# 1. 特性

- 便于使用
  - 10 和 100 的引脚设定增益
  - 包含总体系统性能所有的误差
  - 性能高于分立式放大器设计
  - 提供 8 引脚 SOIC
  - 低功耗，1.8mA 最大电源电流
  - 宽电源范围(±2V 至±19V)
- 出色的直流性能
  - 0.04%最大值，总增益误差
  - ±3ppm/°C，总增益漂移
  - 18μV 最大值，总失调电压
  - 0.03μV/°C(最大值)，失调电压漂移
- 低噪声
- 宽温度范围：
  - INA202：–55°C 到 125°C
- 出色的交流规格
  - 256kHz 带宽(G = 10), 66kHz (G = 100)
  - 60μs 稳定时间至 0.01%

# 2. 应用

- 体重秤
- 传感器接口和数据采集系统
- 工业过程控制
- 电池供电和便携式设备

# 3. 说明

INA201/2 是一款易于使用、低成本、低功耗、高精度仪表放大器，非常适合各种应用。其高性能、小尺寸和低功耗的独特组合，优于分立式仪表放大器。高功能、低增益误差和低增益漂移误差是通过使用内部增益设置电阻器实现的。可以通过外部引脚搭接轻松设置 10 和 100 的固定增益。INA201/2 被完全指定为一个完整的系统，因此简化了设计过程。

对于功率耗散、尺寸和重量至关重要的便携式或远程应用，INA201/2 具有非常低的最大 1.8mA 电源电流，并采用紧凑型 8 引脚 SOIC 封装。INA201/2 在需要高总精度的应用中也表现出色，例如称重秤和传感器接口电路中使用的精密数据采集系统。低误差规格，包括 3ppm 的非线性度、3ppm/°C 的增益漂移、18μV 失调电压和 0.03μV/°C 失调漂移，以比以前分立设计或其他单片设计更低的成本实现总体系统性能仪表放大器。

在 ECG 和血压监测器中以高源阻抗运行时，INA201/2 具有低噪声和低输入偏置电流的理想组合。输入电流噪声也极低。INA201/2 器件在整个工业温度范围内的输入偏置电流规格最大为 7nA。

有关订购信息，请参见 Table 1。

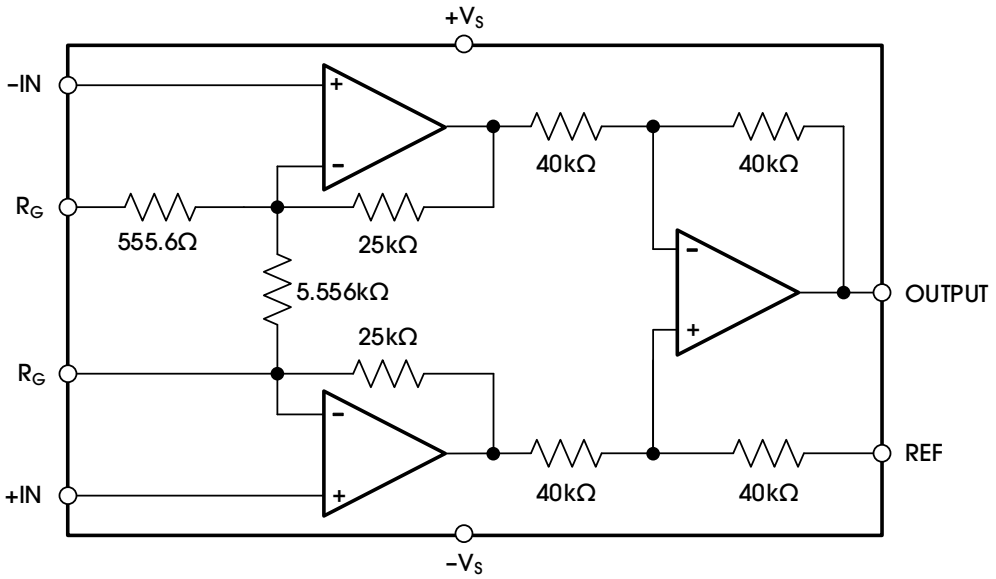


Table 1 lists the order information.

Table 1. Order Information

| ORDER NUMBER | CH (#) | PACKAGE | MARK | $I_Q$ PER CH (TYP) (mA) | BW (kHz) | GAIN | GAIN TYPE | OPERATING TEMP (°C) | PACKAGE OPTION |
|---|---|---|---|---|---|---|---|---|---|
| INA201ASOIC8 | 1 | SOIC-8 | INA201 | 1.5 | 256 | 10-100 | $R_G$ and OS | –40-85 | T/R-4000 |
| INA202ASOIC8 | 1 | SOIC-8 | INA202 | 1.5 | 256 | 10-100 | $R_G$ and OS | –55-125 | T/R-4000 |

Table 2. Family Selection Guide

| ORDER NUMBER | CH (#) | PACKAGE | MARK | $I_Q$ PER CH (TYP) (mA) | BW (kHz) | GAIN | GAIN TYPE | OPERATING TEMP (°C) | PACKAGE OPTION |
|---|---|---|---|---|---|---|---|---|---|
| INA101ASOIC8 | 1 | SOIC-8 | INA101 | 1.56 | 1300 | 1-10000 | $R_G$ | –40-85 | T/R-4000 |
| INA102ASOIC8 | 1 | SOIC-8 | INA102 | 1.56 | 1300 | 1-10000 | $R_G$ | –55-125 | T/R-4000 |
| INA111ASOIC8(1) | 1 | SOIC-8 | INA111 | 0.35 | 130 | 1-10000 | $R_G$ | –40-125 | T/R-4000 |
| INA211ASOIC8(1) | 1 | SOIC-8 | INA211 | 0.35 | 130 | 10-100 | $R_G$ and OS | –40-125 | T/R-4000 |
| INA212ASOIC8(1) | 1 | SOIC-8 | INA212 | 0.35 | 130 | 10-100 | $R_G$ and OS | –40-125 | T/R-4000 |
| INA501LASOIC8(1) | 1 | SOIC-8 | INA501L | 1.56 | 1300 | 2 | Fixed | –40-125 | T/R-4000 |
| INA501MASOIC8(1) | 1 | SOIC-8 | INA501M | 1.56 | 1300 | 5 | Fixed | –40-125 | T/R-4000 |
| INA501HASOIC8(1) | 1 | SOIC-8 | INA501H | 1.56 | 1300 | 10 | Fixed | –40-125 | T/R-4000 |
| INA501NASOIC8(1) | 1 | SOIC-8 | INA501N | 1.56 | 1300 | 20 | Fixed | –40-125 | T/R-4000 |
| INA501PASOIC8(1) | 1 | SOIC-8 | INA501P | 1.56 | 1300 | 25 | Fixed | –40-125 | T/R-4000 |
| INA501RASOIC8(1) | 1 | SOIC-8 | INA501R | 1.56 | 1300 | 50 | Fixed | –40-125 | T/R-4000 |
| INA501SASOIC8(1) | 1 | SOIC-8 | INA501S | 1.56 | 1300 | 75 | Fixed | –40-125 | T/R-4000 |
| INA501TASOIC8(1) | 1 | SOIC-8 | INA501T | 1.56 | 1300 | 100 | Fixed | –40-125 | T/R-4000 |
| INA501KASOIC8(1) | 1 | SOIC-8 | INA501K | 1.56 | 1300 | 125 | Fixed | –40-125 | T/R-4000 |
| INA501JASOIC8(1) | 1 | SOIC-8 | INA501J | 1.56 | 1300 | 200 | Fixed | –40-125 | T/R-4000 |
| INA501GASOIC8(1) | 1 | SOIC-8 | INA501G | 1.56 | 1300 | 250 | Fixed | –40-125 | T/R-4000 |
| INA501FASOIC8(1) | 1 | SOIC-8 | INA501F | 1.56 | 1300 | 500 | Fixed | –40-125 | T/R-4000 |
| INA511LASOIC8(1) | 1 | SOIC-8 | INA511L | 0.35 | 130 | 2 | Fixed | –40-125 | T/R-4000 |
| INA511MASOIC8(1) | 1 | SOIC-8 | INA511M | 0.35 | 130 | 5 | Fixed | –40-125 | T/R-4000 |
| INA511HASOIC8(1) | 1 | SOIC-8 | INA511H | 0.35 | 130 | 10 | Fixed | –40-125 | T/R-4000 |
| INA511NASOIC8(1) | 1 | SOIC-8 | INA511N | 0.35 | 130 | 20 | Fixed | –40-125 | T/R-4000 |
| INA511PASOIC8(1) | 1 | SOIC-8 | INA511P | 0.35 | 130 | 25 | Fixed | –40-125 | T/R-4000 |
| INA511RASOIC8(1) | 1 | SOIC-8 | INA511R | 0.35 | 130 | 50 | Fixed | –40-125 | T/R-4000 |
| INA511SASOIC8(1) | 1 | SOIC-8 | INA511S | 0.35 | 130 | 75 | Fixed | –40-125 | T/R-4000 |
| INA511TASOIC8(1) | 1 | SOIC-8 | INA511T | 0.35 | 130 | 100 | Fixed | –40-125 | T/R-4000 |
| INA511KASOIC8(1) | 1 | SOIC-8 | INA511K | 0.35 | 130 | 125 | Fixed | –40-125 | T/R-4000 |
| INA511JASOIC8(1) | 1 | SOIC-8 | INA511J | 0.35 | 130 | 200 | Fixed | –40-125 | T/R-4000 |
| INA511GASOIC8(1) | 1 | SOIC-8 | INA511G | 0.35 | 130 | 250 | Fixed | –40-125 | T/R-4000 |
| INA511FASOIC8(1) | 1 | SOIC-8 | INA511F | 0.35 | 130 | 500 | Fixed | –40-125 | T/R-4000 |

Note : Available in the future.

Devices can be ordered via the following two ways:
1. Place orders directly on our website (www.analogysemi.com), or;
2. Contact our sales team by mailing to sales@analogysemi.com.

# 4. PIN CONFIGURATION AND FUNCTIONS

Figure 1 illustrates the pin configuration.

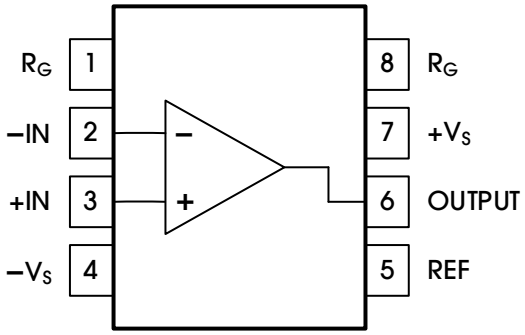



Figure 1. Pin Configuration

Table 3 lists the pin functions.

Table 3. Pin Functions

| POSITION | NAME | TYPE | DESCRIPTION |
|---|---|---|---|
| 1, 8 | $R_G$ | Analog output | By default, there is no connection to $R_G$, and gain is set to 10. When two $R_G$ pins are shorted together, gain is set to 100. Additionally, a resistor can be connected between two $R_G$ pins to set gain. For more information, see the GAIN SELECTION section. |
| 2 | −IN | Analog input | Signal negative input |
| 3 | +IN | Analog input | Signal positive input |
| 4 | $-V_S$ | Power supply | Negative power supply |
| 5 | REF | Analog input | Output reference voltage input |
| 6 | OUTPUT | Analog output | Output |
| 7 | $+V_S$ | Power supply | Positive power supply |

# 5. SPECIFICATIONS

## 5.1 ABSOLUTE MAXIMUM RATINGS

Table 4 lists the absolute maximum ratings of the INA201/2.

Table 4. Absolute Maximum Ratings

| PARAMETER | DESCRIPTION | MIN | MAX | UNITS |
|---|---|---|---|---|
| Voltage | Supply | | ±20 | V |
| | Input voltage | $-V_S$ – 0.3 | $+V_S$ + 0.3 | V |
| Current | Any pin except power supply | –10 | +10 | mA |
| Output Short-Circuit Duration | | Indefinite | | |
| Temperature | Operating, $T_A$, INA201 | –40 | 85 | °C |
| | Operating, $T_A$, INA202 | –55 | 125 | |
| | Storage, $T_{stg}$, Q | –65 | 150 | |
| | Soldering, 10s | | 300 | |

Note 1: Stresses beyond those listed under Table 4 may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Table 6. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## 5.2 ESD RATINGS

Table 5 lists the ESD ratings of the INA201/2.

Table 5. ESD Ratings

| PARAMETER | SYMBOL | DESCRIPTION | VALUE | UNITS |
|---|---|---|---|---|
| Electrostatic Discharge | $V_{(ESD)}$ | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1), all pins except –IN and +IN | ±2000 | V |
| | | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1), –IN and +IN pin | ±2500 | |
| | | Charged-device model (CDM), per JEDEC specification JESD22-C101(2) | ±2000 | |

Note 1: The JEDEC document JEP155 indicates that 500V HBM allows safe manufacturing with a standard ESD control process.
Note 2: The JEDEC document JEP157 indicates that 250V CDM allows safe manufacturing with a standard ESD control process.

## 5.3 RECOMMENDED OPERATING CONDITIONS

Table 6 lists the recommended operating conditions for the INA201/2.

Table 6. Recommended Operating Conditions

| PARAMETER | DESCRIPTION | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|
| Operating Voltage Range | Split supply | ±2 | ±18 | ±19 | V |
| | Single supply | 4 | 36 | 38 | V |
| Specified Temperature Range | INA201 | –40 | | 85 | °C |
| | INA202 | –55 | | 125 | °C |

## 5.4 THERMAL INFORMATION

Table 7 lists the thermal information for the INA201/2.

Table 7. Thermal Information

| PARAMETER | SYMBOL | SOIC-8 | UNITS |
|---|---|---|---|
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ | 90.6 | °C/W |
| Junction-to-Board Thermal Resistance | $R_{\theta JB}$ | 47.6 | °C/W |
| Junction-to-Top Characterization Parameter | $\psi_{JT}$ | 3.6 | °C/W |
| Junction-to-Board Characterization Parameter | $\psi_{JB}$ | 47 | °C/W |
| Junction-to-Case (Top) Thermal Resistance | $R_{\theta JC(top)}$ | 35 | °C/W |

## 5.5 ELECTRICAL CHARACTERISTICS

Table 8 lists the electrical characteristics of INA201/2 (gain = 10/100). Typical at 25°C, $V_S$ = ±18V, and $R_L$ = 2kΩ, unless otherwise noted.

Table 8. Electrical Characteristics

| PARAMETER | CONDITIONS | Gain = 10 | | | Gain = 100 | | | UNITS |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| GAIN | | | | | | | | |
| Gain Error | $V_{OUT}$ = ±10V | | | 0.04 | | | 0.15 | % |
| Nonlinearity | $V_{OUT}$ = –10V to +10V, $R_L$ = 2kΩ | | 3 | | | 10 | | ppm of FS |
| Gain vs. Temperature | | | ±2 | ±3 | | ±25 | ±30 | ppm/°C |
| TOTAL VOLTAGE OFFSET | | | | | | | | |
| Offset (RTI) | | | ±3 | ±18 | | ±2 | ±15 | µV |
| | $V_S$ = ±2V to ±18V, overtemperature | | | ±62 | | | ±21 | µV |
| | $V_S$ = ±2V to ±18V, average TC | | 0.03 | | | 0.02 | | µV/°C |
| Offset Referred to The Input vs. Supply (PSR)(1) | $V_S$ = ±2V to ±20V | 125 | 140 | | 130 | 148 | | dB |
| TOTAL NOISE | | | | | | | | |
| Voltage Noise (RTI) | 1kHz | | 18 | | | 15 | | nV/√Hz |
| | 0.1Hz to 10Hz | | 0.65 | | | 0.52 | | $\mu V_{PP}$ |
| Current Noise | f = 1kHz | | 346 | | | 346 | | fA/√Hz |
| | 0.1Hz to 10Hz | | 10 | | | 15 | | $pAV_{PP}$ |
| INPUT CURRENT | | | | | | | | |
| Input Bias Current | | | 0.5 | 2 | | 0.5 | 2 | nA |
| | INA201, overtemperature | | | 2.5 | | | 2.5 | nA |
| | INA202, overtemperature | | | 7 | | | 7 | nA |
| | INA201, average TC | | 5 | | | 5 | | pA/°C |
| | INA202, average TC | | 20 | | | 20 | | pA/°C |
| Input Offset Current | | | 0.3 | 1.5 | | 0.3 | 1.5 | nA |
| | overtemperature | | | 3.5 | | | 3.5 | nA |
| | INA201, average TC | | 10 | | | 10 | | pA/°C |
| | INA202, average TC | | 8 | | | 8 | | pA/°C |
| INPUT | | | | | | | | |
| Input Impedance | Differential | | 34 \|\| 5 | | | 34 \|\| 5 | | GΩ \|\| pF |
| | Common-Mode | | 34 \|\| 6 | | | 34 \|\| 6 | | GΩ \|\| pF |
| Input Voltage Range(2) | $V_S$ = ±2V to ±19V | $-V_S$ + 0.1 | | $+V_S$ – 2 | $-V_S$ + 0.1 | | $+V_S$ – 2 | V |
| Common-Mode Rejection Ratio DC | $V_{CM}$ = ($-V_S$ + 0.1) to ($+V_S$ – 2) | 115 | 130 | | 134 | 150 | | dB |
| OUTPUT | | | | | | | | |
| Output Swing | $R_L$ = 10kΩ, $V_S$ = ±2V to ±19V, overtemperature | $-V_S$ + 0.2 | | $+V_S$ – 0.2 | $-V_S$ + 0.2 | | $+V_S$ – 0.2 | V |
| Short Circuit Current | | | ±23 | | | ±23 | | mA |

| PARAMETER | CONDITIONS | Gain = 10 | | | Gain = 100 | | | UNITS |
|---|---|---|---|---|---|---|---|---|
| DYNAMIC RESPONSE | | | | | | | | |
| Small Signal, –3dB Bandwidth | | | 256 | | | 66 | | kHz |
| Slew Rate | | | 1.5 | | | 1.5 | | V/µs |
| Settling Time to 0.01%, 10V Step | | | 60 | | | 360 | | µs |
| REFERENCE INPUT | | | | | | | | |
| $R_{IN}$ | | | 80 | | | 80 | | kΩ |
| Voltage Range | | $-V_S$ | | $+V_S$ | $-V_S$ | | $+V_S$ | V |
| Gain to Output Error | | | 0.02 | | | 0.02 | | ppm |
| POWER SUPPLY | | | | | | | | |
| Operating Range | | ±2 | | ±19 | ±2 | | ±19 | V |
| Quiescent Current | $V_S$ = ±2V to ±19V | | 1.5 | 1.8 | | 1.5 | 1.8 | mA |
| | $V_S$ = ±2V to ±19V, overtemperature | | | 1.9 | | | 1.9 | mA |
| TEMPERATURE RANGE | | | | | | | | |
| For Specified Performance | INA201 | –40 | | +85 | –40 | | +85 | °C |
| | INA202 | –55 | | +125 | –55 | | +125 | |

Note 1: This is defined as the supply range over which PSRR is defined.
Note 2: Input Voltage Range = CMV + (Gain × $V_{DIFF}$).

# 6. TYPICAL CHARACTERISTICS

Typical at 25°C, $V_S$ = ±18V, and $R_L$ = 2kΩ, unless otherwise noted.

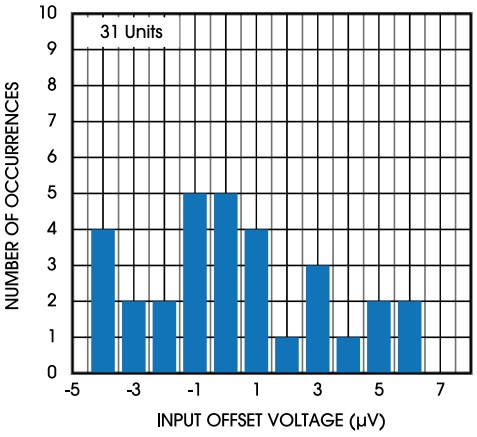



Figure 2. Typical Distribution of Input Offset Voltage

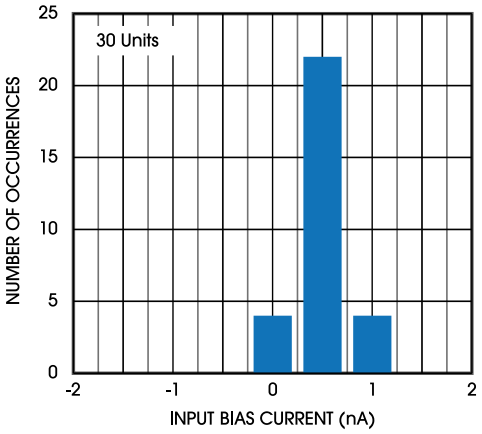



Figure 3. Typical Distribution of Input Bias Current

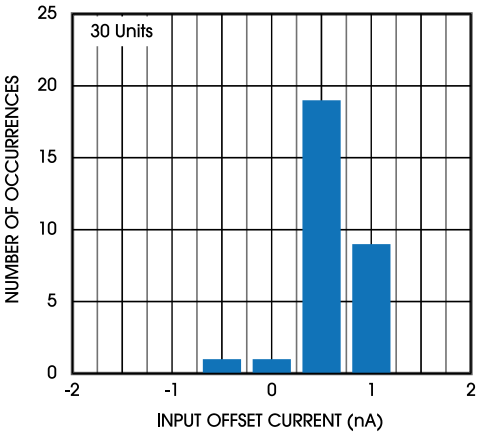



Figure 4. Typical Distribution of Input Offset Current

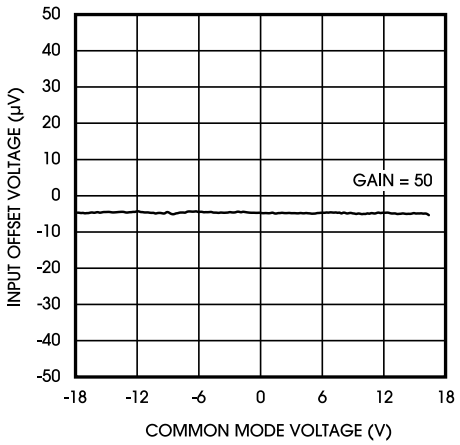



Figure 5. Input Offset Voltage vs. Common Mode Voltage

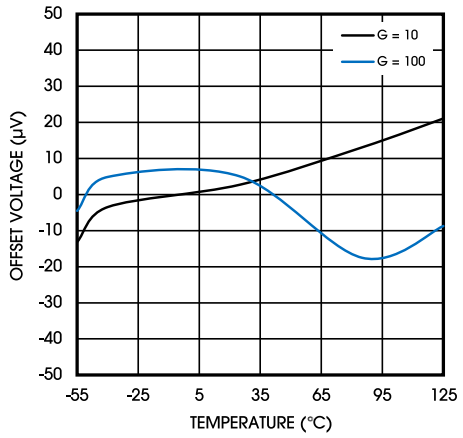



Figure 6. Input Offset Voltage vs. Temperature

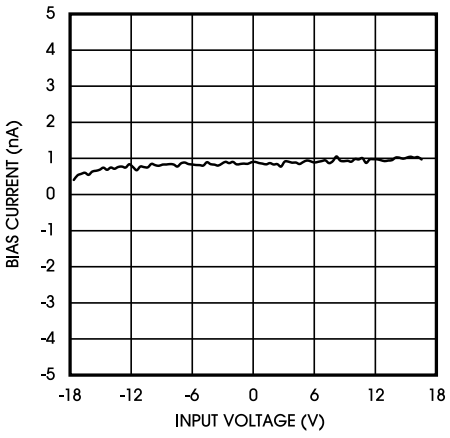



Figure 7. Input Bias Current vs. Common Mode Voltage (25°C)

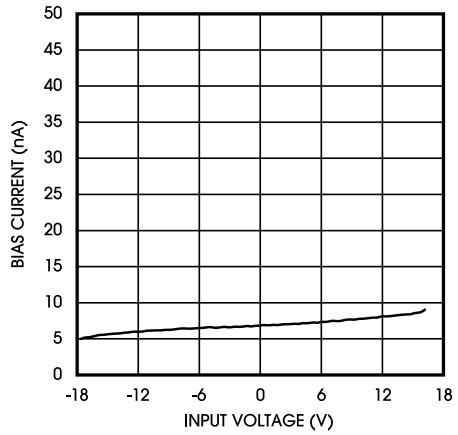



Figure 8. Input Bias Current vs. Common Mode Voltage (125°C)

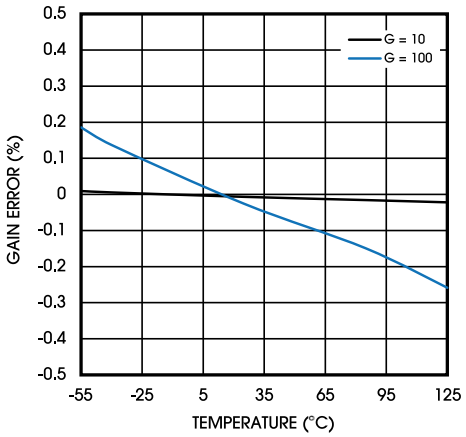



Figure 9. Gain vs. Temperature

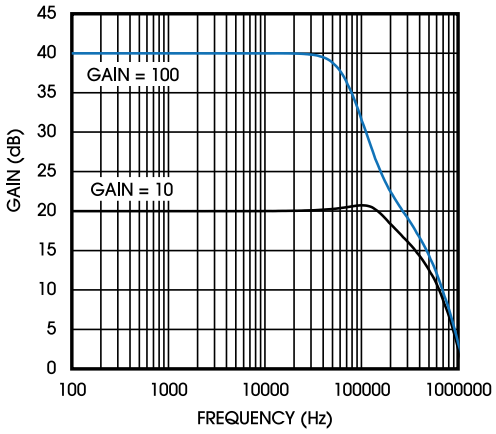



Figure 10. Gain vs. Frequency

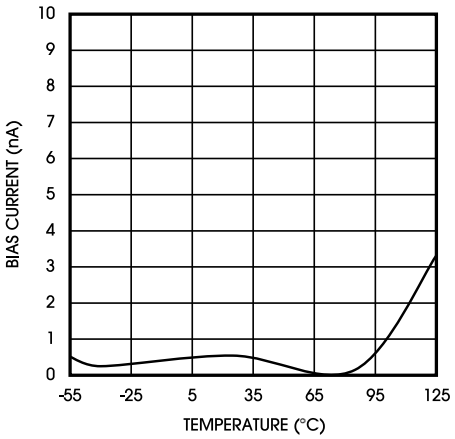



Figure 11. Bias Current vs. Temperature

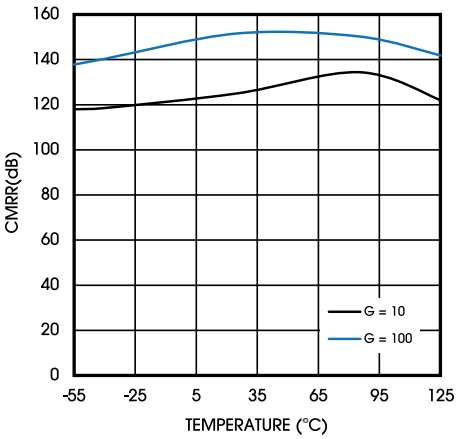



Figure 12. CMRR vs. Temperature

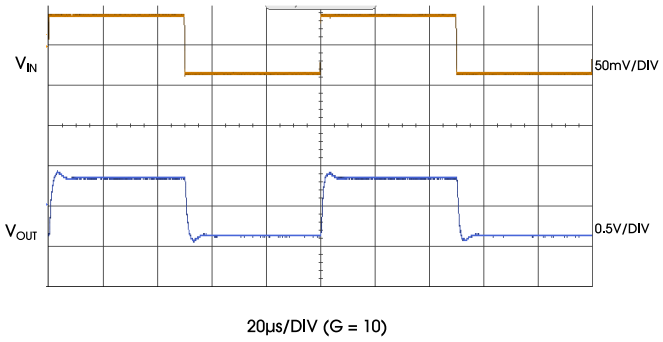



Figure 13. Large Signal Response (G = 10)

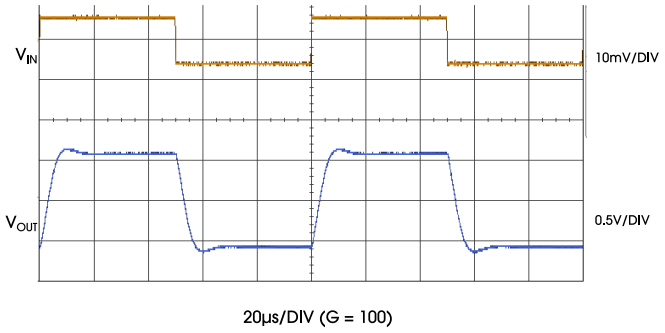



Figure 14. Large Signal Response (G = 100)

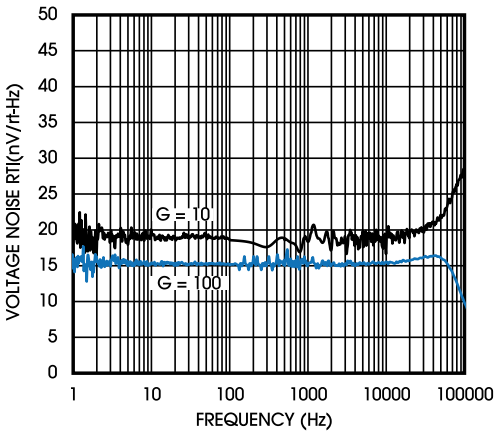



Figure 15. Input Voltage Noise Density

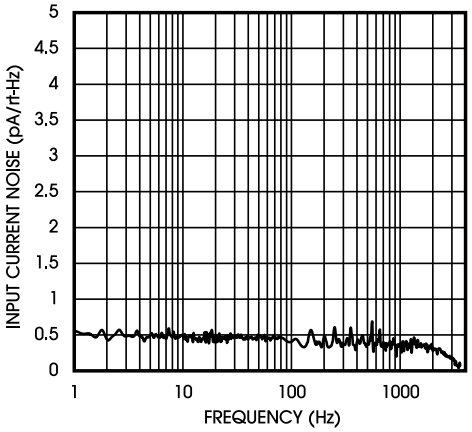



Figure 16. Input Current Noise Density

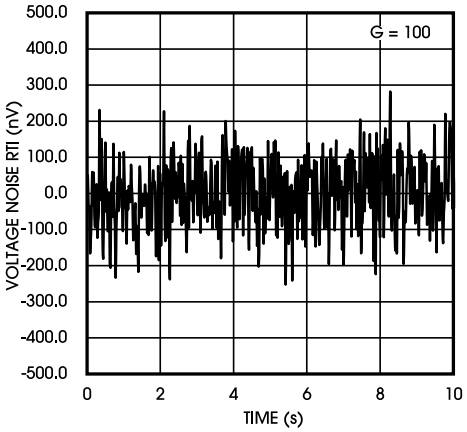



Figure 17. 0.1Hz to 10Hz RTI Voltage Noise

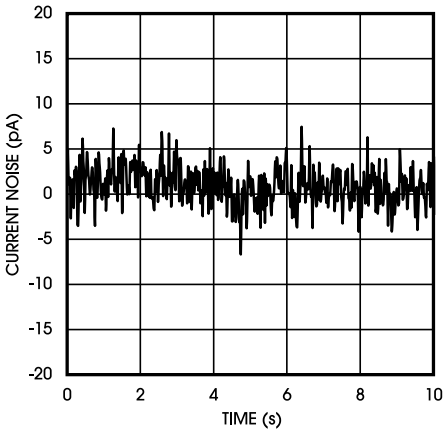



Figure 18. 0.1Hz to 10Hz RTI Current Noise

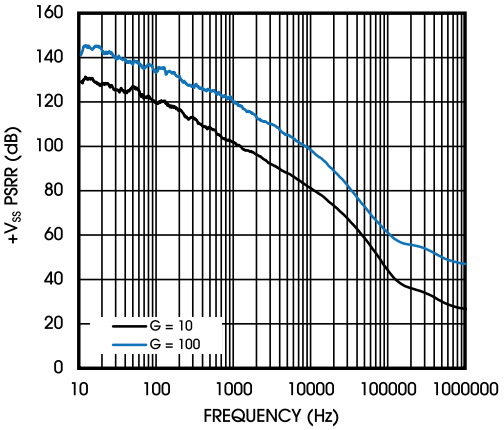



Figure 19. Positive PSR vs. Frequency

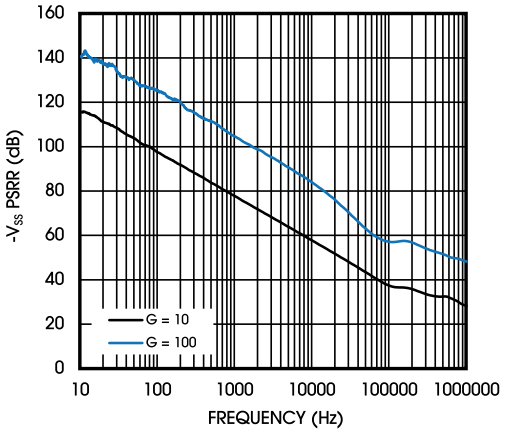



Figure 20. Negative PSR vs. Frequency

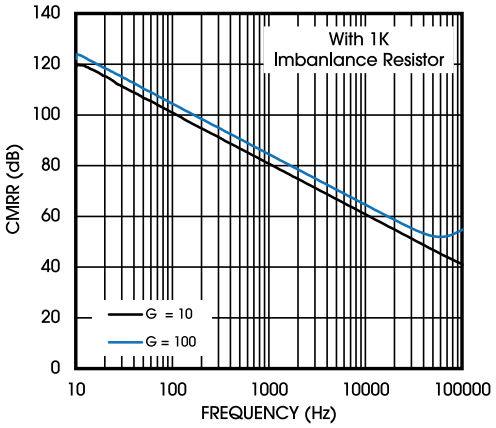



Figure 21. Imbalance CMRR vs. Frequency

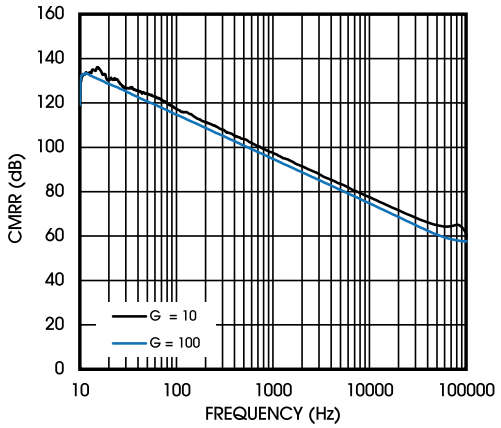



Figure 22. CMRR vs. Frequency

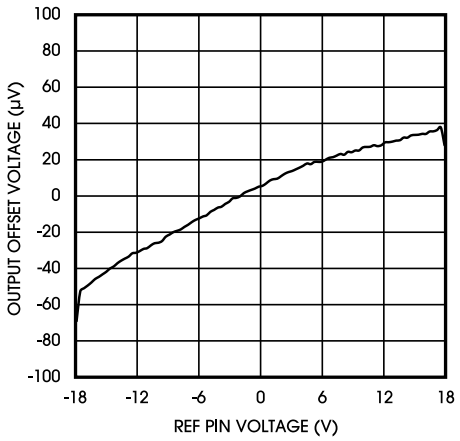



Figure 23. Reference Voltage vs. Output Offset Voltage

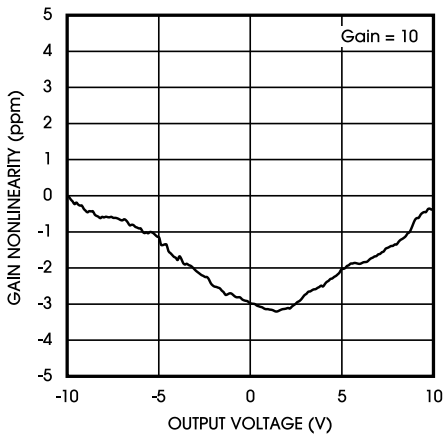



Figure 24. Gain Nonlinearity (G = 10)

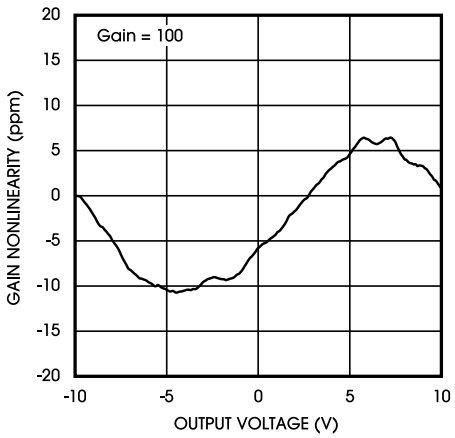



Figure 25. Gain Nonlinearity (G = 100)

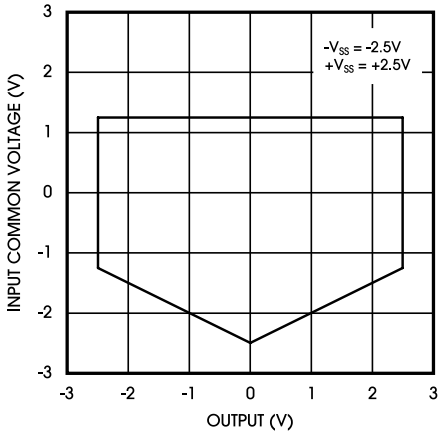



Figure 26. Input Common-Mode Range vs. Output Voltage

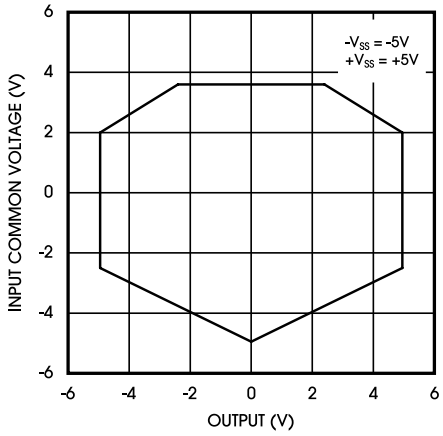



Figure 27. Input Common-Mode Range vs. Output Voltage

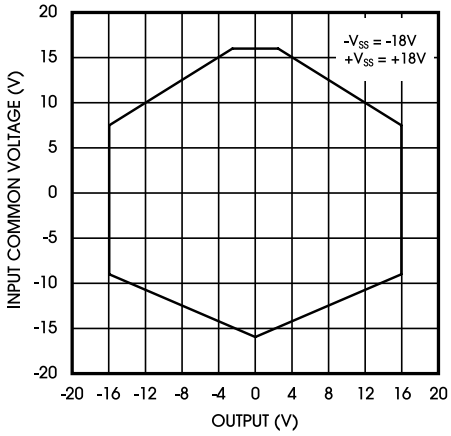



Figure 28. Input Common-Mode Range vs. Output Voltage

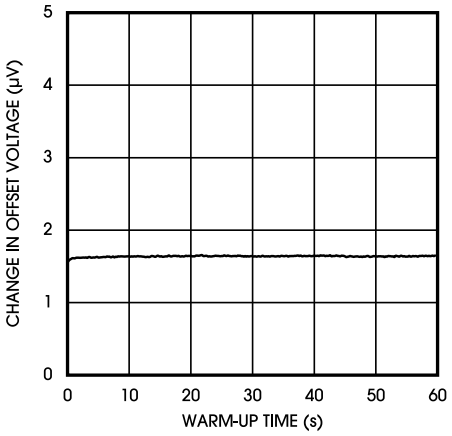



Figure 29. Warm-Up Time

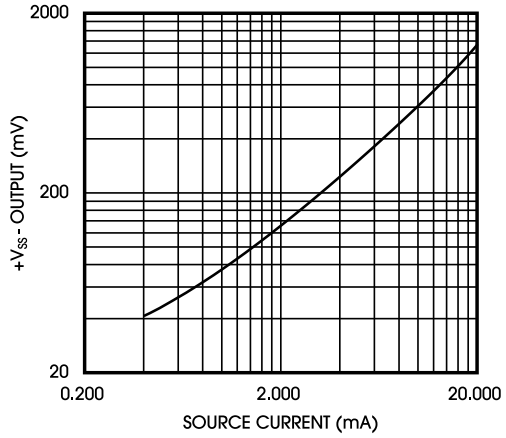



Figure 30. $V_{OH}$ vs. Source Current

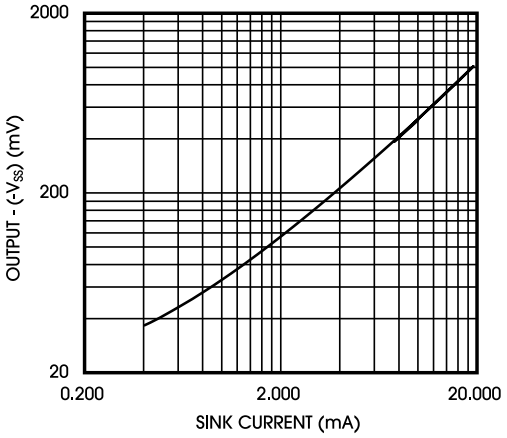



Figure 31. $V_{OL}$ vs. Sink current

# 7. 详细说明

## 7.1 概述

INA201/2 是一款基于经典三运放电路改进的单片仪表放大器。芯片的精心布局，特别注意对称性，建立了关键组件的紧密匹配和跟踪，从而以低廉的价格保持了该电路固有的高性能。

片上增益电阻器针对 10 和 100 的增益进行了预调整。INA201/2 的增益预设为 10。只需一个外部跳线(引脚 1 和 8 之间)即可选择 100 的增益。特殊设计技术确保低增益 TC。

## 7.2 功能模块框图

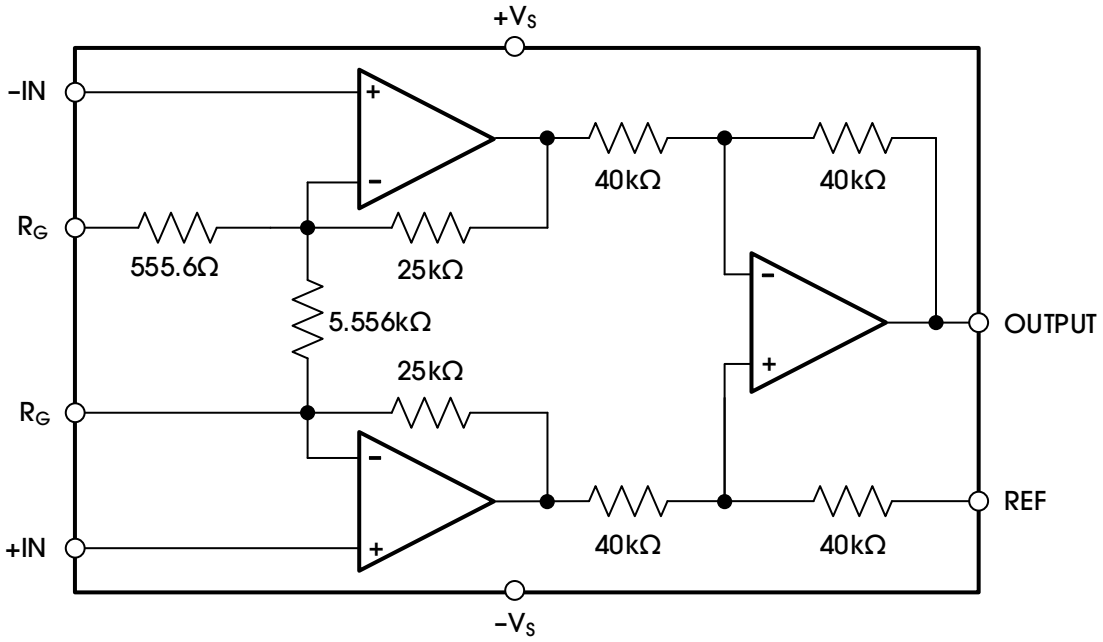



Figure 32. Functional Block Diagram

# 7.3 特性描述

## 7.3.1 输入和输出失调电压

INA201/2 完全针对增益为 10 和 100 时的总输入误差进行了规定。也就是说，INA201/2 内所有误差源的影响都包含在保证的输入误差规格中，无需单独进行误差计算。

$$\text{Total Error RTI} = \text{Input Error} + (\text{Output Error} / G) \quad (1)$$

$$\text{Total Error RTO} = (\text{Input Error} \times G) + \text{Output Error} \quad (2)$$

## 7.3.2 参考终端

虽然通常接地，但参考端子可用于偏移 INA201/2 的输出。当负载“浮动”或不与系统的其余部分共享接地时，这很有用。它还提供了一种注入精确偏移量的直接方法。

使用参考端子的另一个好处是它可以非常有效地消除电路或系统中的接地环路和噪声。

## 7.3.3 输入过载注意事项

传感器故障、输入线路故障或电源时序可能使仪表放大器的输入电压超出其线性范围，甚至超出电源电压，因此放大器必须能够处理这些过载而不会受到影响损坏的。

INA201/2 的输入过载能力可以很容易地增加，同时仅略微降低器件的噪声、共模抑制和失调漂移，方法是添加与放大器输入串联的外部电阻器，如 Figure 33 所示。

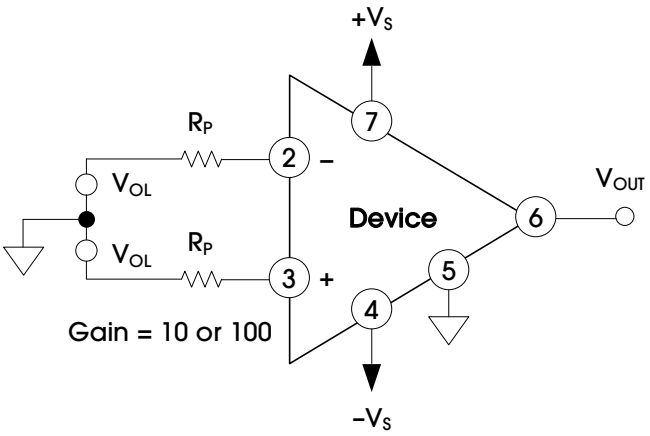



Figure 33. Input Overload Protection

### 7.3.4 增益选择

INA201/2 具有精确的低温度系数(TC)，增益为 10 和 100。INA201/2 的增益标称设置为 10；只需在引脚 1 和 8 之间连接一个跳线，即可轻松将其更改为 100 的增益。

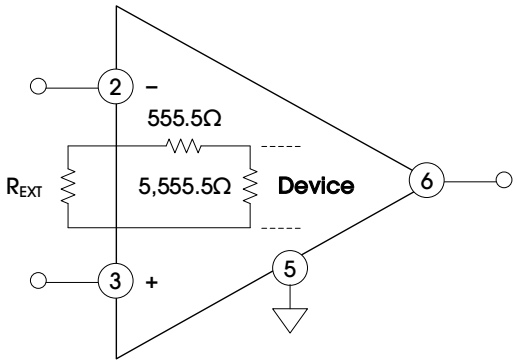



Figure 34. Programming the INA201/2 for Gains Between 10 and 100

如 Figure 34 所示，通过在引脚 1 和 8 之间连接一个外部电阻器，可以将器件编程为 10 到 100 之间的任何增益。请注意，添加外部电阻器会降低增益精度和增益 TC。由于 INA201/2 的增益方程产生：

$$G = 1 + \frac{9(R_X + 6{,}111.111)}{(R_X + 555.555)} \quad (3)$$

对于增益在 10 到 100 之间的外部电阻的标称值，这可以解决：

$$R_X = \frac{(G - 1)555.555 - 55{,}000}{10 - G} \quad (4)$$

Table 9 给出了几种常见增益的实用 1%电阻值。

Table 9. Practical 1% External Resistor Values for Gains Between 10 and 100

| DESIRED GAIN | RECOMMENDED 1% RESISTOR VALUE |
|---|---|
| 10 | ∞ (pins 1 and 8 open) |
| 20 | 4.42kΩ |
| 50 | 698Ω |
| 100 | 0 (pins 1 and 8 shorted) |

### 7.3.5 共模抑制

INA201/2 等仪表放大器提供高 CMR，这是衡量两个输入等量变化时输出电压变化的指标。这些规格通常针对全范围输入电压变化和指定的源不平衡给出。

为获得最佳 CMR，参考端子应连接到低阻抗点，并且两个输入之间的电容和电阻差异应保持在最小值。在许多应用中，屏蔽电缆用于最大限度地减少噪声，并且为了在频率范围内获得最佳 CMR，应正确驱动屏蔽层。Figure 35 和 Figure 36 显示了有源数据保护，它们配置为通过“自举”输入电缆屏蔽的电容来提高交流共模抑制，从而最大限度地减少输入之间的电容失配。

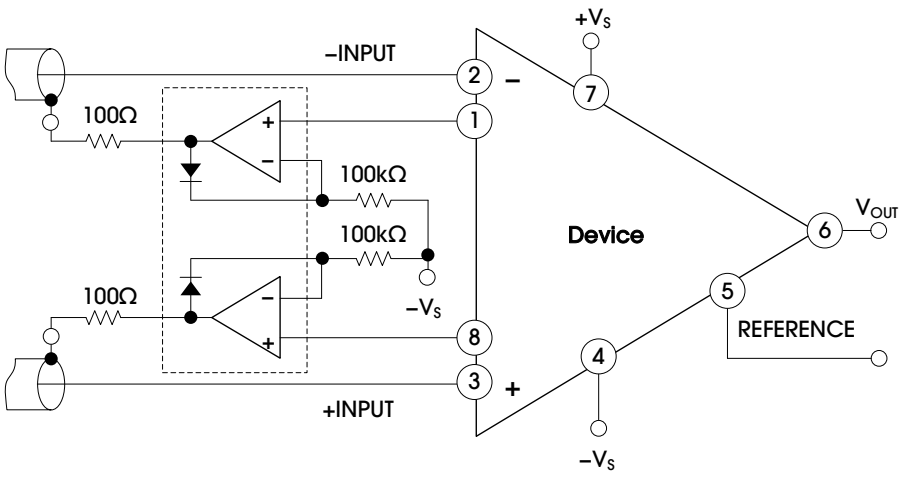



Figure 35. Differential Shield Driver, G = 10

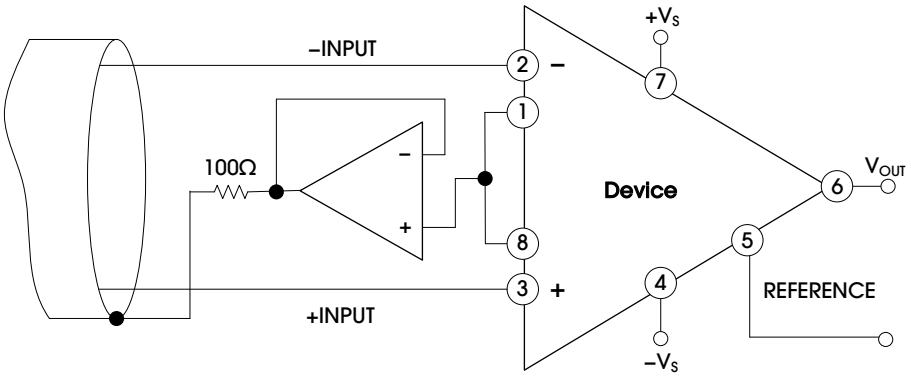



Figure 36. Common-Mode Shield Driver, G = 100

### 7.3.6 输入偏置电流的接地回路

输入偏置电流是偏置放大器输入晶体管所必需的电流。这些电流必须有直接返回路径；因此，当放大变压器或交流耦合源等“浮动”输入源时，每个输入到地之间必须有一条直流路径，如 Figure 37 至 Figure 39 所示。

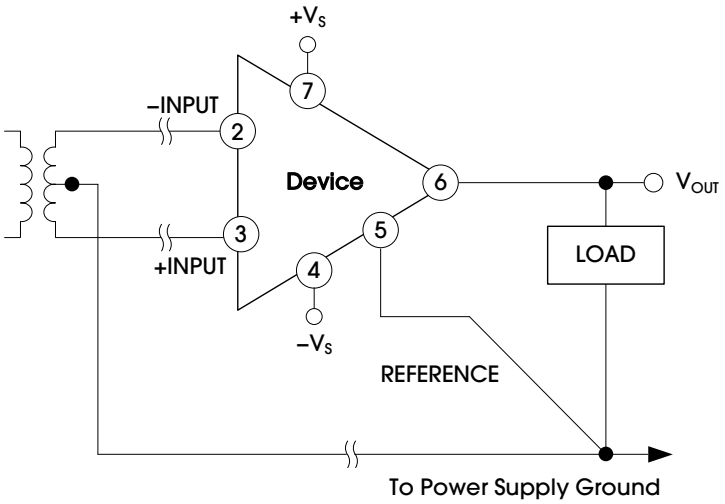



Figure 37. Ground Returns for Bias Currents when Using Transformer Input Coupling

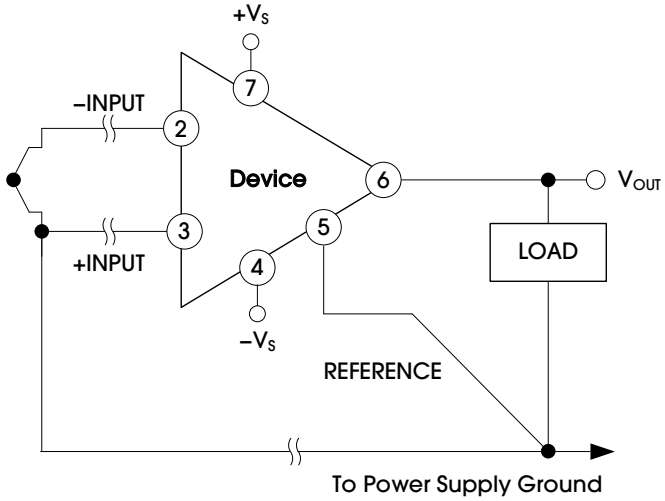



Figure 38. Ground Returns for Bias Currents when Using A Thermocouple Input

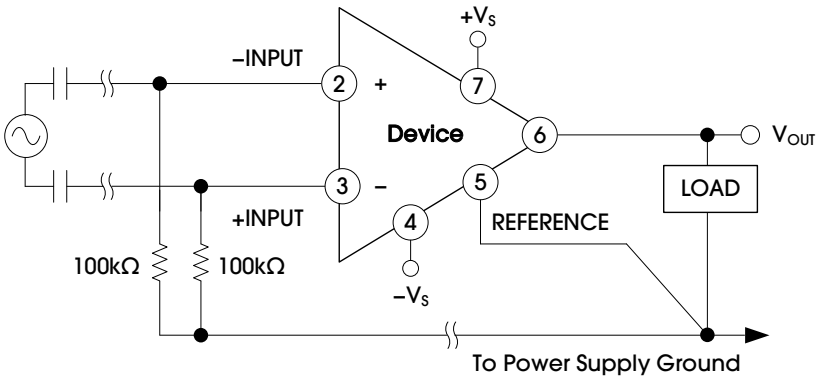



Figure 39. Ground Returns for Bias Currents when Using AC Input Coupling

# 8. PACKAGE INFORMATION

The INA201/2 is available in the SOIC-8 package. Figure 40 shows the package view.

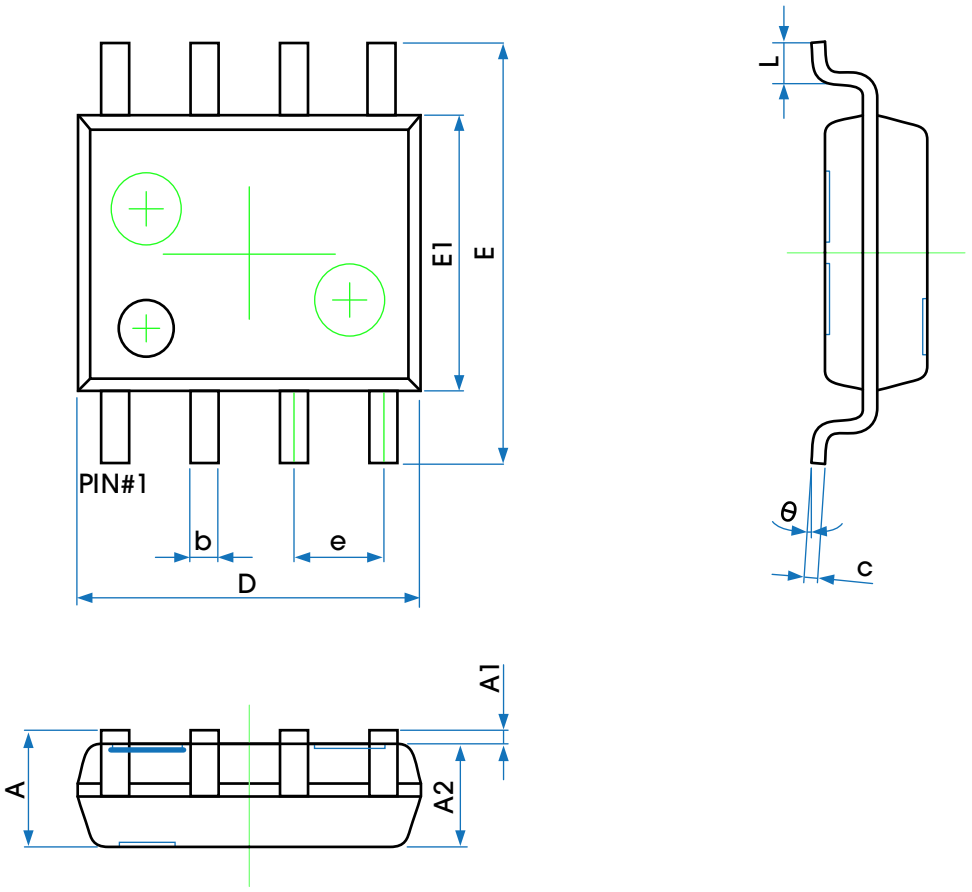



Figure 40. Package View

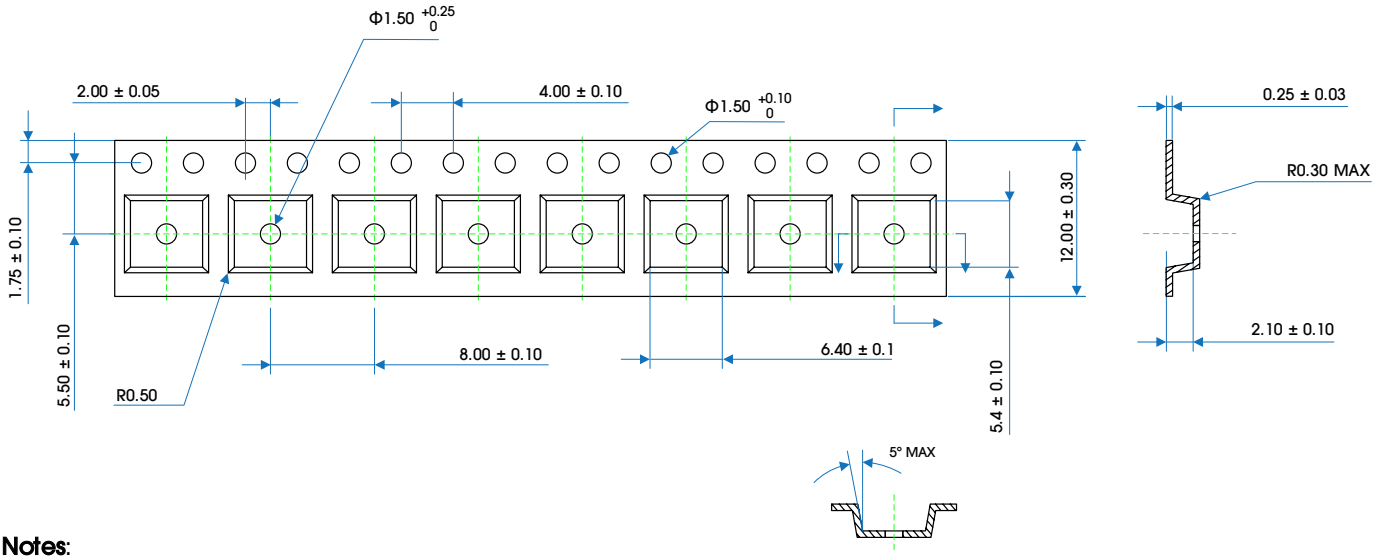
Table 10 provides detailed information about the dimensions.

Table 10. Dimensions

| 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 | 4.700 | 5.100 | 0.185 | 0.201 |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

# 9. TAPE AND REEL INFORMATION

Figure 41 illustrates the carrier tape.




**Notes:**
1. Cover tape width: 9.5 ± 0.10.
2. Cumulative tolerance of 10 sprocket hole pitch: ±0.20 (max).
3. Camber: not to exceed 1mm in 100mm.
4. Mold#: SOIC-8.
5. All dimensions: mm.
6. Direction of view:

Figure 41. Carrier Tape Drawing

Table 11 provides information about tape and reel.

Table 11. Tape and Reel Information

| PACKAGE TYPE | REEL | QTY/REEL | REEL/ INNER BOX | INNER BOX/ CARTON | QTY/CARTON | INNER BOX SIZE (MM) | CARTON SIZE (MM) |
|---|---|---|---|---|---|---|---|
| SOIC-8 | 13'' | 4000 | 1 | 8 | 32000 | 358*340*50 | 430*380*390 |

Figure 42 shows the product loading orientation—pin 1 is assigned at Q1.

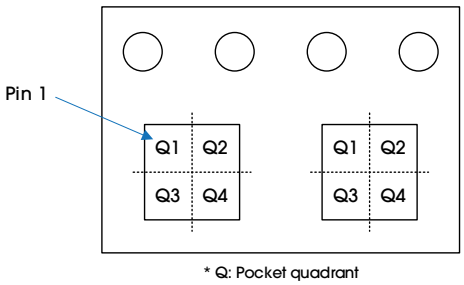



Figure 42. Product Loading Orientation

# REVISION HISTORY

| REVISION | DATE | DESCRIPTION |
|---|---|---|
| Rev A | 11 April 2023 | Rev A release. |