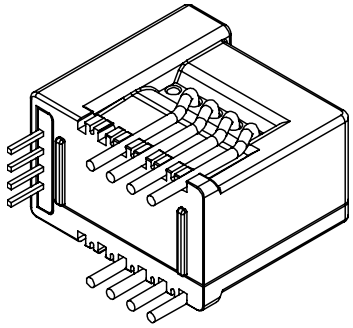
CR1V PB04 SERIES

Current sensor

Model Number:

CR1V 6 PB04
CR1V 15 PB04
CR1V 25 PB04
CR1V 50 PB04



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

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
  - UL 508: 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	4.3	
Impulse withstand voltage1.2/50μs	V_W	kV	8	
Clearance (Pri.-sec.)	d_{Cl}	mm	8.2	
Creepage distance (Pri.-sec.)	d_{Cp}	mm	8.2	
Plastic case	-	-	UL94-V0	
Comparative traking index	CTI	PLC	3	
Application example	-	-	300V CAT Ⅲ PD2	Reinforced insulation,according to IEC 61010-1 IEC 62109-1CATⅢ, PD2
Application example	-	-	600V CAT Ⅲ PD2	Reinforced insulation,according to IEC 61800-5-1 IEC 62109-1CATⅢ, PD2
Application example	-	-	1000V CAT Ⅲ PD2	Basic insulation,according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2

Electrical data

CR1V6PB04

※ 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 measuring current	I_{PM}	At	-20		20	
Turns ratio	K_N	-	1-2-4: 1000			
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	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Electrical offset voltage	V_{OE}	mV	-5.3		5.3	V_{OUT}-V_{REF}
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature coefficient of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Magnetic offset current@I_P=0 after 10xI_{PN}	I_{OM}	A	-0.1		0.1	
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 15 PB04

※ 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 measuring current	I_{PM}	At	-51		51	
Turns ratio	K_N	-	1-2-4: 1000			
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	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Electrical offset voltage	V_{OE}	mV	-2.21		2.21	V_{OUT}-V_{REF}
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature coefficient of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Magnetic offset current@I_P=0 after10xI_{PN}	I_{OM}	A	-0.1		0.1	
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 PB04

※ 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 measuring current	I_{PM}	At	-85		85	
Turns ratio	K_N	-	1-2-4: 1000			
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	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Electrical offset voltage	V_{OE}	mV	-1.35		1.35	V_{OUT}-V_{REF}
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature coefficient of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Magnetic offset current@I_P=0 after 10xI_{PN}	I_{OM}	A	-0.1		0.1	
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

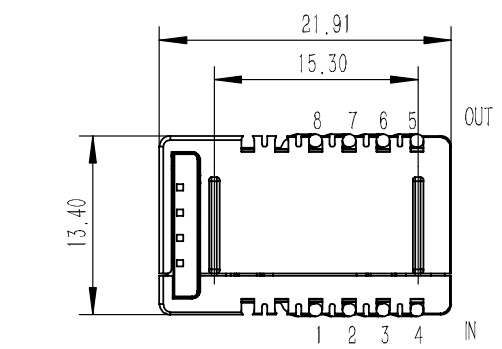
CR1V 50 PB04

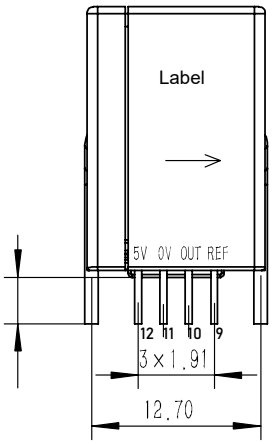
※ With T_A = 25℃, V_C = 5V, R_L = 10kΩ, unless otherwise noted.

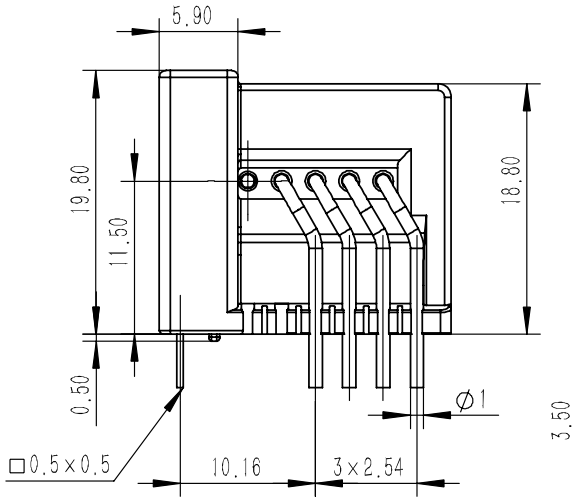
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	At		±50		
Maximum measuring current	I_{PM}	At	-150		150	
Turns ratio	K_N	-	1-2-4: 1000			
Theoretical sensitivity	G_{th}	mV/A		12.5		@ V_C=5V
Load resistance	R_L	kΩ	10			
Current consumption	I_C	mA	8 + I_P/N_S			
Supply voltage	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	
Output voltage	V_{OUT}	V	0.25		4.75	@ V_C=5V
Output voltage@I_P=0A	V_{OUT}	V		V_{REF}		
Electrical offset voltage	V_{OE}	mV	-0.725		0.725	V_{OUT}-V_{REF}
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/K	-30		30	@ -40℃~105℃
Sensitivity error	ε_G	%	-0.5		0.5	Exclusive of V_{OE}
Temperature coefficient of G	TCG	ppm/K	-50		50	@ -40℃~105℃
Magnetic offset current@I_P=0 after 10xI_{PN}	I_{OM}	A	-0.1		0.1	
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			

CR1V PB04 SERIES

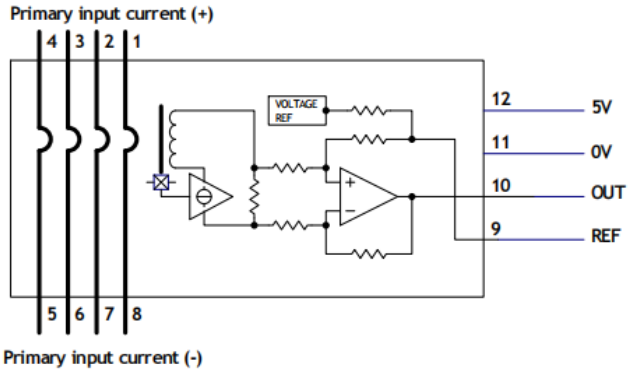
Dimensions（in mm. 1 mm = 0.0394 inch）

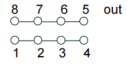
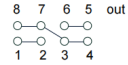
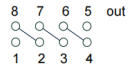






Typical application circuit



Number of Primary turns	Primary resistance R_P (mΩ)	Recommended connections
1	0.18	
2	0.72	
4	2.88	

Mechanical characteristics

- ✧ General tolerance ±0.3 mm
- ✧ Connection of primary pin 6 pins φ1mm
- ✧ Connection of secondary 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.