

3.1W小型便捷低功耗I²S输入单声道D类音频功率放大器

3.1W Tiny, Plug-and-Play, Low Consumption, I²S Input, Mono Class D Audio Amplifier

■ FEATURES

- Plug-and-Play with a single bypass capacitor
- Power Supply VDD: 2.5-5.5V;
- Low Quiescent Current: 2.5mA @VDD = 3.6V
- Low Output Noise: 15uV
- Low Pop Noise
- Flexible Audio I/O
 - I²S (Left, Right, or Left/2+Right/2 Output), 16bit, 24bit or 32 bit; TDM input, 16bit or 32bit
 - 8k, 16k, 32k, 44.1k, 48k, 88.2k, 96kHz Sample Rates
 - No MCLK Required
- Output Power
 - 1.5W (V_{DD}=3.6V, R_L=4Ω, THD+N=10%)
 - 3.1W (V_{DD}=5.0V, R_L=4Ω, THD+N=10%)
 - 200mW (V_{DD}=3.6V, R_L=32Ω, THD+N=1%)
- THD+N= 0.02% (P_o=1W, R_L=4Ω, V_{DD} = 3.7V)
- Adjustable Gain: -0.7, 5.3, 8.3, 11.3, 14.3dBV
- Clock Error, Over Current, Undervoltage, and Overtemperature Protection
- Pb-free Packages, WLCSP9, ESOP8, QFN3×3-16L
- 上电即用, 外围极简 (最少仅需一个电源滤波电容)
- 电源供电: VDD 2.5-5.5V;
- 低静态电流: 2.5mA @ VDD = 3.6V
- 低输出噪声: 15uV
- 低pop声
- 灵活的音频输入:
 - I²S (输出左、右或左/2+右/2可选择), 16bit, 24bit 或 32 bit; TDM 输入, 16bit或32bit
 - 8k, 16k, 32k, 44.1k, 48k, 88.2k, 96kHz 采样频率
 - 无需MCLK
- 输出功率:
 - 1.5W (V_{DD}=3.6V, R_L=4Ω, THD+N=10%)
 - 3.1W (V_{DD}=5.0V, R_L=4Ω, THD+N=10%)
 - 200mW (V_{DD}=3.6V, R_L=32Ω, THD+N=1%)
- THD+N= 0.02% (P_o=1W, R_L=4Ω, V_{DD} = 3.7V)
- 增益可调: -0.7, 5.3, 8.3, 11.3, 14.3dBV
- 保护: 时钟错误、过流、欠压、过温保护等
- WLCSP9, ESOP8, QFN3×3-16L封装

■ APPLICATIONS

- OWS and other earphone devices
- Smart Home
- IoT Devices
- Smart Speakers
- Smart Toys
- Gaming Devices
- Other Li-ion cell/5V Devices
- OWS耳机或其他耳机设备
- 智能家居
- 游戏设备
- 智能玩具
- 智能音箱
- IoT设备
- 其他锂电/5V设备

■ DESCRIPTION

The HT517 is an easy-to-use, low-cost, I²S input mono Class D audio amplifier that drives up to continuous 3.1W into 4ohm speaker with 5V power supply, and 180mW into 32ohm speaker with 3.7V power supply.

HT517 integrates an DA converter, the I²S interface supports up to 32bit width, 96kHz sample rate.

The built-in Class D amplifier also integrates spread spectrum function. The gain of the amplifier is also adjustable.

The Device is available in WLCSP9 and ESOP8 package.

HT517是一款低成本的I²S输入单声道输出D类音频功率放大器。其在5V供电时可提供最大3.1W的输出功率; 在3.7V供电时可提供最大180mW的输出功率。

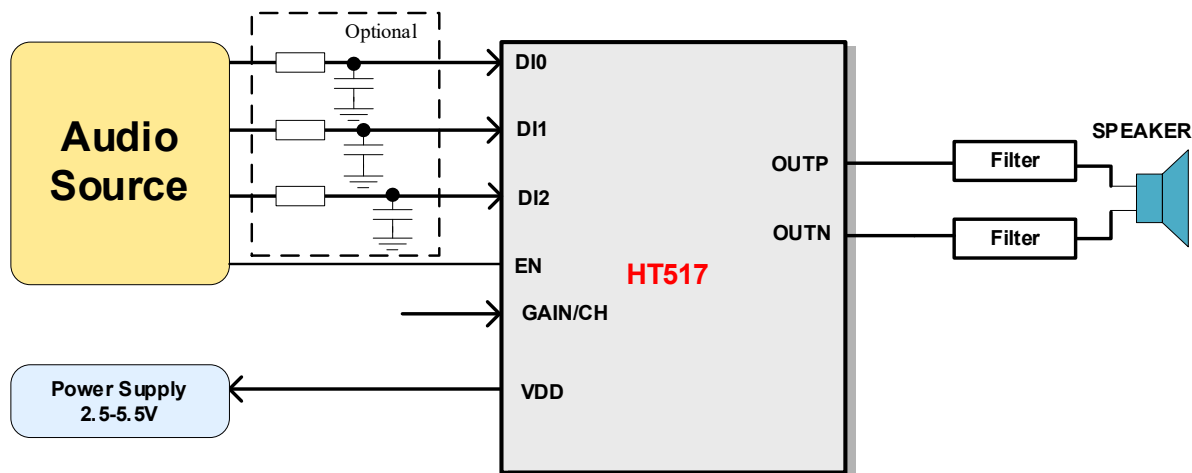
HT517内部集成了DA转换器, 其I²S输入最大支持32-bit字节, 并且可自动监测采样频率, 最高支持96kHz。

HT517集成的D类音频功放还具有增益可调、扩频等功能。

该产品提供WLCSP9和ESOP8封装。

■ TYPICAL APPLICATION

单声道应用 Mono Operation



1. DIx模式设置，通道选择

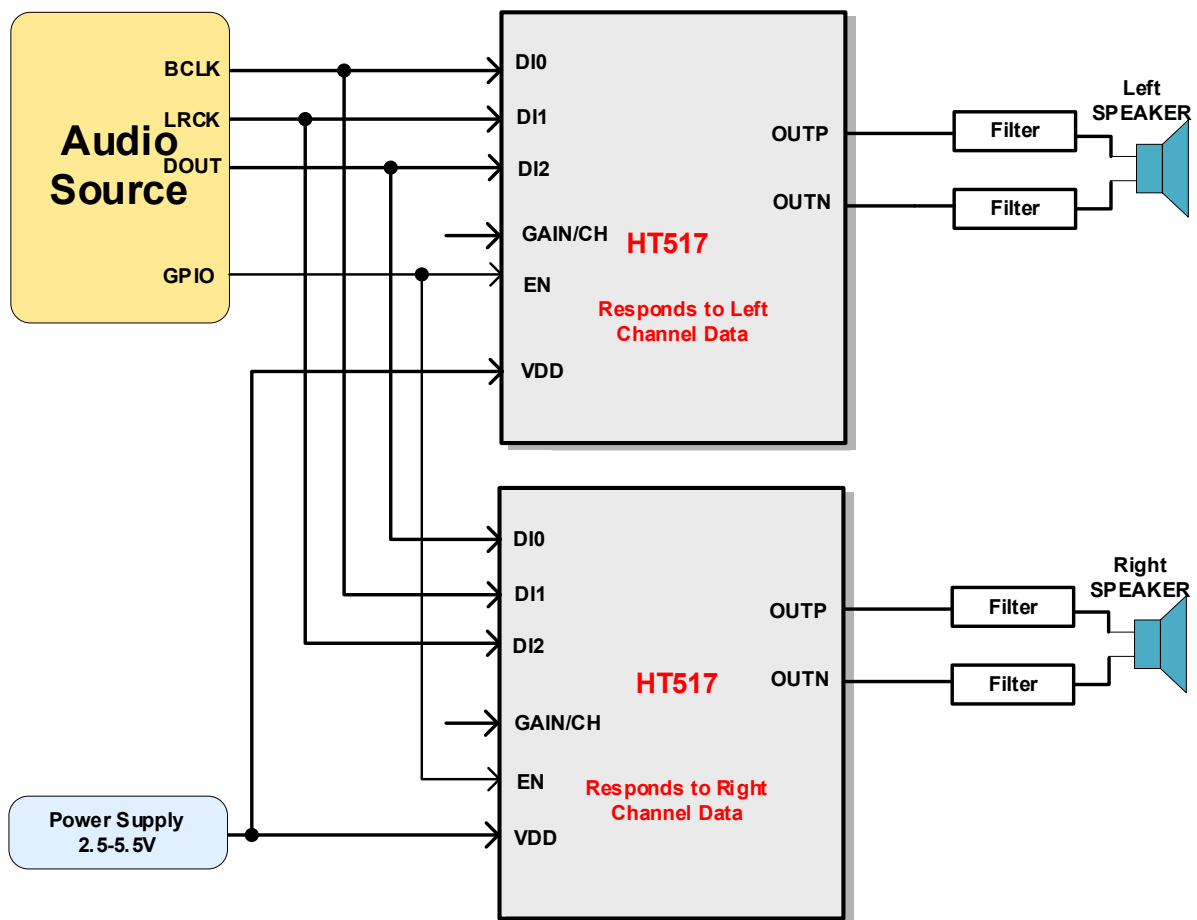
BCLK	LRCK	SDIN	DIx Mode	Channel Selection
DI0	DI1	DI2	A	Left
DI1	DI2	DI0	B	Right
DI2	DI0	DI1	C	Left/2+Right/2

DI0, DI1, DI2可增加RC电路（optional，典型值33R, 10pF），防止走线较长、寄生电感大、波动大时引起的信号异常。以下立体声、TDM等应用时相同。

2. GAIN/CH脚设置，增益选择

GAIN/CH pin	System Gain
Directly connected to GND	14.3dBV
Floating	11.3dBV
Directly connected to VDD	8.3dBV
Connected to VDD thru 100k resistor	5.3dBV
Connected to GND thru 100k resistor	-0.7dBV

立体声应用 Stereo Operation

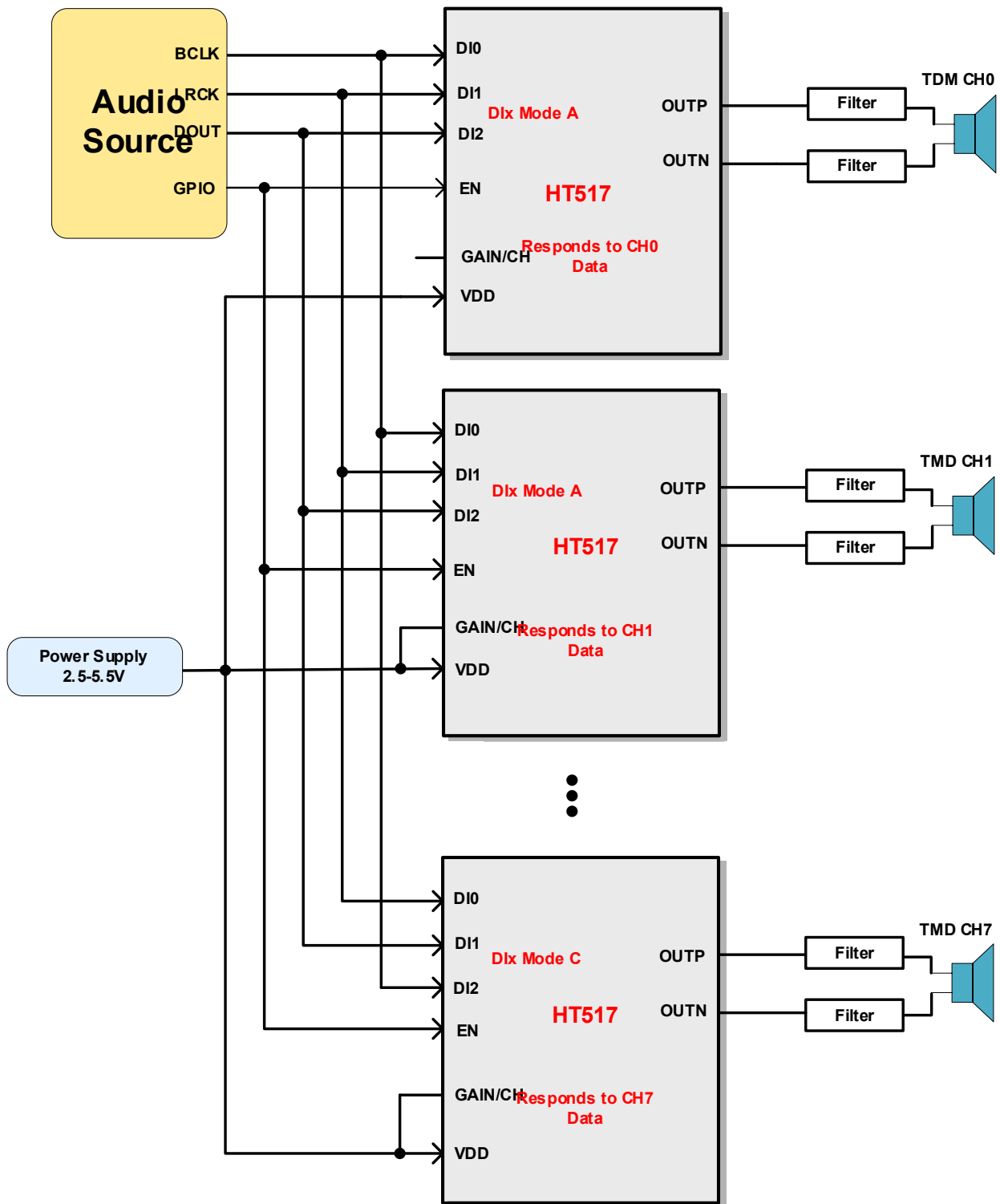


3. GAIN/CH脚设置，增益选择

GAIN/CH pin	System Gain
Directly connected to GND	14.3dBV
Floating	11.3dBV
Directly connected to VDD	8.3dBV
Connected to VDD thru 100k resistor	5.3dBV
Connected to GND thru 100k resistor	-0.7dBV

TDM应用（见下页图），增益固定在14.3dBV TDM Operation, Gain is fixed at 14.3dBV

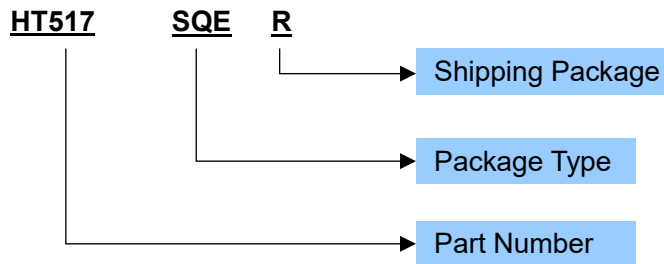
DIx Mode	GAIN/CH	Selected Channel
A	GND	0
A	VDD	1
A	Floating	2
B	VDD	3
B	GND	4
C	GND	5
C	Floating	6
C	VDD	7



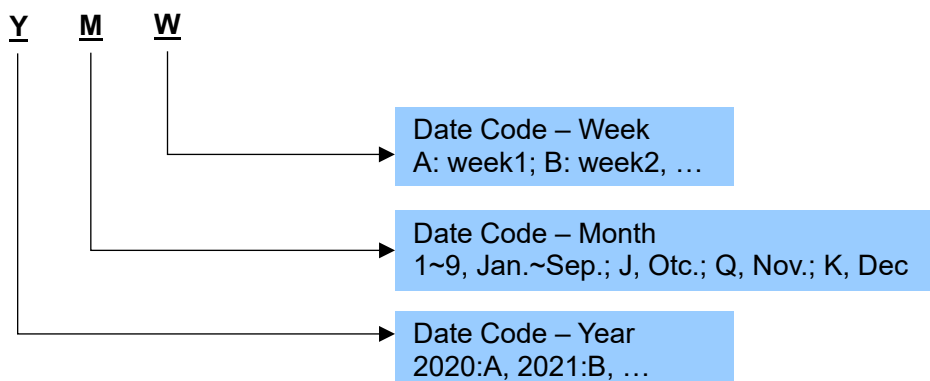
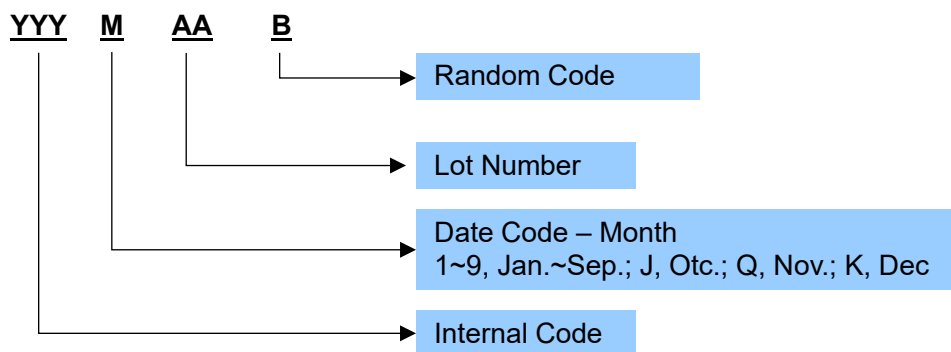
■ ORDERING INFORMATION

Part Number	Package Type	Marking	Operating Temperature Range	MOQ/Shipping Package
HT517WCSR	WLCSP9	517 YMW ¹	-40℃~85℃	5000 / Tape and Reel
HT517SQER	QFN3×3-16L	HT517 YYYMAAB	-40℃~85℃	5000 / Tape and Reel
HT517SPER	ESOP8	HT517 YYYMAAB ²	-40℃~85℃	2500 / Tape and Reel

Ordering Number



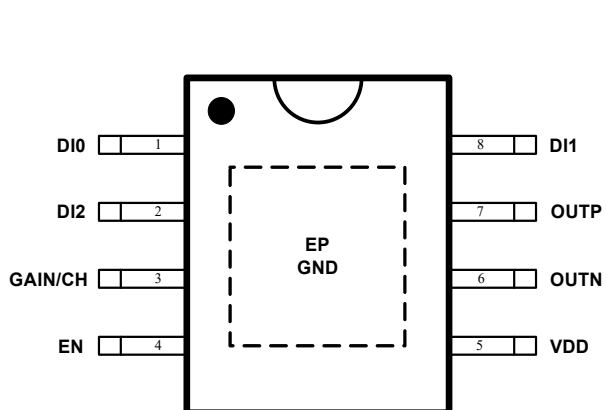
Production Tracking Code



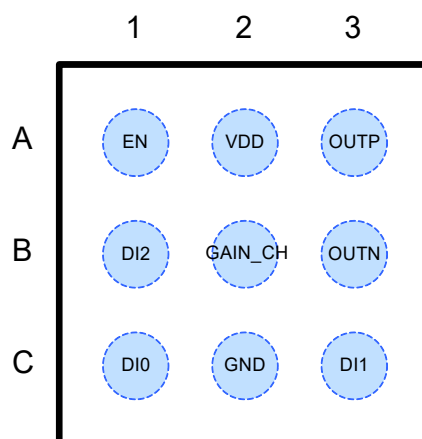
¹ YMW is production tracking code

² YYYMAAB is production tracking code

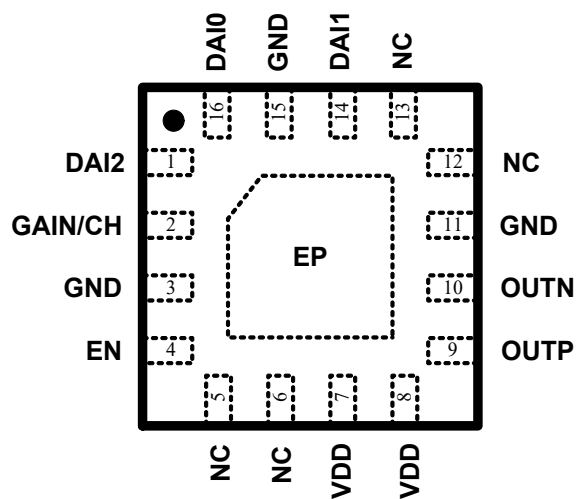
■ TERMINAL CONFIGURATION



ESOP8 Top View



WLCSP9 Top View



QFN3x3-16L Top View

■ TERMINAL FUNCTION

Terminal No.		Name	I/O ¹	Description
ESOP (WLCSP)	QFN			
1 (C1)	16	DI0	I	Digital Audio Interface 0. 数字音频接口 0
2 (B1)	1	DI2	I	Digital Audio Interface 2. 数字音频接口 2
3 (B2)	2	GAIN/CH	I	Gain and channel selection. Select the amplifier gain. Select the channel and DI configuration in TDM mode (in TDM mode, the gain is fixed at 14.3dBV) 增益和通道选择。通过该引脚, 可选择功放的增益, 可选择 TDM 的通道和 DI 引脚的设置
4 (A1)	4	EN	I	Enable pin, when EN pulls low, the device is in Shutdown mode. 使能脚, 接地时器件关闭。
5 (A2)	7,8	VDD	P	Power Supply. 电源
6 (B3)	10	OUTN	O	Negative pin for differential speaker amplifier. 功放输出负端
7 (A3)	9	OUTP	O	Positive pin for differential speaker amplifier. 功放输出正端
8 (C3)	14	DI1	O	Digital Audio Interface 1. 数字音频接口 1
EP (C2)	3, 11	GND	G	Ground pad, also provides thermal connection from the device to the board. 地, 同时为器件散热通道。
--	5,6,12,13, EP	NC	--	No Connection, Connect to GND. 内部无连接, 可连接至地。

¹ I: Input; O: Output; G: Ground; P: Power

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