

General-purpose multifunctional high-precision isolation amplifier

Small Size Multipurpose Analog Signal Isolation Amplifier: ISOS 210AD Series

Product Features:

- High bandwidth: 20KHz (-3dB)
- Low cost, small size, standard SIP12 Pin flame retardant housing package
- Accuracy level: 0.1, 0.2, non-linearity <0.2% over the full range
- Between auxiliary power, signal input and output: 1000VDC triple isolation
- Auxiliary power supply: 5V, 12V, 15V, 24VDC and other single power supply options
- Can functionally expand power distribution at the input and output: $\pm 15V @ \pm 5mA$
- Variable gain input amplifier ($G=1\sim 100V/V$)
- Small size: 33 X 10.5 X 15.5 mm (L X W X H)
- Automotive-grade operating environment wide temperature range: $-40 \sim +125\text{ }^{\circ}\text{C}$

Typical Applications:

- Passive sensor isolated power distribution and signal acquisition and transmission
- Pre-amplification, bridge and other circuit configurations power supply to facilitate signal acquisition
- PLC/FCS/DCS control system analog signal isolation, acquisition
- Highly accurate isolated amplification and conversion of tiny signals at the DC millivolt level
- Analog signal ground interference suppression and loop isolation, acquisition
- Industrial field analog signal isolation amplification conversion and long line transmission
- Instrumentation and sensors, PLC analog transceiver
- Power monitoring, medical equipment high voltage isolation safety grille
- Multi-channel data collector input each circuit isolation anti-interference

Product characteristics

SunYuan The ISOS 210AD series analog signal isolation amplifier is a magneto-electrically coupled hybrid integrated circuit in a low cost, small footprint standard single row SIP12 Pin flame retardant package. The module integrates multiple isolated DC/DC converter circuits and magneto-electric coupling signal isolation converter circuits, which only need to select a single DC 5V/12V/15V/24V power supply to complete the analog signal input/signal output/auxiliary power supply three-terminal isolated amplification and conversion functions, and support single-ended and positive and negative bidirectional DC signal input and output. The ISOS 210AD is designed to be fully functional and uses a non-fixed gain approach. The input signal is amplified by the input preamplifier (gain of 1-100) and then enters the internal modulator for modulation. The non-fixed gain input amplifier is convenient for users to configure and use flexibly according to the field working conditions, and users can achieve variable gain applications through external feedback gain resistors, etc. The modulated signal is transmitted to the output side through transformer coupling and demodulated by the demodulation circuit and then amplified. The module's triple isolation design structure allows the device to meet the signal input, signal output, and auxiliary power supply completely isolated by interrupting the ground loop and leakage path measures to suppress common mode voltage and noise to improve measurement signal accuracy and integrity, making it ideal for single or multi-channel analog signal isolation and amplification conversion applications. The ISOS 210AD is a magneto-electric coupled low-cost solution, mainly for applications with no special requirements for EMC (electromagnetic interference). The internal DC-DC isolated power supply not only supplies power to the internal amplifier circuit, but also provides a set of $\pm 15V/\pm 5mA$ unregulated isolated power supplies to each of the input and output for two-wire sensor power distribution or to provide input preamplification, signal bias, and reference power for differential circuits and bridge circuits, Differential circuit, bridge circuit reference power supply. The products can meet the requirements of automotive-grade field working environment of humidity, vibration and wide temperature range $-40 \sim +125\text{ }^{\circ}\text{C}$.

Maximum product rating

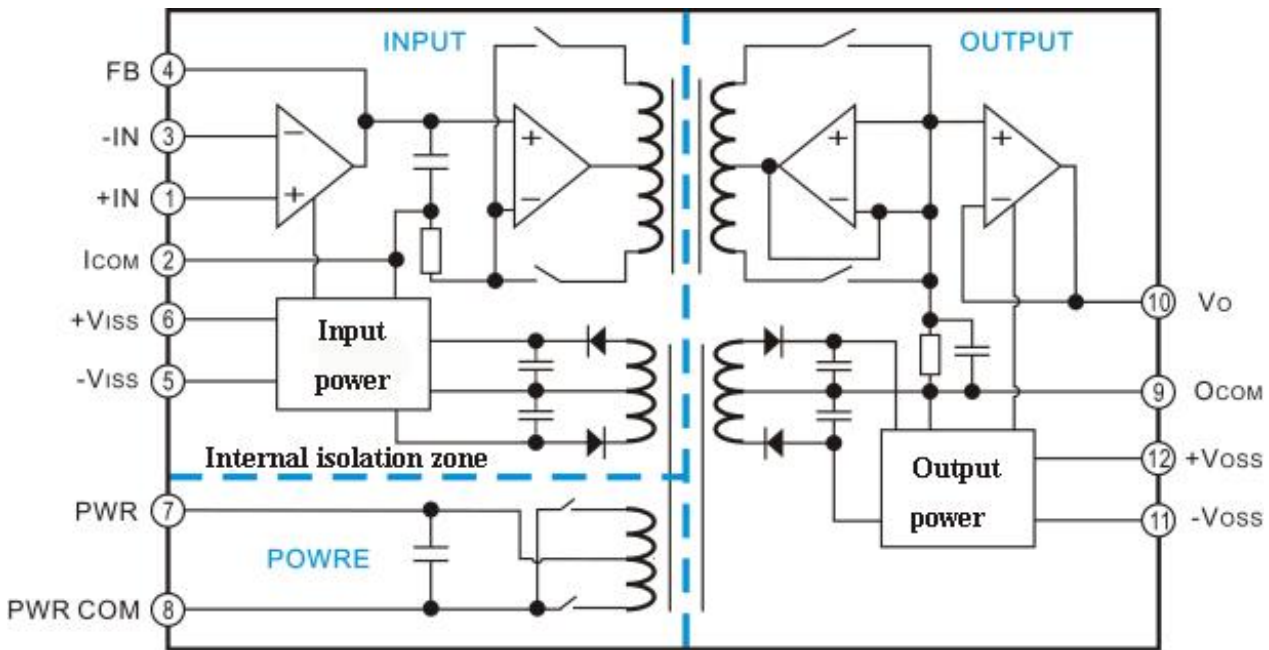


Figure 1 ISOS 210AD Block diagram of the principle

Maximum product rating (Long-term operation in the maximum rated environment affects product life, and irreparable damage can occur beyond the maximum value.)

Continuous Isolation Voltage (Maximum continuous isolation voltage at input and output)	1KVDC/rms
PWR (Maximum input range of auxiliary supply voltage)	±25%Vdd
Junction Temperature (Maximum range of working ambient temperature)	-40°C ~ +125°C
Lead Temperature (Maximum pin soldering temperature and duration<10S)	+300°C
Output Voltage Load Min (Minimum load at output voltage signal)	2KΩ

Product technical parameters

Parameter Name	Test conditions	Min	Typical values	Max	Unit
Isolation voltage	AC,50Hz,1min		1000		VDC
Gain		1		100	V/V
Gain error			2		mV/V
Gain temperature drift			25		ppm/°C
Non-linearity			0.1	0.2	%FSR
Signal Input	Voltage	-10		10	V
Input derating voltage			2	5	mV
Input Impedance			10 ¹²		Ω
Distribution power output	Voltage		±15		V
	current		±5		mA
	Ripple		150		mV
	Precisio		5	10	%
Signal Output	Voltage	-10		10	V
Load Capacity	Vout=±10V	1	2		kΩ

Frequency Response	-3dB			20	KHz	
Common mode rejection ratio				105	dB	
Signal output ripple	No filtering		10	20	mVRMS	
Signal voltage temperature drift			0.1	0.5	mV/°C	
Auxiliary power	Voltage	User-defined	5	12	24	VDC
	Power consumption	Fully loaded		0.8	1	W
Working environment			-40		125	°C
Storage temperature			-55		85	°C

Note: The input and output distribution outputs do not have short-circuit protection, and users are strictly prohibited from short-circuiting to ground during use to avoid irreparable damage to the product.

Model number and selection definition

ISOS 210AD-P

Auxiliary power

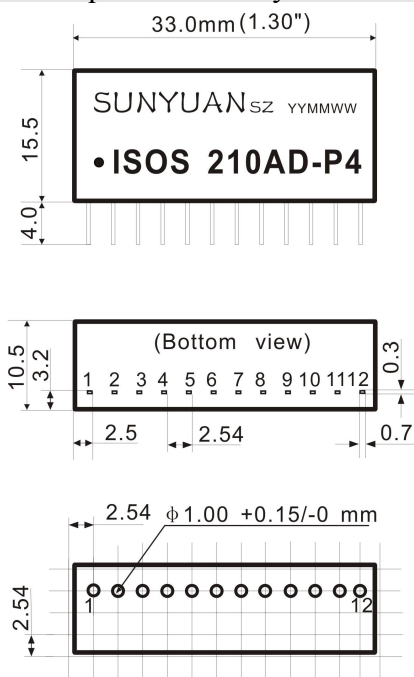
- P1: 24VDC
- P2: 12VDC
- P3: 5VDC
- P4: 15VDC
- P8: **User-defined**

Example of product selection

Example 1: Auxiliary power supply: 24VDC; Model number: ISOS 210AD - P1

Example 2: Auxiliary power supply: 15VDC; Model number: ISOS 210AD - P4

Product shape and PCB layout reference size drawing (standard SIP12 pin)



IC封装SIP12PinPCB布板参考

Typical Application Diagram

Figure 2 shows the most basic gain configuration application, the input amplifier gain is set to $G = 1$, that is, when the input signal is $\pm 10V$, the output is also $\pm 10V$, without any amplification of the input signal, basically to meet the 1:1 ratio to complete the signal isolation output. For the input signal is small, we need to amplify the input signal processing (when $G > 1$), can be configured according to Figure 3 peripheral gain feedback resistor for the input signal amplification. In order to ensure accuracy, the resistor is best to use the temperature coefficient of 25PPM metal film resistor, the value can be calculated in accordance with the actual voltage to be output amplification, according to the amplification to match the resistor, to meet the V_{out} calculation formula can be.

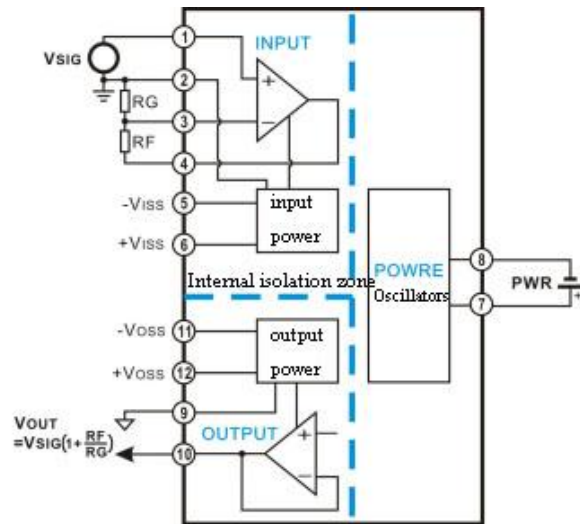
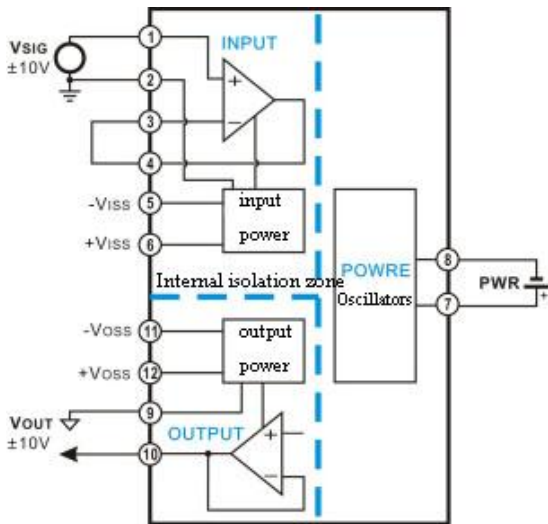


Figure 2 Typical application with gain of 1 ($G = 1$)

Figure 3 Typical application with gain greater than 1 ($G > 1$)

Figure 4 shows the current signal input when the current sampling resistor needs to be added at the input to convert the current signal into a voltage signal input. Figure input amplifier gain configuration for $G = 1$, that is, how much voltage sampled, after the module isolation of the output voltage and the input voltage is basically the same, such as the sampling resistance selected relatively small, to obtain the sampled voltage is relatively small. Need to amplify the sampled voltage and then output, you can refer to Figure 3 to configure the peripheral gain feedback resistor for signal amplification, the value of the resistor can be calculated in accordance with the actual voltage to be output amplification, according to the amplification to match the resistor. In order to ensure the accuracy, it is best to use a metal film resistor with a temperature coefficient of 25PPM to meet the V_{out} calculation formula. Figure 5 input connected as an inverting amplifier application, the input signal can be inverted to amplify the output, the gain can be set by adjusting R_F and R_S , if you choose potentiometer adjustment, please choose a high precision metal film multi-turn potentiometer.

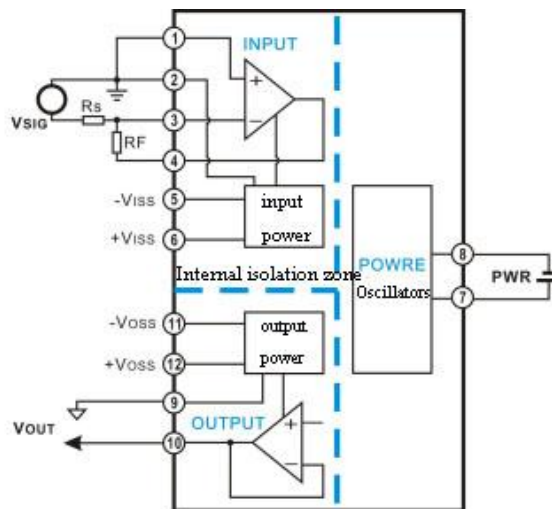
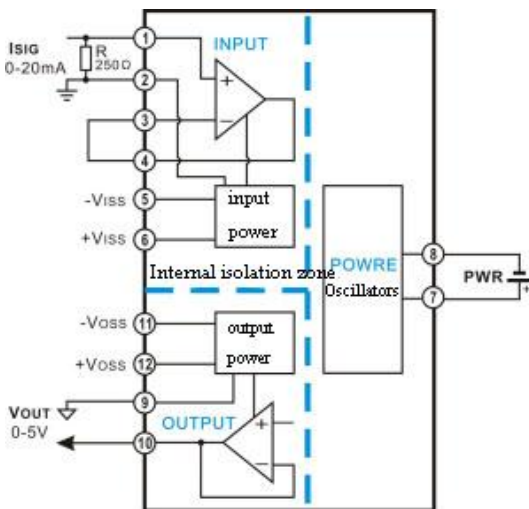


Figure 4 Typical application of current input and voltage output

Figure 5 Typical application of signal inversion mode

Pin Function Description

Pin	Pin Function	
1	+IN	Positive signal input
2	Icom-	Signal input common ground
3	-IN	Signal input negative
4	FB	Signal feedback side
5	-Viss	Input isolation distribution output negative
6	+Viss	Input isolation power distribution output positive
7	PWR	Positive power input
8	PWR COM	Power input ground
9	Ocom	Signal output common ground
10	+Vo	Positive signal output
11	-Voss	Output isolation power distribution output negative
12	+Voss	Output isolation power distribution output positive

