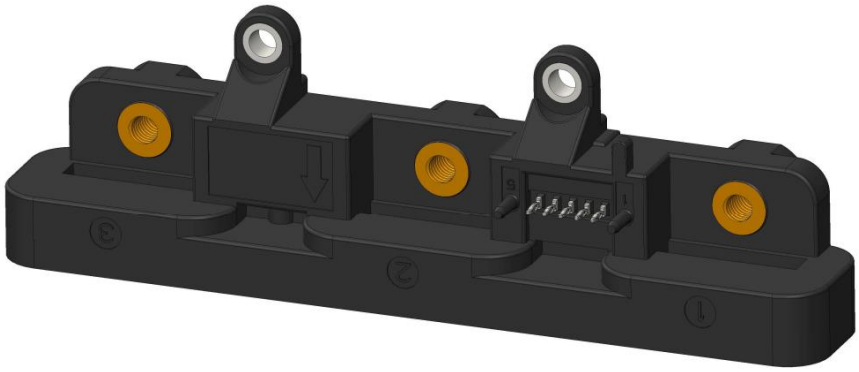
SINOMAGS 希磁科技

# Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-TM-900-S6
SHK-VBS-TM-1000-S6
SHK-VBS-TM-1200-S6

Version: Ver 1.1



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# 1. Description

The SHK-VBS-T current sensor is based on Hall and open-loop design. It is suitable for DC, AC pulsed and any kind of irregular current measurement under the isolated conditions.

## Typical applications

- Electrical Power Steering
- Motor drive application
- Converters
- Battery Management

## General parameter

| Parameter | Symbol | Unit | Value |
|---|---|---|---|
| Working temperature | $T_a$ | ℃ | -40 ~ 125 |
| Storage temperature | $T_{stg}$ | ℃ | -40 ~ 125 |
| Mass | m | g | 100 |

## Absolute maximum rating

| Parameter | Symbol | Unit | Value |
|---|---|---|---|
| Supply voltage | Vcc | V | -0.3 ~ 10 (Not operating) |
| | | | 6.5 |
| Electrostatic discharge voltage | $U_{ESD}$ | kV | 8 (HBM) |

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.

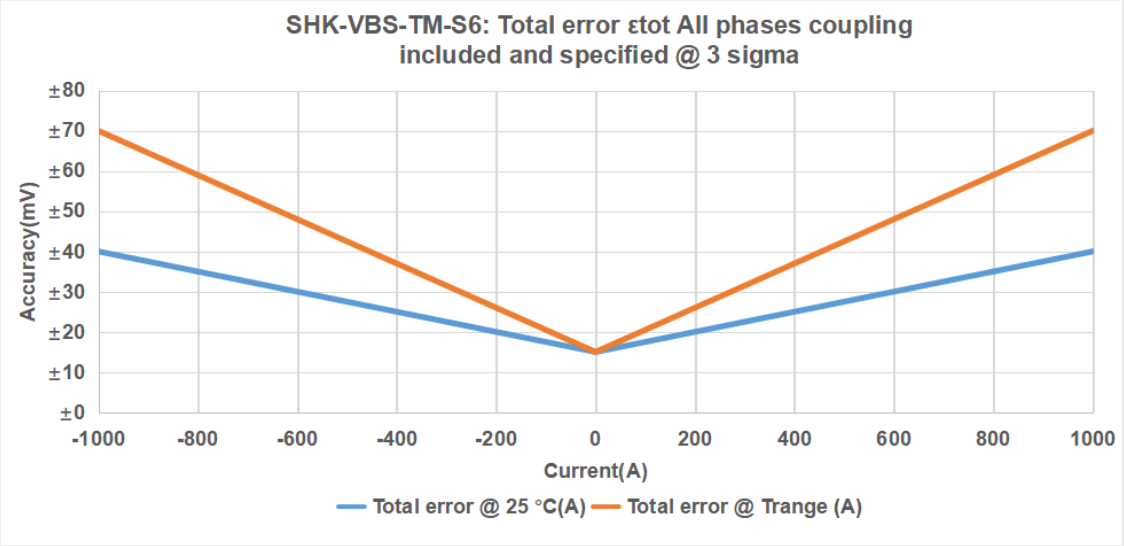
## Isolation parameter

| Parameter | Symbol | Unit | Value | Comment |
|---|---|---|---|---|
| Insulation voltage | $U_d$ | kV | 2.8 | RMS voltage for AC test 50Hz/1 min |
| Insulation resistance | $R_{is}$ | MΩ | 500 | DC 1kV/1 min |
| Clearance distance (pri. -sec) | $d_{Cl}$ | mm | 10 | Shortest distance through air |
| Creepage distance (pri. -sec) | $d_{Cp}$ | mm | 10 | Shortest path along device body |
| Comparative tracking index | CTI | 0 | 600 | IEC60112 |
| Case material | | | V0 according to UL 94 | |

## 2. Electrical data

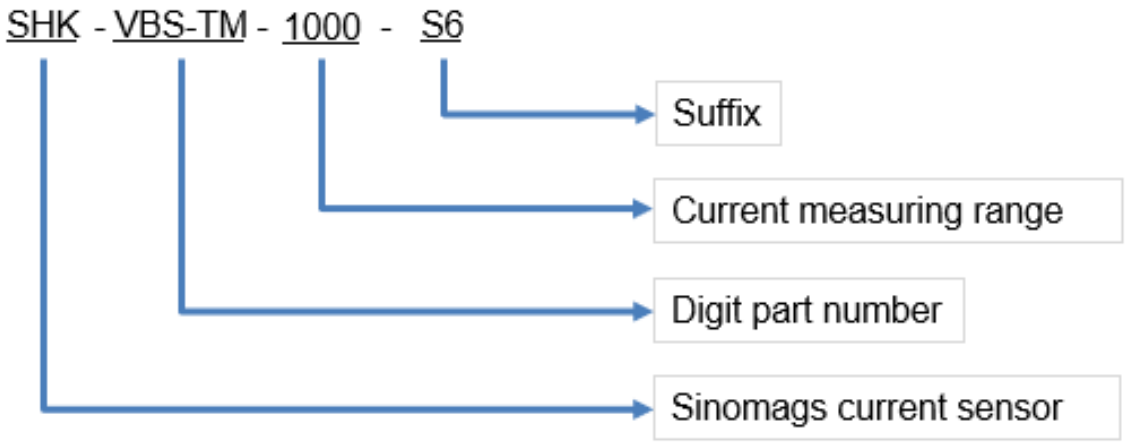
| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary current measuring range | $I_{PM}$ | A | -900 | | 900 | SHK-VBS-TM-900-S6 |
| | | | -1000 | | 1000 | SHK-VBS-TM-1000-S6 |
| | | | -1200 | | 1200 | SHK-VBS-TM-1200-S6 |
| Supply voltage | $V_{CC}$ | V | 4.75 | 5 | 5.25 | |
| Current consumption | $I_{CC}$ | mA | | 45 | 60 | @ $V_{CC}$= 5.0 V |
| Output voltage | $V_{OUT}$ | V | $(V_{CC}/5)\times(V_{off}+G\times I_P)$ | | | @ $T_a$ = 25℃ |
| Quiescent voltage | $V_{off}$ | V | | 2.5 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Sensitivity | G | mV/A | | 2.22 | | SHK-VBS-TM-900-S2 |
| | | | | 2 | | SHK-VBS-TM-1000-S2 |
| | | | | 1.67 | | SHK-VBS-TM-1200-S2 |
| Load resistance | $R_L$ | kΩ | 10 | | 100 | |
| Ratiometricity error | $\varepsilon_r$ | % | | ±0.5 | | @ 4.75V ≤ $V_{CC}$ ≤ 5.25V |
| Sensitivity error | $\varepsilon_G$ | % | | ±1 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Electrical offset voltage error | $V_{OE}$ | mV | -20 | ±10 | 20 | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Magnetic offset voltage error | $V_{OM}$ | mV | | ±5 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V, after ±$I_{PM}$ |
| Ave. Temp. coefficient of $V_{OE}$ | $TCV_{OEAV}$ | mV/℃ | | ±0.15 | | @ -40℃≤$T_a$ ≤125℃ |
| Ave. Temp. coefficient of G | $TCG_{AV}$ | %/℃ | | ±0.03 | | @ -40℃≤$T_a$ ≤125℃ |
| Linearity | $\varepsilon_L$ | % | | ±1 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V, -800A< $I_P$ <800A |
| | | | | ±3 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V, 800A< $I_P$ <1000A, -1000A< $I_P$ <-800A |
| Response time | $T_r$ | μs | | 2 | 6 | @ 90% of $I_{PM}$ |
| Frequency bandwidth (-3 dB) | BW | kHz | 40 | | | No RC circuit |

| | | | | | | |
|---|---|---|---|---|---|---|
| Output voltage noise | $V_{no}$ | mVpp | | 10 | | @ DC ~ 10 kHz |

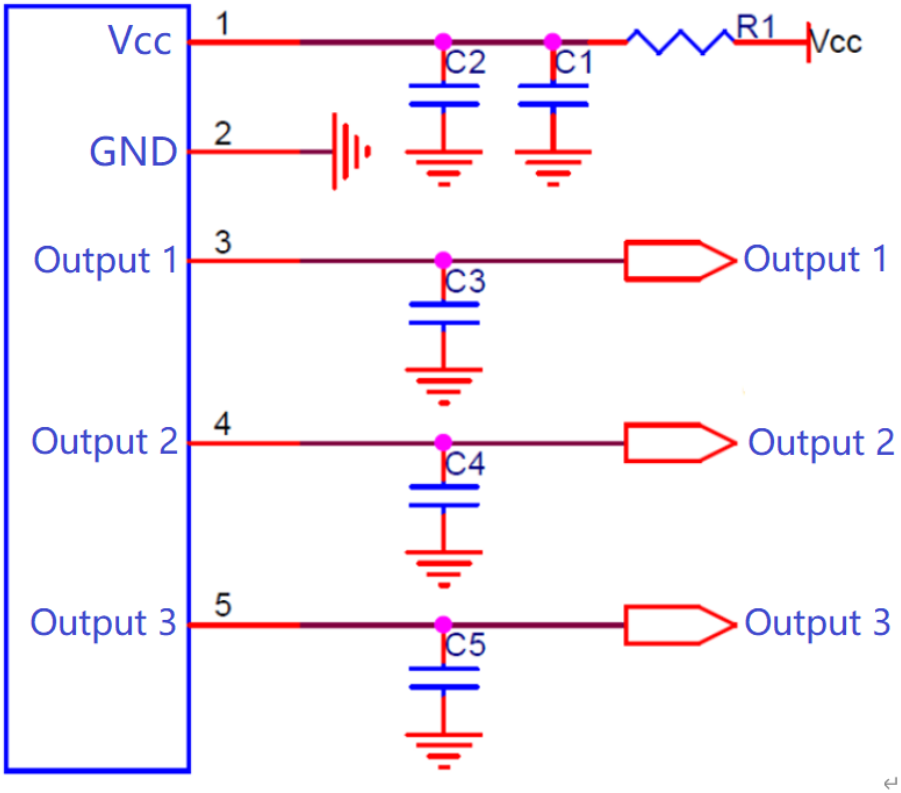



| Total error specification | | | | |
|---|---|---|---|---|
| $I_{PM}$(A) | @Ta=25℃, VCC=5.0V | | @-40℃≤Ta≤125℃, VCC=5.0V | |
| 1000 | ±40mV | ±2% | ±70mV | ±3.5% |
| 800 | ±35mV | ±1.75% | ±59mV | ±2.95% |
| 0 | ±15mV | ±0.75% | ±15mV | ±0.75% |
| -800 | ±35mV | ±1.75% | ±59mV | ±2.95% |
| -1000 | ±40mV | ±2% | ±70mV | ±3.5% |

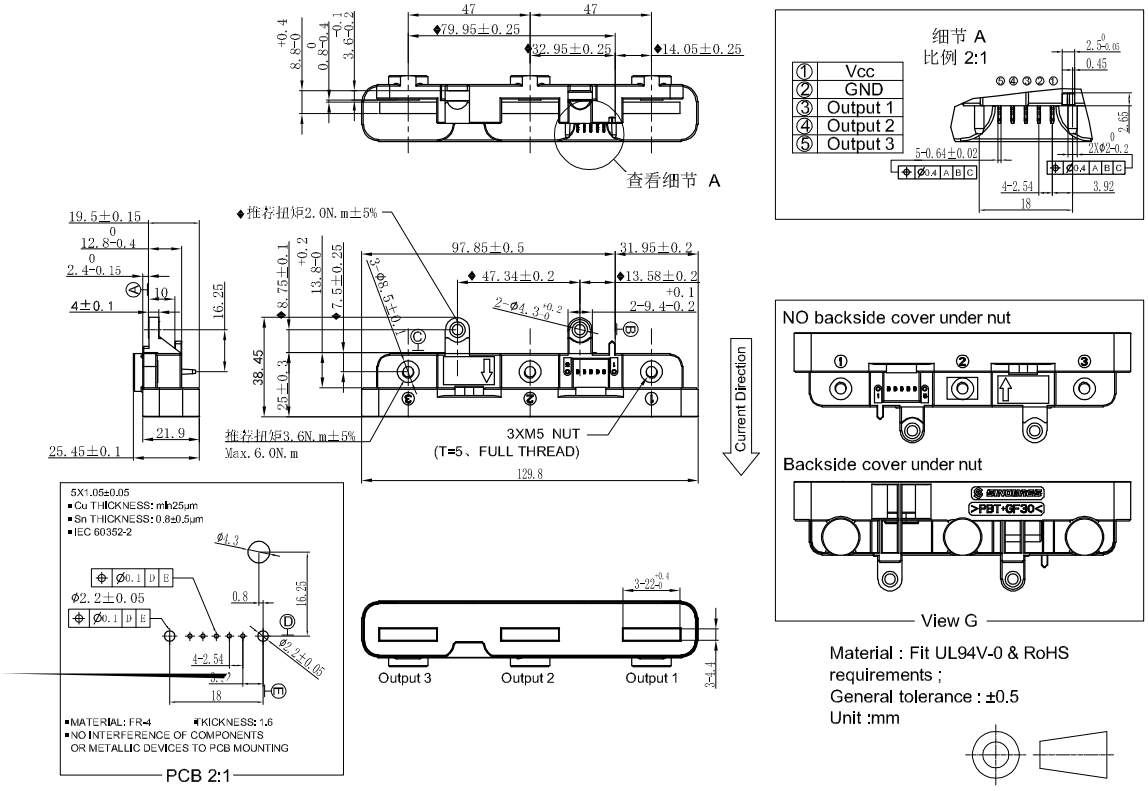
## 3. Product definition statement



## 4. Electrical circuit diagram

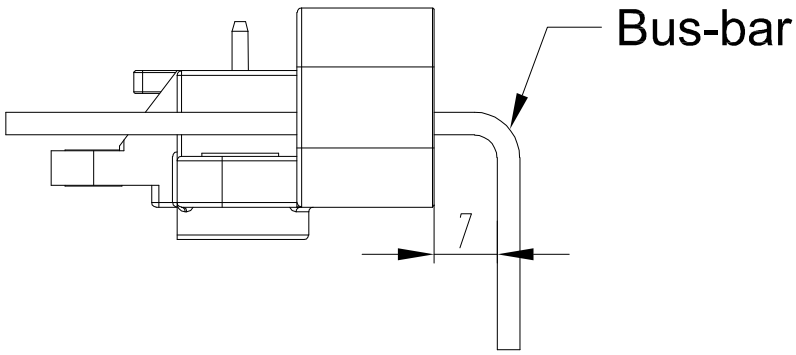



## 5. Dimension & Pin definitions



Remarks：

1. The clearance distance of the product is related to the installation mode of bus-bar .




## 6. Environmental test

| Name | Test condition |
|---|---|
| Electrical tests | |
| Humidity test | 85℃/85%,1000hr |
| Thermal shock | -40℃/125℃, 1000cycles |
| High temperature test | 125℃, 1000hr |
| Low temperature test | -40℃, 1000hr |
| Insulation voltage | 2.8kV, 50Hz, 1min |
| Insulation resistance | DC500V, 1min |
| Mechanical tests | |
| Shocks | ISO16750-3 |
| Vibration test | ISO16750-3 |
| EMC tests | |
| Electrostatic discharges | ISO10605(07/2008) |
| Bulk current injection | ISO11452-4(12/2011) |
| Immunity to Radiated disturbances | ISO11452-2(11/2004), ALSE |
| Emission radiated | CISPR25(03/2008), ALSE |
| Immunity power line magnetic fields | ISO11452-8(06/2015) |

## 7. Important notice

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