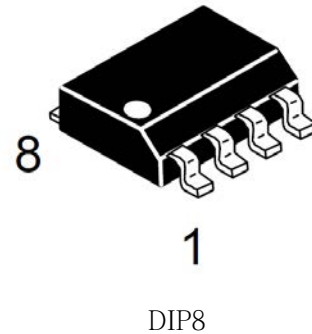




概述

2903是由两个独立、精确的电压比较器组成，其失调电压不超过 2.0mV。可在单电源下或双电源下工作。并且其电流大小不受电源电压幅度大小影响。这些比较器有一个独特的性能，就是即使在单电源下工作时，其输入共模电压范围也能达到零电平。主要用于消费类和工业类电子产品中。

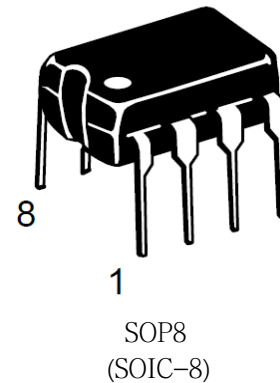
该芯片采用 DIP8 或者 SOP8 封装形式。



DIP8

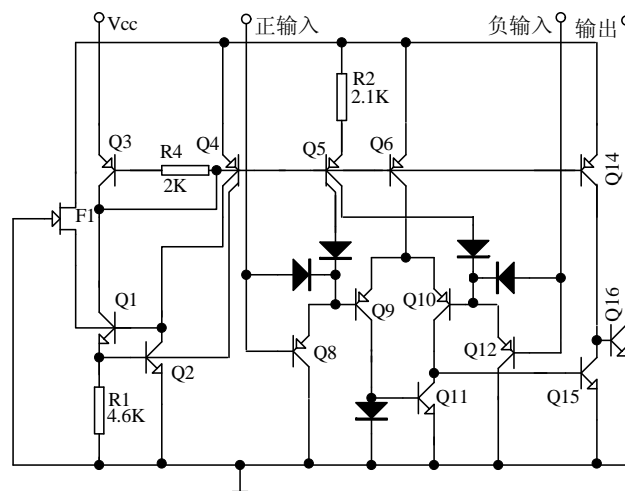
主要特点

- 工作电源电压范围宽：
 - 单电源：2.0V~36V
 - 双电源：±1.0V~±18V
- 电源电流小：0.8mA 与电源电压无关
- 输入偏置电流低：25nA
- 输入失调电流低：5.0nA
- 输入失调电压低：5.0mV
- 输入差分电压的范围与电源电压范围一致。
- 可与TTL、DTL、ECL、MOS和CMOS兼容。



SOP8
(SOIC-8)

内部电路图





引脚端功能符号

| 引出端序号 | 功 能 | 符 号 | 引出端序号 | 功 能 | 符 号 |
|-------|------------|------|-------|------------|------|
| 1 | 比较器 1 输出 | OUT1 | 5 | 比较器 2 正相输入 | IN2+ |
| 2 | 比较器 1 反相输入 | IN1- | 6 | 比较器 2 反相输入 | IN2- |
| 3 | 比较器 1 正相输入 | IN1+ | 7 | 比较器 2 输出 | OUT2 |
| 4 | 地 | GND | 8 | 电源 | Vcc |

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

| 参 数 名 称 | | 符 号 | 数 值 | | 单 位 |
|----------|-------|----------------------|------|----------|--------------------|
| | | | 最 小 | 最 大 | |
| 电源电压 | 双电源电压 | Vcc | - | ± 18 | V |
| | 单电源电压 | | | 36 | |
| 输入差分电压 | | VIDR | | 36 | V |
| 输入共模电压 | | VICR | -0.3 | 36 | V |
| 输出对地短路电流 | | I _{OG} | | 20 | mA |
| 最大工作结温 | | T _J (MAX) | | 125 | $^{\circ}\text{C}$ |
| 功耗 (*) | | PD | | 570 | mW |
| 工作环境温度 | | T _{amb} | 0 | 70 | $^{\circ}\text{C}$ |
| 贮存温度 | | T _{stg} | -65 | 150 | $^{\circ}\text{C}$ |

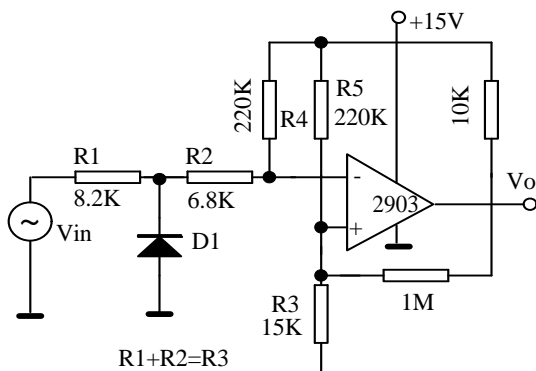
电特性 (若无其它规定, $V_{cc}=5\text{V}$, $T_{amb}=25^{\circ}\text{C}$)

| 特 性 | 测 试 条 件 | 符 号 | 规 范 值 | | | 单 位 |
|----------|---|------------------|-------|-----------|----------------------|------|
| | | | 最 小 | 典 型 | 最 大 | |
| 输入失调电压 | T _a =25 $^{\circ}\text{C}$ | V _{IO} | | ± 1.0 | ± 5.0 | mV |
| | 0 $^{\circ}\text{C}$ \leq T _a \leq 70 $^{\circ}\text{C}$ | | | | ± 9.0 | |
| 输入失调电流 | T _a =25 $^{\circ}\text{C}$ | I _{IO} | | ± 5.0 | ± 50 | nA |
| | 0 $^{\circ}\text{C}$ \leq T _a \leq 70 $^{\circ}\text{C}$ | | | | ± 150 | |
| 输入偏置电流 | T _a =25 $^{\circ}\text{C}$ | I _{IB} | | 25 | 250 | nA |
| | 0 $^{\circ}\text{C}$ \leq T _a \leq 70 $^{\circ}\text{C}$ | | | | 400 | |
| 输入共模电压范围 | T _a =25 $^{\circ}\text{C}$ | V _{ICR} | 0 | | V _{cc} -1.5 | V |
| | 0 $^{\circ}\text{C}$ \leq T _a \leq 70 $^{\circ}\text{C}$ | | 0 | | V _{cc} -2.0 | |
| 电源电流 | R _L = ∞ 双比较器 | I _{cc} | | 0.4 | 1.0 | mA |
| | R _L = ∞ 双比较器, V _{cc} =30V | | | | 2.5 | |
| 电压增益 | R _L \geq 15K Ω , V _{cc} =15V | G _v | 50 | 200 | | V/mV |
| 大信号响应时间 | V _{IN} =TTL 逻辑摆幅, V _{REF} =1.4V, V _{RL} =5.0V, R _L =5.1K Ω | t _{RES} | | 300 | | ns |
| 响应时间 | V _{RL} =5.0V, R _L =5.1K Ω | t _{RES} | | 1.3 | | ns |

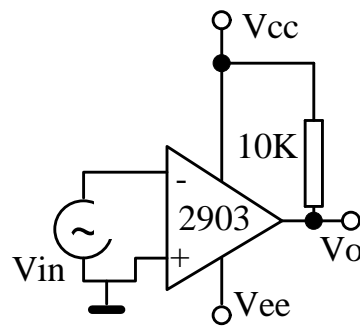


| 特性 | 测试条件 | 符号 | 规范值 | | | 单位 |
|--------|--|------------|-----|-----|----------|----|
| | | | 最小 | 典型 | 最大 | |
| 输入差分电压 | | V_{ID} | | | V_{CC} | V |
| 输出陷电流 | $V_{IN(-)} \geq 1.0V, V_{IN(+)} = 0V, V_O \leq 1.5V$ | I_{SINK} | 6.0 | 16 | | mA |
| 输出饱和电压 | $V_{IN(-)} \geq 1.0V, V_{IN(+)} = 0V, I_{SINK} \leq 4.0mA$ | V_{SAT} | | 150 | 400 | mV |
| | $V_{IN(-)} \geq 1.0V, V_{IN(+)} = 0V, I_{SINK} \leq 4.0mA$ $0^\circ C \leq T_a \leq 70^\circ C$ | | | | 700 | |
| 输出漏电流 | $V_{IN(+)} \geq 1.0V, V_{IN(-)} = 0V, V_O = 5.0V$ | I_{OL} | | 0.1 | | nA |
| | $V_{IN(+)} \geq 1.0V, V_{IN(-)} = 0V, V_O = 30V$ $0^\circ C \leq T_a \leq 70^\circ C$ | | | | 1000 | |

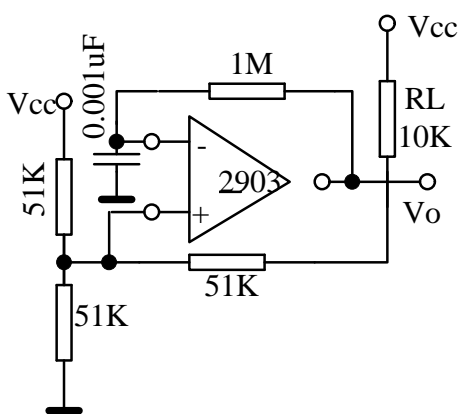
应用图



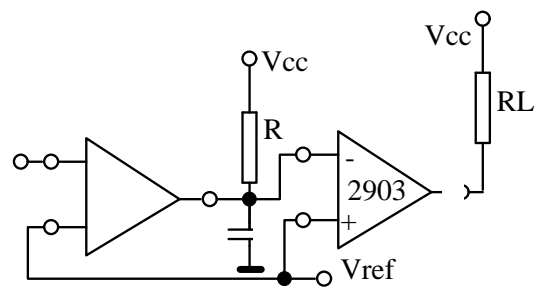
过零检波器(单电源应用)



过零检波器(双电源应用)



方波振荡器



延时发生器



使用说明

2903 是高增益、宽频带器件，像大多数比较器一样，如果输出端到输入端有寄生电容而产生耦合，则很容易产生振荡。这种现象仅仅出现在当比较器改变状态时，输出电压过渡的间隙。电源加旁路滤波并不能解决这个问题，标准 PC 板的设计对减小输入—输出寄生电容耦合是有助的。减小输入电阻至小于 $10K\Omega$ 将减小反馈信号，而且增加甚至很小的正反馈量（滞回 $1.0\sim 10mV$ ）能导致快速转换，使得不可能产生由于寄生电容引起的振荡。除非利用滞后，否则直接插入 IC 并在引脚上加上电阻将引起输入—输出在很短的转换周期内振荡，如果输入信号是脉冲波形，并且上升和下降时间相当快，则滞回将不需要。

比较器的所有没有用的引脚必须接地。

2903 偏置网络确立了其静态电流与

电源电压范围 $2.0\sim 30V$ 无关。

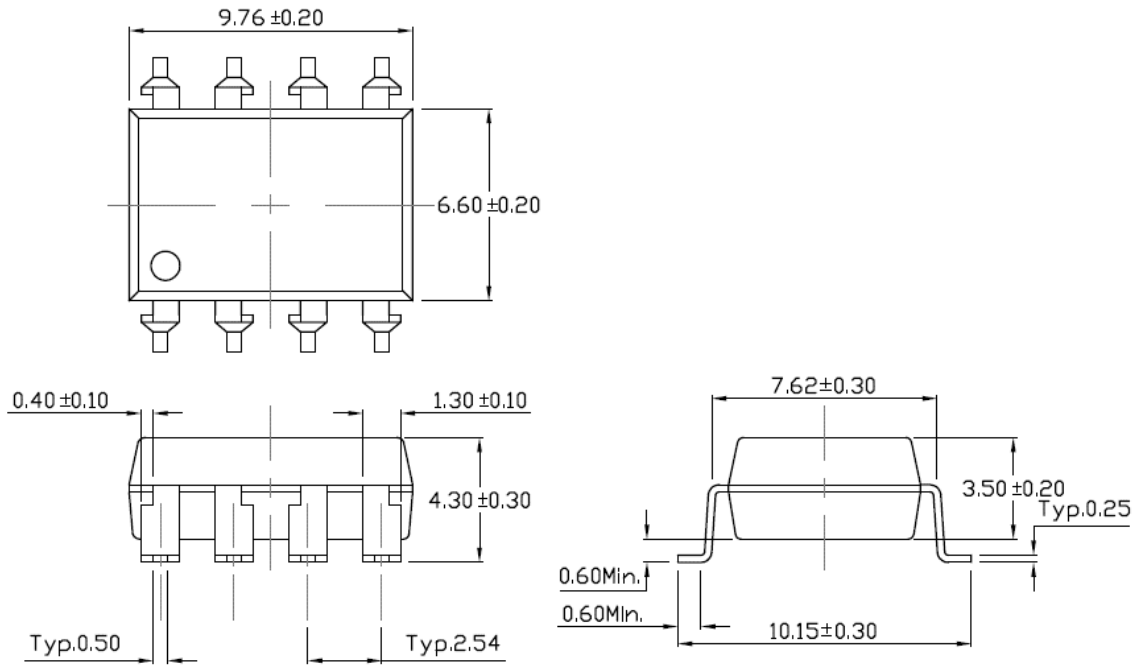
通常电源不需要加旁路电容。

差分输入电压可以大于 V_{CC} 并不损坏器件。保护部分必须能阻止输入电压向负端超过 $-0.3V$ 。

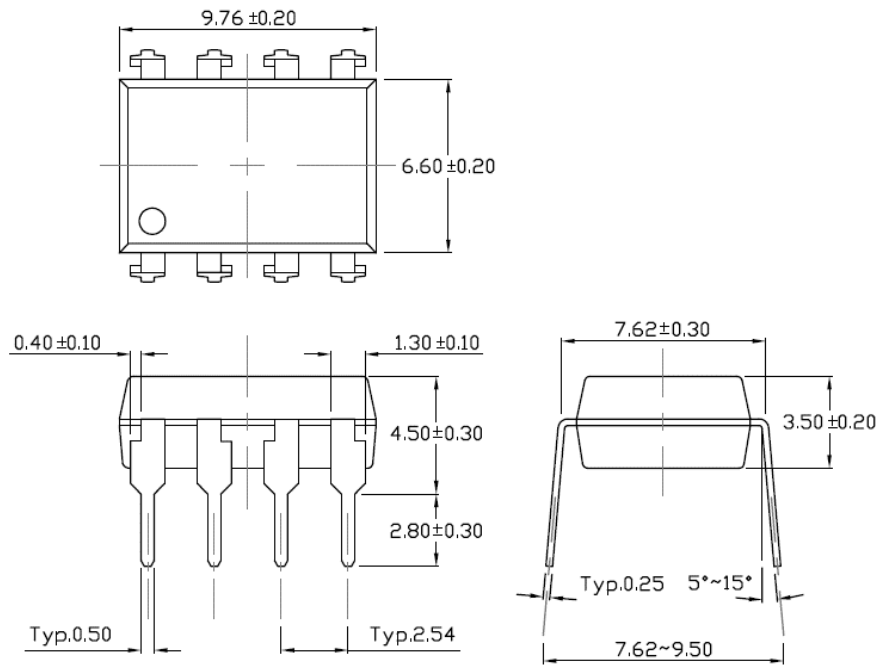
2903 的输出部分是集电极开路，发射极接地的 NPN 输出晶体管，可以用多集电极输出提供或功能。输出负载电阻能衔接在可允许电源电压范围内的任何电源电压上，不受 V_{CC} 端电压值的限制。此输出能作为一个简单的对地 SPS 开路（当不用负载电阻没被运用），输出部分的陷电流被可能得到的驱动和器件的 β 值所限制。当达到极限电流（ $16mA$ ）时，输出晶体管将退出而且输出电压将很快上升。输出饱和电压被输出晶体管大约 60Ω 的 γ_{SAT} 限制。当负载电流很小时，输出晶体管的低失调电压（约 $1.0mV$ ）允许输出箝位在零电平。



SOP-8(SOIC-8)



DIP-8





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