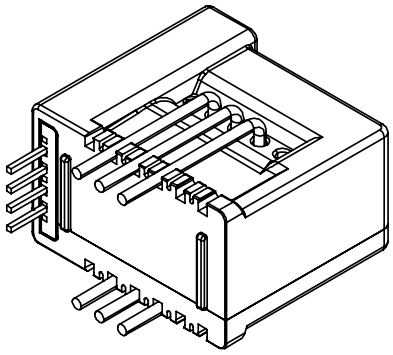
CR1V PB03 SERIES

Current Sensor

Model Number:

CR1V 6 PB03
CR1V 15 PB03
CR1V 25 PB03
CR1V 50 PB03



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
- Supply voltage:3.3V
- 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
- Switch Mode Power Supplies (SMPS)
- Power supply for welding applications
- Battery management
- Wind energy inverter
- Test and detection devices

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	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		85	
Ambient storge temperature	T_S	℃	-40		125	
Mass	m	g		10		

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @50Hz,1min	V_d	kV	3	According to IEC 60664-1
Impulse withstand voltage 1.2/50μs	V_W	kV	8	According to IEC 60664-1
Clearance(Pri.-sec.)	d_{Cl}	mm	6.35	
Creepage distance (pri.- sec.)	d_{Cp}	mm	15.5	
Plastic case	-	-	UL94-V0	
Comparative traking index	CTI	PLC	3	
Application example	-	-	300V	Reinforced insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2
Application example	-	-	600V	Basic insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2

Electrical data

CR1V 6 PB03

※ With T_A = 25℃, V_C = 3.3V, R_L = 2kΩ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±6		
Maximum measuring current	I_{PM}	At	-12		12	
Turns ratio	K_N	-		1-2-3: 960		
Internal sampling resistance（0.1%）	R_{IM}	Ω		15		
Theoretical sensitivity	G_{th}	mV/A		104.17		@ V_C=3.3V
Load resistance	R_L	kΩ	2			
Current consumption	I_C	mA		15 + I_P/N_S+ V_{OUT}/R_L		
Supply voltage	V_C	V		3.3		@ ±5%
Output voltage	V_0	V		1.62±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	mV	1643	1650	1657	
Offset voltage@I_P=0A	V_{OE}	mV	1643	1650	1657	
Temperature drift of offset voltage	TCV_{OE}	mV/℃	-0.05		0.05	@ -40℃~85℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	%/℃	-0.05		0.05	@ -40℃~85℃
Hysteresis offset voltage@I_P=0 after 3 × I_{PN}	V_M	mV	-1	±0.5	1	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.7		0.7	Exclusive of V_{OE}
Response time @90% of I_{PN}	t_r	μs		0.5	1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

Electrical data

CR1V 15 PB03

※ With T_A = 25℃, V_C = 3.3V, R_L = 2kΩ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±15		
Maximum measured current	I_{PM}	At	-30		30	
Turns ratio	K_N	-		1-2-3:960		
Internal sampling resistance（0.1%）	R_{IM}	Ω		10		
Theoretical sensitivity	G_{th}	mV/A		41.67		@ V_C=3.3V
Load resistance	R_L	kΩ	2			
Current consumption	I_C	mA		15 + I_P/N_S+ V_{OUT}/R_L		
Supply voltage	V_C	V		3.3		@ ±5%
Output voltage	V_O	V		1.62±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	mV	1643	1650	1657	
Offset voltage@I_P=0A	V_{OE}	mV	1643	1650	1657	
Temperature drift of offset voltage	TCV_{OE}	mV/℃	-0.05		0.05	@ -40℃~85℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	%/℃	-0.05		0.05	@ -40℃~85℃
Hysteresis offset voltage@I_P=0 after 3×I_{PN}	V_M	mV	-1	±0.5	1	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.7		0.7	Exclusive of V_{OE}
Response time@ 90% of I_{PN}	t_r	μs		0.5	1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

Electrical data

CR1V 25 PB03

※ With T_A = 25℃, V_C = 3.3V, R_L = 2kΩ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±25		
Maximum measured current	I_{PM}	At	-50		50	
Turns ratio	K_N	-		1-2-3:960		
Internal sampling resistance（0.1%）	R_{IM}	Ω		6		
Theoretical sensitivity	G_{th}	mV/A		25		@ V_C=3.3V
Load resistance	R_L	kΩ	2			
Current consumption	I_C	mA		15 + I_P/N_S+ V_{OUT}/R_L		
Supply voltage	V_C	V		3.3		@ ±5%
Output voltage	V_0	V		1.62±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	mV	1643	1650	1657	
Offset voltage@I_P=0A	V_{OE}	mV	1643	1650	1657	
Temperature drift of offset voltage	TCV_{OE}	mV/℃	-0.05		0.05	@ -40℃~85℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature of G	TCG	%/℃	-0.05		0.05	@ -40℃~85℃
Hysteresis offset voltage@I_P=0 after 3 × I_{PN}	V_M	mV	-1	±0.5	1	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.7		0.7	Exclusive of V_{OE}
Response time@ 90% of I_{PN}	t_r	μs		0.5	1	@ di/dt=50A/s
Frequency bandwidth(-3dB)	BW	kHz	200			

Electrical data

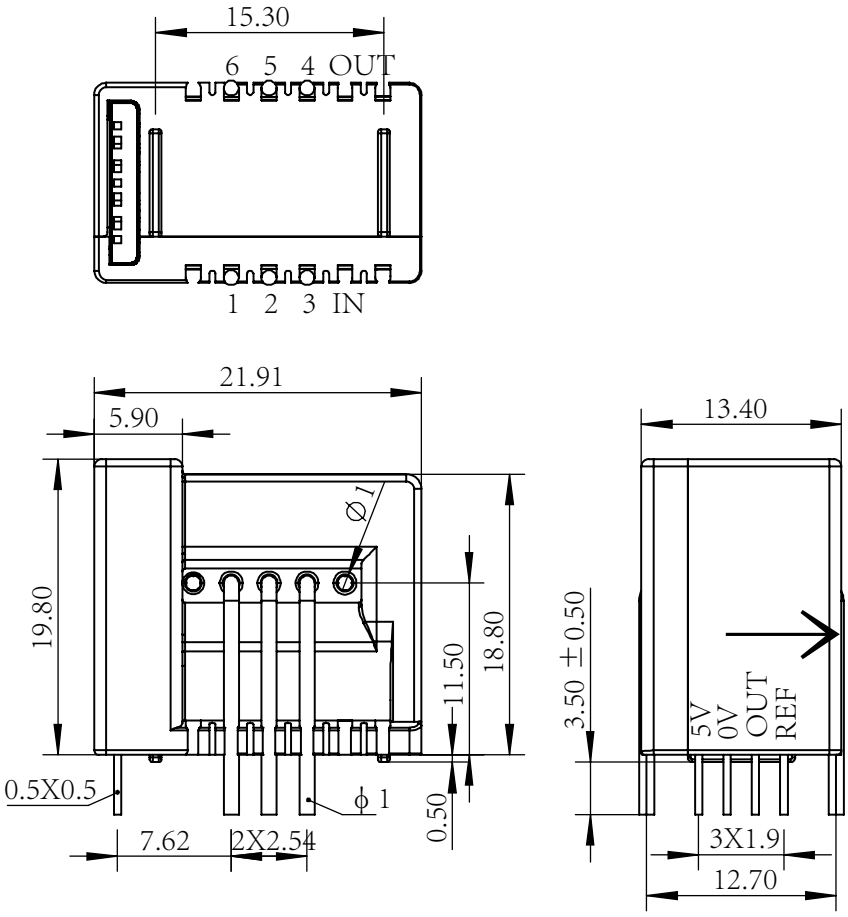
CR1V 50 PB03

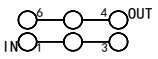
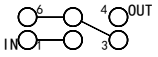
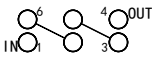
※ With T_A = 25℃, V_C = 3.3V, R_L = 2kΩ,unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±50		
Maximum measured current	I_{PM}	At	-100		100	
Turns ratio	K_N	-		1-2-3:960		
Internal sampling resistance（0.1%）	R_{IM}	Ω		3		
Theoretical sensitivity	G_{th}	mV/A		25		@ V_C=3.3V
Load resistance	R_L	kΩ	2			
Current consumption	I_C	mA		15 + I_P/N_S+ V_{OUT}/R_L		
Supply voltage	V_C	V		3.3		@ ±5%
Output voltage	V_0	V		1.62±(0.625*I_P/I_{PN})		
Reference voltage@I_P=0A	V_{REF}	mV	1643	1650	1657	
Offset voltage@I_P=0A	V_{0E}	mV	1643	1650	1657	
Temperature drift of offset voltage	TCV_{0E}	mV/℃	-0.05		0.05	@ -40℃~85℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{0E}
Temperature of G	TCG	%/℃	-0.05		0.05	@ -40℃~85℃
Hysteresis offset voltage@I_P=0 after 3×I_{PN}	V_M	mV	-1	±0.5	1	
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	Exclusive of V_{0E}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.7		0.7	Exclusive of V_{0E}
Response time @ 90% of I_{PN}	t_r	μs		0.5	1	@ di/dt=50A/s
Frequency bandwidth (-3dB)	BW	kHz	200			

CR1V PB03 SERIES

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, ±50)	1.65±0.625	0.18	0.013	
2	±3 (±7.5, ±12.5, ±25)	1.65±0.625	0.81	0.05	
3	±2 (±5, ±8.3, ±16.6)	1.65±0.625	1.62	0.12	

Mechanical characteristics

- ✧ General tolerance ±0.3 mm
- ✧ Connection of primary pin 6 pins 0.8×0.8mm
- ✧ Connection of secondary pin 4 pins 0.3×0.5mm

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.