

## 内置自适应H类升压和防破音功能的10W D类及AB类音频功率放大器

### 10W Boosted Class D and Class AB Audio Amplifier

#### ■ FEATURES

- Anti-Clipping Function (ACF)
- Filter-less Modulation, Eliminating Output Filter
- Output Power  
10W ( $V_{BAT}=4.2V$ ,  $R_L=3\Omega$ , THD+N=10%,  $f_{IN} = 1kHz$ )  
6W ( $V_{BAT}=3.3\sim4.2V$ ,  $R_L=4\Omega$ , THD+N<1%, 20-20kHz full band)  
3W ( $V_{BAT}=3.3\sim4.2V$ ,  $R_L=8\Omega$ , THD+N<1%, 20-20kHz full band)
- Power Supply  $V_{BAT}$ : 3.0V~5.5V
- High Efficiency Class H Boost Converter
  - Multiple boost voltages automatically adjust Class D audio amplifier
  - Extends the playing time in battery supply applications
  - Adjustable switch peak current limit to avoid over-pulling on battery current
- Class AB / Class D
- Over Current Protection, Thermal Protection, Low voltage malfunction prevention function included
- Pb-Free Packages, SSOP10L-PP

- 防削顶尖失真功能(防破音, Anti-Clipping Function, ACF)
- 免滤波器数字调制, 直接驱动扬声器
- 输出功率  
10W ( $V_{BAT}=4.2V$ ,  $R_L=3\Omega$ , THD+N=10%,  $f_{IN} = 1kHz$ )  
6W ( $V_{BAT}=3.3\sim4.2V$ ,  $R_L=4\Omega$ , THD+N<1%, 20-20kHz 全频段)  
3W ( $V_{BAT}=3.3\sim4.2V$ ,  $R_L=8\Omega$ , THD+N<1%, 20-20kHz 全频段)
- $V_{BAT}$ 供电范围: 3.0V至5.5V
- 高效H类升压功能
- 自适应功放功率的升压轨, 延长电池播放时间
- 可调节最大限流值, 有效防止电池拉死
- AB/D类可切换
- 保护功能:过流/过热/欠压异常保护功能
- 无铅封装, SSOP10L-PP

#### ■ APPLICATIONS

• Bluetooth/Wi-Fi Speakers	• Portable Speakers	• 蓝牙/ Wi-Fi音箱	• 便携式音箱
• Smart speakers	• Smart Home	• 智能音箱	• 智能家居

## ■ DESCRIPTION

HT8731, integrated with adaptive class H boost converter, is a mono Class D audio amplifier that drives up to continuous 6W (<1% THD+N, 20-20kHz full band) into 4ohm speaker from a Li-battery voltage. It also integrates Class AB amplifier.

The built-in Class H boost converter generates a Class D amplifier supply rail with a max voltage of 8.0V. The boost converter is automatically active only when a higher audio output power is required and will track the signal to provide an adaptive voltage supply to the amplifier, which will significantly improve the efficiency and extends the playing time in battery supply applications.

HT8731 features Anti-Clipping Function (ACF) which detects output signal clip due to the over input signal and suppresses the output signal clip automatically. Also, the ACF function can adapt the output clip caused by power supply voltage down with battery. It can significantly improve the sound quality, creating a very comfortable musical enjoyment, and to protect the speakers from overload damage. It supplies 2 different ACF mode with different audio experience, and also ACF OFF mode.

Class AB amplifier mode is also available for HT8731. Once the EMI Interference from class D and Boost Converter becomes an annoying problem, HT8731 can be changed into Class AB mode.

HT8731 has a filter-less modulation circuit which directly drives speakers while realizes low distortion and low noise characteristics. Thanks to filter-less, circuit design with fewer external parts can be made in portable applications.

As for protection function, over current protection function for speaker output terminals, over temperature protection function are also prepared.

HT8731是一款内置自适应H类升压的单声道D类音频功率放大器，由锂电池供电时，THD+N<1%、20-20kHz全频段信号条件下，能连续输出6W功率（4Ω负载）；另外，其还支持AB类模式。

HT8731内置的H类升压，提供8.0V最大输出电压。其小音乐信号时不升压，仅当功率较大时，提供一个适应输出功率的电压给D类功放，其可大幅提高系统效率，延长电池续航时间。

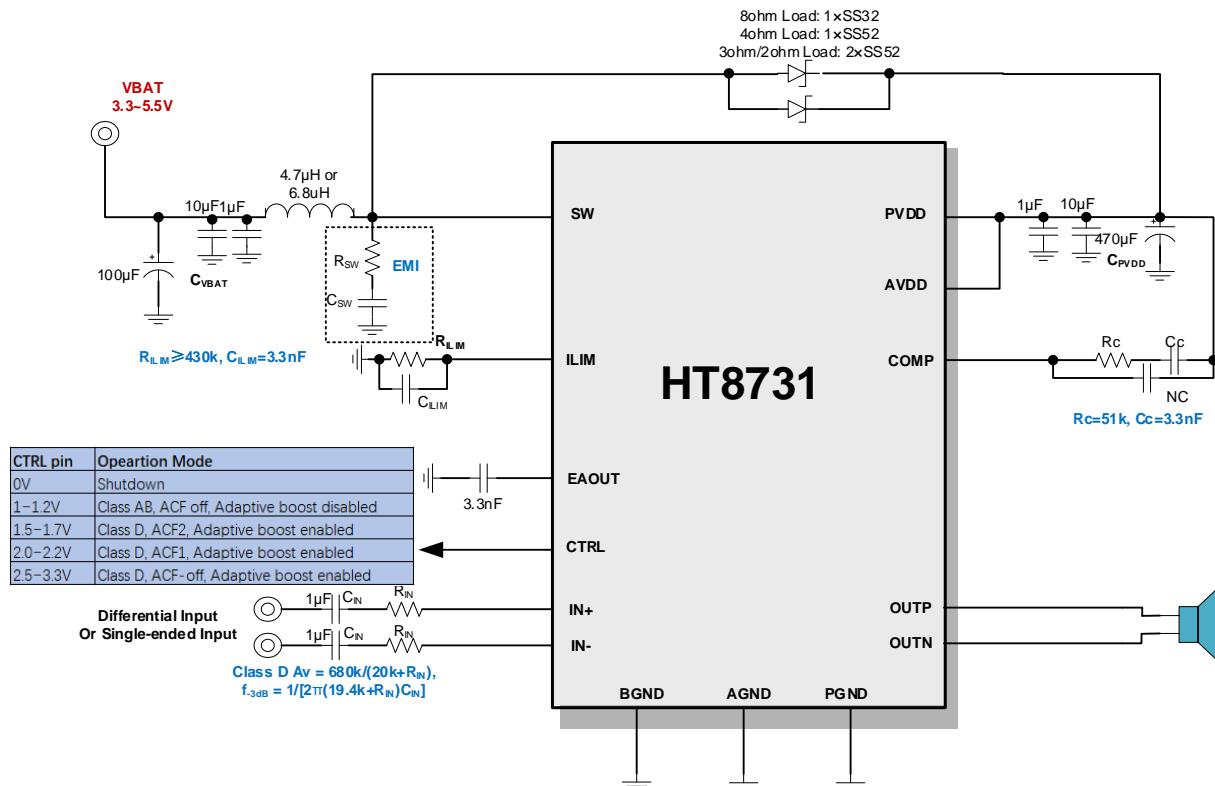
HT8731的最大特点是防削顶尖失真(ACF)输出控制功能，可检测并抑制由于输入音乐、语音信号幅度过大所引起的输出信号削顶尖失真(破音)，也能自适应地防止在BOOST升压电压下降所造成的输出削顶，显著提高音质，创造非常舒适的听音享受，并保护扬声器免受过载损坏。HT8731提供两种不同音乐体验的ACF模式，以及ACF-Off模式。

HT8731具有AB类和D类的自由切换功能，在受到D类功放EMI干扰困扰时，可随时切换至AB类音频功放模式。

HT8731内部集成免滤波器数字调制技术，能够直接驱动扬声器，并最大程度减小脉冲输出信号的失真和噪音。输出无需滤波网络，极少的外部元器件节省了系统空间和成本，是便携式应用的理想选择。

此外，HT8731集成了输出端过流保护、片内过温保护等功能。

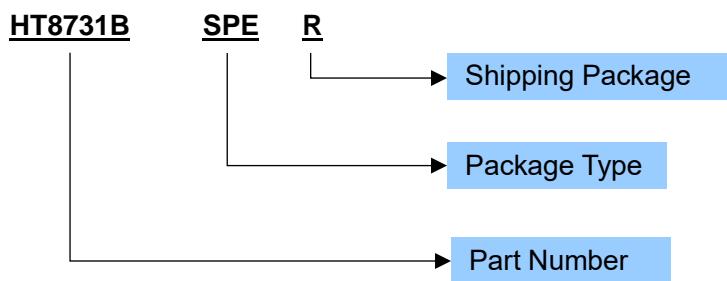
## ■ TYPICAL APPLICATION



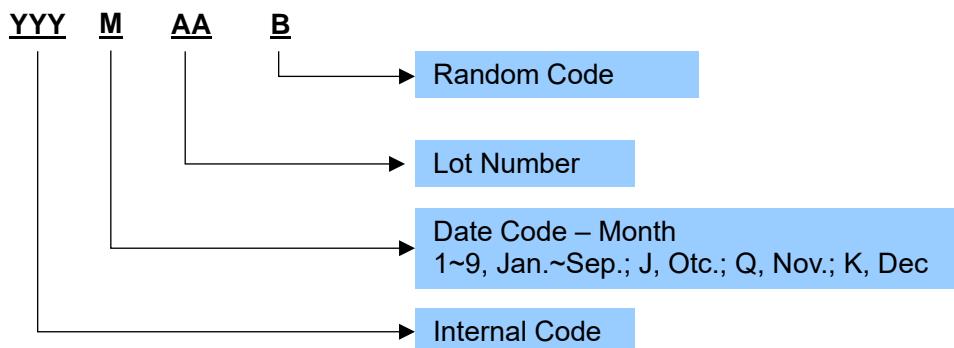
## ■ ORDERING INFORMATION

Ordering Number	Package Type	Marking	Operating Temperature Range	Shipping Package / MOQ
HT8731BSPER	SSOP10L-PP(SPE)	HT8731 <sub>SPE</sub> YYYMAAB	-40°C ~ 85°C	Tape and Reel (R) / 2500pcs
HT8731BSPET	SSOP10L-PP(SPE)	HT8731 <sub>SPE</sub> YYYMAAB	-40°C ~ 85°C	Tube (T) / 100pcs

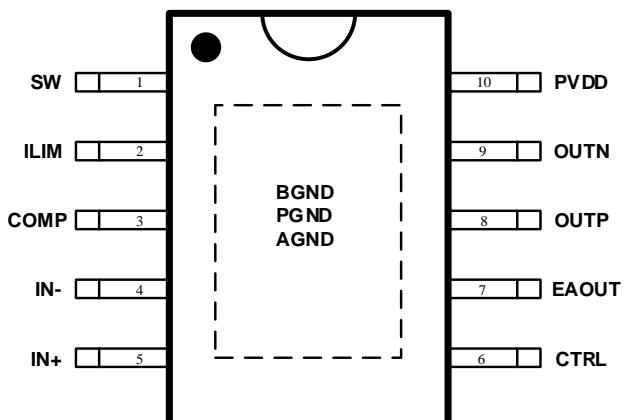
### Ordering Number



### Production Tracking Code



## ■ TERMINAL CONFIGURATION



HT8731BSPE Top View

## ■ TERMINAL FUNCTION

Terminal No.	Name	I/O <sup>1</sup>	Description
EP	BGND	G	Ground for boost converter circuitry. 升压电路地
	AGND	G	Ground for analog circuitry. 模拟电路地
	PGND	G	Ground for power circuitry. 功率电路地
1	SW	I	Boost and rectifying switch input. 升压整流开关输入端
2	ILIM	I	Adjustable switch peak current limit. An external resistor should be connected between this pin and GND. 最大限流值设置端，外部接电阻到地。
3	COMP	O	Output of the internal error amplifier, the loop compensation network should be connected between this pin and the PVDD pin. 环路补偿脚，接补偿电路到PVDD。
4	IN-	I	Negative input (differential-) for audio amplifier. 输入正端
5	IN+	I	Positive input (differential+) for audio amplifier. 输入负端
6	CTRL	I	Mode Control Terminal. 模式控制脚
7	EAOUT	O	Error amplifier output. Connect a 3.3nF capacitor to GND typically. 误差放大器输出端，接3.3nF典型值到地
8	OUTP	O	Positive pin for differential speaker amplifier. 输出正端
9	OUTN	O	Negative pin for differential speaker amplifier. 输出负端
10	PVDD	P	Power Supply for internal power circuitry. 功率电源

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