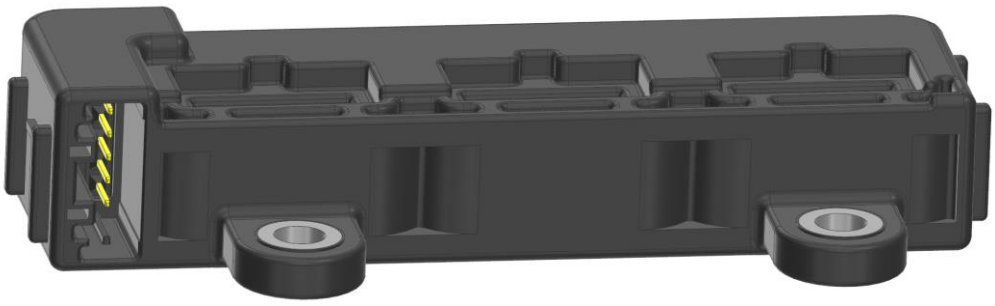
SINOMAGS 希 磁 科 技

# Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-TA-700-S2

Version: Ver 1.7.5



Sinomags Technology Co., Ltd

Web site: www.sinomags.com

# CONTENT

# 1. Description

The SHK-VBS-TA 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 ~ 150 |
| Storage temperature | $T_{stg}$ | ℃ | -40 ~ 150 |
| Mass | m | g | 60 |

## 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 | 2.5 | 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 | 8.0 | Shortest distance through air |
| Creepage distance (pri. -sec) | $d_{Cp}$ | mm | 8.0 | Shortest path along device body |
| Comparative trraking index | CTI | | PLC 3 | |
| Case material | | | V0 according to UL 94 | |

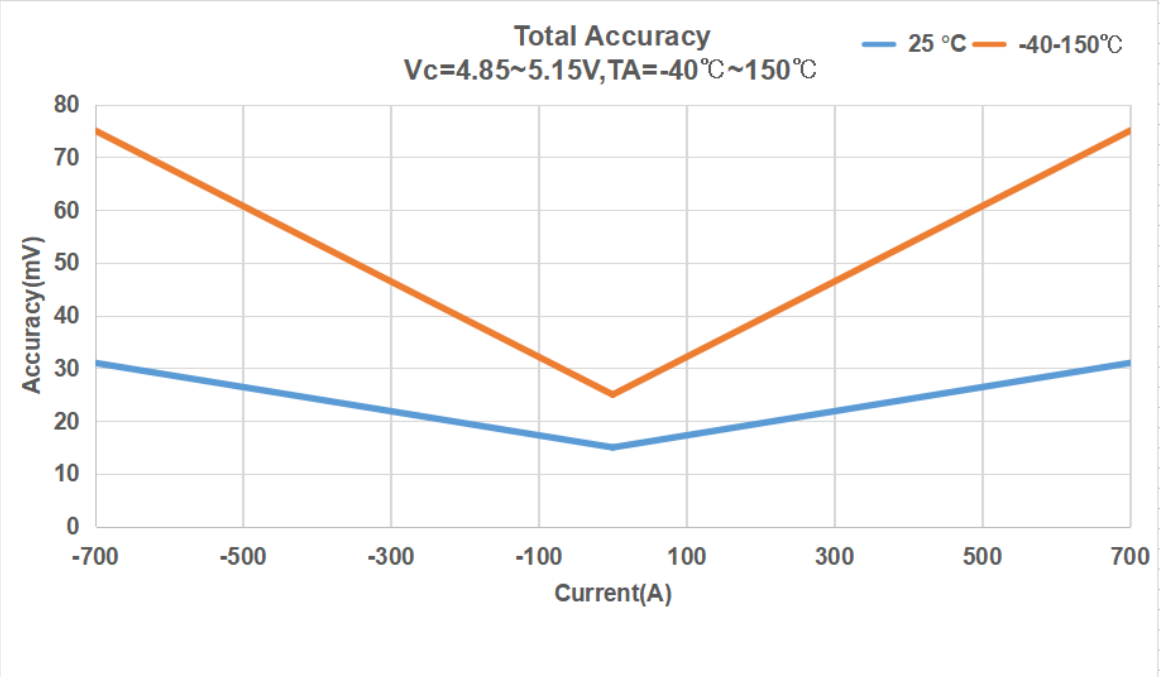
## Selection Guide

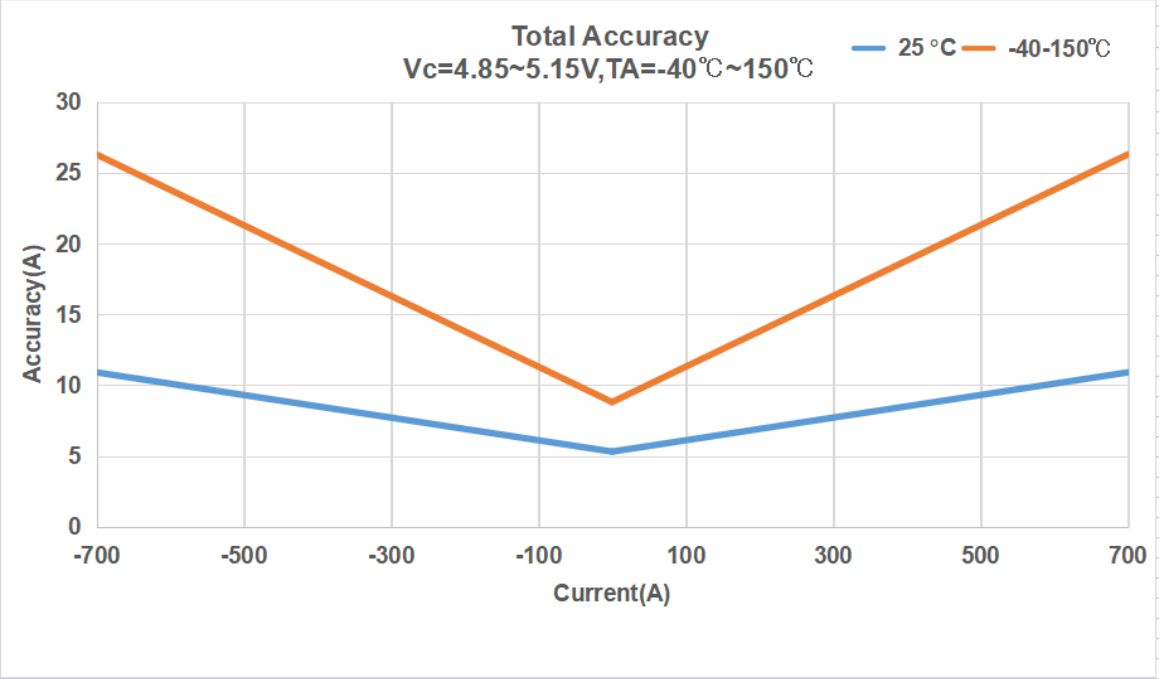
| **Product** | **Nominal current** | **Measuring range** |
|---|---|---|
| SHK-VBS-TA-700-S2 | 700 A | 700 A |

## 2. Electrical data

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary current measuring range | $I_{PM}$ | A | -700 | | 700 | SHK-VBS-TA-700-S2 |
| Supply voltage | $V_{CC}$ | V | 4.75 | | 5.25 | |
| Current consumption | $I_{CC}$ | mA | | 39 | 45 | @ $V_{CC}$= 5.0 V |
| Output voltage | $V_{OUT}$ | V | $(V_{CC}/5)\times(V_{off}+G\times I_{PM})$ | | | @ $T_a$ = 25℃ |
| Quiescent voltage | $V_{off}$ | V | 2.49 | 2.5 | 2.51 | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Sensitivity | G | mV/A | | 2.857 | | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Load resistance | $R_L$ | kΩ | 10 | | 100 | |
| Ratiometricity error | $\varepsilon_r$ | % | -0.5 | | 0.5 | @ 4.85V ≤ $V_{CC}$ ≤ 5.15V |
| Sensitivity error | $\varepsilon_G$ | % | -0.75 | | 0.75 | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V |
| Magnetic offset voltage error | $V_{OM}$ | mV | -3 | ±2 | 3 | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V, after ±$I_{PM}$ |
| Ave. Temp. coefficient of $V_{OE}$ | $TCV_{OEAV}$ | mV/℃ | -0.15 | ±0.05 | 0.15 | @ -40℃≤$T_a$ ≤150℃ |
| Ave. Temp. coefficient of G | $TCG_{AV}$ | %/℃ | -0.025 | ±0.01 | 0.025 | @ -40℃≤$T_a$ ≤150℃ |
| Linearity | $\varepsilon_L$ | % | -0.75 | ±0.35 | 0.75 | @ $T_a$ = 25℃, $V_{CC}$ = 5.0 V, I = $I_{PM}$ |
| Response time | $T_r$ | μs | | 2 | 5 | @ 90% of $I_{PM}$ |
| Frequency bandwidth (-3 dB) | BW | kHz | 40 | | | No RC circuit |
| Output voltage noise | $V_{no}$ | mVpp | | 20 | | @ DC ~ 10 kHz |
| Power on delay | $T_{POD}$ | ms | | | 1 | |

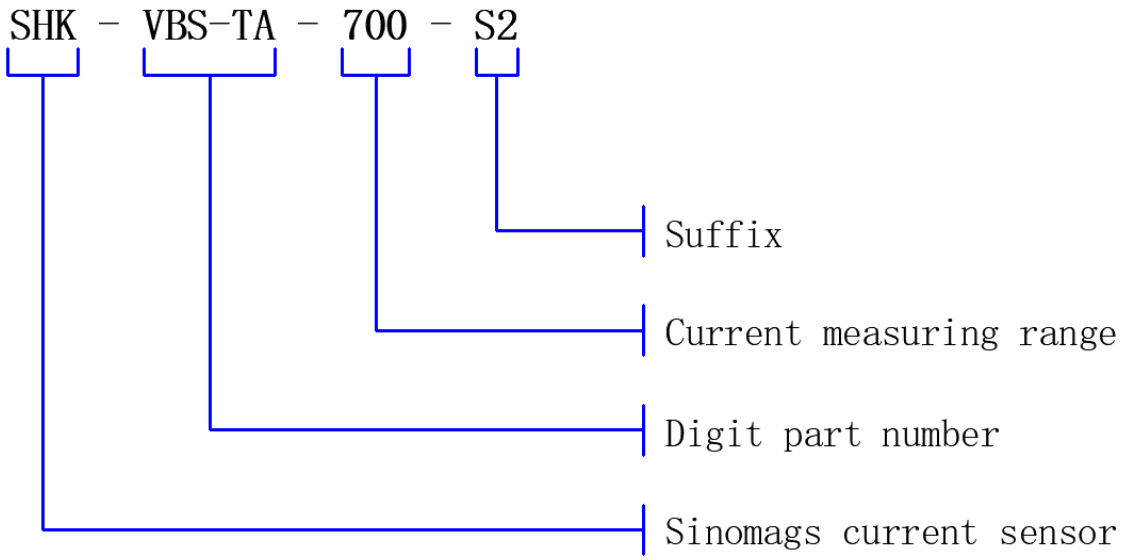
Total error(mV) for ≤700A



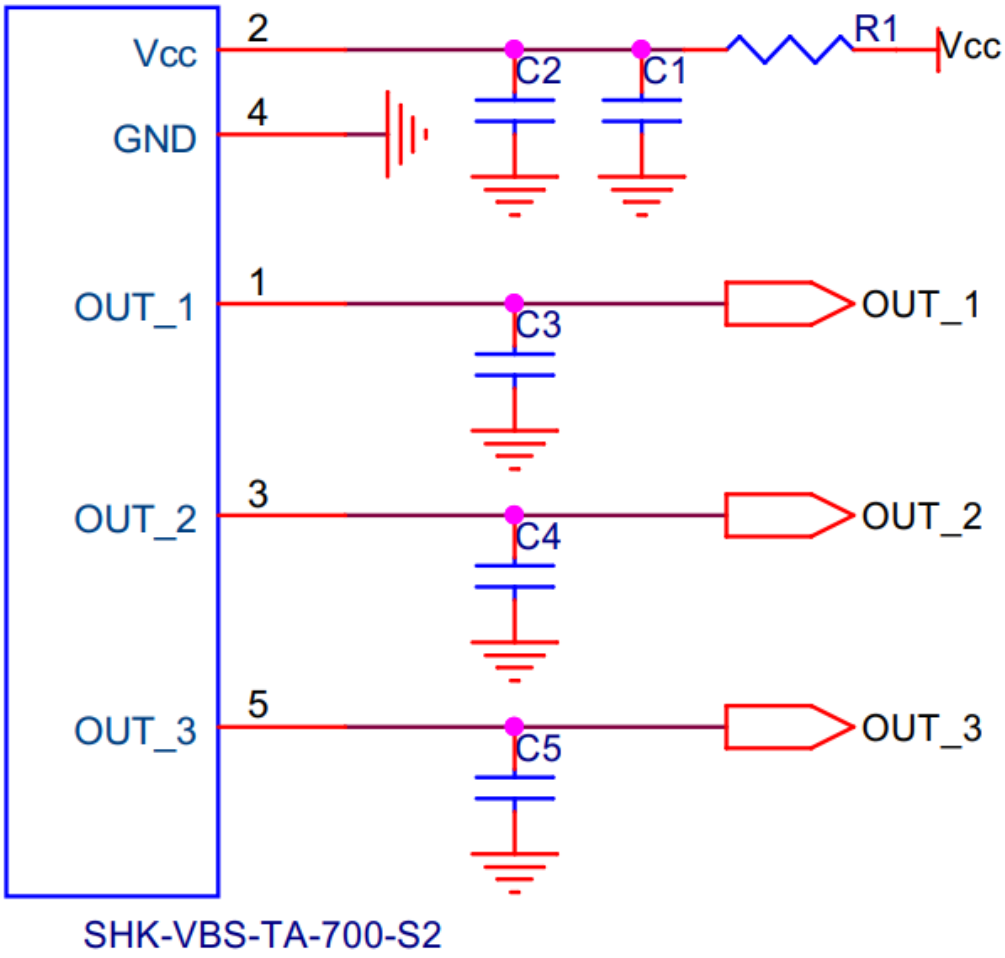




| Accuracy | Specification | | | Unit | Note | Accuracy | Specification | | | Unit | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -700A | 0A | 700A | | | | -700A | 0A | 700A | | |
| 25℃ | 31.0 | 15.0 | 31.0 | mv | | 25℃ | 10.9 | 5.3 | 10.9 | A | |
| -40℃~125℃ | 63.0 | 23.0 | 63.0 | mv | | -40℃~125℃ | 22.1 | 8.1 | 22.1 | A | |
| -40℃~150℃ | 75.0 | 25.0 | 75.0 | mv | | -40℃~150℃ | 26.3 | 8.8 | 26.3 | A | |

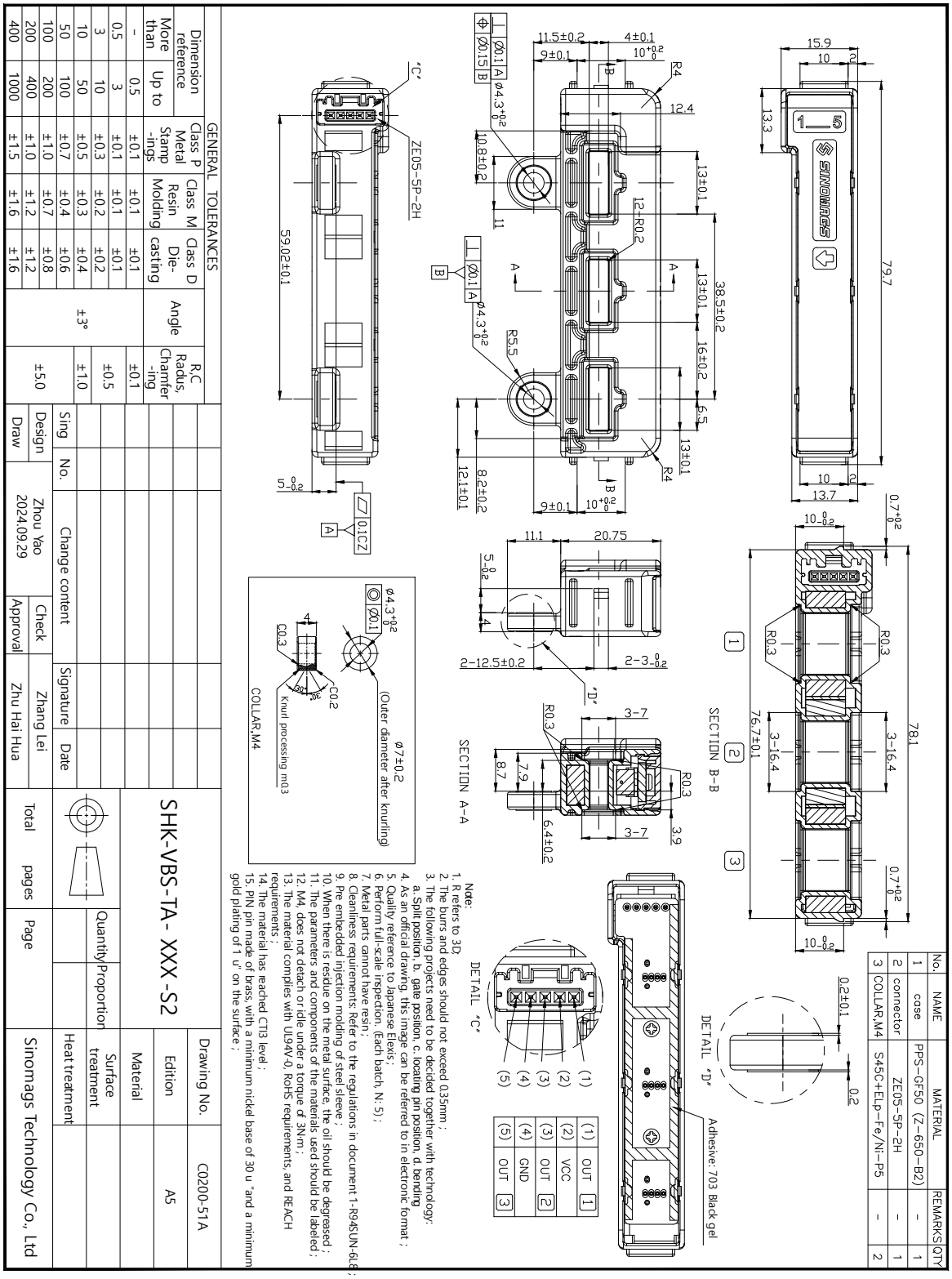
## 3. Product definition statement




## 4. Electrical circuit diagram



# 5. Dimension & Pin definitions




| No. | NAME | MATERIAL | REMARKS | QTY |
|---|---|---|---|---|
| 1 | case | PPS-GF50 (Z-650-B2) | - | 1 |
| 2 | connector | ZE05-5P-2H | - | 1 |
| 3 | COLLAR,M4 | S45C+ELp-Fe/Ni-P5 | - | 2 |

| GENERAL TOLERANCES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dimension reference | | Class P Metal Stamp -ings | Class M Resin Molding | Class D Die-casting | Angle | R,C Radus, Chamfer -ing | |
| More than | Up to | | | | | | |
| - | 0.5 | ±0.1 | ±0.1 | ±0.1 | ±3° | ±0.1 | ±5.0 |
| 0.5 | 3 | ±0.1 | ±0.1 | ±0.1 | | ±0.5 | |
| 3 | 10 | ±0.3 | ±0.2 | ±0.2 | | | |
| 10 | 50 | ±0.5 | ±0.3 | ±0.4 | | ±1.0 | |
| 50 | 100 | ±0.7 | ±0.4 | ±0.6 | | | |
| 100 | 200 | ±1.0 | ±0.7 | ±0.8 | | | |
| 200 | 400 | ±1.0 | ±1.2 | ±1.2 | | | |
| 400 | 1000 | ±1.5 | ±1.6 | ±1.6 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Design | Sing | No. | Change content | Signature | Date | Drawing No. | C0200-51A |
| Draw | Zhou Yao 2024.09.29 | | | | | Edition | A5 |
| Check | Zhang Lei | | | | | Material | |
| Approval | Zhu Hai Hua | | | | | Surface treatment | |
| Total pages | | | | Quantity | Proportion | Heat treatment | |
| Page | | | | | | Sinomags Technology Co., Ltd | |

## 6. Environmental test

| Name | Test condition |
|---|---|
| Environmental tests, electrical tests | |
| Humidity test | 85℃/85%,1000hr |
| Thermal shock | -40℃/125℃, 1000cycles |
| High temperature test | 125℃, 1000hr |
| Low temperature test | -40℃, 1000hr |
| Insulation voltage | 2.5kV, 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

This datasheet and any information contained therein may not be reproduced in whole or in part without the prior permission from Sinomags. The content of this information may be changed without notice for purposes such as improvement. Make sure you have the latest information when using the current sensor.