

Current Sensor

Product Series: STK-HO/2

Part number: STK-HO/2 60, STK-HO/2 100
STK-HO/2 120, STK-HO/2 150
STK-HO/2 180, STK-HO/2 180
STK-HO/2 240, STK-HO/2 250

Version: Ver1.4



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1. Description

STK-HO/2 current sensor is based on the open loop principle. DC, AC, pulses and any kind of irregular wave can be measured by the current sensor under the isolated conditions.

Typical application

- AC Variable speed drives
- UPS
- Power supplies for welding applications
- MPPT
- Switched model power supplies (SMPS)
- Static converters for DC motor drives
- Battery supplied applications
- Combiner box

General parameters

Parameter	Symbol	Unit	Value
Working temperature	T _a	°C	-40 ~ 105
Storage temperature	T _{stg}	°C	-40 ~ 105
Mass	m	g	33.7

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage (not-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 parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test	U _d	kV	4.3	@ 50Hz/1 min
Impulse withstand voltage	Ū _w	kV	8	1.2/50μs
Case material	-	-	V0	According to UL 94
Comparative tracking index	CTI	-	600	
Clearance (pri. - sec.)	D _{ci}	mm	>8	Shortest distance through air
Creepage distance (pri. - sec.)	D _{cp}	mm	>8	When mounted on PCB with recommended layout

2. Electrical performance of STK-HO/2 60

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		60		
Primary current measuring range	I_{pm}	A	-150		150	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-0.6		0.6	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		13.333		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ange}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ange}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ T_x - V_{oe} @ 25^{\circ}C - G_{th} * I_n) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

3. Electrical performance of STK-HO/2 100

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		100		
Primary current measuring range	I_{pm}	A	-250		250	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-1		1	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		8		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ range}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_{TR}	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_{TR\text{ range}}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ \ln @ T_x) - V_{oe@ 25^{\circ}C} - G_{th} * \ln) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

4. Electrical performance of STK-HO/2 120

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		120		
Primary current measuring range	I_{pm}	A	-300		300	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-1.2		1.2	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		6.667		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ range}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	$Non-L_{pn}$	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	$Non-L_{pm}$	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ range}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ T_x - V_{oe} @ 25^{\circ}C - G_{th} * I_n) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

5. Electrical performance of STK-HO/2 150

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		150		
Primary current measuring range	I_{pm}	A	-375		375	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-1.5		1.5	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		5.333		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ange}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ange}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ \ln @ T_x) - V_{oe} @ 25^{\circ}C - G_{th} * \ln) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

6. Electrical performance of STK-HO/2 180

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		180		
Primary current measuring range	I_{pm}	A	-450		450	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-1.8		1.8	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		4.444		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ range}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ range}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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.

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④. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ \ln @ T_x) - V_{oe@ 25^{\circ}C} - G_{th} * \ln) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

7. Electrical performance of STK-HO/2 200

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		200		
Primary current measuring range	I_{pm}	A	-500		500	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-2		2	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		4		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ range}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ range}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ \ln @ T_x) - V_{oe@ 25^\circ C} - G_{th} * \ln) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

8. Electrical performance of STK-HO/2 240

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		240		
Primary current measuring range	I_{pm}	A	-600		600	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-2.4		2.4	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		3.333		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ange}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ange}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

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/2 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. the accuracy @ -40°C~105°C, $X_TRange = ((V_{out} - V_{ref}) @ \ln @ T_x) - V_{oe} @ 25^{\circ}C - G_{th} * \ln) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

9. Electrical performance of STK-HO/2 250

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_{pn}	A		250		
Primary current measuring range	I_{pm}	A	-625		625	
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6	10	
Reference voltage	V_{ref}	V	2.48	2.5	2.52	Output function
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{oe}	mV	-8		8	$V_{out} - V_{ref} @ V_{ref} = 2.5\text{ V}$
Electrical offset current referred to primary	I_{oe}	A	-2.5		2.5	
Output voltage range @ $I_P M$	V_{FS}	V	-2		2	$((V_{out} - V_{ref}) @ I_{pm}) - V_{oe}$
Internal V_{ref} resistance	R_{ref}	Ω	5	10	20	Series
Internal output resistance	R_{out}	Ω	1	5	10	Series
Difference of output resistance ($R_{ref} - R_{out}$)	R_{oe}	Ω	-10		10	Series
OCD output mask time ①	T_{mask}	μs		2		
OCD output hold time ②	T_{hold}	ms		1.5		
Theoretical gain	G	mV/A		3.2		800 mV @ $I_P N$
Temperature drift of V_{oe}	$V_{oe_TR\text{ange}}$	mV	-10		10	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Error of gain	Err_G	% G_{th}	-0.5		0.5	Trimmed in the factory @ 25°C
Temperature drift of gain	G_TR	% G_{th}	-1		1	@ $-40^\circ\text{C} \sim 105^\circ\text{C}$
Rated linearity error	Non- L_{pn}	% I_{pn}	-0.5		0.5	$\pm I_{pn}$
Linearity error @ I_{pm}	Non- L_{pm}	% I_{pm}	-1		1	$\pm I_{pm}$
Step response time	t_{res}	μs		1.5	2	@ 90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		200		No RC circuit
Output voltage noise	V_{noise}	mVpp		4.4		@140kHz Sampling Rate
Primary current, detection threshold ③	I_{pth}	A	$2.64 * I_{pn}$	$2.93 * I_{pn}$	$3.22 * I_{pn}$	Peak value $\pm 10\%$ overcurrent detection OCD
Accuracy @ 25°C	X	% of I_{pn}	-1		1	@ 25°C
Accuracy @ $-40^\circ\text{C} \sim 105^\circ\text{C}$ ④	$X_TR\text{ange}$	% of I_{pn}	-3		3	$-40^\circ\text{C} \sim 105^\circ\text{C}$

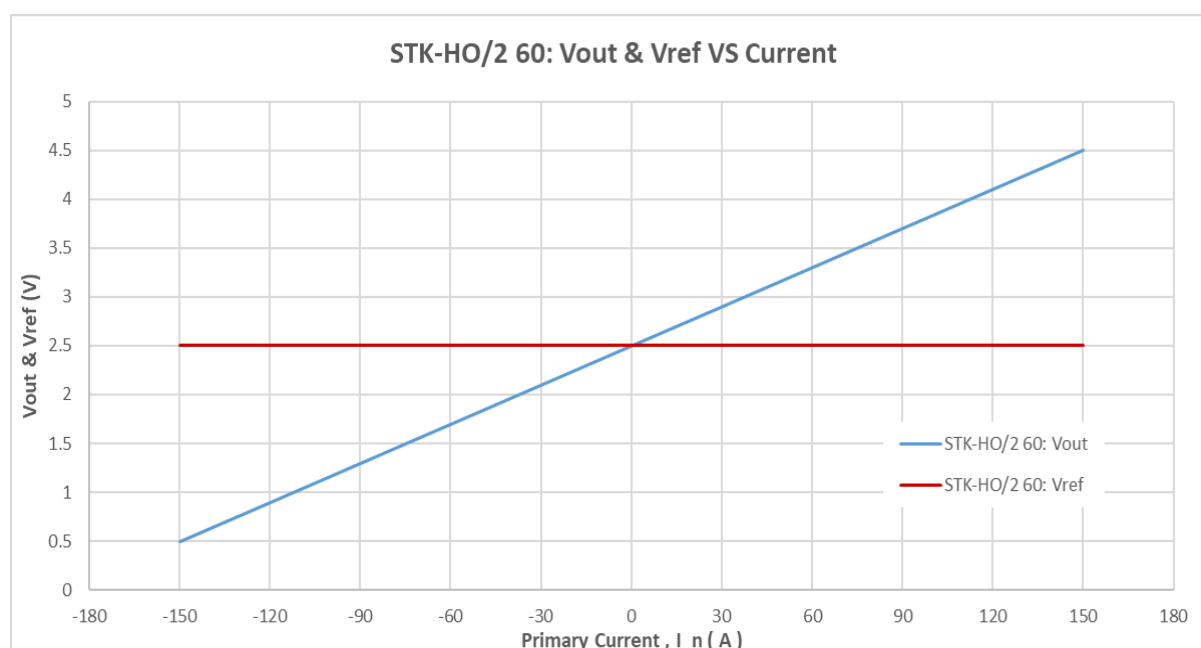
Remarks:

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.

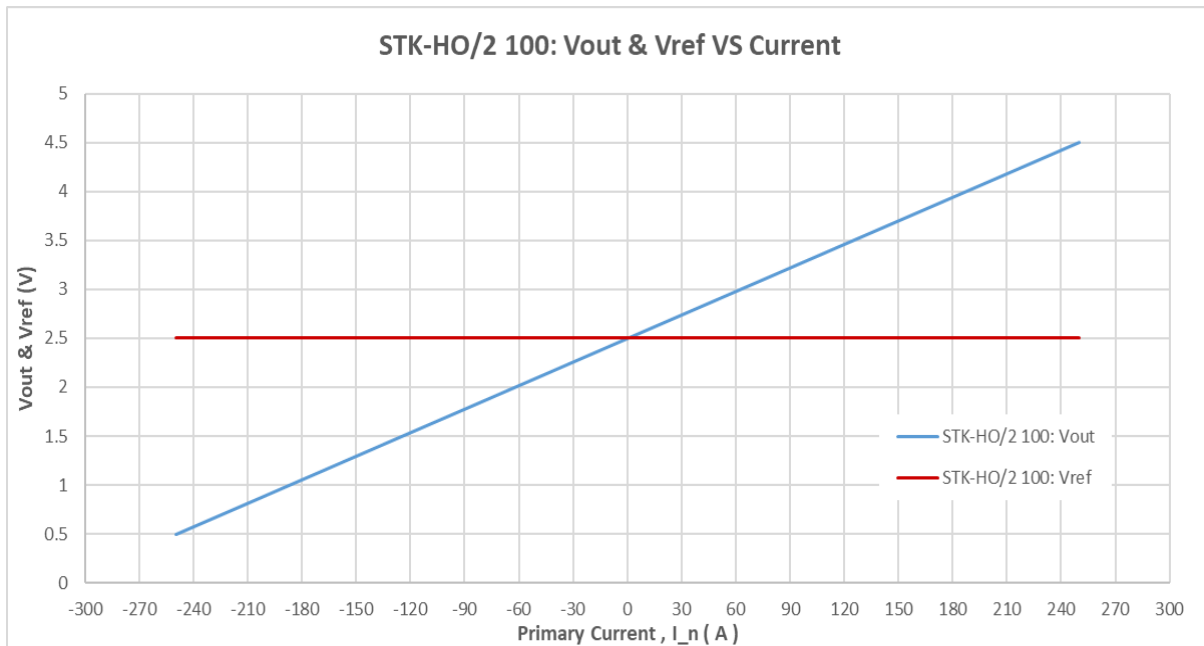
③. STK-HO/2 products may be ordered on request with a dedicated setting of the Trigger current . The product has a built-in overcurrent detection function, When the output voltage detected by the product exceeds the threshold, it is judged to be overcurrent and the output of fault pin changes to low level .

④. the accuracy @ -40℃~105℃, $X_TRange = (((V_{out} - V_{ref}) @ I_n @ T_x) - V_{oe} @ 25^{\circ}C - G_{th} * I_n) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature .

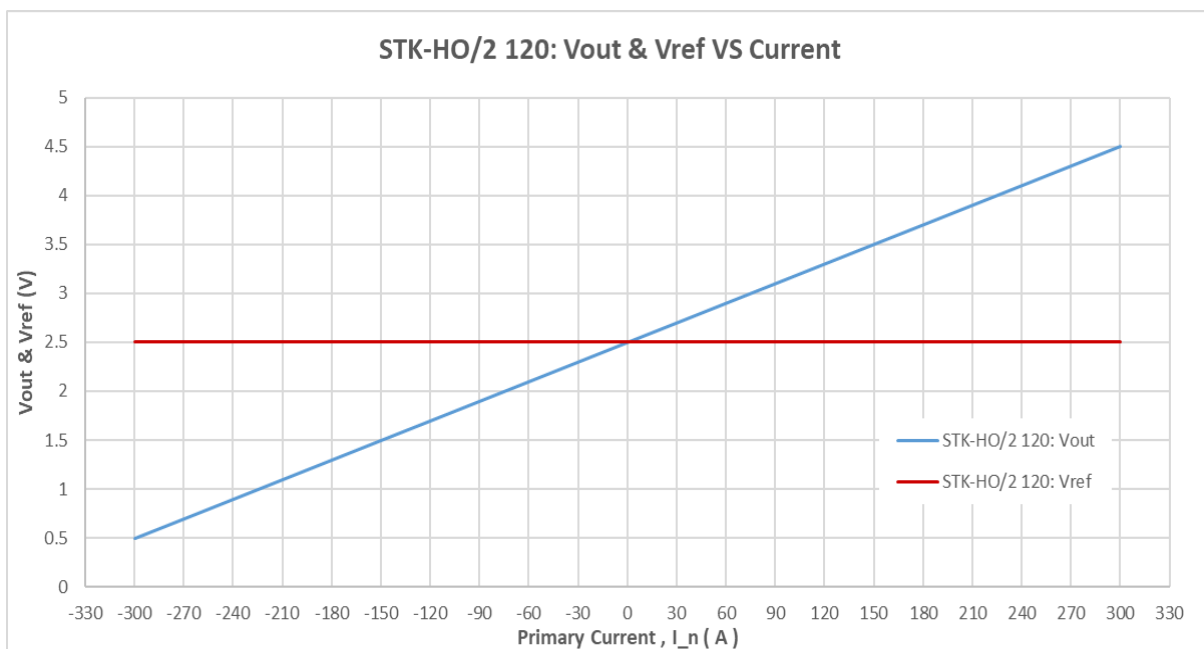
10. Output voltage VS primary current of STK-HO/2



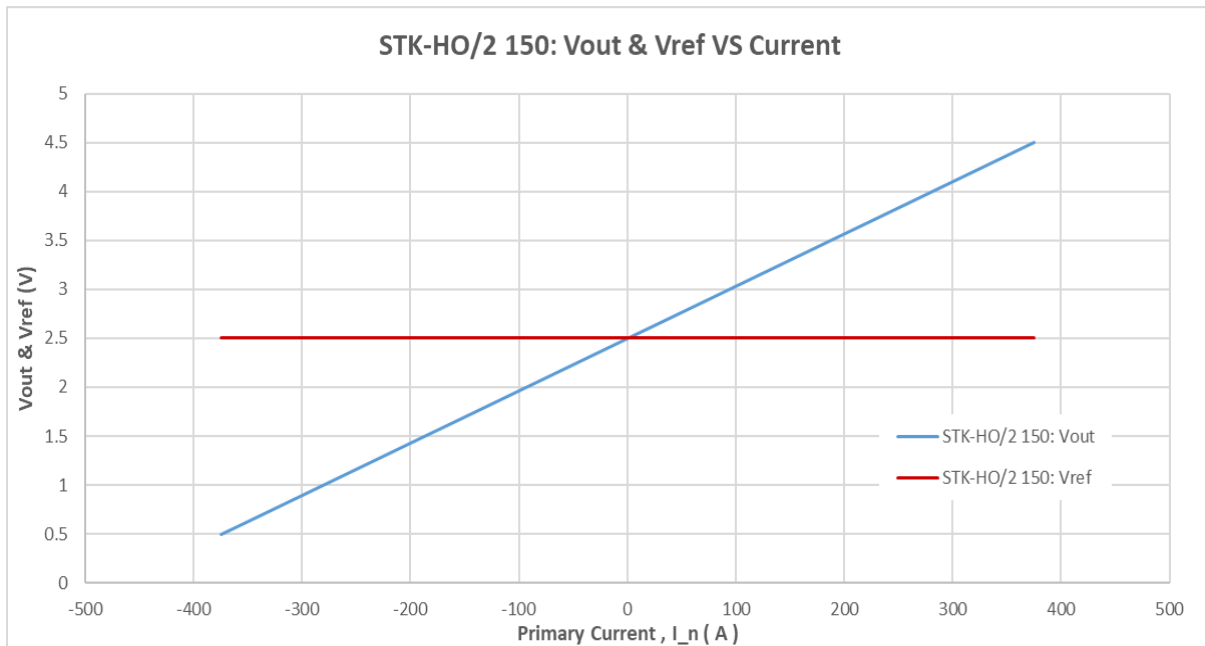
The dependence of Vout & Vref of STK-HO/2 60 on the primary current.



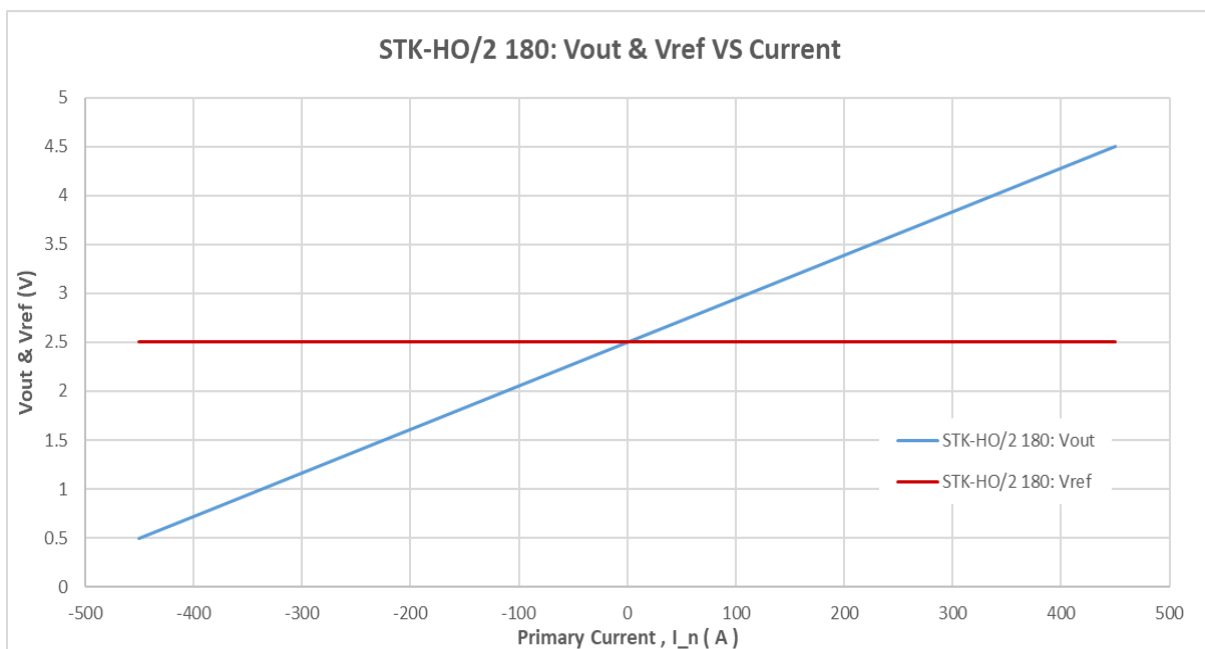
The dependence of V_{out} & V_{ref} of STK-HO/2 100 on the primary current.



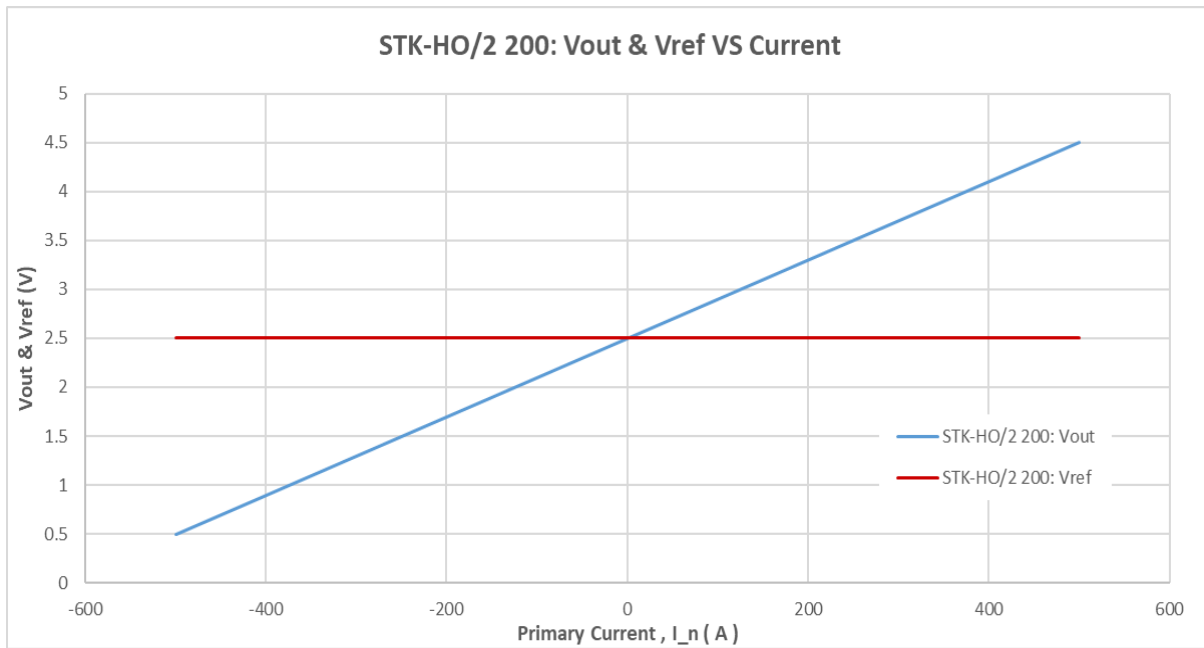
The dependence of V_{out} & V_{ref} of STK-HO/2 120 on the primary current.



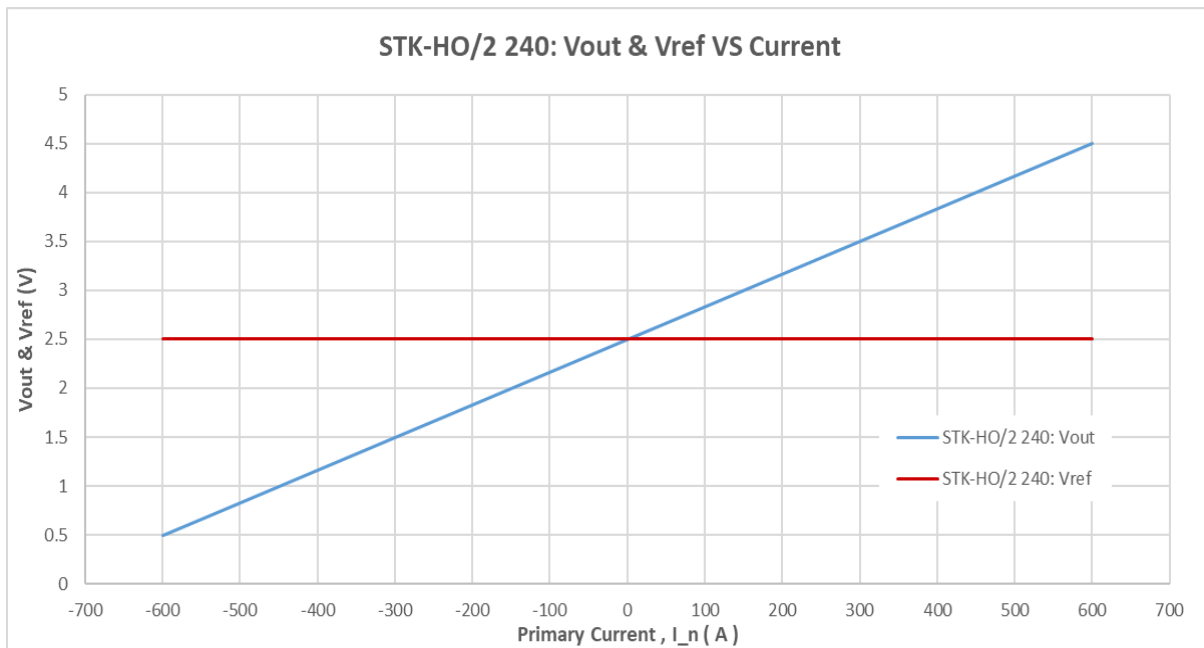
The dependence of V_{out} & V_{ref} of STK-HO/2 150 on the primary current.



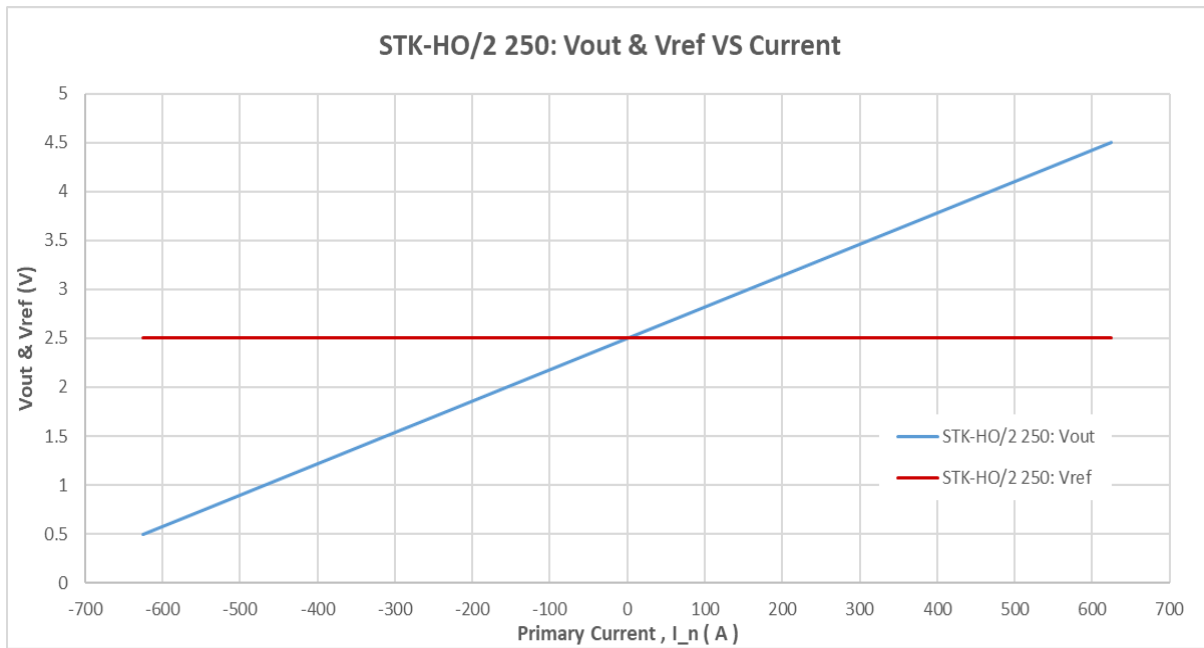
The dependence of V_{out} & V_{ref} of STK-HO/2 180 on the primary current.



The dependence of V_{out} & V_{ref} of STK-HO/2 200 on the primary current.

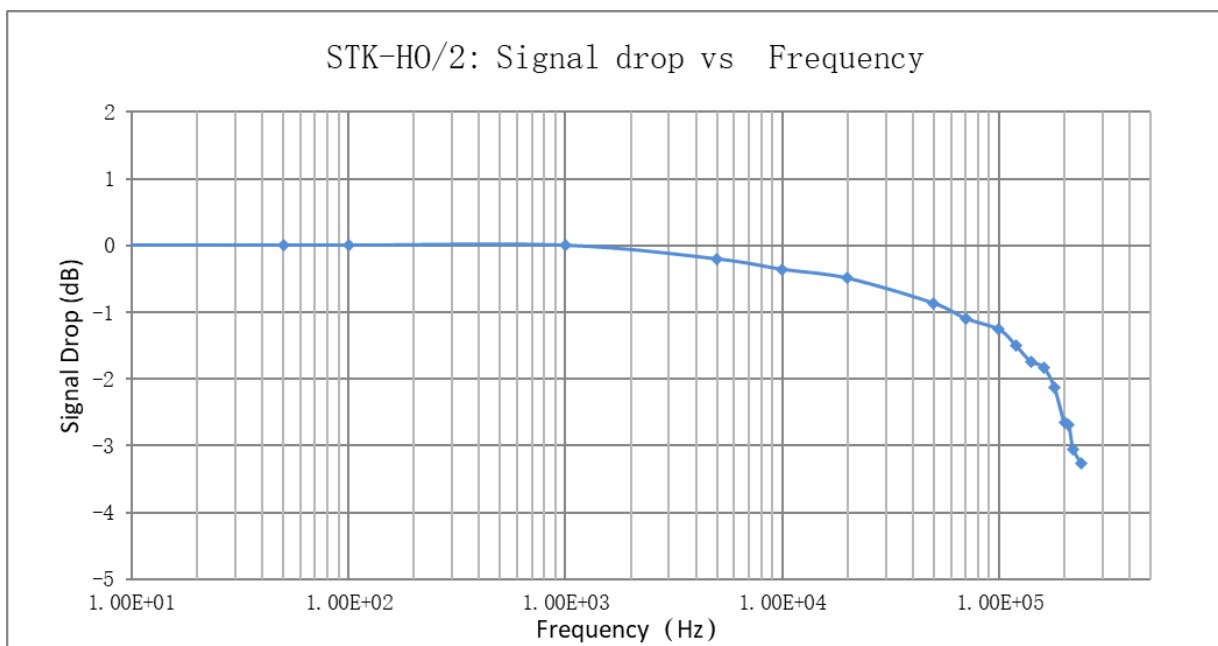


The dependence of V_{out} & V_{ref} of STK-HO/2 240 on the primary current.



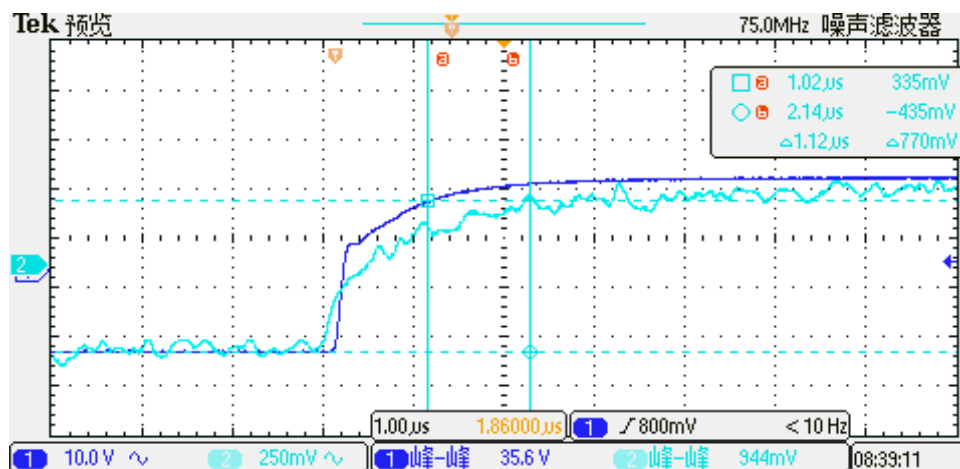
The dependence of Vout & Vref of STK-HO/2 250 on the primary current.

11. Frequency bandwidth



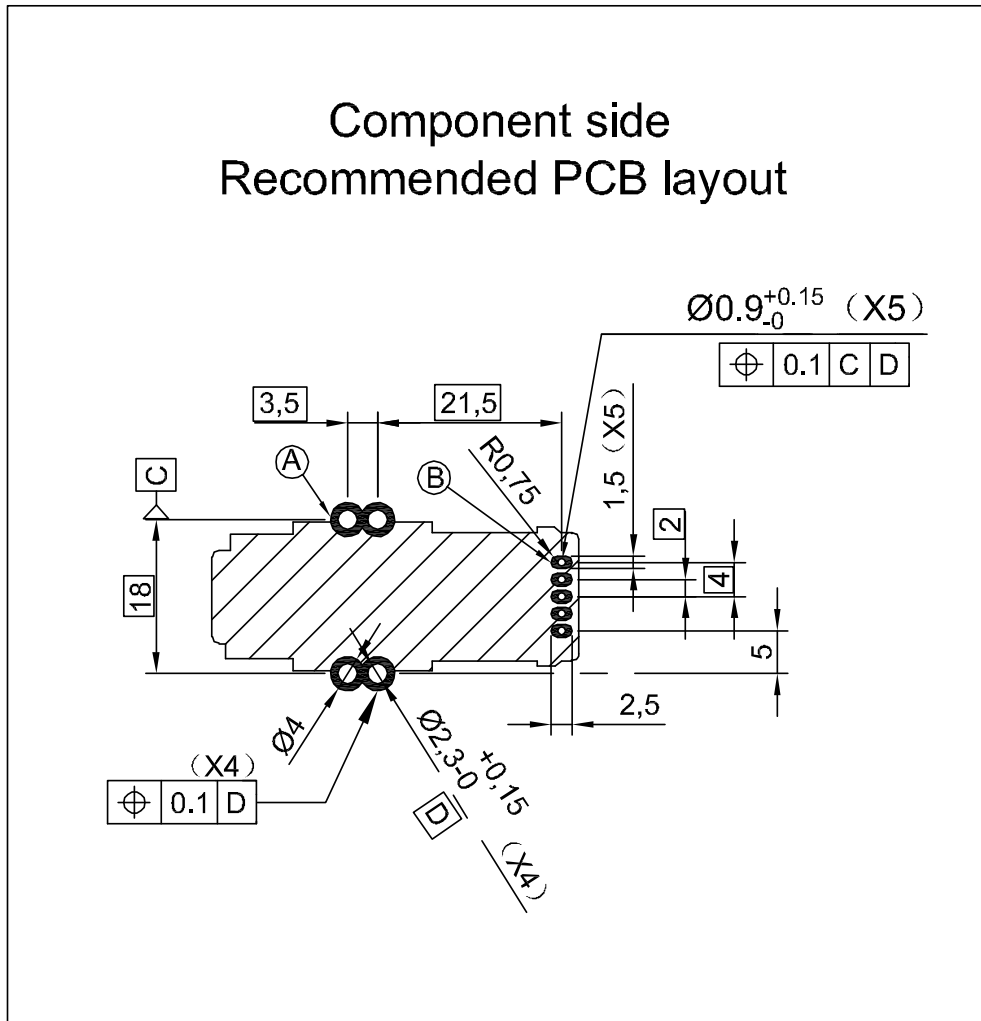
The frequency band width of STK-HO/2 series current sensors.

12. Step response time



The step response time of STK-HO/2 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 1.12 μs .

13. PCB Footprint in mm



Assembly on PCB:

Recommended PCB hole diameter	2.15 mm for primary pin 0.9 mm for secondary pin
Maximum PCB thickness	2.4 mm
Wave soldering profile No clean process only	maximum 260 °C, 10 s

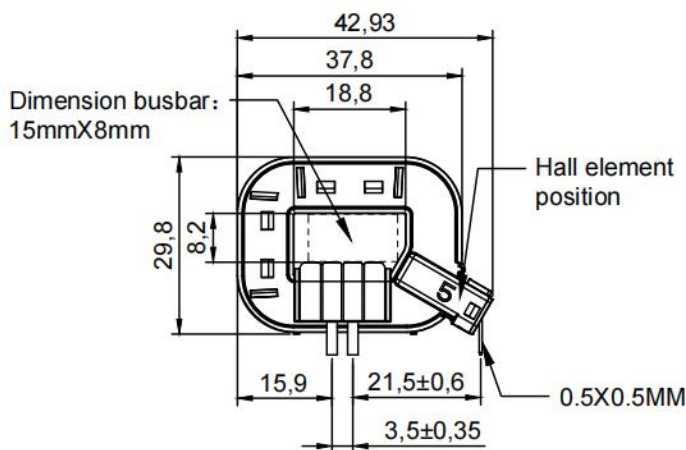
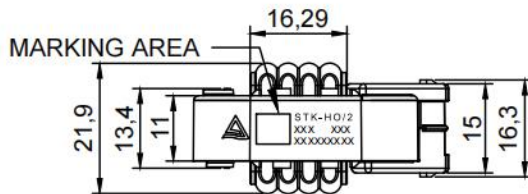
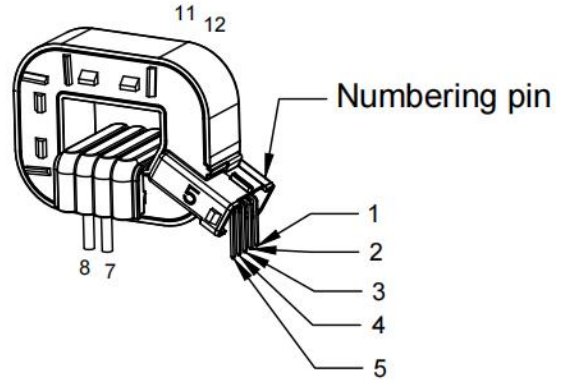
Insulation distance (nominal values):

	d_{Cp}	d_{Cl}
On PCB: A - B	18.85 mm	-
Between jumper and secondary pin	21.1 mm	20.9 mm
Between primary busbar and secondary pin	14.6 mm	-
Between primary busbar and jumper	-	8 mm
Between primary busbar and core	-	11.34 mm
Between core and secondary terminal	-	1.18 mm

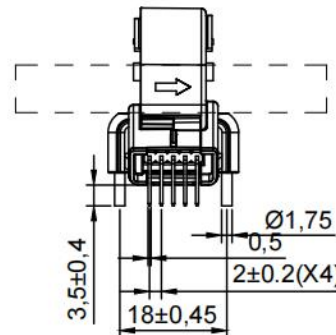
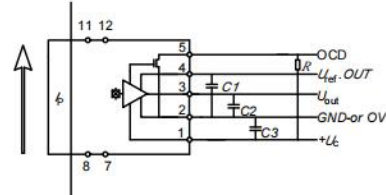
14. Dimensions & Pins & Footprint

NOTES:

- 1) MATERIAL
Primary: Copper alloy
Secondary: Phosphorous bronze
- 2) PLATING
Terminals: Tin over Nickel
- 3) PRODUCT MARKING
See drawing
- 4) CUSTOMER MOUNTING
See recommended PCB layout

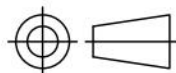


Connection



	dCl(mm)	dCp(mm)
A-B	18.85	18.85

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



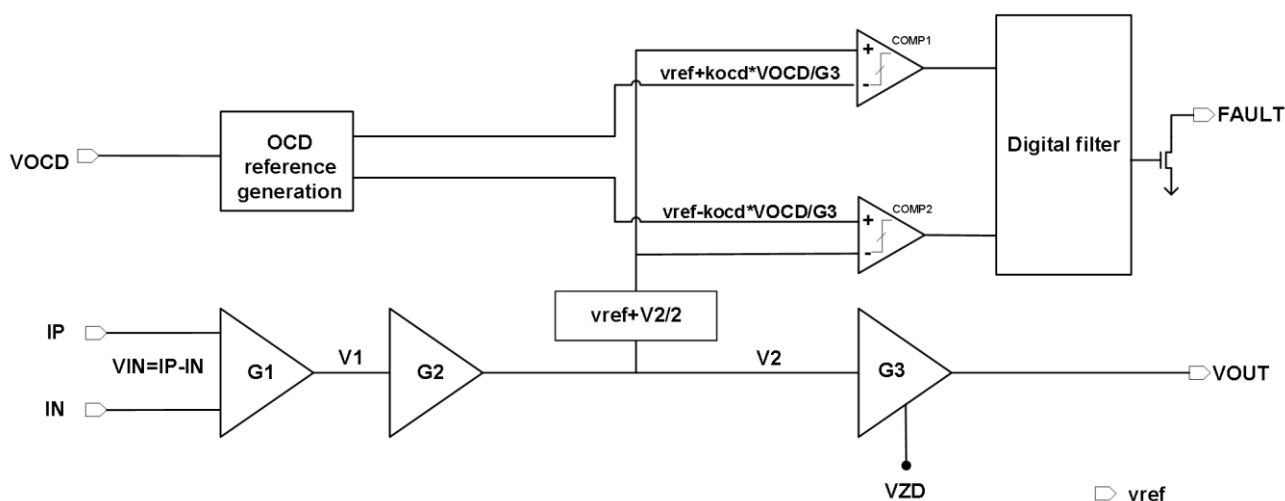
C1	47nF
C2	4.7nF
C3	47 nF
R	5.1K Ω

15. 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) $V_{ref} = 2.5 \text{ V}$
- b) $0.625 \text{ V} \leq V_{OC} \leq V_{ref}$;
- c) Trigger voltage = $V_{ref} \pm 2 \cdot V_{OC}$;
- d) Trigger current = $(V_{ref} \pm 2 \cdot V_{OC} - V_{off}) / G_{th}$;



Functional Block Diagram on OCD function when $V_{ref} = 2.5 \text{ V}$

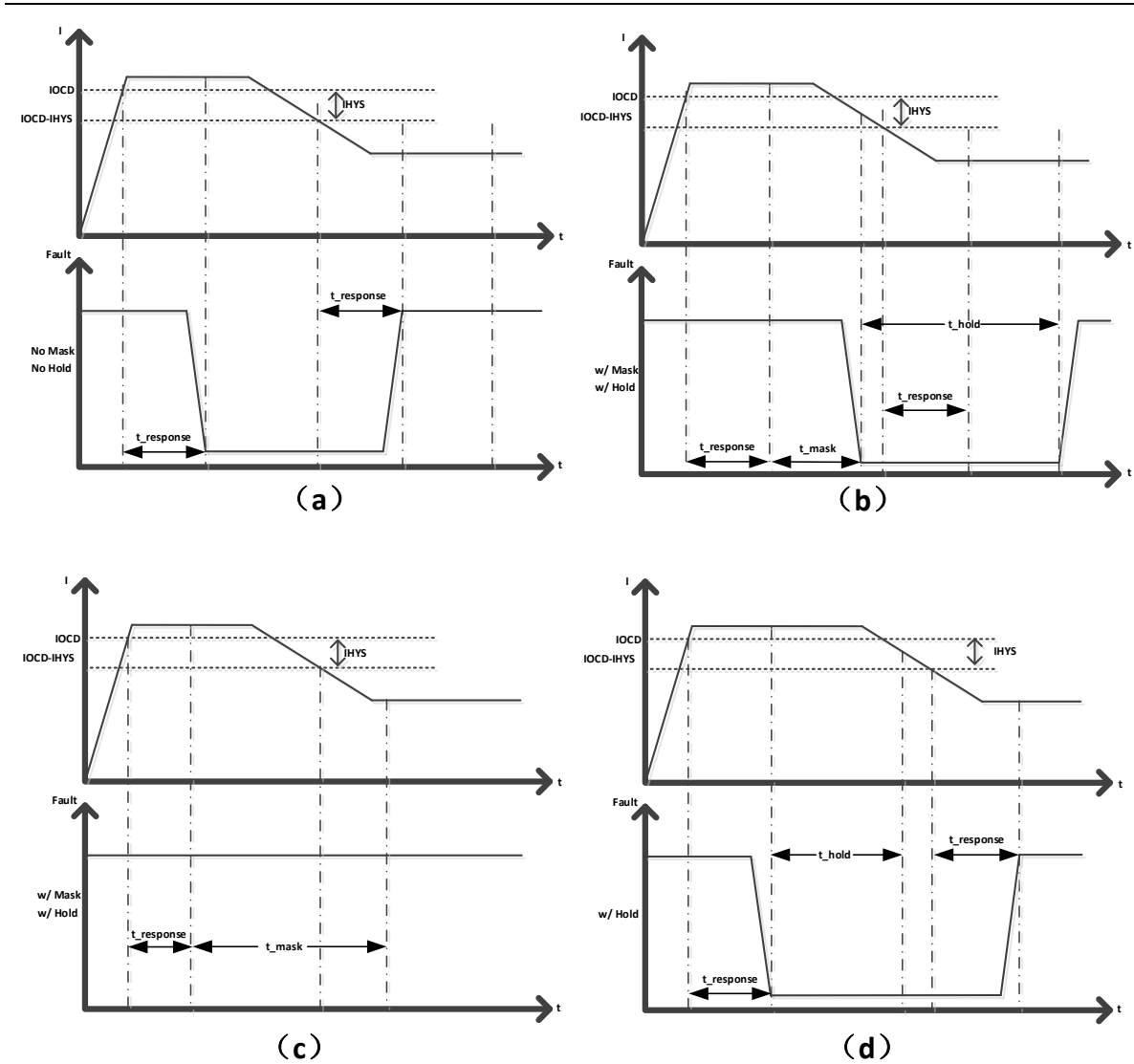
$T_{response}$ is defined as the shortest time from when the chip detects the current exceeding the rated value to when the chip issues an alarm. When t_{mask} and t_{hold} are not set, the $t_{response}$ time is equal to the time from when the chip detects the current exceeding the rated value to when the Fault pin is pulled low. To avoid false OCD alarms caused by current spikes, the chip provides a masking time t_{mask} , which can be set to mask spikes of different widths according to customer needs. The t_{hold} time is used to ensure that when an alarm occurs in the system (the Fault pin is pulled low), the alarm time exceeds a preset value to protect the system.

Figure (a) shows the default situation where t_{mask} and t_{hold} are not set. When an overcurrent occurs and is cleared, the response time of the Fault pin is only $t_{response}$.

Figure (b) shows the situation when t_{mask} and t_{hold} are set. After an overcurrent occurs, it takes $t_{response} + t_{mask}$ time for the Fault pin to be pulled low. After an overcurrent occurs, the alarm will be maintained for t_{hold} time. If the overcurrent is cleared during this period, the Fault pin will not be pulled high until t_{hold} ends.

Figure (c) shows the situation when t_{mask} is set. When an overcurrent occurs, it takes $t_{response} + t_{mask}$ time to pull the Fault pin low. However, during the waiting period, the overcurrent is cleared, so the Fault pin is never pulled low.

Figure (d) shows the situation when t_{hold} is set. When an event below the alarm threshold occurs after t_{hold} , the time required for the Fault pin to be pulled high is only $t_{response}$.



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
5	∞