WCS2200

Linear Current Sensor with differential outputs

Features:

- 14X10 mm ^{2} and 9 mm ^{2} current conductor through hole
- Output voltage proportional to AC and DC current
- Built-in AC to DC rectifier circuit
- Wide sensing current range 0~20 A at 5V volt
- High sensitive differential outputs
  Single Ended, Sensitivity: 70mV/A
  Differential output, Sensitivity: 140mV/A

- Wide operating voltage range 3.0~12 V
- Low operating current 3 mA
- Isolation voltage 4000V
- Ratiometric output from supply voltage
- 23K Hz Bandwidth
- Two bronze sticks for easy soldering on PCB

Functional Description :

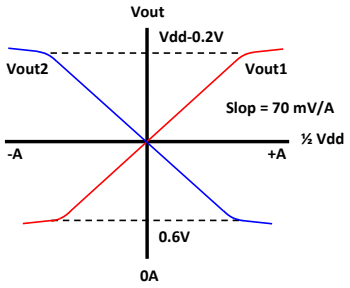
The Winson WCS2200 current sensor provides economical and precise solution for both DC and AC current sensing in industrial, commercial and communications systems. The unique package provides easy implementation without breaking original system and make current sensing possible. Typical applications include motor control, load detection and management, over-current fault detection and any intelligent power management system etc…

The WCS2200 consists of a precise, low-temperature drift linear hall sensor IC with temperature compensation. Users can use system's own electric wire by pass it through this hole to measure passing current. This design allow system designers to monitor any current path without breaking or changing original system layout at all. Any current flowing through this hole will generate a magnetic field which is sensed by the integrated Hall IC and converted into a proportional voltage.

The terminals of the conductive path are electrically isolated from the sensor leads. This allow the WCS2200 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.

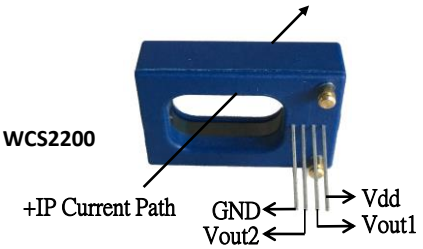
Vout VS. Primary Current



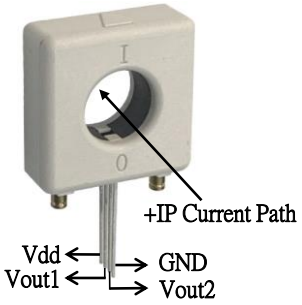
Absolute Maximum Range

Supply Voltage, Vdd ---------- **14V**
Output Current Sink---------- **0.4mA**
Output Current Source---------- **2mA**
Basic Isolation Voltage ---------- **4000V**
Operating Temperature Range, Ta ----------
---------- **-20ºC to +125ºC**
Storage Temperature Range, Ts ----------
---------- **-65ºC to +150ºC**
Power Dissipation, Pd ----------**1W**

WCS2200



WCS2200V

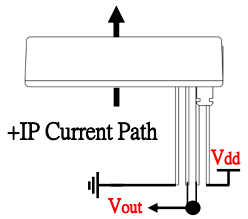


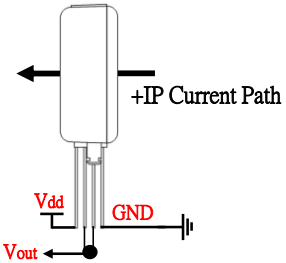
Order Information

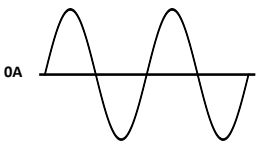
(Vdd = 5V)

Part No.	Through-hole	Sensitivity (Single Ended)	Current range
WCS2200	14X10 mm²	70 mV/A	DC: ±0 ~ 20A AC: rms 15A
WCS2200V	9mm²		

AC to DC Applications



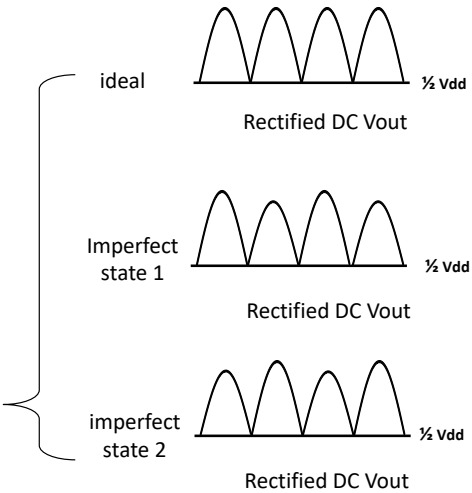




AC current IP

Note:
1. This can get rectified DC signal by connecting Vout1 and Vout2, but the small signal will be offset.

2. The state of rectified DC voltage output is shown below.



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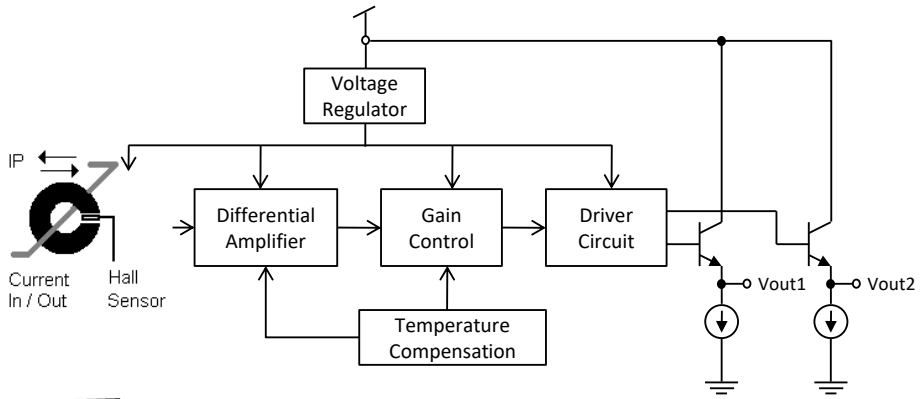
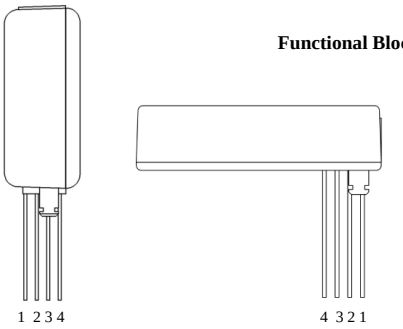
Function Block:



Functional Block Diagram



Number	Name	Description
1	Vdd	Power supply terminal
2	Vout1	Analog output signal 1
3	Vout2	Analog output signal 1
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	Isupply	IP =0 A	—	3.0	6.0	mA
Zero Current Vout	V0G1/2	IP =0 A(DC Mode)	2.3	2.5	2.7	V
Zero Current Differential Vout	V0G1-2	IP =0 A(DC Mode)	-0.4	—	0.4	V
Sensitivity (Single Ended)	△Vout1/2	IP= +-10 A	60	70	80	mV/A
Sensitivity (Differential)	△Vout12	IP= +-10 A	120	140	160	mV/A
Bandwidth	BW	—	—	23	—	kHz
Measurable Current Range	MR	Vdd=5V (DC Mode)	—	±20	—	A
		Vdd=5V (AC RMS)	—	15	—	
Temperature Drift	△Vout	IP =0 A	—	±1.0	—	mV/℃
Output Noise	V_{Np-p}	IP =0 A	—	16.6	—	mV
	$V_{Np-p(0.01uF)}$	IP =0 A, C = 0.01uF	—	3	—	

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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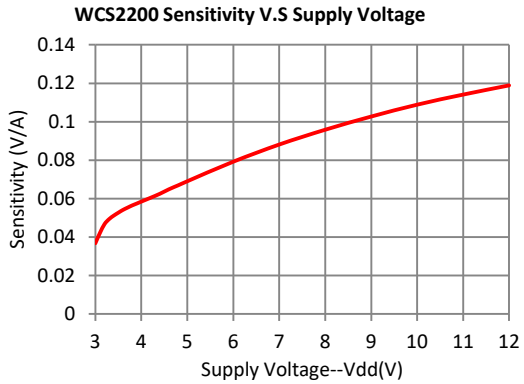
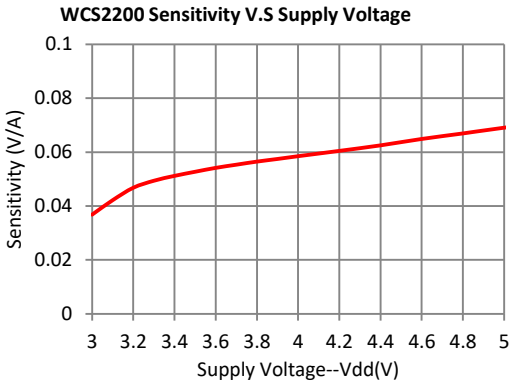
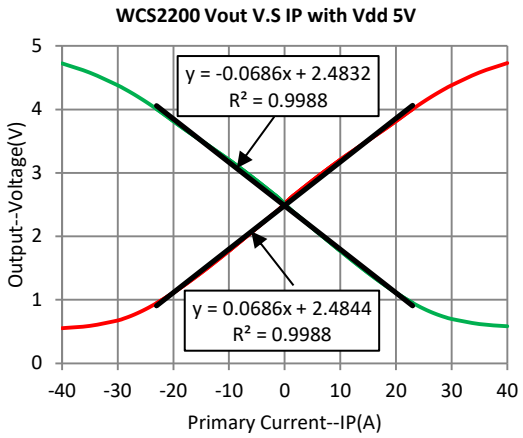
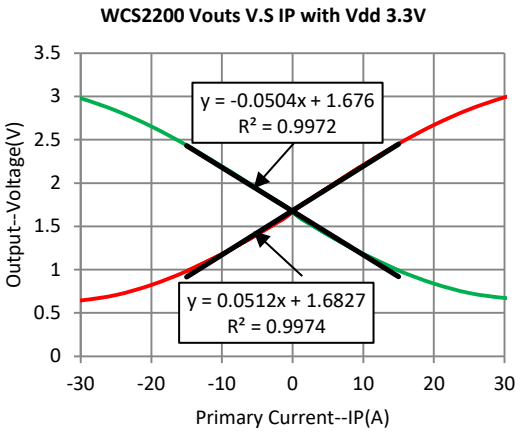
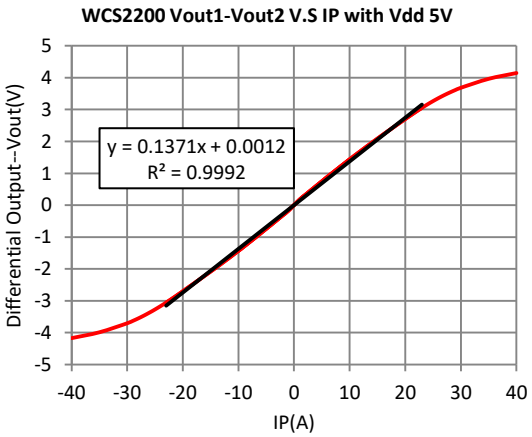
Characteristic Diagrams:

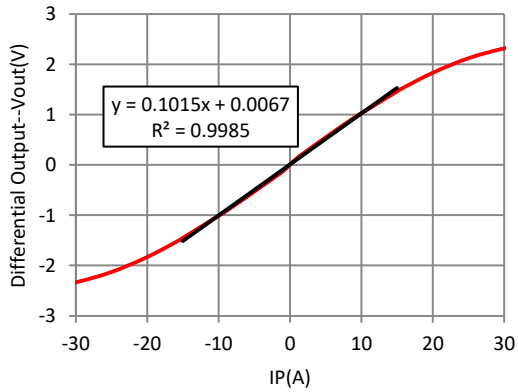












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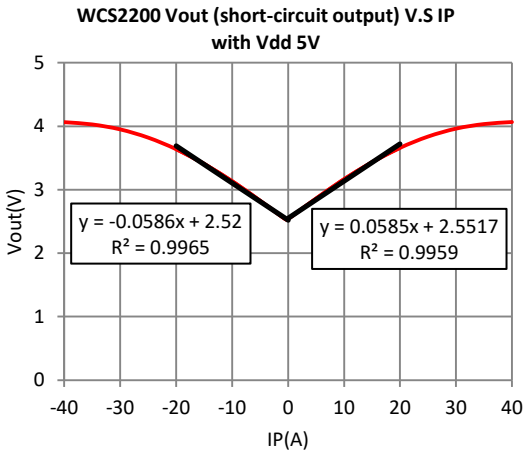
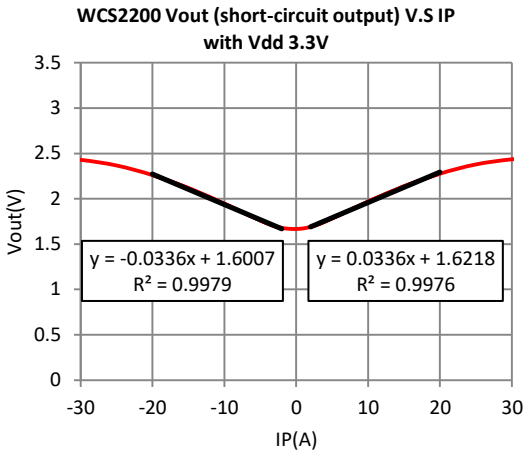
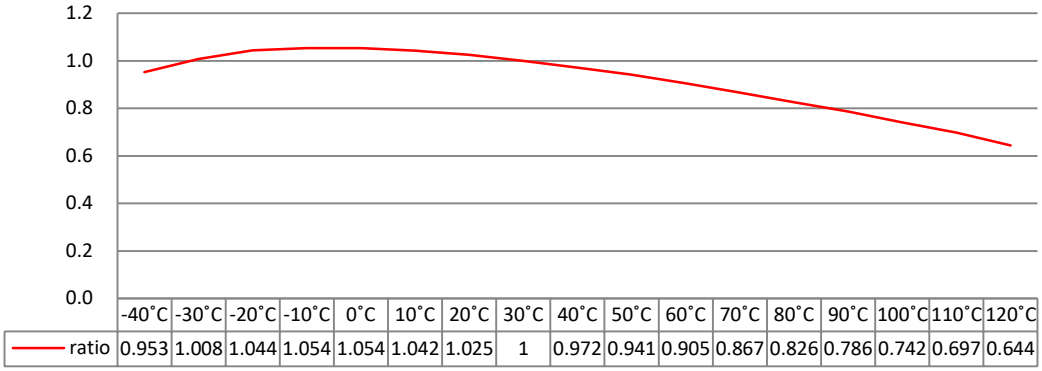


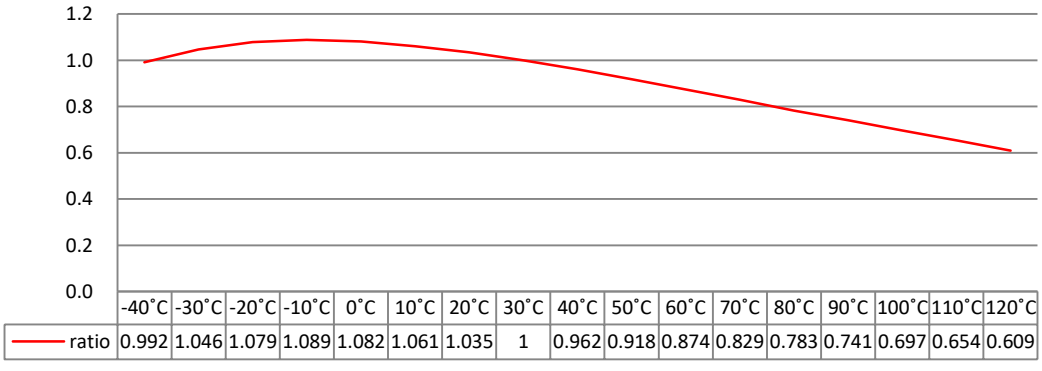


WCS2200 Sensitivity standardization of 30˚C (5V) V.S Temperature



	-40˚C	-30˚C	-20˚C	-10˚C	0˚C	10˚C	20˚C	30˚C	40˚C	50˚C	60˚C	70˚C	80˚C	90˚C	100˚C	110˚C	120˚C
ratio	0.953	1.008	1.044	1.054	1.054	1.042	1.025	1	0.972	0.941	0.905	0.867	0.826	0.786	0.742	0.697	0.644

WCS2200 Sensitivity standardization of 30˚C (3.3V) V.S Temperature



	-40˚C	-30˚C	-20˚C	-10˚C	0˚C	10˚C	20˚C	30˚C	40˚C	50˚C	60˚C	70˚C	80˚C	90˚C	100˚C	110˚C	120˚C
ratio	0.992	1.046	1.079	1.089	1.082	1.061	1.035	1	0.962	0.918	0.874	0.829	0.783	0.741	0.697	0.654	0.609

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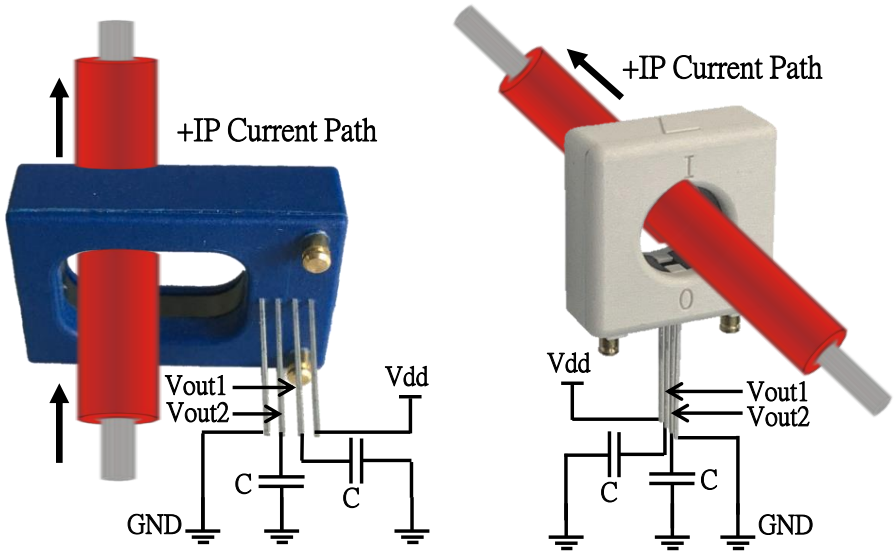
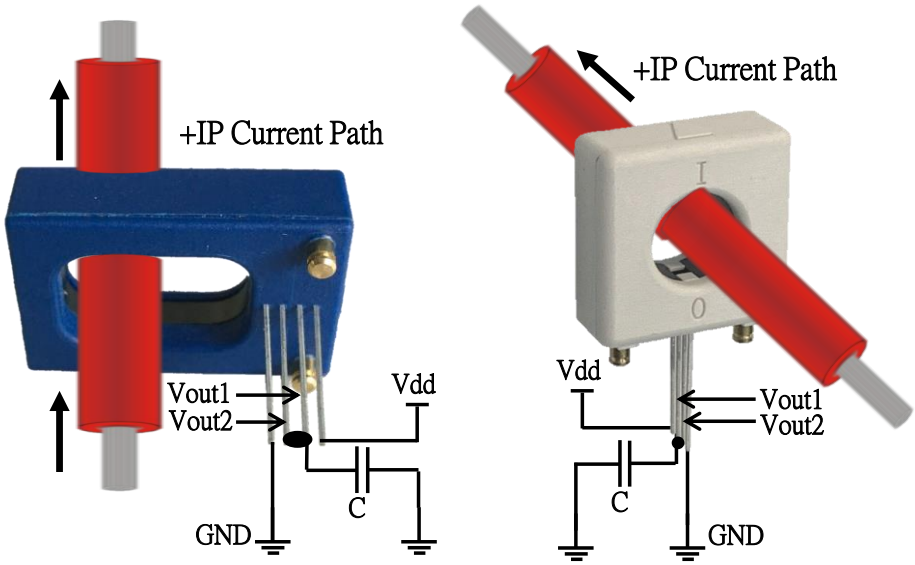
Application Circuit:



(1)Differential Output



(2) AC to DC

Capacitor C(0.01uF~0.1uF) is recommend to be connected between Vout1(Vout2) and GND to reduce output noise.

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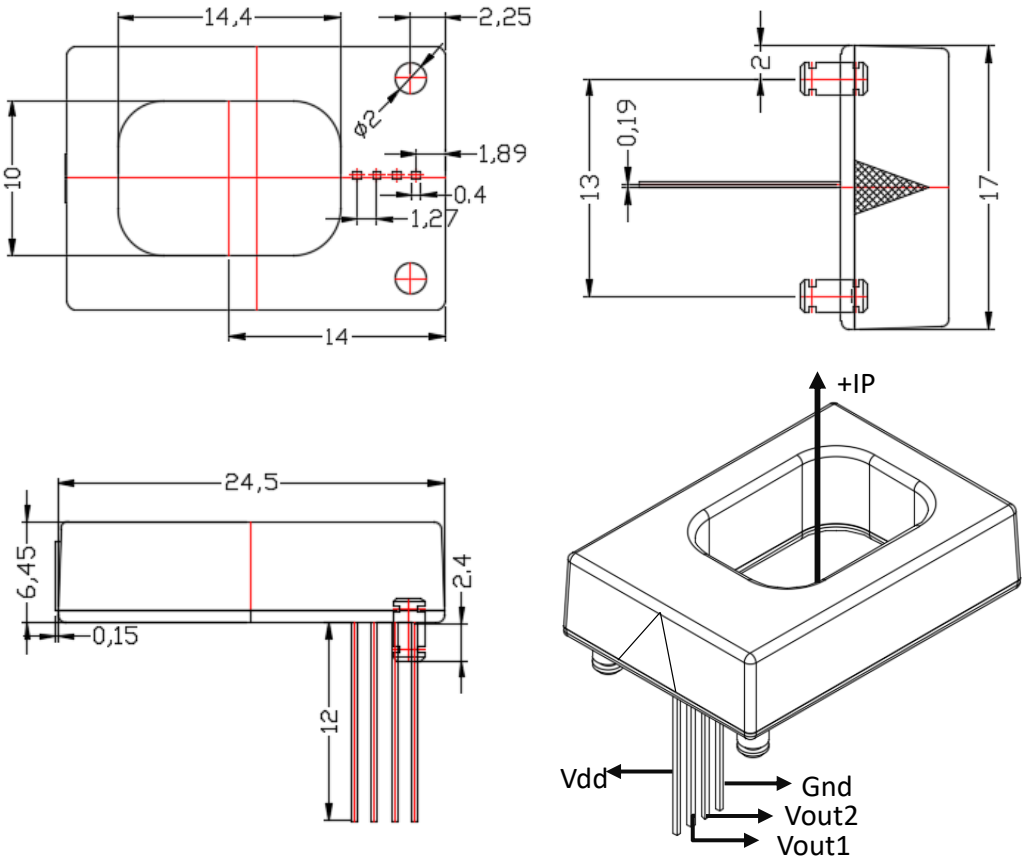
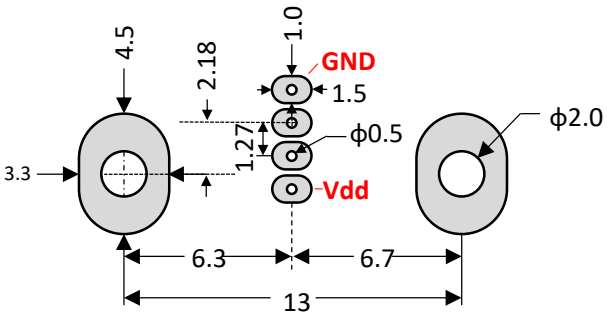
Package Information:

-WCS2200

(Unit: mm)



PCB Layout Reference View(Top View)



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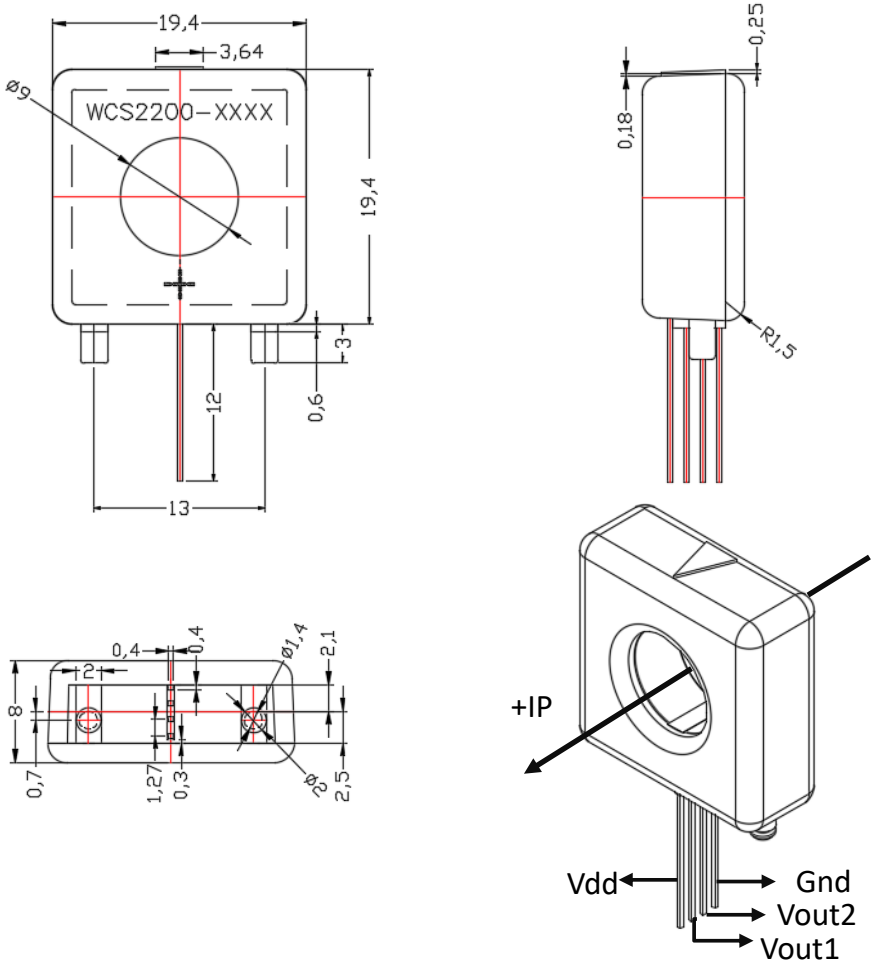
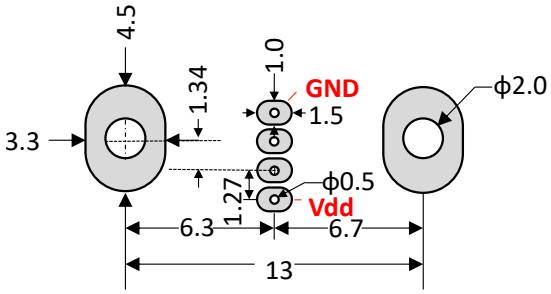
-WCS2200V

(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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