

2X10W 立体声 Class-D 音频功放 BL6356

● 特性

- 输出功率 2*10W (12V, $R_L=8\Omega$, THD+N=10%)
- 4阶可选增益控制
- 宽电压工作范围: 4V-12V
- 高效率 (88%@ $R_L=8\Omega$, $P_o=4W$)
- 过流、过温保护
- ETSSOP28封装

● 应用

消费电子产品

● 概要

BL6356 是一款增益可调的 10W 立体声 D 类音频功放芯片, 针对消费电子设备应用设计。每通道 BTL 输出功率可达 10W。可通过 PBTL 引脚增大输出功率。芯片集成输出短路保护功能、热保护功能, 短路保护和热保护功能可以自动恢复。

● 典型应用图

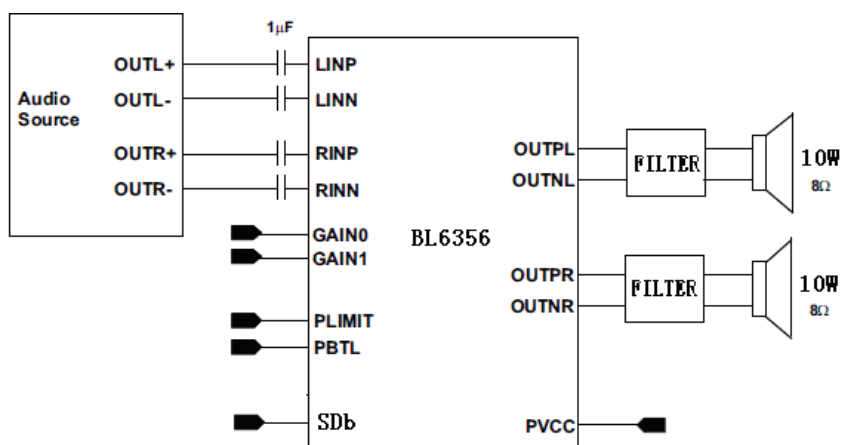


Figure 1. BL6356 Simplified Application Schematic

● 极限参数

参数	数值
电源电压	-0.3V to 14V
工作结温(Tj)	-40 °C - 125°C
工作环境温度(Ta)	-40°C - 85°C
最大存储温度范围(Ts)	-55°C - 150°C
ESD (人体模型)	2000V

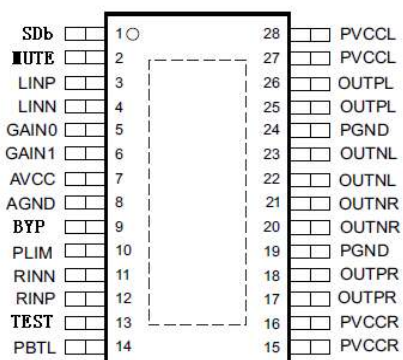
● 主要电参数指标

(未经特别说明, 均指在 12V 电源下的参数, 温度为 25°C)

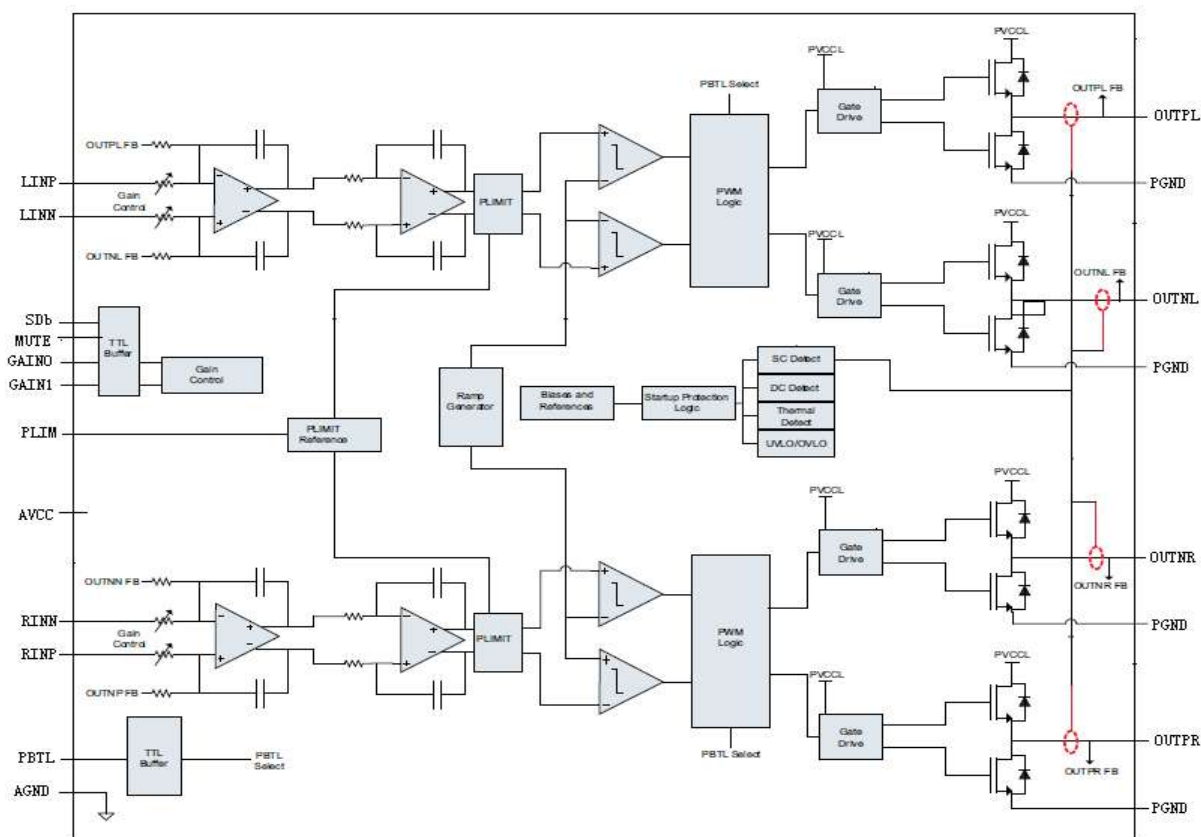
Symbol	Parameter	Conditions	MIN	TYP	MAX	Units
VDD	Supply Voltage		4		12	V
I _{CC}	Quiescent Current	No load		25		mA
I _{SD}	Shutdown Current	V _{DD} =4V to 12V		70		uA
P ₀	Output Power	THD+N=10%, f=1kHz, RL=8ohm		10		W
Av	Voltage Gain	Gain<1:0>=00		20		dB
		Gain<1:0>=01		26		
		Gain<1:0>=10		32		
		Gain<1:0>=11		36		
THD+N	Total Harmonic Distortion	V _{DD} =12V, Po=5W, R _L =8Ω, f=1kHz		0.14		%
ton	Turn on time			120		ms
f _{sw}	Switching Frequency	V _{DD} =4V to 12V		300		kHz
rDS(on)	Drain-source on-state resistance	VCC=12V, IO=500mA	High side	460		mΩ
			Low side	380		
SNR	Signal-to-noise ratio	Maximum output at THD+N <1%, f=1 kHz, Gain = 20 dB, A-weighted		95		dB

	Crosstalk	Gain = 20dB, $f = 1 \text{ kHz}$	94		dB
V_n	Output integrated noise	20Hz to 22kHz, A-weighted filter	126		μV

● 管脚图:



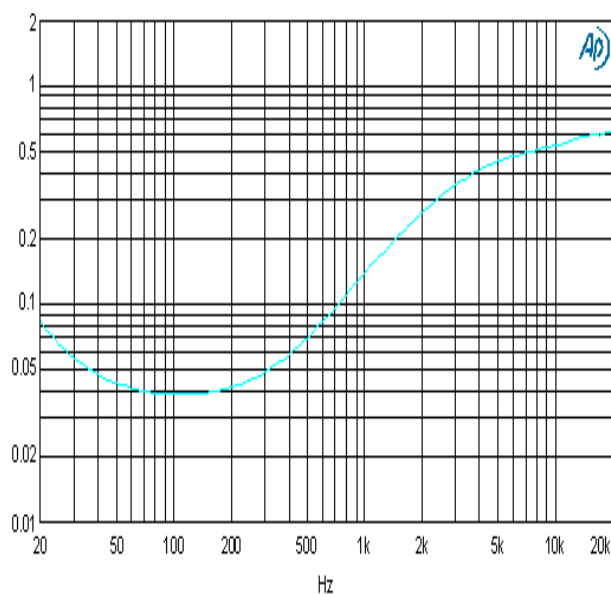
● 芯片架构框图:



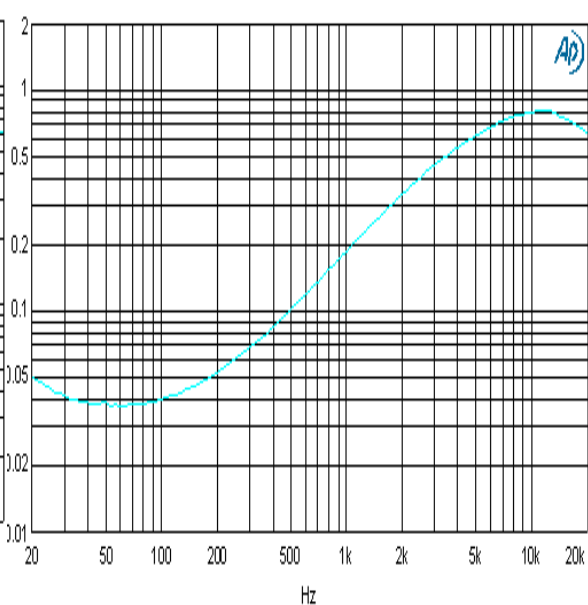
● 管脚定义

No.	Name	Description	I/O
1	SDB	Shutdown mode input, H active. 300k pull-down resistor is built in.	I
2	MUTE	Mute pin	I
3	LINP	Positive input signal for L channel	I
4	LINN	Negative input signal for L channel	I
5	GAIN0	Gain select least significant bit	I
6	GAIN1	Gain select most significant bit	I
7	AVCC	Analog power supply pin	P
8	AGND	Analog signal ground	
9	BYP	Bypass capacitor pin	I
10	PLIM	Power limit level adjust. Connect a resistor divider from AVCC to AGND to set power limit. Floating for no power limit.	I
11	RINN	Negative input signal for R channel	I
12	RINP	Positive input signal for R channel	I
13	TEST	Test pin	I
14	PBTL	Parallel BTL mode switch. H for Parallel.	I
15	PVCCR	Power supply for R channel H-bridge.	P
16	PVCCR	Power supply for R channel H-bridge.	P
17	OUTPR	Class-D H-bridge positive output for R channel	O
18	OUTPR	Class-D H-bridge positive output for R channel	O
19	PGND	Power ground for H-bridges	
20	OUTNR	Class-D H-bridge negative output for R channel	O
21	OUTNR	Class-D H-bridge negative output for R channel	O
22	OUTNL	Class-D H-bridge negative output for L channel	O
23	OUTNL	Class-D H-bridge negative output for L channel	O
24	PGND	Power ground for H-bridges	
25	OUTPL	Class-D H-bridge positive output for R channel	O
26	OUTPL	Class-D H-bridge positive output for R channel	O
27	PVCCL	Power supply for L channel H-bridge.	P
28	PVCCL	Power supply for L channel H-bridge.	P

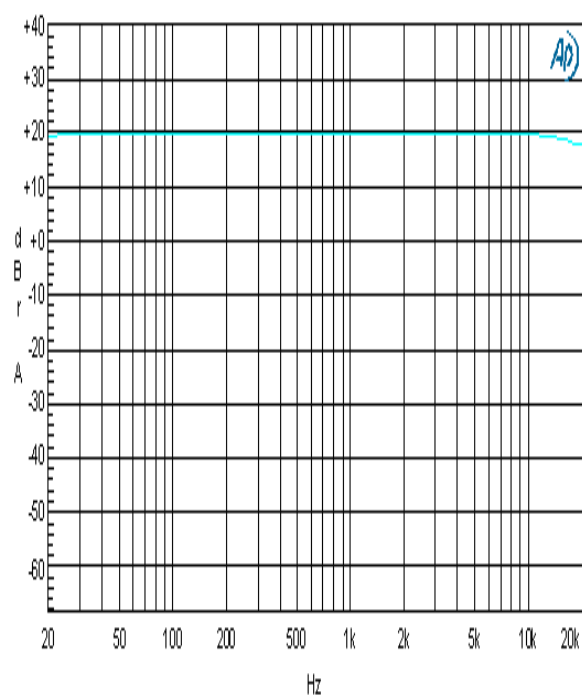
- 典型特性：（除非特别说明，否则都是 1kHz 情况下测量。）



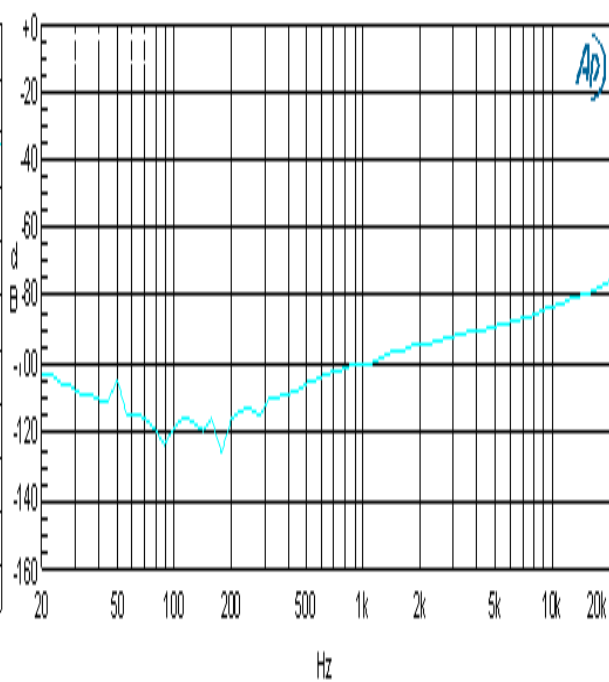
THDN_F@12V 8OHM 5W



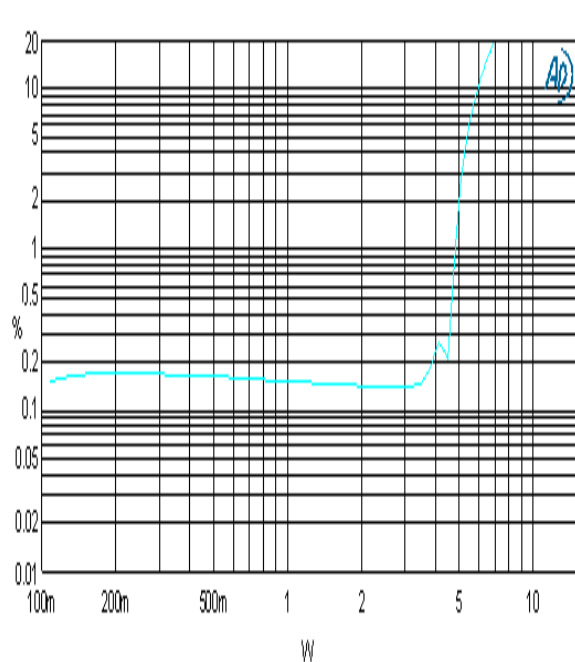
THDN_F@9V 4OHM 3W



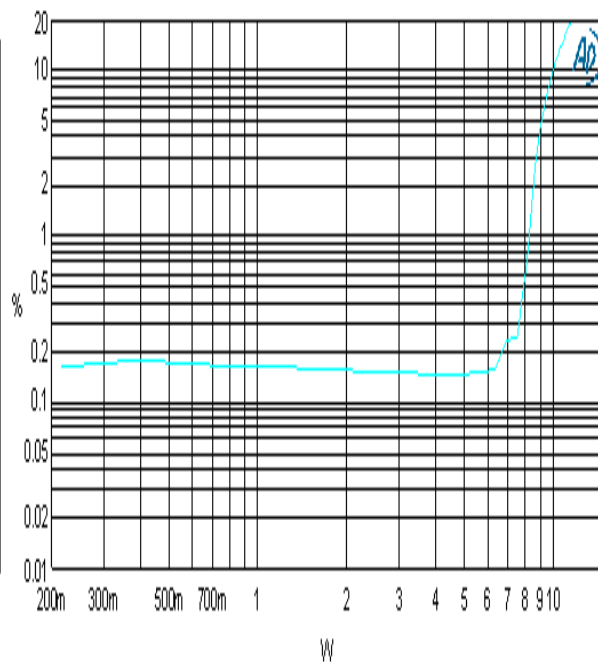
GAIN_F@12V 8OHM



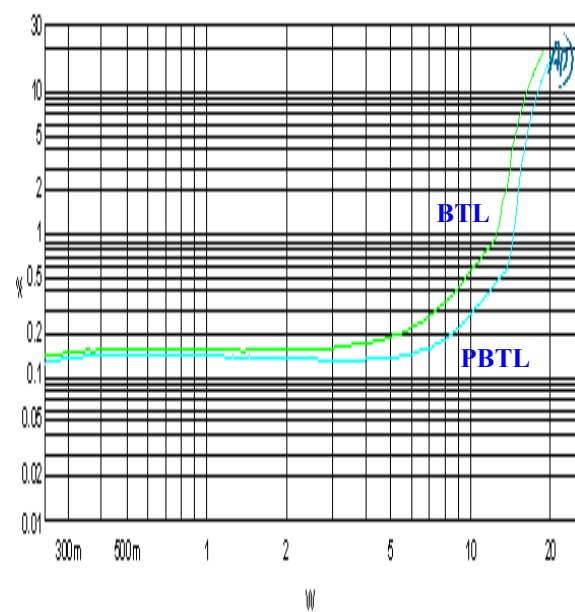
XTK_F@12V 8OHM



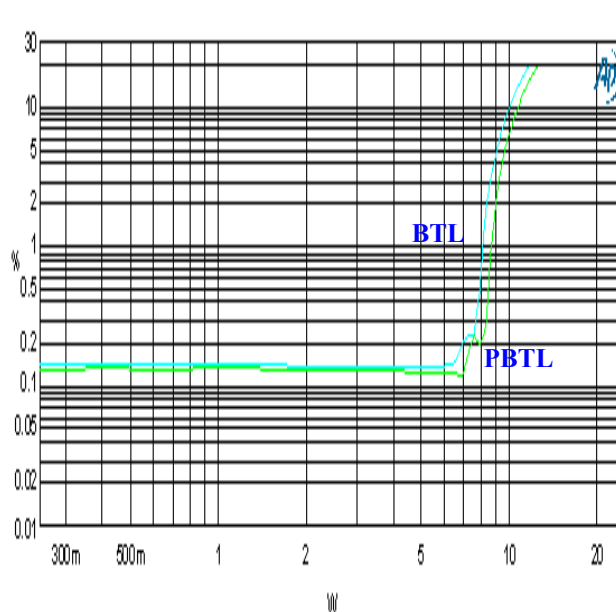
THDN_PO@9V 4OHM



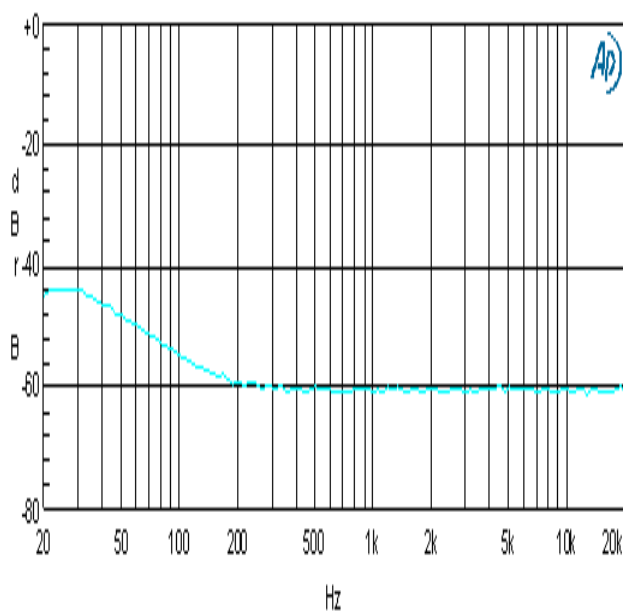
THDN_PO@12V 8OHM



PBTTL@12V 4OHM



PBTTL@12V 8OHM



PSRR_F@12V 8OHM

● SD 功能

芯片不工作时，BL6356 可以关断。芯片正常工作时 SD=H；SD=L 使芯片进入低电流关断模式。SD 脚悬空时内部下拉电阻使芯片关断。

● PBTL 选择

BL6356 可以将同一通道的两个输出直接接到一起，两个通道做为并联 BTL 输出。如果 PBTL 脚接高电平，每个通道的两个输出脚的输出同相。PBTL 模式时，将输入信号加在右通道，将喇叭放在 LEFT 和 RIGHT 输出之间。PBTL 模式可以提供更高的效率。

一般 BTL 模式工作时，将 PBTL 脚接零电位。

● PLIM 功能

通过调节 PLIM 脚的电压值来限制输出功率，AVCC 到地的电阻分压值加于 PLIM 脚即可调节 PLIM 脚电压。不用此功能时 PLIM 脚悬空即可。

PLIMIT 典型值:

Test condition	PLIMIT Voltage	Output Power (W)	Output Voltage Amplitude (V _{p-p})
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	4	10.38	22.9
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	3	9.4	22.7
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	2.5	6.7	17.8
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	2	4.6	14.6
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	1.5	3	13.6
PVCC=12V, Vin=1.1Vrms, RL=8 Ω , Gain=20dB	1	2.2	13.6

● 短路保护功能

BL6356 提供输出输出脚之间短路保护功能。短路保护后可自动恢复。

● 应用图:

PBTL=L 时, BL6356 作为正常双通道应用。

PBTL=H 时, BL6356 两通道并联作为单通道使用。

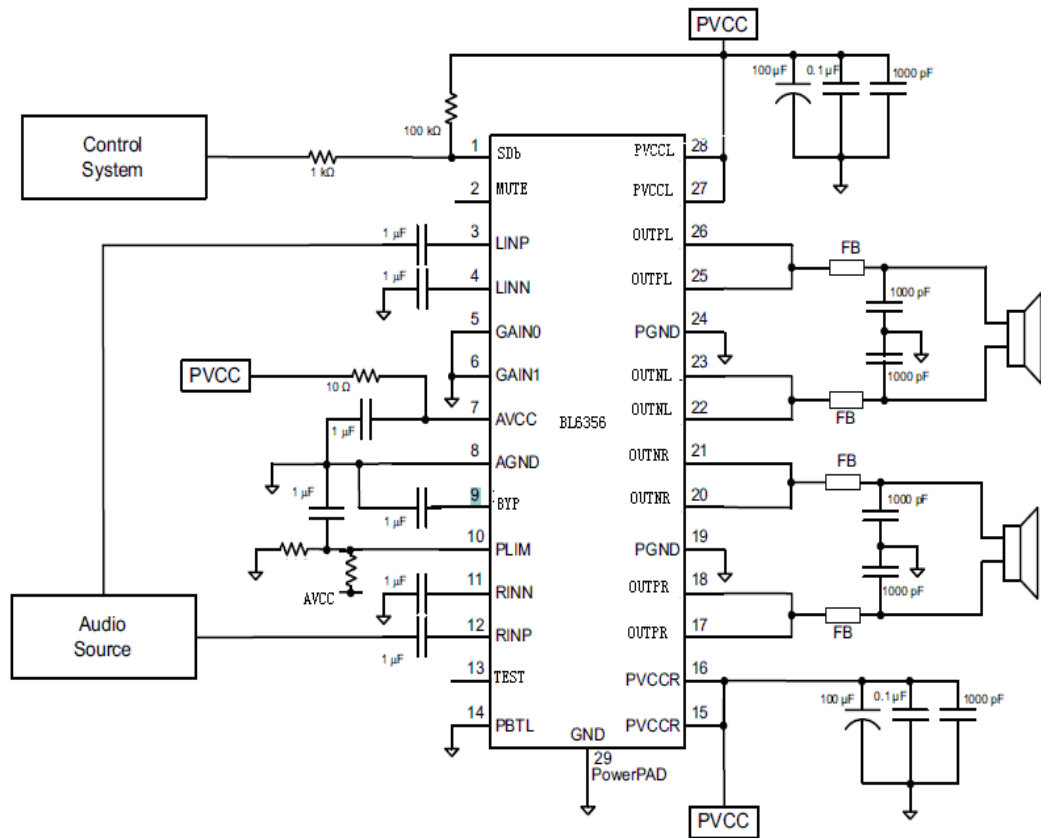
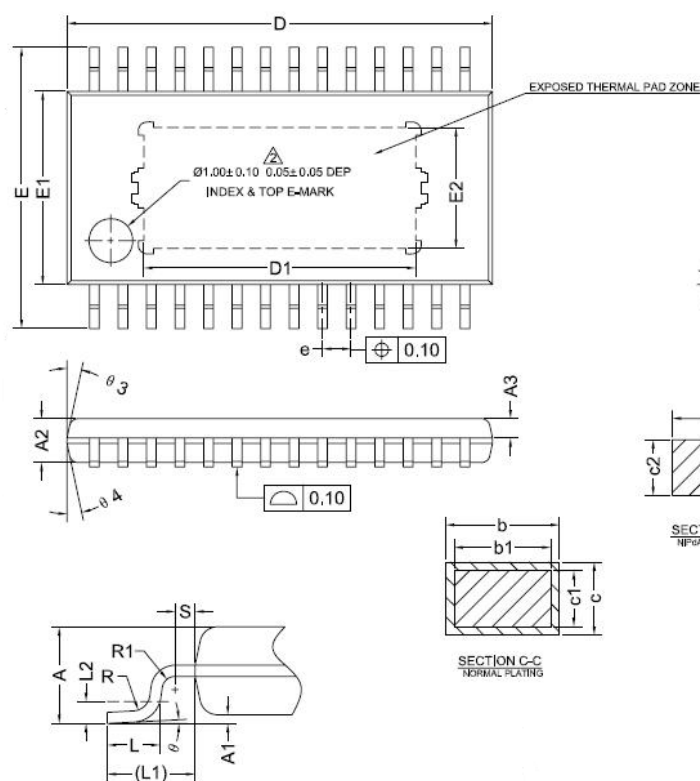


Figure 2. Stereo Class-D Amplifier with BTL Output and Single-Ended inputs with power Limiting

V1.1

封装示意图 (ETSSOP28)

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.90	1.00	1.10
A3	0.34	0.44	0.54
b	0.20	-	0.29
b1	0.19	0.22	0.25
b2	0.19	-	0.25
c	0.13	-	0.18
c1	0.12	0.13	0.14
c2	0.12	-	0.14
D	9.60	9.70	9.80
D1	6.20REF		
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
E2	2.75REF		
e	0.55	0.65	0.75
L	0.45	0.60	0.75
L1	1.00REF		
L2	0.25BSC		
R	0.09	-	-
R1	0.09	-	-
S	0.20	-	-
θ	0°	-	8°
θ1	10°	12°	14°
θ2	10°	12°	14°
θ3	10°	12°	14°
θ4	10°	12°	14°

NOTES:

1. ALL DIMENSIONS REFER TO JEDEC STANDARD MO-153 AET DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. 'D1' AND 'E2' ARE VARIABLES DEPENDING ON DIE PAD SIZES.