# CONTENT

# 1. Summary

The STK-BS series current sensor is based on TMR (tunnel magnetoresistance) technology and open-loop-design. It is suitable for DC, AC pulsed and any kind of irregular current measurement under the isolated conditions.

## Typical applications

- AC Variable speed drives
- Inverter
- Electric welder power supply
- Switched model power supplies (SMPS)

## General parameter

| Parameter | Symbol | Unit | Value |
|---|---|---|---|
| Working temperature | T_A | ℃ | -40 ~ 85 |
| Storage temperature | T_stg | ℃ | -40 ~ 105 |
| Mass | m | g | 60 |

## Absolute maximum rating

| Parameter | Symbol | Unit | Value |
|---|---|---|---|
| Supply voltage （not-destructive） | $V_C$ | V | ±18 |
| 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.

## Isulation parameter

| Parameter | Symbol | Unit | Value | Comment |
|---|---|---|---|---|
| RMS voltage for AC test 50Hz/1 min | Ud | kV | 4 | |
| Impulse withstand voltage 1.2/50μs | Ûw | kV | 8 | |
| Clearance distance (pri. -sec) | dCI | mm | > 8 | Shortest distance through air |
| Creepage distance (pri. -sec) | dCp | mm | > 8 | Shortest path along device body |
| Case material | | | V0 according to UL 94 | |

## 2. Electrical data STK-50BS

Condition：T_A = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -50 | | 50 | |
| Primary current measuring range | I_pm | A | -150 | | 150 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 1 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 80 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40℃ ~ 85℃ |

Remarks：

1. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
2. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

## 3. Electrical data STK-100BS

Condition：T_A = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -100 | | 100 | |
| Primary current measuring range | I_pm | A | -300 | | 300 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 40 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40°C ~ 85°C |

Remarks：

3. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
4. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

# 4. Electrical data STK-200BS

Condition：T_A = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -200 | | 200 | |
| Primary current measuring range | I_pm | A | -600 | | 600 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 20 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | 20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40°C ~ 85°C |

Remarks：

5. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
6. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

# 7. Electrical data STK-300BS

Condition：T_A = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -300 | | 300 | |
| Primary current measuring range | I_pm | A | -900 | | 900 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 13.333 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40℃ ~ 85℃ |

Remarks：

8. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
9. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

## 10. Electrical data STK-400BS

Condition：T_A = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -400 | | 400 | |
| Primary current measuring range | I_pm | A | -900 | | 900 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 10 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40℃ ~ 85℃ |

Remarks：

11. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
12. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

## 13. Electrical data STK-500BS

Condition：$T_A$ = 25℃ Vcc = ±15 V

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -500 | | 500 | |
| Primary current measuring range | I_pm | A | -900 | | 900 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 8 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40℃ ~ 85℃ |

Remarks：

14. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
15. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

## 16. Electrical data STK-600BS

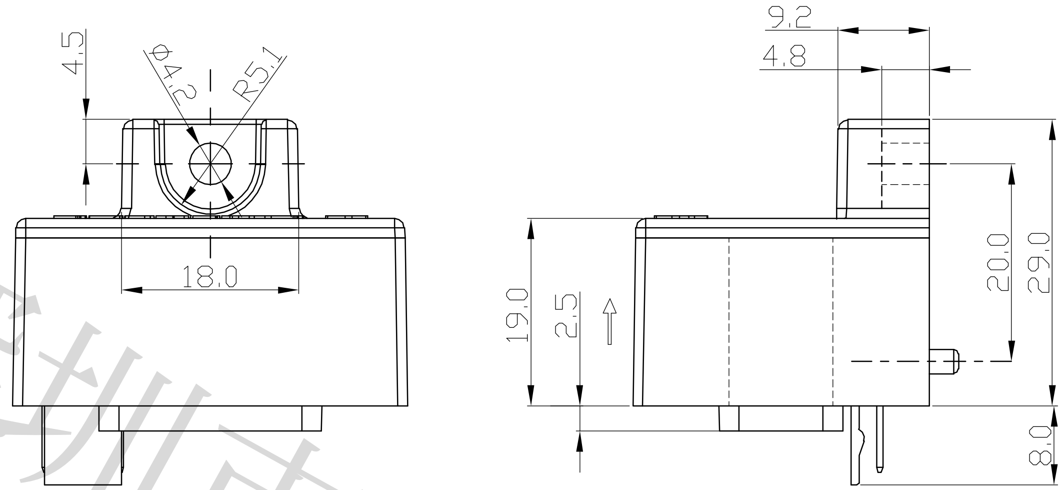
Condition：T_A = 25℃ Vcc = ±15 V

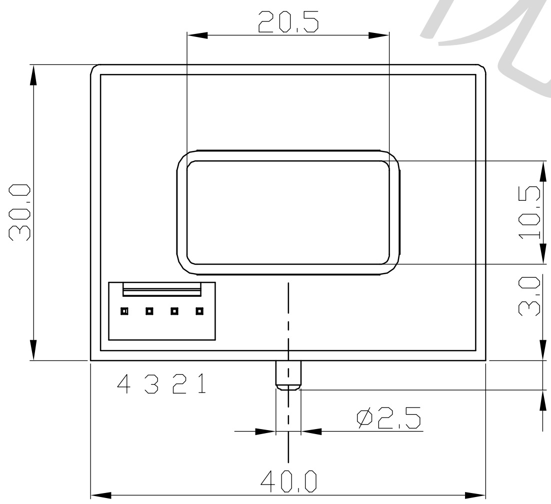
| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal current rms | I_pn | A | -600 | | 600 | |
| Primary current measuring range | I_pm | A | -900 | | 900 | |
| Supply voltage | Vcc | V | | ±15±5% | | |
| Current consumption | Icc | mA | | 20 | | |
| Rated output voltage | V_FS | V | | ±4 | | (Vout @ ±I_pn) – Voff |
| Internal output resistance | R_out | Ω | | 100 | | Vout |
| Quiescent voltage | Voff | V | -0.04 | 0 | 0.04 | Vout @ 0 A |
| Theoretical gain | G_th | mV/A | | 6.666 | | 4V @ I_pn |
| Drift of gain | Err_G | %G_th | -0.5 | | 0.5 | Trim in the factory@25℃ |
| Rated linearity error | Non-L | %I_pn | -1 | | 1 | ±I_pn |
| Reaction time | t_ra | μs | | 1 | | @10% of $I_{PN}$ |
| Step response time | t_res | μs | | 2.5 | | @90% of $I_{PN}$ |
| Delay time | t_delay | μs | | 1.5 | | 250 kHz sine wave |
| Frequency bandwidth (-3dB) | BW | kHz | | 250 | | No RC circuit |
| Output voltage noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz | Vnoise | mVpp | | <br>20<br>30 | | |
| Accuracy @ $I_{PN}$ @$T_A$=25℃ | X | % of I_pn | -1 | | 1 | @ 25℃ |
| Accuracy @ $I_{PN}$ @$T_A$=-40 ℃ -85℃ | X_TRange | % of I_pn | -5 | | 5 | -40℃ ~ 85℃ |

Remarks：

17. Accuracy @ 25℃, X = ((Vout – Vref) @ I_n @ 25℃–Voe@25℃ – G_th * I_n) / V_FS. Where, V_FS represents rated output voltage, I_n the test current, G_th the theoretical gain.
18. Accuracy -40℃~105℃, X_TRange = ((Vout – Vref) @ I_n @ T_x – Voe@ T_x – G_th * In) / V_FS, Where T_x represents present temperature.

## 19. Dimension & Pin definitions




Terminals

| | |
|---|---|
| 1 | +(+U ) |
| 2 | -(-U ) |
| 3 | M(Output) |
| 4 | 0(0V) |

Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ±0.2
Unit :mm