Structure : Silicon Monolithic Integrated Circuit

Product : Sound Processor for car audio

Type : BD3702FV

Package : SSOP-B28

●Feature

1. Reduce switching noise of input gain control, mute, main volume, fader volume, bass, middle, treble, loudness, mixing 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, loudness filter. And, possible to control Q, Gv, fo of 3-band equalizer and fc of LPF, fo, Gv of loudness 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-B28. 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	1063 ※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.

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.)
Should you intend to use this product with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety device), please be sure to consult with our sales representative in advance.
・ROHM assumes no responsibility for use of any circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement.

●Function

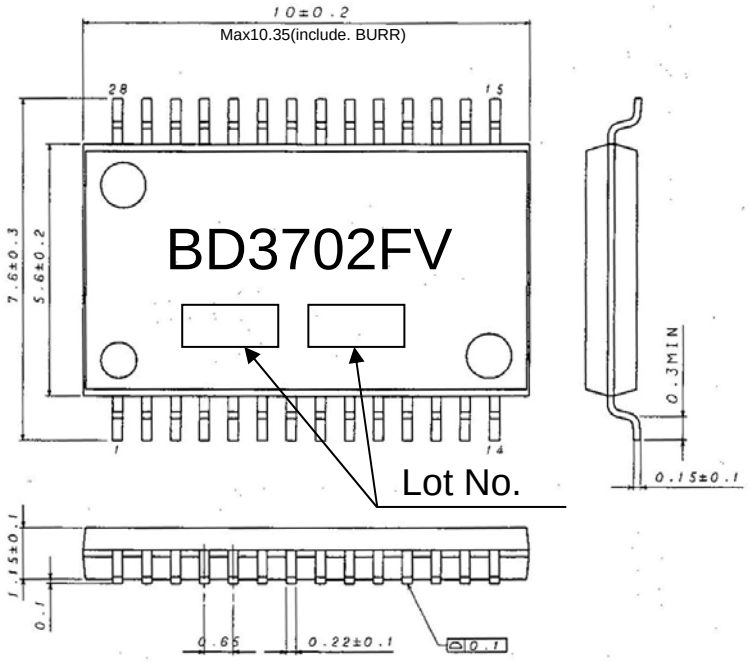
Function	Specifications
Input selector	Stereo input　Possible to set the number of single-end/diff/full-diff as follows
Input gain	0～20dB (1dB step), Possible to use “Advanced switch” for prevention of switching noise
Mute	Possible to use “Advanced switch” for prevention of switching noise.
Volume	+15dB～-79dB (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), fo=250/400/800Hz Possible to use “Advanced switch” for prevention of switching noise.
LPF	fc=55/85/120Hz, pass.
Level meter	I2C BUS control, DC Output
Mixing	Monaural input , +7dB～-79dB（1dB step）, -∞ Possible to use “Advanced switch” for prevention of switching noise.

●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, LPF OFF, MIX OFF, Fader 0dB)

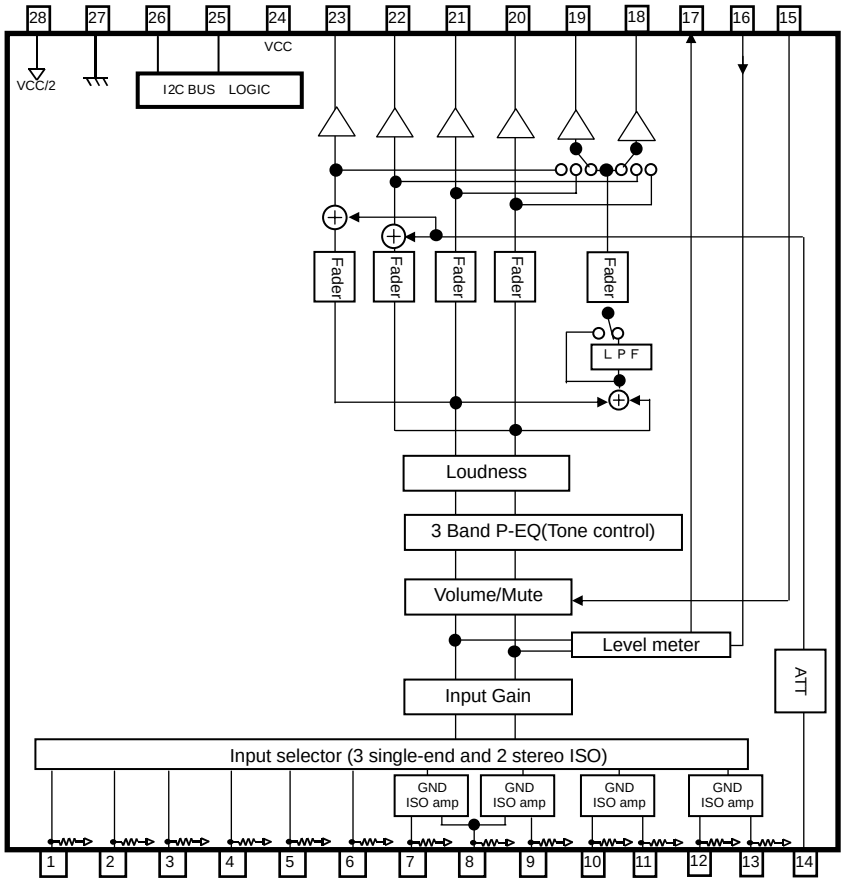
Item	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current upon no signal	I_Q	－	48	60	mA	No signal
Voltage gain	G_V	-1.5	0	1.5	dB	Gv=20log(VOUT/VIN)
Channel balance	CB	-1.5	0	1.5	dB	CB = GV1-GV2
Total harmonic distortion 1 (FRONT,REAR)	THD+N1	－	0.001	0.05	%	VOUT=1Vrms BW=400-30KHz
Total harmonic distortion 2 (SUBWOOFER)	THD+N2	－	0.002	0.05	%	VOUT=1Vrms BW=400-30KHz
Output noise voltage 1 (FRONT,REAR)	V_{NO1}	－	3.8	15	μVrms	Rg = 0Ω BW = IHF-A
Output noise voltage 2 (SUBWOOFER)	V_{NO2}	－	4.8	15	μVrms	Rg = 0Ω BW = IHF-A
Residual output noise voltage	V_{NOR}	－	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	V_{IM}	2.0	2.2	－	Vrms	VIM at THD+N(VOUT)=1% BW=400-30kHz
Maximum gain	$G_{V\ MAX}$	13	15	17	dB	Volume = 15dB VIN=100mVrms Gv=20log(VOUT/VIN)
Maximum attenuation	$G_{V\ MIN}$	－	-100	-85	dB	Volume=-∞dB Gf=20log(VOUT/VIN) BW=IHF-A
Maximum output voltage	V_{OM}	2.0	2.2	－	Vrms	THD+N=1% BW=400-30kHz

●Dimensional outline drawing



SSOP-B28 (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	MUTE
16	LRST
17	LOUT
18	OUTS2
19	OUTS1
20	OUTR2
21	OUTR1
22	OUTF2
23	OUTF1
24	VCC
25	SCL
26	SDA
27	GND
28	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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【REV A → REV B】

ページ	内容
3/4	Dimensional outline drawing BS3700FV -> BD3702FV