

CURRENT SENSOR

PRODUCT SERIES: STB-300LA

PRODUCT PART NUMBER: STB-300LA/M
STB-300LA/ML

VERSION: Ver1.7



Sinomags Technology Co., Ltd.

Web site: www.sinomags.com

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1. Description

STB-300LA/M 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} =530A |
| Storage temperature | T_stg | °C | -40 ~ 105 | |
| Mass | m | g | 115 | STB-300LA/M |

Absolute parameters

| Parameters | Symbol | Unit | Value |
|-------------------------------|---------------------|------|--------------------|
| Supply voltage | V _{cc_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°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

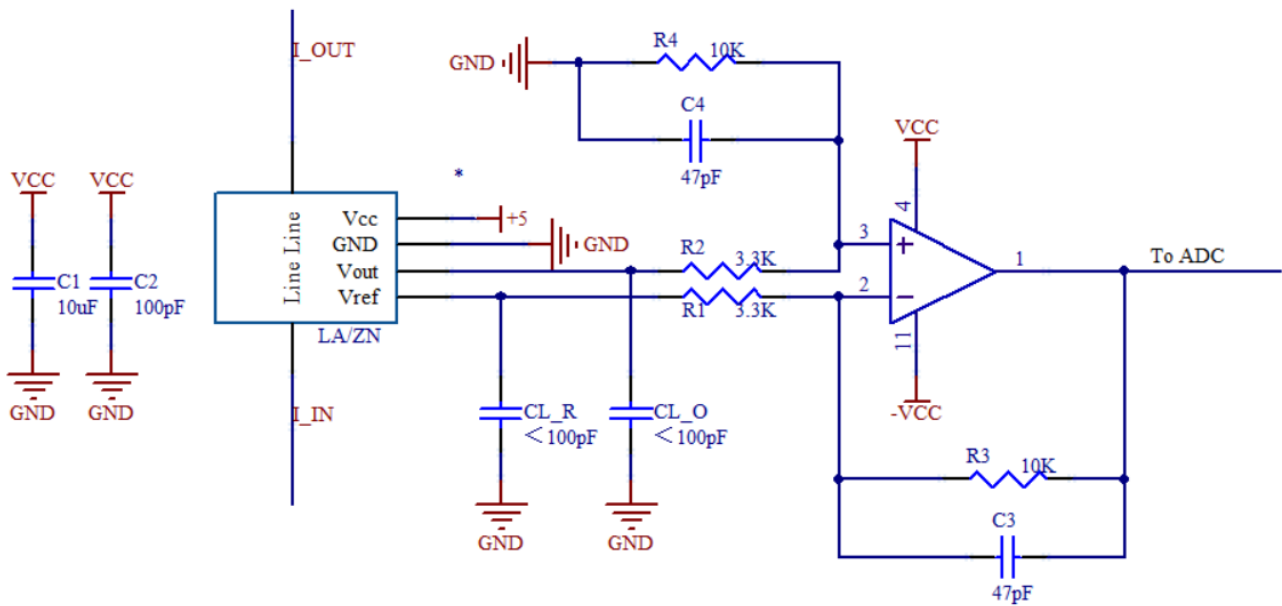
| Parameter | Symbol | Unit | Value | Remark |
|------------------------------------|----------------|------|-------|--------------------|
| RMS voltage for AC test 50Hz/1 min | U _d | kV | 4 | |
| Impulse withstand voltage 1.2/50μs | Ū _w | kV | 8 | |
| Case material | | | V0 | According to UL 94 |
| Comparative tracking index | CTI | V | 600 | |

2. Electrical parameters (STB-300LA/M&STB-300LA/ML)

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

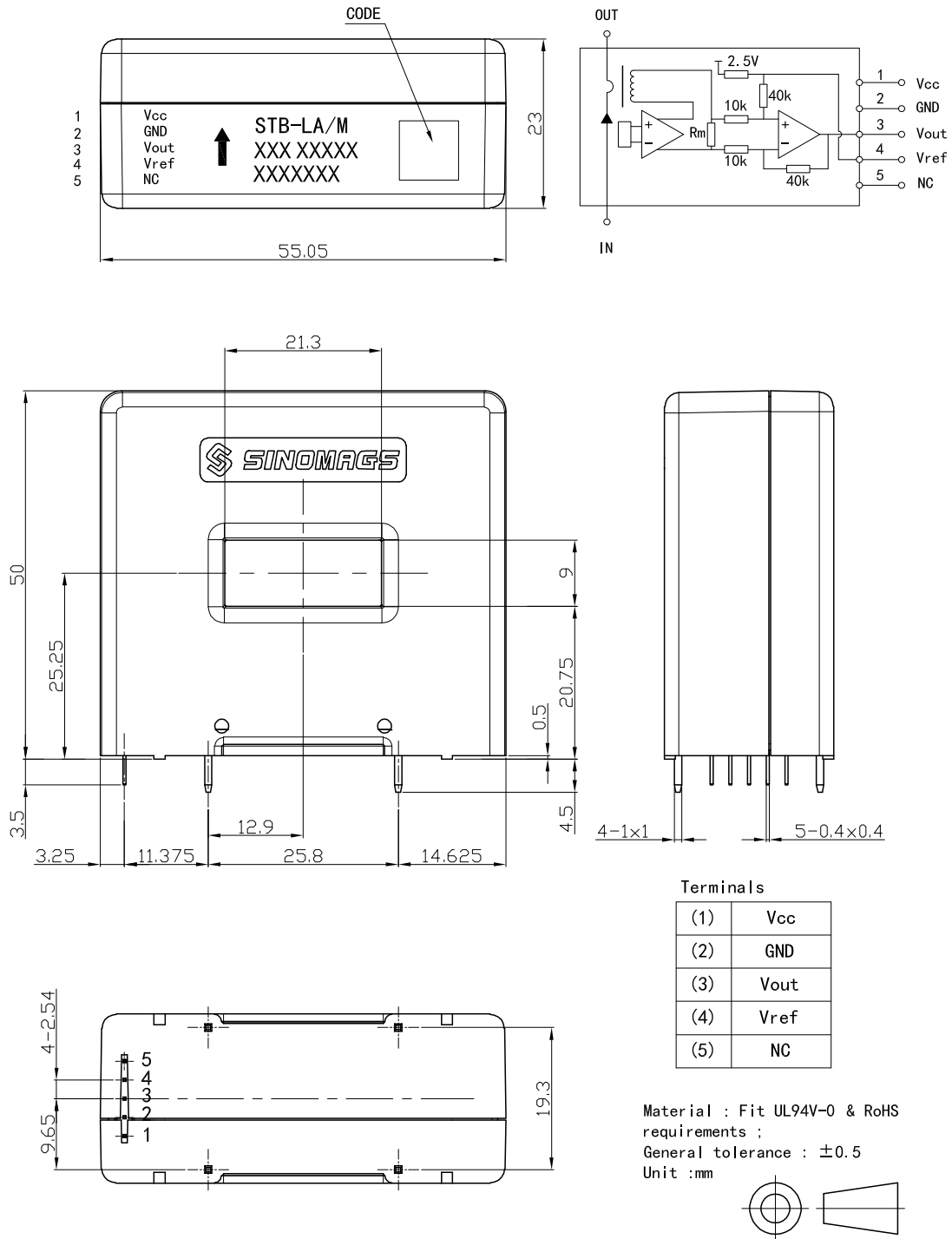
| Parameters | Symb ol | Unit | Min. | Typ. | Max. | Remark |
|--|-------------------------|-------------------------|------------------------------|----------|------|--|
| Primary nominal rms current | I _{pn} | A | | 300 | | |
| Primary current measuring range | I _{pm} | A | -600 | | 600 | |
| Maximum measured peak overcurrent (transformer effect) | î _p meas | A | -750 | | 750 | duration at 750 A is 2s |
| Supply voltage | V _{cc} | V | 4.75 | 5 | 5.25 | |
| Consumption current | I _c | mA | 10 + I _p /NS*1000 | | | NS = 1875 |
| Reference voltage | V _{ref} | V | 2.48 | 2.5 | 2.52 | |
| Electrical offset voltage | V _{oe} | mV | | 5 | | 100 % tested (V _{out} - V _{ref}) @ 0 A |
| Magnetic offset current | I _{om} | mA | 100 | | 100 | @6*I _{pn} |
| Full-scale voltage | V _{fs} | V | | ± 0.9375 | | (V _{out} - V _{ref}) @ I _{pn} |
| Theoretical sensitivity | G _{th} | mV/ A | | 3.125 | | 0.9375 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°C |
| Reaction time @ 10 % of I _p | t _{ra} | µs | | 0.6 | | |
| Step response time @ 90 % of I _p | t _r | µs | | 0.6 | | |
| -3 dB band width | BW | kHz | | 300 | | |
| Noise DC ~ 10 kHz DC ~ 100 kHz | V _{nois} e | mV pp | | 5 6 | | |
| Accuracy @ 25°C | X | % of I _{pn} | -0.8 | | 0.8 | |
| Accuracy @ 85 °C | X _{TR} ange | % of I _{pn} | -1.1 | | 1.1 | |
| Vout Capacitive Load | CL _O | pF | 0 | | 100 | |
| Vref Capacitive Load | CL _R | pF | 0 | | 100 | |

3. Typical application circuits

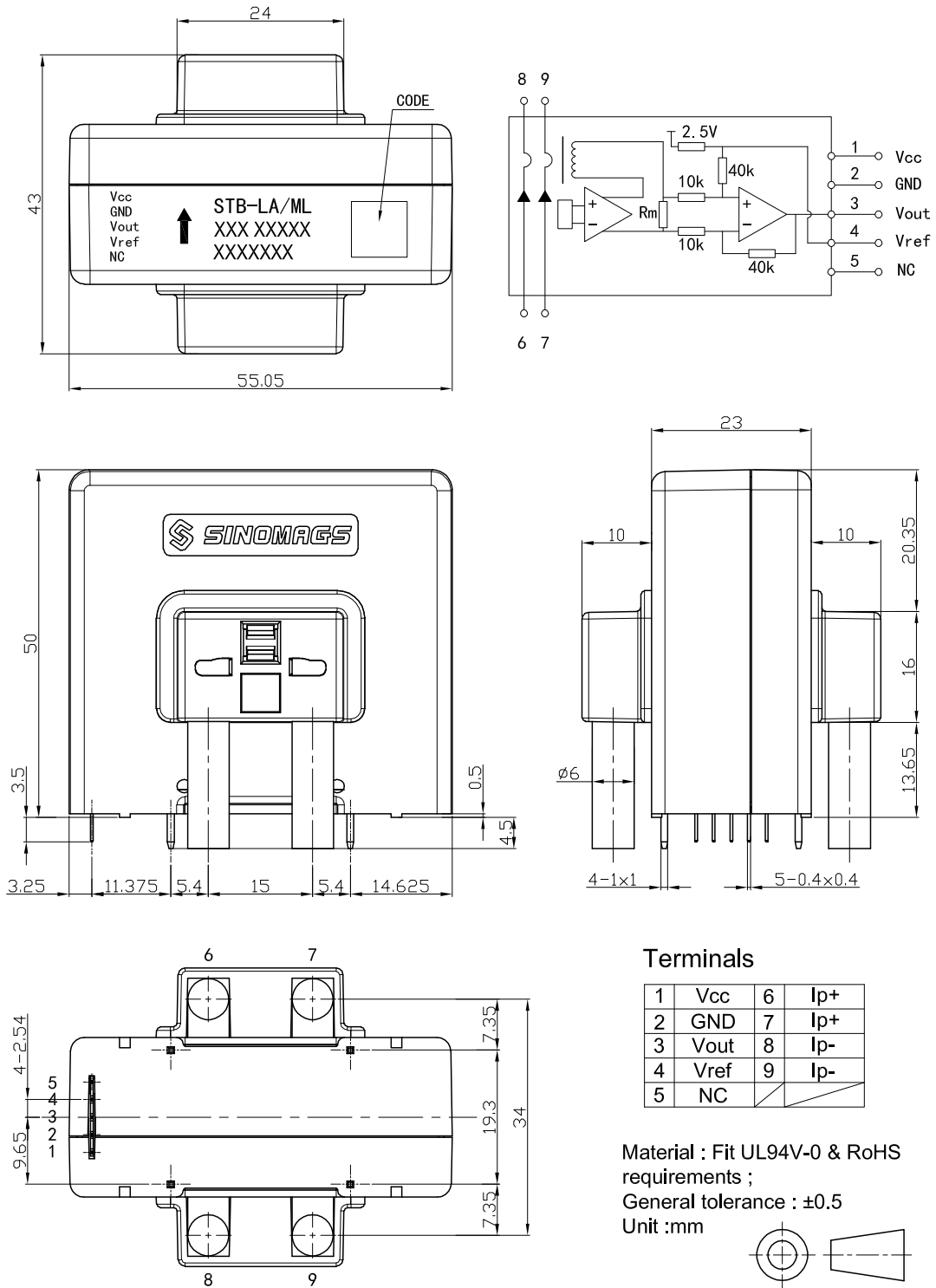


Typical application circuits for STB-LA current sensor. The magnification can be estimated as $M = R4 / R2$ with the condition of $R1 = R2$, and $R3 = R4$. The magnification in the circuit above is around 3. The capacitive load of Vout and Vref should not exceed 100pF to avoid oscillations.

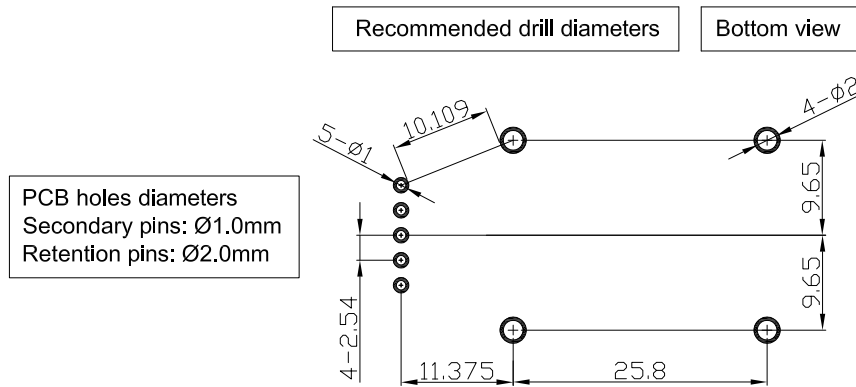
4. Dimensions: STB-300LA/M



5. Dimensions: STB-300LA/ML



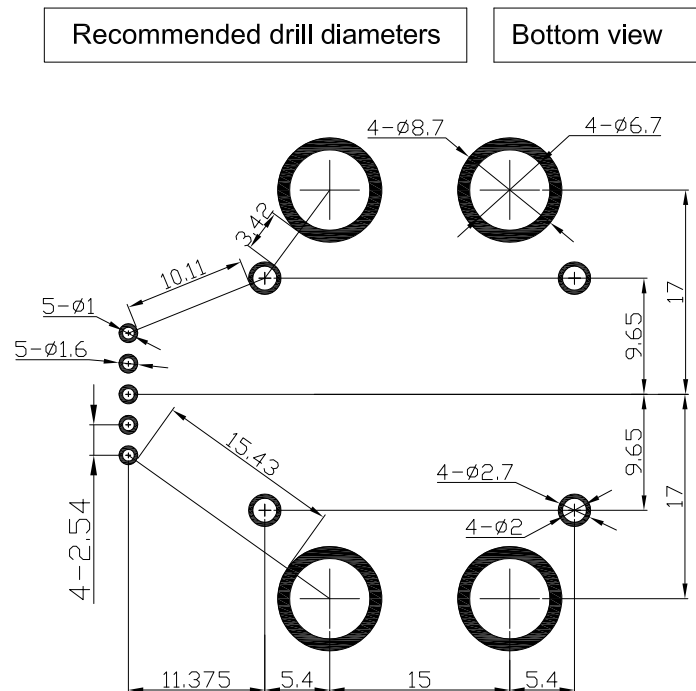
6. PCB footprint (STB-300LA/M)



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.

7. PCB footprint (STB-300LA/ML)



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.