

# 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°C)

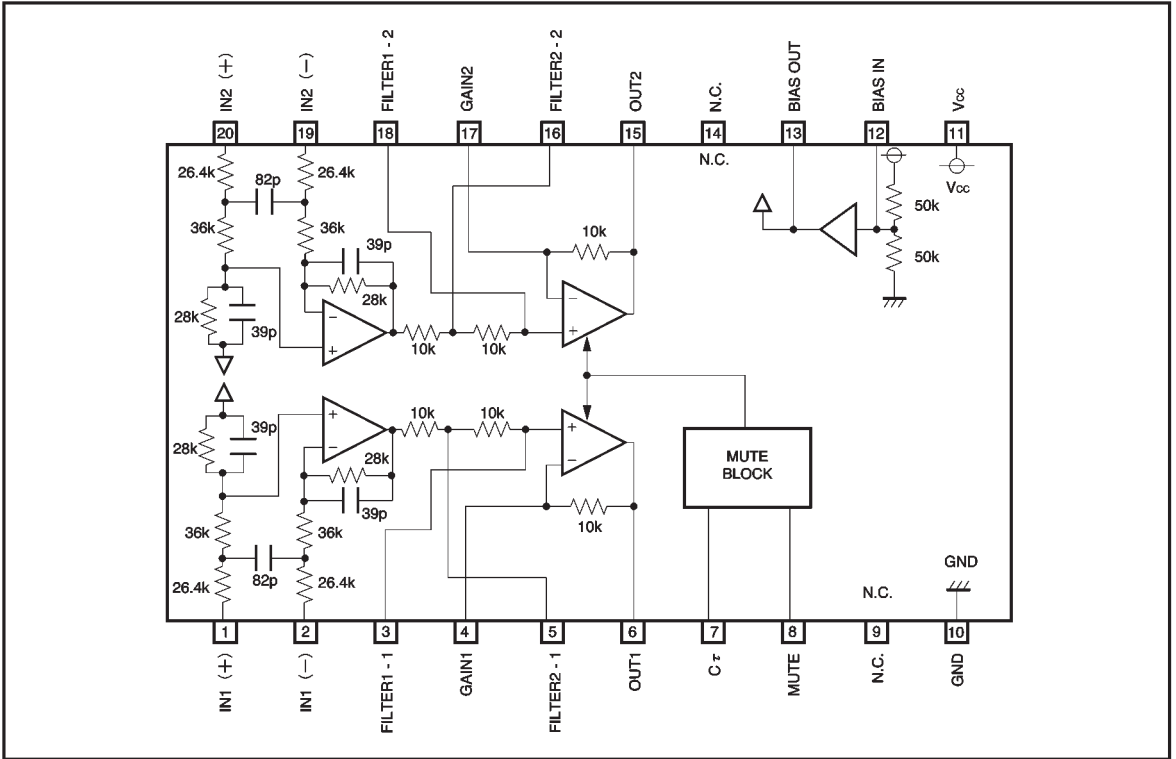
Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>CC</sub>	5.5	V
Power dissipation	P <sub>d</sub>	400*	mW
Operating temperature	T <sub>opr</sub>	-35~+85	°C
Storage temperature	T <sub>stg</sub>	-55~+125	°C

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

### ●Recommended operation conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V <sub>CC</sub>	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	C $\tau$	Connecting the mute time constant capacitor
8	MUTE	Mute control
9	N.C.	—
10	GND	Ground
11	V <sub>CC</sub>	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

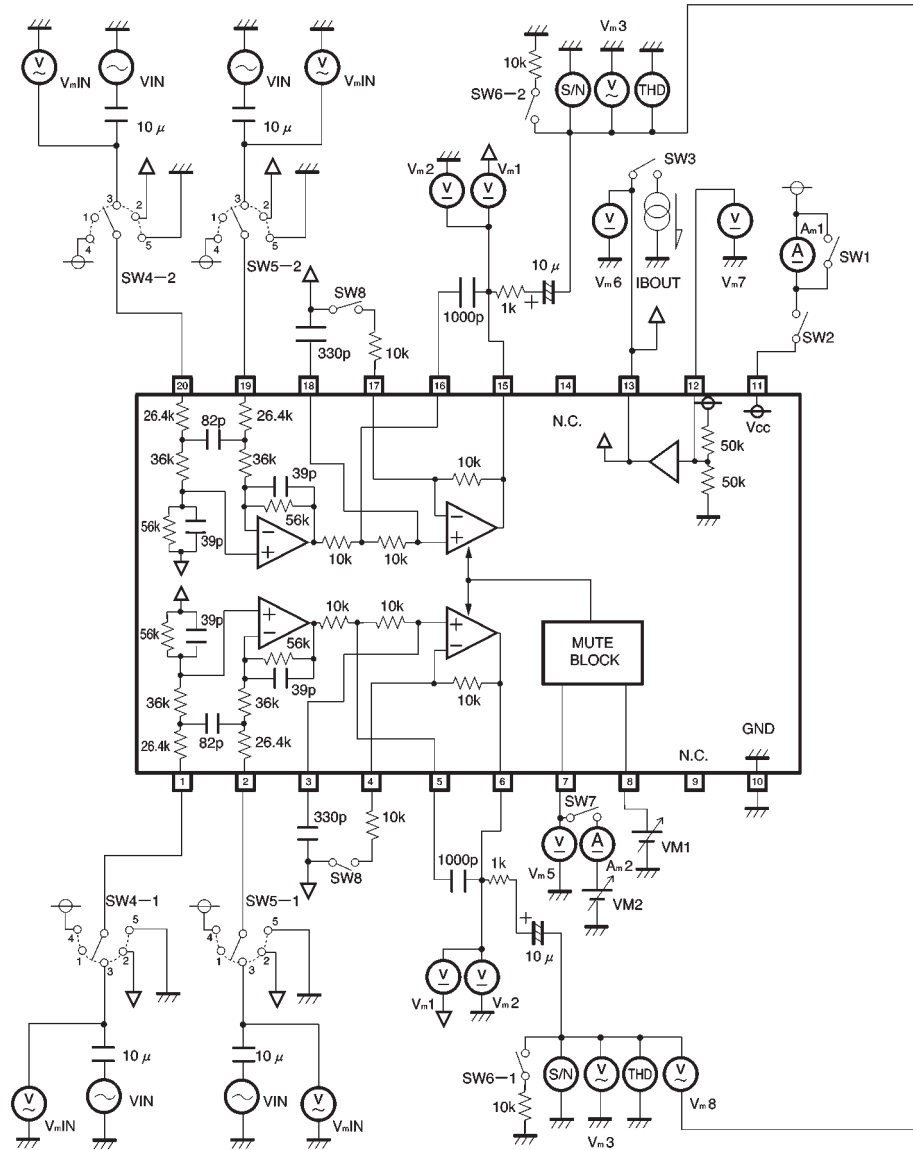
●Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.5\text{V}$ ,  $R_L = 10\text{k}\Omega$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current 1	$I_{Q1}$	3.0	4.5	6.0	mA	MUTE OFF, $R_L = \infty$
Quiescent current 2	$I_{Q2}$	3.0	4.5	6.0	mA	MUTE ON, $R_L = \infty$
Offset voltage 1	$V_{off1}$	-15	0	15	mV	MUTE OFF, reference BIAS OUTPUT
Offset voltage 2	$V_{off2}$	-15	0	15	mV	MUTE ON, reference BIAS OUTPUT
Bias voltage	$V_{BO}$	1.60	1.75	1.90	V	
Bias voltage load regulation 1	$V_{BO1}$	—	—	50	mV	$I_B = +5\text{ mA}$ (source)
Bias voltage load regulation 2	$V_{BO2}$	—	—	50	mV	$I_B = -5\text{ mA}$ (sink)
C $\tau$ pin source current	$I_{Min.}$	10.5	14.0	17.5	$\mu\text{A}$	$C \tau = 1.4\text{ V}$ , MUTE = OFF
C $\tau$ pin sink current	$I_{Mout}$	10.5	14.0	17.5	$\mu\text{A}$	$C \tau = 1.4\text{ V}$ , MUTE = ON
C $\tau$ pin sink / source current ratio	OUT / IN	0.8	1	1.2	—	
MUTE ON voltage	$V_{thON1}$	1.6	—	—	V	Verifies: Output voltage, BIAS level
MUTE OFF voltage	$V_{thOFF1}$	—	—	1.2	V	Verifies: Output voltage, HIGH level
C $\tau$ pin ON-state voltage	$V_{thON2}$	—	—	1.10	V	Verifies: Output voltage, BIAS level
C $\tau$ pin OFF-state voltage	$V_{thOFF2}$	1.64	—	—	V	Verifies: Output voltage, HIGH level
Output high level voltage	$V_{OH}$	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	$V_{OL}$	—	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 BIAS OUT
Closed loop voltage gain	$G_{VC}$	-10.8	-7.8	-4.8	dB	$V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
Frequency characteristic 1	$f_{c1}$	-10.8	-7.8	-4.8	dB	$V_{IN} = 15\text{kHz}$ , $0.5V_{rms}$
Frequency characteristic 2	$f_{c2}$	-21	-16	-11	dB	$V_{IN} = 40\text{kHz}$ , $0.5V_{rms}$
Mute attenuation	ATT	80	—	—	dB	$V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
Crosstalk	CT	—	90	—	dB	$V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
Total harmonic distortion	THD	—	0.01	0.02	%	$V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
Signal to noise ratio	S / N	90	100	—	dB	0dB at $1V_{rms}$ Output
L-R channel balance 1	CB1	-1	0	1	dB	Positive phase input $V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
L-R channel balance 2	CB2	-1	0	1	dB	Negative phase input $V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$
Differential balance	$G_{VB}$	45	55	—	dB	Common mode input $V_{IN} = 1\text{kHz}$ , $0.5V_{rms}$

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

©Not 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

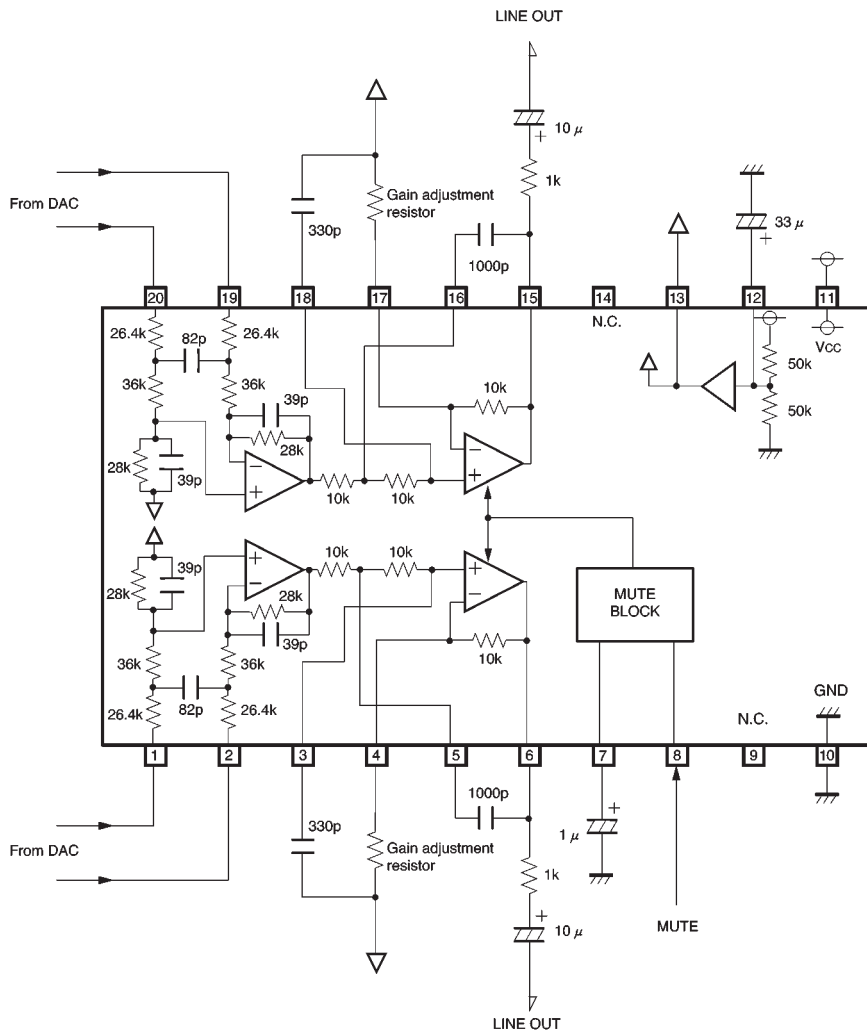


Fig. 2

## ●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 1µF) to pin 7.
- (5) Be sure to connect the IC to a 0.1µF bypass capacitor to the power supply, at the base of the IC.

●Electrical characteristic curve

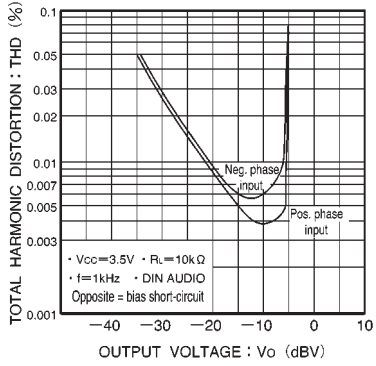


Fig. 3 Output voltage vs.distortion

●External dimensions (Units: mm)

