# **Optical disc ICs**

# Post amplifier applicable with 1-bit D / A converter BH3563FV

The BH3563FV is a post amplifier applicable with 1-bit D / A converter for compact disc players.

Applications
Portable CD players, etc.

### Features

- 1) 2-channel analog filter IC for 1-bit D/A converters.
- 2) Internal partial CR for two channels (left and right) LPF.
- 3) Operates on a single power supply.
- 4) Operates on a power supply voltage as low as 3.1V.

•Absolute maximum ratings (Ta =  $25^{\circ}$ C)

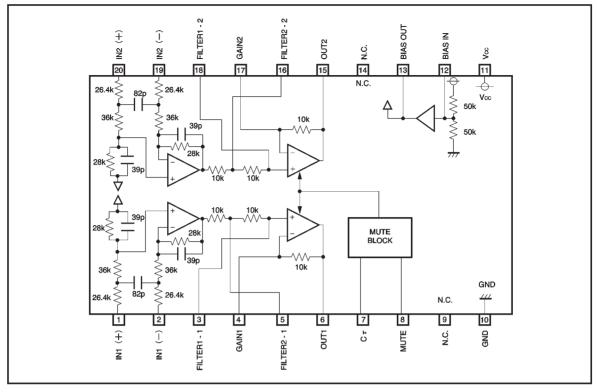
Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	5.5	V
Power dissipation	Pd	400*	mW
Operating temperature	Topr	$-35 \sim +85$	Ĵ
Storage temperature	Tstg	-55~+125	Ĵ

\* Reduced by 4.0 mW for each increase in Ta of 1°C over 25°C.

•Recommended operation conditions (Ta =  $25^{\circ}$ C)

Parameter	Symbol	Min.	Тур.	Max.	Unit
Power supply voltage	Vcc	3.1	—	5.5	V

# Block diagram



## Pin descriptions

Pin No.	Pin name	Function		
1	IN1 (+)	Channel 1 positive input		
2	IN1 (—)	Channel 1 negative input		
3	FILTER 1-1	Filter setting (1-1)		
4	GAIN 1	Gain adjustment (1)		
5	FILTER 2-1	Filter setting (2-1)		
6	OUT 1	Channel 1 output		
7	Сτ	Connecting the mute time constant capacitor		
8	MUTE	Mute control		
9	N.C.	_		
10	GND	Ground		
11	Vcc	Power supply		
12	BIAS IN	Bias input		
13	BIAS OUT	Bias output		
14	N.C.	_		
15	OUT 2	Channel 2 output		
16	FILTER 2-2	Filter setting (2-2)		
17	GAIN 2	Gain adjustment (2)		
18	FILTER 1-2	Filter setting (1-2)		
19	IN2 (-)	Channel 2 negative input		
20	IN2 (+)	Channel 2 positive input		

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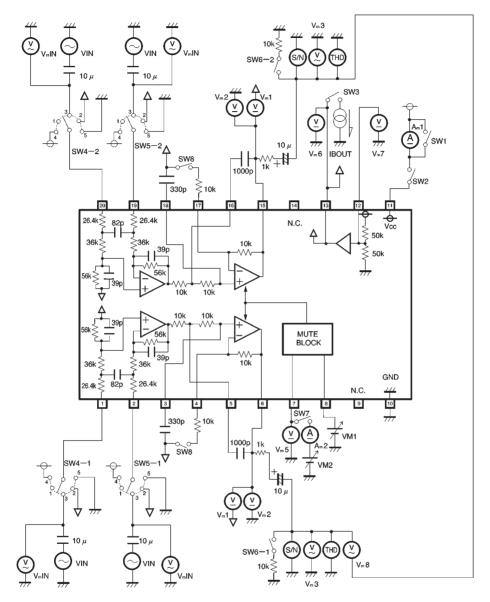
•Electrical characteristics (unless otherwise noted, Ta =  $25^{\circ}$ C, Vcc = 3.5V, RL = 10k $\Omega$ )

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Quiescent current 1	lo1	3.0	4.5	6.0	mA	MUTE OFF, R∟=∞
Quiescent current 2	<b>I</b> Q2	3.0	4.5	6.0	mA	MUTE ON, R∟=∞
Offset voltage 1	Voff1	-15	0	15	mV	MUTE OFF, reference BIAS OUTPUT
Offset voltage 2	Voff2	-15	0	15	mV	MUTE ON, reference BIAS OUTPUT
Bias voltage	Vво	1.60	1.75	1.90	V	
Bias voltage load regulation 1	V <sub>BO1</sub>	-	-	50	mV	IB=+5 mA (source)
Bias voltage load regulation 2	V <sub>BO2</sub>	-	-	50	mV	IB=-5 mA (sink)
C $\tau$ pin source current	IMin.	10.5	14.0	17.5	μA	C $\tau$ = 1.4 V, MUTE = OFF
C $\tau$ pin sink current	Mout	10.5	14.0	17.5	μA	C τ = 1.4 V, MUTE = ON
C $ au$ pin sink / source current ratio	OUT / IN	0.8	1	1.2	_	
MUTE ON voltage	VthON1	1.6	-	-	V	Verifies: Output voltage, BIAS level
MUTE OFF voltage	VthOFF1	-	-	1.2	V	Verifies: Output voltage, HIGH level
C τ pin ON-state voltage	VthON2	-	-	1.10	V	Verifies: Output voltage, BIAS level
C $\tau$ pin OFF-state voltage	VthOFF2	1.64	-	-	V	Verifies: Output voltage, HIGH level
Output high level voltage	Vон	2.55	2.70	_	v	GAIN: 6 dB UP (10 kW attached) Input 3.5 V to pos. phase and 0 V to neg. phase Connect opposite end to BIAS OUT
Output low level voltage	Vol	_	0.75	0.90	V	GAIN: 6 dB UP (10 kW attached) Input 0 V to pos. phase and 3.5 V to neg. phase Connect opposite end to BIASΩ OUT
Closed loop voltage gain	Gvc	-10.8	-7.8	-4.8	dB	VIN=1kHz, 0.5Vms
Frequency characteristic 1	fc1	-10.8	-7.8	-4.8	dB	V <sub>IN</sub> =15kHz, 0.5V <sub>ms</sub>
Frequency characteristic 2	fc2	-21	-16	-11	dB	V <sub>IN</sub> =40kHz, 0.5V <sub>rms</sub>
Mute attenuation	ATT	80	_	_	dB	V <sub>IN</sub> =1kHz, 0.5V <sub>rms</sub>
Crosstalk	СТ	-	90	-	dB	V <sub>IN</sub> =1kHz, 0.5V <sub>rms</sub>
Total harmonic distortion	THD	-	0.01	0.02	%	V <sub>IN</sub> =1kHz, 0.5V <sub>rms</sub>
Signal to noise ratio	S/N	90	100	-	dB	0dB at 1Vms Output
L-R channel balance 1	CB1	-1	0	1	dB	Positive phase input VIN=1kHz, 0.5Vrms
L-R channel balance 2	CB2	-1	0	1	dB	Negative phase input VIN=1kHz, 0.5Vms
Differential balance	Gvв	45	55	-	dB	Common mode input VIN=1kHz, 0.5Vrms

Note: A weighing filter is used when measuring AC parameters (excluding frequency characteristics).

ONot designed for radiation resistance.

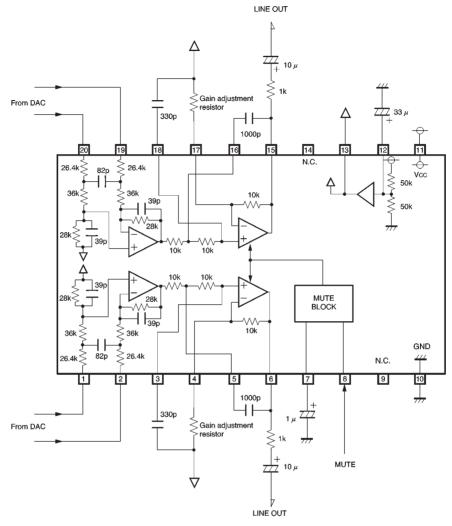
Measurement circuit



Note 1: Arrows indicate the positive current direction. Note 2: Unless otherwise noted, AC input (VIN) = 1 kHz sine waves. Note 3: Unless otherwise noted, SW8 = Off.

Fig. 1

### Application example





#### Operation notes

(1) When the MUTE pin voltage reaches 1.5V or higher, the output voltage is muted and the bias level is output.

(2) Frequency characteristics can be changed by adjusting the capacitor attached to pin 3 (pin18) or pin 5 (pin16).

(3) Gain can be changed by attaching a resistor to pin 4 (pin17).

(4) To prevent popping sounds due to sudden fluctuation in the mute pin voltage, attach a capacitor (approximately  $1\mu F$ ) to pin 7.

(5) Be sure to connect the IC to a  $0.1\mu$ F bypass capacitor to the power supply, at the base of the IC.

## Electrical characteristic curve

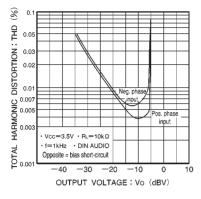


Fig. 3 Output voltage vs.distortion

•External dimensions (Units: mm)

