

Structure : Silicon Monolithic Integrated Circuit

Product : Audio Sound Processor built-in **SCF**

Type : **BD3445FS**

Package : SSOP-A32

●Feature

1. Slice the external parts by using switched capacitor circuit.
Possible to control Bass Treble Middle and LPF equalizer freely.
2. Built-in operational amplifier in front output for Super Bass function. Possible to control gain setting.
3. It is equipped with 2 systems of output terminals of Subwoofer. Moreover, the stereo signal of the front and rear, too, can be output by the I²C BUS control.
4. Reduce the switching noise of Volume, Fader, Super Bass, Bass Middle Treble LPF gain and attenuation by using soft switching circuit. (Possible to control all steps.)
5. It is possible for the bass, middle, treble to correspond to the simple loudness, too, with the gain adjustment quantity of $\pm 20\text{dB}$ and 1 dB step gain adjustment.
6. Bi-CMOS process is suitable for the design
7. Built-in ground isolation amplifier inputs, ideal for external stereo input.
8. The package of this IC is SSOP-A32. The PCB layout can be easy and the area of PCB is reduced by putting sound input terminals together, and output terminals too.
9. It is possible to control by 3.3V / 5V for I²C BUS and 2 wire serial controller.

●Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply Voltage	VCC	10.0	V
Input Voltage	V _{IN}	VCC+0.3~GND-0.3	V
Power Dissipation	P _d	950 *1	mW
Storage Temperature	T _{stg}	-55~+150	°C

*1 At Ta=25°C or higher, this value is decreased to 7.6mW/°C.

When Rohm standard board is mounted.

Rohm standard board: size: 70×70×1.6 (mm³)

material: FR4 glass-epoxy substrate (copper foil area: not more than 3%).

●Operating Range

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VCC	7.0	-	9.5	V
Temperature	T _{opr}	-40	-	+85	°C

※ Design against radiation-proof isn't made.

Status of this document

The Japanese version of this document is the formal specification. A customer may use this translation only for a reference to help reading the formal version. If there are any differences in translation version of this document, formal version takes priority.

Application example

- ROHM cannot provide adequate confirmation of patents.
- The product described in this specification is designed to be used with ordinary electronic equipment or device (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys.)
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●Function

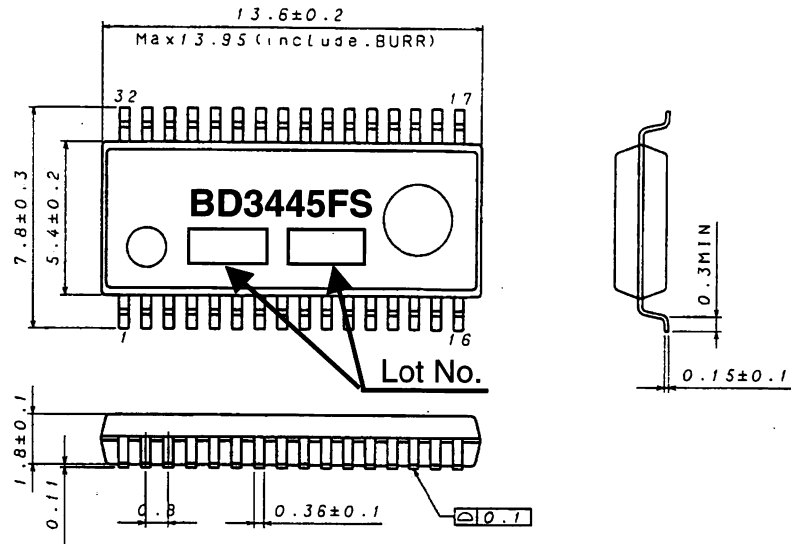
Function	Specifications
Input selector	Stereo 4 input Possible to select single/differential input at D input
Input gain	0~20dB (1dB step)
Mute	Possible to control by I ² C BUS or external compulsory mute terminal, Possible to use soft switching and select 4 switching time
Volume	+15dB~-79dB (1dB step), -∞dB Possible to use soft switching and select 8 switching time
Bass	-20~+20dB (1dB step), Q= 0.5, 1, 1.5, 2, f ₀ =60, 80, 100, 120 Possible to use soft switching at changing gain
Middle	-20~+20dB (1dB step), Q= 0.75, 1, 1.25, 1.5, f ₀ =500, 1k, 1.5k 2.5k Possible to use soft switching at changing gain
Treble	-20~+20dB (1dB step), Q= 0.75, 1.25, f ₀ =7.5k, 10k, 12.5k, 15k Possible to use soft switching at changing gain
Fader	+15dB~-79dB (1dB step), -∞dB Possible to use soft switching and select 8 switching time
Super Bass	0dB~20dB(0~+10dB/1dB step, +10dB~+20dB/2dB step)
LPF	f _c =80/120/160Hz, LPF=off
Level meter	2-wired serial control, DC Output

●Electrical characteristics

Unless specified particularly, Ta=25°C, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600Ω, RL=10kΩ, A input, Input gain 0dB, Mute off, Volume 0dB, Tone control 0dB, Super Bass 0dB, Fader 0dB

Item	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current upon no signal	I _Q	—	36	50	mA	No Signal
Voltage gain	G _V	-1.5	0	1.5	dB	G _V =20log(V _{OUT} /V _{IN})
Channel balance	CB	-1.5	0	1.5	dB	CB=G _{V1} -G _{V2}
Total harmonic distortion	THD	—	0.007	0.05	%	V _{OUT} =1Vrms BW=400-30kHz
Output noise voltage	V _{NO}	—	10.5	25	μVrms	Rg=0Ω BW=IHF-A
Residual output noise voltage	V _{NOR}	—	2.5	10	μVrms	Fader=-∞dB Rg=0Ω BW=IHF-A
Cross-talk between channels	CTC	—	-100	-90	dB	Rg=0Ω CTC=20log(V _{OUT} /V _{IN}) BW=IHF-A
Ripple rejection	RR	—	-70	-40	dB	f=100Hz VRR=100mVrms RR=20log(V _{OUT} /V _{CCIN})
Common mode rejection ratio	CMRR	50	65	—	dB	DP1 and DN input DP2 and DN input CMRR=20log(V _{IN} /V _{OUT}) BW=IHF-A
Maximum input voltage	V _{IM}	2.1	2.3	—	Vrms	V _{IM} at THD+N(V _{OUT})=1% BW=400-30kHz
Maximum gain	G _V MAX	+13	+15	+17	dB	Volume=+15dB V _{IN} =100mVrms G _V =20log(V _{OUT} /V _{IN})
Maximum attenuation	G _F MIN	—	-100	-85	dB	Volume=-∞dB G _F =20log(V _{OUT} /V _{IN}) BW=IHF-A
Maximum output voltage	V _{OM}	2	2.2	—	Vrms	THD+N=1% BW=400-30kHz

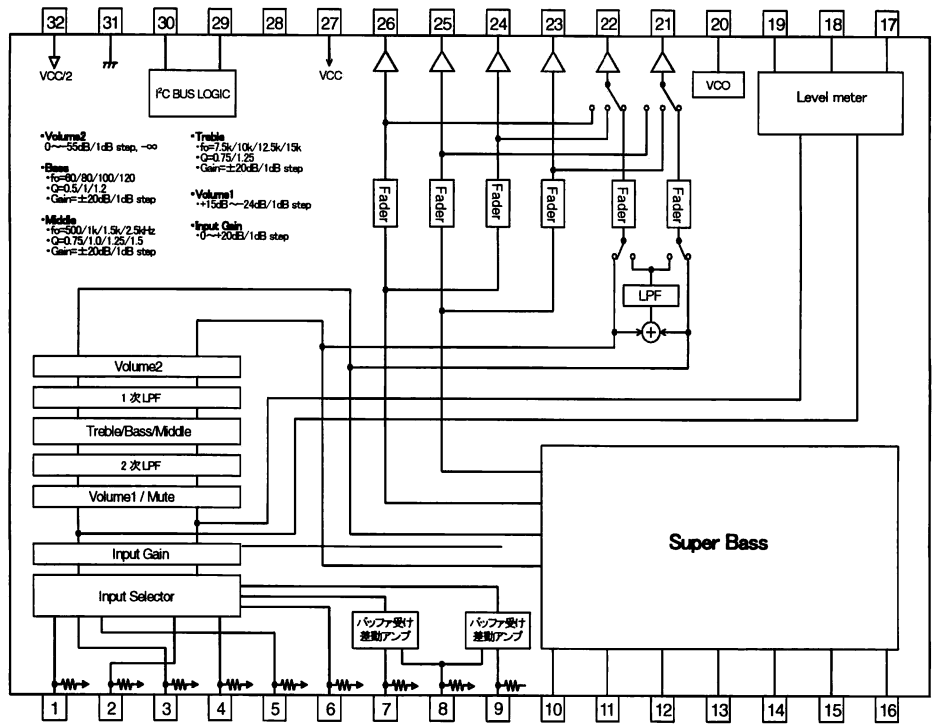
● Dimensional outline drawing



(UNIT : mm)

SSOP-A32

● Block diagram



● Terminal No. / Terminal Name

Terminal No.	Terminal name
1	A1
2	A2
3	B1
4	B2
5	C1
6	C2
7	DP1
8	DN
9	DP2
10	SB32
11	SB12
12	SB22
13	SBIAS
14	SB21
15	SB11
16	SB31
17	CLK
18	DATA
19	LOUT
20	ADJ
21	OUTS2
22	OUTS1
23	OUTR2
24	OUTR1
25	OUTF2
26	OUTF1
27	VCC
28	MUTE
29	SCL
30	SDA
31	GND
32	FIL

●Cautions on use

(1) Absolute maximum ratings

If applied voltage, operating temperature range, or other absolute maximum ratings are exceeded, the LSI may be damaged. Do not apply voltages or temperatures that exceed the absolute maximum ratings. If you think of a case in which absolute maximum ratings are exceeded, enforce fuses or other physical safety measures and investigate how not to apply the conditions under which absolute maximum ratings are exceeded to the LSI.

(2) GND potential

Make the GND pin voltage such that it is the lowest voltage even when operating below it. Actually confirm that the voltage of each pin does not become a lower voltage than the GND pin, including transient phenomena.

(3) Thermal design

Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.

(4) Shorts between pins and misinstallation

When mounting the LSI on a board, pay adequate attention to orientation and placement discrepancies of the LSI. If it is misinstalled and the power is turned on, the LSI may be damaged. It also may be damaged if it is shorted by a foreign substance coming between pins of the LSI or between a pin and a power supply or a pin and a GND.

(5) Operation in strong magnetic fields

Adequately evaluate use in a strong magnetic field, since there is a possibility of malfunction.

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