

# 可任意限幅、内置自适应升压的2×9.0W立体声音频功放

## 2×9.0W Audio Amplifier with Class G Boost Converter and Limiter

### FEATURES

- Flexible Limiter Function adjusted by external resistor so that the output music is limited under a preset THD+N and power
- Integrated Thermal Foldback (TFB) Function that significantly increases the peak audio power
- Integrated adaptive class G Boost Converter that extends the play time in battery supply applications
- Adjustable switch peak current limit to avoid over-pulling on battery current
- Adjustable max boost voltage
- THD+N: 0.05% (RL=4Ω, f<sub>IN</sub>=1kHz, Po=2×1.0W)
- Low Quiescent Current:7mA, 3.7V
- Output Power (V<sub>BAT</sub>=3.7V, f<sub>IN</sub> = 1kHz, R<sub>L</sub>=4Ω)
  - 2×7W (V<sub>POUT</sub>=8.4V, THD+N = 1%)
  - 2×9W (V<sub>POUT</sub>=8.4V, THD+N = 10%)
- Power Supply V<sub>BAT</sub>: 2.9V~8.5V
- Multiple Gain Available: 21dB, 25.5dB, 30dB
- Filter-less Modulation
- Thermal/Low voltage malfunction prevention function with auto recovery
- Pb-free Packages, TSSOP20L-PP
- 可任意配置的限幅功能
- 自由配置音频限制幅度，使输出音频信号限制在固定失真水平内
- 内置自动限温控制功能
- 适应不同散热条件，避免出现过温关断现象
- 高效自适应G类升压功能，有效延长播放时间
- 可调节最大限流值，有效防止电池拉死
- 升压值可调
- THD+N: 0.05% (RL=4Ω, f<sub>IN</sub>=1kHz, Po=2×1.0W)
- 低静态电流：7mA, 3.7V
- 输出功率(V<sub>BAT</sub>=3.7V, f<sub>IN</sub>=1kHz, R<sub>L</sub>=4Ω)
  - 2×7W (V<sub>POUT</sub>=8.4V, THD+N= 1%)
  - 2×9W (V<sub>POUT</sub>=8.4V, THD+N = 10%)
- V<sub>BAT</sub>供电范围：2.9V至8.5V
- 三种增益选择：21dB, 25.5dB, 30dB
- 免滤波器数字调制，直接驱动扬声器
- 保护功能：过流/过热/欠压异常保护功能
- 无铅无卤封装，TSSOP20L-PP

### APPLICATIONS

- Smart Speakers
- Portable Speakers
- Megaphone
- 智能音响
- Wireless Speakers
- 2.1Channel Speakers
- Portable Gamers
- 无线音响
- 2.1声道小音箱
- 拉杆音箱
- 便携式游戏机
- 便携式音箱

### ORDERING INFORMATION

| Part Number | Package Type | Marking                                       | Operating Temperature Range | MOQ/Shipping Package     |
|-------------|--------------|---|-----------------------------|--------------------------|
| HT8787BMTER | TSSOP20L-PP  | HT8787B <sup>MTE</sup><br>UVWXYZ <sup>1</sup> | -40℃~85℃                    | Tape and Reel<br>3000PCS |
| HT8787BMTET | TSSOP20L-PP  | HT8787B <sup>MTE</sup><br>UVWXYZ              | -40℃~85℃                    | Tube<br>46PCS            |

<sup>1</sup> UVWXYZ is production tracking code

### DESCRIPTION

The HT8787B is a stereo Class D audio amplifier that drives up to continuous  $2 \times 7W$  (1% THD+N, boosted to 8.4V) into 4ohm speaker.

HT8787B built-in Class G boost converter supports adjustable boost voltages. The boost converter is automatically active only when a higher audio output power is required, which will significantly improve the efficiency and extends the playing time in battery supply applications.

HT8787B integrates Limiter function. When it is active, the output music can be limited below a certain power and THD+N. This will allow different demands in sound performance and prevent speakers from damage.

The Thermal Foldback (TFB) function is designed to protect the HT8787B from excessive die temperature in case of the device being operated beyond the recommended temperature or power limit, or with a weaker thermal system than recommended. The TFB works by reducing the on-die power dissipation by reducing Gain if the temperature trig point is exceeded, so that the peak audio power is significantly increased.

HT8787B has a filter-less modulation circuit which can directly drive speakers. HT8787B can be shut down so that the power consumption can be minimized. As for protection function, over current protection function for speaker output terminals, over temperature protection function and low supply voltage malfunction preventing function are also prepared.

HT8787B是一款内置自适应升压的立体声D类音频功率放大器，由锂电池供电升压至 $V_{POUT}=8.4V$ 时，THD+N=1%、1kHz信号条件下，能连续输出 $2 \times 7W$ 功率（ $4 \Omega$ 负载）。

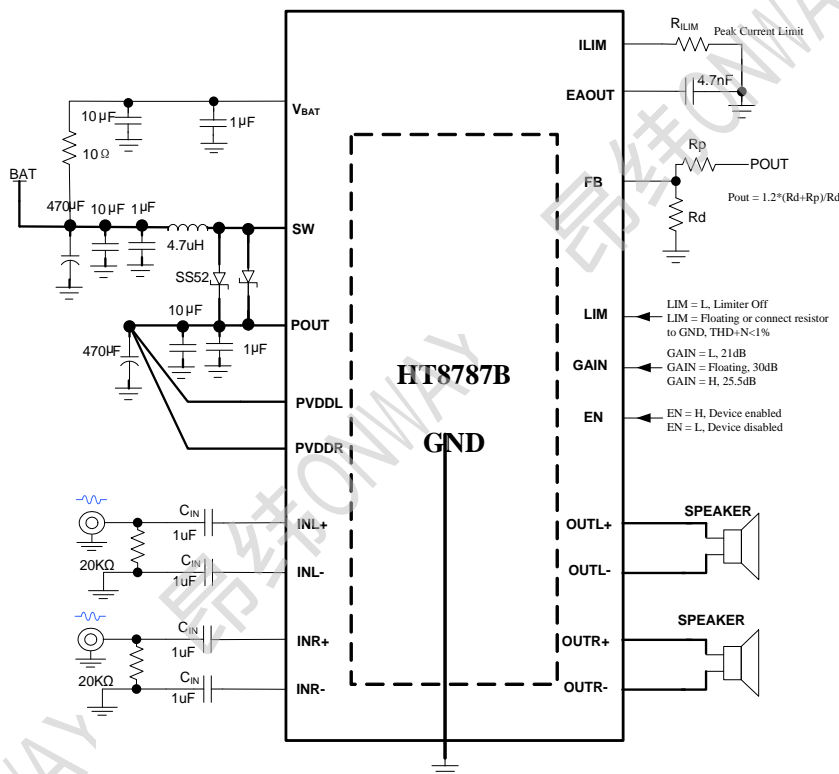
HT8787B内置G类升压，可任意设置最大升压值，以满足不同的输出功率需求。该升压在小音乐信号时不升压，仅当功率较大时工作。其可大幅提高系统效率，延长电池续航时间。

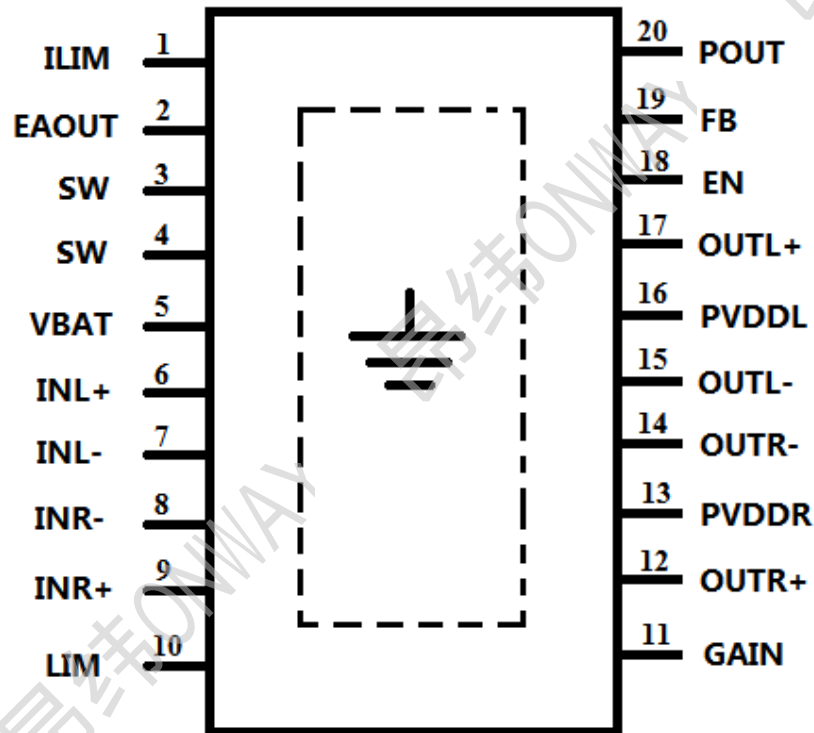
HT8787B具有可任意配置的限幅(Limiter)功能。限幅功能开启后，即使输入信号很大，音乐输出也能被限制在指定的功率和THD+N之内，满足不同音质体验和保护喇叭的需求。

HT8787B还具有自动限温控制（TFB）功能，在高功率输出、高环境温度等情况下导致芯片内温度较高时，芯片能自动降低系统增益，避免芯片进入过温关断保护模式，在保证音乐品质的前提下显著提升音乐峰值功率。

此外，HT8787B内部集成免滤波器调制技术，能够直接驱动扬声器，内置的关断功能使待机电流最小化，还集成了输出端过流保护、片内过温保护和电源欠压异常保护等功能。

### TYPICAL APPLICATION



**■ TERMINAL CONFIGURATION**

**■ TERMINAL FUNCTION**

| Terminal No. | Name  | I/O <sup>1</sup> | Description   |
|--------------|-------|------------------|---|
| 0            | GND   | G                | Power ground. Also provides thermal connection from the device to the board. A matching ground pad should be provided on the PCB and the device connected to it via solder.<br>地, 同时提供器件向板级散热的路径。PCB 板上需要留有足够的铺地露铜与之良好焊接。 |
| 1            | ILIM  | I                | Adjustable switch peak current limit. An external resistor should be connected between this pin and GND.<br>最大限流值设置端, 外部接电阻到地。  |
| 2            | EAOUT | I                | Error amplifier output. Connect a 4.7nF capacity to GND typically.<br>误差放大器输出端。接 4.7nF 电容到地。  |
| 3,4          | SW    | I                | Boost and rectifying switch input.<br>升压整流开关输入端。  |
| 5            | VBAT  | P                | Power supply for logic.<br>内部逻辑电源供电端。   |
| 6            | INL+  | I                | Positive input (differential+) for audio amplifier of left channel.<br>音频左声道输入正端。   |
| 7            | INL-  | I                | Negative input (differential-) for audio amplifier of left channel.<br>音频左声道输入负端。   |
| 8            | INR-  | I                | Negative input (differential-) for audio amplifier of right channel.<br>音频右声道输入负端。  |
| 9            | INR+  | I                | Positive input (differential+) for audio amplifier of right channel.<br>音频右声道输入正端。  |
| 10           | LIM   | I                | Enable the Limiter Function and select limiter level.<br>使能限幅功能和限幅值设置端。   |

<sup>1</sup> I: Input; O: Output; G: Ground; P: Power

|    |       |   |   |
|----|-------|---|---|
| 11 | GAIN  | I | System GAIN set. Three GAIN level for select.<br>增益设置端。   |
| 12 | OUTR+ | O | Positive output terminal (BTL+) for right channel.<br>右声道正端输出。  |
| 13 | PVDDR | O | Power supply terminal for right channel.<br>右声道功率电源端。   |
| 14 | OUTR- | O | Negative output terminal (BTL-) for right channel.<br>右声道负端输出。  |
| 15 | OUTL- | O | Negative output terminal (BTL-) for left channel.<br>左声道负端输出。   |
| 16 | PVDDL | P | Power supply terminal for left channel.<br>左声道功率电源端。  |
| 17 | OUTL+ | O | Positive output terminal (BTL+) for left channel.<br>左声道正端输出。   |
| 18 | EN    | I | Audio amplifier and Boost converter enabling terminal. The IC is enabled when it is pulled high.<br>功放和升压使能端，接高时功放开启。 |
| 19 | FB    | I | Regulator Feedback Input.<br>升压调节反馈输入端。   |
| 20 | POUT  | I | Boost Converter voltage detect pin.<br>升压输出检测端。   |