

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)

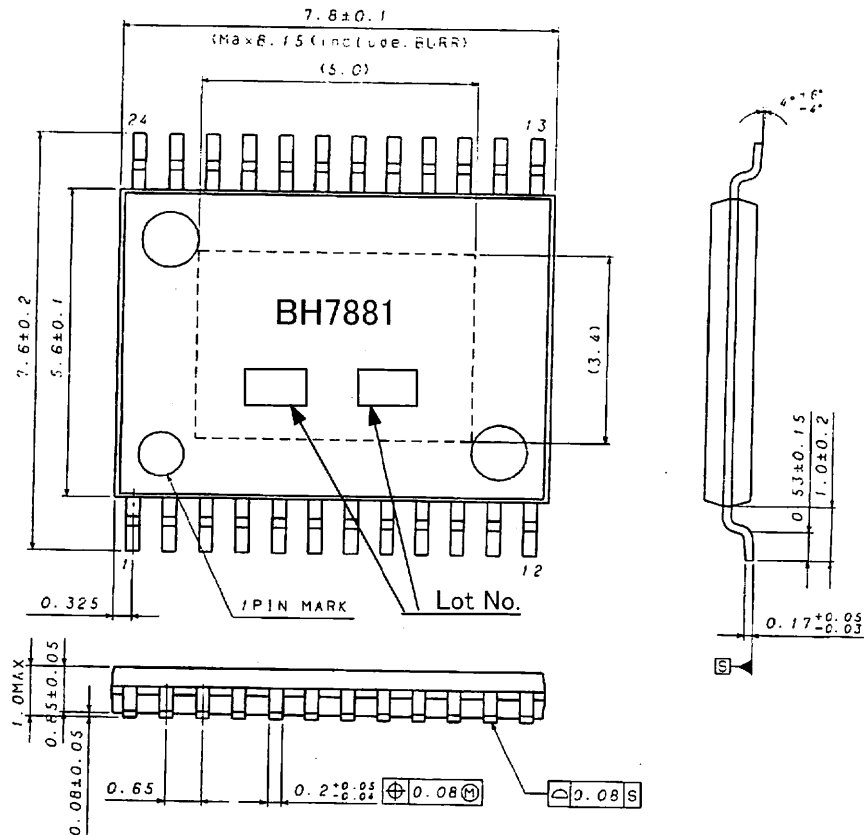
Parameter	Limits			Unit	Conditions
	Min.	Typ.	Max.		
■ 1CHIP					
Circuit current (ACTIVE)	-	18	30	mA	No signal
Circuit current(SUSPEND)	-	0	10	μA	No signal
■ SP AMP					
Voltage gain1	8.5	11.0	13.5	dB	SE, Vin=-18dBV
Voltage gain 2	14.5	17.0	19.5	dB	BTL, Vin=-18dBV
Distortion	-	0.04	1.0	%	BTL, Vin=-18dBV
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)

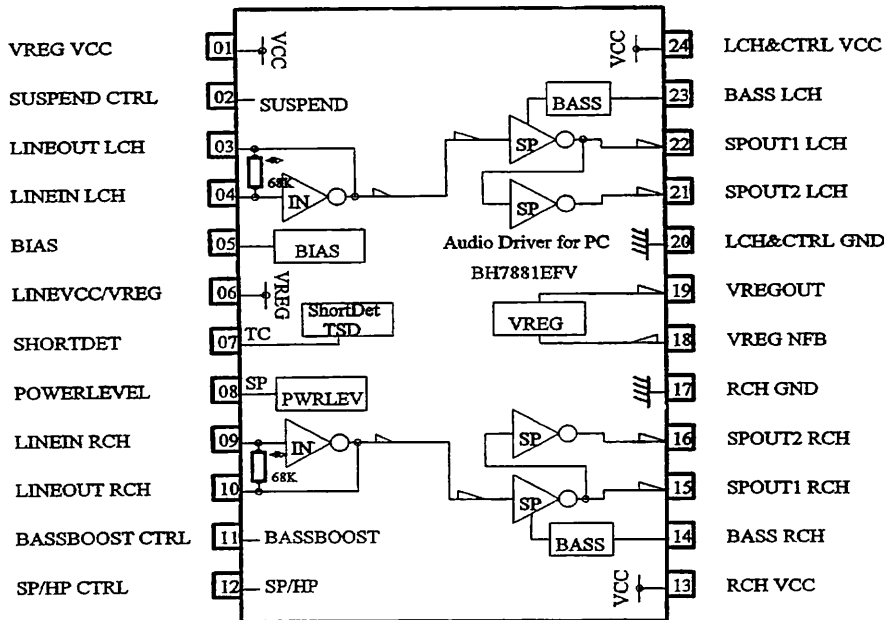
■CONTROL PIN					
ACTV/SPND CTRL : 2PIN control pin					
SUSPEND mode	VCC/3+0.8	-	VCC	V	SP/HP® SUSPEND
ACTIVE mode	0	-	0.8	V	SP/HP® ACTIVE
SP/HP CTRL : 12PIN control pin					
SP&HP mode	VCC/3+0.8	-	VCC	V	SP/HP ON
HP(SP MUTE) mode	0	-	0.8	V	SP OFF(SP MUTE), HP ON
BASSBOOST CTRL : 11PIN control pin			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