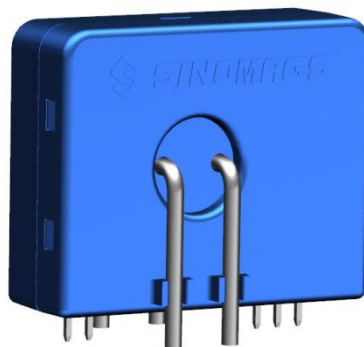


CURRENT SENSOR

PRODUCT SERIES: STK-P

PRODUCT PART NUMBER: STK-1.0P/P1S

REVISION: Ver 1.6



CONTENT

1.	Description.....	2
2.	Absolute parameter.....	3
3.	Electrical data.....	4
4.	Dimensions (in mm).....	5
5.	Assembly on PCB.....	6
6.	Typical application circuit.....	7

1. Description

Features

- Open loop current transducer
- Voltage output
- Insulation voltage for 5kV/AC
- Single supply voltage
- PCB mounting.

Applications

- Residual current measurement
- Leakage current measurement in transformerless PV inverters
- First human contact protection of PV arrays
- Failure detection in power sources
- Leakage current detection in stacked DC sources
- Communication power
- Single phase or three phase nominal current measurement of RMS ± 20 A per wire.

Advantages

- High accuracy
- High overload capability
- High insulation capability
- High separation ability
- Low temperature drift
- Degauss and test functions.

Standards

- EN 50178
- IEC 61326-1: 2012

Application Domain

- Industry.

2. Absolute parameter

Absolute maximum ratings

Parameter	Symbol	Unit	Value
Supply voltage	V _c	V	6
Primary conductor temperature		°C	110
Overload capability (100 μs, 500 A/μs)		A	3300

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

Isolation parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	V _d	kV	5	
Impulse withstand voltage 1.2/50μs	V _w	kV	10.1	
Comparative tracking index	CTI	V	600	
Clearance distance (pri. –pri.)	d _{Cl}	mm	5	Shortest distance through air
Creepage distance (pri. –pri.)	d _{Cp}	mm	5.5	Shortest path along device body
Clearance distance (pri. –sec.)	d _{Cl}	mm	6	Shortest distance through air
Creepage distance (pri. –sec.)	d _{Cp}	mm	6	Shortest path along device body
Case material			V0 according to UL 94	

Environmental and mechanical characteristics

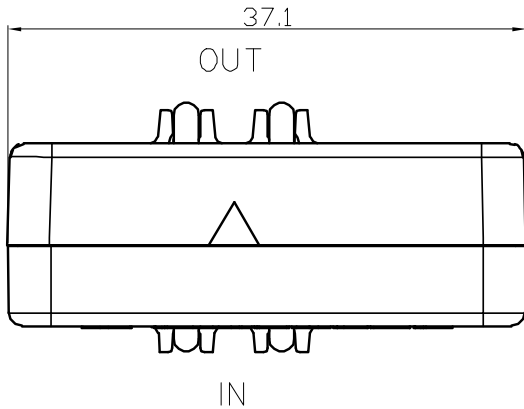
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T _A	°C	-40		105	
Ambient storage temperature	T _S	°C	-40		105	
Mass	m	g		40		
standard	EN 50178, IEC 61010-1, UL 508					

3. Electrical data

At $T_A = 25^\circ\text{C}$, $V_C = 5\text{ V}$.

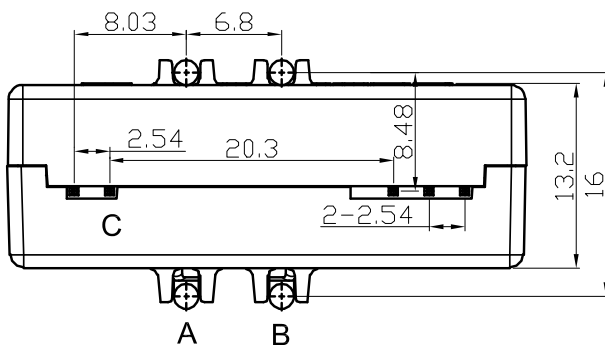
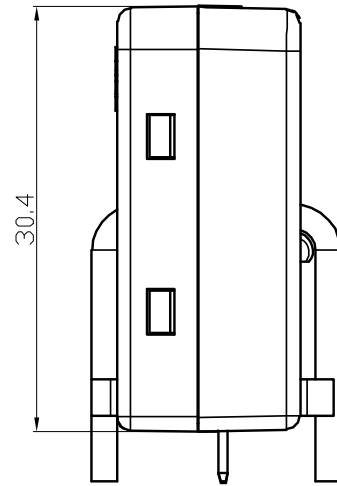
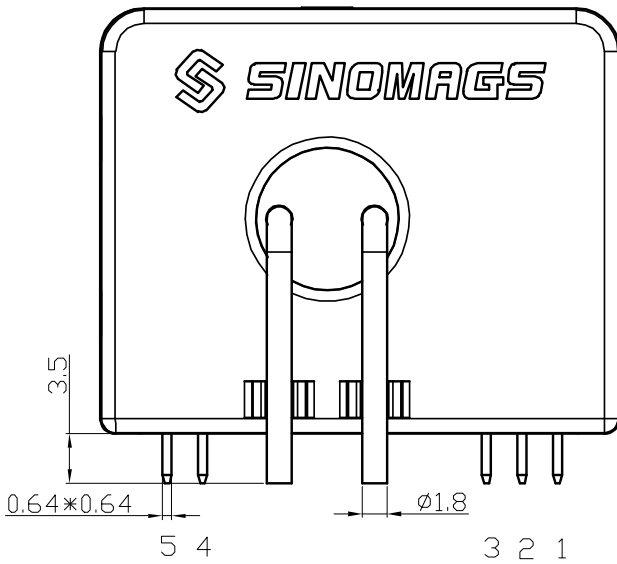
Parameters	Symbol	Unit	Min	Typ	Max	Remark
Primary nominal residual rms current	I_{pn}	A		1		
Primary residual current, measuring range	I_{pm}	A	-1.7		1.7	
Supply voltage	V_C	V	4.75	5	5.25	
Current consumption	I_C	mA		6	10	
Reference voltage @ $I_P = 0$	V_{ref}	V	2.48	2.5	2.52	Internal reference
Electrical offset voltage	V_{oe}	mV	-25		25	$(V_{out} - V_{ref})$ @ 0 A
Temperature coefficient of V_{OE} @ $I_P = 0\text{ A}$	TCV_{oe}	ppm/K		570		ppm/K of 2.5 V -40 ... 105 °C
Theoretical sensitivity	G_{th}	V/A		1.2		
Sensitivity error	ϵ_G	%	-1.6	0.5	1.6	$R_L > 500\text{ k}\Omega$
Temperature coefficient of G	TCG	ppm/K		± 400		-40°C ..105°C
Linearity error	ϵ_L	%		0.5	1	
Check current	I_{CK}	mA	156	166	176	$\pm 10\text{mA}$
Output voltage(Checkfunction)	V_{CK}	V	$V_{oe} + 0.188$	$V_{oe} + 0.2$	$V_{oe} + 0.212$	
Check enable voltage	V_{CE}	V	3.3		V_C	
Check disabled voltage	V_{CD}	V		< 0.2		
Reaction time @ 10 % of I_{PRN}	t_{ra}	μs		10		$R_L > 500\text{ k}\Omega$, $di/dt > 5\text{ A}/\mu\text{s}$
Step response time to 90 % of I_{PN}	t_r	μs		40		$R_L > 500\text{ k}\Omega$, $di/dt > 5\text{ A}/\mu\text{s}$
Frequency bandwidth (-3dB)	BW	kHz		15		$R_L > 500\text{ k}\Omega$
Noise(1 Hz ~ 10 kHz)	V_{no}	mV rms		10		$R_L > 500\text{ k}\Omega$
Accuracy@ I_{PN} @ $T_A = 25^\circ\text{C}$	X_{25c}	% of I_{PN}		± 2		
Accuracy@ I_{PN} @ $T_A = 105^\circ\text{C}$	X_{105c}	% of I_{PN}		± 5		

4. Dimensions (in mm)



Terminals

1	Vout
2	CHK
3	GND
4	Vcc
5	Vref



	D _{C1}	D _{OP}
A-B	5	5.5
A-C	8	--
A-D	--	9

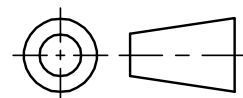
D is secondary inside the transducer

On the customer's PCBA		
	D _{C1}	D _{OP}
A-B	2.3	2.3
A-C	6	6

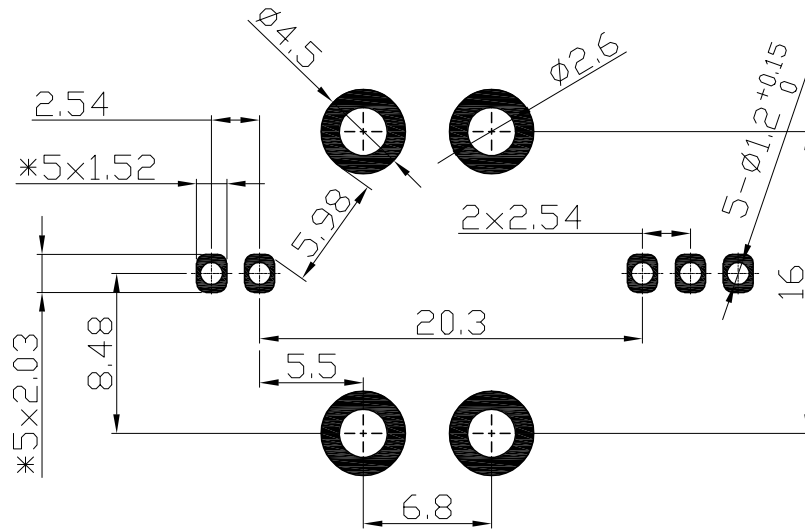
Material : Fit UL94V-0 & RoHS requirements ;

General tolerance : ± 0.2

Unit : mm



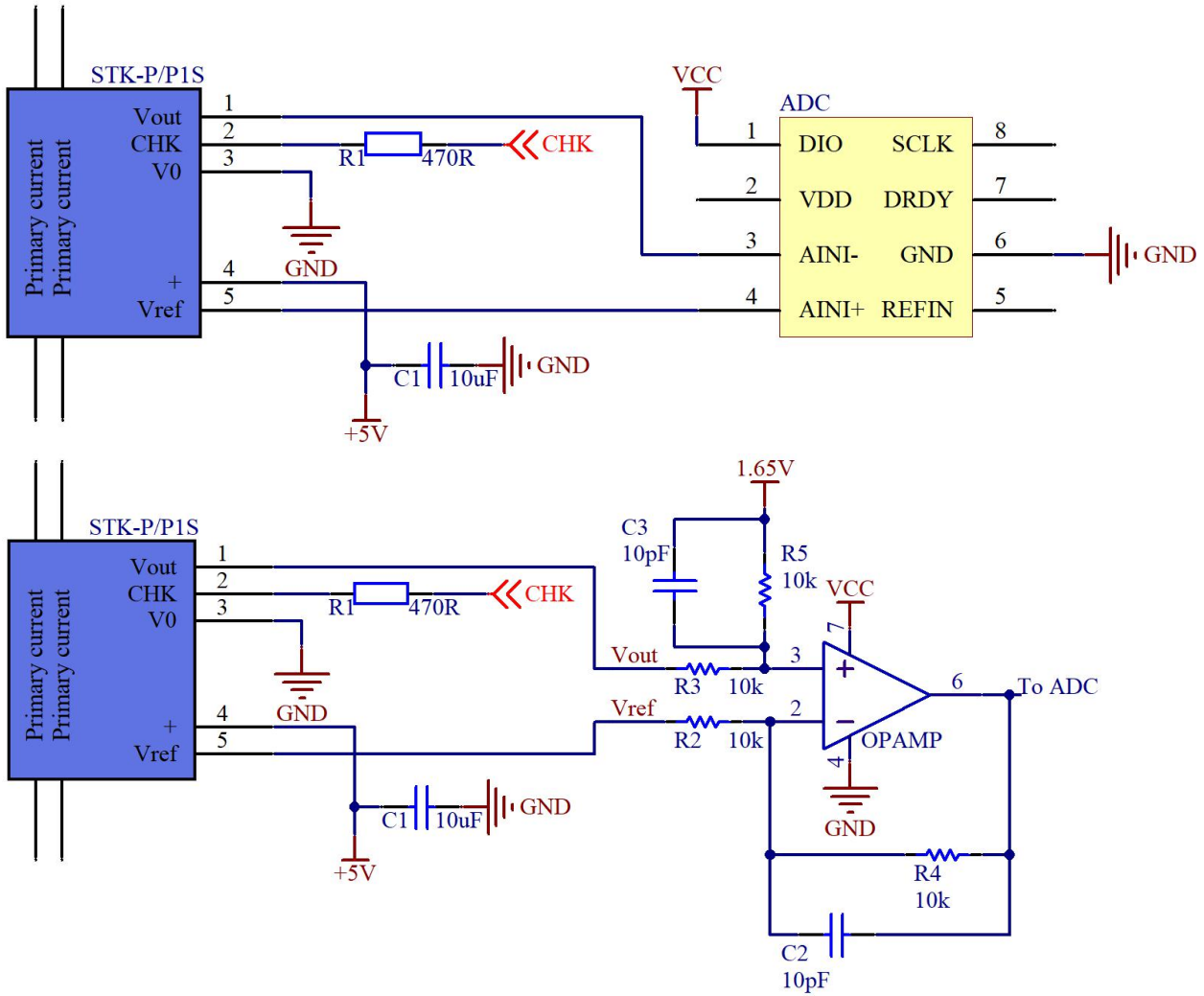
5. Assembly on PCB



Top side view

- Maximum PCB thickness 2.4 mm
- Wave-soldering: 260°C @ 10 s
- Recommended PCB hole diameter 1.2 mm for secondary pin.

6. Typical application circuit



R5 (kohm)	C3 (nF)	Theoretical -3dB $f = 1/(2\pi RC)$ (kHz)	Measured -3dB (kHz)
10	1.2	13.3	~ 15
10	1.5	10.6	~ 15
10	1.8	9	~ 10

The frequency characteristics of STK-P/P1S series current sensor are not affected by the R-C setting (according to recommended R-C setting), therefore the active filter circuit or R-C circuit can be applied to modulate the sensor's frequency characteristics.

The signal input to ADC is $1.65 + R4/R2 * (Vout - Vref)$ with the conditions: $R2 = R3$, $R4 = R5$, $C2 = C3$.