

GZC6201A

Current Sensor

Analog Output

Datasheet

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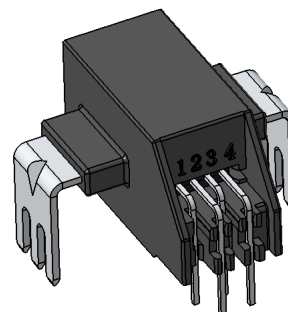
Document Revision History

Revision	Description	Date
V1.0	Initial version	2022.10.08
V1.1	Revise exterior information	2023.02.08
V1. 2	Uniform template	2023.0 4.12
V1. 3	Add parameters and adjusted naming rules	2023.0 7.31
V1.4	Add UL certification information	2024.01.20
V 1.5	Standard template	2024.05.28

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1. Product Description

GZP6201A series from Sencocho is an open-loop current sensor based on the Hall effect principle. It is widely used for AC or DC current detection in industrial, commercial, and communication systems. Each GZC6201A consists of a high-precision, low-temperature-drift linear Hall IC, a magnetic core, and a built-in low-insertion-resistance current conductor path. An applied current flowing through this low-resistance current conductor path generates a magnetic field, which the Hall IC converts into a voltage signal output proportional to the input current. The internal magnetic core effectively suppresses interference from external common-mode magnetic fields, improving accuracy in noisy environments.



GZC6201A's output voltage is precisely calibrated in-house to meet different current range requirements. The chip's output exhibits a positive slope ($>VOQ$) as applied current flows through the internal current conduction path (from pins 8, 9, and 10 to pins 5, 6, and 7). The internal resistance of this conduction path is typically $0.21m\Omega$, enabling low power consumption. The terminals of the conduction path (pins 5 to 10) are electrically isolated from the signal lines (pins 1 to 4). This allows the GZC6201A current sensor to be used in high-end current sensing applications without the need for additional, expensive isolation technologies.

Products are designed and tested based on industry standards such as IEC61010 and IEC61326, and meet requirements such as CE, RoHS, and UL.



Certificate Number:
UL-US-2402267-0
UL-CA-2401742-0

- IEC61010-1 : 2 010
- IEC61 326-1 :2 012
- CE certification
- RoHS Certification
- UL Certification

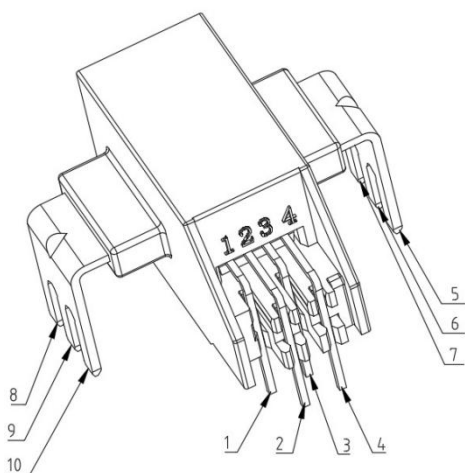
2. Product Features

- $\pm 0.25\%$ typical linearity across the entire temperature range
- Fast output step response time: $1.8\mu s$
- 240kHz signal bandwidth
- Powered by 5.0V DC power supply
- $40^{\circ}C$ to $105^{\circ}C$ working temperature
- Rated current detection range: (bidirectional) $\pm 10A \sim \pm 120A$
- Detecting AC and DC current signals
- Fixed output mode independent of power supply
- Extremely stable static output voltage
- The chip has a built-in reference output

3. Application Areas

- Medium&low power frequency converters
- Motor phase and rail
- String photovoltaic inverter
- Chargers and converters
- MPPT Current Detection
- DC power supply
- Overcurrent protection
- Uninterruptible Power Supply (UPS)

4. Pin Configuration and Functions



No.	Symbol	Description
1	VREF	Reference voltage output
2	VOUT	Analog voltage output
3	GND	signal ground
4	VCC	power supply
5, 6, 7	IP-	Input current negative terminal
8, 9, 10	IP+	Input current positive terminal

5. Naming Rules for Current Sensors

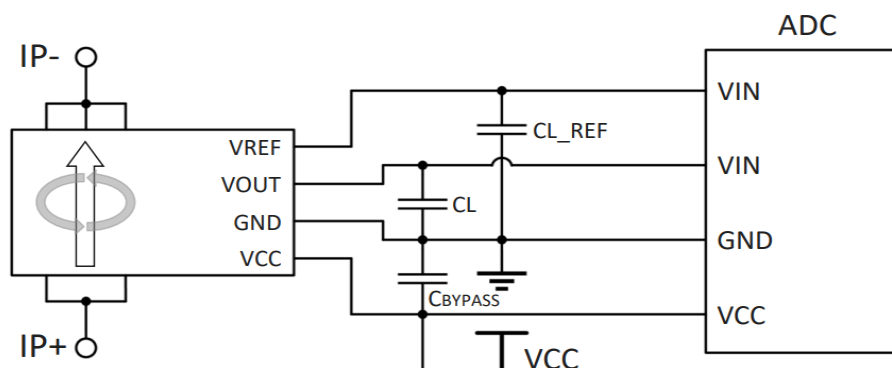
GZP6201A-C1PC-050-K001-B2-WX

GZC	Sencoch Current Sensor Series
6201	Product Category
A	Output type A: Analog output
C1PC	Interior Scheme
050	Current Range 010: $\pm 10A$ 020: $\pm 20A$ 032: $\pm 32A$ 050: $\pm 50A$ 080: $\pm 80A$ 120: $\pm 120A$
K001	Power Supply and Output K001: 5V input, 0.5~4.5V output
B02	Packaging Method B02: Plastic Tray
WX	Company interior code

6. Typical Application Circuits

(1) The CBYPASS=100nF. bypass capacitor should be placed near the "power-to-ground" connection of the GZC6201. CL_REF is recommended to be 100nF, and CL is recommended to be 1nF.

(2) The GZC6201A has a "reference signal output" terminal, which can be used for both single-ended and differential output to interface with an ADC or operational amplifier.



7. Electrical and Magnetic Properties

7.1 Absolute Maximum Ratings

The absolute maximum ratings are limits for individual applications; exceeding these values may impair the usability of the circuit. The functional impact of damage may be subtle, but prolonged exposure to absolute maximum ratings can affect the reliability of the device.

Parameter	Description	Minimum value	Maximum value	Unit
VCC	power supply voltage	-	15	V
VRCC	Power supply reverse voltage	- 0.5	-	V
VOU	Output voltage	-	15	V
VROU	Output reverse voltage	-0.5	-	V
IOUT(source)	Continuous output current (source current)	-	2.8	mA
IOUT(sink)	Continuous output current (sink current)	-	8.8	mA
TA	Operating ambient temperature	-40	1 05	°C
TS	Storage temperature	-40	1 25	°C
M	Weight (10A-50A)	-	5	g
	Weight (80A-120A)		7	g

7.2 Isolation and Packaging Characteristics

Parameter	Description	Test conditions	Value	Unit
VISO	Insulation strength voltage	t = 60 s 50/60Hz	4300	Vac
VPUL	Pulse insulation strength voltage	t = 60 s 1.2/50us	8000	Vdc
DC I	electrical clearance	Measure the shortest air distance from the input terminal to the output terminal.	>8	mm
DC P	creepage distance	Measure the shortest distance from the input terminal along the molding compound to the output terminal.	>8	mm
CM	Shell material	Compliant with UL94 standards	V0	

7.3 Electrical Specifications

TA = 25 °C, VCC = 5V, CBYPASS = 0.1uF (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
NP	Number of turns of the primary side		-	1	-	
RIP	Conductor resistance	TA=25°C	-	0.21	-	mΩ
		TA=105°C	-	0.29	-	mΩ
VCC	Power supply voltage		4.5	5	5.5	V
ICC	Consume current		-	14	19	mA
VOUT-VREF	Output voltage range	IP=IPM	-2	-	2	V
CL	Output capacitor load	V OUT–GND	-	1	10	nF
CL_REF	Reference terminal capacitor load	V REF –GND	-	100	470	nF
RL	Output load resistor	Scroll down to GND	5	-	-	KΩ
		Pull up to VCC	50	-	-	KΩ
RL_REF	Reference load resistor	Scroll down to GND	20	-	-	KΩ
		Pull up to VCC	20	-	-	KΩ
ELIN	Nonlinear error	IP=IPM	-0.5	-	0.5	%
BW	bandwidth	-3 dB; CL=1nF	-	240	-	kHz
T PO	Power-on time	CL=1nF	-	80	-	us
TR	Reaction time	10% IP N	-	1.2	-	us
TRES	Output response time	90% IP N	-	1.8	-	us
T DEL	Frequency delay time	200kHz sine wave	-	1.5	-	us
VOL	Analog output low level	RL>= 5 KΩ	-	-	0.25	V
VOH	Analog output high level	RL>= 50 KΩ	4.75	-	-	V

7.4 Accuracy Specifications

GZC6201A - C 1P-C020K001B02

TA = 25 °C, VCC = 5V (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
IPN	Rated input current range	effective value	- 2 0	-	20	A
IPM	Maximum input current range	Peak-to-peak value	- 50	-	50	A
SNST	Sensitivity	800mV @ IPN	-	40	-	mV/A
VREF	Reference output voltage range	TA = -40 °C to 105 °C	2.49	~	2.51	V
V OQ	Static output voltage range	TA = -40 °C to 105 °C	2.48	~	2.52	V
VOE	Zero Current Output Error VOQ-VREF	IP=0A, TA=25 °C	- 8	-	8	m V
		IP=0A, TA=25 °C to 105 °C	-15	-	15	m V
		IP=0A, TA=-40 °C to 25 °C	-15	-	15	mV
ESNST	Sensitivity error	IP = IPN , TA = 25 °C	-	± 0.5	-	%
		IP= IPN ,TA=25 °C to 105 °C	-	±1.5	-	%
		IP= IPN ,TA=-40 °C to 25 °C	-	± 2.0	-	%
ETOT	Total output error	IP= IPN ,TA=25 °C	-1	-	1	%
		IP = IPN , TA = 25 °C to 105 °C	-2.5	-	2.5	%
		IP = IPN , TA = -40 °C to 25 °C	- 3.0	-	3.0	%

GZC6201A - C 1P-C032K001B02

TA = 25 °C, VCC = 5V (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
IPN	Rated input current range	effective value	- 32	-	32	A
IPM	Maximum input current range	Peak-to-peak value	- 80	-	80	A
SNST	Sensitivity	800mV @ IPN	-	25	-	mV/A
VREF	Reference output voltage range	TA = -40 °C to 105 °C	2.49	~	2.51	V
V OQ	Static output voltage range	TA = -40 °C to 105 °C	2.48	~	2.52	V
VOE	Zero Current Output Error VOQ-VREF	IP=0A, TA=25 °C	- 8	-	8	m V
		IP=0A, TA=25 °C to 105 °C	-15	-	15	mV
		IP=0A,TA=-40 °C to 25 °C	-15	-	15	mV
ESNST	Sensitivity error	IP= IPN ,TA=25 °C	-	± 0.5	-	%
		IP= IPN , TA=25°C to 105 °C	-	±1.5	-	%
		IP= IPN , TA=-40°C to 25 °C	-	± 2.0	-	%
ETOT	Total output error	IP= IPN ,TA=25 °C	-1.0	-	1.0	%
		IP= IPN ,TA=25 °C to 105 °C	-2.5	-	2.5	%
		IP= IPN ,TA=-40 °C to 25 °C	- 3.0	-	3.0	%

GZC6201A - C 1P-C050K001B02

TA = 25 °C, VCC = 5V (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
IPN	Rated input current range	effective value	- 50	-	50	A
IPM	Maximum input current range	Peak-to-peak value	- 125	-	125	A
SNST	Sensitivity	800mV @ IPN	-	16	-	mV/A
VREF	Reference output voltage range	TA = -40 °C to 105 °C	2.49	~	2.51	V
V OQ	Static output voltage range	TA = -40 °C to 105 °C	2.48	~	2.52	V
VOE	Zero Current Output Error VOQ-VREF	IP=0A, TA=25 °C	- 8	-	8	m V
		IP=0A, TA=25 °C to 105 °C	-15	-	15	m V
		IP=0A, TA=-40 °C to 25 °C	-15	-	15	mV
ESNST	Sensitivity error	IP = IPN , TA = 25 °C	-	± 0.5	-	%
		IP= IPN , TA=25 °C to 105 °C	-	±1.5	-	%
		IP= IPN , TA=-40 °C to 25 °C	-	± 2.0	-	%
THIS	Total output error	IP= IPN ,TA=25 °C	-1.0	-	1.0	%
		IP= IPN , TA=25 °C to 105 °C	-2.5	-	2.5	%
		IP = IPN , TA = -40°C to 25 °C	- 3.0	-	3.0	%

GZC6201A - C 1P-C080K001B02

TA = 25 °C, VCC = 5V (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
IPN	Rated input current range	effective value	- 80	-	80	A
IPM	Maximum input current range	Peak-to-peak value	- 200	-	200	A
SNST	Sensitivity	800mV @ IPN	-	10	-	mV/A
VREF	Reference output voltage range	TA = -40 °C to 105 °C	2.49	~	2.51	V
V OQ	Static output voltage range	TA = -40 °C to 105 °C	2.48	~	2.52	V
VOE	Zero Current Output Error VOQ-VREF	IP=0A, TA=25 °C	- 8	-	8	m V
		IP=0A, TA=25 °C to 105 °C	-20	-	20	m V
		IP=0A, TA=-40 °C to 25 °C	-20	-	20	mV
ESNST	Sensitivity error	IP = IPN , TA = 25 °C	-	± 0.8	-	%
		IP = IPN, TA= 25 °C to 105 °C	-	±1.5	-	%
		IP = IPN, TA = -40 °C to 25 °C	-	± 2.0	-	%
ETOT	Total output error	IP = IPN , TA = 25 °C	-1.0	-	1.0	%
		IP = IPN, TA= 25 °C to 105 °C	-3.0	-	3.0	%
		IP = IPN , TA= -40 °C to 25 °C	- 3.0	-	3.0	%

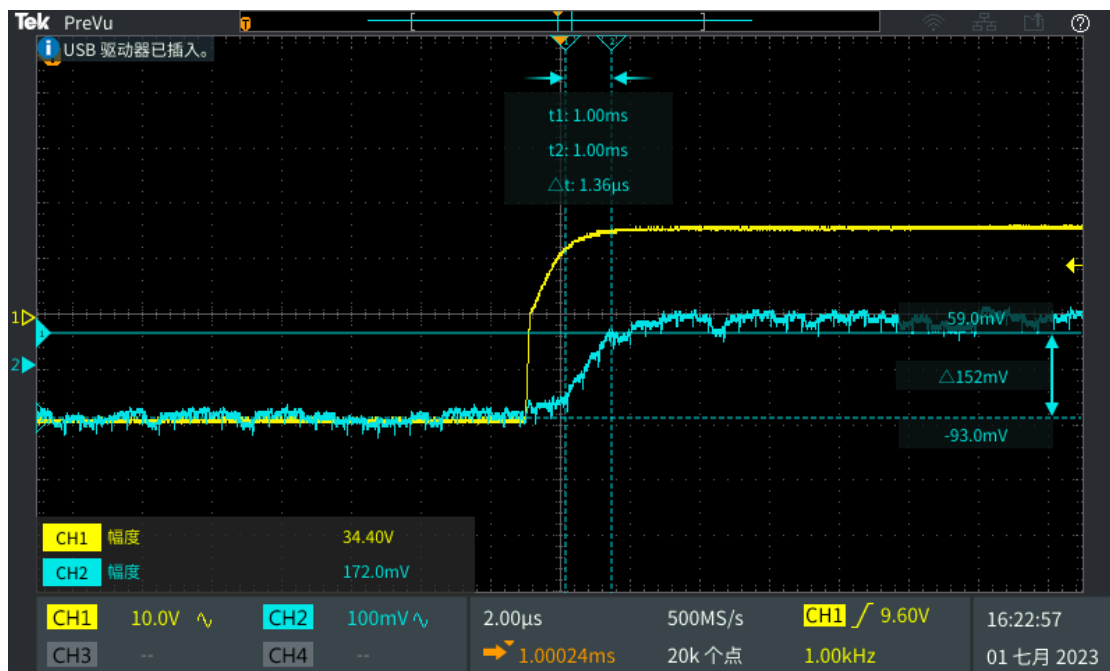
GZC6201A - C 1P-C120K001B02

TA = 25 °C, VCC = 5V (excluding other specified conditions)

Parameter	Description	Test conditions	Min. value	Typ. value	Max. value	Unit
IPN	Rated input current range	effective value	- 120	-	120	A
IPM	Maximum input current range	Peak-to-peak value	- 300	-	300	A
SNST	Sensitivity	800mV @ IPN	-	6.67	-	mV/A
VREF	Reference output voltage range	TA = -40 °C to 105 °C	2.49	~	2.51	V
V OQ	Static output voltage range	TA = -40 °C to 105 °C	2.48	~	2.52	V
VOE	Zero Current Output Error VOQ-VREF	IP=0A, TA=25 °C	- 8	-	8	m V
		IP=0A, TA=25 °C to 105 °C	-20	-	20	m V
		IP=0A, TA=-40 °C to 25 °C	-20	-	20	mV
ESNST	Sensitivity error	IP = IPN , TA = 25 °C	-	± 0.8	-	%
		IP =IPN , TA=25°C to 105 °C	-	±1.5	-	%
		IP= IPN ,TA=-40 °C to 25 °C	-	± 2.0	-	%
ETOT	Total output error	IP= IPN ,TA=25 °C	-1.0	-	1.0	%
		IP= IPN ,TA=25 °C to 105 °C	-3.0	-	-3.0	%
		IP = IPN, TA=-40 °C to 25 °C	- 3.0	-	3.0	%

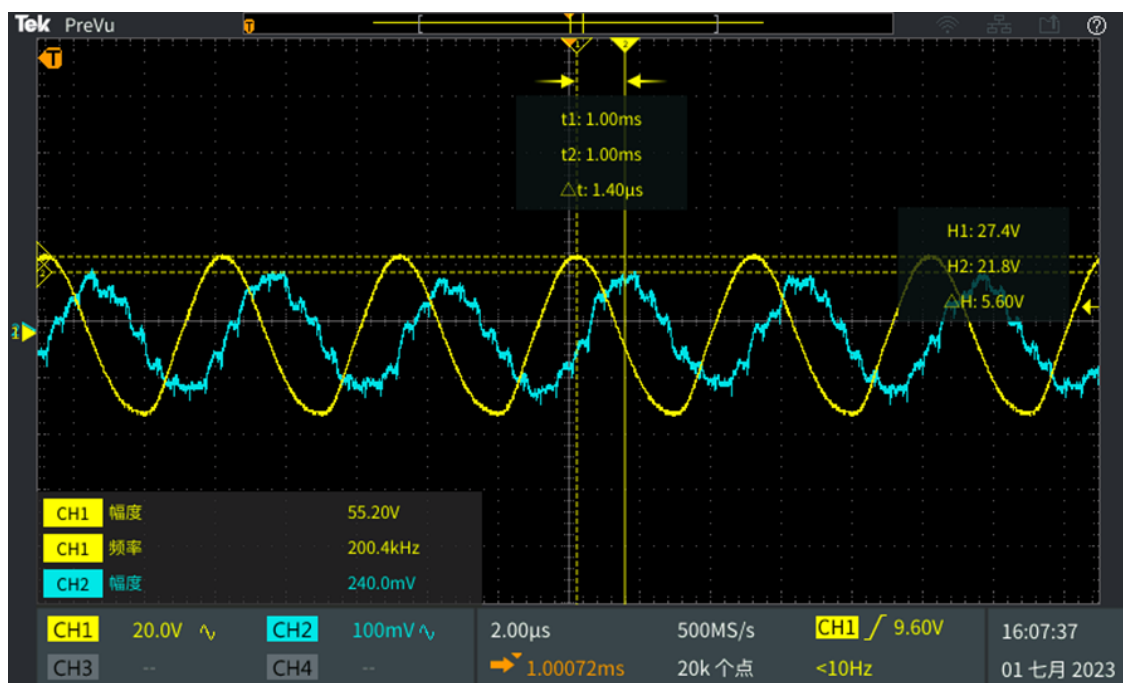
7.5 Step response time and frequency delay characteristics

7.5.1 Output Step Response Time



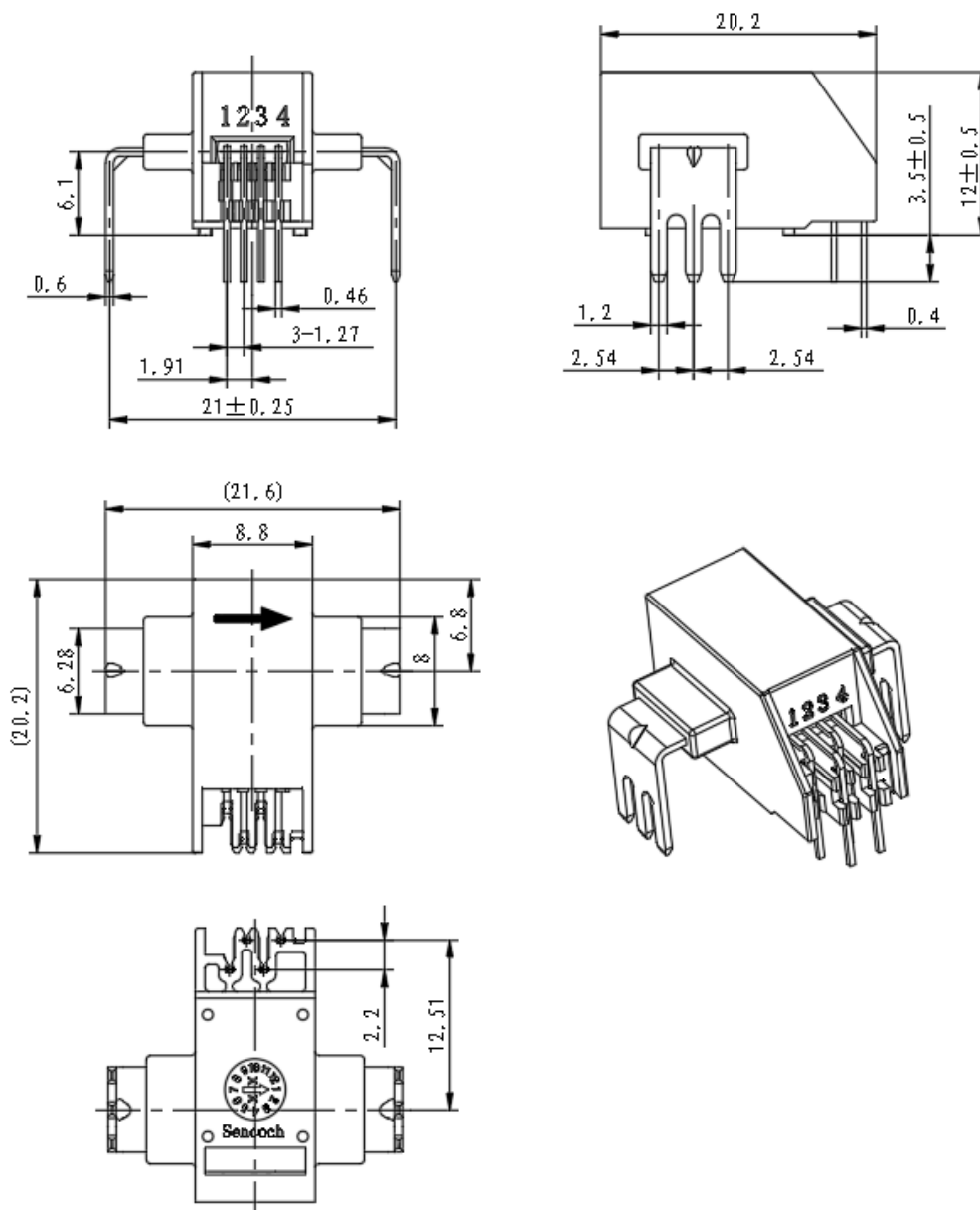
Output step response time < 1.8μs

7.5.2 Frequency Delay Characteristics



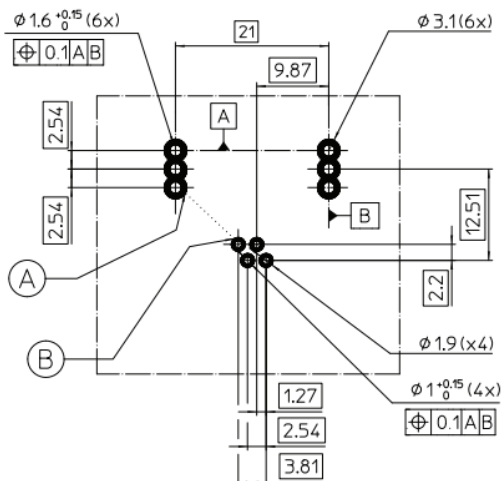
Typical frequency delay time < 1.5μs

8. External dimensions (unit: mm)



9. Recommended PCB layout

The recommended PCB layout for GZC6201 is as follows: (Unit: mm)



	d_{Cl} (mm)	d_{Cp} (mm)
A-B	9.42	9.42

When the product is mounted on the PCB

- Recommended PCB aperture size

1.6mm (primary current pins 5~10)

1.0mm (Secondary signal pins 1 ~ 4)

Maximum PCB thickness : 2.4mm

- Wave soldering profile: 260 °C @ 10s

10. Order Guide

Order Part Number	Output mode	Power supply (V)	Rated current range (A)	Max. current range (A)	Sensitivity (m V/A)	Quantity per box (pcs)
GZC6201AC 1PC010K001B02	Analog voltage	5	± 10	± 25	80	600
GZC6201AC 1PC020K001B02			± 20	± 50	40	
GZC6201AC 1PC032K001B02			± 32	± 80	25	
GZC6201AC 1PC050K001B02			± 50	± 125	16	
GZC6201AC 1PC080K001B02			± 80	± 200	10	
GZC6201AC 1PC120K001B02			± 120	± 300	6.67	

11. Ordering Instructions :

If have any special requirements for the product's performance parameters and functions, please consult with Sencoch.

12 . Precautions for use

- 1) When the direction of the copper busbar current IP is consistent with the arrow marking on the product, $V_{OUT} = 2.5V + IP \times S$; otherwise, $V_{OUT} = 2.5V - IP \times S$.
- 2) Incorrect wiring or a power supply voltage that does not conform to this instruction manual may damage the sensor;
- 3) The power supply must be disconnected during product installation, and no other devices shall be placed in the projection area directly below the product;
- 4) Sensors can be customized according to customer needs, including power supply voltage, measurement current range, sensitivity, installation dimensions, and operating temperature range.
- 5) Please feel free to contact us if you have any questions.