



LA6576 — Monolithic Linear IC

5-channel Driver for Compact Disk Applications

Overview

The LA6576 is a 5-channel driver for optical disc drives with a VREF switching function.

Features

- Power amplifier 5-channel built-in. (Bridge-connection (BTL): 4-channel, H bridge: 1-channel)
- I_O max 1A.
- Level shift circuit built-in (except H bridge).
- Mute circuit (output ON/OFF) built-in.
(Operable with BTL AMP with CH1 to 4 and not operable for the H bridge of 5VREG)
- 5V regulator built-in (external PNP transistor).
- With VREF changeover function (H: external, L: internal).
- Overheat protection circuit (thermal shutdown) built-in.

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		14	V
Maximum output current	I_O max	Each output for H bridge, channel 1 to 4	1	A
Maximum input voltage	V_{INB}		13	V
Mute pin voltage	V_{MUTE}		13	V
Allowable operation	P_d max	Independent IC	0.8	W
		Specified board*	2	W
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

*1 A circuit board for mounting (76.1mm×114.3mm×1.6mm, glass epoxy resin)

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		5.6 to 13	V

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Electrical Characteristics at $V_{CC1} = V_{CC2} = 8V$, $V_{REF} = 2.5V$, $T_a = 25^\circ C$, unless especially specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
All blocks						
No-load current drain ON	I_{CC-ON}	BTL-AMP output ON, LOADING block OFF *1		30	50	mA
No-load current drain OFF	I_{CC-OFF}	All outputs OFF *1		10	15	mA
Thermal shutdown temperature	TSD	Design guarantee value	150	175	200	$^\circ C$
VREF-AMP						
VREF-AMP offset voltage	VREF-OFFSET		-10		10	mV
VREF Input voltage range	VREF-IN		1		$V_{CC}-1.5$	V
VREF-OUT output current	I-VREF-OUT	CH1 input reference voltage	2	5		mA
BTL AMP Block (CH1 to CH4)						
Output offset voltage	VOFF	Voltage difference between outputs for BTL AMP, each channel. *2	-50		50	mV
Input voltage range	V_{IN}	Input voltage range for input for OP-AMP.	0		$V_{CC}-1.5$	V
Output voltage	V_O	Each voltage between V_{O+} and V_{O-} when $R_L = 8\Omega$. *3	5.7	6.2		V
Closed-circuit voltage gain	VG	Input and output gain. Input OP-AMP : BUFFER	3.6	4	4.4	deg
Slew rate	SR	AMP Independent Multiply 2 between outputs.		0.5		V/ μs
MUTE ON voltage	VMUTE-ON	Output ON voltage, each MUTE *4	2			V
MUTE OFF voltage	VMUTE-OFF	Output OFF voltage, each MUTE *4			0.5	V
Input AMP Block (CH1 to CH4)						
Input voltage range	V_{IN-OP}		0		$V_{CC}-1.5$	V
Output current (SINK)	SINK-OP		2			mA
Output current (SOURCE)	SOURCE-OP	*5	300	500		μA
Output offset voltage	VOFF-OP		-10		10	mV
CH1 input changeover voltage 1	VSW-OP1	CH1 input AMP (B), external VREF select *6	2			V
CH1 input changeover voltage 2	VSW-OP2	CH1 input AMP (A), internal VREF select *6			0.5	V
Loading Block (CH5, H bridge)						
Output voltage	V_{O-LOAD}	Between forward and reverse outputs, $R_L = 8\Omega$	5.7	6.5		V
Break output saturation voltage	VCE-BREAK	Output voltage at braking *8			0.3	V
Input low level	V_{IN-L}				1	V
Input high level	V_{IN-H}		2			V
Power Supply Block (PNP transistor: 2SB632K-use)						
5V supply output	V_{OUT}	$I_O = 200mA$	4.8	5.0	5.2	V
REG-IN SINK current	REG-IN-SINK	Base current to external PNP	5	10		mA
Line regulation	$\Delta VOLN$	$6V \leq V_{CC} \leq 12V$, $I_O = 200mA$		10	100	mV
Load regulation	$\Delta VOLD$	$5mA \leq I_O \leq 200mA$		10	100	mV

*1. Current dissipation that is a sum of V_{CC1} and V_{CC2} at no load.

*2. Input AMP is a BUFFER AMP.

*3. Voltage difference between both ends of load (8Ω). Output saturated.

*4. Output ON with MUTE: [H] and OFF with MUTE: [L] (HI impedance).

*5. The source of input OP-AMP is a constant current. As the $11k\Omega$ resistance to the next stage is a load, pay due attention when setting the input OP-AMP gain.

*6. With V_{IN1-SW} : [L], the input AMP selects AMP-A while VREF selects internal VREF ($\approx 2.5V$).

With V_{IN1-SW} : [H], the input AMP selects AMP-B while VREF selects external VREF ($\approx 2V_{REF-IN}$).

*7. Voltage of upper (SOURCE) + lower (SINK) sides. At forward/reverse, the output voltage is determined by subtracting this voltage from V_{CC} .

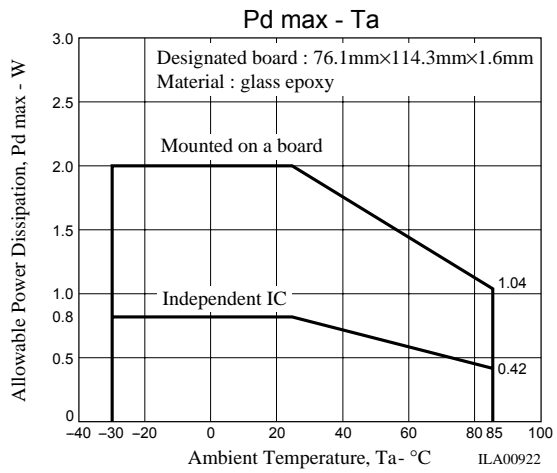
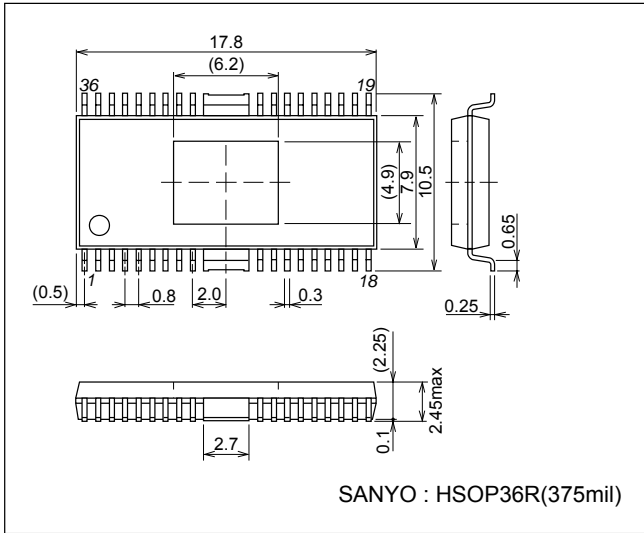
*8. Short (GND) brake used. SINK side output ON.

*9. 5VREG incorporates a drooping protection circuit and operated when the base current is 10mA (TYP).

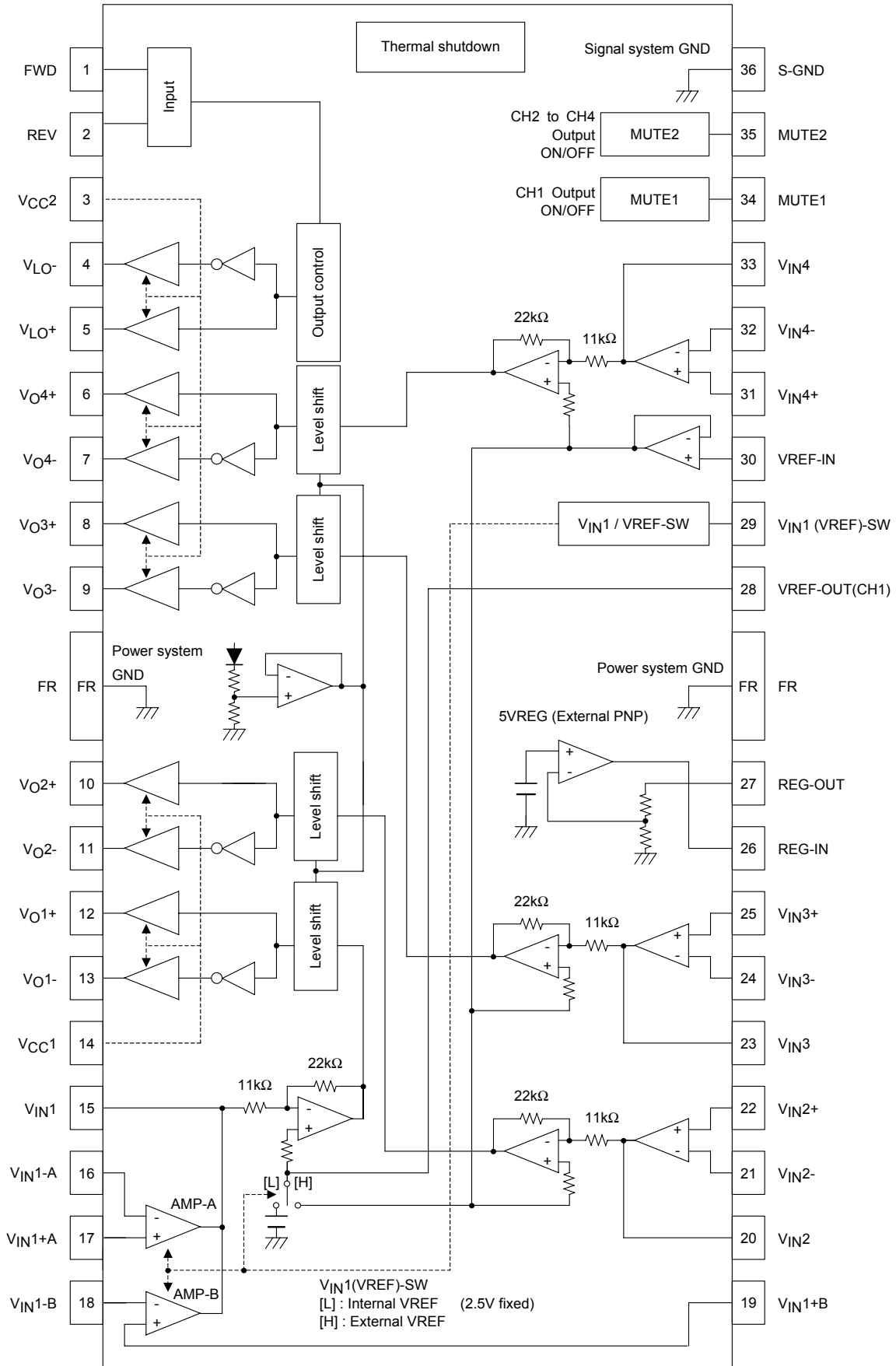
Package Dimensions

unit : mm

3251



Block Diagram

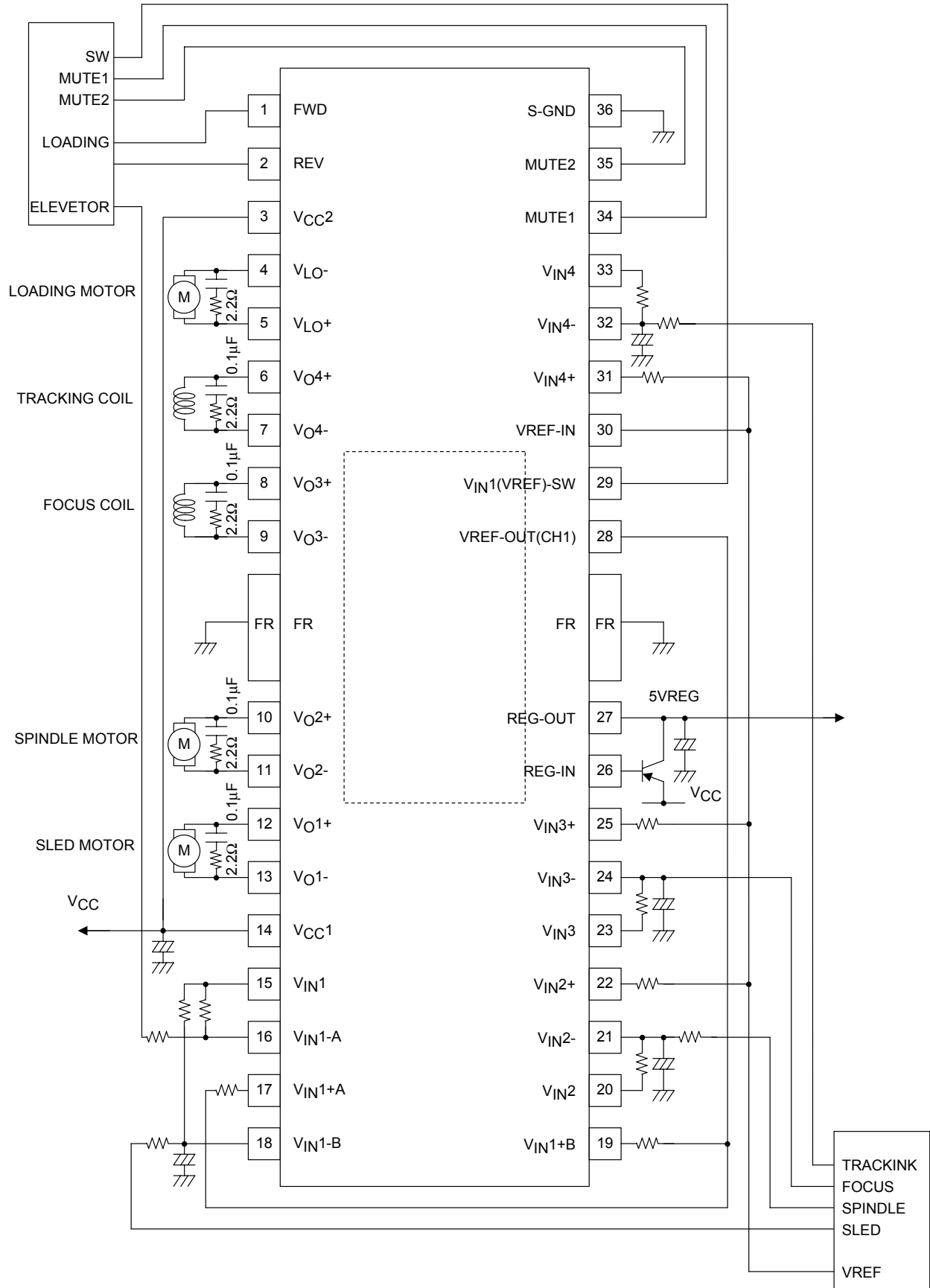


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Pin Description

Pin name	Pin name	Pin no.	Equivalent circuit	Pin explanation
Input (CH1 to 4)	V _{IN1+A} V _{IN1+B} V _{IN1-A} V _{IN1-B} V _{IN1} V _{IN2+} V _{IN2-} V _{IN2} V _{IN3+} V _{IN3-} V _{IN3} V _{IN4-} V _{IN4+} V _{IN4}	17 19 16 18 15 22 21 20 25 24 23 32 31 33		Input pin (CH1 to 4)
Input (H bridge)	FWD REV	1 2		Logic input pin. By combining H and L of this pin, any one of four modes (forward/reversed/brake/idling) can be selected.
Output (BTL-AMP)	V _{O1+} V _{O1-} V _{O2+} V _{O2-} V _{O3+} V _{O3-} V _{O4+} V _{O4-}	12 13 10 11 8 9 6 7		Output for channel 1 to 4.
Output (H bridge)	V _{LO-} V _{LO+}	4 5		H bridge (LOADING) output
MUTE	MUTE1 MUTE2	34 35		BTL AMP output, which turns ON/OFF the output for CH1 – CH4, MUTE: H Output ON MUTE: L Output OFF

Sample Application Circuit



Truth Table (loading (H bridge) section)

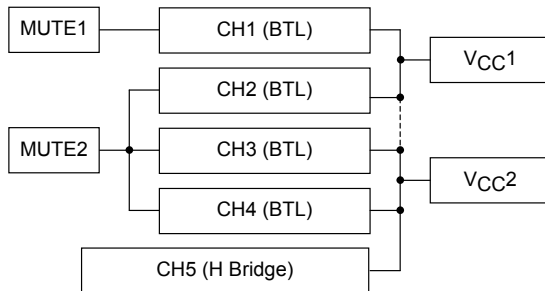
FWD	REV	V _{LO+}	V _{LO-}	Loading output
L	L	OFF	OFF	OFF *1
	H	H	L	Forward
H	L	L	H	Reversed
	H	L	L	(Short) brake *2

*1 The output has a high impedance.

*2 At brake, the SINK side transistor is ON (short brake).

V_{LO+} and V_{LO-} are approximately on the GND level.

Relation of MUTE and Power (V_{CC}*)



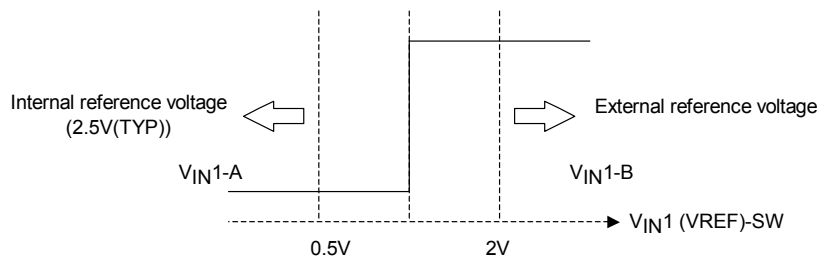
*Connect V_{CC}1 and V_{CC}2 externally.

(This is to minimize effects of voltage drop in internal and metal wirings.)

V_{IN}1 (VREF)-SW (CH1 input AMP selection and internal/external VREF selection function)

(Relation between input AMP (CH1 only) and VREF)

V _{IN} 1-SW	Input AMP (CH1) state	VREF state
L	V _{IN} 1-A (AMP-A)	Internal VREF (2.5V:TYP)
H	V _{IN} 1-B (AMP-B)	External VREF



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