

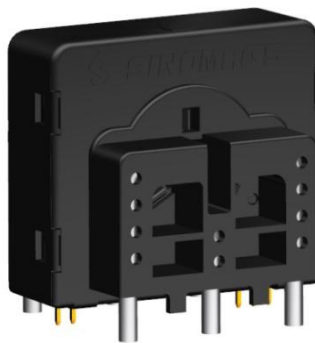
## CURRENT SENSOR

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PRODUCT SERIES: SFG-X.XP/S3

PRODUCT PART NUMBER: SFG-0.3P/S3, SFG-1.0P/S3

REVISION: Ver 1.1



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## 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

### 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 <sub>c</sub>	V	5.5
Primary conductor temperature	T <sub>B max</sub>	°C	110
Overload capability (100 μs, 500 A/μs)	I <sub>P max</sub>	A	3300
Maximum Primary current @ T <sub>Amax</sub> =105°C	I <sub>M</sub>	A/wire	42

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 <sub>d</sub>	kV	5	
Impulse withstand voltage 1.2/50μs	V <sub>w</sub>	kV	10.1	
Comparative tracking index	CTI	V	600	
Clearance distance (pri. –pri.)	d <sub>Cl</sub>	mm	11.2	Shortest distance through air
Creepage distance (pri. –pri.)	d <sub>Cp</sub>	mm	14	Shortest path along device body
Clearance distance (pri. –sec.)	d <sub>Cl</sub>	mm	11	Shortest distance through air
Creepage distance (pri. –sec.)	d <sub>Cp</sub>	mm	11	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 <sub>A</sub>	°C	-40		105	
Ambient storage temperature	T <sub>S</sub>	°C	-45		125	
Mass	m	g		65		
standard	EN 50178, IEC 61010-1, UL 508					

### 3. SFG-0.3S/P3 Electrical data

SFG-0.3S/P3 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		0.3		
Primary residual current, measuring range	$I_{pm}$	A	-0.5		0.5	
Supply voltage	$V_C$	V	4.9	5	5.1	
Current consumption	$I_C$	mA		18		
Reference voltage @ $I_P = 0$	$V_{ref}$	V	2.475	2.5	2.525	Internal reference
Electrical offset voltage	$V_{oe}$	mV	-25		25	$(V_{out} - V_{ref})$ @ 0 A
Theoretical sensitivity	$G_{th}$	V/A		4		
Linearity error	$\epsilon_L$	%		0.5	1	
Check current	$I_{CK}$	mA		50		$\pm 5\text{mA}$
Output voltage(Checkfunction)	$V_{CK}$	V		$V_{oe} + 0.2$		
Check enable voltage	$V_{CE}$	V	3.3		$V_C$	
Check disabled voltage	$V_{CD}$	V		< 0.2		
Frequency bandwidth (-3dB)	BW	Hz		700		
Noise(1 Hz ~ 10 kHz)	$V_{no}$	mV rms		10		
Accuracy@ $I_{PN}@T_A = 25^\circ\text{C}$	$X_{25^\circ\text{C}}$	% of $I_{PN}$		$\pm 2$		
Accuracy@ $I_{PN}$ @ $T_A = 105^\circ\text{C}$	$X_{105^\circ\text{C}}$	% of $I_{PN}$		$\pm 4$		
Fault over current recovery limit	$I_M$	A		42		

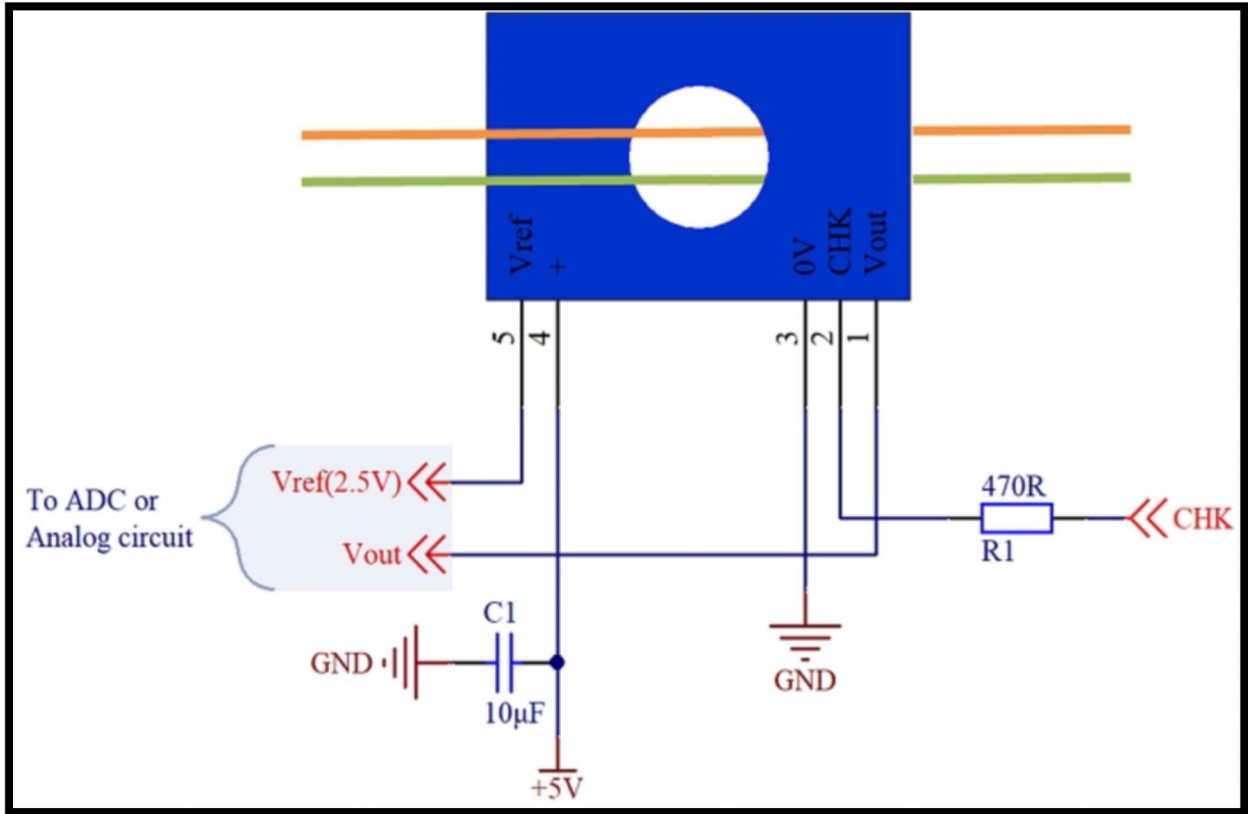
#### 4. SFG-1.0S/P3 Electrical data

SFG-1.0S/P3 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		1.02		
Primary residual current, measuring range	$I_{pm}$	A	-1.7		1.7	
Supply voltage	$V_C$	V	4.9	5	5.1	
Current consumption	$I_C$	mA		18		
Reference voltage @ $I_P = 0$	$V_{ref}$	V	2.475	2.5	2.525	Internal reference
Electrical offset voltage	$V_{oe}$	mV	-25		25	$(V_{out} - V_{ref})$ @ 0 A
Theoretical sensitivity	$G_{th}$	V/A		1.17		
Linearity error	$\epsilon_L$	%		0.5	1	
Check current	$I_{CK}$	mA		170		$\pm 5\text{mA}$
Output voltage(Checkfunction)	$V_{CK}$	V		$V_{oe} + 0.2$		
Check enable voltage	$V_{CE}$	V	3.3		$V_C$	
Check disabled voltage	$V_{CD}$	V		< 0.2		
Frequency bandwidth (-3dB)	BW	Hz		700		
Noise(1 Hz ~ 10 kHz)	$V_{no}$	mV rms		10		
Accuracy@ $I_{PN}@T_A = 25^\circ\text{C}$	$X_{25^\circ\text{C}}$	% of $I_{PN}$		$\pm 2$		
Accuracy@ $I_{PN}$ @ $T_A = 105^\circ\text{C}$	$X_{105^\circ\text{C}}$	% of $I_{PN}$		$\pm 4$		
Fault over current recovery limit	$I_M$	A		42		

## 5. Application information

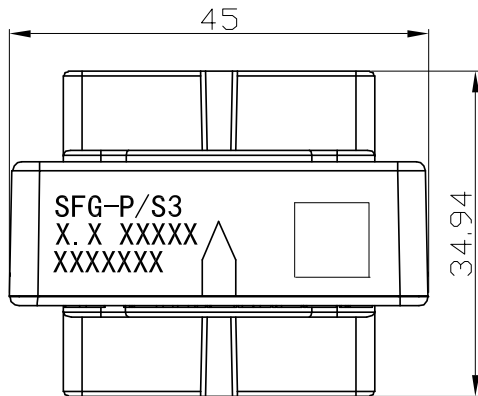
### Application circuit



### Self-check Function

Set the CHK pin to high status. SFG-X.XP/S3 will run in self-test mode, check the out pin, equivalent to the status  $I_p$  is  $I_{ck}$ , at this time the output has equal voltage, the detector is OK. Then sets CHK to low voltage  $V_{CD} < 0.2V$ , the SFG-X.XP/S3 starts to run in the residual current.

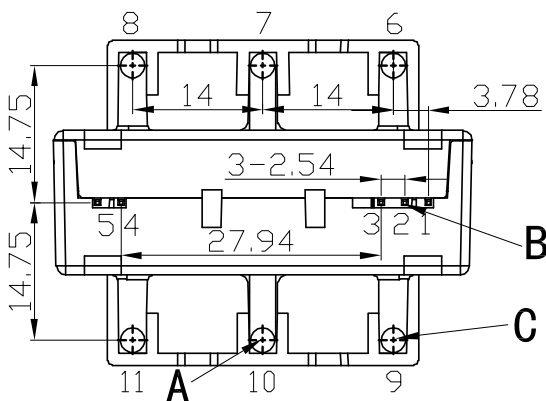
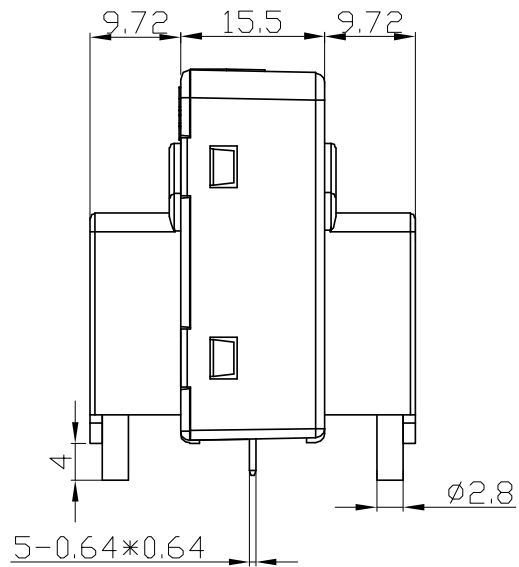
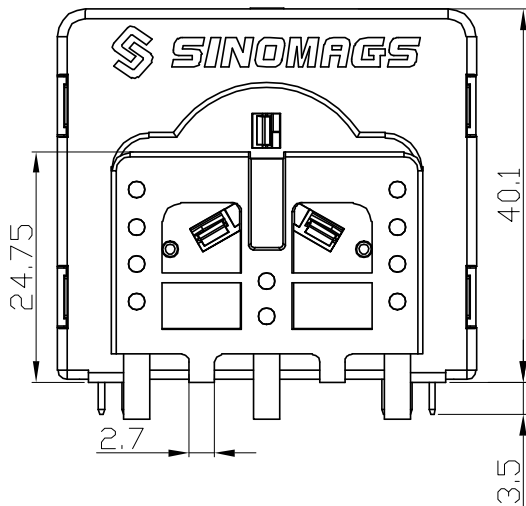
## 6. Dimensions (in mm)



	D <sub>Cl</sub>	D <sub>CP</sub>
B-C	13	--
A-C	11.2	14
C-D	--	>14

D is secondary inside the transducer

On the customer's PCBA		
	D <sub>Cl</sub>	D <sub>CP</sub>
B-C	11	11
A-C	9	9



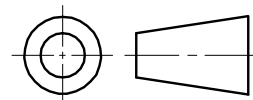
### Terminals:

1	Vout	7	I <sub>p+</sub>
2	CHK	8	I <sub>p+</sub>
3	GND	9	I <sub>p-</sub>
4	Vcc	10	I <sub>p-</sub>
5	Vref	11	I <sub>p-</sub>
6	I <sub>p+</sub>		

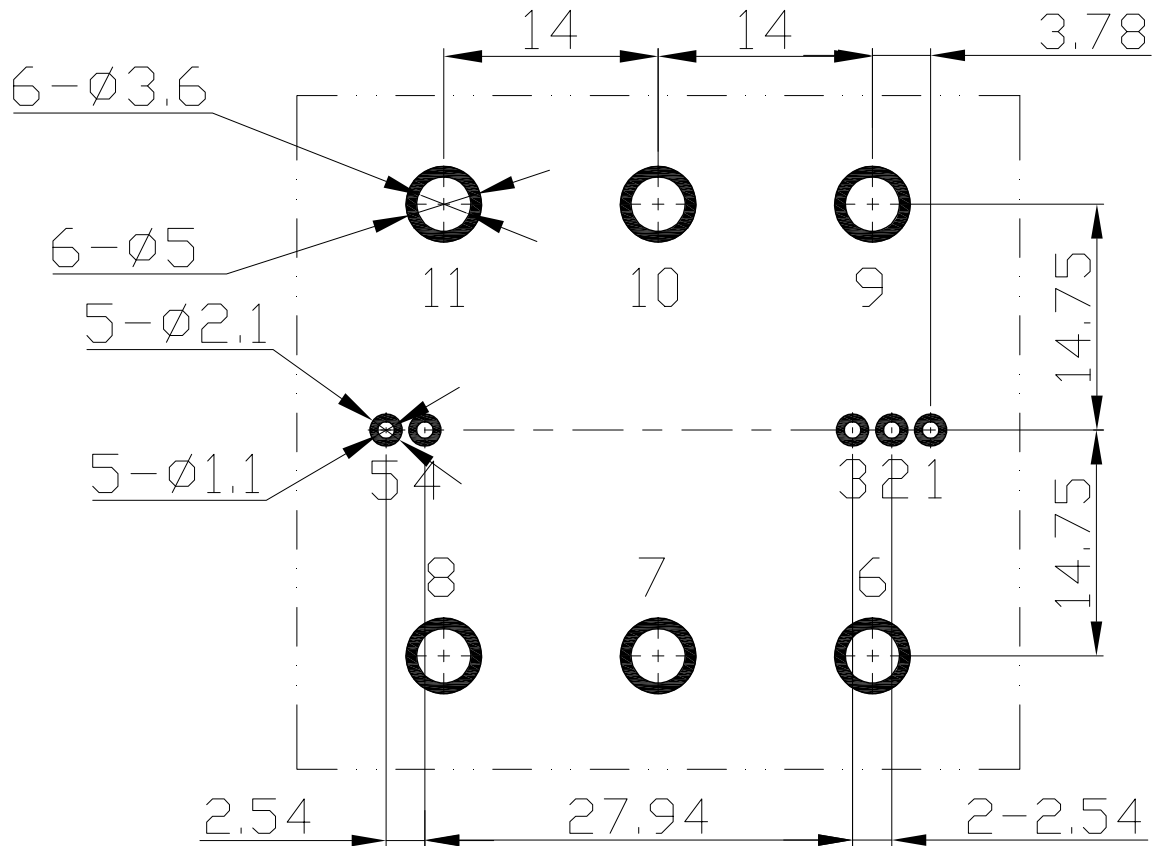
Material : Fit UL94V-0 & RoHS requirements ;

General tolerance : ±0.5

Unit :mm



## 7. Assembly on PCB



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