Post amplifier applicable with 1- bit D/A converter

BH3563FV

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

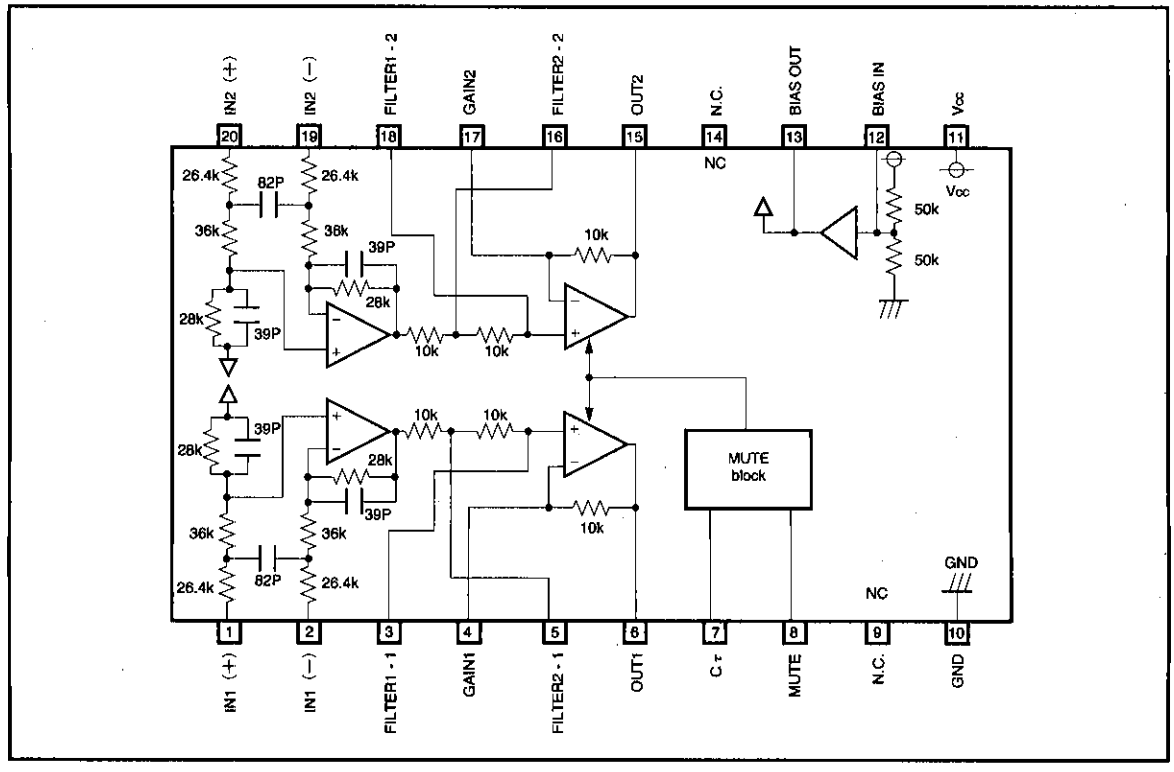
●Applications

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 supply voltage as low as 3.1V.

●Block diagram



●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	5.5	V
Power dissipation	Pd	400*	mW
Operating temperatur	Topr	−35~85	℃
Storage temperature	Tstg	−55~125	℃

* Reduced by 4.0 mW for each increase in Ta of 1℃ over 25℃.

●Recommended operation conditions (Ta=25℃)

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

●Pin description

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 τ	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

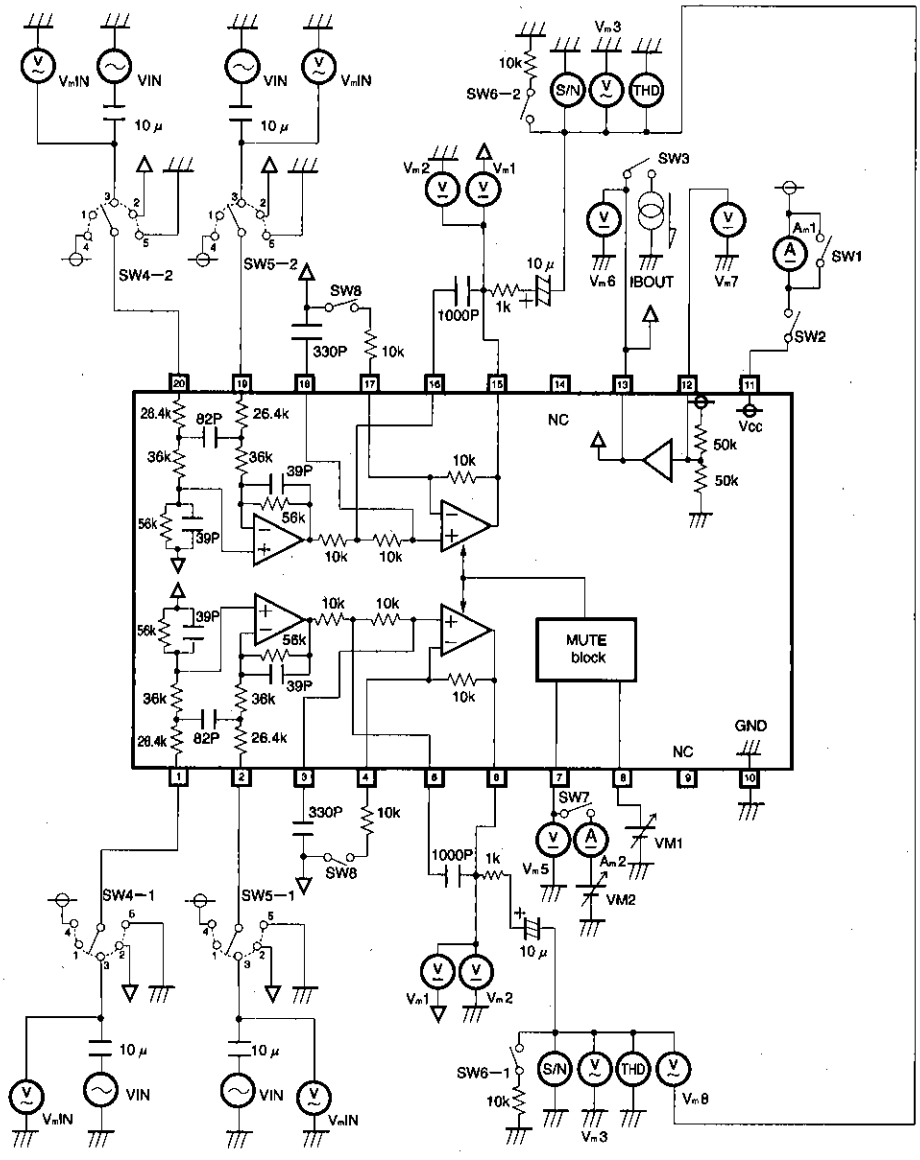
●Electrical characteristics (Unless otherwise noted, Ta=25℃, V_{CC}=3.5V, R_L=10kΩ)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent circuit current 1	I_{Q1}	3.0	4.5	6.0	mA	MUTE OFF, R_L =∞
Quiescent circuit current 2	I_{Q2}	3.0	4.5	6.0	mA	MUTE ON, R_L =∞
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 mA (source)
Bias voltage load regulation 2	V_{BO2}	—	—	50	mV	I_B = -5 mA (sink)
C τ pin source current	$I_{Min.}$	10.5	14.0	17.5	μA	C τ = 1.4 V, MUTE = OFF
C τ pin sink current	I_{Mout}	10.5	14.0	17.5	μA	C τ = 1.4 V, MUTE = ON
C τ 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 τ pin ON-state voltage	V_{thON2}	—	—	1.10	V	Verifies: Output voltage, BIAS level
C τ pin OFF-state voltage	V_{thOFF2}	1.64	—	—	V	Verifies: Output voltage, HIGH level
Output voltage, high level	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 voltage, low level	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 BIASΩ OUT
Voltage gain (closed load)	G_{VC}	−10.8	−7.8	−4.8	dB	V_{IN}=1kHz, 0.5Vrms
Frequency characteristic 1	f_{C1}	−10.8	−7.8	−4.8	dB	V_{IN}=15kHz, 0.5Vrms
Frequency characteristic 2	f_{C2}	−21	−16	−11	dB	V_{IN}=40kHz, 0.5Vrms
Mute attenuation	ATT	80	—	—	dB	V_{IN}=1kHz, 0.5Vrms
Crosstalk	CT	—	90	—	dB	V_{IN}=1kHz, 0.5Vrms
Total harmonic distortion	THD	—	0.01	0.02	%	V_{IN}=1kHz, 0.5Vrms
Signal to noise ratio	S / N	90	100	—	dB	Output 1Vrms 0dB
L-R channel balance 1	CB1	−1	0	1	dB	Positive phase input V_{IN}=1kHz, 0.5Vrms
L-R channel balance 2	CB2	−1	0	1	dB	Negative phase input V_{IN}=1kHz, 0.5Vrms
Differential balance	G_{VB}	45	55	—	dB	Common mode input V_{IN}=1kHz, 0.5Vrms

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 (V_{IN}) = 1 kHz sine waves.
Note 3: Unless otherwise noted, SW8 = Off.

Fig. 1

●Application example

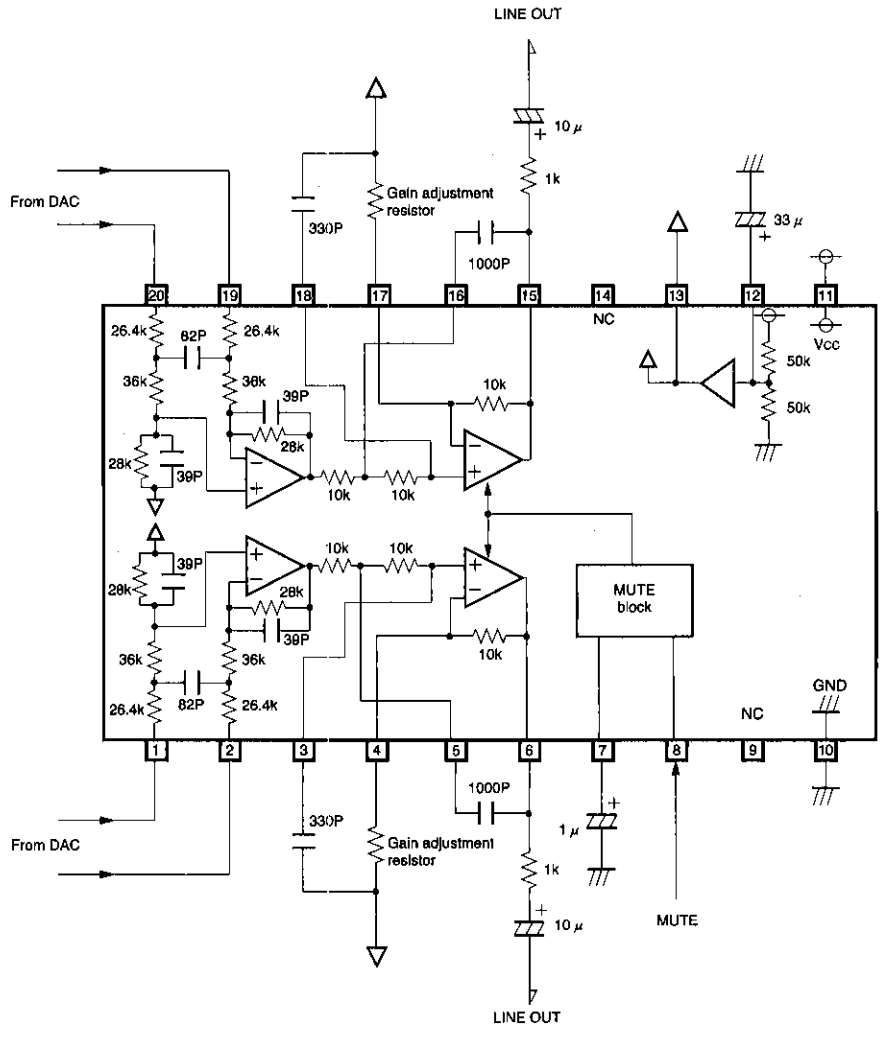


Fig. 2

●Operation notes

- When the MUTE pin voltage reaches 1.5V or higher, the output voltage is muted and the bias level is output.
- Frequency characteristics can be changed by adjusting the capacitor attached to pin 3 Pin 18 or pin 5 Pin 16.
- Gain can be changed by attaching a resistor to pin 4 Pin17.
- To prevent popping sounds due to sudden fluctuation in the mute pin voltage, attach a capacitor (approximately 1 μF) to pin 7.
- Be sure to connect the IC to a 0.1 μF bypass capacitor to the power supply, at the base of the IC.

●Electrical characteristic curve

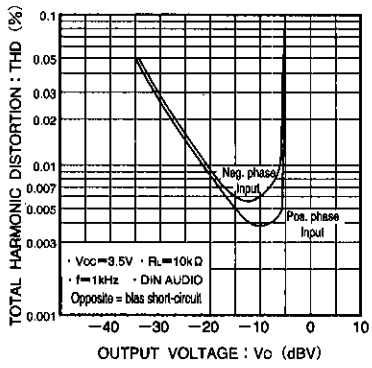
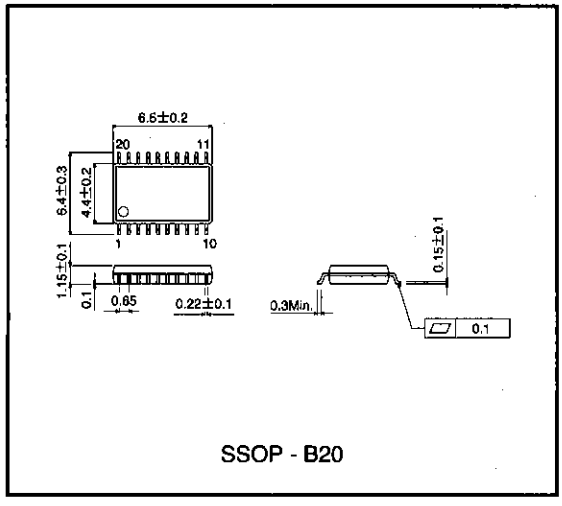


Fig. 3 Output voltage vs. distortion characteristics

●External dimensions (Units: mm)



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