Structure: Silicon Monolithic Integrated Circuit

Product: Sound Processor for car audio

Type: BD37543FS

Package: SSOP-A32

●Feature

1. Reduce switching noise of input gain control, mute, main volume, fader volume, bass, middle, treble, loudness, by using advanced switch circuit [Possible to control all steps]
2. Built-in ground isolation amplifier inputs, ideal for external stereo input.
3. Built-in differential input selector that can make various combination of single-ended / differential input.
4. Built-in input gain controller reduce switching noise for volume of a portable audio input.
5. Decrease the number of external components by built-in 3-band equalizer filter, LPF for subwoofer, HPF. And, possible to control Q, Gv, fo of 3-band equalizer and fc of LPF and fc of HPF by I^2C BUS control freely.
6. It is possible for the bass, middle, treble to the gain adjustment quantity of ±20dB and 1 dB step gain adjustment.
7. It is equipped with output terminals of Subwoofer. Moreover, the stereo signal of the front and rear also can be output by the I^2C BUS control.
8. Built-in mixing input and mixing attenuation.
9. Bi-CMOS process is suitable for the design of low current and low energy. And it provides more quality for small-scale regulator and heat in a set.
10. Package is SSOP-A32. Putting input-terminals together and output-terminals together can make PCB layout easier and can makes area of PCB smaller.
11. It is possible to control by 3.3V / 5V for I^2C BUS.

●Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply Voltage	VCC	10.0	V
Input voltage	VIN	VCC+0.3～GND-0.3	V
Power Dissipation	Pd	950 ※1	mW
Storage Temperature	Tastg	-55～+150	℃

※1 At Ta＝25°C or higher, this value is decreaced to 8.5mW/°C
When Rohm standard board is mounted.
Rohm standard board: Size：70×70×1.6(mm^3)
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	Topr	-40	－	+85	℃

※Design against radiation-proof isn't made.

●**Function**

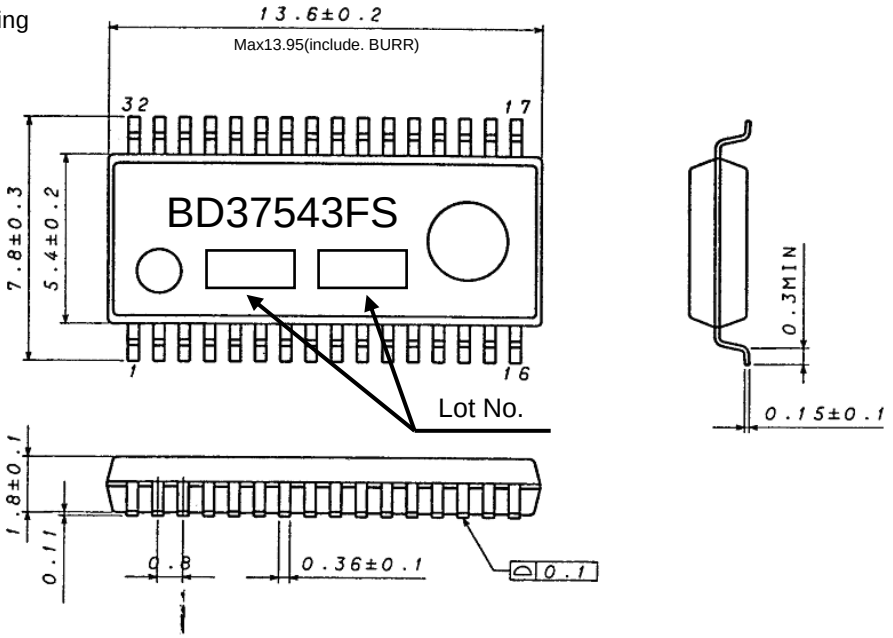
Function	Specifications
Input selector	Stereo 3 single-end input and 2differential input possible to switch single-end input
Input gain	0～20dB (1dB step), Possible to use “Advanced switch” for prevention of switching noise.
Mute	Possible to use “Advanced switch” for prevention of switching noise.
Volume	+15dB～−79dB (1dB step), −∞dB Possible to use “Advanced switch” for prevention of switching noise.
Bass	−20～+20dB (1dB step), Q=0.5, 1, 1.5, 2, fo=60, 80, 100, 120Hz Possible to use advanced switch at changing gain
Middle	−20～+20dB (1dB step), Q=0.75, 1, 1.25, 1.5, fo=500, 1k, 1.5k, 2.5kHz Possible to use advanced switch at changing gain
Treble	−20～+20dB (1dB step), Q=0.75, 1.25, fo=7.5k, 10k, 12.5k, 15kHz Possible to use advanced switch at changing gain
Fader	+15dB～−79dB (1dB step), −∞dB Possible to use “Advanced switch” for prevention of switching noise.
Loudness	0dB～20dB (1dB step) Possible to use “Advanced switch” for prevention of switching noise.
LPF	fc=55/85/120/160Hz, pass Phase shift (0°/180°)
HPF	fc=55/85/120/160Hz, pass
Mixing	Monaural input +7dB～-79dB (1dB step), −∞dB Possible to use “Advanced switch” for prevention of switching noise.
Level meter	I2C BUS control DC Output

●**Electrical Characteristic**

(Unless specified particularly, Ta=25℃, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600Ω, R_L=10kΩ, A input,
Input gain 0dB, Mute OFF, Volume 0dB, Tone control 0dB, Loudness 0dB, Fader 0dB, LPF/HPF OFF, Mixing OFF)

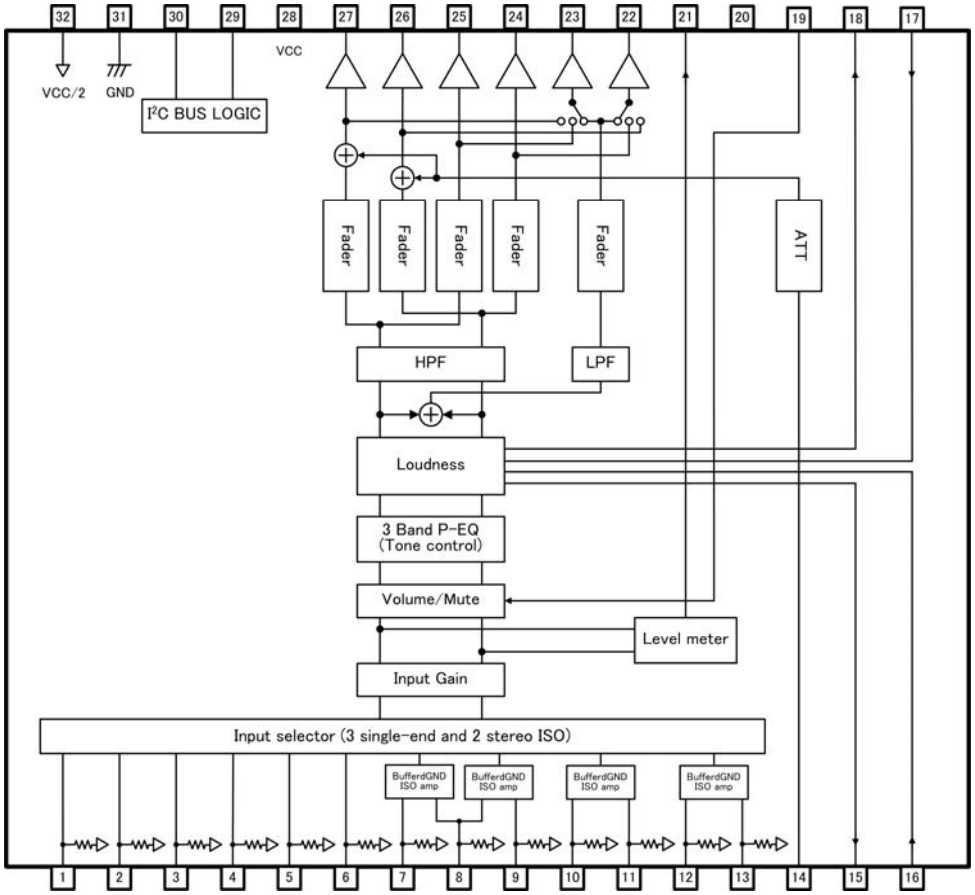
Item	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current upon no signal	IQ	−	38	48	mA	No signal
Voltage gain	GV	-1.5	0	1.5	dB	Gv=20log(VOUT/VIN)
Channel balance	CB	-1.5	0	1.5	dB	CB = GV1-GV2
Total harmonic distortion 1 (FRONT,REAR)	THD+N1	−	0.001	0.05	%	VOUT=1Vrms BW=400-30KHz
Total harmonic distortion 2 (SUBWOOFER)	THD+N2	−	0.002	0.05	%	VOUT=1Vrms BW=400-30KHz
Output noise voltage 1 (FRONT,REAR)	VNO1	−	3.8	15	μVrms	Rg = 0Ω BW = IHF-A
Output noise voltage 2 (SUBWOOFER)	VNO2	−	4.8	15	μVrms	Rg = 0Ω BW = IHF-A
Residual output noise voltage	VNOR	−	1.8	10	μVrms	Fader=−∞dB Rg=0Ω BW=IHF-A
Cross-talk between channels	CTC	−	-100	-90	dB	Rg=0Ω CTC=20log(VOUT/VIN) BW=IHF-A
Ripple rejection	RR	−	-70	-40	dB	f=100Hz VRR=100mVrms RR=20log(VOUT/VCCIN)
Common mode rejection ratio (D, E)	CMRR	50	65	−	dB	XP1 and XN input XP2 and XN input CMRR=20log(VIN/VOUT) BW = IHF-A,[※X・・・D,E]
Maximum input voltage	VIM	2.0	2.2	−	Vrms	VIM at THD+N(VOUT)=1% BW=400-30kHz
Maximum gain	GV MAX	13	15	17	dB	Volume = 15dB VIN=100mVrms Gv=20log(VOUT/VIN)
Maximum attenuation	GV MIN	−	-100	-85	dB	Volume=−∞dB Gf=20log(VOUT/VIN) BW=IHF-A
Maximum output voltage	VOM	2.0	2.2	−	Vrms	THD+N=1% BW=400-30kHz

●Dimensional outline drawing



SSOP-A32 (UNIT：mm)

●Block Diagram



●Descriptions of terminal

Terminal No.	Terminal Name
1	A1
2	A2
3	B1
4	B2
5	C1
6	C2
7	DP1
8	DN
9	DP2
10	EP1
11	EN1
12	EN2
13	EP2
14	MIN
15	LDA1
16	LDB1
17	LDB2
18	LDA2
19	MUTE
20	N.C.
21	LOUT
22	OUTS2
23	OUTS1
24	OUTR2
25	OUTR1
26	OUTF2
27	OUTF1
28	VCC
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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