

CURRENT SENSOR

PRODUCT SERIES: STB-LA/SF

PRODUCT PART NUMBER: STB-100LA/SF

REVISION: Ver 1.1



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1. Description

For the electronic measurement of currents: DC, AC, pulsed, mixed with a galvanic Isolation between the primary circuit (high power) and the secondary circuit (electronic circuit)

Typical application

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

General parameters

| Parameter | Symbol | Unit | Value |
|---------------------|--------|------|----------|
| Working temperature | T_A | °C | -40 ~ 85 |
| Storage temperature | T_s | °C | -40 ~ 85 |
| Mass | m | g | 14 |

Absolute parameters

| Parameters | Symbol | Unit | Value |
|------------------|-----------|------|-------|
| Supply voltage | V_C | V | 7 |
| ESD rating (HBM) | U_{ESD} | 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.

Isolation parameters

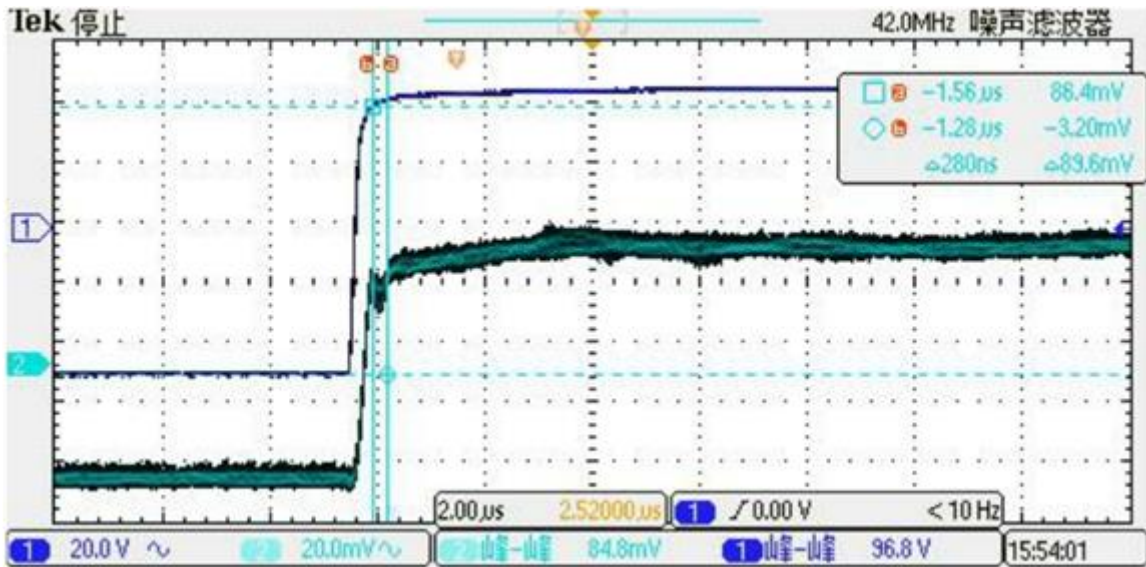
| Parameter | Symbol | Unit | Value | Remark |
|------------------------------------|-------------|------|-----------------------|---------------------------------|
| RMS voltage for AC test 50Hz/1 min | U_d | kV | 4 | |
| Impulse withstand voltage 1.2/50μs | \hat{U}_W | kV | 8 | |
| Clearance distance (pri.-sec) | dCl | mm | 10.2 | Shortest distance through air |
| Creepage distance (pri.-sec) | dCp | mm | 10.2 | Shortest path along device body |
| Case material | | | V0 according to UL 94 | |
| Comparative tracking index | CTI | V | 600 | |

2. STB-100LA/SF parameters

Condition: $V_{CC} = 5.0\text{ V}$, $N_P = 1$, $R_L = 10\text{ k}\Omega$, $T_A = 25^\circ\text{C}$, unless specified.

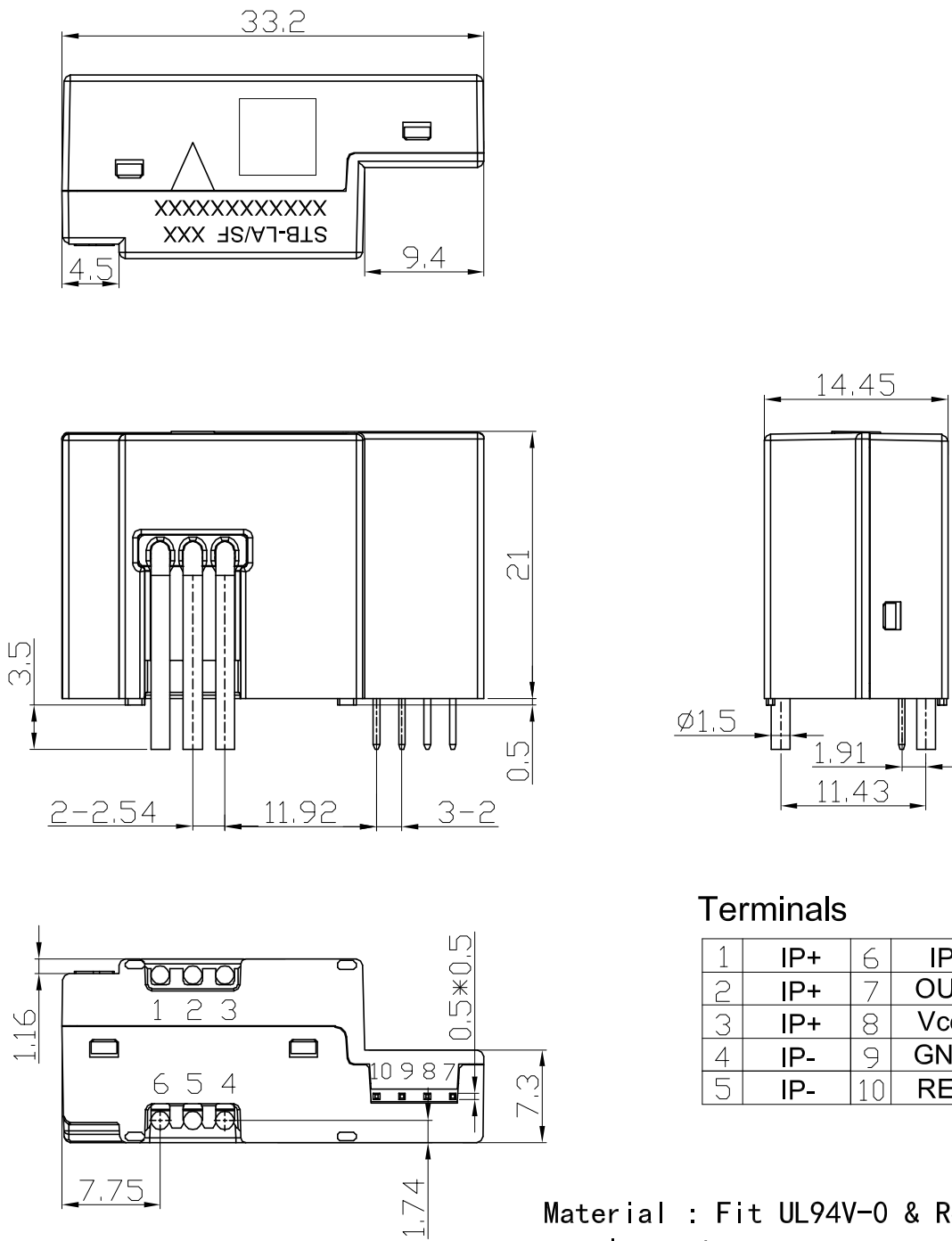
| Parameters | Symbol | Unit | Min. | Typ. | Max. | Remark | |
|---|---------------------|-----------------------|-------|--------------------------------------|-------|---|---|
| Primary nominal RMS current | I_{PN} | A | | 100 | | | |
| Primary current, Max. measuring range | I_{Pmax} | A | -200 | | 200 | With $V_C = 5\text{V}$, $T_A = 25^\circ\text{C}$, $R_L = 10\text{ k}\Omega$. | |
| Number of primary turns | N_P | | | 1, 2, 3 | | | |
| Supply voltage | V_C | V | 4.75 | 5 | 5.25 | | |
| Current consumption | I_C | mA | | $16 + I_P * N_P / N_S * 1000$ | | $N_S = 1100$ | |
| External Reference voltage | V_{REF} | V | 0 | | 4 | | |
| Internal Reference voltage | | V | 2.495 | 2.5 | 2.505 | | |
| Output voltage @ I_P | V_{OUT} | V | | $V_{REF} \pm (0.625 * I_P / I_{PN})$ | | | |
| Output voltage @ $I_P = 0\text{A}$ | | V | | $V_{REF} \pm 0.0025$ | | $T_A = 25^\circ\text{C}$ | |
| Electrical offset voltage | V_{oe} | mV | -2.5 | | 2.5 | $V_{OUT} - V_{REF} @ I_{PN} = 0\text{ A}, T_A = 25^\circ\text{C}$ | |
| Temperature coefficient of $V_{OUT} @ I_P = 0\text{ A}$ | TCV_{OUT} | ppm/ $^\circ\text{C}$ | -10 | ± 3 | 10 | ppm/K of 2.5V (-40 $^\circ\text{C}$... 85 $^\circ\text{C}$) | |
| Theoretical sensitivity | G_{th} | mV/A | | 6.25 | | $0.625 @ I_{PN}$ | |
| Accuracy @ I_{PN} , $T_A = 25^\circ\text{C}$ | X | % | -0.7 | | 0.7 | 100 % tested | |
| Temperature coefficient of X | $X_{Ti} / \Delta T$ | ppm/K | -40 | | 40 | -40 $^\circ\text{C}$... 85 $^\circ\text{C}$ | |
| Linearity error 0 ~ I_{PN} | ϵ_L | % | -0.1 | | 0.1 | Tested @ 25 $^\circ\text{C}$ | |
| Reaction time | t_{ra} | μs | | | 1 | 10 % of I_{PN} | |
| Response time | t_r | μs | | | 1 | 90 % of I_{PN} | |
| Frequency bandwidth | BW | kHz | | 100 | | | |
| Noise | V_{noise} | mV_{PP} | | | | | |
| DC ~ 10 kHz | | | | | | | 5 |
| DC ~ 100 kHz | | | | | | | 6 |

3. Step response time



The step response time of STB-xxLA/SF current sensors. The blue is primary current, while the green is output signal of current sensor. The step response time is less than 0.3 μs.

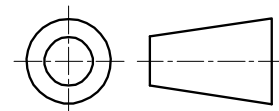
4. Dimensions: STB-100LA/SF



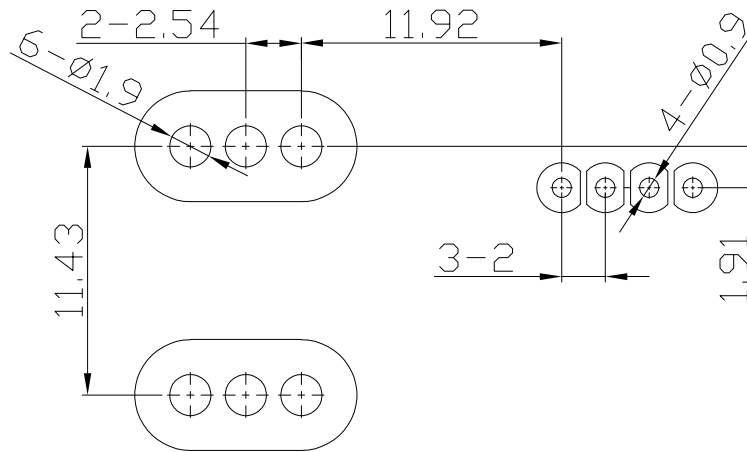
Terminals

| | | | |
|---|-----|----|-----|
| 1 | IP+ | 6 | IP- |
| 2 | IP+ | 7 | OUT |
| 3 | IP+ | 8 | Vcc |
| 4 | IP- | 9 | GND |
| 5 | IP- | 10 | REF |

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



5. PCB footprint



TOP side view

- Maximum PCB thickness 2.0 mm
- Wave-soldering: 260°C
- Recommended PCB hole diameter 1.2 mm for secondary pin