
Figure 1. Photo of AD202KNATI

## FEATURES

- Isolated Power Outputs
- Small Size: 4 Channels/Inch Low
- Uncommitted Input Amplifier
- High CMR: 130dB (Gain = 100V/V)
- High Accuracy: ±0.01% Max Nonlinearity
- High CMV Isolation: ±2000V Continuous

## APPLICATIONS

It can be applied for multichannel data acquisition, current shunt measurements motor controls, process signal isolation, high voltage instrumentation amplifier, etc.

## DESCRIPTION

**Upgraded Drop-in Replacement for AD202KN**

**We guarantee production for ≥10 years.**

The AD202KNATI is a high voltage isolation amplifier designed for multiple applications where input signals are measured, processed, or transmitted without a galvanic connection. These isolation amplifiers in DIP package offer a signal and power isolation function.

With internal transformer-coupling, the AD202KNATI provides total galvanic isolation between the input and output stages of the isolation amplifier. These amplifiers eliminate the need for an external DC-DC converter, which allows the designer to minimize the necessary circuit overhead, thus reducing the overall design and component costs.

The AD202KNATI is powered directly from a 15V DC power supply, featuring small size, high accuracy, low power, wide bandwidth, excellent performance, flexible input, isolated power, etc.

## INSIDE THE AD202KNATI

The AD202KNATI uses an amplitude modulation technique to permit transformer coupling of signals down to dc (Figure 2). It also contains an uncommitted input op amp and a power transformer that provides isolated power to the op amp, the modulator, and any external load. The power transformer primary is driven by a 20kHz, $15V_{P-P}$ square wave generated internally.

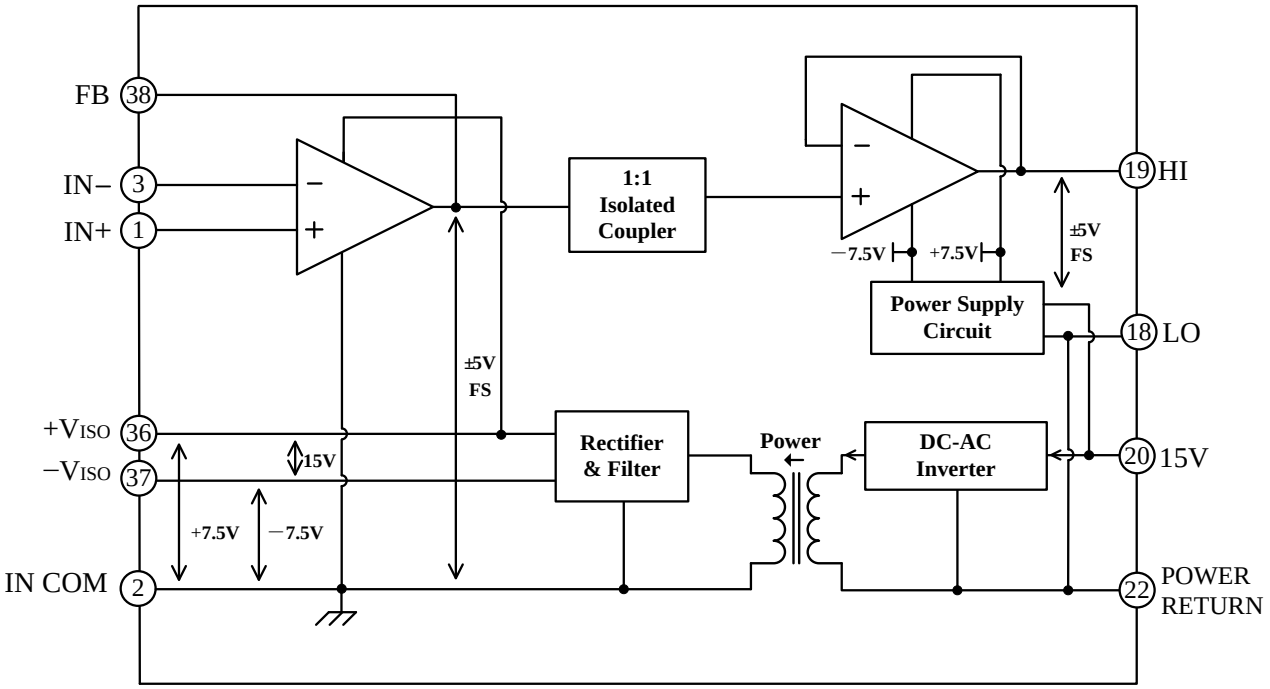


Figure 2. AD202KNATI Functional Block Diagram


 

## SPECIFICATIONS

Table 1. Electrical characteristics. (Typical @ 25 ℃ and $V_S$ = 15V unless otherwise noted.)

| Model | AD202KNATI |
|---|---|
| GAIN | |
| Range | 1V/V–100 V/V |
| Error | ±0.5% typ (±4% max) |
| vs. Temperature | ±20ppm/ ℃ typ (±45ppm/ ℃ max) |
| vs. Time | ±50 ppm/1000 Hours |
| vs. Supply Voltage | ±0.01%/V |
| Nonlinearity (G = 1V/V) | ±0.01 max |
| Nonlinearity vs. Isolated Supply Load | ±0.0015%/mA |
| INPUT VOLTAGE RATINGS | |
| Input Voltage Range | ±5V |
| Max Isolation Voltage (Input to Output) | |
| AC, 60Hz, Continuous | 1500Vms |
| Continuous (AC and DC) | ±2000V Peak |
| CMRR (Common-Mode Rejection Ratio)* | −74dB |
| CMTC(Common-Mode Transfer Coefficient)* | $-0.2\times10^{3}$ |
| RS ≤ 100Ω (HI and LO Inputs) G = 1V/V | 105dB |
| G = 100V/V | 130dB |
| RS ≤ l kΩ (Input HI, LO, or Both) G = 1V/V | 100dB min |
| G = 100V/V | 110dB min |
| Leakage Current Input to Output @ 240Vrms, 60 Hz | 2 µA rms max |
| INPUT IMPEDANCE | |
| Differential (G = 1V/V) | $10^{12}\Omega$ |
| Common-Mode | 2GΩ‖4.5pF |
| INPUT BIAS CURRENT | |
| Initial, @ 25 ℃ | ±30pA |
| vs. Temperature (0 ℃ to 70 ℃) | ±10nA |
| INPUT DIFFERENCE CURRENT | |
| Initial, @ 25 ℃ | ±5pA |
| vs. Temperature (0 ℃ to 70 ℃) | ±2nA |
| INPUT NOISE | |
| Voltage, 0.1Hz to 10Hz | $1.8\,\mu V_{p\text{-}p}$ |
| f > 100Hz | $10.8nV/\sqrt{Hz}$ |
| FREQUENCY RESPONSE | |
| Bandwidth ($V_O \le 10V_{p\text{-}p}$, G = 1V–50V/V) | 20kHz |
| Settling Time, to ±10mV (10V Step) | 1ms |
| OFFSET VOLTAGE (RTI) | |
| Initial, @ 25 ℃ Adjustable to Zero | (±5 ±5/G)mV max |
| vs. Temperature (0 ℃ to 70 ℃) | $[\pm10 \pm\frac{10}{G}]$ µV/ ℃ |
| RATED OUTPUT | |
| Voltage (Out HI to Out LO) | ±5V |
| Output Resistance | 7kΩ |
| Output Ripple, 100kHz Bandwidth | $10mV_{p\text{-}p}$ |
| 5kHz Bandwidth | 0.5mV rms |
| ISOLATED POWER OUTPUT | |
| Voltage, No Load | ±7.5V |
| Accuracy | ±10% |
| Current | 400 µA Total |
| Regulation, No Load to Full Load | 5% |
| Ripple | $100mV_{p\text{-}p}$ |
| POWER SUPPLY | |
| Voltage, Rated Performance | 15V ±5% |
| Voltage, Operating | 15V ±10% |
| Current, No Load ($V_S$ = 15V) | 10mA |
| TEMPERATURE RANGE | |
| Rated Performance | 0 ℃ to 70 ℃ |
| Operating | −40 ℃ to +85 ℃ |
| Storage | −40 ℃ to +85 ℃ |
| PACKAGE DIMENSIONS | |
| DlP Package (N) | 2.10" ×0.700" ×0.350" |

*Test Schematic Figure 3 @ 100Hz Sine Wave @$v_S$(t) = 1000V.


 

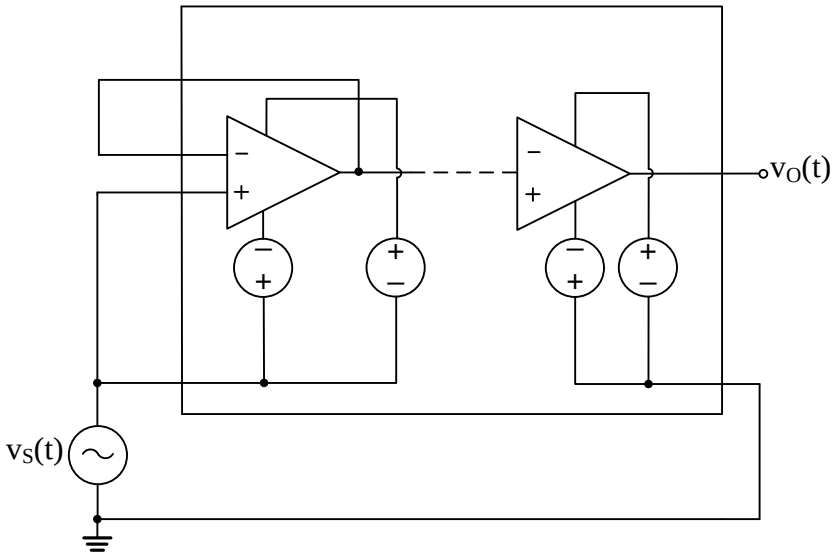


Figure 3. CMRR & CMTC Test Schematic

## PIN DESIGNATIONS

| Block | Pin # | Pin Name | Type | Function Description |
|---|---|---|---|---|
| **Isolated Block** | 1 | IN+ | Isolated analog input | Isolated positive (Non-inverting) input |
| | 2 | IN COM | Isolated analog ground | Isolated ground |
| | 3 | IN− | Isolated analog input | Isolated negative (inverting) input |
| | 36 | +VISO OUT | Isolated power output | Isolated positive power supply output, +7.5V, referenced to pin 2 IN COM |
| | 37 | −VISO OUT | Isolated power output | Isolated negative power supply output, approximately −7.0V, referenced to pin 2 IN COM |
| | 38 | FB | Isolated analog output | Isolated op amp output as a feedback signal |
| Local Block | 18 | LO | Analog ground | Output voltage ground reference, internally connected to pin 22 POWER RETURN |
| | 19 | HI | Analog output | Op amp output, equals to the voltage difference between FB and IN COM |
| | 20 | 15 V | Analog input | Positive 15V power supply input |
| | 22 | POWER RETURN | Analog input | Power supply return, internally connected to pin 18 GND |


 

## MECHANICAL DIMENSIONS

The dimensions of AD202KNATI in DIP package are shown in Figure 3.

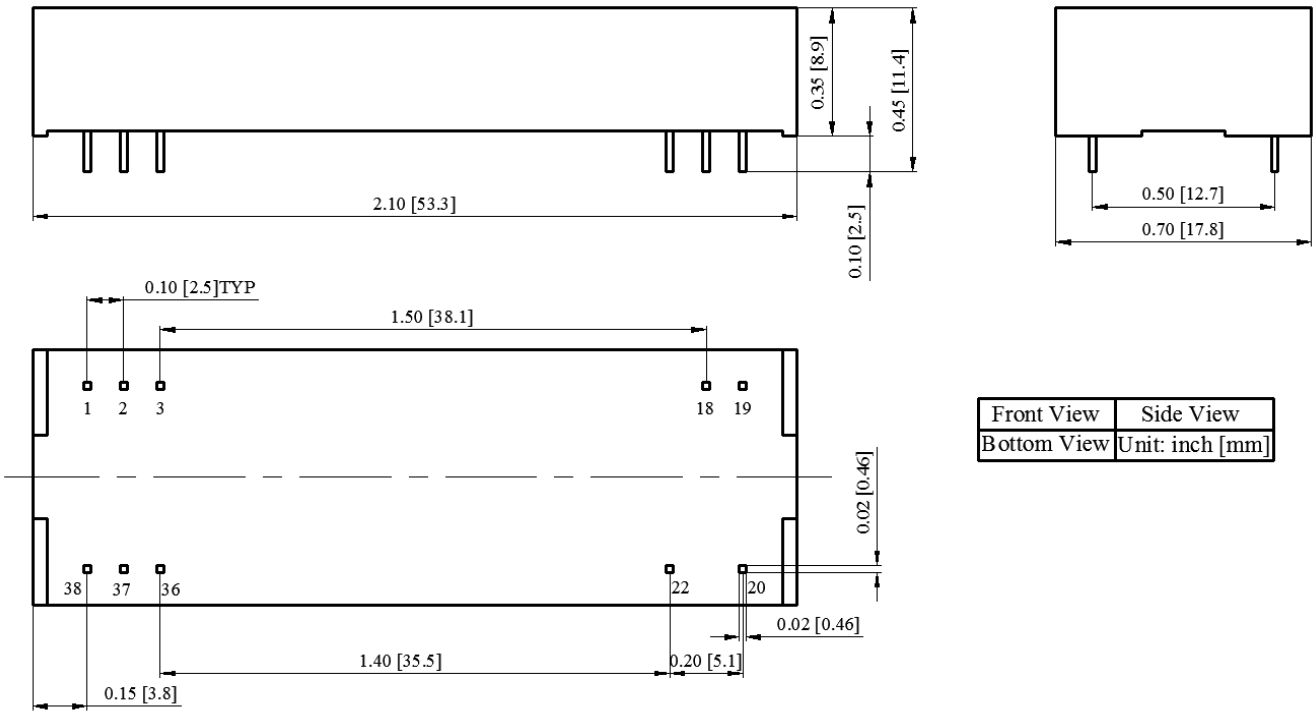


Figure 3. Dimensions of AD202KNATI DIP Package


 

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