

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 $\pm 20\text{dB}$ 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 I²C 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 decreased to 7.5mW/°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	Topr	-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

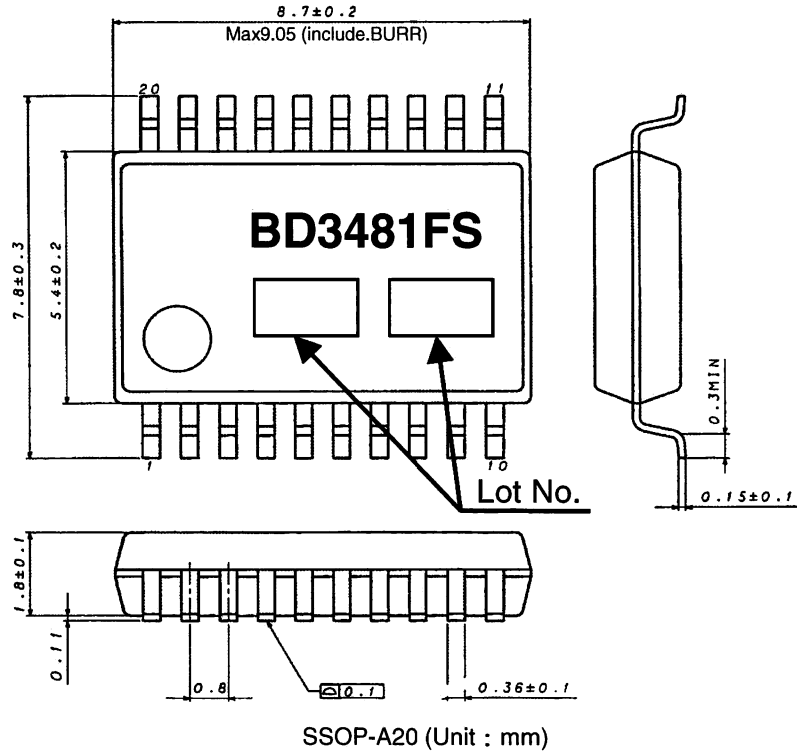
Function	Specifications
Input selector	Stereo 4 input, D input can be switched between single and differential input
Input gain	0~20dB, 1dB step
Primary volume	+12dB~-40dB(1dB step), Possible to use advanced switch
Bass	-20~+20dB(1dB step), Q=1, f0=100Hz Possible to use advanced switch
Treble	-20~+20dB(1dB 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°C, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600Ω, RL=10kΩ, A input, Input gain 0dB, Volume 0dB, Bass 0dB, Treble 0dB, Fader 0dB

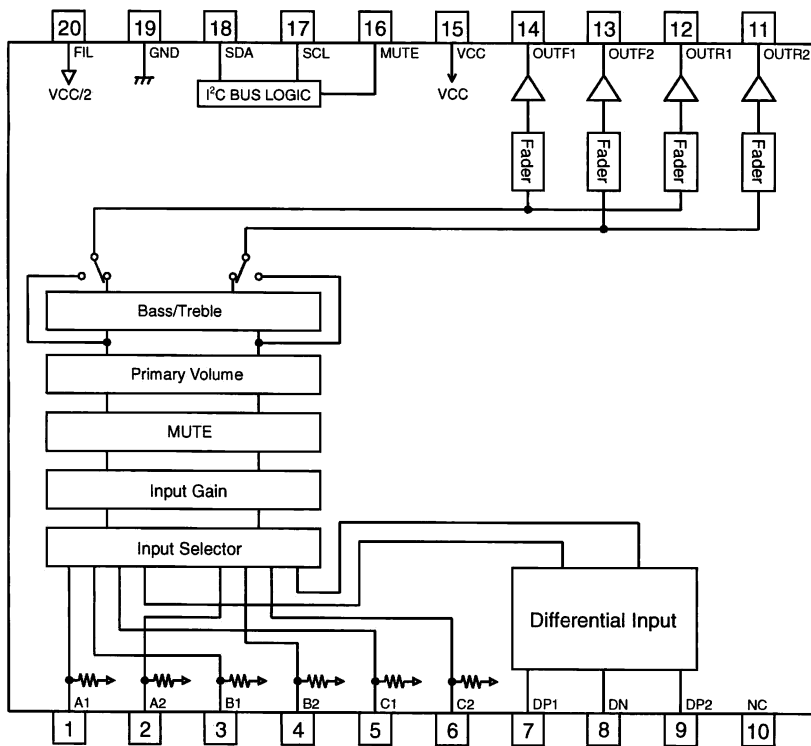
Item	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current upon no signal	IQ	—	15	30	mA	No signal
Voltage gain	Gv	-1.5	0	1.5	dB	$Gv=20\log(V_{OUT}/V_{IN})$
Channel balance	CB	-1.5	0	1.5	dB	$CB=Gv_1-Gv_2$
Total harmonic distortion	THD+N	—	0.005	0.05	%	VOUT=1Vrms BW=400-30kHz
Output noise voltage	VNO	—	6	25	μVrms	Rg=0Ω BW=IHF-A
Residual output noise voltage	VNOR	—	2	10	μVrms	Fader=-∞dB Rg=0Ω BW=IHF-A
Cross-talk between channels	CTC	—	-100	-90	dB	Rg=0Ω $CTC=20\log(V_{OUT}/V_{IN})$ BW=IHF-A
Ripple rejection	RR	—	-70	-40	dB	Rg=0Ω f=100Hz VRR=100mVrms $RR=20\log(V_{OUT}/V_{CCIN})$
Common mode rejection ratio	CMRR	50	65	—	dB	DP1 and DN input DP2 and DN input $CMRR=20\log(V_{IN}/V_{OUT})$ BW=IHF-A
Maximum input voltage	VIM	2.1	2.3	—	Vrms	VIM at THD+N(VOUT)=1% BW=400-30kHz
Maximum gain	GV MAX	+10	+12	+14	dB	Volume=+12dB VIN=100mVrms $Gv=20\log(V_{OUT}/V_{IN})$
Maximum attenuation	GF MIN	—	-100	-90	dB	$Gf=20\log(V_{OUT}/V_{IN})$ BW=IHF-A, Att=-∞dB
Maximum output voltage	VOM	2.0	2.2	—	Vrms	THD+N=1% BW=400-30kHz

● Dimensional outline drawing



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● 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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U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /
(Internal Sales)

Tokyo	2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082	TEL : +81(3)5203-0321	FAX : +81(3)5203-0300
Yokohama	2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575	TEL : +81(45)476-2131	FAX : +81(45)476-2128
Nagoya	Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya, Aichi 450-0002	TEL : +81(52)581-8521	FAX : +81(52)561-2173
Kyoto	579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216	TEL : +81(75)311-2121	FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama	TEL : +81(45)476-9270	FAX : +81(045)476-9271
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As of 18th. April 2005