Structure Silicone monolithic integrated circuit

Product name *SCF* built-in audio sound processor for TV

Model Name **BD3831FS**

●Features

1. Loaded with new heavy low sound equalizer (P^2-Bass) enabling reproduction of real surround sound close to original sound
2. Built-in unique low sound reproduction processor, and SBS (Shadow Bass Sound)
3. Built-in external filter using switched capacitor circuit technology
4. Reduced switching noise using soft switching circuit.
5. I^2C BUS control with the control voltage of 3.3V-5.0V
6. Use the Bi-CMOS process

●Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Applied Voltage	VCC	10.0	V
	SDA	7.0	V
Input Voltage	VIN	VCC+0.3～GND-0.3	V
Power Dissipation	Pd	1190 *1	mW
Operating Temperature	Topr	-40～+85 *2	°C
Storage Temperature	Tastg	-55～+150	°C

*1 At Ta=25°C or higher, this value is decreaced to 9.5mW/°C.
When Rohm standard board is mounted. Thermal resistance θja = 105 (°C/W).
Rohm standard board: size: 70×70×1.6 (mm^3)
material: FR4 glass-epoxy substrate (copper foil area: not more than 3%).

*2 As long as voltage stays within operating voltage range, certain circuit operation is guaranteed in the operating temperature range.
Allowable loss conditions are related to temperature, to which care must be taken.
In addition though the standard value of its electrical characteristics cannot be guaranteed under the conditions other than those specified, original functions are maintained.

●Operating Voltage Range

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage *3	VCC	7.0	9.0	9.5	V

Basic operation shall be available at Ta=25°C.

*3 As long as temperature components must be set in accordance with the operating voltage and temperature ranges before using this IC.
In addition, though the standard value of its electrical characteristics cannot be guaranteed under the conditions other than those specified, original functions are maintained.

●Function

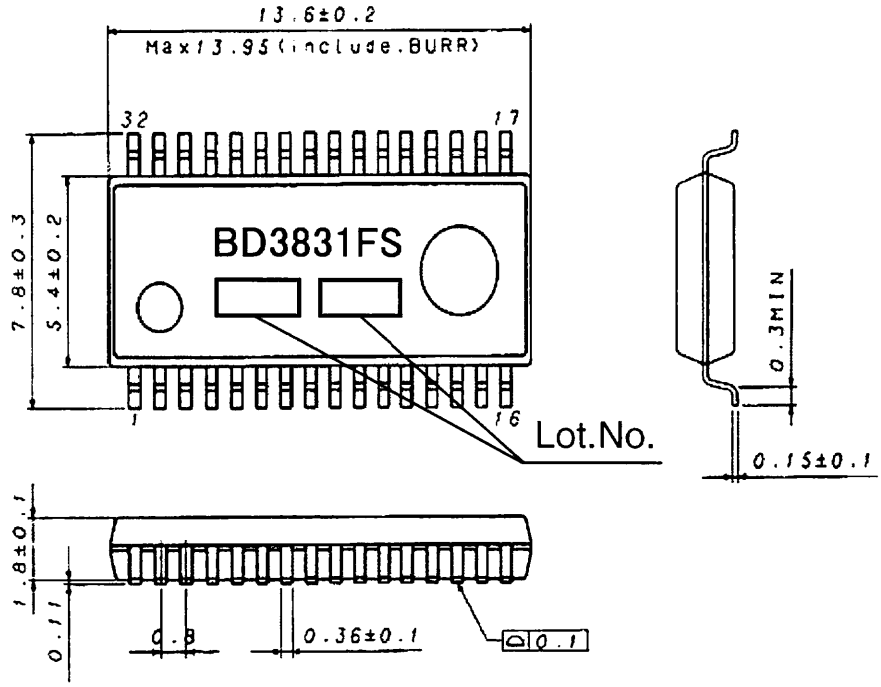
Function	Specifications
AGC	Suppression level = 100, 150, 200, 300, 400, 500, 600 mVrms
D-Range Control	0dB～-20dB, 1dB/step
Volume (Lch, Rch, Center)	0dB～-79dB, -∞dB, 1dB/step, Possible to use soft switching Independent control of Lch and Rch
BASS	±15dB 1dB/step
TREBLE	±15dB 1dB/step, fc=5, 7.5, 10, 12.5kHz
Stereo Surround Monaural Surround	Stereo Surround/Monaural Surround ON/OFF control, Surround effect control
SAS	SAS Gain = 6～13dB
SBS (Shadow Bass Sound) /P^2 Bass	SBS/LPF output ON/OFF control, Gain=6dB～13dB 1dB/step
Speaker setting	fc=60, 80, 100, 120Hz for Filter1 fc=120, 160, 200, 240Hz for Filter2
Soft switching	Soft switching time = 12.5, 25, 50, 100 msec

●Electrical characteristics

Unless specified: Ta=25°C, VCC=9V, f=1kHz, Vin=1Vrms, Rg=600Ω, RL=10kΩ, AGC=OFF, Surround=OFF, Shadow Bass =OFF, SAS=OFF, Tone=0dB, Volume 0dB, Input pin=IN_L, Output pin=OUT_L

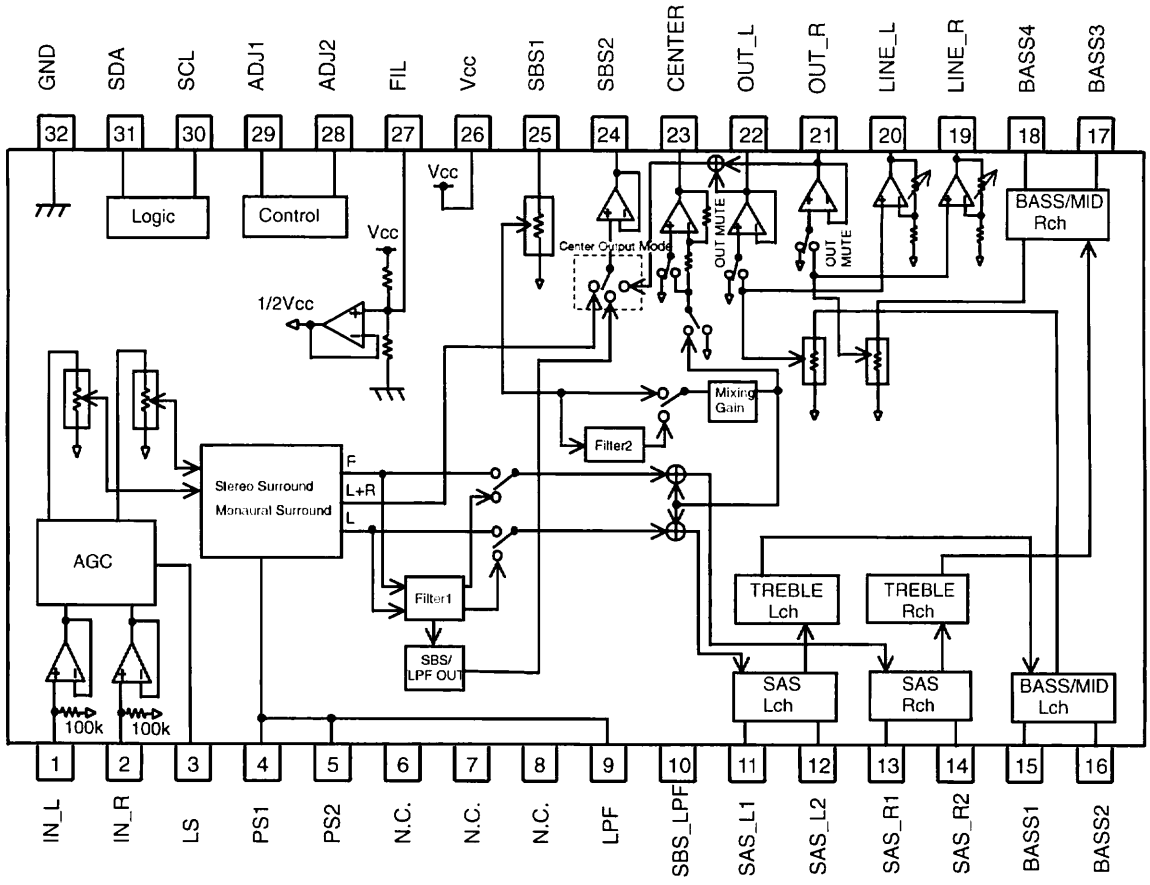
Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Circuit Current upon no signal	I_Q	-	20	36	mA	
Maximum input voltage	V_{IM}	2.2	2.5	-	Vrms	V_{IM} at THD(V_{OUT})=1%
Maximum output voltage	V_{OM}	2.1	2.5	-	Vrms	V_{OM} at THD(V_{OUT})=1%
Voltage gain	G_V	-1.5	0	1.5	dB	
Channel balance	CB	-1.5	0	1.5	dB	CB=GV(Lch)-GV(Rch)
Total harmonic distortion	THD	-	0.005	0.1	%	V_{OUT}=0.5Vrms BW=400-30KHz
Output noise voltage	V_{NO}	-	6	30	μVrms	Rg = 0Ω, DIN AUDIO
Residual noise voltage	V_{NOR}	-	3	10	μVrms	Volume = -∞dB Rg = 0Ω, DIN AUDIO
Cross-talk between channels	CTC	-	-80	-70	dB	Rg = 0Ω, IHF-A
Input impedance	R_{IN}	70	100	130	kΩ	
Max.Attenuation	G_{MUTE}	-	-100	-90	dB	Volume=-∞dB, D-rang=-20dB G_{MUTE}=20log(V_{OUT}/V_{IN}), BW=IHF-A

●Dimensional outline drawing



SSOP-A32 (Unit : mm)

●Block diagram



●Cautions on use

(1) Numbers and data in entries are representative design values and are not guaranteed values of the items.
(2) Although we are confident in recommending the sample application circuits, carefully check their characteristics further when using them. When modifying externally attached component constants before use, determine them so that they have sufficient margins by taking into account variations in externally attached components and the Rohm LSI, not only for static characteristics but also including transient characteristics.
(3) 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.
(4) 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.
(5) Thermal design
Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.
(6) 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.
(7) Operation in strong magnetic fields
Adequately evaluate use in a strong magnetic field, since there is a possibility of malfunction.

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As of 18th. April 2005