

Structure: Silicon Monolithic Integrated Circuit

Product: Sound Processor for car audio

Type: **BD37544FS**

Package: SSOP-A32

● **Feature**

1. Reduce switching noise of input gain control, mute, main volume, fader volume, bass, middle, treble, super Bass 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 I²C 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 I²C 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 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 | 950 ※1 | mW |
| Storage Temperature | Tastg | -55~+150 | °C |

※1 At Ta=25°C or higher, this value is decreased to 8.5mW/°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.

●Function

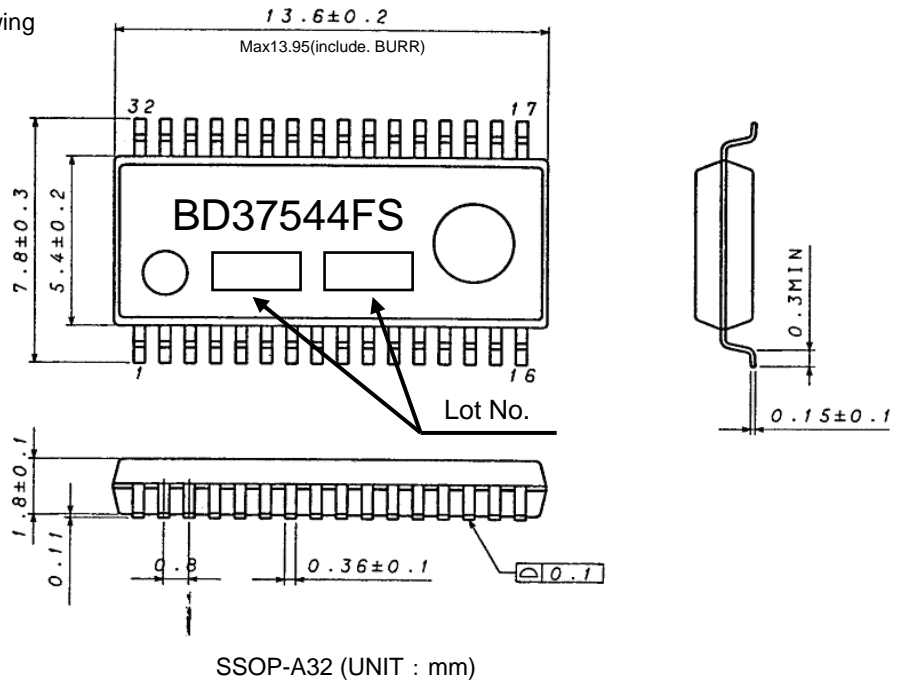
| Function | Specifications |
|----------------|--|
| Input selector | Stereo 3 single-end input and 2 differential input possible to switch single-end input |
| Input gain | 0~20dB (1dB step), Possible to use "Advanced switch" for prevention of switching noise. |
| Mute | Possible to use "Advanced switch" 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. |
| 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. |
| Super Bass | 0~+20dB (1dB step), (Actual gain is different from setup gain) Possible to use "Advanced switch" for prevention of switching noise. |

●Electrical Characteristic

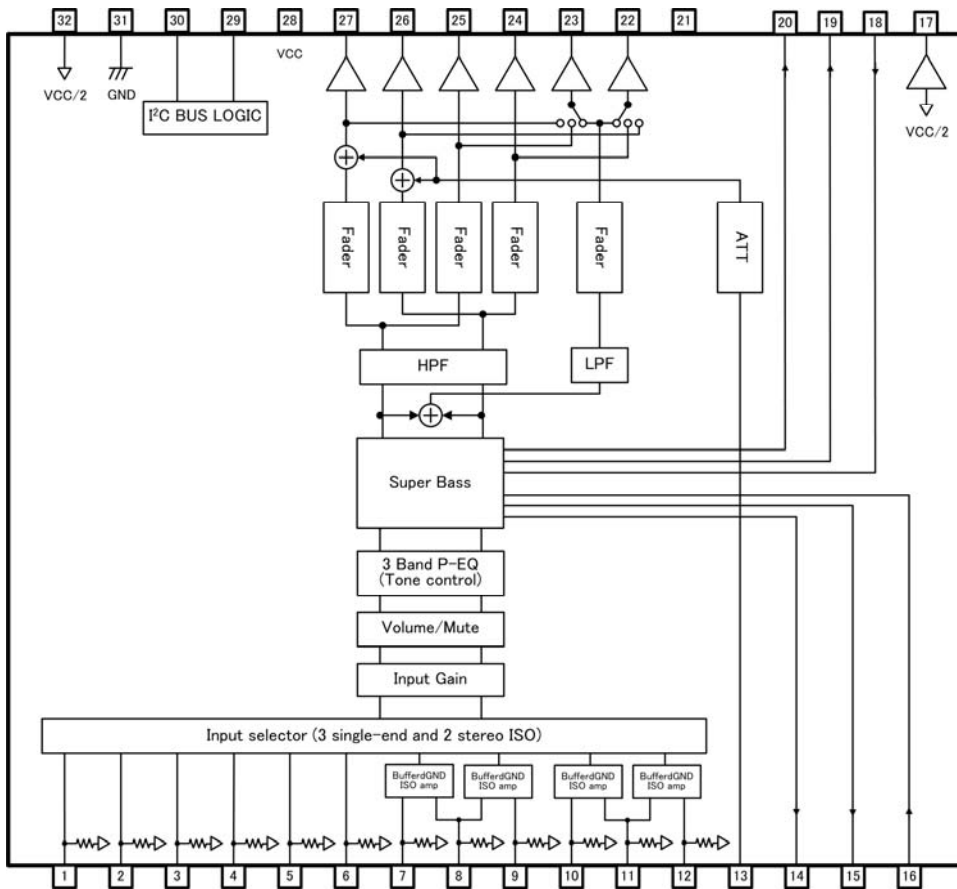
(Unless specified particularly, Ta=25°C, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600Ω, RL=10kΩ, A input, Input gain 0dB, Mute OFF, Volume 0dB, Tone control 0dB, Fader 0dB, Super Bass 0dB, LPF/HPF OFF, Mixing OFF)

| 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



● 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 | EN |
| 12 | EP2 |
| 13 | MIN |
| 14 | SBC1 |
| 15 | SBA1 |
| 16 | SBB1 |
| 17 | SBBIAS |
| 18 | SBB2 |
| 19 | SBA2 |
| 20 | SBC2 |
| 21 | N.C. |
| 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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