SINOMAGS 希 磁 科 技

Current Sensor

Product Series： STK-HO/A

Part number：
STK-HO/A 50
STK-HO/A 75
STK-HO/A 100
STK-HO/A 130
STK-HO/A 150
STK-HO/A 180
STK-HO/A 200

Version: Ver1.5

Sinomags Technology Co., Ltd

Web site: www.sinomags.com

CONTENT

1. Summary

The STK-HO/A series is based on open-loop design. It is suitable for DC, AC, pulsed and any kind of irregular current measurement under the isolated conditions. The nominal current range of the STK-HO/A current sensor consists of 50 A, 75 A, 100 A, 130 A，150A，180A，200A.

Typical applications

- AC variable speed and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Combiner box
- Solar inverter on DC side of the inverter (MPPT)
- Plasma cutter, welding
- Charging station.

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_A	℃	-40 ~ 105
Storage temperature	T_stg	℃	-40 ~ 105
Mass	m	g	39.6

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage（non-destructive）	V_C	V	6
ESD rating（HBM）	U_{ESD}	kV	4

Remark: the unrecoverable damage may occur when the product works on the conditions over the absolute maximum ratings. Long-time working on the absolute maximum ratings may cause the degradation on performance and reliability.

Isolation parameter

Parameter	Symbol	Unit	Value	Comment
RMS voltage for AC test 50Hz/1 min	Ud	kV	4	@ 50Hz/1 min
Impulse withstand voltage 1.2/50μs	Ûw	kV	8	1.2/50μs
Clearance distance (pri. -sec)	dCl	mm	13.7812	Shortest distance through air
Creepage distance (pri. -sec)	dCp	mm	13.7812	Shortest path along device body
Case material			V0	According to UL 94
Application example	CTI	V	600	Reinforced insulation, CAT III, PD 2, non uniform field according EN 50178, IEC 61010

2. STK-HO/A 50 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		50		STK-HO/A 50
Primary current measuring range	I_pm	A	-125		125	STK-HO/A 50
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		16		STK-HO/A 50
Rated linearity error	Non-L_pn	%I_pn	-0.5		0.5	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-1		1	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-3		3	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

3. STK-HO/A 75 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		75		STK-HO/A 75
Primary current measuring range	I_pm	A	-187.5		187.5	STK-HO/A 75
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		10.667		STK-HO/A 75
Rated linearity error	Non-L_pn	%I_pn	-0.5		0.5	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-1		1	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-3		3	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

4. STK-HO/A 100 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		100		STK-HO/A 100
Primary current measuring range	I_pm	A	-250		250	STK-HO/A 100
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		8		STK-HO/A 100
Rated linearity error	Non-L_pn	%I_pn	-0.5		0.5	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-1		1	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-3		3	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

5. STK-HO/A 130 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		130		STK-HO/A 130
Primary current measuring range	I_pm	A	-325		325	STK-HO/A 130
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		6.154		STK-HO/A 130
Rated linearity error	Non-L_pn	%I_pn	-0.7		0.7	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-2		2	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-3		3	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-5		5	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

6. STK-HO/A 150 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		150		STK-HO/A 150
Primary current measuring range	I_pm	A	-360		360	STK-HO/A 150
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		5.333		STK-HO/A 150
Rated linearity error	Non-L_pn	%I_pn	-0.8		0.8	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-3		3	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-4		4	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-8		8	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

7. STK-HO/A 180 Electrical performance

Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		180		STK-HO/A 180
Primary current measuring range	I_pm	A	-360		360	STK-HO/A 180
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		4.444		STK-HO/A 180
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-3		3	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-4		4	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-8		8	-40℃ ~ 105℃

Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature.

8. STK-HO/A 200 Electrical performance

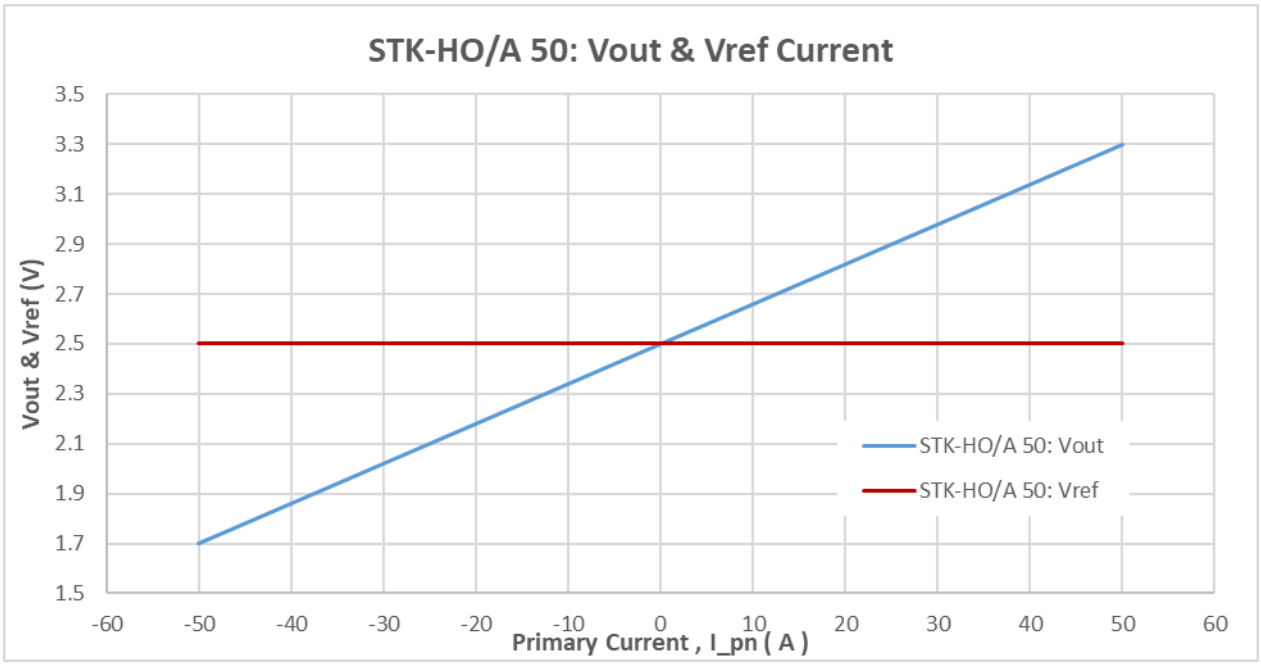
Condition：T_A = 25℃, Vcc = 5 V (Except special instructions)

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		200		STK-HO/A 200
Primary current measuring range	I_pm	A	-375		375	STK-HO/A 200
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA	5	7	9	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	15	20	25	Output
Internal output resistance	R_ref	Ω	12	16	20	Vref
Quiescent voltage	Voff	V	2.48	2.5	2.52	Vout @ 0 A
Electrical offset voltage	Voe	mV	-10		10	(Vout – Vref) @ 0 A
Temperature drift of Voe	Voe_TRange	%V_FS	-1.5		1.5	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		4		STK-HO/A 200
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn @ 25℃
Rated linearity error	Non-L_pm	%I_pm	-4		4	±I_pm @ 25℃
Step response time	t_res	μs		0.2		@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		1000		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 15 25		
Accuracy @ 25℃	X	% of I_pn	-1.5		1.5	@ 25℃
Accuracy @ -40℃ ~ 105℃①	X_TRange	% of I_pn	-3		3	-40℃ ~ 105℃
Accuracy @ 25℃	X	% of I_pm	-5		5	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pm	-10		10	-40℃ ~ 105℃

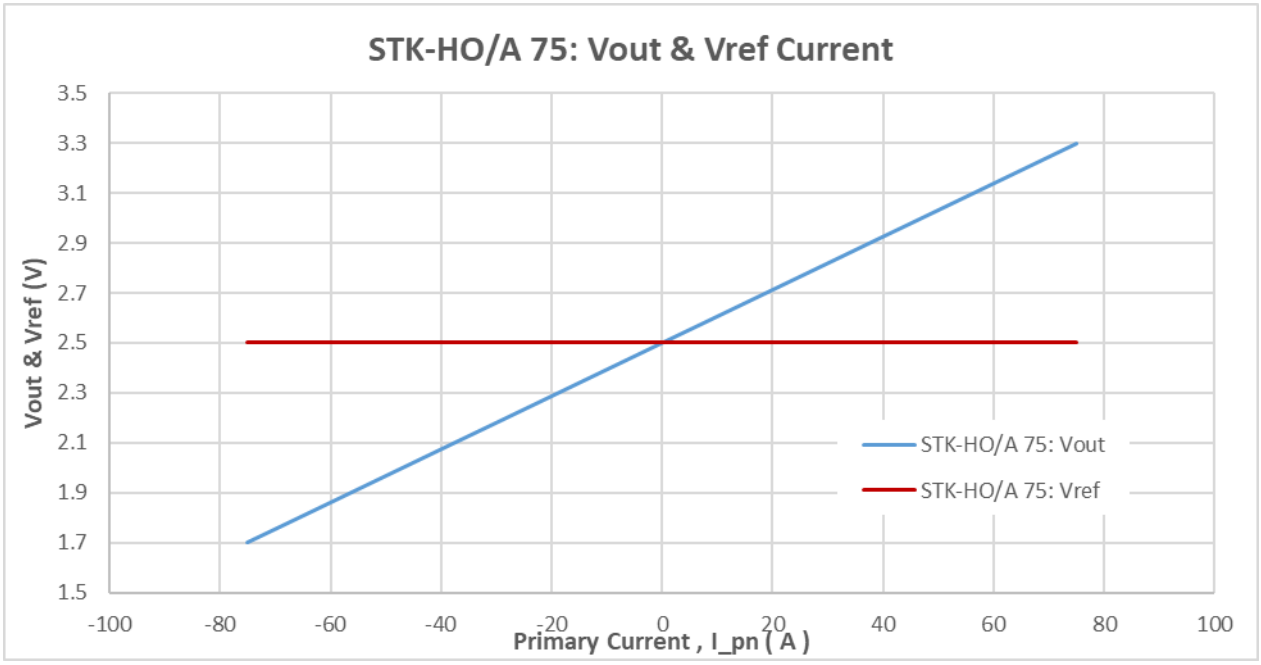
Remarks:

①. the accuracy @ -40℃~105℃, X_TRange = (((Vout – Vref)@ In @ T_x) – Voe@ 25℃ – G_th * In) / V_FS, where T_x represents present temperature, G_th is fitted gain at room temperature .

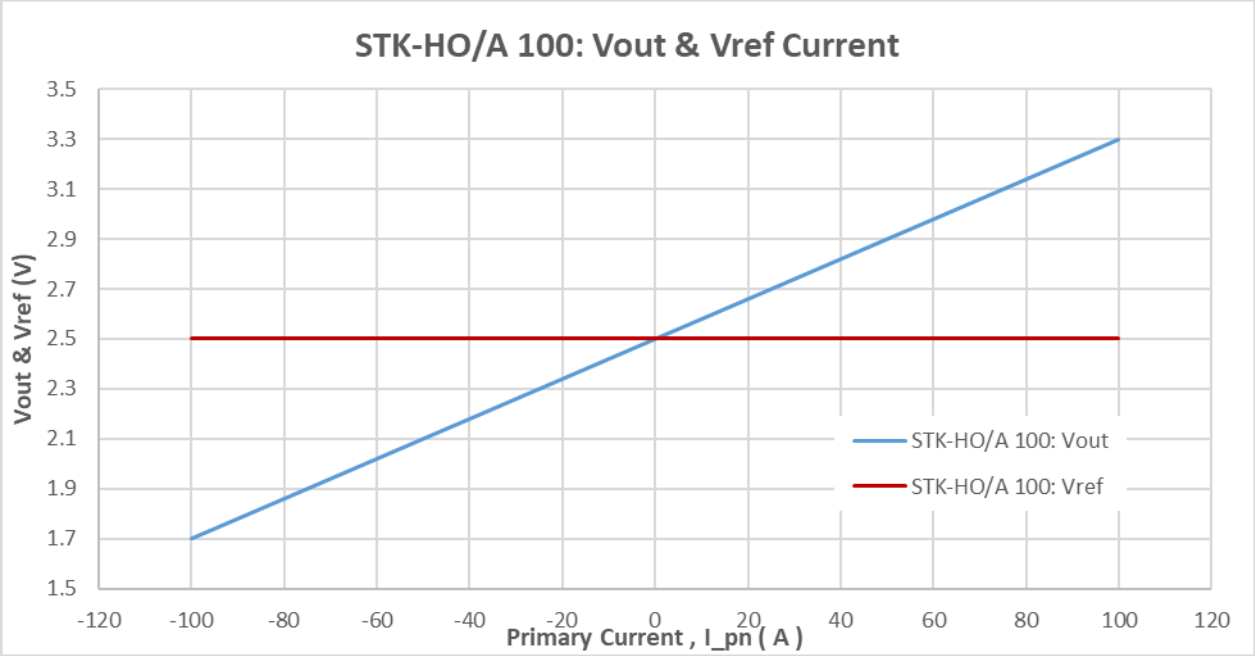
9. Output voltage VS primary current



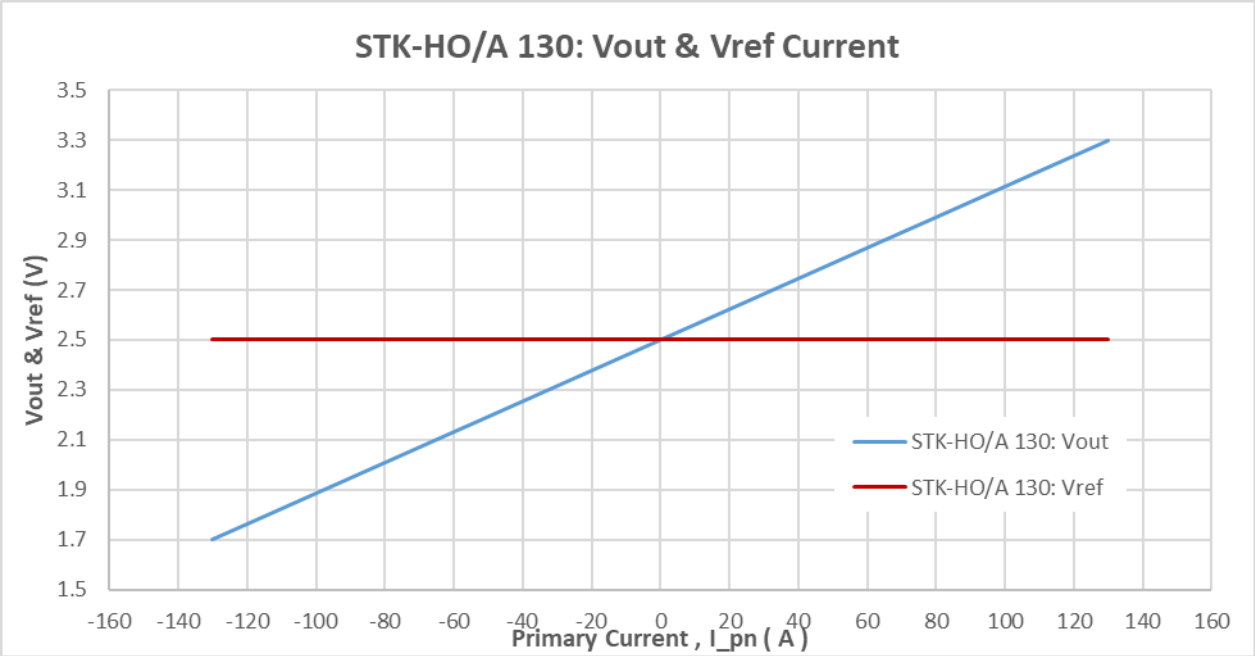
The dependence of Vout of STK-HO/A 50 on the primary current.



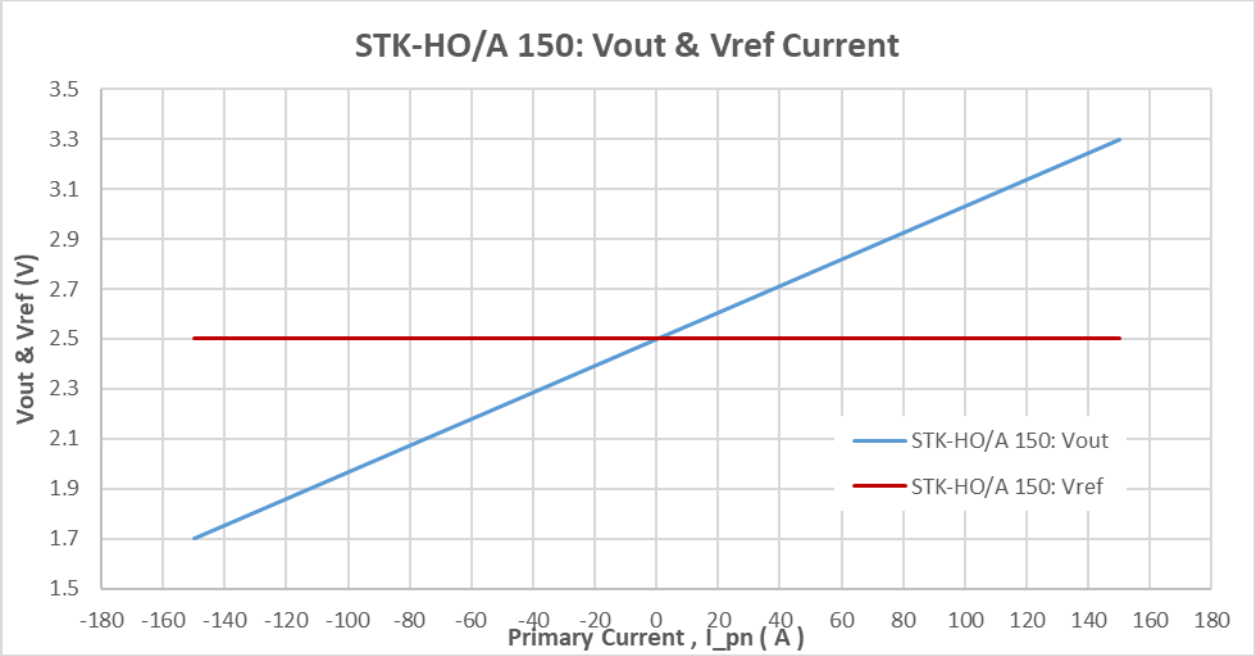
The dependence of Vout of STK-HO/A 75 on the primary current.



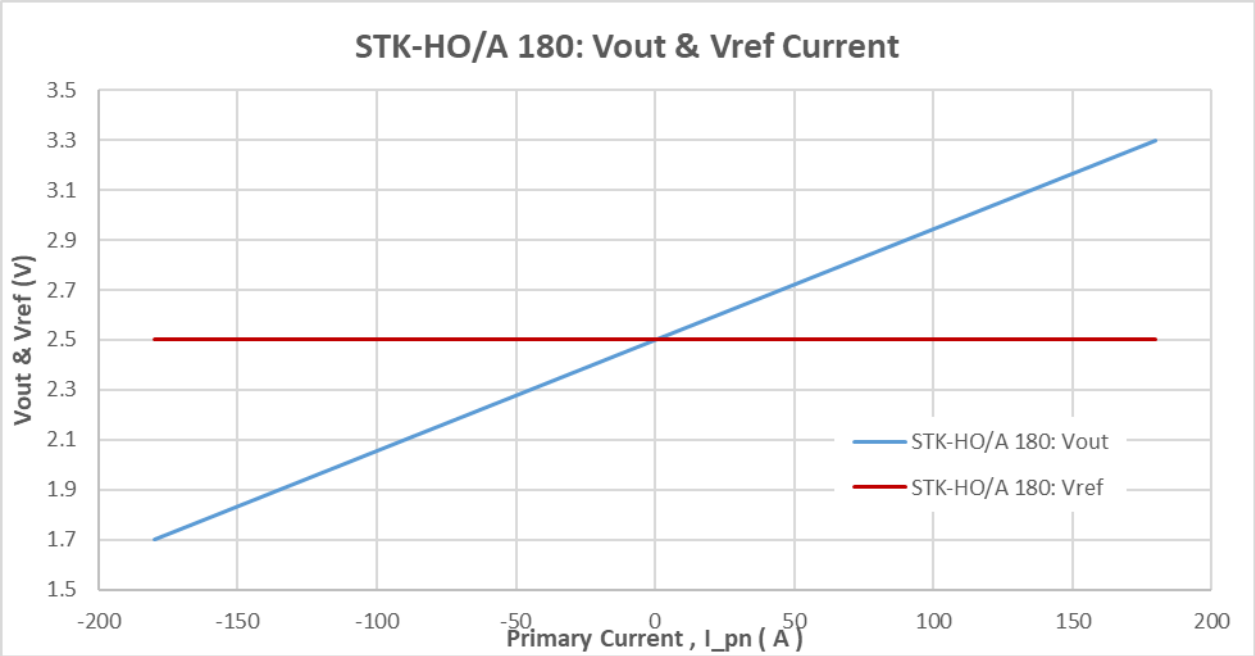
The dependence of Vout of STK-HO/A 100 on the primary current.



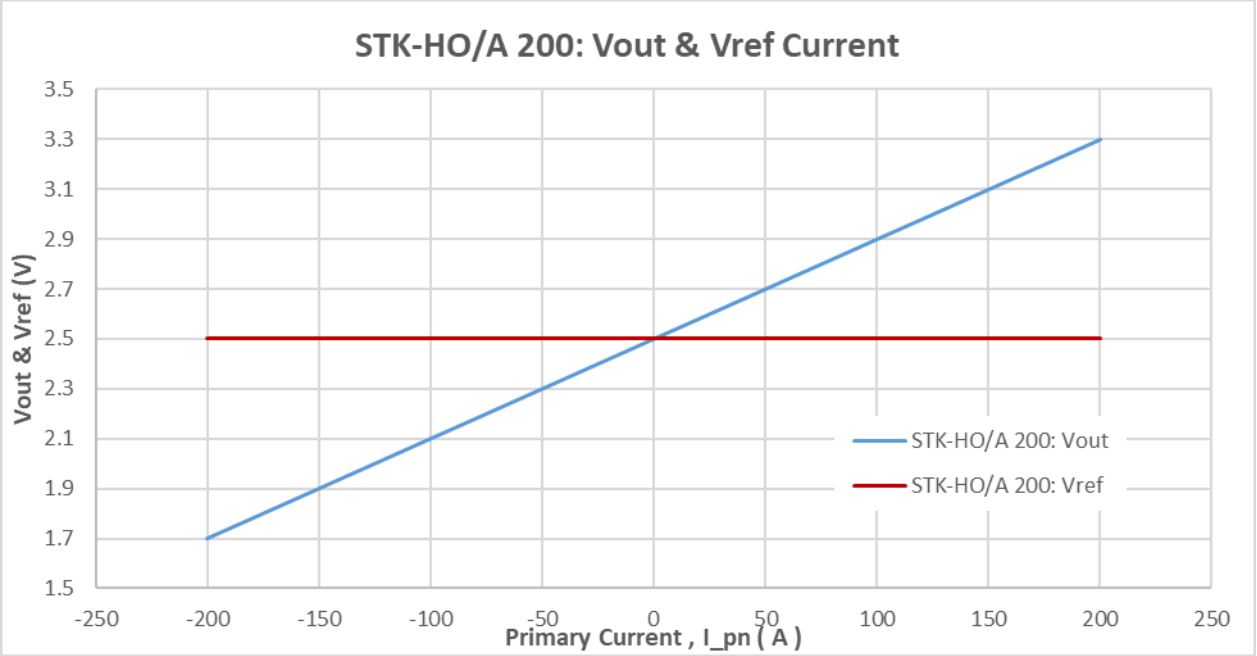
The dependence of Vout of STK-HO/A 130 on the primary current.



The dependence of Vout of STK-HO/A 150 on the primary current.

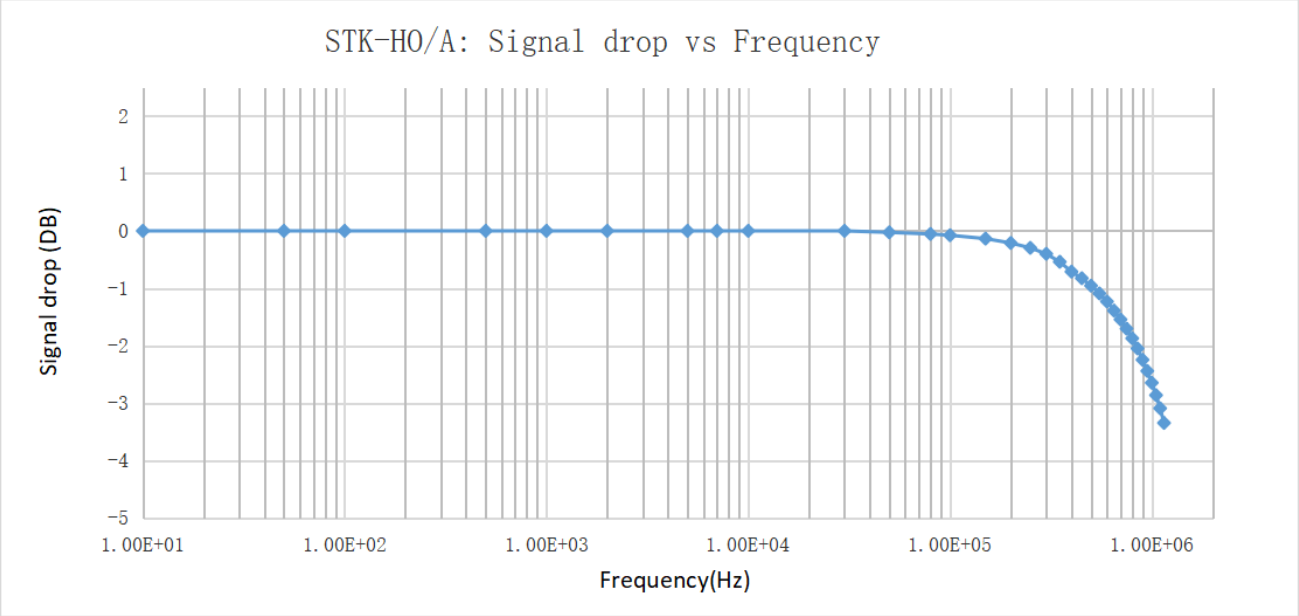


The dependence of Vout of STK-HO/A 180 on the primary current.



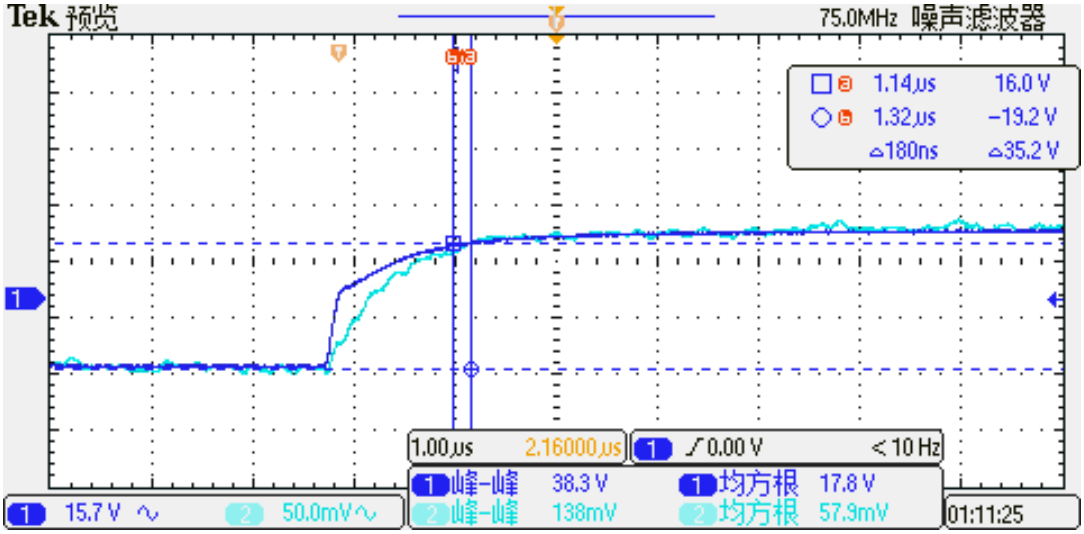
The dependence of Vout of STK-HO/A 200 on the primary current.

10. Frequency bandwidth of STK-HO/A xx



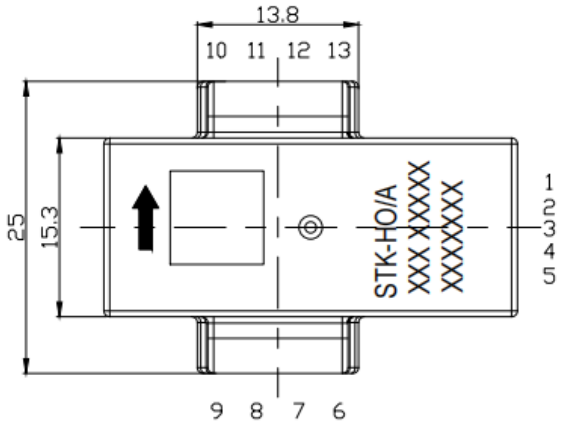
The frequency bandwidth of STK-HO/A series current sensor. The bandwidth of these current sensors is DC ~ 1000 kHz (-3 dB).

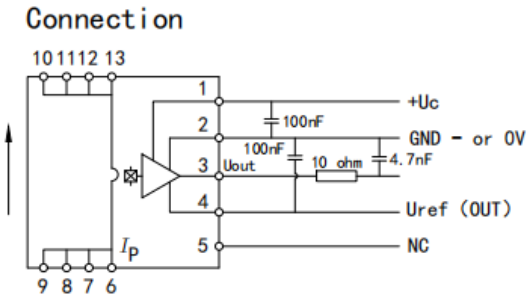
11. Step response time

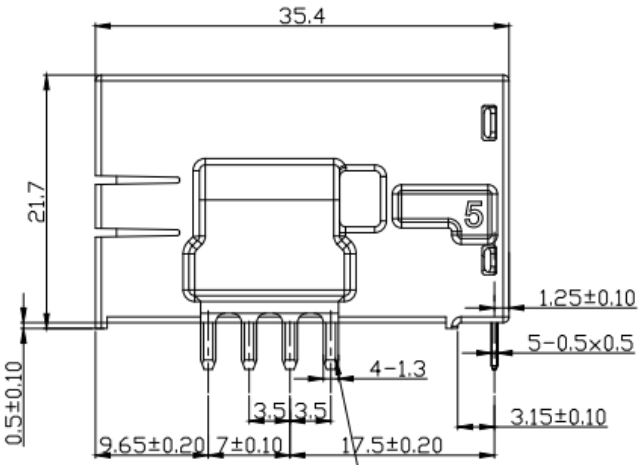


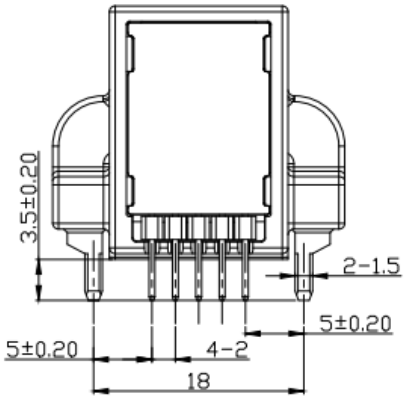
The typical frequency response of STK-HO/A current sensor. The response time from 90% of the primary current (dark blue) to 90% of the secondary output (light blue) is less than 0.2 µs.

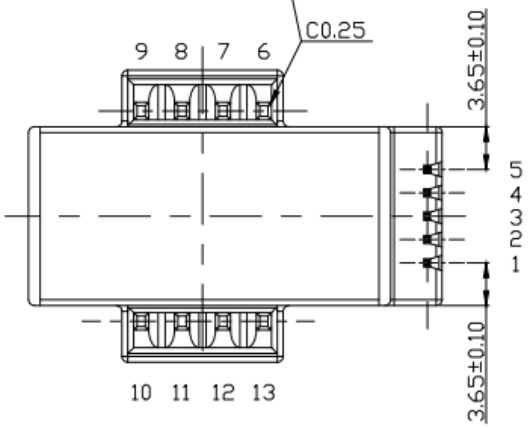
12. Dimension & Pin definitions



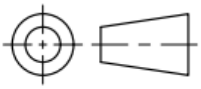








Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ±0.5
Unit :mm



Recommended PCB layout