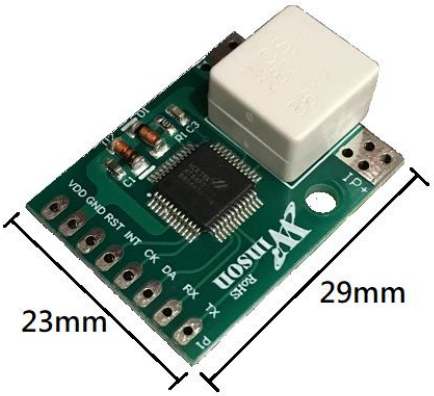
AC / DC Sensing Current Module with Digital Data output

Feature:



- Operating voltage DC5.0V
- 98 mΩ internal conductor resistance
- Sensing current range :
  AC : 0~0.5A (50Hz, 60Hz)
  DC : 0~±0.7A
- High accuracy :
  AC : (0~0.2A) ± 2mA
  (0.2~0.5A) ± 1%
  DC : ±(0~0.2A) ± 2mA
  ±(0.2~0.7A) ± 1%
- High resolution :
  AC / DC : 0.6mA
- UART digital data output，Baud Rare : 9600 bps
- Temperature calibration
- Isolation Voltage 1KV

General Description:

The Winson WCM2801 provides economical and precise solution for both AC and DC current sensing in industrial, commercial and communications systems. The unique package allows for easy implementation by customer. Typical applications include motor control, load detection and management, over-current fault detection and any intelligent power management system etc…

The WCM2801 consists of a current sensor, temperature sensor, a very high accuracy A/D converter and digital signal output of current.

The WCM2801includes 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, user's MCU can get the real data from DATA pin.

The WCM2801 provides temperature calibration of the internal current sensor and accurately measures the current of AC 50 / 60Hz and DC at temperature from -20˚C~70˚C. The WCM2801 also offers solutions for true RMS current measurement of various loads.

1.VDD 2.GND 3.RST 4.INT 5.CK 6.DA 7.RX 8.TX

ABSOLUTE MAXIMUM RATING

Supply Voltage, Vdd ---------- **6V**

Pass Current, IP----------**2.5A**

Pass Current (10ms pulse), Ipulse----------**5A**

Basic Isolation Voltage ---------- **1000V**

Operating Temperature Range, Ta ----------

---------- **-20℃ to +70℃**

Storage Temperature Range, Ts ----------

---------- **-50℃ to +125℃**

Selection Guide:

Model	Maximum Current		Operating Voltage	mode
	AC	DC		
WCM2801-AC50C	0.5A	-	5.0V	Continuous
WCM2801-DC50C		±0.7A	5.0V	Continuous
WCM2801-50C	0.5A	±0.7A	5.0V	Continuous

Pad Description:

Pad No	Pad Name	I/O	Description
1	VDD	-	The positive power input pin
2	GND	-	The system ground
3	RST	I	The system reset
4	INT	I	Sampling control
5	CK	I/O	System programming, reserve
6	DA	I/O	
7	RX	I	The data of measured current output. Its output is UART communication. The baud rate is 9.6K bits/sec.
8	TX	O	

Electrical Characteristics:

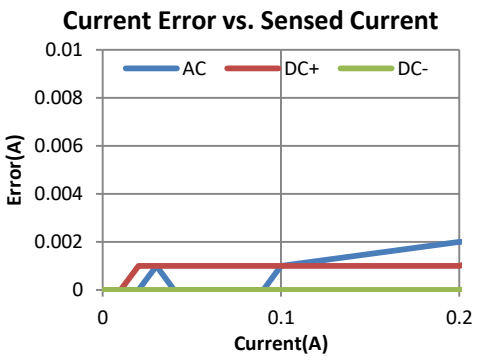
-50C T_{OP} = 25˚C, V_{DD} = 5.0V

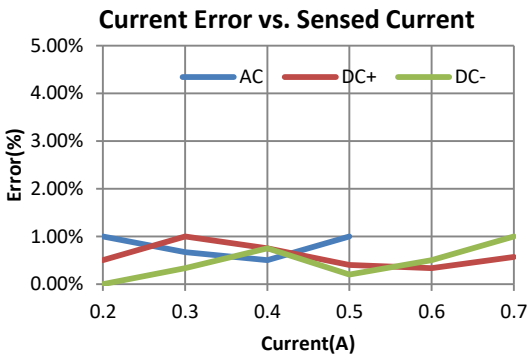
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
VDD	Operation Voltage	-	4.9	5	5.1	V
IDD	Operation Current	-	-	6	8	mA
IOP	AC Current Range	-	0	-	0.5	A
	DC Current Range	-	0	-	±0.7	A
TOP	Operating Temperature	-	-20	-	70	˚C
ETOT	AC Current Total Output Error	IOP=0~0.2A，TOP=25˚C	-	±2	-	mA
		IOP=0.2~0.5A，TOP=25˚C	-	±1	-	%
		IOP=0~0.5A，TOP=-20˚C to 70˚C	-	±5	-	%
	DC Current Total Output Error	IOP=±(0~0.2A)，TOP=25˚C	-	±2	-	mA
		IOP=±(0.2~0.7A)，TOP=25˚C	-	±1	-	%
		IOP=0~±0.7A，TOP=-20˚C to 70˚C	-	±5	-	%

System Start Up Time Characteristics:

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
TSST	System Start-up Time (Wake-up)	-	-	10	-	ms
TRSTD	System Reset Delay Time	-	-	1	-	s

Error Diagram: (T_{OP} = 25˚C, V_{DD} = 5.0V)

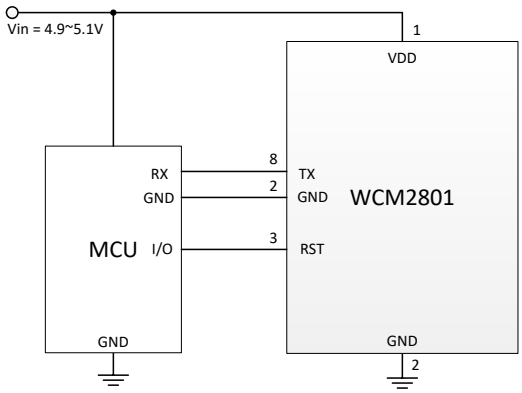




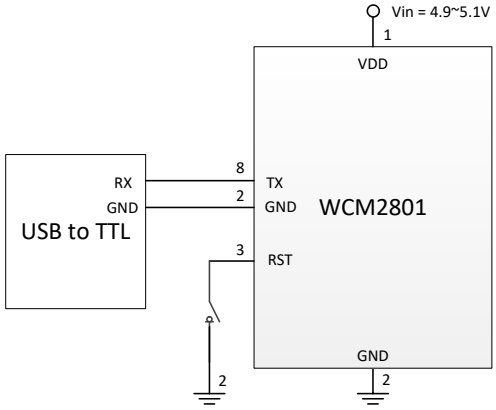
Winson reserves the right to make changes to improve reliability or manufacturability.

Application Note:

Application Diagram:



APP. 1. Output UART signal with MCU



APP. 2. Output UART signal with USB to TTL

Measured Current Data Output:

The measured current can be transmitted by UART format. There are total 8 bytes of data will be output.

(1) If the measured data is AC “1.234”A, then the output data is ‘~’, ‘0’, ‘1’, ‘2’, ‘3’, ‘4’, ‘\r’,‘\n’, total of 8 bytes; the output data is ASCII code.

(2) If the measured data is +DC “1.234”A, then the output data is ‘+’, ‘0’, ‘1’, ‘2’, ‘3’, ‘4’, ‘\r’,‘\n’, total of 8 bytes; the output data is ASCII code.

(3) If the measured data is -DC “1.234”A, then the output data is ‘-’, ‘0’, ‘1’, ‘2’, ‘3’, ‘4’, ‘\r’,‘\n’, total of 8 bytes; the output data is ASCII code.

True RMS Current Measurement:

In order to calculate true RMS of AC current, you need to know "zero" value of AC current first. The "zero" value of symmetric AC current is the average value *Vo*(dc) of the current shown in Figure 1.

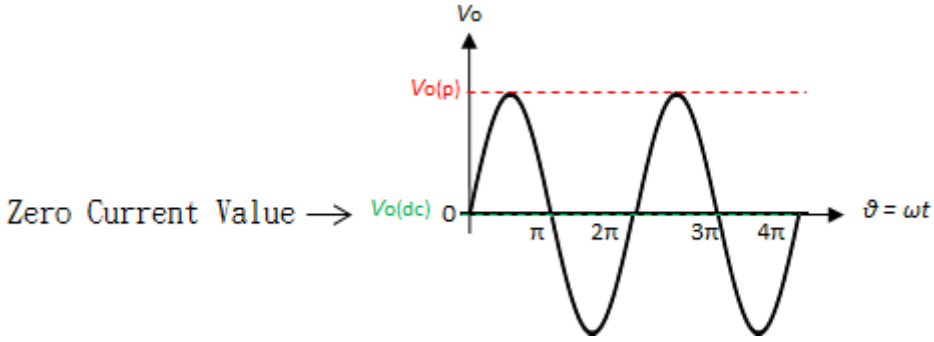


Figure 1 The zero current value of sine waveform

But in asymmetrical AC current, the "zero" value is not the average value *Vo*(dc) of the current. Based on this "zero" value and do RMS calculation. You will get wrong answer.

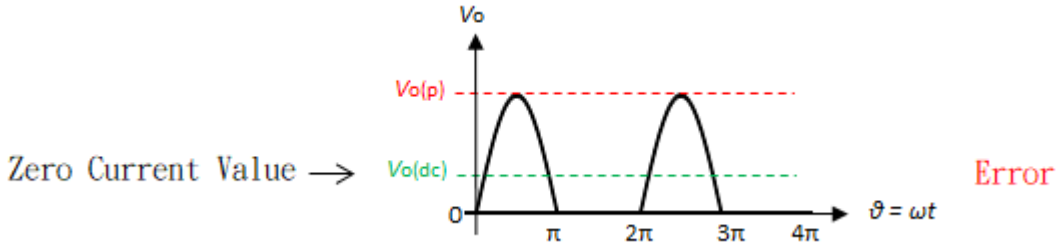


Figure 2 The zero current value of the asymmetric waveform (Error)

The WCM2801 offers a true RMS solution for both symmetric and asymmetric AC current. It can correctly detect "zero" current value, shown in Figure 3. and do perfect RMS calculation.

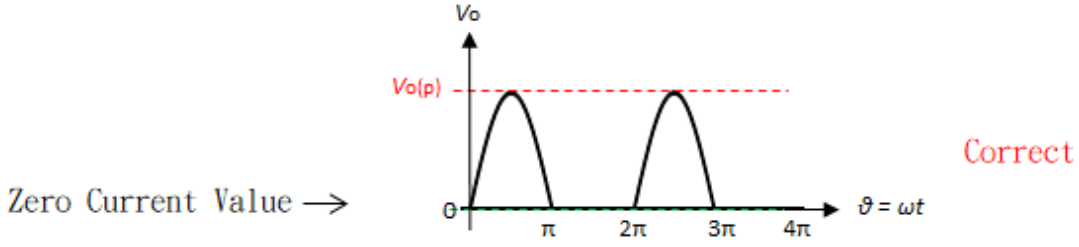


Figure 3 The zero current value of the asymmetric waveform (Correct)

Package:

(Unit: mm)