GP9105
APC (Analog to PWM Converter)
Analog Voltage to PWM



## 特性

- 将0V到VCC的模拟电压输入，线性转换成0%-100%占空比的PWM信号输出。
- 输出PWM信号的频率范围: 1Hz to 1MHz
- 最大PWM占空比误差：< 1% （0.5%、0.1%）
- PWM占空比线性度误差 <0.5%（0.2%、0.1%）
- 电源电压：2.7V - 5.5V
- 功耗：<5mA
- 启动时间：<2ms
- 工作温度：-40°C to 85°C、-40°C to 125°C

## 描述

GP9105是一个模拟信号转PWM信号转换器，相当于一个PWM信号输出的ADC。此芯片可以将0V到VCC的模拟电压线性转换成占空比为0%到100%的PWM信号，并且占空比的线性误差小于0.5%。

## 应用

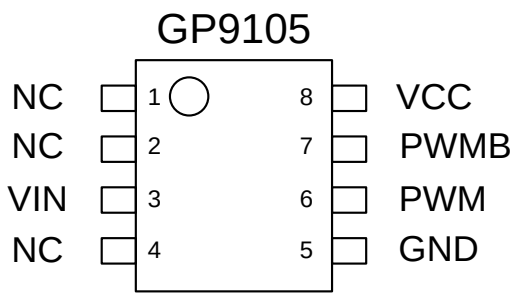
- 直流马达调速
- LED调光
- 工业模拟信号隔离
- 逆变器
- 电源

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## 1. 管脚定义

| 管脚名称 | 管脚功能 |
|---|---|
| VIN | 输入模拟电压信号 |
| VCC | 电源 |
| GND | 地 |
| NC | 不接 |
| PWM | PWM占空比信号输出 |
| PWMB | 信号PWM的互补信号 |

表-A 管脚分布




## 2. 绝对最大额定参数

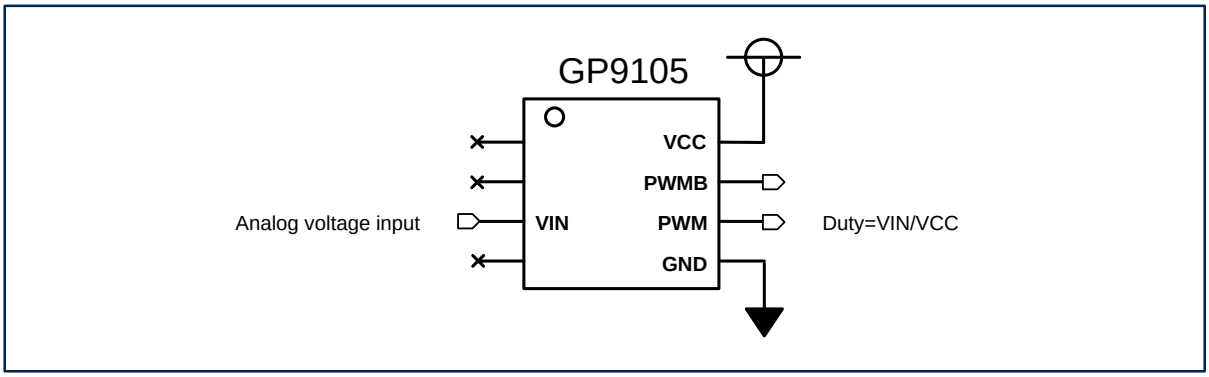
| | |
|---|---|
| **工业操作温度** | -40 ℃ to 125 ℃ |
| **储存温度** | -50 ℃ to 125 ℃ |
| **输入电压** | -0.3 V to VCC + 0.3 V |
| **最大电压** | 8 V |
| **ESD 保护** | > 4000 V |

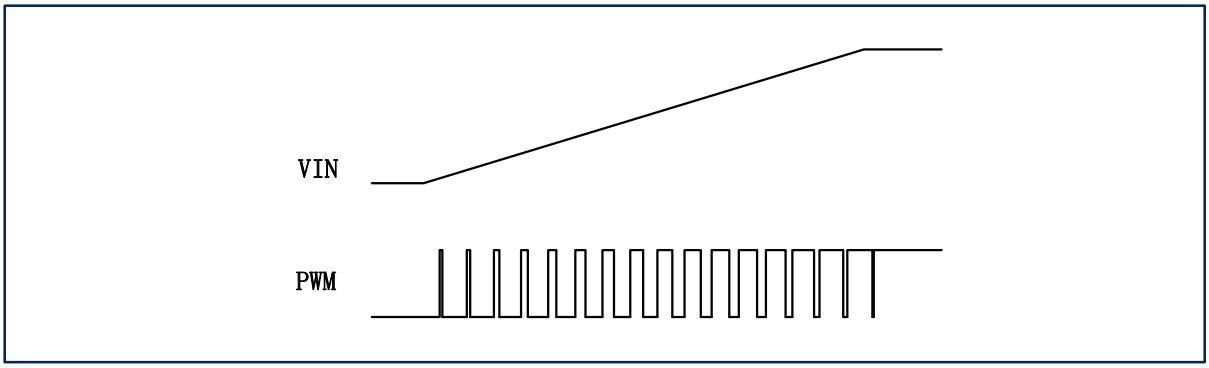
** 超过“绝对最大额定值”中列出的参数值可能会造成永久性损坏设备。不保证器件在超出规范中列出的条件下操作。长时间暴露于极端条件下可能影响设备可靠性或功能。*

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# 3. 典型应用

## 3.1 基本功能

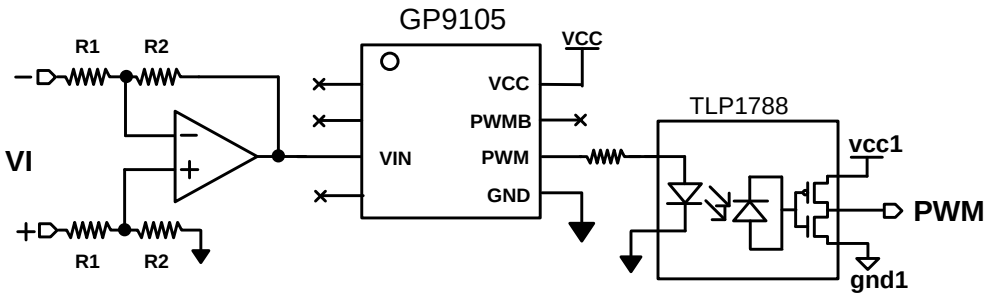



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# 3. 典型应用

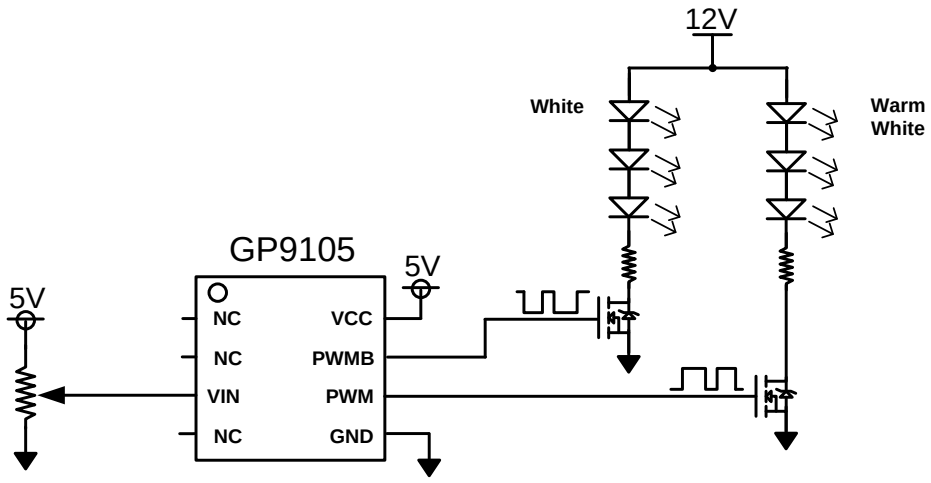
## 3.2 模拟信号隔离采集




**输出PWM占空比：$D_{PWM}$=（VI*R2/R1）/VCC**

模拟电压经过运放放大后，给GP9105的VIN电压的范围控制在0V-VCC之内，则可以获得PWM信号的占空比为：$D_{PWM}$=（VI*R2/R1）/VCC，此方案既实现了模拟电压隔离，输出的PWM信号也非常便于采集。

## 3.3 LED色温调节

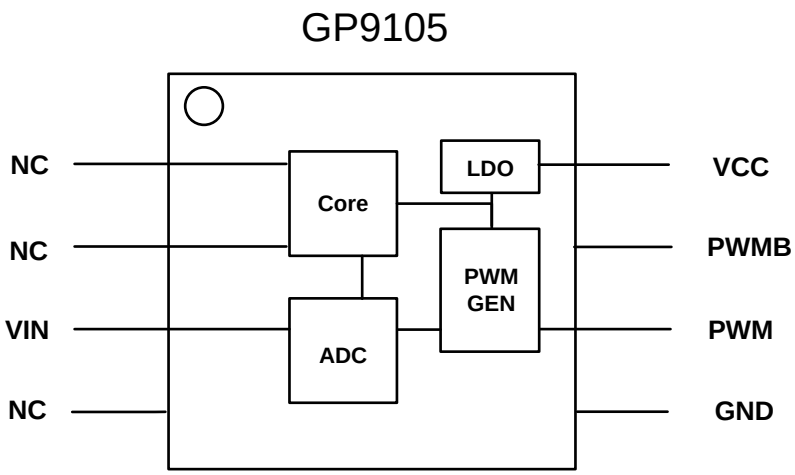



这是一款电位器控制的LED色温调光电路，电位器通过分压产生0V至5V的VIN电压，并将VCC引脚连接至5V，然后GP9105可根据输入电压产生一对互补的PWM和PWMB信号，通过PWM和PWMB占空比的变化来控制MOS管的开断，从而实现LED色温调调节。

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## 4. 芯片工作方式

GP9105是一款高性能APC芯片（模拟到PWM转换器），输出PWM信号的频率可以从1Hz到1MHz中选择。输入电压范围为0V至VCC，输出PWM和PWMB信号的占空比为0%至100%，PWM信号的占空比与输入电压的关系如下：$D_{PWM}$ = VIN / VCC。




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## 5. 交流特性

| 符号 | 描述 | 最小 | 默认 | 最大 | 单位 |
|---|---|---|---|---|---|
| $f_{pwm}$ | PWM 信号频率(注1) | 1 | 1K | 1M | Hz |
| $\Delta f_{pwm}$ | PWM 信号的频率误差 | -3 | 0 | 3 | % |
| $\Delta D_{pwm}$ | PWM 信号占空比误差 | | 0.5 | 1 | % |
| $D_{pwm}$ | PWM 信号的占空比 (注2) | 0 | | 100 | % |
| $J_{pwm}$ | PWM信号的抖动(注3) | | 0.1 | 0.2 | $\%_{p-p}$ |

*交流特性备注:*

*1. PWM信号频率可在1Hz至1MHz范围内调整，默认值为1KHz。*

*2. PWM占空比定义为平均占空比，由于周期抖动，每个周期的占空比不完全相同。*

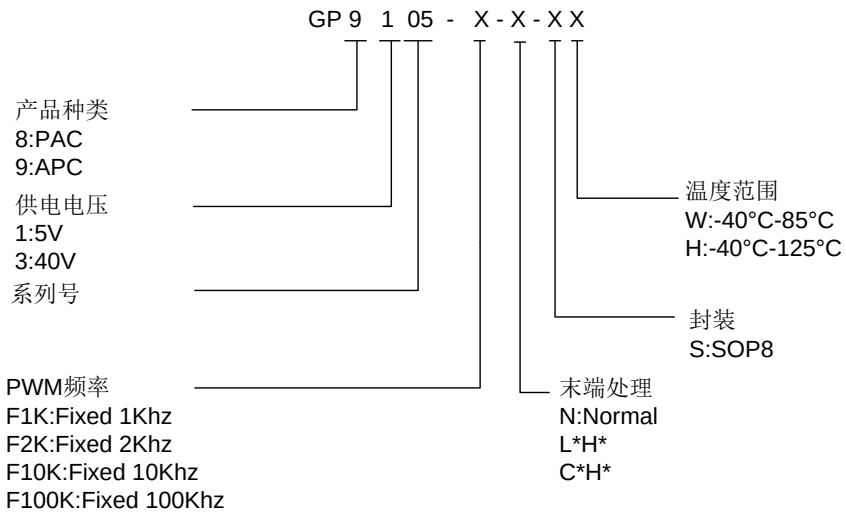
*3.抖动是周期的峰 - 峰偏差与周期平均值的比值。PWM抖动在频率为1KHz处测量*

## 6. 直流特性

| 符号 | 描述 | 测试条件 | 最小 | 典型 | 最大 | 单位 |
|---|---|---|---|---|---|---|
| VCC | 电源电压 | | 2.7 | 5 | 5.5 | V |
| ICC | 电源功耗 | VCC @ 5.0V | | 2 | 5 | mA |
| VIN | 输入电压 | * | 0 | | VCC | V |
| IIL | 输入漏电流 | VIN = VCC or VSS | | | 3 | μA |
| ILO | 输出漏电流 | VIN = VCC or VSS | | | 3 | μA |
| VOL | 输出低电平 | VCC @ 5.0V, IOL = 10 mA | | | 0.4 | V |
| VOH | 输出高电平 | VCC @ 5.0V, IOL = 10 mA | | | VCC-0.4 | V |
| Tr | 输出上升时间 | VCC @ 5.0V, $C_{LOAD}$=5pF | | 20 | 40 | ns |
| Tf | 输出下降时间 | VCC @ 5.0V, $C_{LOAD}$=5pF | | 20 | 40 | ns |

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## 7. 订购须知

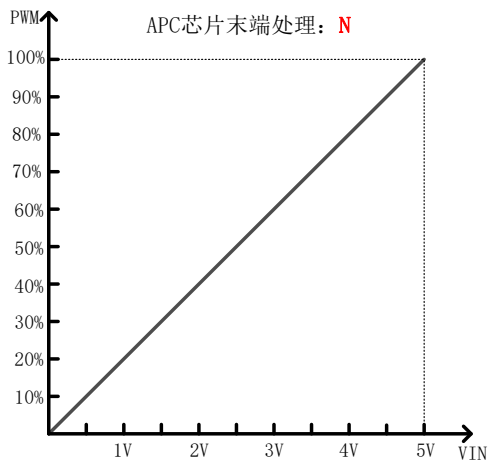



末端处理说明：

N：末端未加处理，0V-VCC（5V）对应0%-100%，由于0点会有失调存在，会存在PWM为0%时对应的输入电压无法保证绝对0V，100%点也会有失调存在。

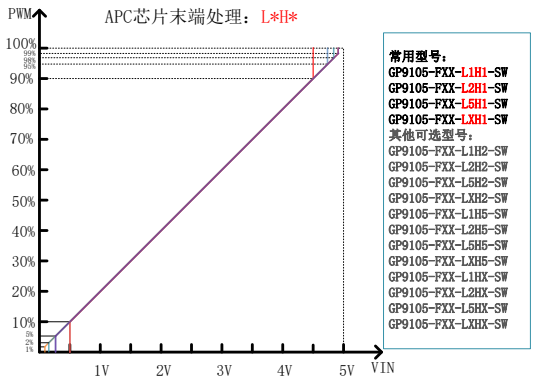
L*H*：输出低于某个占空比后直接为0，高于某个占空比后直接为100%。低有4档可选：1%/2%/5%/10%，分别对应L1,L2,L5,LX；高有4档可选：90%/95%/98%/99%，分别对应HX,H5,H2,H1。

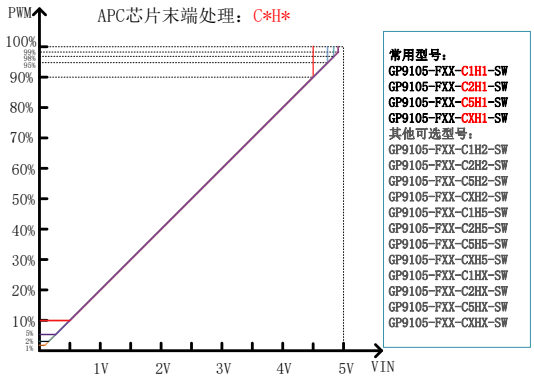
C*H*：输出低于某个占空比后保持占空比不变，高于某个占空比后直接为100%。低有4档可选1%/2%/5%/10%，分别对应C1,C2,C5,CX；高有4档可选：90%/95%/98%/99%，分别对应HX,H5,H2,H1。




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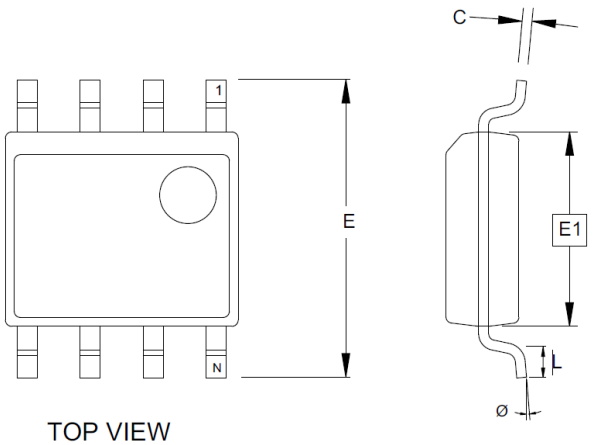



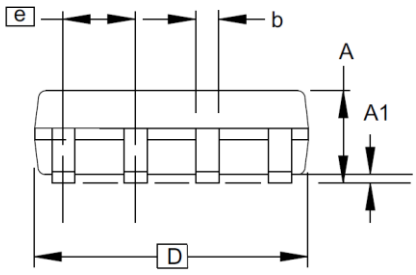

| 封装 | 工作温度 | 电源 | PWM频率 | 末端处理 | 订购码 |
|---|---|---|---|---|---|
| SOP8 | -40℃-85℃ | 4.5V-5.5V | *Hz | N | GP9105-F*-N-SW |
| SOP8 | -40℃-85℃ | 4.5V-5.5V | *Hz | L*H* | GP9105-F*-L*H*-SW |
| SOP8 | -40℃-85℃ | 4.5V-5.5V | *Hz | C*H* | GP9105-F*-C*H*-SW |
| SOP8 | -40℃-125℃ | 4.5V-5.5V | *Hz | N | GP9105-F*-N-SH |
| SOP8 | -40℃-125℃ | 4.5V-5.5V | *Hz | L*H* | GP9105-F*-L*H*-SH |
| SOP8 | -40℃-125℃ | 4.5V-5.5V | *Hz | C*H* | GP9105-F*-C*H*-SH |

**可以根据需要选择不同的频率和末端处理类型*

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## 8. 封装信息




(计量单位：毫米)

| 符号 | 最小值 | 正常值 | 最大值 |
|---|---|---|---|
| A1 | 0.10 | – | 0.25 |
| A | 1.35 | – | 1.75 |
| b | 0.31 | – | 0.51 |
| C | 0.17 | – | 0.25 |
| D | 4.80 | – | 5.05 |
| E1 | 3.81 | – | 3.99 |
| E | 5.79 | – | 6.20 |
| e | 1.27 BSC | | |
| L | 0.40 | – | 1.27 |
| Ø | 0° | – | 8° |

注意：

- 此图仅供一般参考。有关合适的尺寸，公差，基准等，请参阅JEDEC图纸MS-012

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