SINOMAGS
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Current Sensor

Product Series: STK-HO-YS

Part number: STK-500HO-YS

Version: Ver 1.0

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CONTENT

1. Description

The STK-HO-YS series current sensor is based on Hall and open-loop design. It is suitable for DC, AC pulsed and any kind of irregular current measurement under the isolated conditions.

Typical applications

- AC Variable speed drives
- Power supplies for welding applications
- Switched model power supplies (SMPS)
- Battery supplied applications

- UPS
- MPPT
- Static converters for DC motor drives
- Combiner box

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_A	℃	-40 ~ 105
Storage temperature	T_stg	℃	-40 ~ 105
Mass	m	g	111

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	Vcc	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	5.4	
Impulse withstand voltage 1.2/50 us	Uw	kV	9.6	
Clearance distance (pri. -sec)	dCl	mm	>10.5	Shortest distance through air
Creepage distance (pri. -sec)	dCp	mm	>10.5	Shortest path along device body
Case material			V0 according to UL 94	

2. Electrical performance of STK-500HO-YS

Condition：T_A = 25℃，Vcc = 5 V

| Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		500		STK-500HO-YS
Primary current measuring range	I_pm	A	-1250		1250	STK-500HO-YS
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		10		
Quiescent voltage	Voff	V	2.492	2.5	2.508	Vout @ 0 A (20℃ ~ 30℃)
Temperature drift of Voff	Voff_TRange	V	2.48		2.52	Vout @ 0 A (-40℃ ~ 105℃)
Internal output resistance	R_out	Ω	4.5	12	19.5	Series
OCD output mask time ①	Tmask	µs		2		
OCD output hold time ②	Thold	ms		1.5		
Output voltage range @ I P N	V_FS	V		0.78125		(Vout @ ±I_pn) – Voff
Theoretical gain	G_th	mV/A		1.563		STK-500HO-YS
Rated linearity error	Non-L	% I_{PN}		±1		±I_{PN}
Delay time @ 10 % of I_{PN}	$t_{D\,10}$	µs		3	3.5	@ 100 A/µs
Delay time @ 90 % of I_{PN}	$t_{D\,90}$	µs		3	3.5	@ 100 A/µs
Frequency bandwidth (-3dB)	BW	kHz		180		No RC circuit
Output voltage noise	Vnoise	mVpp		6		@140kHz Sampling Rate
Primary current, detection threshold ③	I_pth	A		3 * I_pn		Peak value ±10% overcurrent detection OCD
Accuracy @ 25℃	X	% of I_{PN}		±1.5		@ 25℃
Accuracy @ -40℃~85℃	X_TRange	% of I_{PN}	-3.3		3.3	
Accuracy @ 85℃~105℃ ④	X_TRange	% of I_{PN}	-4		4	

Remarks：

① ②． To prevent nuisance tripping, a tmask time is used. If an over current occurs, but does not persist for the duration of tmask, it does not trigger the fault pin. This prevents short transient spikes from causing erroneous fault detections. In the event where transient error reporting is desired, the tmask can be disabled. If the fault is triggered, it will remain active for a minimum time of thold and up to the end of the fault condition, whichever is greater.

③． STK-HO-YS products may be ordered on request with a dedicated setting of the Trigger current . The product has a built-in overcurrent detection function, When the output voltage detected by the product exceeds the threshold, it is judged to be overcurrent and the output of fault pin changes to low level .
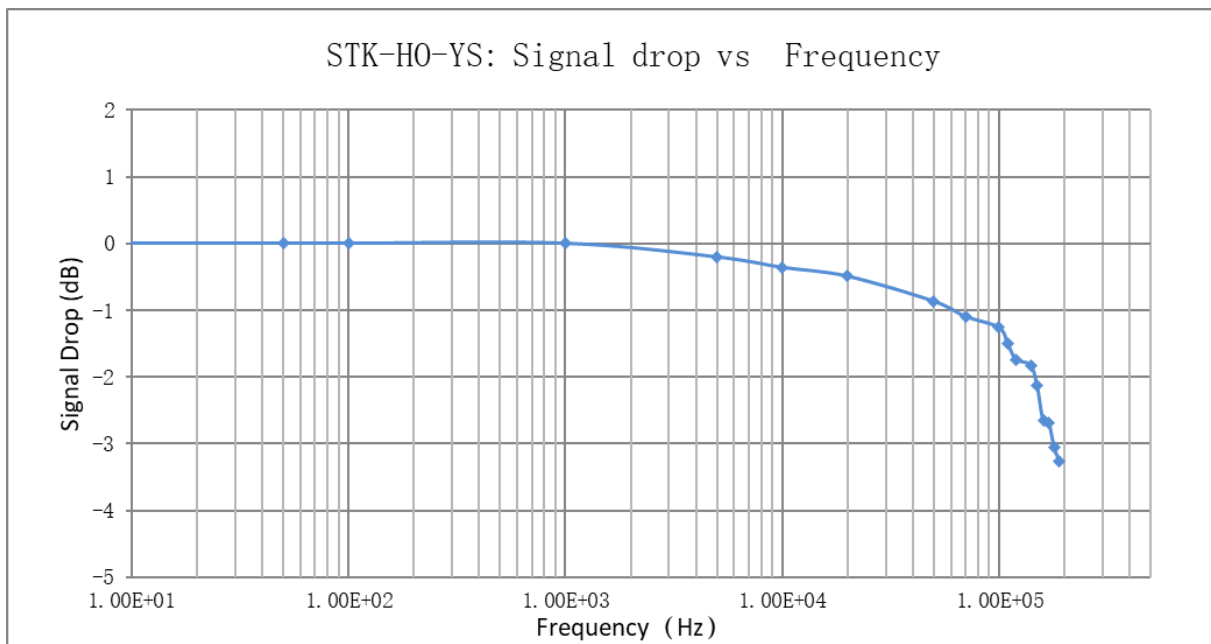
④． Accuracy,X_TRange = ((Vout @ In @ T_x) – (G_fit@25℃ * In+Voff @ 25℃)) / V_FS,The fitting gain of the product at G_fit@25 ℃ is 25 ℃.

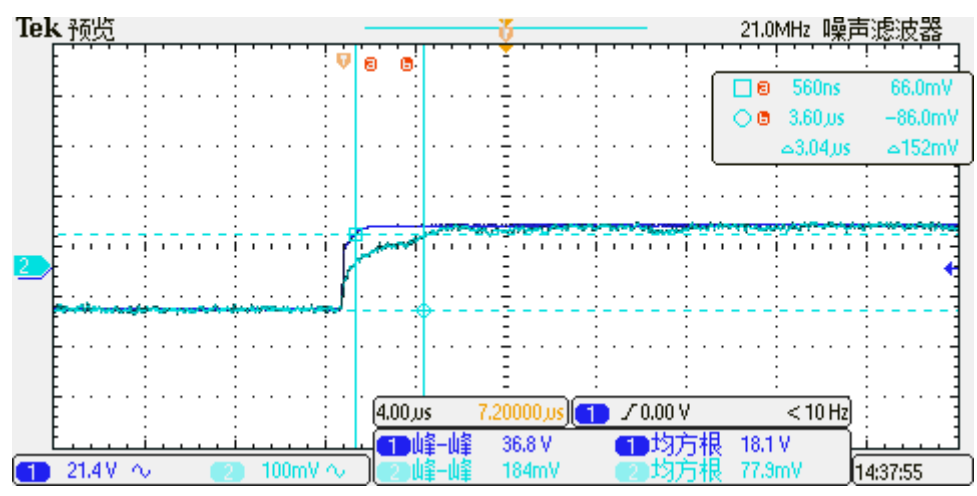## 3. Output voltage VS primary current of STK-HO-YS
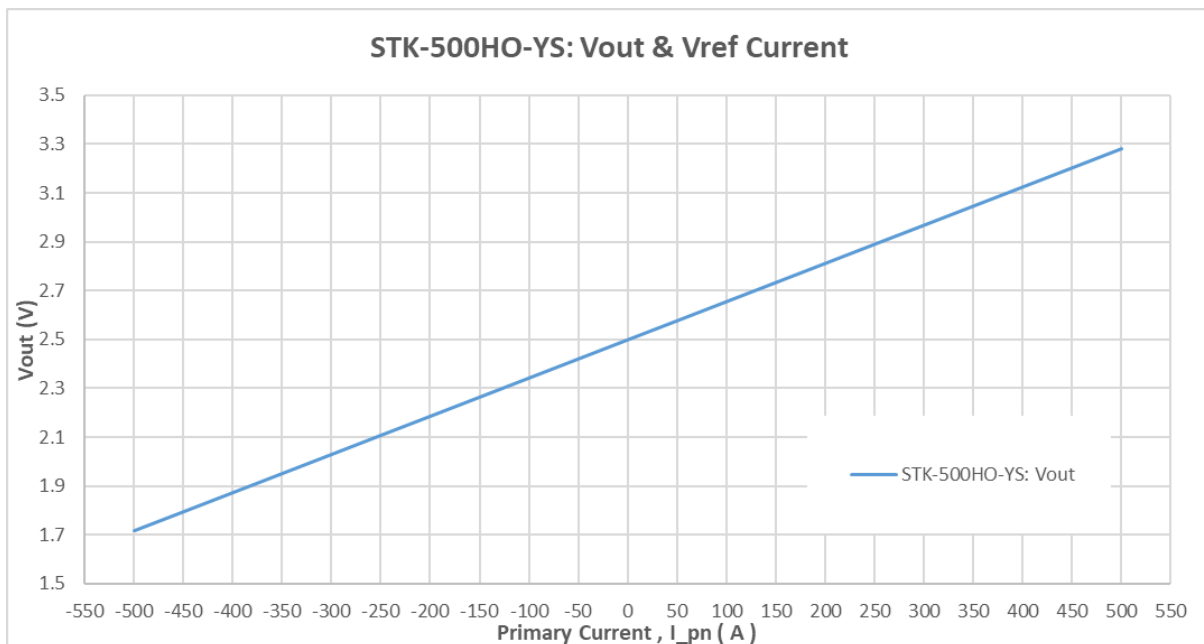
The dependence of Vout of STK-500HO-YS on the primary current.

4. Frequency bandwidth

The frequency band width of STK-HO-YS series current sensors.

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5. Step response time

The step response time of STK-HO-YS current sensors. The dark light blue is primary current, while the light blue is output signal of current sensor. The step response time is about 3 μs.

6. General information on OCD

This section describes the general information on OCD function, the specific functions, which are not listed in the section of "electrical data", can be defined per request.

Since the trigger voltage is set after the second amplifier, the OCD function supports that the trigger current can be higher than I_pn. The trigger voltage can be defined:

a) Vref = 2.5 V

b) 0.5 V ≦ VOC ≦ Vref;

c) Trigger voltage = Vref +/- VOC;

d) Trigger current = (Vref +/- VOC -Voff) / G_th;
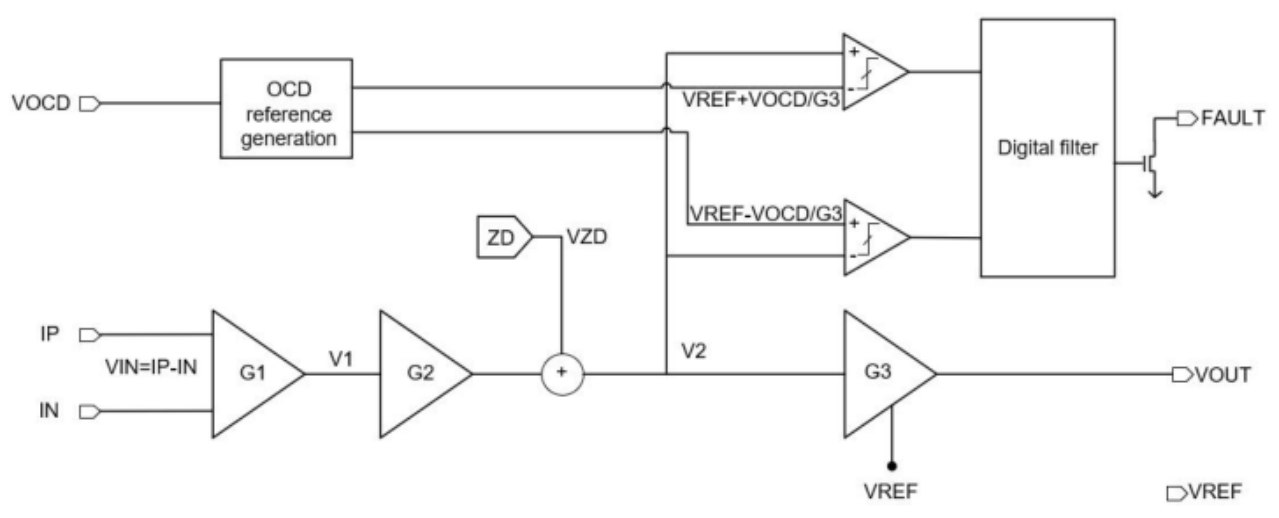
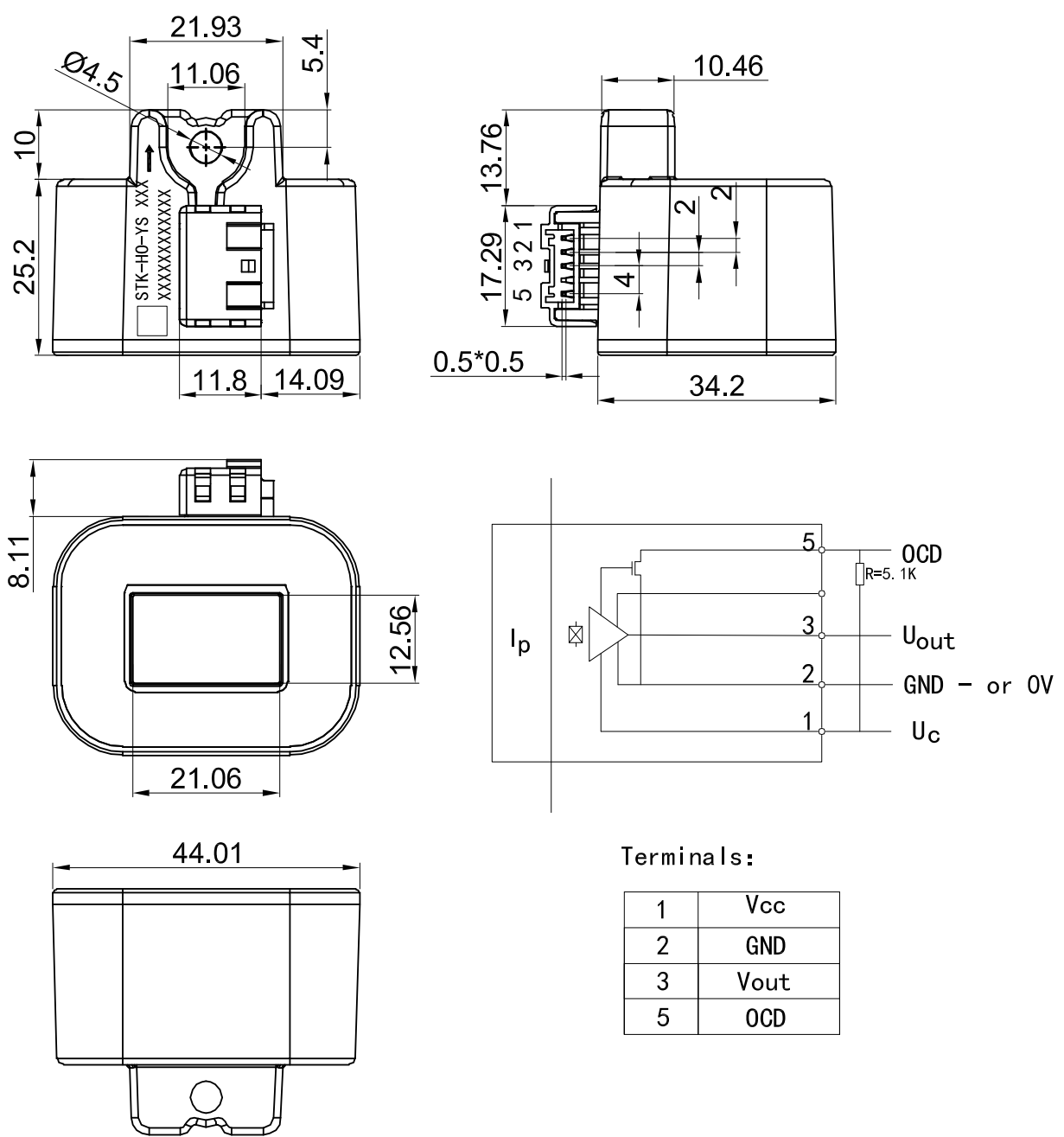Functional Block Diagram on OCD function when Vref = 2.5 V
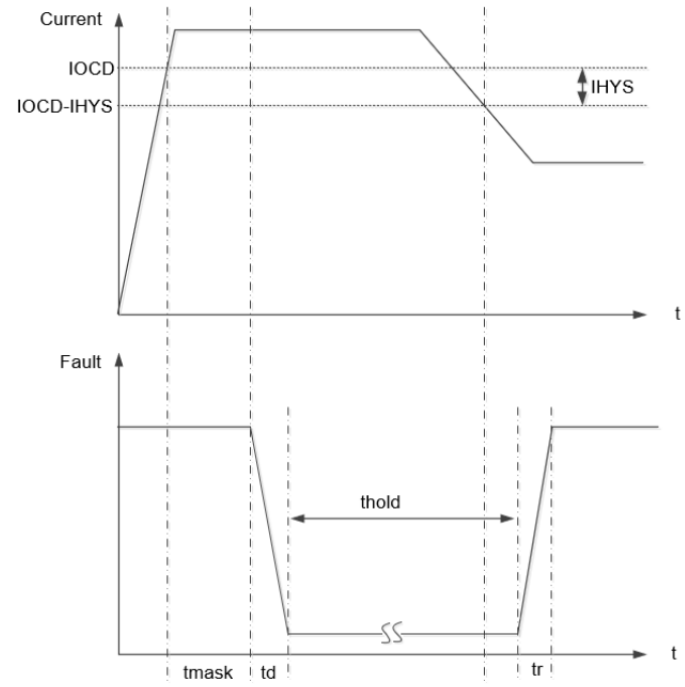
The above plot shows the definition on the time in OCD function. The typical value for tmask & thold is that tmask = 2μs , and thold = 1.5ms . The overcurrent detection function can also set tmask and thold time:

a)

Tmask:set	Value
1	0μs
2	1μs
3	2μs
4	3μs

Thold:set	Value
1	0ms
2	1.5ms
3	3ms
4	4.5ms

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7. Dimension & Pin definitions

Terminals:

1	Vcc
2	GND
3	Vout
5	OCD

Remarks:

1、Connection system equivalent to JST B05B-PASK
2、Transducer fastening   1 hole Ø 4.5 mm
                                      1 nonmagnetic screw M4
3、Recommended fastening torque   3.5 N.m

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