

Linear Current Sensor with differential outputs**Features:**

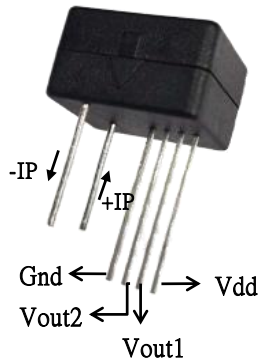
- Output voltage proportional to AC and DC current
- Built-in AC to DC rectifier circuit
- 98 mΩ internal conductor resistance
- Wide sensing current range 0~0.8 A at 5V volt
- High sensitive differential outputs
Single Ended, Sensitivity: 2.1 mV/mA
Differential output, Sensitivity: 4.2 mV/mA
- Wide operating voltage range 3.0~12 V
- Low operating current 3 mA
- Nearly zero magnetic hysteresis
- Ratiometric output from supply voltage
- 10K Hz Bandwidth
- Isolation voltage 1000V
- “Output voltage” is 1/2 supply voltage at zero current

**Functional Description :**

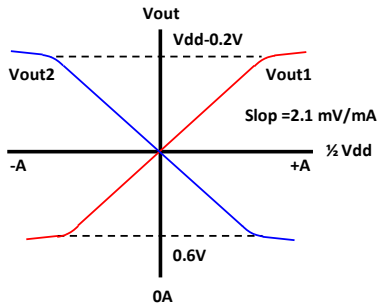
The Winson WCS2201 current sensor provides economical and precise solution for both DC and AC current sensing in industrial, commercial and communications systems. The unique package provides easy implementation without breaking original system and make current sensing possible. Typical applications include motor control, load detection and management, over-current fault detection and any intelligent power management system etc...

The WCS2201 consists of a precise, low-temperature drift linear hall sensor IC with temperature compensation and AC to DC rectifier circuit and a current path with 98 mΩ typical internal conductor resistance. This extremely low resistance can effectively reduce power loss, operating temperature and increase the reliability greatly. Applied current flowing through this conduction path generates a magnetic field which is sensed by the integrated Hall IC and converted into a proportional rectified DC voltage.

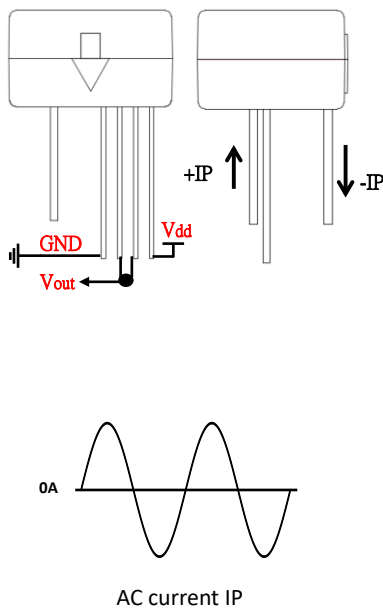
The terminals of the conductive path are electrically isolated from the sensor leads. This allow the WCS2201 current sensor to be used in applications requiring electrical isolation without the use of opto-isolators or other costly isolation techniques and make system more competitive in cost. Winson reserves the right to make changes to improve reliability or manufacturability.



Vout VS. Primary Current



AC to DC Applications



Absolute Maximum Range

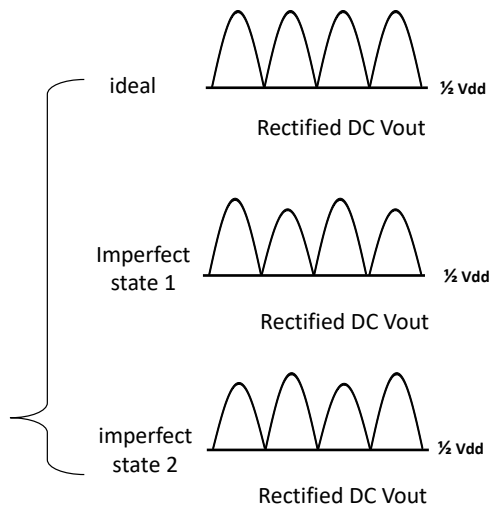
Supply Voltage, Vdd	-----	14V
Pass Current, IP	-----	2.5A
Pass Current (10ms pulse), I _{pulse}	-----	5A
Output Current Sink	-----	0.4mA
Output Current Source	-----	2mA
Basic Isolation Voltage	-----	1000V
Operating Temperature Range, T _a	-----	-20°C to +125°C
Storage Temperature Range, T _s	-----	-65°C to +150°C
Power Dissipation, P _d	-----	1W

(Vdd = 5V)

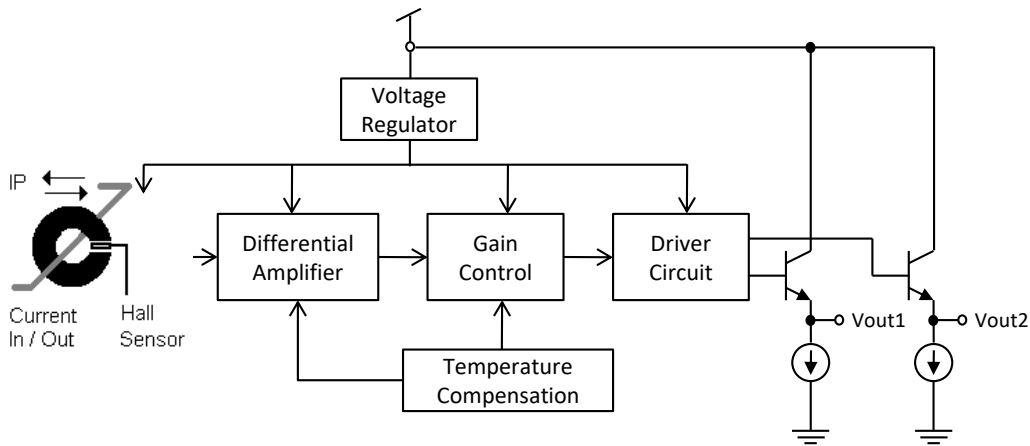
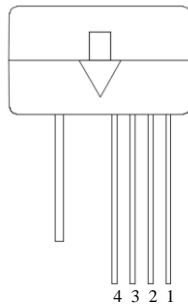
Part No.	Sensitivity (Single Ended)	Current range
WCS2201	2.1 mV/mA	DC: ±0 ~ 0.8A AC: rms 0.6A

Note:

- This can get rectified DC signal by connecting Vout1 and Vout2, but the small signal will be offset.
- The state of rectified DC voltage output is shown below.



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Function Block:

Functional Block Diagram


Number	Name	Description
1	Vdd	Power supply terminal
2	Vout1	Analog output signal 1
3	Vout2	Analog output signal 2
4	GND	Signal ground terminal

Electrical Characteristics:
(T=+25°C, Vdd=5.0V)

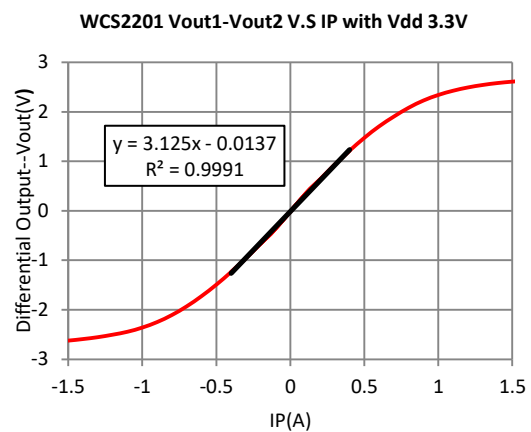
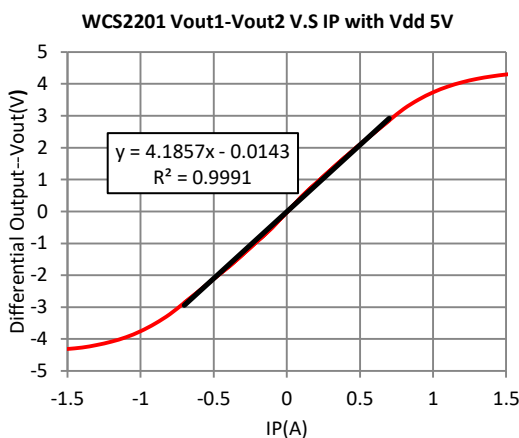
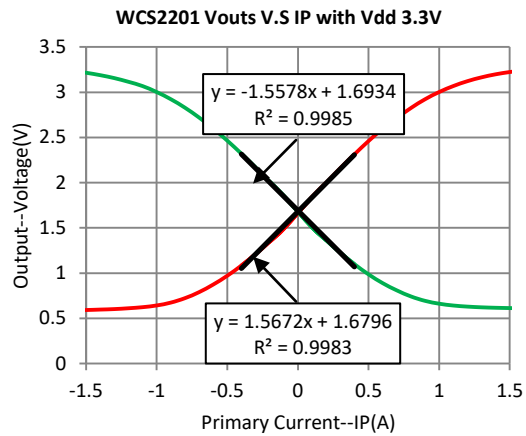
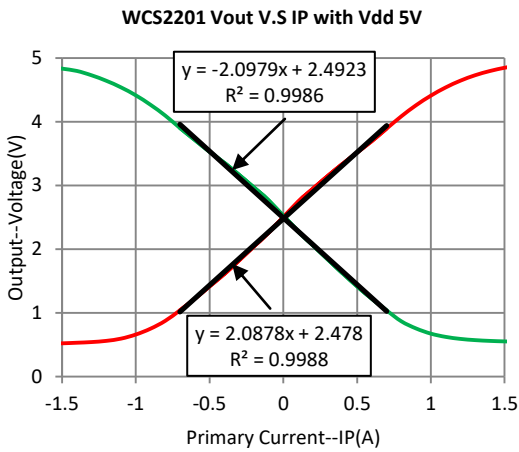
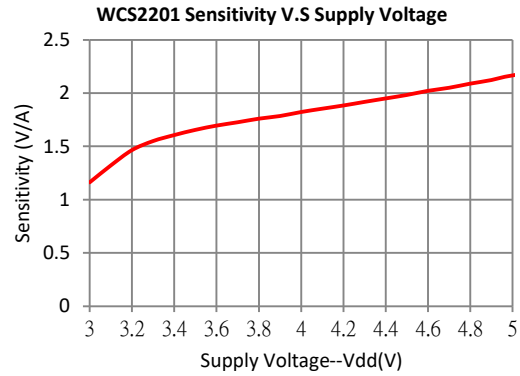
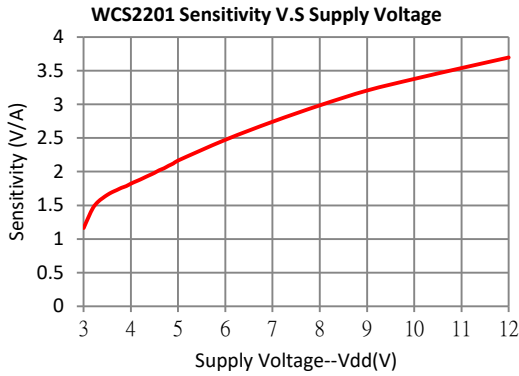
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	Vdd	—	3.0	—	12	V
Supply Current	I _{supply}	I _P = 0 A	—	3.0	6.0	mA
Zero Current Vout	V _{0G1/2}	I _P = 0 A (DC Mode)	2.3	2.5	2.7	V
Zero Current Differential Vout	V _{0G1-2}	I _P = 0 A (DC Mode)	-0.4	—	0.4	V
Sensitivity (Single Ended)	$\Delta V_{out1/2}$	I _P = +0.2 A	1.7	2.1	2.4	mV/mA
Sensitivity (Differential)	ΔV_{out12}	I _P = +0.2 A	3.5	4.2	4.8	mV/mA
Bandwidth	BW	—	—	10	—	kHz
Measurable Current Range	MR	Vdd=5V (DC Mode)	—	±0.8	—	A
		Vdd=5V (AC RMS)	—	0.6	—	
Temperature Drift	ΔV_{out}	I _P = 0 A	—	±1.0	—	mV/°C
Output Noise	V _{Np-p}	I _P = 0 A	—	16.6	—	mV
	V _{Np-p(0.01uF)}	I _P = 0 A, C = 0.01uF	—	3.0	—	

1. All output-voltage measurements are made with a voltmeter having an input impedance of at least 100kΩ

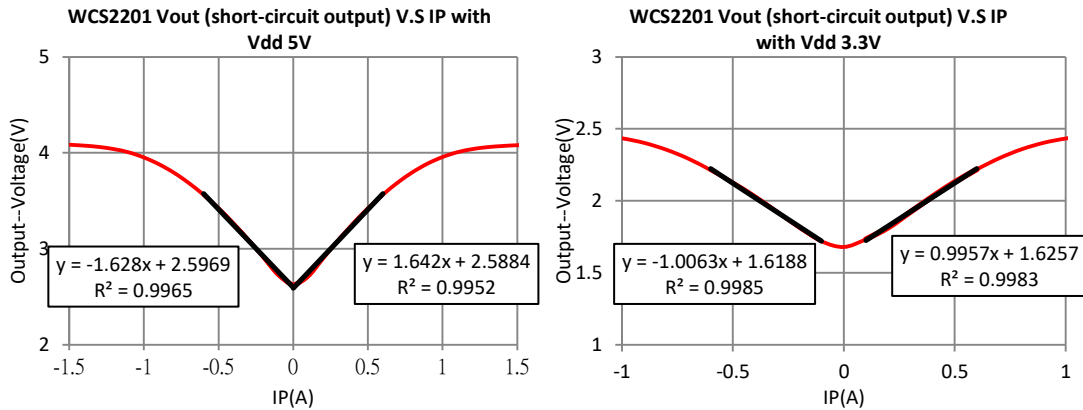
2. Do not apply any 'resistor load' on output pin, it will degrade IC's performance

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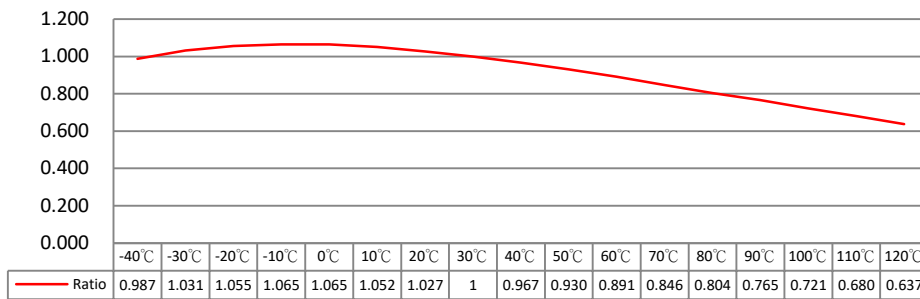
Characteristic Diagrams:



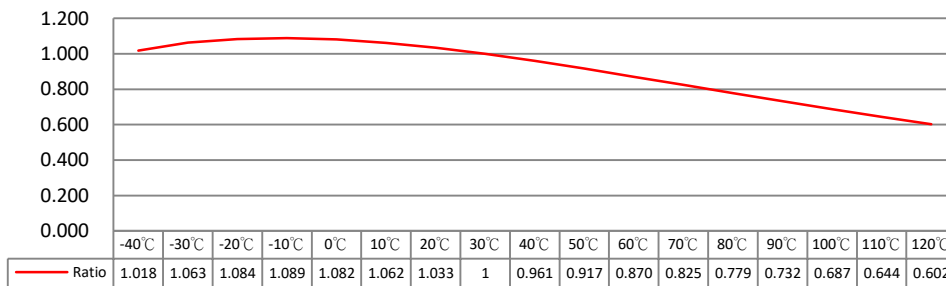
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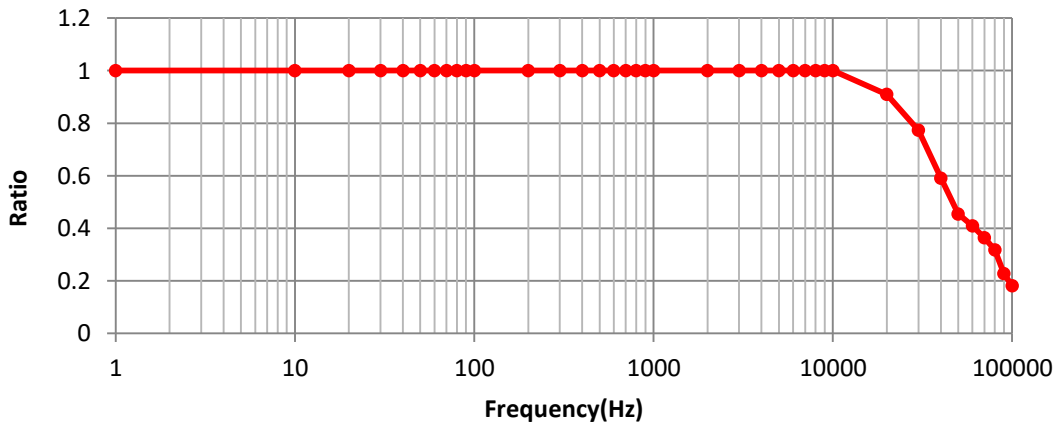
WCS2201 Sensitivity standardization of 30°C (5V) V.S Temperature



WCS2201 Sensitivity standardization of 30°C (3.3V) V.S Temperature

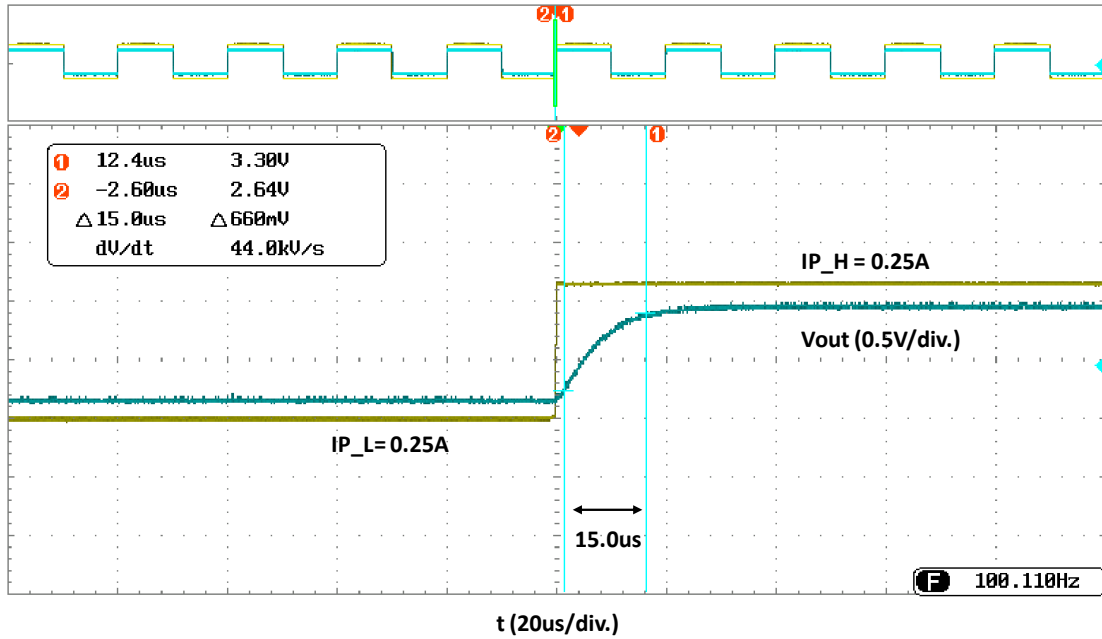


WCS2201 Unit Gain V.S. Frequency

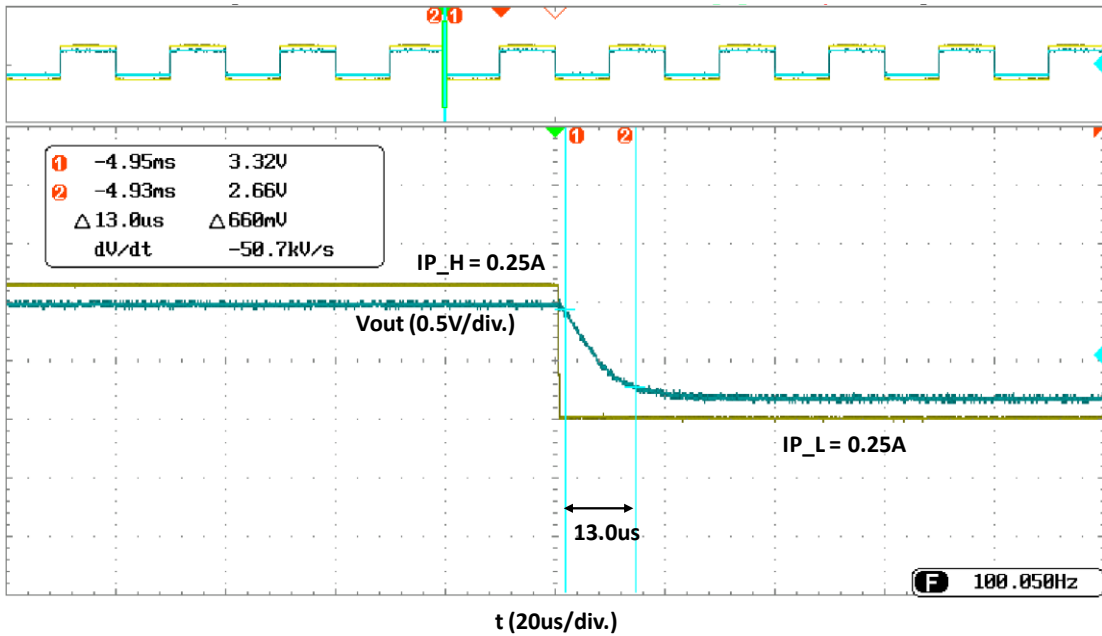


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Vout1 Response Time of Pulse Current

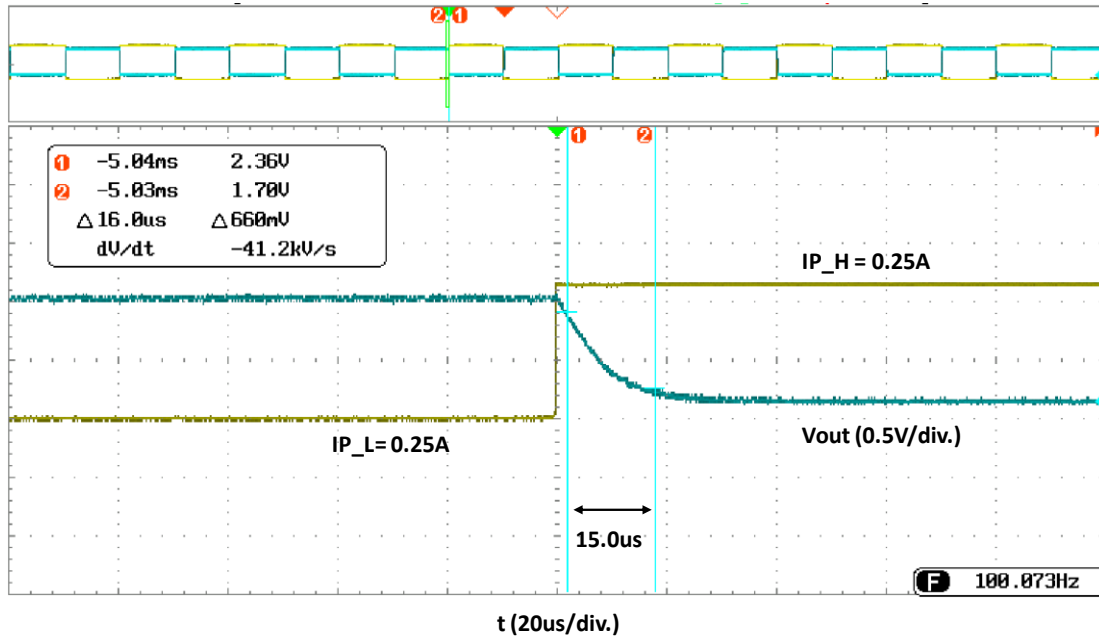


Vout1 Response Time of Pulse Current

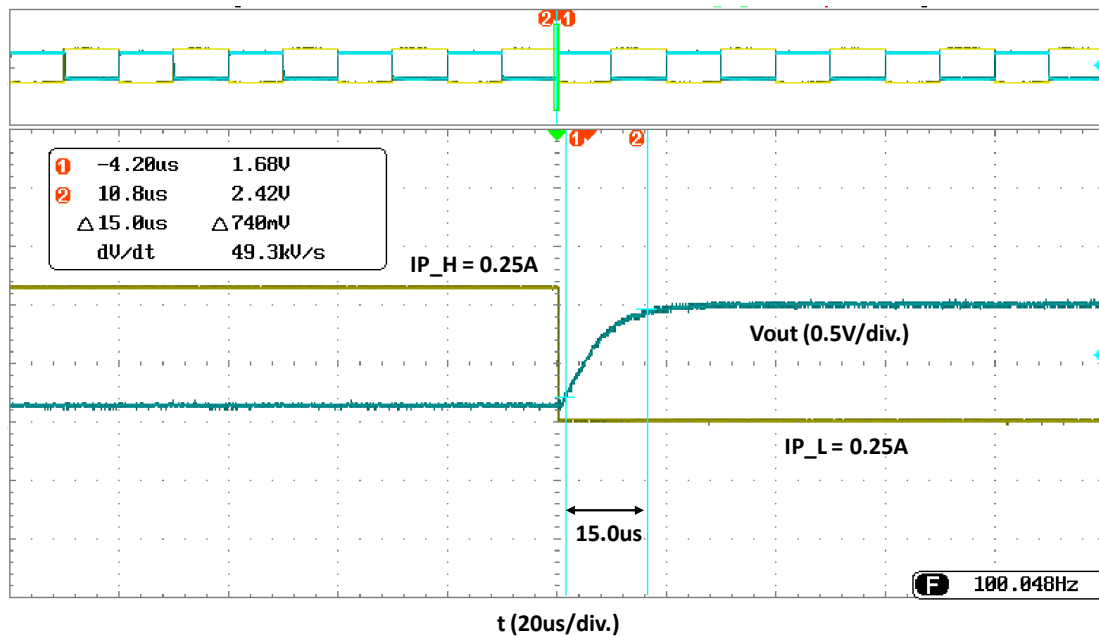


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Vout2 Response Time of Pulse Current

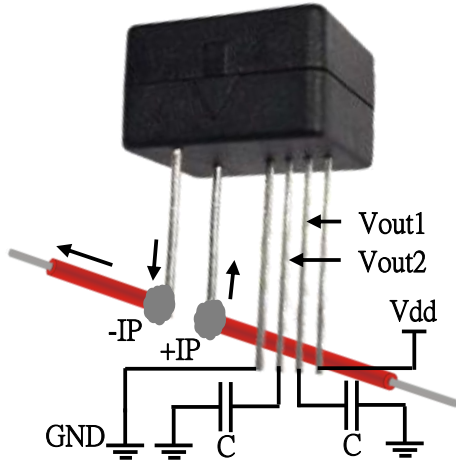


Vout2 Response Time of Pulse Current

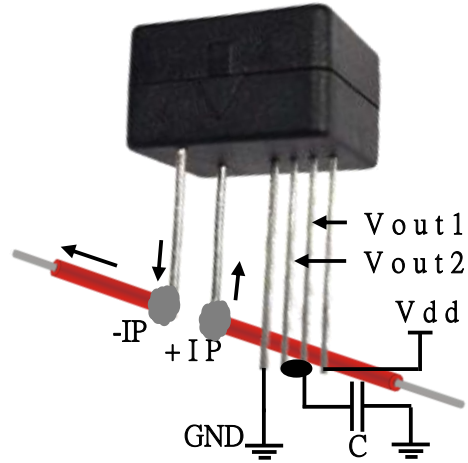


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Application Circuit:



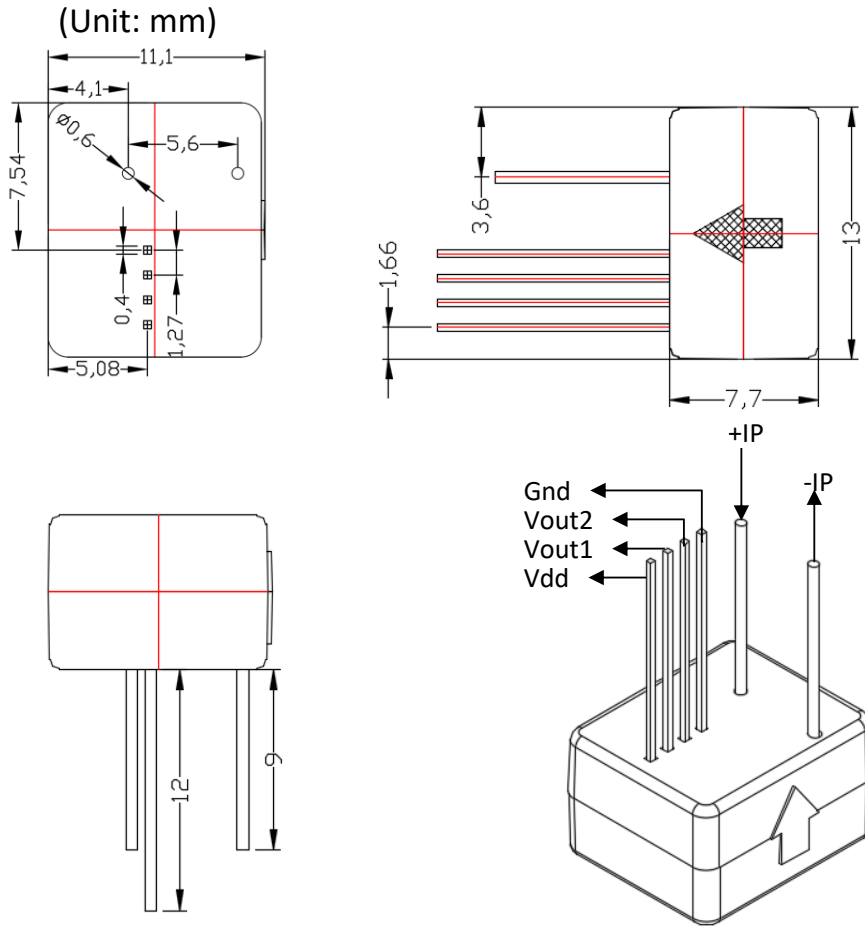
(1) Differential Output



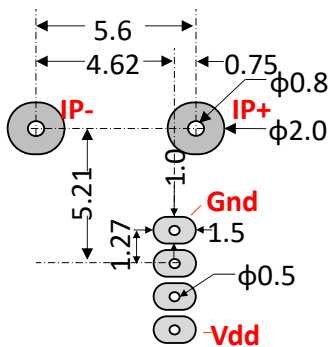
(2) AC to DC

Capacitor **C**(0.01uF~0.1uF) is recommend to be connected between Vout and GND to reduce output noise.

Package Information: (Unit : mm)



PCB Layout Reference View(Top View)



WCS Application Note : please refer to Winson Website -> Products->

Application Note -> WCS Application Note :

<http://www.winson.com.tw/Product/83>

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