Structure : Silicone monolithic integrated circuit

Product Name : Sound processor for car audio

Model Name : **BD3481FS**

Package : SSOP-A20

●Features

1. Reduce the switching noise of Primary / Fader Volume attenuation and Tone by using advanced switch circuit.
2. Taking in a filter of bass and treble inside can reduce the external parts.
3. Bi-CMOS process
4. Reduce the noise of through mode by using tone-pass route.
5. It is possible for bass, treble to correspond to the simple loudness, too, with the gain adjustment quantity of ±20dB and 1 dB step gain adjustment.
6. Built-in ground isolation amplifier input, ideal for external stereo input.
7. The package of this IC is SSOP-A20. It gathers a sound input terminals, sound output terminals respectively and it arranges them, to be arranging facilitates the laying-out of PCB pattern and reduces PCB area to one-way in the flow of the signal.
8. It is possible to control by 3.3V / 5V for I^2C BUS.

●Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply Voltage	VCC	10.0	V
Input Voltage	VIN	VCC+0.3～GND-0.3	V
Power Dissipation	Pd	940 *1	mW
Storage Temperature	Tastg	-55～+150	°C

*1 At Ta=25°C or higher, this value is decreaced to 7.5mW/°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.)
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●Function

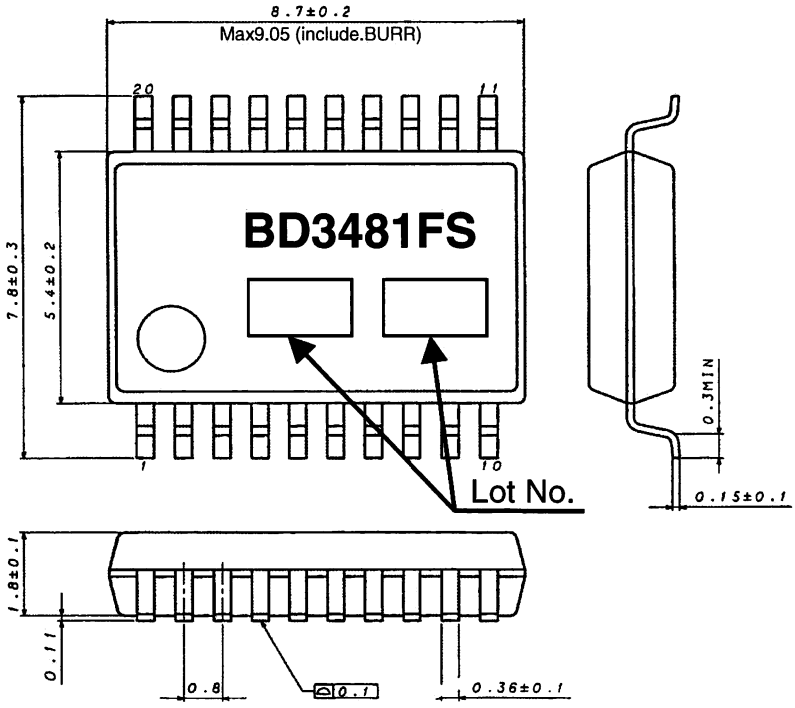
Function	Specifications
Input selector	Stereo 4 input, D input can be switched between single and differential input
Input gain	0～20dB,1dB step
Primary volume	+12dB～-40dB(1dB step), Possible to use advanced switch
Bass	-20～+20dB(1dB step), Q=1, f0=100Hz Possible to use advanced switch
Treble	-20～+20dB(1dB step), Q=1, f0=10kHz Possible to use advanced switch
Fader	0dB～-62dB(1dB step), -∞dB, Possible to control independently for each four output Possible to use advanced switch

●Electrical characteristics

Unless otherwise specified, Ta=25℃, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600Ω, RL=10kΩ, A input, Input gain 0dB, Volume 0dB, Bass 0dB, Treble 0dB, Fader 0dB

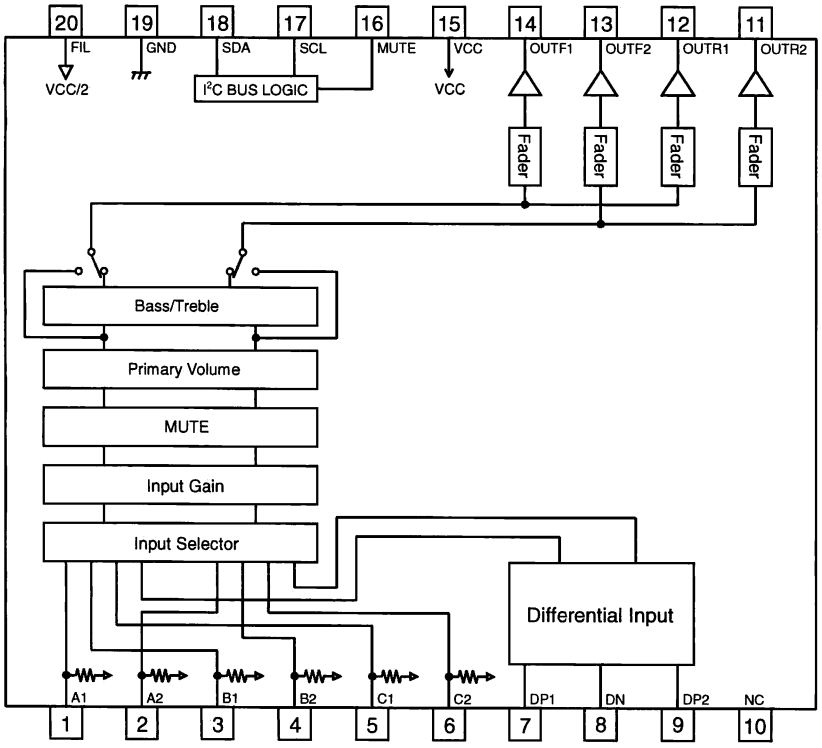
Item	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current upon no signal	I_Q	–	15	30	mA	No signal
Voltage gain	G_V	-1.5	0	1.5	dB	Gv=20log(VOUT/VIN)
Channel balance	CB	-1.5	0	1.5	dB	CB=G_{V1}-G_{V2}
Total harmonic distortion	THD+N	–	0.005	0.05	%	VOUT=1Vrms BW=400-30kHz
Output noise voltage	V_{NO}	–	6	25	μVrms	Rg=0Ω BW=IHF-A
Residual output noise voltage	V_{NOR}	–	2	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	Rg=0Ω f=100Hz VRR=100mVrms RR=20log(VOUT/VCCIN)
Common mode rejection ratio	CMRR	50	65	–	dB	DP1 and DN input DP2 and DN input CMRR=20log(VIN/VOUT) BW=IHF-A
Maximum input voltage	V_{IM}	2.1	2.3	–	Vrms	VIM at THD+N(VOUT)=1% BW=400-30kHz
Maximum gain	$G_{V\,MAX}$	+10	+12	+14	dB	Volume=+12dB VIN=100mVrms Gv=20log(VOUT/VIN)
Maximum attenuation	$G_{F\,MIN}$	–	-100	-90	dB	Gf=20log(VOUT/VIN) BW=IHF-A, Att=-∞dB
Maximum output voltage	V_{OM}	2.0	2.2	–	Vrms	THD+N=1% BW=400-30kHz

●Dimensional outline drawing



SSOP-A20 (Unit : mm)

●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	NC
11	OUTR2
12	OUTR1
13	OUTF2
14	OUTF1
15	VCC
16	MUTE
17	SCL
18	SDA
19	GND
20	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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