage to ground when an 8 Ω load is connected between bridge amplifier outputs.
- Sink voltage to ground when an 8 Ω load is connected between bridge amplifier outputs.
- When the mute signal is high, all amplifier outputs turn on, and when low, all amplifier outputs turn off. When the mute signal is low, amplifier output is undefined.
- 5 V supply voltage when the reset output goes low.
- Potential difference from the 5 V supply voltage when the reset output goes low and when it goes high.



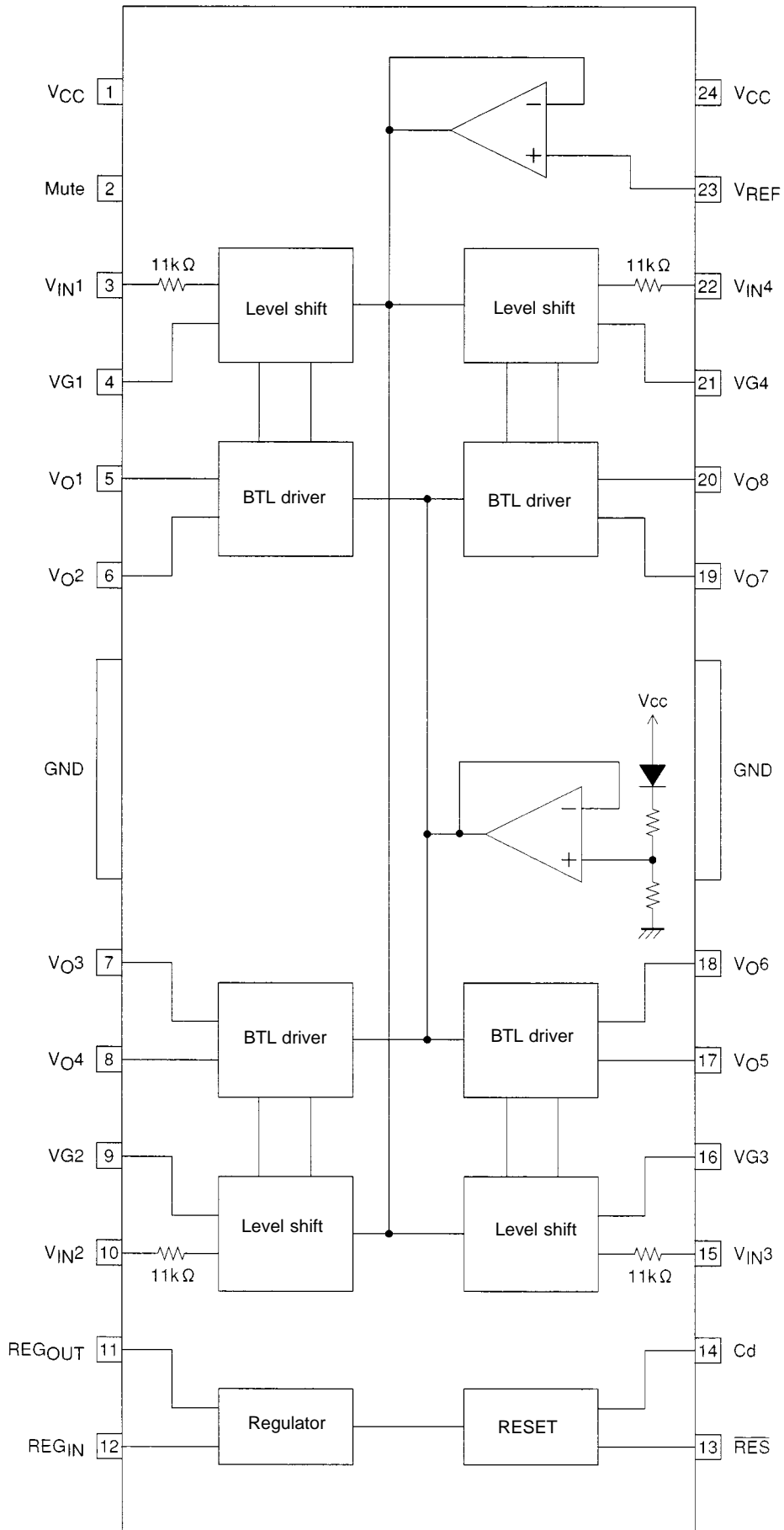
Truth Table

Input	MUTE	CH1		CH2		CH3		CH4	
		V_{O1} (Amp1)	V_{O2} (Amp2)	V_{O3} (Amp3)	V_{O4} (Amp4)	V_{O5} (Amp5)	V_{O6} (Amp6)	V_{O7} (Amp7)	V_{O8} (Amp8)
H	H	H	L	L	H	H	L	L	H
	L	—	—	—	—	—	—	—	—
L	H	L	H	H	L	L	H	H	L
	L	—	—	—	—	—	—	—	—

* The “—” symbol means “amplifier output is OFF.”

LA6541

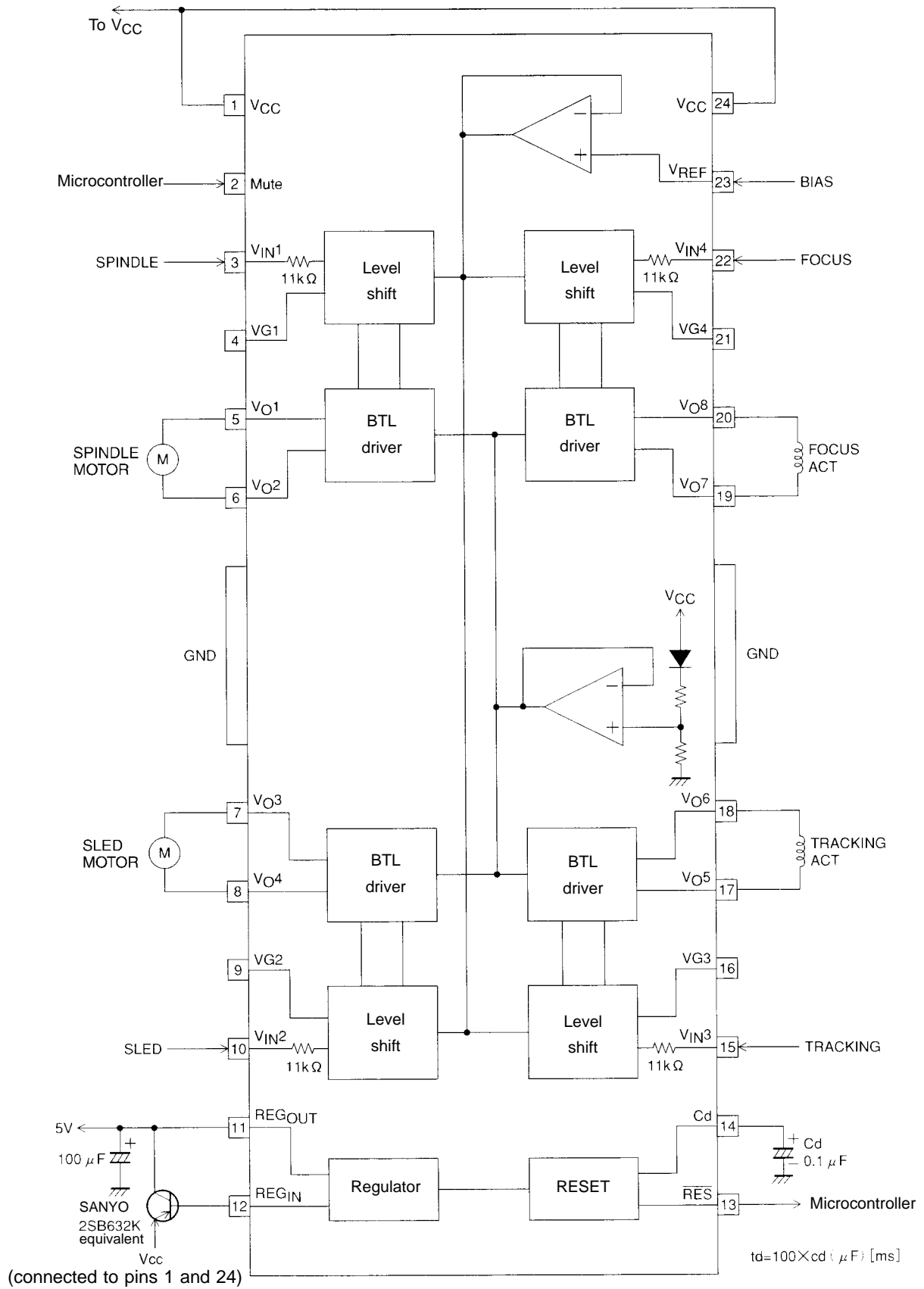
Block Diagram



A06415

LA6541

Sample Application Circuit



A06416

Note: Use a delay capacitor (Cd) whose capacitance does not change much according to the temperature.

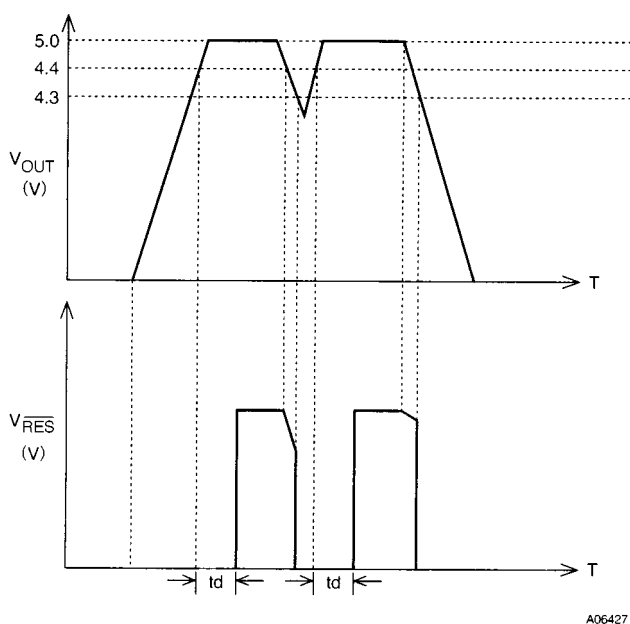
LA6541

Pin Functions

Pin No.	Pin Name	Equivalent Circuit	Description
1	V _{CC}		Power supply (shorted with pin 24)
2	Mute	<p style="text-align: right; font-size: small;">A06419</p>	ON/OFF control for all BTL AMP outputs
3 4 9 10 15 16 21 22	V _{IN1} VG1 VG2 V _{IN2} V _{IN3} VG3 VG4 V _{IN4}	<p style="text-align: right; font-size: small;">A06417</p>	BTL AMP 1 input BTL AMP 1 input (for gain control) BTL AMP 2 input (for gain control) BTL AMP 2 input BTL AMP 3 input BTL AMP 3 input (for gain control) BTL AMP 4 input (for gain control) BTL AMP 4 input
5 6 7 8 17 18 19 20	V _{O1} V _{O2} V _{O3} V _{O4} V _{O5} V _{O6} V _{O7} V _{O8}	<p style="text-align: right; font-size: small;">A06418</p>	BTL AMP 1 output (non-inverting side) BTL AMP 1 output (inverting side) BTL AMP 2 output (inverting side) BTL AMP 2 output (non-inverting side) BTL AMP 3 output (non-inverting side) BTL AMP 3 output (inverting side) BTL AMP 4 output (inverting side) BTL AMP 4 output (non-inverting side)
11	REG _{OUT}		Connection for collector of external transistor (PNP); 5 V supply output
12	REG _{IN}		Connection for base of external transistor (PNP)
13	RES		Reset output
14	Cd		Reset output delay time setting (with capacitor)
23	V _{REF}		Reference voltage input for level shift circuit
24	V _{CC}		Power supply (shorted with pin 1)

Note: GND (minimum electrical potential) should be connected to the center frame of the pin.

Reset Operation



A06427

- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of July, 1998. Specifications and information herein are subject to change without notice.