



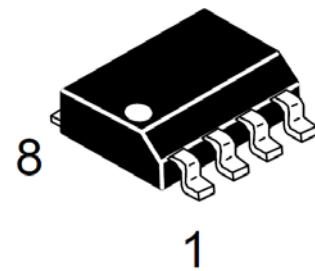
概述:

LM2904是由两个独立的高增益运算放大器组成。
可以是单电源工作，也可以是双电源工作，电源的功耗
电流与电源电压大小无关。应用范围包括音频放大器、
工业控制、DC 增益部件和所有常规运算放大电路。

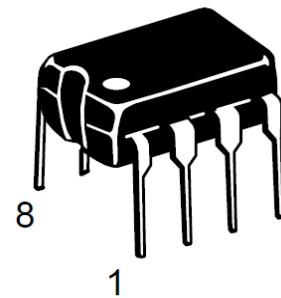
采用 DIP-8 或 SOP-8 封装形式。

主要特点:

- ◇ 可单电源或双电源工作。
- ◇ 包含两个运算放大器。
- ◇ 逻辑电路匹配。
- ◇ 功耗小。
- ◇ 频率范围宽。

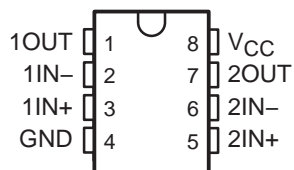


DIP-8



SOP-8

功能框图和管脚排列图



极限值 (绝对最大额定值, 若无其它规定, $T_{amb}=25^{\circ}C$)

| 参数名称 | 数值 | 单位 |
|--|---------------|-------------|
| 电源电压 | 24 或 ± 12 | V |
| 差分输入电压 | 24 | V |
| 输入电压 | -0.3 ~ 24 | V |
| 输出端对地短路电流 (1 放大器) ($V \leq 15V$, $T_a=25^{\circ}C$) | 持续 | |
| 输入电流 ($V_{IN} < -0.3V$) | 50 | mA |
| 工作环境温度 | 0 ~ 70 | $^{\circ}C$ |
| 贮存温度 | -65 ~ 150 | $^{\circ}C$ |



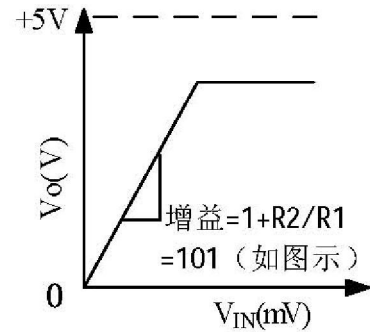
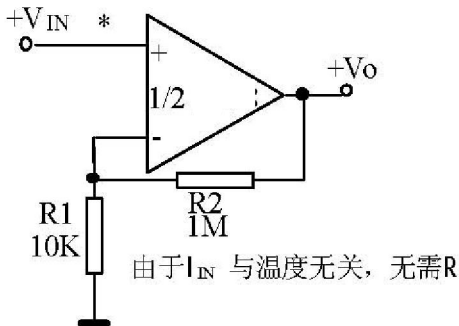
电特性 (若无其它规定, $V^+ = 5.0V$)

| 特性 | 测试条件 | | 规范值 | | | 单位 |
|------------|--|-----------------------------|---------------------|------|---------------------|-------|
| | | | 最小 | 典型 | 最大 | |
| 输入失调电压 | Ta=25°C | | | 2 | 5 | mV |
| 输入偏流 | Ta=25°C, IIN(+)或 IIN (-), VCM=0V | | | 45 | 150 | nA |
| 输入失调电流 | Ta=25°C, IIN(+) - IIN (-), VCM=0V | | | 3 | 30 | nA |
| 输入共模电压范围 | Ta=25°C, V ⁺ =24V | | 0 | | V ⁺ -1.5 | V |
| 电源电流 | 在整个温度范围上, RL=∞在所有运算放大器上, | | V ⁺ =24V | 1 | 2 | mA |
| | | | V ⁺ =5V | 0.5 | 1.2 | |
| 大信号电压增益 | V ⁺ =15V, Ta=25°C, RL≥2kΩ(对于 Vo=1~11V) | | 50 | 100 | | V/mV |
| 共模抑制比 | DC, Ta=25°C, VCM=0~V ⁺ -1.5V | | 65 | 90 | | dB |
| 电源抑制比 | DC, Ta=25°C, V ⁺ =5~24V | | 65 | 100 | | dB |
| 放大器之间的耦合系数 | Ta=25°C, f=1~20kHz(所有的输入) | | | -120 | | dB |
| 输出源电流 | VIN(+)=1V, VIN(-)=0V, V ⁺ =15V, Vo=2V, Ta=25°C | | 20 | 40 | | mA |
| 输出吸电流 | VIN(-)=1V, VIN(+)=0V, V ⁺ =15V, Vo=2V, Ta=25°C | | 10 | 20 | | mA |
| | VIN(-)=1V, VIN(+)=0V, V ⁺ =15V, Vo=200mV, Ta=25°C | | 12 | 50 | | μA |
| 对地短路电流 | V ⁺ =15V, Ta=25°C | | | 40 | 60 | mA |
| 输入失调电压 | | | | | 7 | mV |
| 输入失调电压漂移 | Rs=0Ω | | | 7 | | μV/°C |
| 输入失调电流 | IIN(+) - IIN (-) | | | | 100 | nA |
| 输入失调电流漂移 | Rs=0Ω | | | 10 | | pA/°C |
| 输入偏置电流 | IIN(+)或 IIN (-) | | | 40 | 300 | nA |
| 输入共模电压范围 | V ⁺ =24V | | 0 | | V ⁺ -2 | V |
| 大信号电压增益 | V ⁺ =15V, (Vo=1~11V), RL≥2kΩ | | 25 | | | V/mV |
| 输出电压摆幅 | VOH | V ⁺ =24V | RL=2kΩ | 20 | | V |
| | | | RL=10kΩ | 21 | 22 | V |
| | VOL | V ⁺ =5V, RL=10kΩ | | | 5 | 20 |
| 输出电流 | VIN(+)=1V, VIN(-)=0V, V ⁺ =15V, Vo=2V | | 10 | 20 | | mA |
| | VIN(-)=1V, VIN(+)=0V, V ⁺ =15V, Vo=2V | | 5 | 8 | | mA |

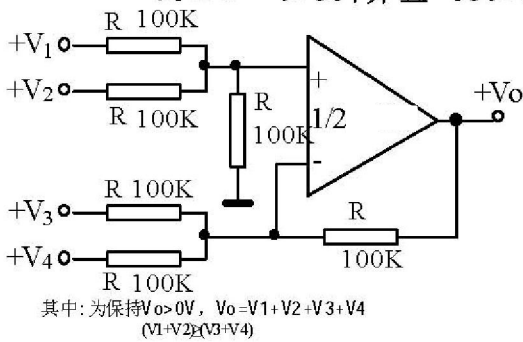


典型应用

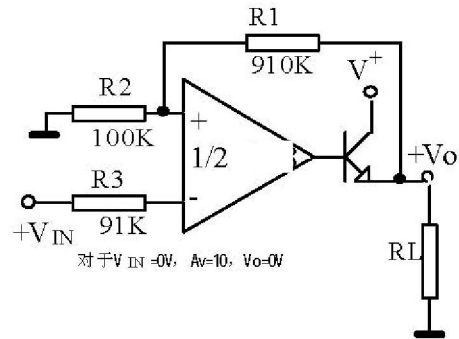
同相直流增益 (0V输入=0V输出)



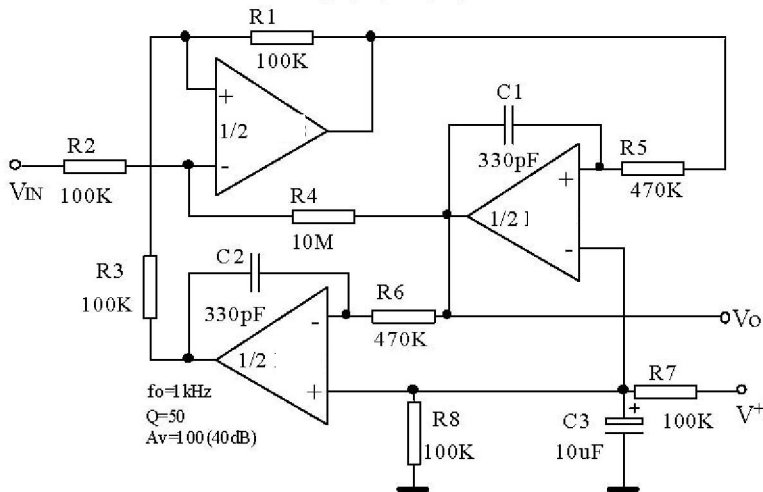
直流求和放大器
($V_{INs} \geq 0V$, 并且 $V_o \geq 0V$)



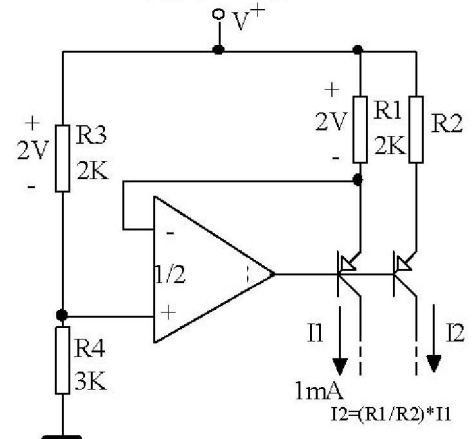
功率放大器



RC 有源带通滤波器

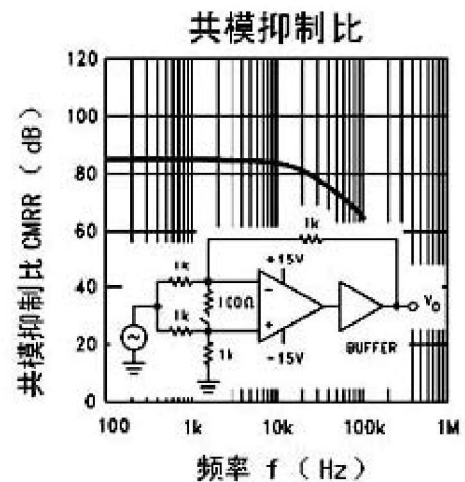
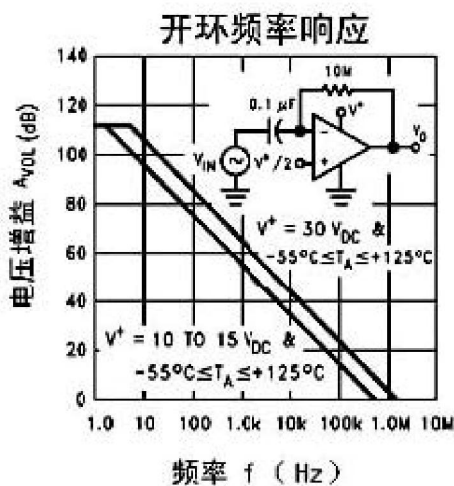
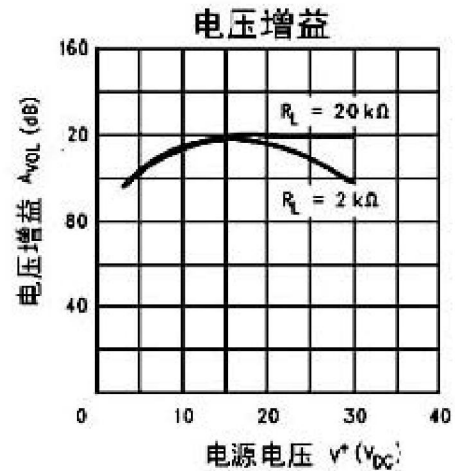
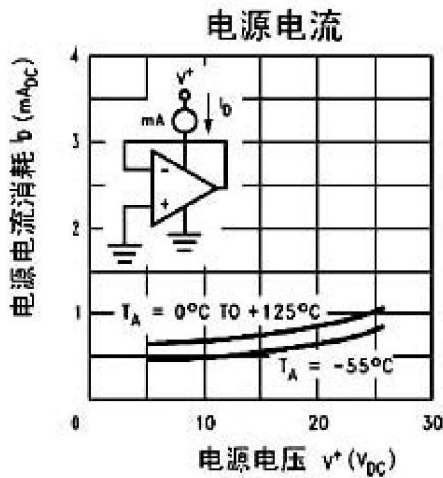
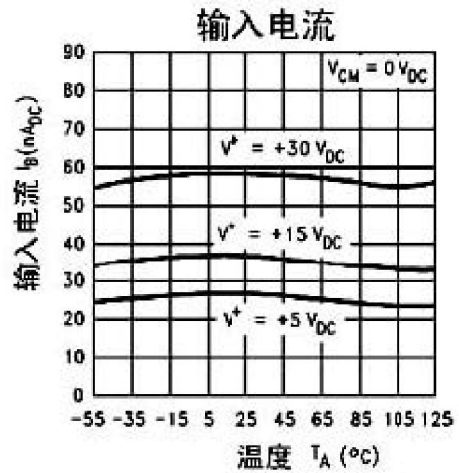
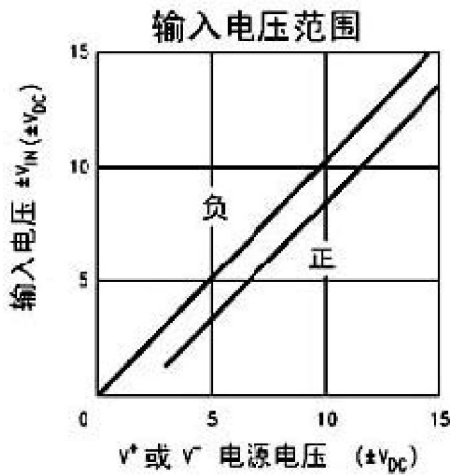


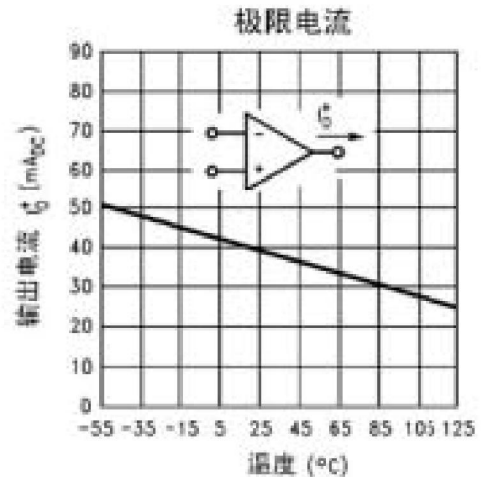
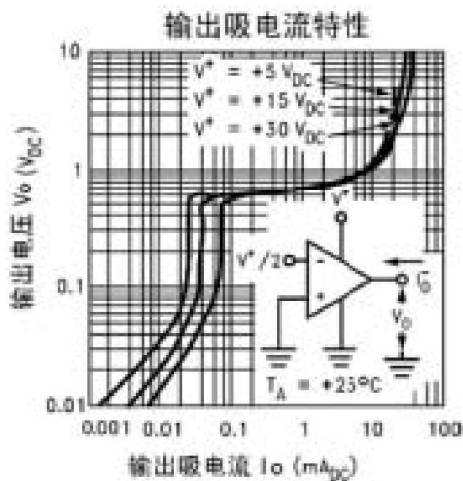
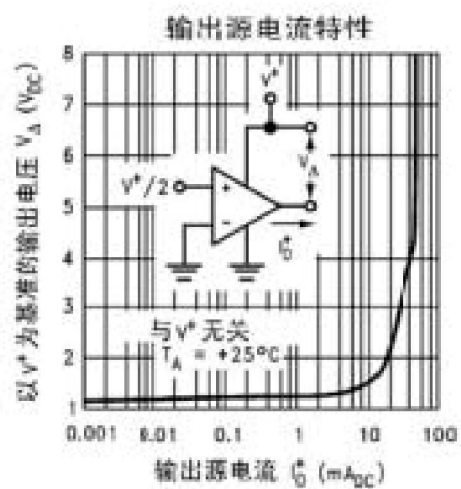
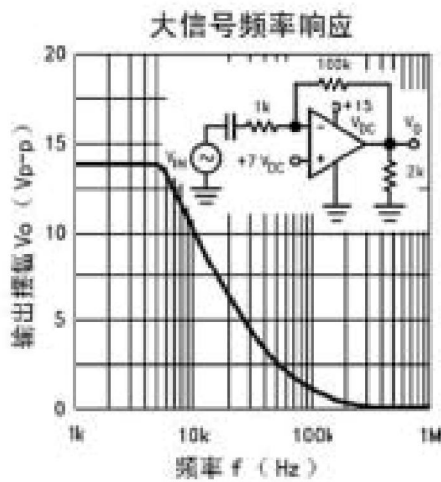
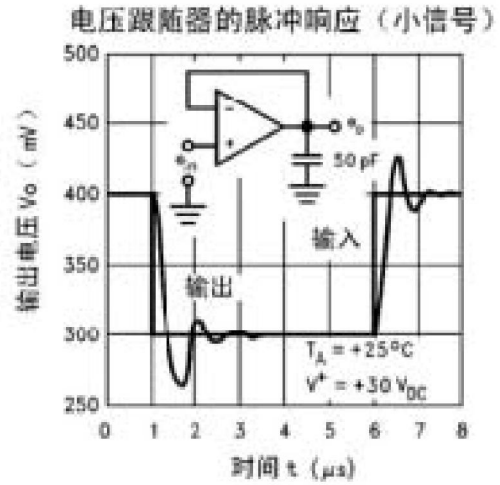
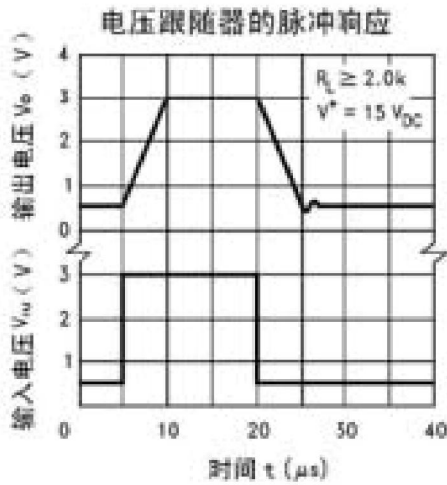
固定电流源





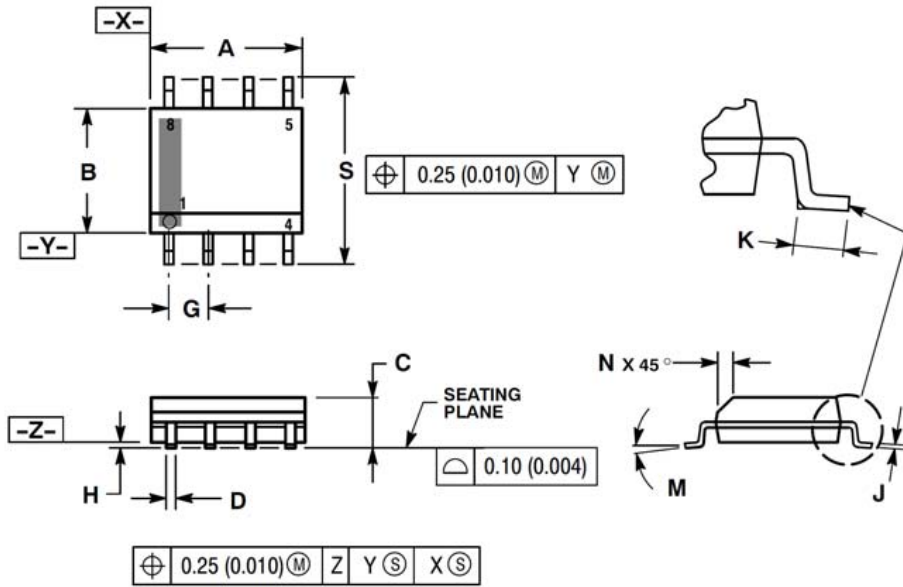
典型特性曲线







SOP-8

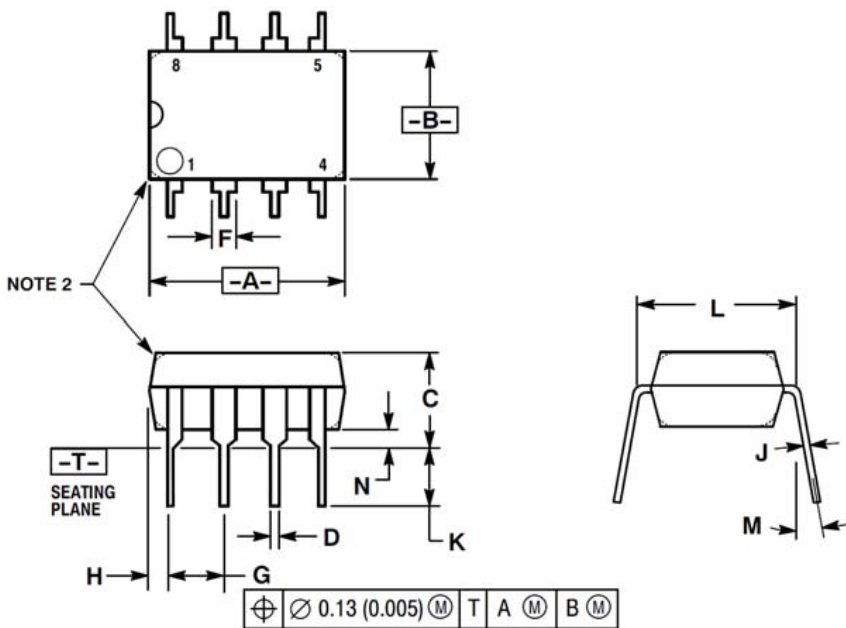


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.80 | 5.00 | 0.189 | 0.197 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.053 | 0.069 |
| D | 0.33 | 0.51 | 0.013 | 0.020 |
| G | 1.27 BSC | | 0.050 BSC | |
| H | 0.10 | 0.25 | 0.004 | 0.010 |
| J | 0.19 | 0.25 | 0.007 | 0.010 |
| K | 0.40 | 1.27 | 0.016 | 0.050 |
| M | 0° | 8° | 0° | 8° |
| N | 0.25 | 0.50 | 0.010 | 0.020 |
| S | 5.80 | 6.20 | 0.228 | 0.244 |

DIP-8



NOTES:

1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 9.40 | 10.16 | 0.370 | 0.400 |
| B | 6.10 | 6.60 | 0.240 | 0.260 |
| C | 3.94 | 4.45 | 0.155 | 0.175 |
| D | 0.38 | 0.51 | 0.015 | 0.020 |
| F | 1.02 | 1.78 | 0.040 | 0.070 |
| G | 2.54 BSC | | 0.100 BSC | |
| H | 0.76 | 1.27 | 0.030 | 0.050 |
| J | 0.20 | 0.30 | 0.008 | 0.012 |
| K | 2.92 | 3.43 | 0.115 | 0.135 |
| L | 7.62 BSC | | 0.300 BSC | |
| M | --- | 10° | --- | 10° |
| N | 0.76 | 1.01 | 0.030 | 0.040 |



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