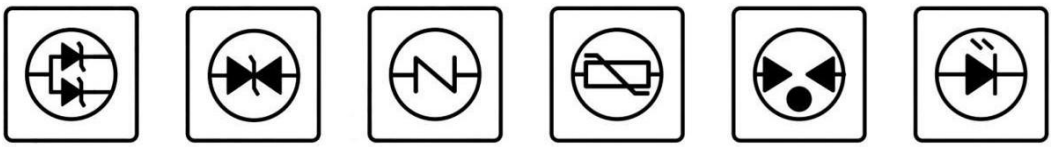
MSKSEMI 美森科
SEMICONDUCTOR



LM4871-MS

Product specification

描述

LM4871-MS 是一颗单通道 AB 类差分输入音频功率放大器。在 5.0V 电源供电，THD+N=10%，3 欧姆负载上可以输出 2.8W 的功率。

LM4871-MS 的差分输入架构能有效提高噪声的抑制能力 。产品应用电路简单，仅需极少数的外围器件，就能提供高品质低失真的输出。

LM4871-MS 具有关断功能，极大的延长系统的待机时间。过热保护功能增强系统的可靠性。POP 声抑制功能改善了系统的听觉感受，同时简化系统调试。

LM4871-MS 提供 SOP8 封装。

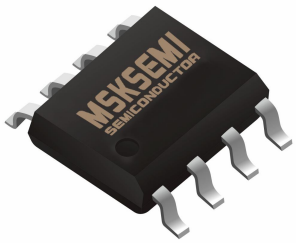
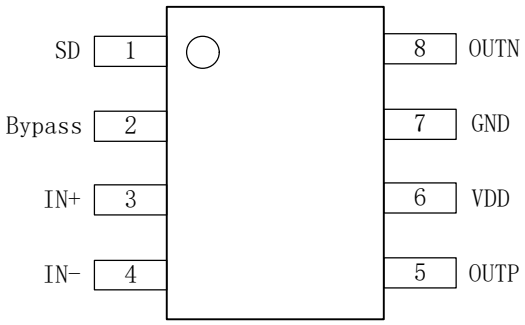
特性

- 输出功率：
  —1.6W (VDD=5.0V, RL =8Ω, THD+N=10%)
  —2.6W (VDD=5.0V, RL =4Ω, THD+N=10%)
  —2.8W (VDD=5.0V, RL =3Ω, THD+N=10%)
- 工作电压 ： 2.5V to 5.5V
- 低失真和低噪声
- 开机 POP 声抑制功能
- 过热保护功能

应用

- FM 播放器
- 网络摄像头
- 玩具及游戏机
- 插卡音箱/USB 音箱/蓝牙音箱

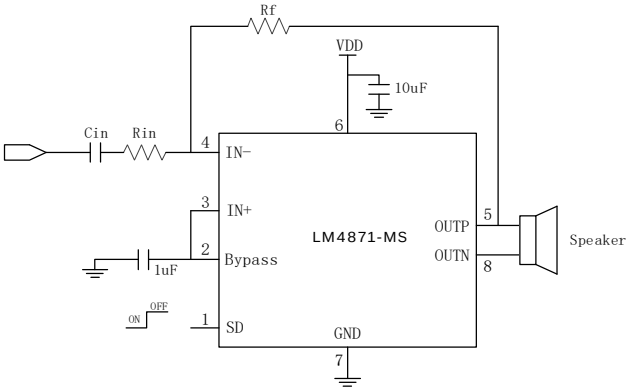
封装信息及引脚排列

SOP-8	引脚排列	丝印
		

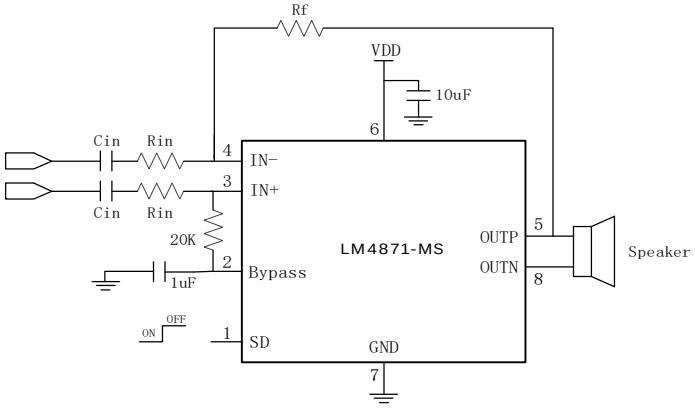
管脚描述

管脚	符号	I/O	描述
1	SD	I	系统关断控制，默认高电平（高电平关机，低电平工作）
2	Bypass	I	参考电压
3	IN+	I	音频正输入端
4	IN-	I	音频负输入端
5	OUTP	O	音频正输出端口
6	VDD	P	电源
7	GND		地
8	OUTN	O	音频负输出端口

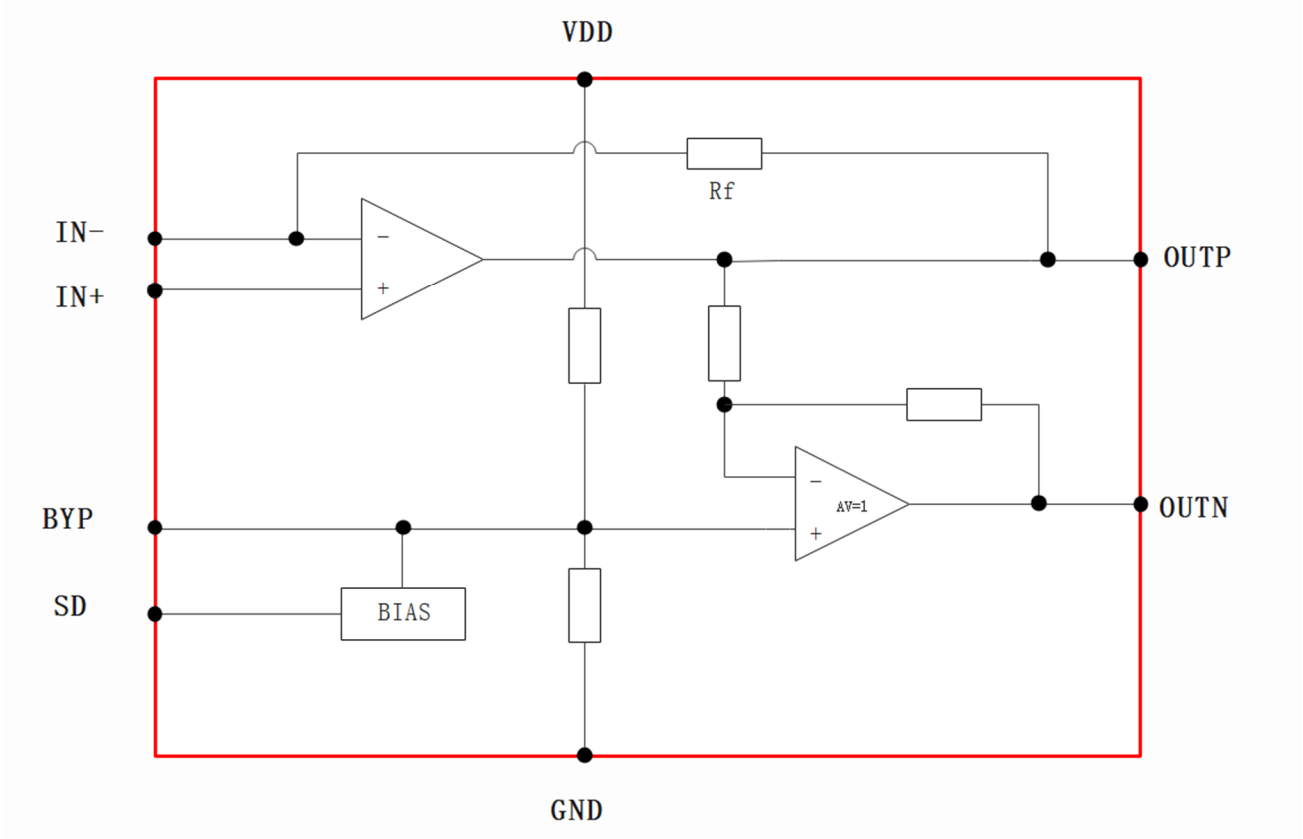
单端输入典型应用电路图



差分输入典型应用电路图



功能框图



绝对最大额定值

V_{DD}	供电电压	-0.3V to 6V
V_I	输入电压	-0.3V to V_{DD}+0.3V
T_A	工作温度	-40°C to 85°C
T_J	结温	-40°C to 125°C
T_{STG}	储存温度	-65°C to 150°C
T_{SLD}	焊接温度	300°C, 5sec

注：绝对最大额定值是指设备的寿命受到损害的值，在绝对最大额定条件下会引起芯片的永久性损坏。

推荐额定值

			MIN	MAX	UNIT
V_{DD}	供电电压	VDD	2.5	5.5	V
V_{IH}	SD高电平	V_{DD}=5.0V	2		V
V_{IL}	SD低电平	V_{DD}=5.0V		0.6	V
RL_{MIN}	最小负载	V_{DD}=5.0V	3		Ω

热阻参数

Parameter	Symbol	Package	MAX	UNIT
热阻(Junction to Ambient)	θ_{JA}	SOP8	115	°C/W
热阻（Junction to Case）	θ_{JC}		63	°C/W

电性参数

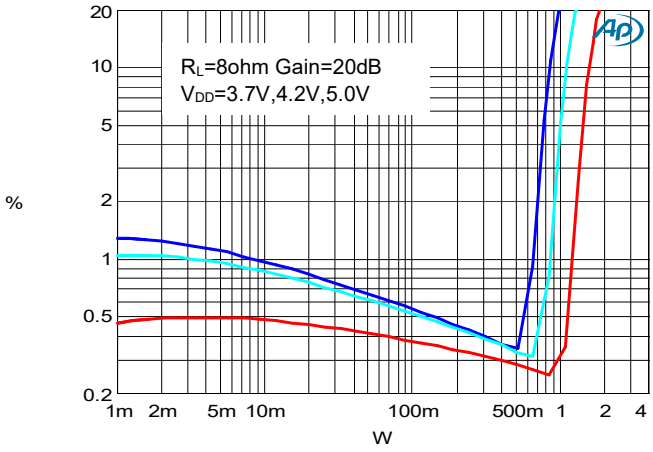
(VDD =5V, Gain=20dB, R_L =8Ω, T =25°C, unless otherwise noted.)

Symbol	Parameter	Test Conditions		MIN	TYP	MAX	UNIT
Po	输出功率	THD+N=10%,f=1KHZ,R_L=8Ω	V_{DD}=5.0V		1.6		W
			V_{DD}=4.2V		1.1		
			V_{DD}=3.7V		0.85		
		THD+N=1%, f=1KHZ,R_L=8Ω	V_{DD}=5.0V		1.3		W
			V_{DD}=4.2V		0.86		
			V_{DD}=3.7V		0.66		
		THD+N=10%,f=1KHZ,R_L=4Ω	V_{DD}=5.0V		2.6		W
			V_{DD}=4.2V		1.7		
			V_{DD}=3.7V		1.3		
		THD+N=1%, f=1KHZ,R_L=4Ω	V_{DD}=5.0V		2.0		W
			V_{DD}=4.2V		1.3		
			V_{DD}=3.7V		1.0		
		THD+N=10%,f=1KHZ,R_L=3Ω	V_{DD}=5.0V		2.8		W
			V_{DD}=4.2V		1.95		
			V_{DD}=3.7V		1.46		
		THD+N=1%, f=1KHZ,R_L=3Ω	V_{DD}=5.0V		2.0		W
			V_{DD}=4.2V		1.5		
			V_{DD}=3.7V		1.1		
THD+N	总谐波失真＋噪声	V_{DD}=5.0V, P_O=1.0W, R_L=8Ω	f=1KHz		0.3		%
		V_{DD}=3.7V, P_O=0.5W, R_L=8Ω			0.4		
G_V	增益	R_{in}=27K，R_f=150K	V_{DD}=3.7V		20		dB
PSRR	电源纹波抑制比	VDD=4.2V ±200mVp-p	f=1KHz		57		dB
SNR	信噪比	V_{DD}=5.0V,Vorms=1V, G_V=20dB	f=1KHz		89		dB
Vn	残余噪声	V_{DD}=5.0V,Input floating with C_{in}=0.1μF	A-weighting		35		μV
			No A-weighting		53		
Dyn	动态范围	V_{DD}=5.0V, THD=1%	f=1KHz		98		dB
I_Q	静态电流	V_{DD}=5.0V	V_{SD}=0.3V No Load		5		mA
		V_{DD}=4.2V			4		
		V_{DD}=3.7V			3		
I_{SD}	关断电流	V_{DD}=2.0V to 5.0V	V_{SD}=3.3V		1		μA
Vos	失调电压	V_{DD}=5V, AC_GND			3		mV
Tst	启动时间	C_{Byp} =1.0uF			90		mS
OTP	温度保护	Junction Temperature, No Load	V_{DD}=5.0V		175		°C
OTH	迟滞温度				30		

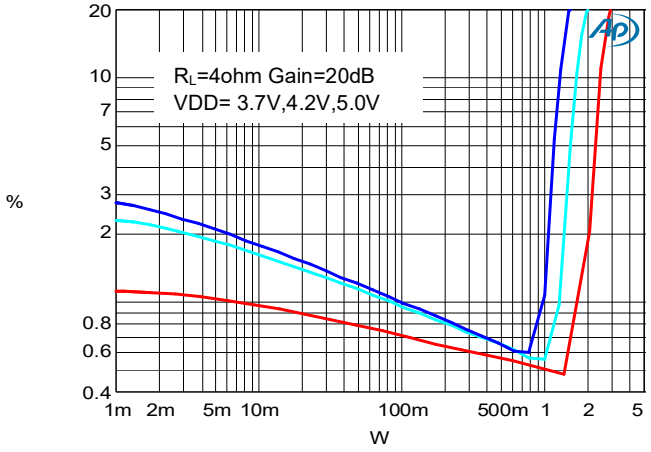
典型特征曲线

(VDD =5V, Gain=20dB, R_L =8Ω, T =25°C, unless otherwise noted.)

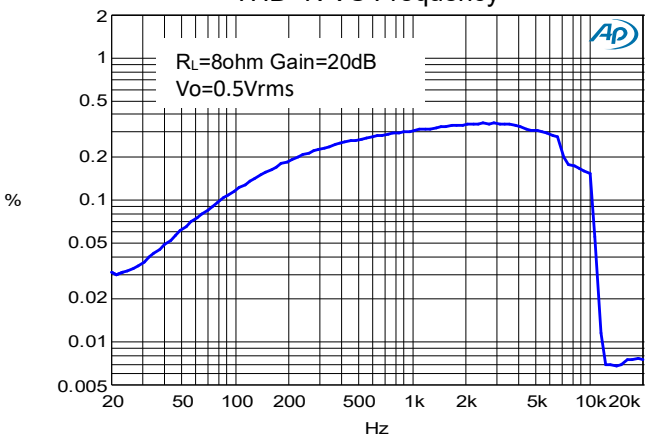
THD+N vs Output Power



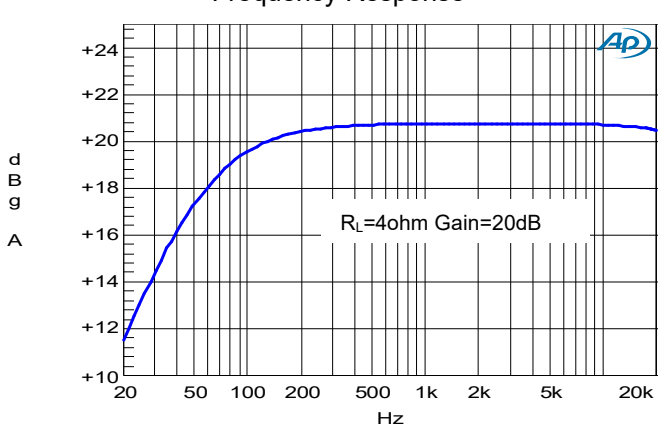
THD+N vs Output Power



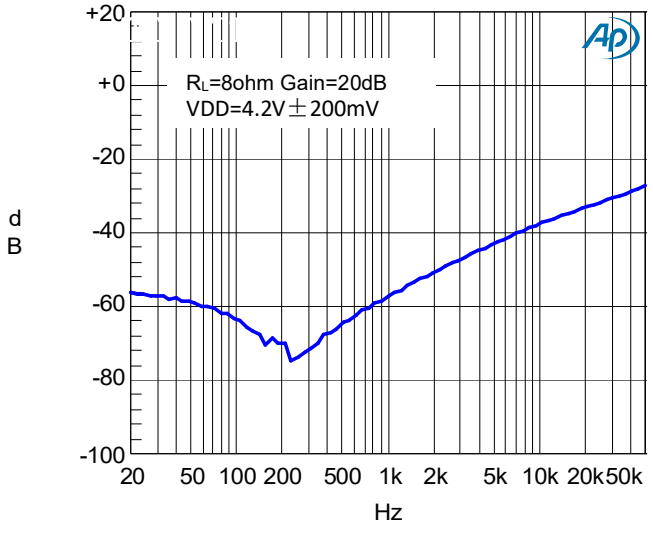
THD+N VS Frequency



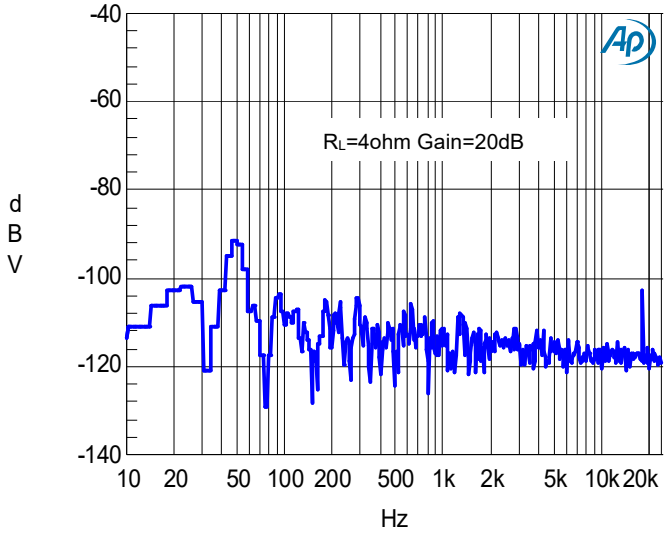
Frequency Response



PSRR



Noise Floor FFT



应用信息

输入电阻(Ri)

LM4871-MS的增益由音量调节控制的输入电阻(RI)和反馈电阻RF)控制。
增益计算如下：

$$Av = 2 X \frac{Rf}{RI} \left(\frac{V}{V}\right)$$

其中，输入电阻RI为外部的输入电阻，Rf为外部反馈电阻。

输入电容（Ci）

输入电容与输入电阻构成一个高通滤波器，其截至频率可由下试得出：

$$f_c=\frac{1}{(2\pi RiCi)}$$

Ci的值不仅会影响到电路的低频响应，而且也会影响电路启动和关断时所产生的POP声，输入电容越大，则到达其稳定工作点所需的电荷越多，在同等条件下，小的输入电容所产生的POP声比较小。

偏置电容C_{BYP}

偏置电容是最关键的电容，它与几个重要性能相关，当电路启动时，偏置电容决定了放大器的开启速度，偏置电容同时会影响到电路的噪声和电源抑制比以及开关机的POP声。
为避免启动时的POP声，偏置电压的上升速度应该比输入偏置电压的上升速度慢。

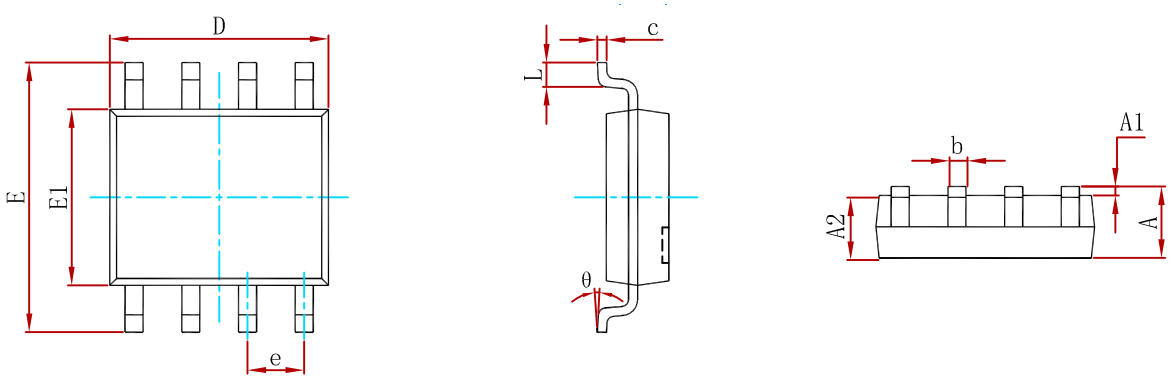
关断工作模式

为了减少在关断模式下的功率损耗，LM4871-MS带有关闭放大器偏置的关断电路。当SD引脚为低电平时，放大器正常工作。当SD引脚为高电平时，放大器被关闭，工作电流达到最小；SD引脚默认高电平。

过温保护

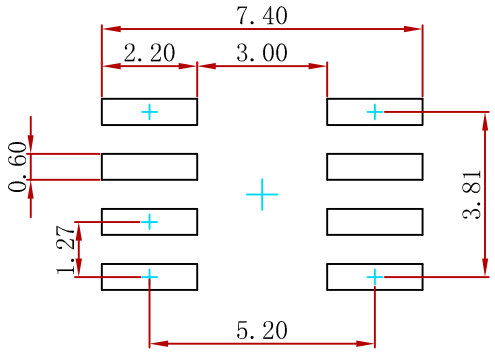
LM4871-MS带有过温保护电路以防止内部温度超过175℃时器件损坏。在不同器件之间，这个值有25℃的差异。当内部电路超过设置的保护温度时，器件进入关断状态，输出被截止。当温度下降 30℃后，器件重新正常工作。

封装图（SOP8）



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

焊盘布局建议



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

订单信息

型号	封装	包装
LM4871-MS	SOP-8	3000PCS

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