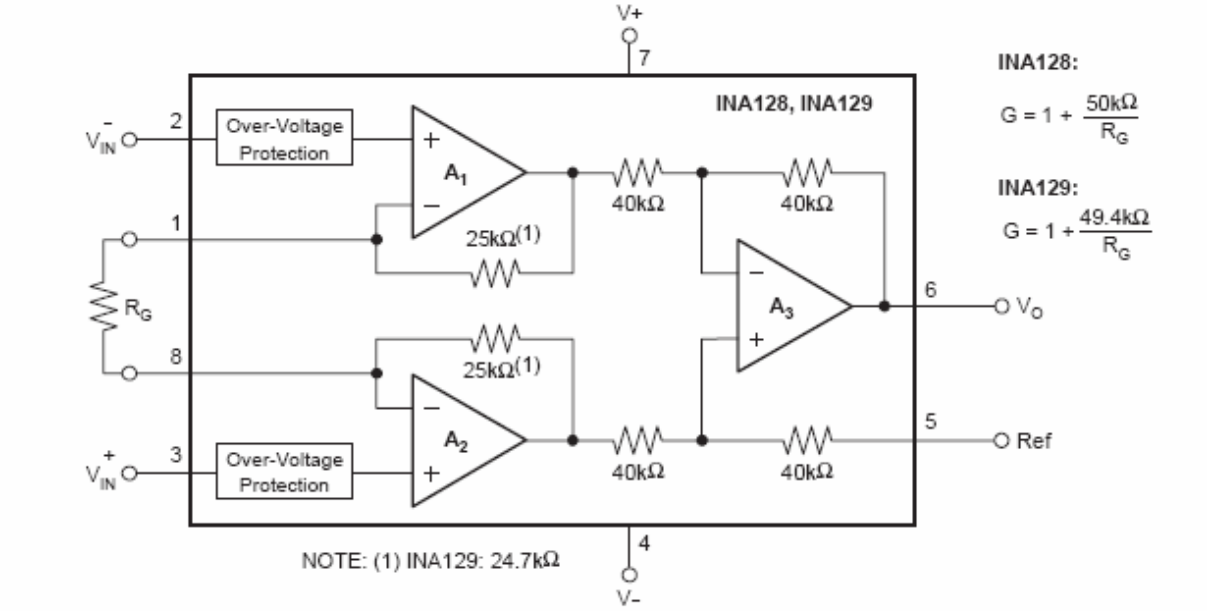


## ELECTRICAL CHARACTERISTICS (continued)

At $T_A$ = +25°C, $V_S$ = ±15V, $R_L$ = 10kΩ, unless otherwise noted.

| PARAMETER | CONDITIONS | INA128P, U INA129P, U | | | INA128PA, UA INA129PA, UA | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| **OUTPUT** | | | | | | | | |
| Voltage: Positive | $R_L$ = 10kΩ | (V+) – 1.4 | (V+) – 0.9 | | * | * | | V |
| Negative | $R_L$ = 10kΩ | (V–) + 1.4 | (V–) + 0.8 | | * | * | | V |
| Load Capacitance Stability | | | 1000 | | | * | | pF |
| Short-Circuit Current | | | +6/–15 | | | * | | mA |
| **FREQUENCY RESPONSE** | | | | | | | | |
| Bandwidth, –3dB | G = 1 | | 1.3 | | | * | | MHz |
| | G = 10 | | 700 | | | * | | kHz |
| | G = 100 | | 200 | | | * | | kHz |
| | G = 1000 | | 20 | | | * | | kHz |
| Slew Rate | $V_O$ = ±10V, G = 10 | | 4 | | | * | | V/µs |
| Settling Time, 0.01% | G = 1 | | 7 | | | * | | µs |
| | G = 10 | | 7 | | | * | | µs |
| | G = 100 | | 9 | | | * | | µs |
| | G = 1000 | | 80 | | | * | | µs |
| Overload Recovery | 50% Overdrive | | 4 | | | * | | µs |
| **POWER SUPPLY** | | | | | | | | |
| Voltage Range | | ±2.25 | ±15 | ±18 | * | * | * | V |
| Current, Total | $V_{IN}$ = 0V | | ±700 | ±750 | | * | * | µA |
| **TEMPERATURE RANGE** | | | | | | | | |
| Specification | | –40 | | +85 | * | | * | °C |
| Operating | | –40 | | +125 | * | | * | °C |
| $\theta_{JA}$ 8-Pin DIP | | | 80 | | | * | | °C/W |
| SO-8 SOIC | | | 150 | | | * | | °C/W |

NOTE: * Specification is same as INA128P, U or INA129P, U.

(1) Input common-mode range varies with output voltage — see typical curves.

(2) Specified by wafer test.

(3) Temperature coefficient of the 50kΩ (or 49.4kΩ) term in the gain equation.

(4) Nonlinearity measurements in G = 1000 are dominated by noise. Typical nonlinearity is ±0.001%.

## ELECTRICAL CHARACTERISTICS

At $T_A$ = +25°C, $V_S$ = ±15V, $R_L$ = 10kΩ unless otherwise noted.

| PARAMETER | CONDITIONS | INA128P, U INA129P, U | | | INA128PA, UA INA129PA, UA | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| **INPUT** | | | | | | | | |
| Offset Voltage, RTI | | | | | | | | |
| Initial | $T_A$ = +25°C | | ±10±100/G | ±50±500/G | | ±25±100/G | ±125±1000/G | µV |
| vs Temperature | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | ±0.2±2/G | ±0.5±20/G | | ±0.2±5/G | ±1±20/G | µV/°C |
| vs Power Supply | $V_S$ = ±2.25V to ±18V | | ±0.2±20/G | ±1±100/G | | * | ±2±200/G | µV/V |
| Long-Term Stability | | | ±0.1±3/G | | | * | | µV/mo |
| Impedance, Differential | | | $10^{10}$ \|\| 2 | | | * | | Ω \|\| pF |
| Common-Mode | | | $10^{11}$ \|\| 9 | | | * | | Ω \|\| pF |
| Common-Mode Voltage Range(1) | $V_O$ = 0V | (V+) − 2 | (V+) − 1.4 | | * | * | | V |
| | | (V−) + 2 | (V−) + 1.7 | | * | * | | V |
| Safe Input Voltage | | | | ±40 | | | * | V |
| Common-Mode Rejection | $V_{CM}$ = ±13V, $\Delta R_S$ = 1kΩ | | | | | | | |
| | G = 1 | 80 | 86 | | 73 | * | | dB |
| | G = 10 | 100 | 106 | | 93 | * | | dB |
| | G = 100 | 120 | 125 | | 110 | * | | dB |
| | G = 1000 | 120 | 130 | | 110 | * | | dB |
| **BIAS CURRENT** | | | ±2 | ±5 | | * | ±10 | nA |
| vs Temperature | | | ±30 | | | * | | pA/°C |
| Offset Current | | | ±1 | ±5 | | * | ±10 | nA |
| vs Temperature | | | ±30 | | | * | | pA/°C |
| **NOISE VOLTAGE, RTI** | G = 1000, $R_S$ = 0Ω | | | | | | | |
| f = 10Hz | | | 10 | | | * | | nV/√Hz |
| f = 100Hz | | | 8 | | | * | | nV/√Hz |
| f = 1kHz | | | 8 | | | * | | nV/√Hz |
| $f_B$ = 0.1Hz to 10Hz | | | 0.2 | | | * | | $\mu V_{PP}$ |
| Noise Current | | | | | | | | |
| f = 10Hz | | | 0.9 | | | * | | pA/√Hz |
| f = 1kHz | | | 0.3 | | | * | | pA/√Hz |
| $f_B$ = 0.1Hz to 10Hz | | | 30 | | | * | | $pA_{PP}$ |
| **GAIN** | | | | | | | | |
| Gain Equation, INA128 | | | 1 + (50kΩ/$R_G$) | | | * | | V/V |
| INA129 | | | 1 + (49.4kΩ/$R_G$) | | | * | | V/V |
| Range of Gain | | 1 | | 10000 | * | | * | V/V |
| Gain Error | G = 1 | | ±0.01 | ±0.024 | | * | ±0.1 | % |
| | G = 10 | | ±0.02 | ±0.4 | | * | ±0.5 | % |
| | G = 100 | | ±0.05 | ±0.5 | | * | ±0.7 | % |
| | G = 1000 | | ±0.5 | ±1 | | * | ±2 | % |
| Gain vs Temperature(2) | G = 1 | | ±1 | ±10 | | * | * | ppm/°C |
| 50kΩ (or 49.4kΩ) Resistance(2)(3) | | | ±25 | ±100 | | * | * | ppm/°C |
| Nonlinearity | $V_O$ = ±13.5V, G = 1 | | ±0.0001 | ±0.001 | | * | ±0.002 | % of FSR |
| | G = 10 | | ±0.0003 | ±0.002 | | * | ±0.004 | % of FSR |
| | G = 100 | | ±0.0005 | ±0.002 | | * | ±0.004 | % of FSR |
| | G = 1000 | | ±0.001 | (4) | | * | * | % of FSR |

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