

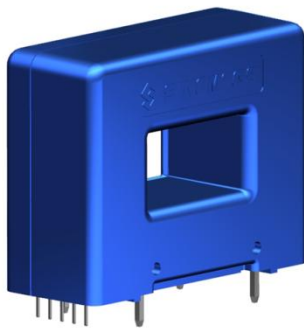


# CURRENT SENSOR

PRODUCT SERIES: STB-LA/Zx

PRODUCT PART NUMBER: STB-100LA/Z, STB-100LA/ZN  
STB-150LA/Z, STB-150LA/ZN  
STB-200LA/Z, STB-200LA/ZN

VERSION: Ver 5.8



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## 1. Description

STB-LA/Z 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
- Direct-current dynamo
- Uninterruptible Power Supplies (UPS)
- Switched model power supplies (SMPS)
- Variable frequency converter

### General parameters

Parameter	Symbol	Unit	Value	Remark
Working temperature	T_A	°C	-40 ~ 105	105°C, I(max)=420A
Storage temperature	T_stg	°C	-40 ~ 105	
Limit temperature of primary conductor	T_LP	°C	105	STB-xxxLA/Z
Mass	m	g	59	STB-xxxLA/ZN
Mass	m	g	86	STB-xxxLA/Z

### Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage	Vcc_max	V	6
Maximum primary current	I_p_max	A	10*I <sub>pn</sub>
ESD rating (HBM)	U_ESD_HBM	kV	4
High temperature and humidity	T_HAST	-	85°C&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	

## 2. Electrical parameters (STB-100LA/Z, STB-100LA/ZN)

Condition: Vcc = 5.0 V, RL = 10 kΩ, TA = 25°C, unless specified.

Parameters	Symb ol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I <sub>pn</sub>	A		100		
Primary current measuring range	I <sub>pm</sub>	A	-300		300	
Supply voltage	V <sub>cc</sub>	V	4.75	5	5.25	
Consumption current	I <sub>c</sub>	mA	$15 + I_{pn}/NS * 1000$			NS = 1500
Reference voltage	V <sub>ref</sub>	V	2.48	2.5	2.52	
Electrical offset voltage	V <sub>oe</sub>	mV		5		100 % tested (V <sub>out</sub> - V <sub>ref</sub> )@ 0 A
Magnetic offset current	I <sub>om</sub>	A	100		100	@6*I <sub>pn</sub>
Full-scale voltage	V <sub>fs</sub>	V		± 0.625		(V <sub>out</sub> - V <sub>ref</sub> )@ I <sub>pn</sub>
Theoretical sensitivity	G <sub>th</sub>	mV/ A		6.25		0.625 V @ I <sub>pn</sub>
Sensitivity error	G <sub>err</sub>	% of I <sub>pn</sub>	-0.8		0.8	
Linearity error within I <sub>pn</sub>	ξ <sub>L</sub>	% of I <sub>pn</sub>	-0.15		0.15	@25°C
Reaction time @ 10 % of I <sub>p</sub>	t <sub>ra</sub>	μs		0.3		
Step response time @ 90 % of I <sub>p</sub>	t <sub>r</sub>	μs		0.3		
-3 dB band width	BW	kHz		300		
Noise DC ~ 10 kHz DC ~ 100 kHz	V <sub>noise</sub>	mVp p		5 6		
Accuracy @ 25°C	X	% of I <sub>pn</sub>	-0.8		0.8	
Accuracy @ 85 °C	X <sub>TR</sub> ange	% of I <sub>pn</sub>	-1.1		1.1	
Vout Capacitive Load	CL <sub>O</sub>	pF	0		100	
Vref Capacitive Load	CL <sub>R</sub>	pF	0		100	

### 3. Electrical parameters (STB-150LA/Z, STB-150LA/ZN)

Condition: Vcc = 5.0 V, RL = 10 kΩ, TA = 25°C, unless specified.

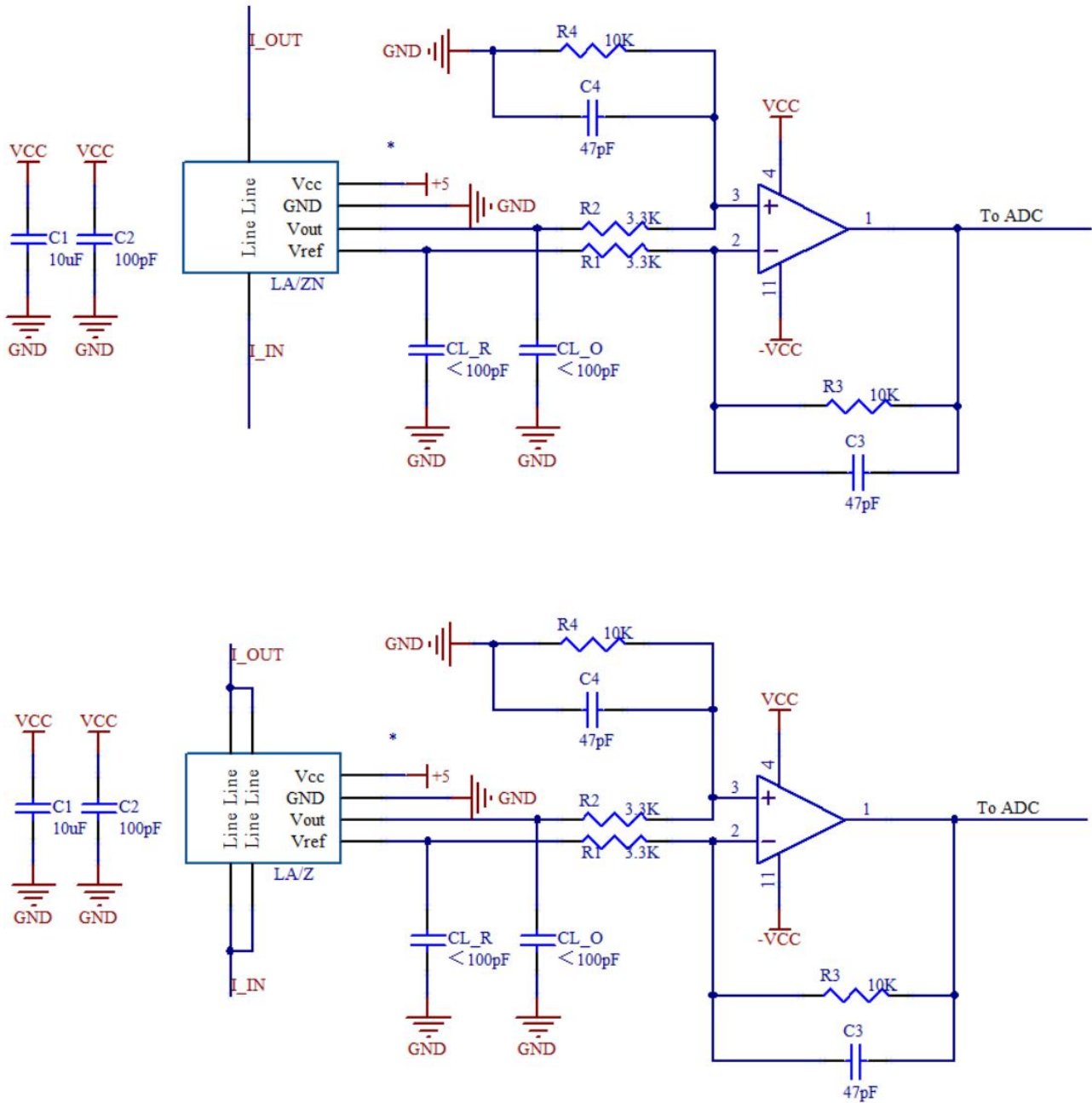
Parameters	Sym bol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I <sub>pn</sub>	A		150		
Primary current measuring range	I <sub>pm</sub>	A	-400		400	
Supply voltage	V <sub>cc</sub>	V	4.75	5	5.25	
Consumption current	I <sub>c</sub>	mA	$15 + I_{pn}/NS * 1000$			NS = 1500
Reference voltage	V <sub>ref</sub>	V	2.48	2.5	2.52	
Electrical offset voltage	V <sub>oe</sub>	mV		5		100 % tested (V <sub>out</sub> - V <sub>ref</sub> )@ 0 A
Magnetic offset current	I <sub>om</sub>	mA	100		100	@6*I <sub>pn</sub>
Full-scale voltage	V <sub>fs</sub>	V		± 0.625		(V <sub>out</sub> - V <sub>ref</sub> )@ I <sub>pn</sub>
Theoretical sensitivity	G <sub>th</sub>	mV/ A		4.167		0.625 V @ I <sub>pn</sub>
Sensitivity error	G <sub>err</sub>	% of I <sub>pn</sub>	-0.8		0.8	
Linearity error within I <sub>pn</sub>	ξ <sub>L</sub>	% of I <sub>pn</sub>	-0.15		0.15	@25°C
Reaction time @ 10 % of I <sub>p</sub>	t <sub>ra</sub>	μs		0.3		
Step response time @ 90 % of I <sub>p</sub>	t <sub>r</sub>	μs		0.3		
-3 dB band width	BW	kHz		300		
Noise DC ~ 10 kHz DC ~ 100 kHz	V <sub>noise</sub>	mVp p		5 6		
Accuracy @ 25°C	X	% of I <sub>pn</sub>	-0.8		0.8	
Accuracy @ 85 °C	X <sub>TR</sub> ange	% of I <sub>pn</sub>	-1.1		1.1	
Vout Capacitive Load	CL <sub>O</sub>	pF	0		100	
Vref Capacitive Load	CL <sub>R</sub>	pF	0		100	

## 4. Electrical parameters (STB-200LA/Z, STB-200LA/ZN)

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

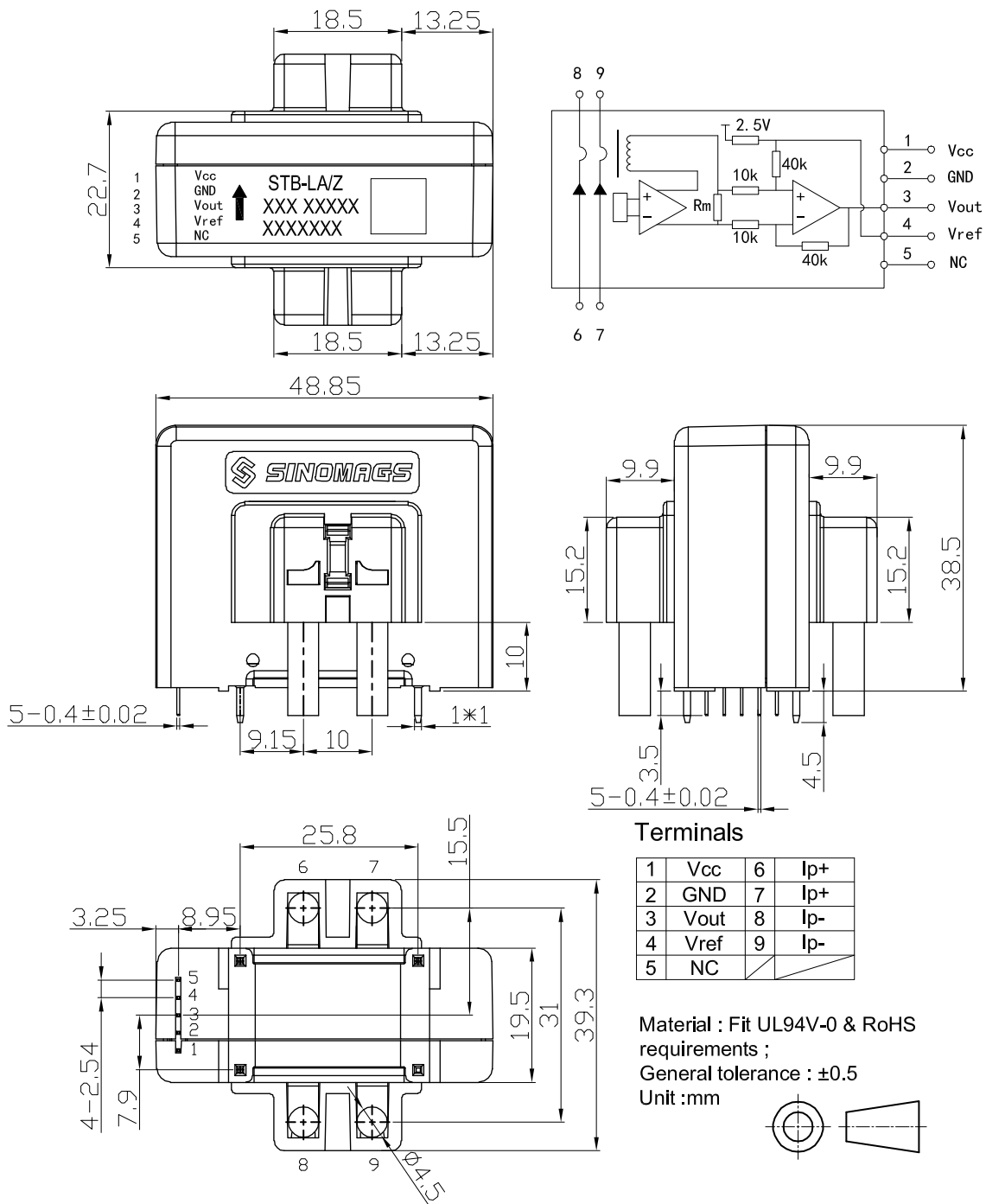
Parameters	Symb ol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I <sub>pn</sub>	A		200		
Primary current measuring range	I <sub>pm</sub>	A	-450		450	
Supply voltage	V <sub>cc</sub>	V	4.75	5	5.25	
Consumption current	I <sub>c</sub>	mA	$15 + I_{pn} * NS * 1000$			NS = 1500
Reference voltage	V <sub>ref</sub>	V	2.48	2.5	2.52	
Electrical offset voltage	V <sub>oe</sub>	mV		5		100 % tested (V <sub>out</sub> – V <sub>ref</sub> )@ 0 A
Magnetic offset current	I <sub>om</sub>	mA	-210		210	@10*I <sub>pn</sub>
Full-scale voltage	V <sub>fs</sub>	V		± 0.625		(V <sub>out</sub> – V <sub>ref</sub> )@ I <sub>pn</sub>
Theoretical sensitivity	G <sub>th</sub>	mV/ A		3.125		0.625 V @ I <sub>pn</sub>
Sensitivity error	G <sub>err</sub>	% of I <sub>pn</sub>	-0.8		0.8	
Linearity error within I <sub>pn</sub>	ξ <sub>L</sub>	% of I <sub>pn</sub>	-0.15		0.15	@25°C
Reaction time @ 10 % of I <sub>p</sub>	t <sub>ra</sub>	μs		0.3		
Step response time @ 90 % of I <sub>p</sub>	t <sub>r</sub>	μs		0.3		
-3 dB band width	BW	kHz		300		
Noise DC ~ 10 kHz DC ~ 100 kHz	V <sub>nois e</sub>	mVp p		5 6		
Accuracy @ 25°C	X	% of I <sub>pn</sub>	-0.8		0.8	
Accuracy @ 85 °C	X <sub>TR ange</sub>	% of I <sub>pn</sub>	-1.4		1.4	
Vout Capacitive Load	CL <sub>O</sub>	pF	0		100	
Vref Capacitive Load	CL <sub>R</sub>	pF	0		100	

## 5. Typical application circuits



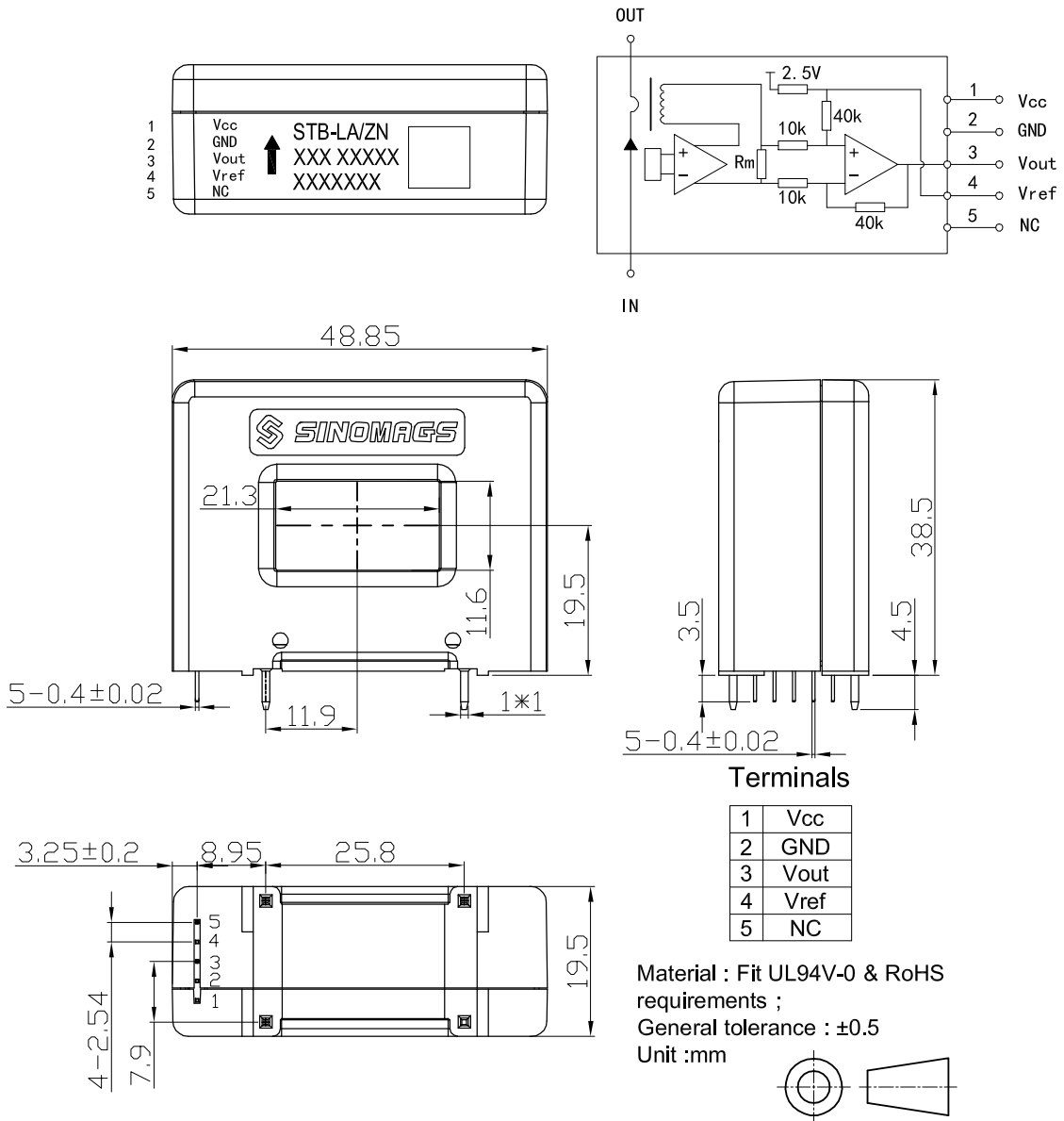
Typical application circuits for STB-LA current sensor. The magnification can be estimated as  $M = R4 / R2$  with the condition of  $R1 = R2$ , and  $R3 = R4$ . The magnification in the circuit above is around 3. The capacitive load of Vout and Vref should not exceed 100pF to avoid oscillations.

## 6. Dimensions: STB-xxxLA/Z

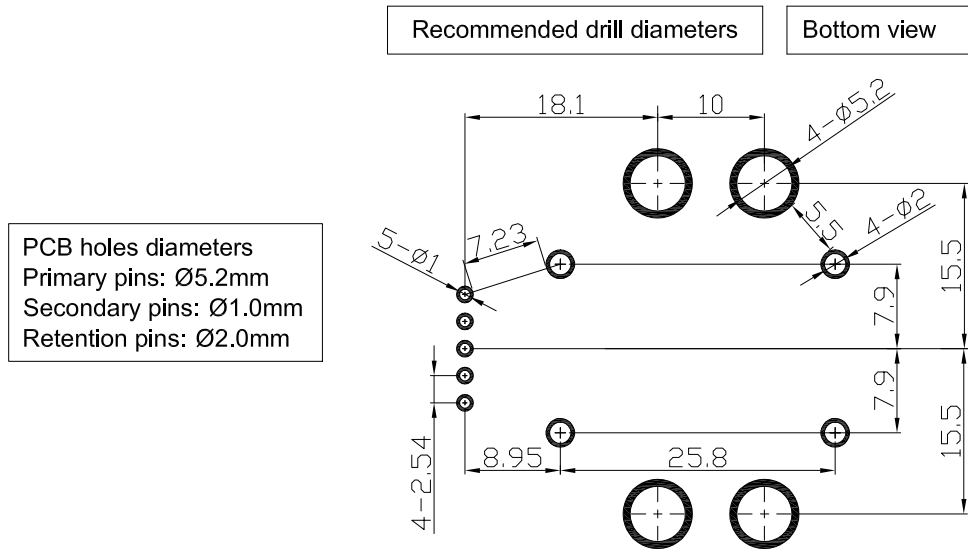




### 7. Dimensions: STB-xxxLA/ZN



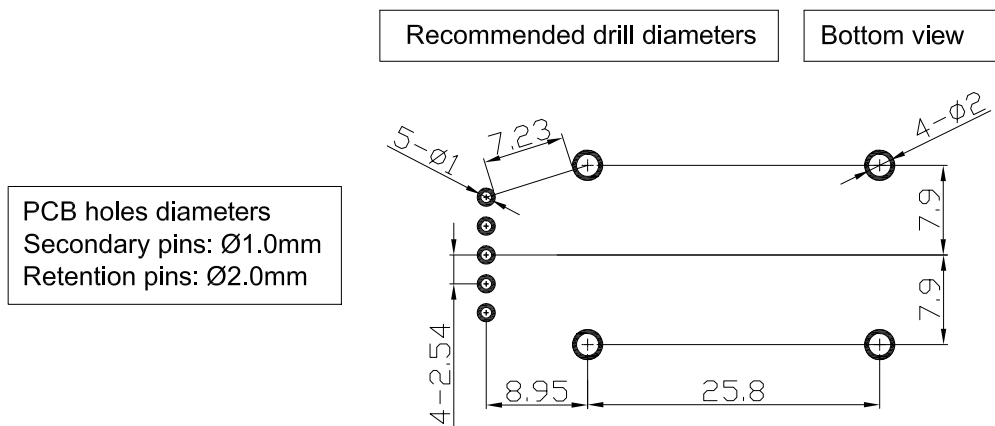
## 8. PCB footprint (STB-xxxLA/Z)



### 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°C for 10 seconds.

## 9. PCB footprint (STB-xxxLA/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°C for 10 seconds.