

Structure : Silicon Monolithic Integrated Circuit

Product : Audio Sound Controller for home audio

Type : **BD3883FS**

- Features :
- 1) High S/N achieved by implementing 2-stage configuration of Front Volume and Rear Volume.
  - 2) Providing Surround and Rear Volume with Soft Switch to reduce a shock sound at switching.
  - 3) Volume and Tone implemented with the resistance ladder circuit to achieve high performance with low noise and low distortion.
  - 4) Adopting the BiCMOS process achieves low-consumption current, which contributes to energy-saving design.  
It has the advantage in quality over scaling down of the internal regulators and heat control.
  - 5) For the packages, SSOP-A32 is used. Input pins and output pins are organized and separately laid out so as to keep the signal flows in one direction; consequently, simplifying pattern layout of the set board and decreasing the board dimensions.

Absolute Maximum Ratings(Ta=25°C)

Item	Symbol	Value	Unit
Power Supply Voltage	Vcc	10	V
Power Dissipation	Pd	950*	mW
Input Voltage Range	Vin	GND-0.3 to VCC+0.3	V
Operating Temperature Range	Topr	-25 to +75	°C
Storage Temperature Range	Tstg	-55 to +125	°C

\*Over Ta=25°C, derating at the rate of 9.5mW/°C.  
When installed on the standard board (Size: 70 × 70 × 1.6mm).

Operating Voltage Range

Symbol	Range	Unit
Vcc	6.5 to 9.5	V

\*It must function normally at Ta=25°C.

Note that ROHM cannot provide adequate confirmation of patents.

The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys).

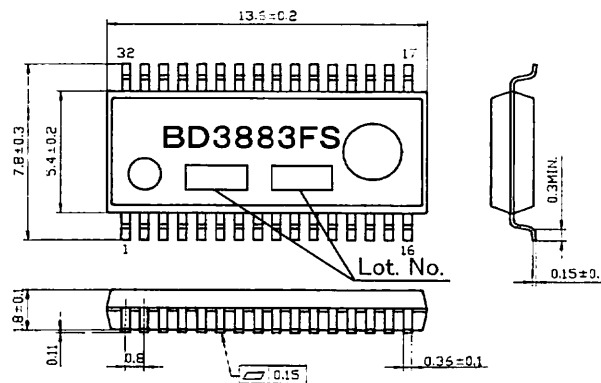
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Electrical characteristics

Ta=25°C, VCC=8V, f=1kHz, Vi=200mVrms, RL=10kΩ, Rg=600Ω,  
 Input Selector=Ach, Input Gain=0dB, Volume=0dB, Bass=0dB, Middle=0dB, Treble=0dB,  
 Surround=OFF, RECOUT=OFF, unless otherwise noted.

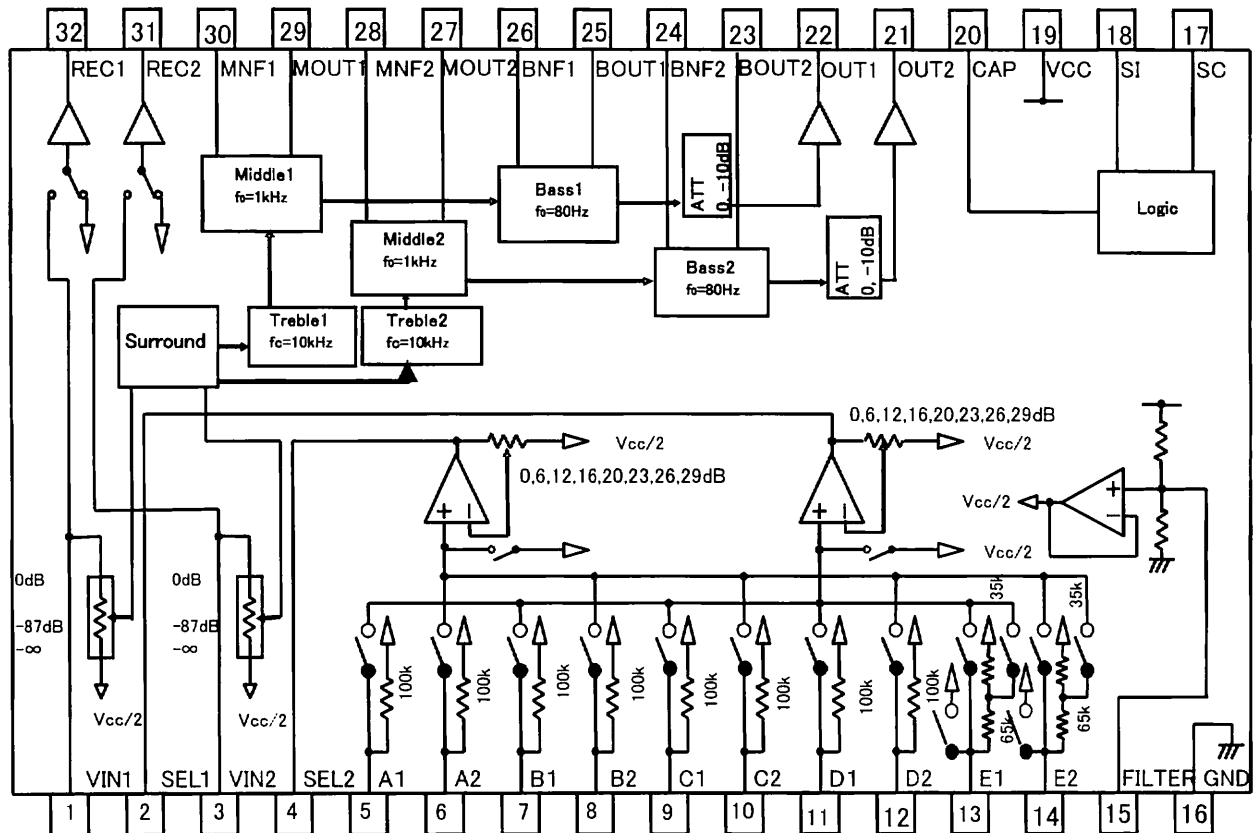
Item	Symbol	Standard Value			Unit	Condition
		Min.	Typ.	Max.		
Circuit Current	IQ	-	8	21	mA	At no signal
Total Output Voltage Gain	Gv	-2	0	2	dB	
Total Harmonic Distortion	THDO	-	0.01	0.1	%	Bw=400 to 30kHz
Maximum Output Voltage	Vomaxo	1.6	2.1	-	Vrms	THD=1% Bw=400 to 30kHz
Total Residual Noise Voltage	Vno	-	2	10	μVrms	Rg=0Ω, Vol=-∞dB Bw=IHF-A, REAR ATT=-10dB
Total Output Noise Voltage	Vmno	-	4	15	μVrms	Rg=0Ω, Vol=0dB Bw=IHF-A
Cross-talk between Channels	CTC12	-	-80	-70	dB	Rg=0Ω, Bw=IHF-A VOUT=1Vrms
Cross-talk between Selectors	CTS1	-	-80	-70	dB	VOUT=1Vrms Rg=0Ω, Bw=IHF-A
Maximum Attenuation	Vmin	-	-	-90	dB	Bw=IHF-A VOUT=1Vrms
Bass Boost Gain (Max)	Gbb	15	17.5	20	dB	GB=20log(VOUT/VIN)
Bass Cut Gain (Max)	Gbc	-20	-17.5	-15	dB	GB=20log(VOUT/VIN)
Middle Boost Gain (Max)	Gmb	12	14	16	dB	GM=20log(VOUT/VIN)
Middle Cut Gain (Max)	Gmc	-16	-14	-12	dB	GM=20log(VOUT/VIN)
Treble Boost Gain (Max)	Gtb	12	14	16	dB	GT=20log(VOUT/VIN)
Treble Cut Gain (Max)	Gtc	-16	-14	-12	dB	GT=20log(VOUT/VIN)
Surround Opposite-phase Gain	Vsur	8	10	12	dB	2ch opposite-phase inputs

Outline dimensions and Marking diagram



SSOP-A32 (Unit: mm)

Block diagram



Terminal description

Terminal number	Terminal name	Terminal description	Terminal number	Terminal name	Terminal description
1	VIN1	1ch volume input terminal	17	SC	Serial clock input terminal
2	SEL1	1ch input selector output terminal	18	SI	Serial data input terminal
3	VIN2	2ch volume input terminal	19	VCC	Power supply terminal
4	SEL2	2ch input selector output terminal	20	CAP	A pin for ON/OFF switching time constant of surround to soften switching noise
5	A1	1ch input terminal A	21	OUT2	2ch output terminal
6	A2	2ch input terminal A	22	OUT1	1ch output terminal
7	B1	1ch input terminal B	23	BOUT2	2ch bass filter setting terminal
8	B2	2ch input terminal B	24	BNF2	2ch bass filter setting terminal
9	C1	1ch input terminal C	25	BOUT1	1ch bass filter setting terminal
10	C2	2ch input terminal C	26	BNF1	1ch bass filter setting terminal
11	D1	1ch input terminal D	27	MOUT2	2ch middle filter setting terminal
12	D2	2ch input terminal D	28	MNF2	1ch middle filter setting terminal
13	E1	1ch input terminal E	29	MOUT1	Serial clock input terminal
14	E2	2ch input terminal E	30	MNF1	Serial data input terminal
15	FILTER	1/2 VCC terminal	31	REC2	2ch RECOUT terminal
16	GND	Grounding terminal	32	REC1	1ch RECOUT terminal

## Caution on use

## 1) About operation voltage supply range

Within operation voltage supply range, basic circuit function Operation is guaranteed within operation ambient temp. But please confirm set up of constant and element, voltage set up and temp set up on use.

## 2) About operation temp range

If it within operation voltage range, circuit function operation is guaranteed within operation temp. it corralled to conditions of power dissipation to temp.

Please watch out except condition stipulated by electrical characteristics within the range. It cannot guarantee standard value of electrical characteristics. But it retains original function.

## 3) About 2-wire serial control

As the terminals of SC and SI are designed for inputting high-frequency digital signals, the wiring and layout patterns should be routed not to cause interference with the analog-signal-related lines.

## 4) About E Input external resistance

To avoid a sudden noise onto E Input external resistance (4.7kΩ), the wiring distance between the external resistance and the IC should be designed shorter.

## 5) About function switching

When switching between the Volume, Treble, Middle and Bass functions, the action to absorb such switching shock sound is taken.

## 6) About Power-ON Reset

A built-in circuit for performing initialization inside the IC at Power-ON is provided. In the case of the setting design, however, to be on the safe side, it is recommended that data shall be sent to all the addresses as initial data at power-ON and, until this sending operation is completed, MUTE shall be applied. To avoid malfunctions, serial data signals must be set to the Low state at power-ON/OFF.

## 7) About step switching noise

For Surround and Rear Volume, an external capacitor C is attached to the CAP pin as the switching step noise control measures. In the application circuit, a constant value, as an example, is shown by the CAP pin. While we are confident that this value shall be recommended, careful consideration and examination must be given before determining the value.

The time constant for charge/discharge of the capacitor C (varying between VBE to 5VBE(2.65V)) controls the slow switching operation.

The switching time constant T is stated as the following:

$$T=2.55 \times 10^5 \times C$$

VBE has temperature characteristics and may affect the value of the time constant T.

## 8) About Input Selector and Input Gain

When changing Input Selector or Input Gain, the soft switching is not applied. Accordingly, it is recommended to provide a set design with a MUTE function constructed of external components.

## 9) About constraints of serial control

On soft-switching of the RECOUT, Surround and Rear Volume functions, data must not be serially sent to the functions involved before the switching operation is completed.

## 10) About function setting while muting Volume

While muting Volume, to avoid increasing residual noise, the serial data must be sent so as to set Bass, Middle and Treble to 0dB; Surround to OFF and Rear Volume to -10dB.

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