

# CURRENT SENSOR

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PRODUCT SERIES: STB-300LA/M

PRODUCT PART NUMBER: STB-300LA/M

VERSION: Ver1.4



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## CONTENT

|    |                                           |   |
|----|-------------------------------------------|---|
| 1. | Description .....                         | 2 |
| 2. | Electrical parameters (STB-300LA/M) ..... | 3 |
| 3. | Typical application circuits .....        | 4 |
| 4. | Dimensions: STB-300LA/M .....             | 5 |
| 5. | PCB footprint (STB-300LA/M) .....         | 6 |
| 6. | Revision History .....                    | 7 |

## 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 <sub>max</sub> =530A |
| Storage temperature | T_stg  | °C   | -40 ~ 105 |                               |
| Mass                | m      | g    | 115       | STB-300LA/M                   |

### Absolute parameters

| Parameters                    | Symbol              | Unit | Value              |
|-------------------------------|---------------------|------|--------------------|
| Supply voltage                | V <sub>cc_max</sub> | V    | 6                  |
| Maximum primary current       | I <sub>p_max</sub>  | 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

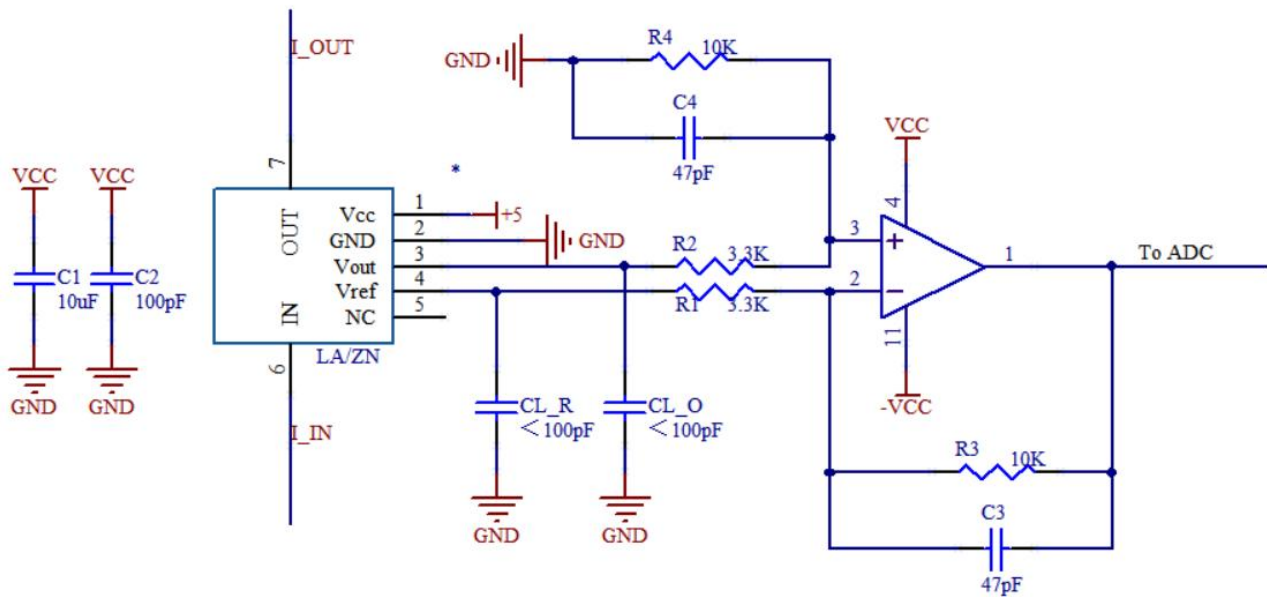
| Parameter                          | Symbol         | Unit | Value | Remark             |
|------------------------------------|----------------|------|-------|--------------------|
| RMS voltage for AC test 50Hz/1 min | U <sub>d</sub> | kV   | 4     |                    |
| Impulse withstand voltage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

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

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

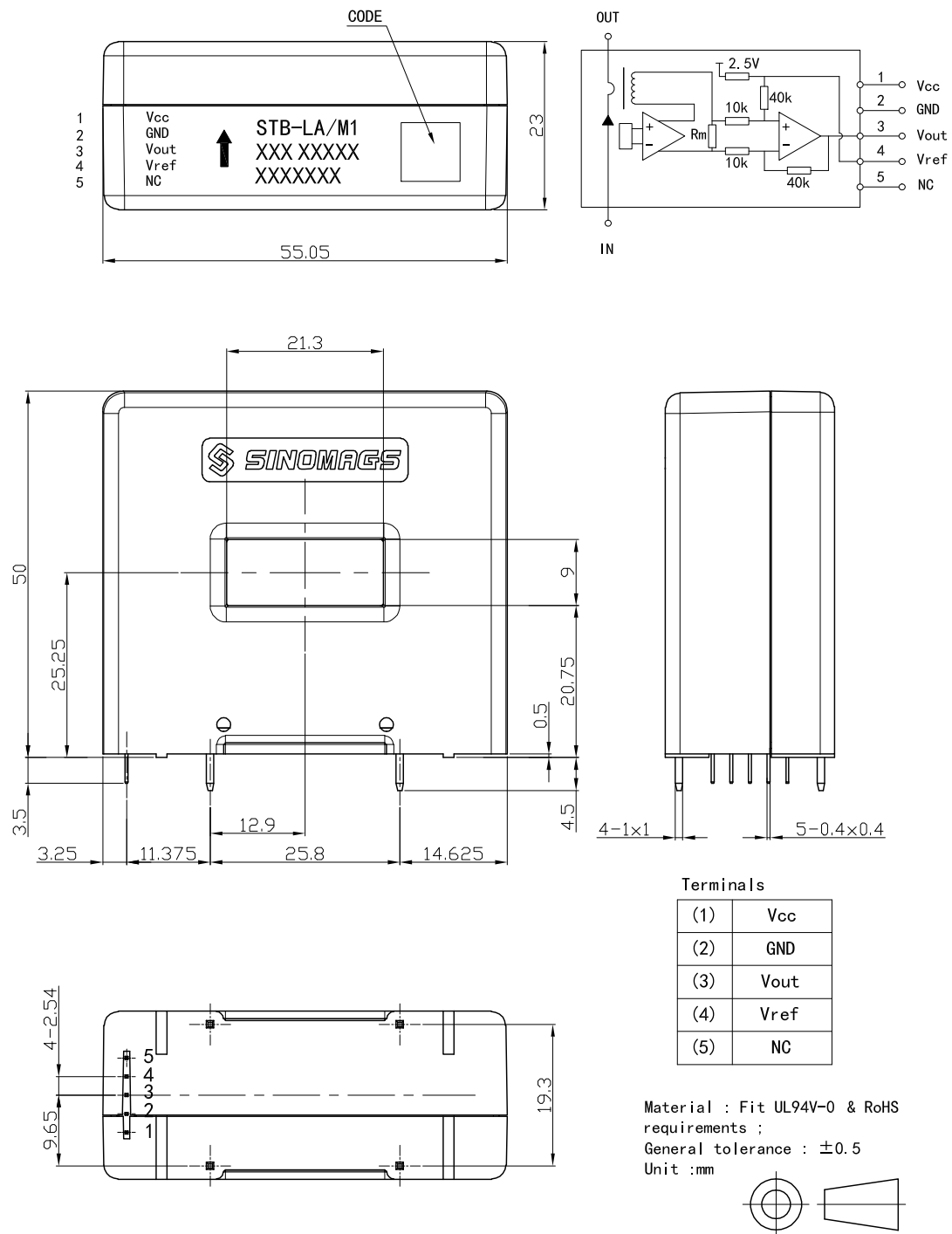
| Parameters                                  | Sym<br>bol              | Unit                    | Min.                         | Typ.     | Max. | Remark                                                      |
|---------------------------------------------|-------------------------|-------------------------|------------------------------|----------|------|-------------------------------------------------------------|
| Primary nominal rms current                 | I <sub>pn</sub>         | A                       |                              | 300      |      |                                                             |
| Primary current measuring range             | I <sub>pm</sub>         | A                       | -600                         |          | 600  |                                                             |
| Supply voltage                              | Vcc                     | V                       | 4.75                         | 5        | 5.25 |                                                             |
| Consumption current                         | Ic                      | mA                      | 10 + I <sub>p</sub> /NS*1000 |          |      | NS = 1875                                                   |
| Reference voltage                           | V <sub>ref</sub>        | V                       | 2.48                         | 2.5      | 2.52 |                                                             |
| Electrical offset voltage                   | V <sub>oe</sub>         | mV                      |                              | 5        |      | 100 % tested<br>(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                       |                              | ± 0.9375 |      | (V <sub>out</sub> – V <sub>ref</sub> )@ I <sub>pn</sub>     |
| Theoretical sensitivity                     | G <sub>th</sub>         | mV/<br>A                |                              | 3.125    |      | 0.9375 V @ I <sub>pn</sub>                                  |
| Sensitivity error                           | G <sub>err</sub>        | % of<br>I <sub>pn</sub> | -0.8                         |          | 0.8  |                                                             |
| Linearity error within I <sub>pn</sub>      | ξ <sub>L</sub>          | % of<br>I <sub>pn</sub> | -0.15                        |          | 0.15 | @25°C                                                       |
| Reaction time @ 10 % of I <sub>p</sub>      | t <sub>ra</sub>         | μs                      |                              | 0.6      |      |                                                             |
| Step response time @ 90 % of I <sub>p</sub> | t <sub>r</sub>          | μs                      |                              | 0.6      |      |                                                             |
| -3 dB band width                            | BW                      | kHz                     |                              | 300      |      |                                                             |
| Noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz        | V <sub>noise</sub>      | mV<br>pp                |                              | 5<br>6   |      |                                                             |
| Accuracy @ 25°C                             | X                       | % of<br>I <sub>pn</sub> | -0.8                         |          | 0.8  |                                                             |
| Accuracy @ 85 °C                            | X <sub>TR</sub><br>ange | % of<br>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. Typical application circuits

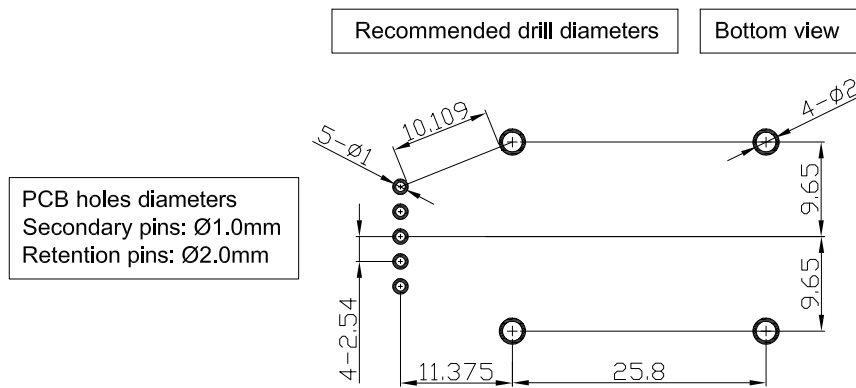


Typical application circuits for STB-LA current sensor. The magnification can be estimated as  $M = R4 / R2$  with the condition of  $R1 = R2$ , and  $R3 = R4$ . The magnification in the circuit above is around 3. The capacitive load of Vout and Vref should not exceed 100pF to avoid oscillations.

## 4. Dimensions: STB-300LA/M



## 5. 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  $260^{\circ}\text{C}$  for 10 seconds.