# AN1V PB20

芯森
CHIPSENSE

Current Sensor

Model Number:

AN1V 50 PB20
AN1V 100 PB20
AN1V 150 PB20
AN1V 200 PB20

RoHS compliant

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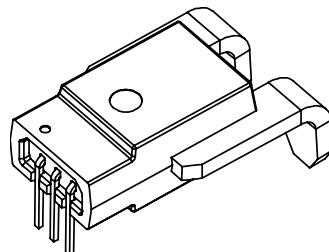
For the electronic measurement of current:DC,AC,pulsed...,with galvanic separation between the primary and the secondary circuit.

Features

- ◇ Open loop current sensor using the Hall effect.
- ◇ ASIC Technology.
- ◇ Maintain output proportional to changes in the power supply（include offset and sensitivity）.
- ◇ Galvanic separation between primary and secondary.
- ◇ Insulating plastic case recognized according to UL 94-V0.
- ◇ No insertion losses.
- ◇ Small size.
- ◇ Standards:
    - ■ IEC 60664-1:2020
    - ■ IEC 61800-5-1:2022
    - ■ IEC 62109-1:2010

Applications

- ◇ AC variable speed.
- ◇ 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.

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.

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Absolute maximum ratings(not operating)

Parameter	Symbol	Unit	Value
Supply voltage	V_C	V	6.5
ESD rating, Human Body Model (HBM)	V_{ESD}	V	8000

※ 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		150	AN1V 50 PB20
			−40		150	AN1V 100 PB20
			−40		125	AN1V 150 PB20
			−40		85	AN1V 200 PB20
Ambient storge temperature	T_S	℃	−55		150	
Primary resistance value	R_P	μΩ		100		
Mass	m	g		5		

Insulation coordination

Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test, @50Hz,1min	V_d	kV	4.8	According to IEC 60664−1
Plastic case	−	−	UL94−V0	
Comparative traking index	CTI	PLC	2	
Application example	−	−	475V_{RMS}	Reinforced insulation,according to IEC 61800−5−1, IEC 62109−1CATⅢ, PD2
Application example	−	−	960V_{RMS}	Basic insulation,according to IEC 61800−5−1, IEC 62109−1CATⅢ, PD2

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Electrical data

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

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Electrical data						
Primary nominal rms current	I_{PN}	A	–50		50	
Supply voltage	V_C	V	4.5	5.0	5.5	
Output voltage	V_{OUT}	V	$V_{OUT}= V_{QOV} + G_{th} \times I_P \times (V_C/5)$			
Electrical offset voltage	V_{QOV}	V		$V_{CC}/2$		
Theoretical sensitivity	G_{th}	mV/A		40		
Current consumption	I_C	mA		8	11	
Load resistance	R_L	kΩ	5.1			
Load capacitor	C_2	nF		1	10	
Power filter capacitor	C_1	nF		100		
Performance data						
Sensitivity error	ε_G	%	–1		1	
Temperature of G	TCG	%	–1.5		1.5	@T_A=–40℃~150℃
Electrical offset current	V_{0E}	mV	–10	±5	10	@V_C=5V also I_P=0A
Electrical offset error of temperature drift	TCV_{0E}	mV	–10		10	@T_A=–40℃~150℃
Hysteresis offset voltage	V_{0M}	mV		4		@ V_C=5V, after ±I_{PN}
Linearity error	ε_L	% of I_{PN}	–1		1	Exclusive of V_{0E}
Accuracy@ I_{PN}	X	% of I_{PN}	–2		2	@T_A=–40℃~150℃
Response time @90% of I_{PN}	t_r	μs		2.5	5	@C_2=1nF
Frequency bandwidth(–3dB)	BW	kHz		250		@C_2=1nF
Output noise	Vno	mV		5		@C_2=1nF

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

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Electrical data						
Primary nominal rms current	I_{PN}	A	–100		100	
Supply voltage	V_C	V	4.5	5.0	5.5	
Output voltage	V_{OUT}	V	$V_{OUT}= V_{QOV} + G_{th} \times I_P \times (V_C/5)$			
Electrical offset voltage	V_{QOV}	V		$V_{CC}/2$		
Theoretical sensitivity	G_{th}	mV/A		20		
Current consumption	I_C	mA		8	11	
Load resistance	R_L	kΩ	5.1			
Load capacitor	C_2	nF		1	10	
Power filter capacitor	C_1	nF		100		
Performance data						
Sensitivity error	ε_G	%	–1		1	
Temperature of G	TCG	%	–1.5		1.5	@T_A=–40℃~150℃
Electrical offset current	V_{0E}	mV	–10	±5	10	@V_C=5V also I_P=0A
Electrical offset error of temperature drift	TCV_{0E}	mV	–10		10	@T_A=–40℃~150℃
Hysteresis offset voltage	V_{OM}	mV		4		@ V_C=5V, after ±I_{PN}
Linearity error	ε_L	% of I_{PN}	–1		1	Exclusive of V_{0E}
Accuracy@ I_{PN}	X	% of I_{PN}	–2		2	@T_A=–40℃~150℃
Response time @90% of I_{PN}	t_r	μs		2.5	5	@C_2=1nF
Frequency bandwidth(-3dB)	BW	kHz		250		@C_2=1nF
Output noise	Vno	mV		2.7		@C_2=1nF

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

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Electrical data						
Primary nominal rms current	I_{PN}	A	–150		150	
Supply voltage	V_C	V	4.5	5.0	5.5	
Output voltage	V_{OUT}	V	$V_{OUT}= V_{QOV} + G_{th} \times I_P \times (V_C/5)$			
Electrical offset voltage	V_{QOV}	V		$V_{CC}/2$		
Theoretical sensitivity	G_{th}	mV/A		13.33		
Current consumption	I_C	mA		8	11	
Load resistance	R_L	kΩ	5.1			
Load capacitor	C_2	nF		1	10	
Power filter capacitor	C_1	nF		100		
Performance data						
Sensitivity error	ε_G	%	–1		1	
Temperature of G	TCG	%	–1.5		1.5	@T_A=–40℃~125℃
Electrical offset current	V_{0E}	mV	–10	±5	10	@V_C=5V also I_P=0A
Electrical offset error of temperature drift	TCV_{0E}	mV	–10		10	@T_A=–40℃~125℃
Hysteresis offset voltage	V_{0M}	mV		4		@ V_C=5V, after ±I_{PN}
Linearity error	ε_L	% of I_{PN}	–1		1	Exclusive of V_{0E}
Accuracy@ I_{PN}	X	% of I_{PN}	–2		2	@T_A=–40℃~125℃
Response time@ 90% of I_{PN}	t_r	μs		2.5	5	@C_2=1nF
Frequency bandwidth(-3dB)	BW	kHz		250		@C_2=1nF
Output noise	Vno	mV		1.8		@C_2=1nF

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

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Electrical data						
Primary nominal rms current	I_{PN}	A	−200		200	
Supply voltage	V_C	V	4.5	5.0	5.5	
Output voltage	V_{OUT}	V	$V_{OUT}= V_{QOV} + G_{th} \times I_P \times (V_C/5)$		
Electrical offset voltage	V_{QOV}	V		$V_{CC}/2$		
Theoretical sensitivity	G_{th}	mV/A		10		
Current consumption	I_C	mA		8	11	
Load resistance	R_L	kΩ	5.1			
Load capacitor	C_2	nF		1	10	
Power filter capacitor	C_1	nF		100		
Performance data						
Sensitivity error	ε_G	%	−1		1	
Temperature of G	TCG	%	−1.5		1.5	@T_A=−40℃~85℃
Electrical offset current	V_{OE}	mV	−10	±5	10	@V_C=5V also I_P=0A
Electrical offset error of temperature drift	TCV_{OE}	mV	−10		10	@T_A=−40℃~85℃
Hysteresis offset voltage	V_{OM}	mV		4		@ V_C=5V, after ±I_{PN}
Linearity error	ε_L	% of I_{PN}	−1		1	Exclusive of V_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	−2		2	@T_A=−40℃~85℃
Response time@ 90% o f I_{PN}	t_r	μs		2.5	5	@C_2=1nF
Frequency bandwidth(-3dB)	BW	kHz		250		@C_2=1nF
Output noise	Vno	mV		1.4		@C_2=1nF

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Dimensions(Unit mm)

Pin definition：
1 VCC
2 GND
3 VOUT
4 IP+
5 IP-
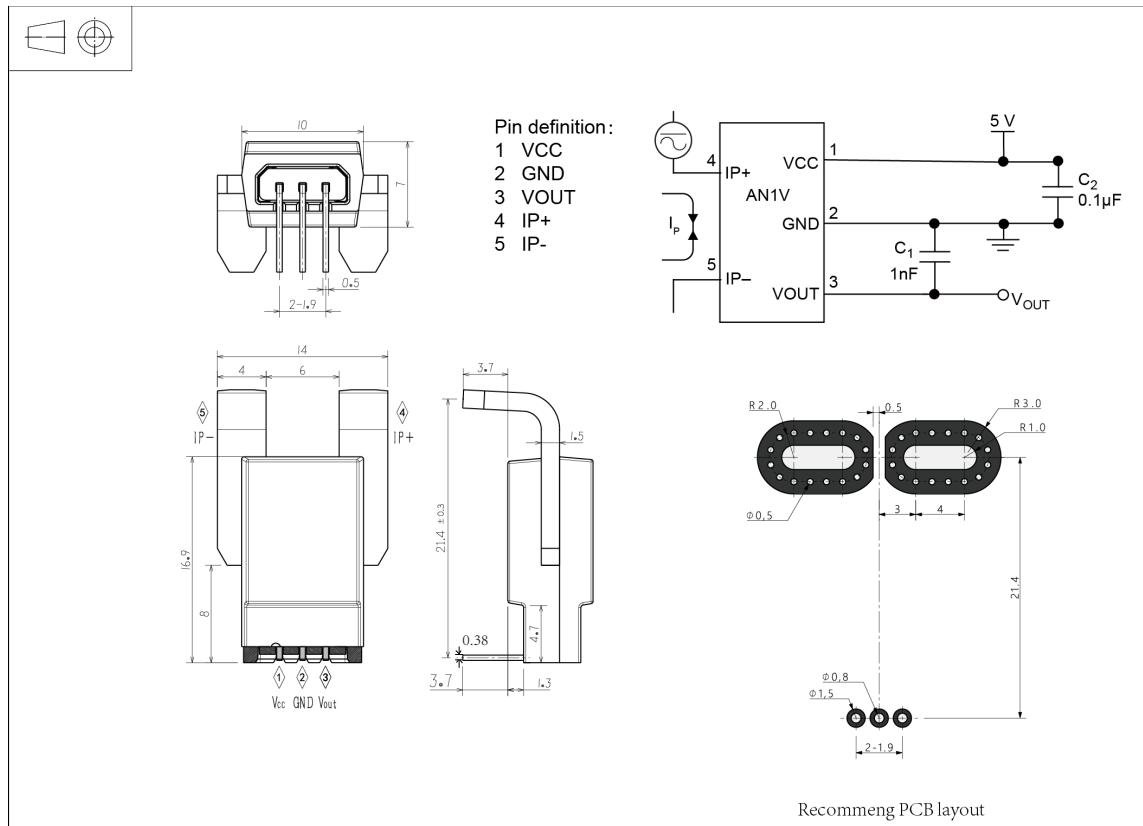
Recommeng PCB layout

Mechanical characteristics

✧ General tolerance ±0.3 mm

✧ Conductor and pin material Red copper with tin plating

Remarks

✧ When I_P flows in the direction of pin4 to pin5, V_{out} increase.

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