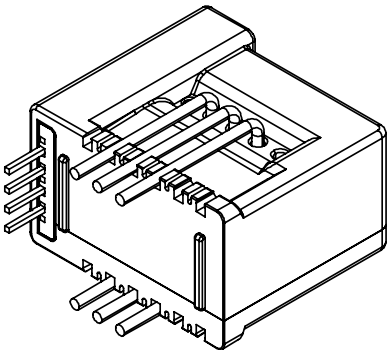
CR1V PB01 SERIES

Current Sensor

Model Number:

CR1V 6 PB01
CR1V 15 PB01
CR1V 25 PB01



For the electronic measurement of current:DC,AC,pulsed...,with galvanic separation between the primary and the secondary circuit.

Features

- Closed loop（compensated）current sensor using the Hall effect
- Galvanic separation between primary and secondary
- Insulating plastic case recognized according to UL 94-V0
- Very good linearity
- High accuracy
- Very low offset drift over temperature
- No insertion losses
- Standards:
  - IEC 60664-1:2020
  - IEC 61800-5-1:2022
  - IEC 62109-1:2010

Applications

- AC variable speed and servo motor drives
- Uninterruptible Power Supply (UPS)
- Static converters for DC motor drives
- Swith Mode Power Supplies (SMPS)
- Power supply for welding applications
- Battery Management
- Photovoltaic inverter
- Module power supply

Safety

The sensor must be used according to IEC 61800-5-1.
The sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the following manufacture's operating instructions.

Caution,risk of electrical shock !

When operating the sensor,certain parts of the module can carry hazardous voltage (e.g.,Primary busbar, power supply). Ignore this warning can lead to injury and/or cause serious damage.
This sensor is a built-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

Absolute maximum ratings (not operating)

Parameter	Symbol	Unit	Value
Supply voltage	V_C	V	6
Primary conductor tempearture	T_B	℃	110
ESD rating, Human Body Model (HBM)	V_{ESD}	kV	4

※ Stresses above these ratings may cause permanent damage.
※ Exposure to absolute maximum ratings for extended periods may degrade reliability.

Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T_A	℃	-40		105	
Ambient storage temperature	T_S	℃	-55		125	
Mass	m	g		10		

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @ 50Hz,1min	V_d	kV	4.1	According to IEC 60664-1
Impulse withstand voltage 1.2/50μs	V_W	kV	7.5	According to IEC 60664-1
Clearance (Pri.-sec.)	d_{Cl}	mm	7.5	
Creepage distance (Pri.-sec.)	d_{Cp}	mm	7.5	
Plastic case	-	-	UL94-V0	
Comparative traking index	CTI	PLC	1	
Application example	-	-	300V	Reinforced insulation, according to IEC 61800-5-1, IEC62109-1CATⅢ，PD2
Application example	-	-	600V	Basic insulation, according to IEC 61800-5-1, IEC62109-1CATⅢ，PD2

Electrical data

CR1V 6 PB01

※ With T_A = 25℃, V_C = 5V, R_L = 10kΩ , unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±6		
Maximum measured current	I_{PM}	At	-20		20	
Turns ratio	K_N	-		1-2-3: 1000		
Internal sampling resistance	R_{IM}	Ω		26		
Theoretical sensitivity	G_{th}	mV/A		104.17		@ V_C=5V
Load resistance	R_L	kΩ	10			
Current consumption	I_C	mA		8 + I_P/N_S		
Supply voltage	V_C	V	4.75	5	5.25	@ ±5%
Output voltage	V_O	V		2.5±(0.625*I_P/I_{PN})		
Reference voltage @I_P=0A	V_{REF}	V	2.495	2.5	2.505	
Extenal reference voltage	V_{REF}	V	0.5		2.75	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Offset voltage	V_{OE}	mV	-5		5	V_{OUT}-V_{REF}
Temperature drift of offset voltage	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Hysteresis offset voltage@I_P=0 after 3xI_{PN}	V_M	mV	-2	±1	2	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclisive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.8		0.8	Exclusive of V_{OE}
Response time @ 90% of I_{PN}	t_r	μs			1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

Electrical data

CR1V 15 PB01

※ With T_A = 25℃, V_C = 5V, R_L = 10kΩ ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±15		
Maximum measured current	I_{PM}	At	-51		51	
Turns ratio	K_N	-		1-2-3: 1000		
Internal sampling resistance	R_{IM}	Ω		15.6		
Theoretical sensitivity	G_{th}	mV/A		41.67		@ V_C=5V
Load resistance	R_L	kΩ	10			
Current consumption	I_C	mA		8 + I_P/N_S		
Supply voltage	V_C	V	4.75	5	5.25	@ ±5%
Output voltage	V_O	V		2.5±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	V	2.495	2.5	2.505	
External reference voltage	V_{REF}	V	0.5		2.75	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Offset voltage	V_{OE}	mV	-5		5	V_{OUT}-V_{REF}
Temperature drift of offset voltage	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Hysteresis offset voltage@I_P=0 after 3xI_{PN}	V_M	mV	-2	±1	2	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.8		0.8	Exclusive of V_{OE}
Response time @ 90% of I_{PN}	t_r	μs			1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

Electrical data

CR1V 25 PB01

※ With T_A = 25℃, V_C = 5V, R_L = 10kΩ ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±25		
Maximum measured current	I_{PM}	At	-85		85	
Turns ratio	K_N	-		1-2-3: 1000		
Internal sampling resistance	R_{IM}	Ω		10.4		
Theoretical sensitivity	G_{th}	mV/A		25		@ V_C=5V
Load resistance	R_L	kΩ	10			
Current consumption	I_C	mA		8 + I_P/N_S		
Supply voltage	V_C	V	4.75	5	5.25	@ ±5%
Output voltage	V_O	V		2.5±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	V	2.495	2.5	2.505	
External reference voltage	V_{REF}	V	0.5		2.75	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Offset voltage	V_{OE}	mV	-5		5	@ V_{OUT}-V_{REF}
Temperature drift of offset voltage	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Hysteresis offset voltage@ I_P=0 after 3xI_{PN}	V_M	mV	-2	±1	2	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.8		0.8	Exclusive of V_{OE}
Response time @ 90% of I_{PN}	t_r	μs			1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

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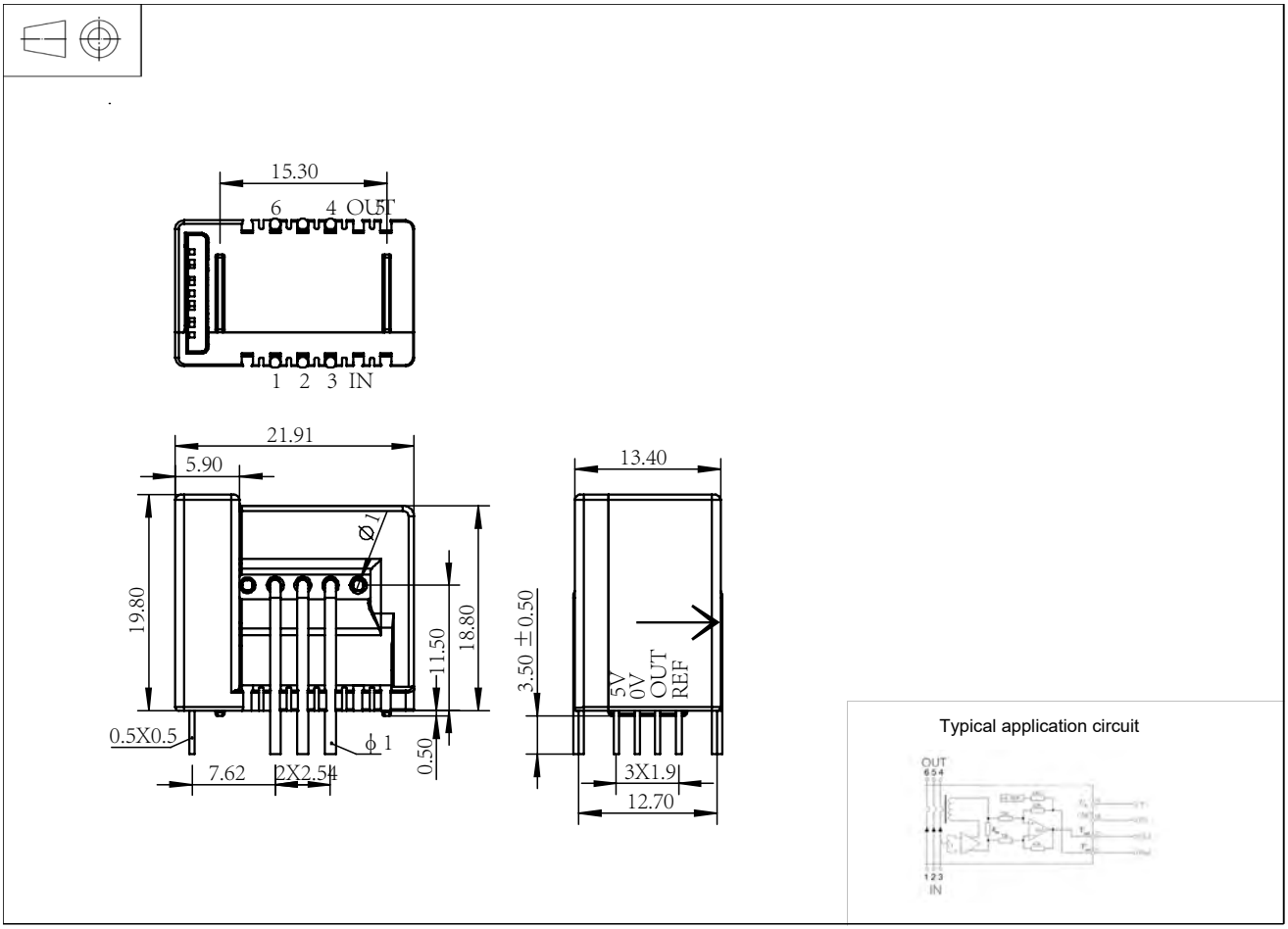
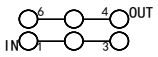
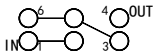
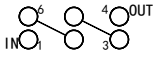
Dimensions（in mm. 1 mm = 0.0394 inch）



Number of Primary turns	Primary nominal current I_{PN} (A)	Nominal output voltage V_O(V)	Primary resistance R_P (mΩ)	Primary inductance L_P (μH)	Recommended connections
1	±6 (±15, ±25)	2.5±0.625	0.18	0.013	
2	±3 (±7.5, ±12.5)	2.5±0.625	0.81	0.05	
3	±2 (±5, ±8.3)	2.5±0.625	1.62	0.12	

Mechanical characteristics

- ✧ General tolerance ±0.3 mm
- ✧ Connect the original side to the pin 6 pins φ1mm
- ✧ The secondary side signal connects to the pin 4 pins 0.5x0.5mm

Remarks

- ✧ I_S is positive when the measured electric current flows from 1,2,3 to 4,5,6.
- ✧ This is a standard model. For different applications (measurement, secondary connections…), please contact CHIPSENSE.