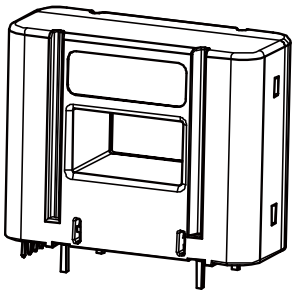
# CS1V P00 SERIES

## Current Sensor

### Model Number:

CS1V 80 P00
CS1V 100 P00
CS1V 150 P00
CS1V 200 P00



For the electronic measurement of current:DC,AC, pulsed..., with galvanic separation between the primary and the secondary circuits.

## Features

- Closed loop (compensated) current sensor using the Hall Effect
- Galvanic separation between primary and secondary
- Insulating plastic case recognized according to UL 94-V0
- Very good linearity
- High accuracy
- Very low offset drift over temperature
- No insertion loss
- Standards:
  - IEC 60664-1: 2020
  - IEC 61800-5-1: 2022
  - IEC 62109-1: 2010

## Applications

- AC variable speed and servo motor drives
- Uninterruptible Power Supplies (UPS)
- Battery management
- Switch Mode Power Supplies (SMPS)
- Power supplies for welding applications
- Inverter

## Safety

This sensor must be used according to IEC61800-5-1.
This sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the following manufacture's operating instructions.

*Caution, risk of electrical shock!*

When operating the sensor, certain parts of the module can carry hazardous voltage (e.g., Primary busbar, power supply). Ignore this warning can lead to injury and/or cause serious damage.
This sensor is a built-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

## Absolute maximum ratings(not operating)

| Parameter | Symbol | Unit | Value |
|---|---|---|---|
| Supply voltage | $V_C$ | V | 7 |
| ESD rating, Human Body Model (HBM) | $V_{ESD}$ | kV | 4 |

※ Stresses above these ratings may cause permanent damage.

※ Exposure to absolute maximum ratings for extended periods may degrade reliability.

## Environmental and mechanical characteristics

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Ambient operating temperature | $T_A$ | ℃ | -40 | | 85 | |
| Ambient storge temperature | $T_S$ | ℃ | -55 | | 125 | |
| Mass | $m$ | g | | 45 | | |

## Insulation coordination

| Parameter | Symbol | Unit | Value | Comment |
|---|---|---|---|---|
| Rms voltage for AC insulation test @ 50Hz,1min | $V_d$ | kV | 3 | According to IEC 60664-1 |
| Impulse withstand voltage1.2/50μs | $V_W$ | kV | 8 | According to IEC 60664-1 |
| Insulation resistance | $R_{IS}$ | GΩ | ＞200 | @500V，$T_A$=25℃ |
| Clearance (pri.-sec.) | $d_{Cl}$ | mm | 12.9 | |
| Creepage distance (pri.-sec.) | $d_{Cp}$ | mm | 12.9 | |
| Plastic case | - | - | UL94-V0 | |
| Comparative traking index | CTI | | 600 | |
| Application example | - | - | 600V | Reinforced insulation, according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2 |
| Application example | - | - | 1000V | Basic insulation, according to IEC 61800-5-1, IEC 62109-1CATⅢ, PD2 |

## Electrical data

# CS1V 80 P00

※ With $T_A$ = 25℃, $V_C$ = 5V, $R_L$ = 10Ω,unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal rms current | $I_{PN}$ | A | | 80 | | |
| Primary current, measuring range | $I_{PM}$ | A | | 270 | | |
| Supply voltage | $V_C$ | V | 4.75 | 5 | 5.25 | @ ±5% |
| Current consumption | $I_C$ | mA | | 18+$I_P$(mA)/ $N_S$ | 20+$I_P$(mA)/ $N_S$ | @$N_S$ =2026 |
| Reference voltage | $V_{REF}$ | V | 2.485 | 2.5 | 2.515 | @$I_P$=0A |
| Output voltage | $V_{Out}$ | V | 0.25 | | 4.75 | @ $V_C$=5V |
| Offset voltage | $V_{Out}$ | V | | $V_{REF}$ | | |
| Electrical offset voltage | $V_{OE}$ | mV | -2.8 | | 2.8 | |
| Electrical offset cur | $I_{OE}$ | mA | -448 | | 448 | |
| Temperature coefficient of $I_{OE}$ | $TCI_{OE}$ | A/K | -0.002 | | 0.002 | |
| Temperature coefficient of $V_{REF}$ | $TCV_{REF}$ | ppm/K | -100 | | 100 | |
| Temperature coefficient of $V_{OE}$ | $TCV_{OUT}$ | ppm/K | -3 | | 3 | @ ppm/K of 2.5V |
| Theoretical sensitivity | $G_{th}$ | mV/A | | 7.813 | | |
| Sensitivity error | $G$ | % | -0.8 | | 0.8 | |
| Temperature drift of G | $TCG$ | ppm/K | | | 75 | @ ppm/k of $I_{PN}$ |
| Linearity error | $\varepsilon_L$ | % of $I_{PN}$ | -0.1 | | 0.1 | |
| Magnetic offset current@ 10x $I_P$ | $I_{OM}$ | mA | -83 | | 83 | |
| Output noise | $Vno$ | mVpp | | 0.3<br>0.5 | | @DC~10kHz<br>@DC~100kHz |
| Primary current, detection threshold | $I_{PTH}$ | A | 2.35* $I_{PN}$ | 2.41* $I_{PN}$ | 2.47* $I_{PN}$ | |
| Delay time of threshold output for high value | $t_{DH\ Th}$ | μs | | 1.4 | 2.2 | |
| Response time@ 10% of $I_{PN}$ | $t_r$ | μs | | | 1 | @ di/dt=50A/s |
| Response time@ 80% of $I_{PN}$ | $t_r$ | μs | | | 3 | @ di/dt=50A/s |
| Frequency bandwidth(±3dB) | $BW$ | kHz | 200 | | | |
| Accuracy | $X$ | % of $I_{PN}$ | | | 1 | @Notes 1) |
| Accuracy@85°C | $X$ | % of $I_{PN}$ | | | 1.4 | @Notes 1) |
| Sum of sensitivity and and linearity | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 0.83 | @Notes 2) |
| Sum of sensitivity and and linearity@85°C | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 1.2 | @Notes 2) |

Notes:

1) $X(T_A) = X_{25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

2) $\varepsilon_{GL}(T_A) = \varepsilon_{GL\,25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

## CS1V 100 P00

※ With $T_A$ = 25℃, $V_C$ = 5V, $R_L$ = 10Ω,unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal rms current | $I_{PN}$ | A | | 100 | | |
| Primary current, measuring range | $I_{PM}$ | A | | 270 | | |
| Supply voltage | $V_C$ | V | 4.75 | 5 | 5.25 | @ ±5% |
| Current consumption | $I_C$ | mA | | 18+$I_P$(mA)/ $N_S$ | 20+$I_P$(mA)/ $N_S$ | @$N_S$ =2026 |
| Reference voltage | $V_{REF}$ | V | 2.485 | 2.5 | 2.515 | @$I_P$=0A |
| Output voltage | $V_{Out}$ | V | 0.25 | | 4.75 | @ $V_C$=5V |
| Offset voltage | $V_{Out}$ | V | | $V_{REF}$ | | |
| Electrical offset voltage | $V_{OE}$ | mV | -2.8 | | 2.8 | |
| Electrical offset cur | $I_{OE}$ | mA | -448 | | 448 | |
| Temperature coefficient of $I_{OE}$ | $TCI_{OE}$ | A/K | -0.002 | | 0.002 | |
| Temperature coefficient of $V_{REF}$ | $TCV_{REF}$ | ppm/K | -100 | | 100 | |
| Temperature coefficient of $V_{OE}$ | $TCV_{OUT}$ | ppm/K | -3 | | 3 | @ ppm/K of 2.5V |
| Theoretical sensitivity | $G_{th}$ | mV/A | | 6.250 | | |
| Sensitivity error | $G$ | % | -0.8 | | 0.8 | |
| Temperature drift of G | $TCG$ | ppm/K | | | 75 | @ ppm/k of $I_{PN}$ |
| Linearity error | $\varepsilon_L$ | % of $I_{PN}$ | -0.1 | | 0.1 | |
| Magnetic offset current@ 10x $I_P$ | $I_{OM}$ | mA | -104 | | 104 | |
| Output noise | $Vno$ | mVpp | | 5<br>6 | | @DC~10kHz<br>@DC~100kHz |
| Primary current, detection threshold | $I_{PTH}$ | A | 1.87* $I_{PN}$ | 1.93* $I_{PN}$ | 1.98* $I_{PN}$ | |
| Delay time of threshold output for high value | $t_{DH\ Th}$ | μs | | 1.4 | 2.2 | |
| Response time@ 10% of $I_{PN}$ | $t_r$ | μs | | | 1 | @ di/dt=50A/s |
| Response time@ 80% of $I_{PN}$ | $t_r$ | μs | | | 3 | @ di/dt=50A/s |
| Frequency bandwidth(±3dB) | $BW$ | kHz | 200 | | | |
| Accuracy | $X$ | % of $I_{PN}$ | | | 1 | @Notes 1) |
| Accuracy@85°C | $X$ | % of $I_{PN}$ | | | 1.4 | @Notes 1) |
| Sum of sensitivity and and linearity | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 0.83 | @Notes 2) |
| Sum of sensitivity and and linearity@85°C | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 1.2 | @Notes 2) |

Notes:

1) $X(T_A) = X_{25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

2) $\varepsilon_{GL}(T_A) = \varepsilon_{GL\,25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

## CS1V 150 P00

※ With $T_A$ = 25℃, $V_C$ = 5V, $R_L$ = 10Ω,unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal rms current | $I_{PN}$ | A | | 150 | | |
| Primary current, measuring range | $I_{PM}$ | A | | 270 | | |
| Supply voltage | $V_C$ | V | 4.75 | 5 | 5.25 | @ ±5% |
| Current consumption | $I_C$ | mA | | 18+$I_P$(mA)/ $N_S$ | 20+$I_P$(mA)/ $N_S$ | @$N_S$ =2026 |
| Reference voltage | $V_{REF}$ | V | 2.485 | 2.5 | 2.515 | @$I_P$=0A |
| Output voltage | $V_{Out}$ | V | 0.25 | | 4.75 | @ $V_C$=5V |
| Offset voltage | $V_{Out}$ | V | | $V_{REF}$ | | |
| Electrical offset voltage | $V_{OE}$ | mV | -2.5 | | 2.5 | |
| Electrical offset cur | $I_{OE}$ | mA | -600 | | 600 | |
| Temperature coefficient of $I_{OE}$ | $TCI_{OE}$ | A/K | -0.002 | | 0.002 | |
| Temperature coefficient of $V_{REF}$ | $TCV_{REF}$ | ppm/K | -100 | | 100 | |
| Temperature coefficient of $V_{OE}$ | $TCV_{OUT}$ | ppm/K | -3 | | 3 | @ ppm/K of 2.5V |
| Theoretical sensitivity | $G_{th}$ | mV/A | | 4.167 | | |
| Sensitivity error | $G$ | % | -0.8 | | 0.8 | |
| Temperature drift of G | $TCG$ | ppm/K | | | 75 | @ ppm/k of $I_{PN}$ |
| Linearity error | $\varepsilon_L$ | % of $I_{PN}$ | -0.1 | | 0.1 | |
| Magnetic offset current@ 10x $I_P$ | $I_{OM}$ | mA | -156 | | 156 | |
| Output noise | $Vno$ | mVpp | | 5<br>6 | | @DC~10kHz<br>@DC~100kHz |
| Primary current, detection threshold | $I_{PTH}$ | A | 1.39* $I_{PN}$ | 1.44* $I_{PN}$ | 1.5* $I_{PN}$ | |
| Delay time of threshold output for high value | $t_{DH\ Th}$ | μs | | 1.4 | 2.2 | |
| Response time@ 10% of $I_{PN}$ | $t_r$ | μs | | | 1 | @ di/dt=50A/s |
| Response time@ 80% of $I_{PN}$ | $t_r$ | μs | | | 3 | @ di/dt=50A/s |
| Frequency bandwidth(±3dB) | $BW$ | kHz | 200 | | | |
| Accuracy | $X$ | % of $I_{PN}$ | | | 1 | @Notes 1) |
| Accuracy@85°C | $X$ | % of $I_{PN}$ | | | 1.4 | @Notes 1) |
| Sum of sensitivity and and linearity | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 0.83 | @Notes 2) |
| Sum of sensitivity and and linearity@85°C | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 1.2 | @Notes 2) |

Notes:

1) $X(T_A) = X_{25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

2) $\varepsilon_{GL}(T_A) = \varepsilon_{GL\,25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

## Electrical data

### CS1V 200 P00

※ With $T_A$ = 25℃, $V_C$ = 5V, $R_L$ = 10Ω,unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Comment |
|---|---|---|---|---|---|---|
| Primary nominal rms current | $I_{PN}$ | A | | 200 | | |
| Primary current, measuring range | $I_{PM}$ | A | -450 | | 450 | |
| Supply voltage | $V_C$ | V | 4.75 | 5 | 5.25 | @ ±5% |
| Current consumption | $I_C$ | mA | | 18+$I_P$(mA)/ $N_S$ | 20+$I_P$(mA)/ $N_S$ | @$N_S$ =1500 |
| Reference voltage | $V_{REF}$ | V | 2.485 | 2.5 | 2.515 | @$I_P$=0A |
| Output voltage | $V_{Out}$ | V | 0.25 | | 4.75 | @ $V_C$=5V |
| Offset voltage | $V_{Out}$ | V | | $V_{REF}$ | | |
| Electrical offset voltage | $V_{OE}$ | mV | -2.5 | | 2.5 | |
| Electrical offset cur | $I_{OE}$ | mA | -800 | | 800 | |
| Temperature coefficient of $I_{OE}$ | $TCI_{OE}$ | A/K | -0.002 | | 0.002 | |
| Temperature coefficient of $V_{REF}$ | $TCV_{REF}$ | ppm/K | | | ±100 | |
| Temperature coefficient of $V_{OE}$ | $TCV_{OUT}$ | ppm/K | | | ±2 | @ ppm/K of 2.5V |
| Theoretical sensitivity | $G_{th}$ | mV/A | | 3.125 | | |
| Sensitivity error | $G$ | % | -0.8 | | 0.8 | |
| Temperature drift of G | $TCG$ | ppm/K | | | 75 | @ ppm/k of $I_{PN}$ |
| Linearity error | $\varepsilon_L$ | % of $I_{PN}$ | -0.15 | | 0.15 | |
| Magnetic offset current@ 10x $I_P$ | $I_{OM}$ | mA | -208 | | 208 | |
| Output noise | $Vno$ | mVpp | | 5<br>6 | | @DC~10kHz<br>@DC~100kHz |
| Primary current, detection threshold | $I_{PTH}$ | A | 1.87* $I_{PN}$ | 1.93* $I_{PN}$ | 1.98* $I_{PN}$ | |
| Delay time of threshold output for high value | $t_{DH\ Th}$ | μs | | 1.4 | 2.2 | |
| Response time@ 10% of $I_{PN}$ | $t_r$ | μs | | | 1 | @ di/dt=70A/s |
| Response time@ 80% of $I_{PN}$ | $t_r$ | μs | | | 3 | @ di/dt=70A/s |
| Frequency bandwidth(±3dB) | $BW$ | kHz | 200 | | | |
| Accuracy | $X$ | % of $I_{PN}$ | | | 1.1 | @Notes 1) |
| Accuracy@85°C | $X$ | % of $I_{PN}$ | | | 1.4 | @Notes 1) |
| Sum of sensitivity and and linearity | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 0.83 | @Notes 2) |
| Sum of sensitivity and and linearity@85°C | $\varepsilon_{GL}$ | % of $I_{PN}$ | | | 1.2 | @Notes 2) |

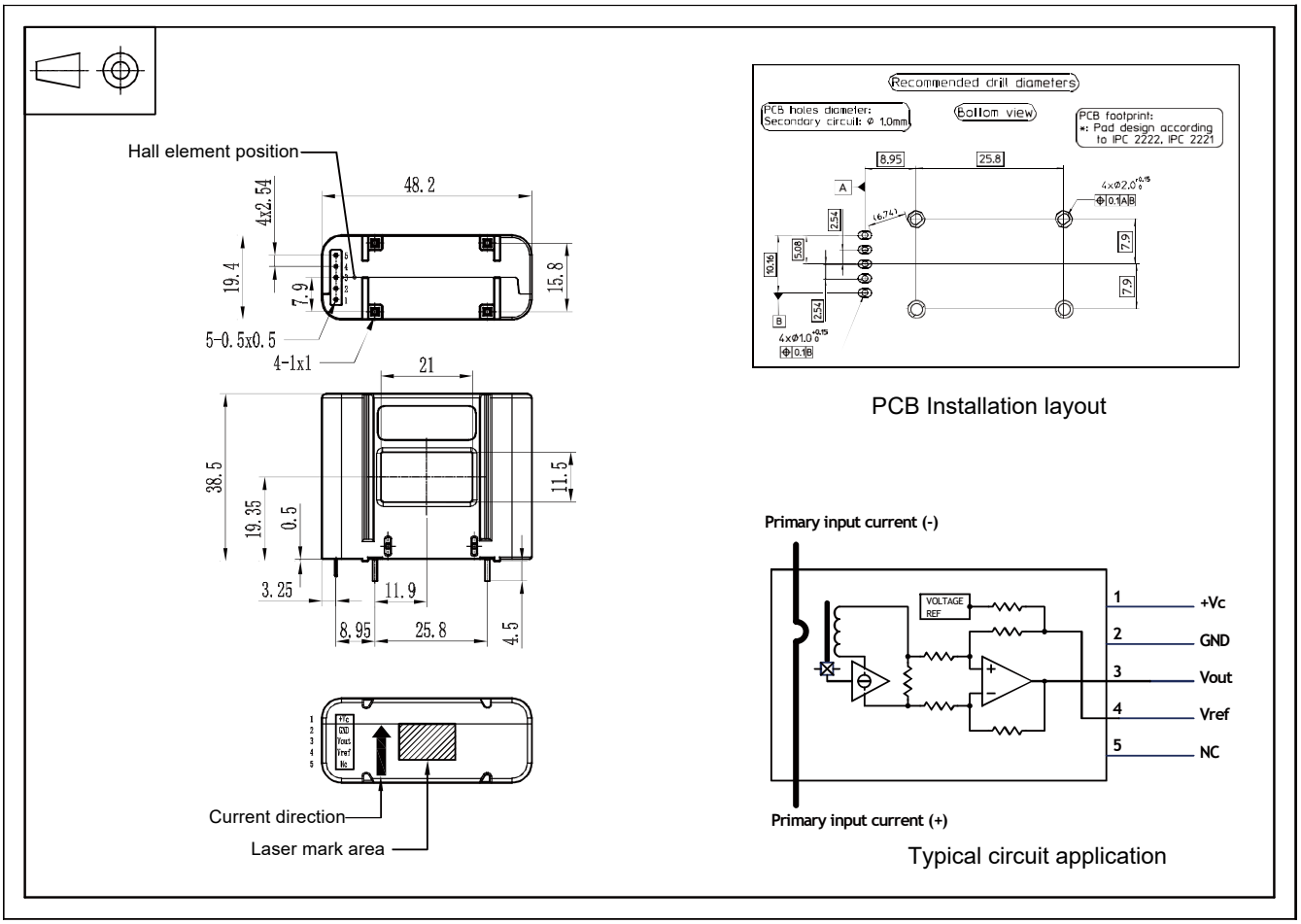
Notes:

1) $X(T_A) = X_{25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

2) $\varepsilon_{GL}(T_A) = \varepsilon_{GL\,25} + \left(TCG + \frac{TCI_{OE}}{I_{PN}}\right) X \mid T_A - 25 \mid$

# CS1V P00 SERIES

## Dimensions（in mm. 1 mm = 0.0394 inch）




## Mechanical characteristics

✧ General tolerance ±0.6 mm

## Remarks

This is a series of standard models, for different versions (supply voltages,connectors...), please contact CHIPSENSE.