SINOMAGS
希 磁 科 技

CURRENT SENSOR

PRODUCT SERIES: STB-250LA/Zx

PRODUCT PART NUMBER: STB-250LA/ZN STB-250LA/Z
STB-250LA2/ZN STB-250LA2/Z

VERSION: Ver 1.6.2

Sinomags Technology Co., Ltd.

Web site: www.sinomags.com

CONTENT

1. Description

STB-LA/ZN series current sensors are based on close loop principle with TMR technology. The sensor can detect the current with DC, AC, pulse and irregular wave shape.

Typical application

- Solar inverter
- Uninterruptible Power Supplies (UPS)
- Variable frequency converter
- Direct-current dynamo
- Switched model power supplies (SMPS)

General parameters

Parameter	Symbol	Unit	Value	Remark
Working temperature	T_A	℃	-40 ~ 105	105℃,I(max)=420A
Storage temperature	T_stg	℃	-40 ~ 105	
Limit temperature of primary conductor	T_LP	℃	105	STB-xxxLA/Z
Mass	m	g	59	STB-xxxLA/ZN

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage	Vcc_max	V	6
Maximum primary current	I_p_max	A	10*I_pn
ESD rating (HBM)	U_ESD_HBM	kV	4
High temperature and humidity	T_HAST	-	85℃&85%RH（1000h）

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 50Hz/1 min	Ud	kV	4	
Impulse withstand voltage 1.2/50μs	Ûw	kV	8	
Clearance distance (pri. -sec)	dCl	mm	12.9	Shortest distance through air
Creepage distance (pri. -sec)	dCp	mm	12.9	Shortest path along device body
Case material			V0	According to UL 94
Comparative tracking index	CTI	V	600	
Operating Altitude	ASL	m	4000	

2. Electrical parameters (STB-250LA/ZN&STB-250LA/Z)

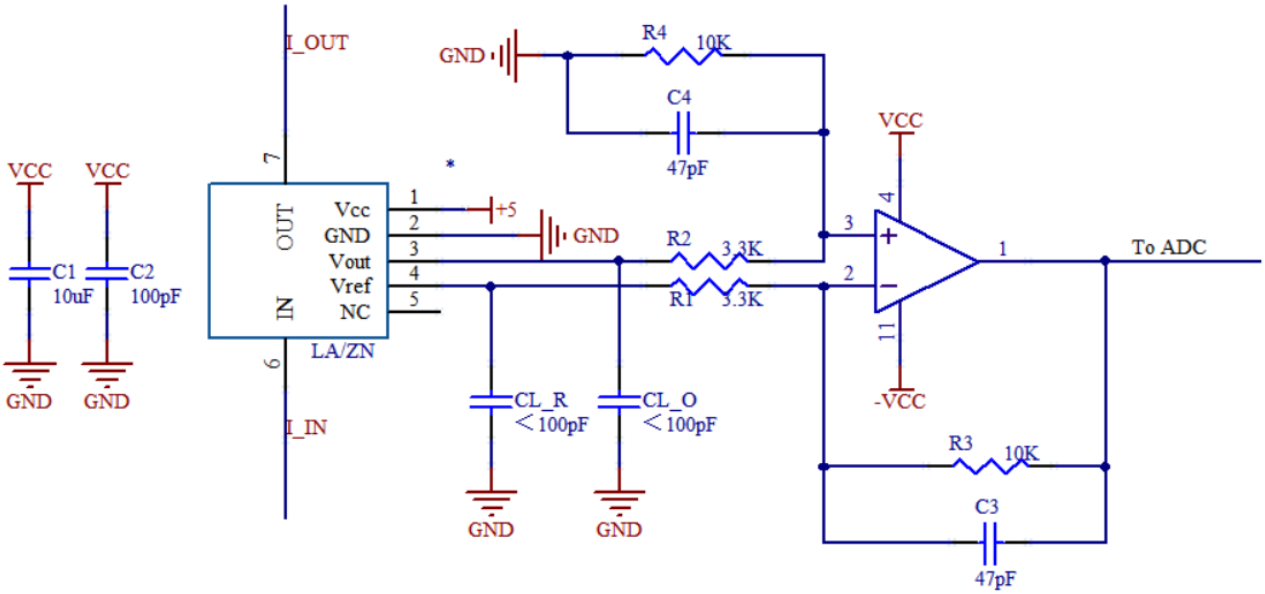
Condition: Vcc = 5.0 V, RL = 10 kΩ, T A = 25℃, unless specified.

Parameters	Symbol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I_pn	A		250		Supports continuous operation at 280 A
Primary current, measuring range	I_pm	A	-380		380	VCC=4.75V,@85℃
		A	-450		450	VCC=5V,@85℃
Maximum measured peak overcurrent (transformer effect)	ÎP meas	A	-650		650	di/dt >= 50 A/μs,duration at 650 A is 400 μs
Supply voltage	Vcc	V	4.75	5	5.25	
Consumption current	Ic	mA	15 + I_p*/NS*1000			NS = 1500
Reference voltage	V_ref	V	2.48	2.5	2.52	
Electrical offset voltage@25℃	V_oe	mV	-5		5	100 % tested (V_out – V_ref)@ 0 A
Magnetic offset current	I_om	mA	-210		210	@5*I_pn
Full-scale voltage	V_fs	V		± 0.7425		(V_out – V_ref)@ I_pn
Theoretical sensitivity	G_th	mV/A		2.7		0.7425 V @ I_pn
Sensitivity error	G_err	% of I_pn	-0.8		0.8	
Linearity error within I_pn	ξ_L	% of I_pn	-0.15		0.15	@25℃
Reaction time @ 10 % of I_p	t_ra	μs			1	
Step response time @ 90 % of I_p	t_r	μs			3	
-3 dB band width	BW	kHz	200			
Noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		0.15 0.25		
Accuracy @ 25℃	X	% of I_pn	-1		1	
Accuracy @ 85 °C	X_TRange	% of I_pn	-1.4		1.4	
Vout Capacitive Load	CL_O	pF	0		100	
Vref Capacitive Load	CL_R	pF	0		100	

3. Electrical parameters (STB-250LA2/ZN&STB-250LA2/Z)

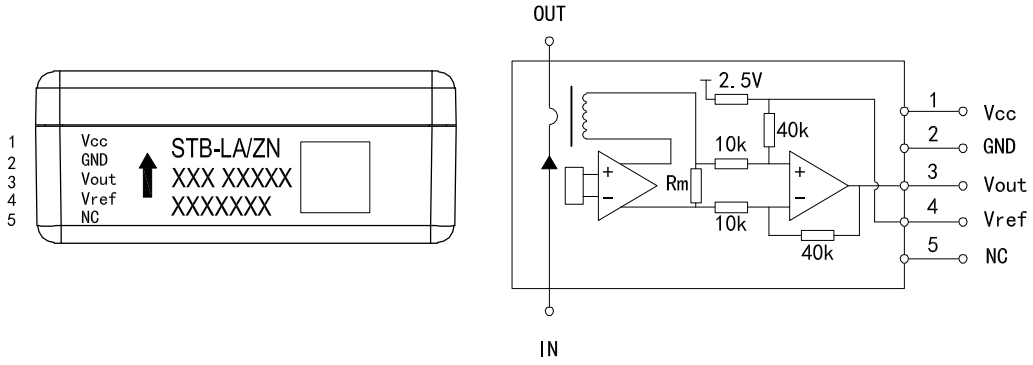
Parameters	Symbol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I_pn	A		250		Supports continuous operation at 280A
Primary current, measuring range	I_pm	A	-390		390	VCC=4.75V,@85℃
		A	-470		470	VCC=5V,@85℃
Maximum measured peak overcurrent (transformer effect)	ÎP meas	A	-670		670	di/dt >= 50 A/μs,duration at 670 A is 400 μs
Supply voltage	Vcc	V	4.75	5	5.25	
Consumption current	Ic	mA	15 + I_p*/NS*1000			NS = 1500
Reference voltage	V_ref	V	2.48	2.5	2.52	
Electrical offset voltage@25℃	V_oe	mV	-5		5	100 % tested (V_out – V_ref)@ 0 A
Magnetic offset current	I_om	mA	-210		210	@5*I_pn
Full-scale voltage	V_fs	V		± 0.4725		(V_out – V_ref)@ I_pn
Theoretical sensitivity	G_th	mV/A		1.89		0.4725 V @ I_pn
Sensitivity error	G_err	% of I_pn	-0.8		0.8	
Linearity error within I_pn	ξ_L	% of I_pn	-0.15		0.15	@25℃
Reaction time @ 10 % of I_p	t_ra	μs			1	
Step response time @ 90 % of I_p	t_r	μs			3	
-3 dB band width	BW	kHz	200			
Noise DC ~ 10 kHz DC ~ 100 kHz	Vnoise	mVpp		0.15 0.25		
Accuracy @ 25℃	X	% of I_pn	-1		1	
Accuracy @ 85 °C	X_TRange	% of I_pn	-1.4		1.4	
Vout Capacitive Load	CL_O	pF	0		100	
Vref Capacitive Load	CL_R	pF	0		100	

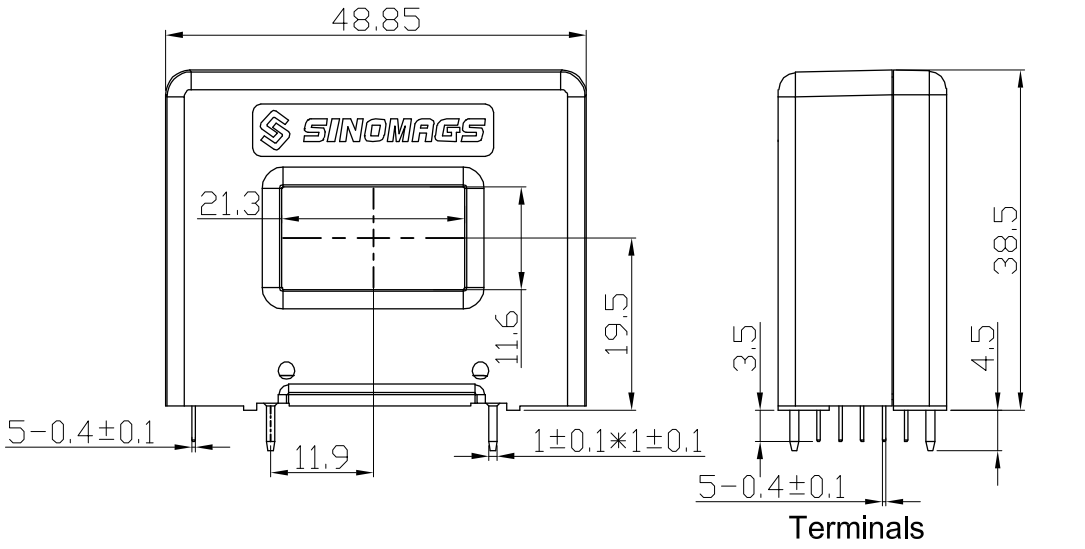
4. Typical application circuits



Typical application circuits for STB-LA current sensor. The magnification can be estimated as M = R4 / R2 with the condition of R1 = R2, and R3 = R4. The magnification in the circuit above is around 3. The capacitive load of Vout and Vref should not exceed 100pF to avoid oscillations.

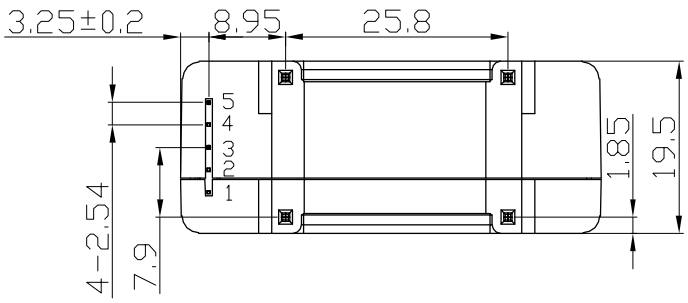
5. Dimensions: STB-250LA/ZN&STB-250LA2/ZN



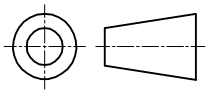


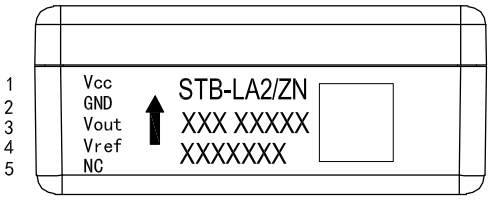
Terminals

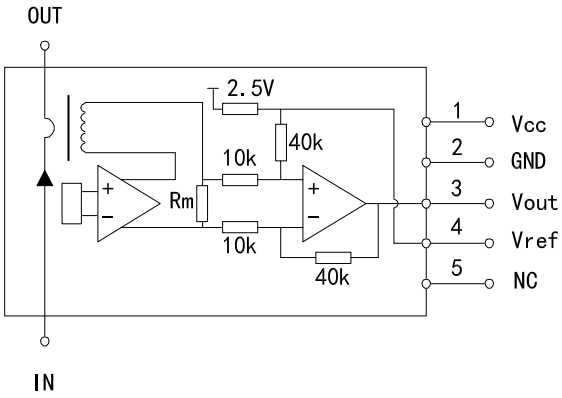
1	Vcc
2	GND
3	Vout
4	Vref
5	NC

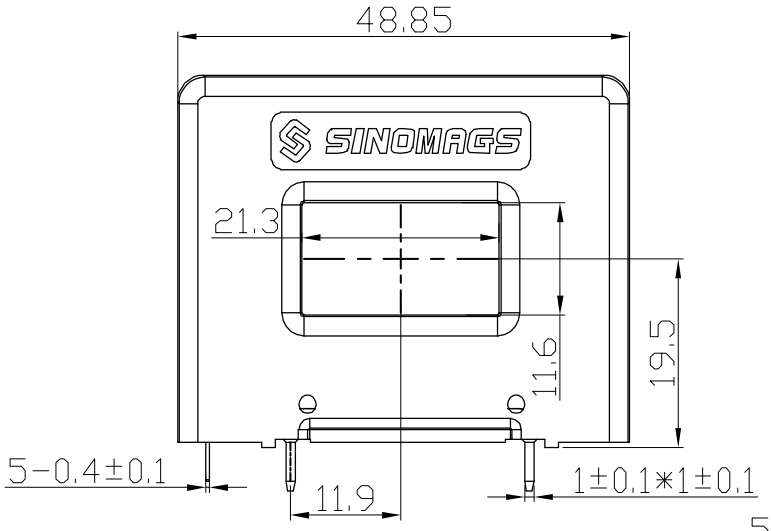


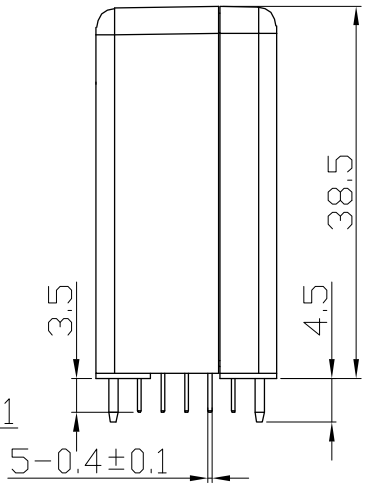
Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ±0.5
Unit :mm

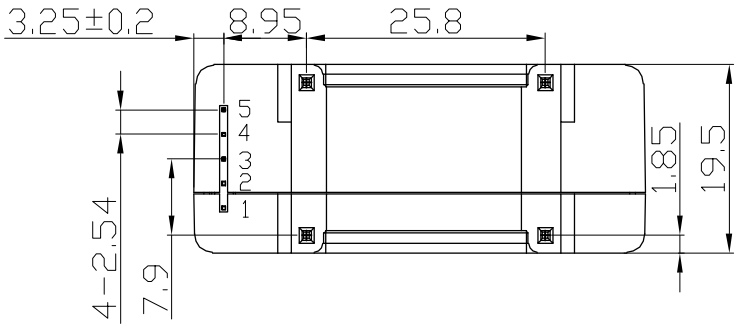








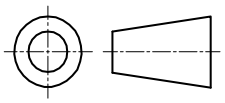




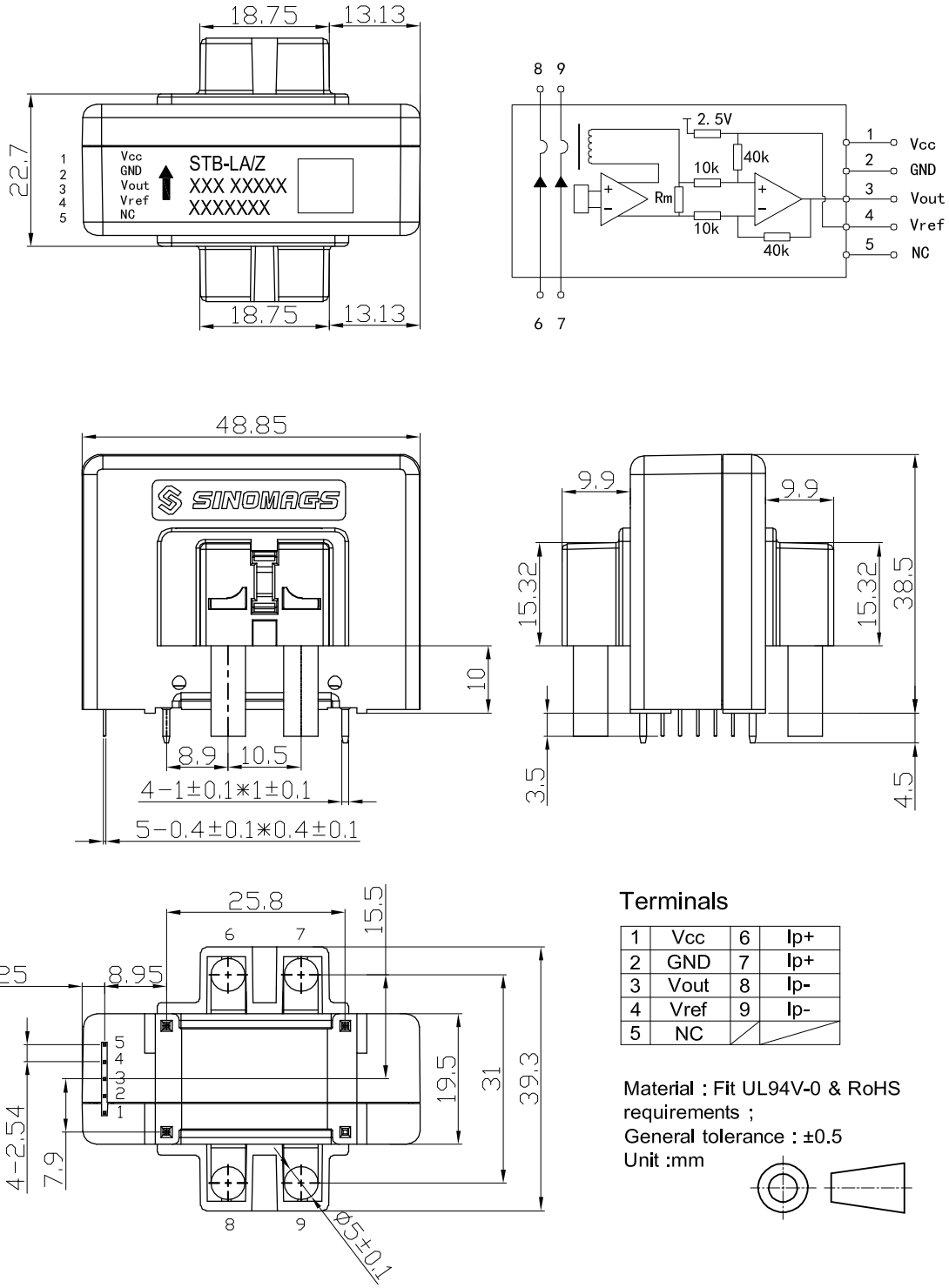
Terminals

1	Vcc
2	GND
3	Vout
4	Vref
5	NC

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



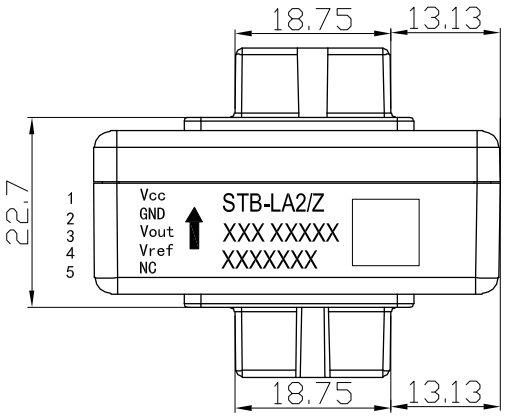
6. Dimensions: STB-250LA/Z&STB-250LA2/Z

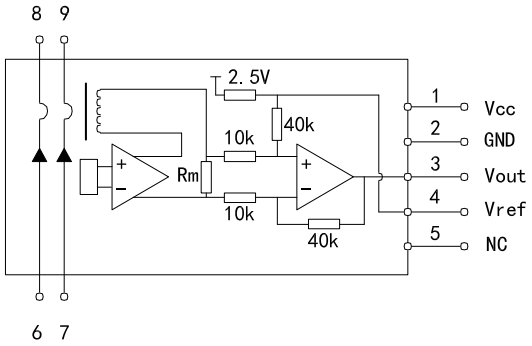


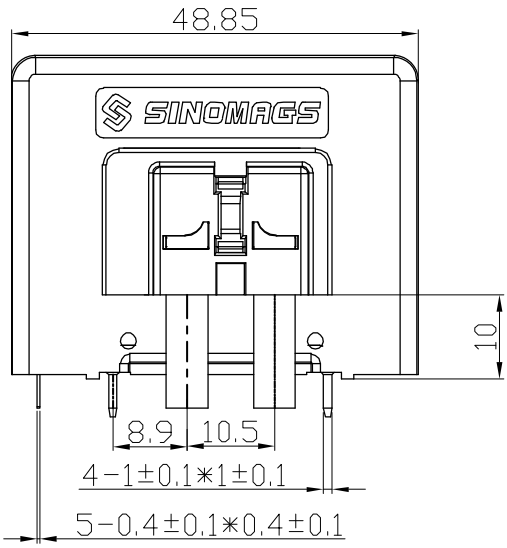
Terminals

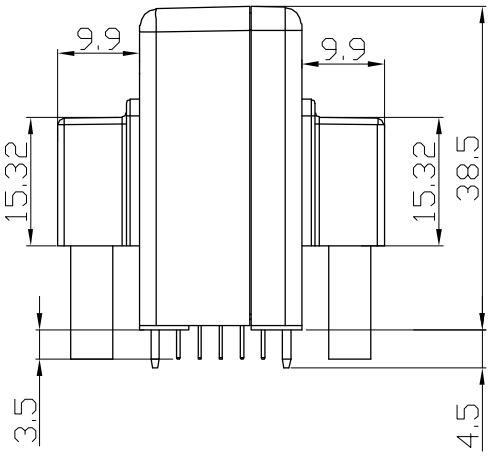
1	Vcc	6	Ip+
2	GND	7	Ip+
3	Vout	8	Ip-
4	Vref	9	Ip-
5	NC		

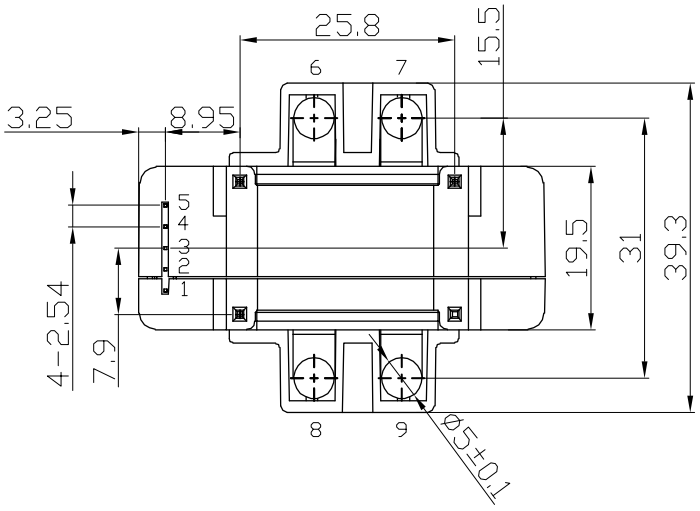
Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ±0.5
Unit :mm











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General tolerance : ±0.5
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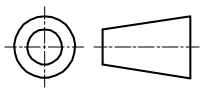
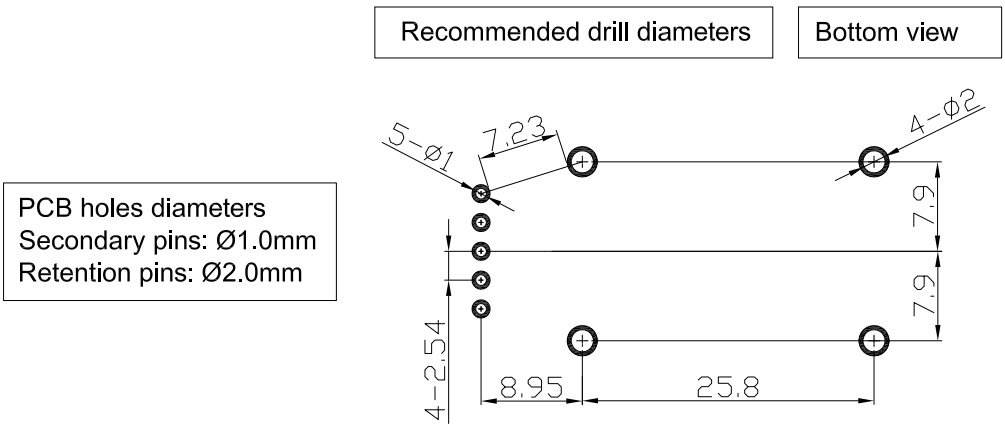


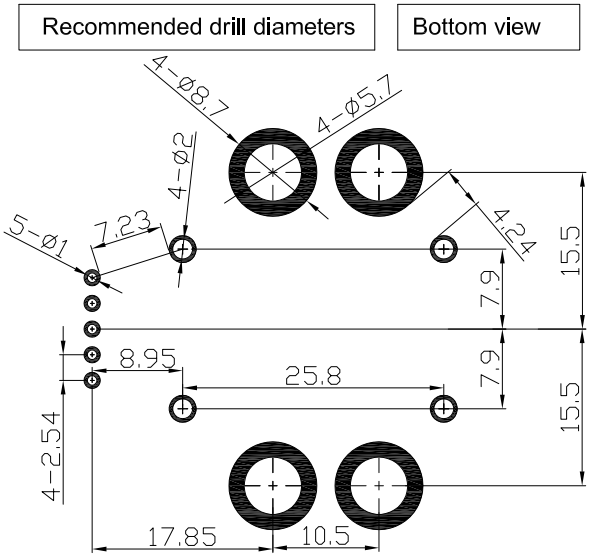
7. PCB footprint (STB-250LA/ZN&STB-250LA2/ZN)



Assembly on PCB

- Recommended PCB hole diameter: 1 mm for secondary pins, 2 mm for retention pin.
- Maximum PCB thickness: 2.4 mm (can be customized per request).
- Wave soldering profile: maximum 260℃ for 10 seconds.

8. PCB footprint (STB-250LA/Z& STB-250LA2/Z)



Assembly on PCB

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