SINOMAGS 希磁科技

Current Sensor

Product Series： STK-HD/L2

Part number： STK-6 HD/L2
STK-10 HD/L2
STK-20 HD/L2
STK-30 HD/L2
STK-32 HD/L2
STK-50 HD/L2
STK-80 HD/L2

Version: Ver 2.0

Sinomags Technology Co., Ltd

Web site: www.sinomags.com

CONTENT

1. Summary

The STK- HD/L2 series is based on HALL technology and open-loop design. It is suitable for DC, AC, pulsed and any kind of irregular current measurement under the isolated conditions.

Typical applications

- PV combiner box
- PV inverter (MPPT & AC)
- motor driver controller
- SMPS & UPS
- Battery management system

Standards

- EN50178:1997
- IEC 61010-1:2010
- IEC 61326-1:2012

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_A	℃	-40 ~ 105
Storage temperature	T_stg	℃	-40 ~ 105
Mass	m	g	1.4

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage（non-destructive）	V_C	V	7.5
ESD rating（HBM）	U_{ESD}	kV	4
ESD rating（CDM）	U_{CDM}	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.

Ratings

Parameter	Symbol	Unit	Value
Ambient operating temperature	T_A	℃	-40~105
Primary current	I_p	A	According to series primary current
Output voltage	V_out	V	0.1 ~ 4.9

Isolation parameter

Parameter	Symbol	Unit	Value	Comment
RMS voltage for AC test 50Hz/1 min	Ud	kV	4	
Impulse withstand voltage 1.2/50μs	Ûw	kV	10	
Clearance distance (pri. -sec)	dCl	mm	8.98	Shortest distance through air
Creepage distance (pri. -sec)	dCp	mm	11.88	Shortest path along device body
Case material			according to UL 94	

2. STK-6HD/L2 Electrical performance

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		6		
Primary current measuring range	I_pm	A	-15		15	
Sup Condition：T_A = 25℃ Vcc = 5 V (Except special instructions)ply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
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	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		133.33		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

3. STK-10HD/L2 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		10		
Primary current measuring range	I_pm	A	-25		25	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
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	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		80		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

4. STK-20HD/L2 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		20		
Primary current measuring range	I_pm	A	-50		50	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
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	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		40		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

5. STK-30HD/L2 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		30		
Primary current measuring range	I_pm	A	-75		75	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
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	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		26.666		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

6. STK-32HD/L2 Electrical performance

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		32		
Primary current measuring range	I_pm	A	-80		80	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
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	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		25		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

7. STK-50HD/L2 Electrical performance

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

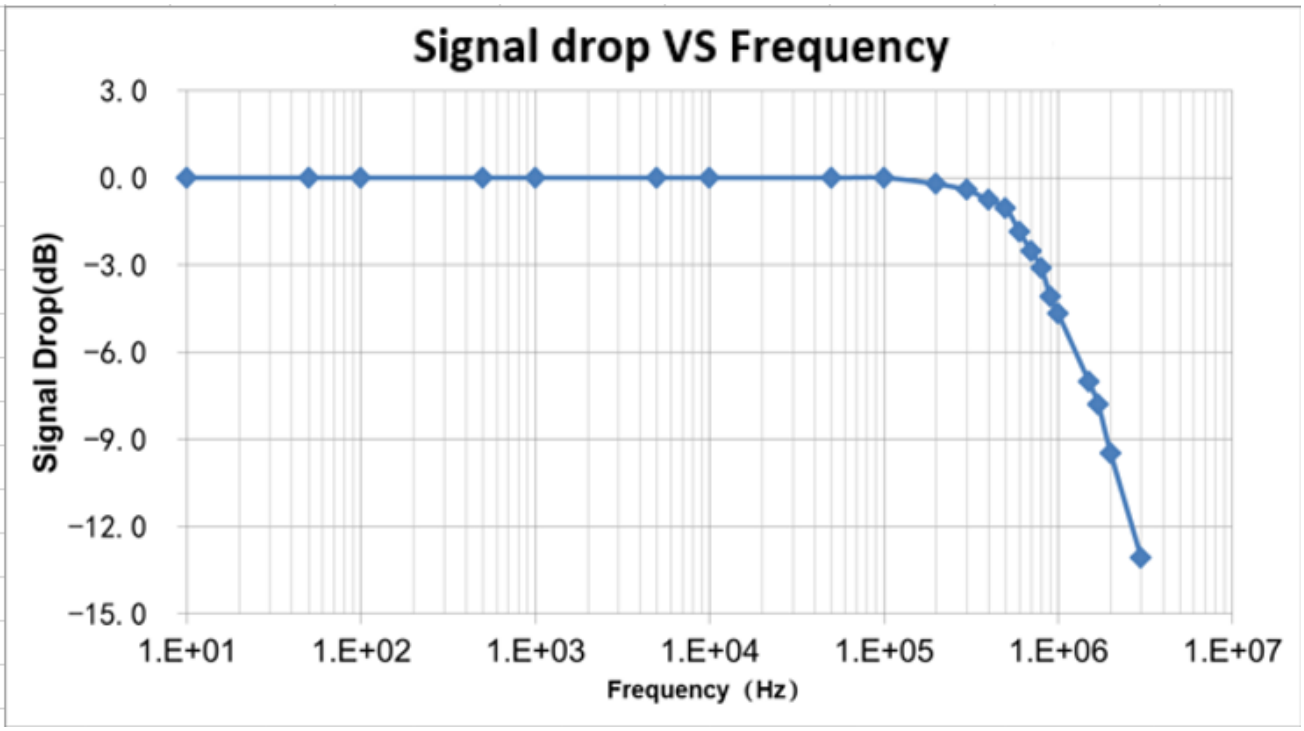
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		50		
Primary current measuring range	I_pm	A	-125		125	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		16		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

8. STK-80HD/L2 Electrical performance

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

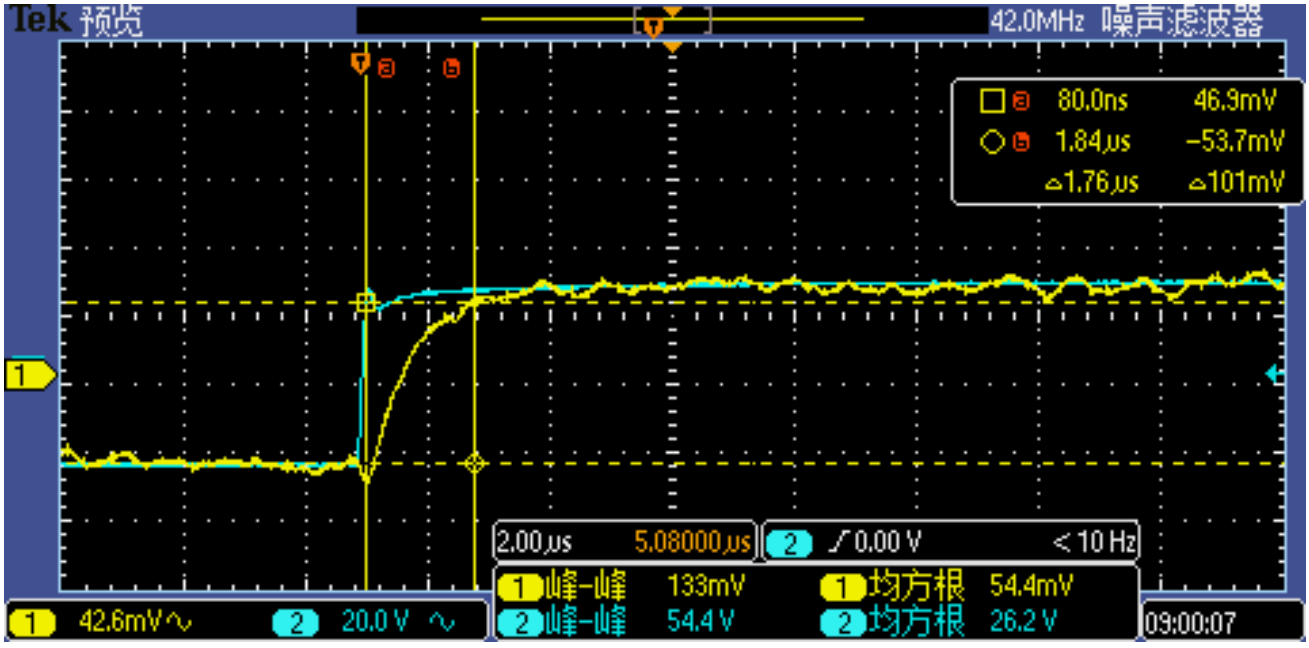
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current rms	I_pn	A		80		
Primary current measuring range	I_pm	A	-200		200	
Supply voltage	Vcc	V	4.75	5	5.25	
Current consumption	Icc	mA		5	10	
Reference voltage	Vref	V	2.48	2.5	2.52	Output function
Rated output voltage	V_FS	V		0.8		(Vout - Vref)@ I_pn
Internal output resistance	R_out	Ω	4	10	16	Output
Internal output resistance	R_ref	Ω	4	10	16	Output
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	mV	-8		8	-40℃ ~ 105℃
Theoretical gain	G_th	mV/A		10		800 mV @ I_pn
Error of gain	Err_G	%G_th		±0.5		Trimmed in the factory @ 25℃
Temperature drift of gain	G_TR	%G_th	-1.0		1.0	-40℃ ~ 105℃
Rated linearity error	Non-L_pn	%I_pn	-1		1	±I_pn
Linearity error @ I_pm	Non-L_pm	%I_pm	-3		3	±I_pm
Step response time	t_res	μs		2	3	@ 90% of I_pn
Frequency bandwidth (-3dB)	BW	kHz		300		No RC circuit
Output voltage noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		 12 17		
Accuracy @ 25℃	X	% of I_pn	-1		1	@ 25℃
Accuracy @ -40℃ ~ 105℃	X_TRange	% of I_pn	-2		2	-40℃ ~ 105℃
Welding temperature	WT	℃		260		
Welding hold time	WHT	S		10		

9. Frequency response and bandwidth



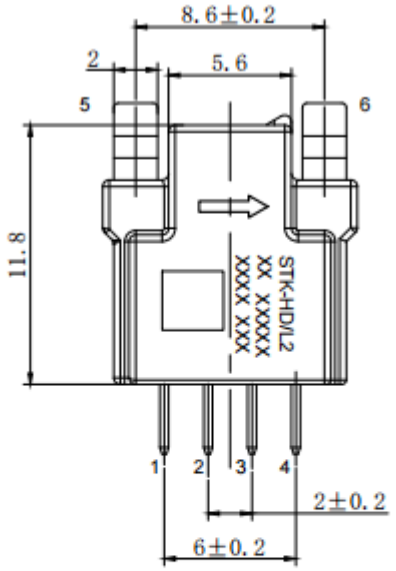
The frequency bandwidth of STK-HD/L2 series current sensor. The bandwidth of current sensor is DC ~ 300 kHz (-3dB).

10. Step response time



The typical frequency response of STK-xxHD/L2 current sensor. The response time from 90% of the primary current (light blue) to 90% of the secondary output (dark blue) is less than 2us.

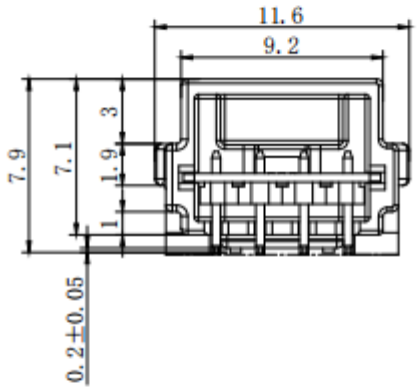
11. Dimension & Pin definitions

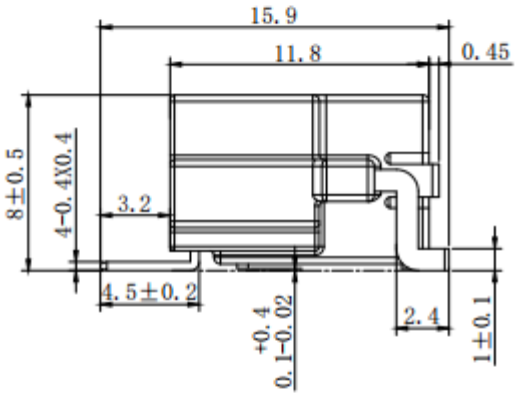


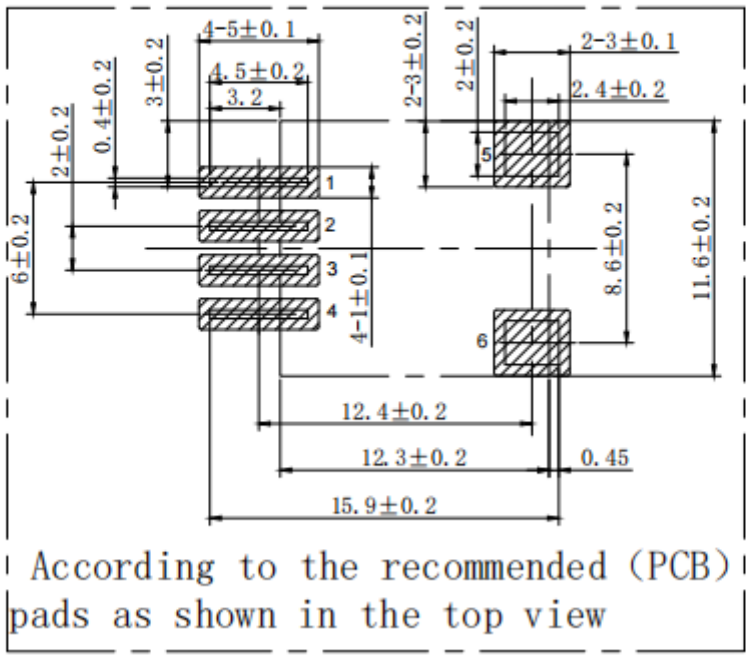
Terminals:

Pin 1	Vref
Pin 2	Vcc
Pin 3	GND
Pin 4	Vout
Pin 5	Ip+
Pin6	Ip-

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







According to the recommended (PCB) pads as shown in the top view