

Structure : Silicon Monolithic Integrated Circuit

Product name : 2W +2W Stereo Speaker Amplifier / Headphone Amplifier

Type : **BH7881EFV**

- Features :
- 1) Low voltage drive, low noise, High power driver (2W × 2CH/4Ω /Vcc=5V)
 - 2) Low dropout regulator (Connectable digital power supply, adjustable output voltage & maximum output current, protection with short-circuit detector)
 - 3) Bass boost mode, gain select mode
 - 4) Speaker MUTE function (Headphone mode)
 - 5) Line amplifier (Gain adjustable, set with LPF)
 - 6) Active/suspend mode (TTL input compatible)
 - 7) Hysteresis thermal shutdown (T=150°C/90°C)
 - 8) IC protection (Speaker output with short-circuit detector)
 - 9) Speaker protection (Speaker output Limiter)

○Absolute Maximum Ratings (Ta=25°C)

| Parameter | Limits | Unit |
|-----------------------|------------|------|
| Supply voltage | +6.0 | V |
| Power dissipation | 1100※ | mW |
| Storage temperature | -55 ~ +125 | °C |
| Operating temperature | -10 ~ +70 | °C |

※Deratings is done at 11mW/°C above Ta=25°C.
(When mounting on a 70mmX70mmX1.6mm PCB board)

○Operating Range (Ta=25°C)

| Parameter | Limits | Unit |
|----------------|-------------|------|
| Supply voltage | +3.3 ~ +5.5 | V |

※This product is not designed for protection against radioactive rays.

Application example

The product described in this specification is designed to be used with ordinary electronic equipment or devices (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 devices), please be sure to consult with our sales representative in advance.

○Electrical characteristics

(Unless otherwise noted, VCC=3.3V, Ta=25°C, f=1kHz, R=4 Ω, 400Hz~30kHz BPF)

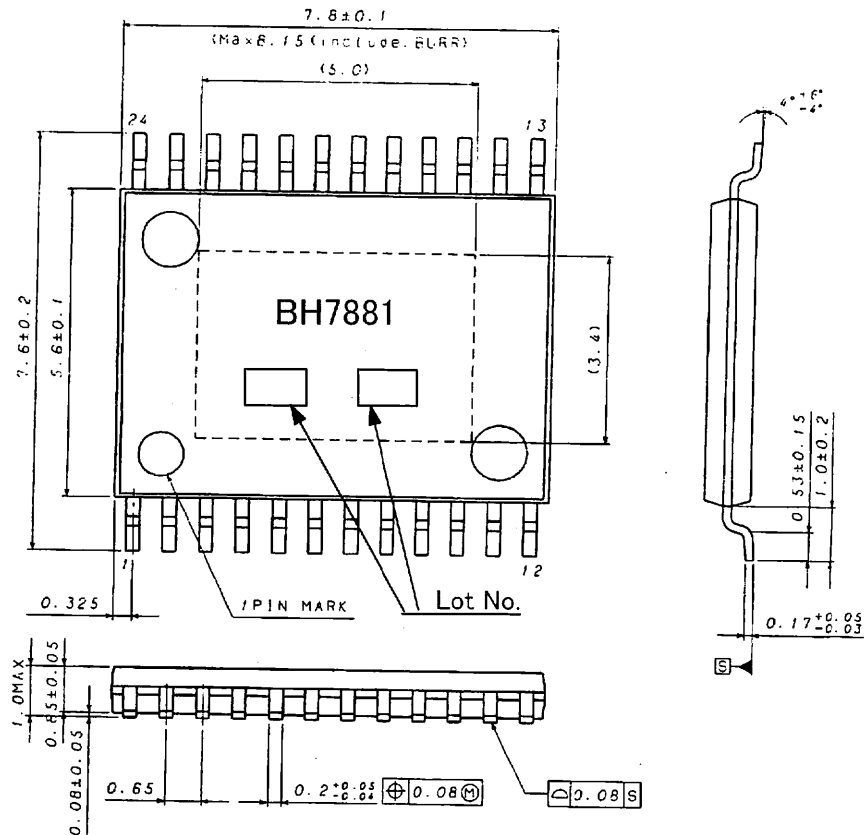
| Parameter | Limits | | | Unit | Conditions |
|--------------------------|--------|------|------|------|-------------------------|
| | Min. | Typ. | Max. | | |
| ■ 1CHIP | | | | | |
| Circuit current (ACTIVE) | - | 18 | 30 | mA | No signal |
| Circuit current(SUSPEND) | - | 0 | 10 | μ A | No signal |
| ■ SP AMP | | | | | |
| Voltage gain1 | 8.5 | 11.0 | 13.5 | dB | SE, Vin=-18dBV |
| Voltage gain 2 | 14.5 | 17.0 | 19.5 | dB | BTL, Vin=-18dBV |
| Distortion | - | 0.04 | 1.0 | % | BTL, Vin=-18dBV |
| Maximum output level | 1.5 | 4.5 | - | dBV | BTL, DSTN=1% |
| Output noise level | - | -90 | -80 | dBV | SE, DIN Audio |
| Cross talk | - | -85 | -75 | dBV | SE, DIN Audio |
| Output level on mute | - | -110 | -80 | dBV | BTL, Vin=-18dBV |
| ■ HP AMP | | | | | |
| Voltage gain | 3.0 | 5.5 | 8.0 | dB | SE, Vin=-18dBV, RL=32 Ω |
| Distortion | - | 0.02 | 1.0 | % | SE, Vin=-18dBV, RL=32 Ω |
| Maximum output level | -1.6 | 1.4 | - | dBV | SE, DSTN=1% ,RL=10k Ω |
| Output noise level | - | -95 | -80 | dBV | SE, DIN Audio ,RL=32 Ω |
| Cross talk | - | -90 | -80 | dBV | SE, DIN Audio ,RL=32 Ω |
| Output level on mute | - | -105 | -80 | dBV | SE, Vin=-18dBV, RL=32 Ω |
| ■ BIAS | | | | | |
| Output voltage | 1.40 | 1.65 | 1.90 | V | No signal |
| ■ Regulator | | | | | |
| Output voltage | 2.7 | 3.0 | - | V | No signal |
| PSRR | - | -80 | - | dBV | VIN=0.28Vpp, 1kHz |

○Electrical characteristics

(Unless otherwise noted, VCC=3.3V, Ta=25°C, f=1kHz, R=4Ω, 400Hz~30kHz BPF)

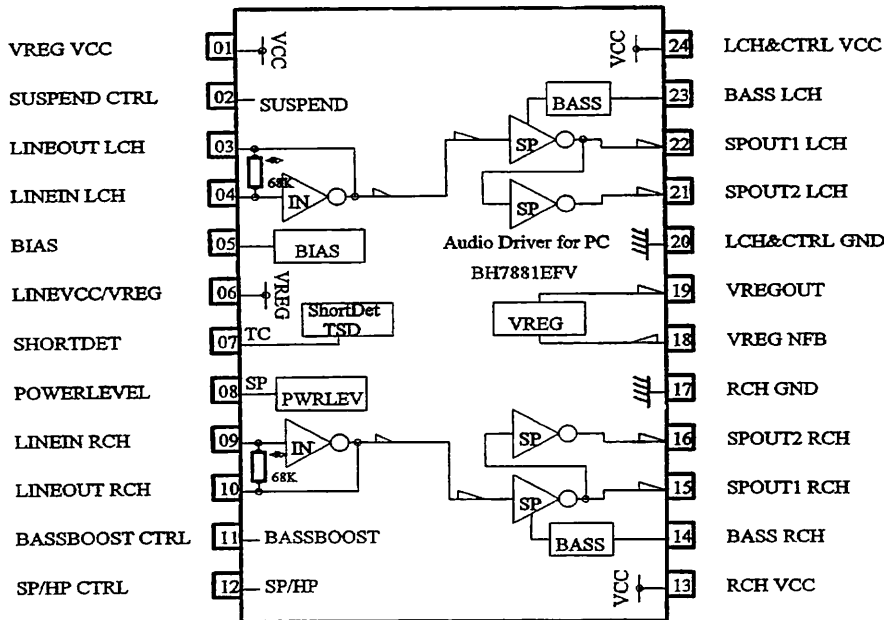
| ■CONTROL PIN | | | | | |
|------------------------------------|-----------|---|-----|---|------------------------|
| ACTV/SPND CTRL : 2PIN control pin | | | | | |
| SUSPEND mode | VCC/3+0.8 | - | VCC | V | SP/HP® SUSPEND |
| ACTIVE mode | 0 | - | 0.8 | V | SP/HP® ACTIVE |
| SP/HP CTRL : 12PIN control pin | | | | | |
| SP&HP mode | VCC/3+0.8 | - | VCC | V | SP/HP ON |
| HP(SP MUTE) mode | 0 | - | 0.8 | V | SP OFF(SP MUTE), HP ON |
| BASSBOOST CTRL : 11PIN control pin | | | | | |
| BassBoost mode | VCC/3+0.8 | - | VCC | V | SP/HP gain UP |
| NonBoost mode | 0 | - | 0.8 | V | SP/HP gain NORMAL |

○Outer dimensions



HTSSOP-B24 (Unit: mm)

○Block diagram



○Pin number and pin name

| Pin No. | Pin name |
|---------|----------------|
| 1 | VREG VCC |
| 2 | SUSPEND CTRL |
| 3 | LINEOUT LCH |
| 4 | LINEIN LCH |
| 5 | BIAS |
| 6 | LINEVCC/VREG |
| 7 | SHORTDET |
| 8 | POWERLEVEL |
| 9 | LINEIN RCH |
| 10 | LINEOUT RCH |
| 11 | BASSBOOST CTRL |
| 12 | SP/HP CTRL |
| 13 | RCH VCC |
| 14 | BASS RCH |
| 15 | SPOUT1 RCH |
| 16 | SPOUT2 RCH |
| 17 | RCH GND |
| 18 | VREG NFB |
| 19 | VREGOUT |
| 20 | LCH&CTRL GND |
| 21 | SPOUT2 LCH |
| 22 | SPOUT1 LCH |
| 23 | BASS LCH |
| 24 | LCH&CTRL VCC |

○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 miss-installation

When mounting the LSI on a board, pay adequate attention to orientation and placement discrepancies of the LSI. If it is miss-installed 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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(Contact address for overseas customers in Japan)

| | | |
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