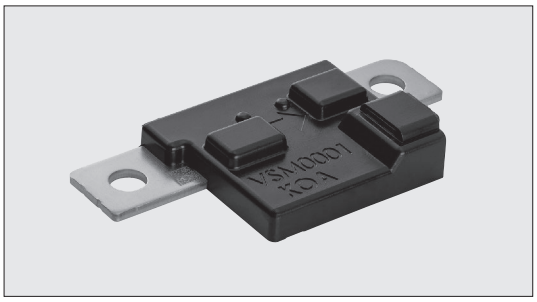
# Shunt Current Sensor

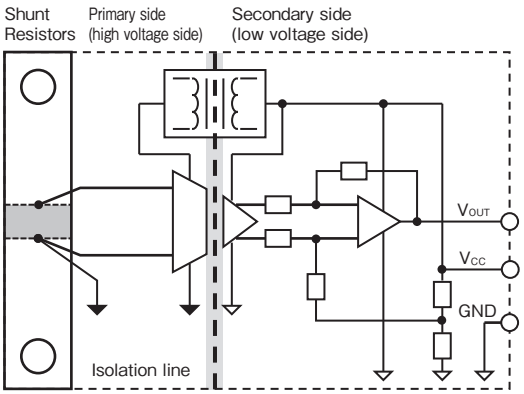
NEW EU RoHS

# VSM0001 Series



## ■Type Designation

| VSM0001 | A | 400 | A |
|---|---|---|---|
| Product Code | A: Analog Output | Current Rating<br>400 : ±400A<br>200 : ±200A | Sub-Number |




Block Diagram

## ■Features

- Large current detection via shunt resistor
- High-precision current sensing
- Low input loss
- Isolation between current path and output circuit

## ■Applications

- Battery Management Systems (BMS)
- Backup power for storage battery systems
- Rapid chargers

## ■Absolute Maximum Ratings

| Parameter | | Min | Max | Unit | Condition |
|---|---|---|---|---|---|
| Supply Voltage | | − | 5.5 | V | |
| Rated Current (DC) | VSM0001−A400A | −400 | 400 | A | See derating curve |
| | VSM0001−A200A | −200 | 200 | A | |
| Maximum Current (≤ 1 sec) | | −600 | 600 | A | |
| Operating Temp. | | −40 | 105 | ℃ | |
| Rated Terminal Part Temp. | | − | 105 | ℃ | Temperature of the screw fastening part |

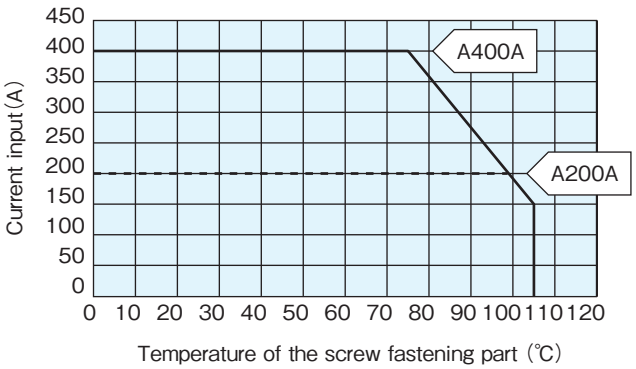
## ■Specifications ($V_{CC}$=5.0V, $T_F$=25℃※1)

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 4.75 | 5.0 | 5.25 | V | |
| Current Consumption | | | | 40 | mA | |
| Output (0A Input) | $V_{ZERO}$ | | $V_{CC}$/2 | | V | $I_S$=0A |
| Offset | | − 5 | | 5 | mV | $I_S$=0A |
| Output | $V_{OUT}$ | | 0.5 | | V | VSM0001−A400A : $I_S$=−400A<br>VSM0001−A200A : $I_S$=−200A |
| | | | 4.5 | | V | VSM0001−A400A : $I_S$=+400A<br>VSM0001−A200A : $I_S$=+200A |
| Full-scale Error | FSerror | − 1.0 | | 1.0 | % | |
| Frequency Characteristic | | | | 10 | kHz | − 3dB |
| Response Time | | | 3 | 5 | μ s | Input50% → Output50% |
| Isolation Voltage | | 3.75kVrms, 1 minute | | | V | Leakage Current ≤0.2mA |
| Insulation Resistance | | 100 | | | M Ω | at 1,500 $V_{DC}$ |
| Shunt Resistance | Rshunt | | 100 | | μ Ω | |

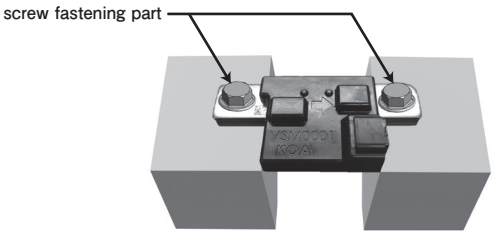
※1 Temperature of the screw fastening part

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.
Contact our sales representatives before you use our products for applications including automotives, medical equipment and aerospace equipment.
Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

## ■Derating Curve

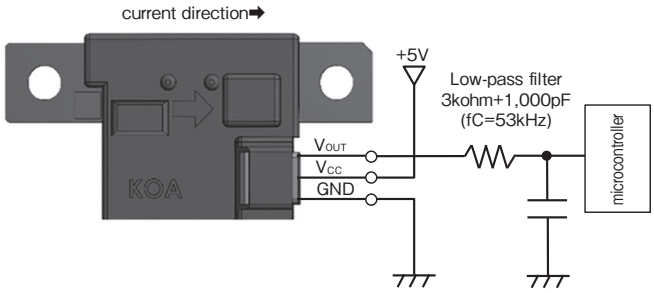



If the terminal temperature exceeds 75° C due to heat generated inside the shunt resistor, reduce the current according to the derating curve.

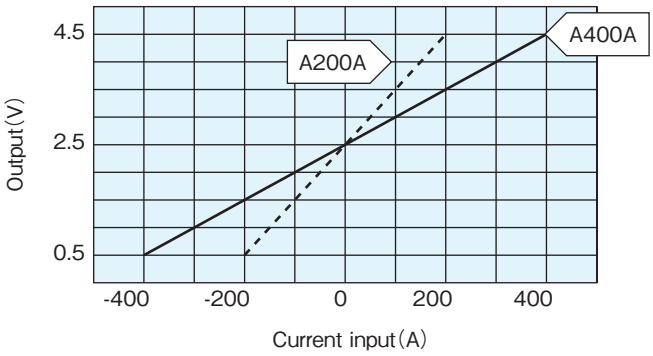



## ■Recommended Operating Conditions

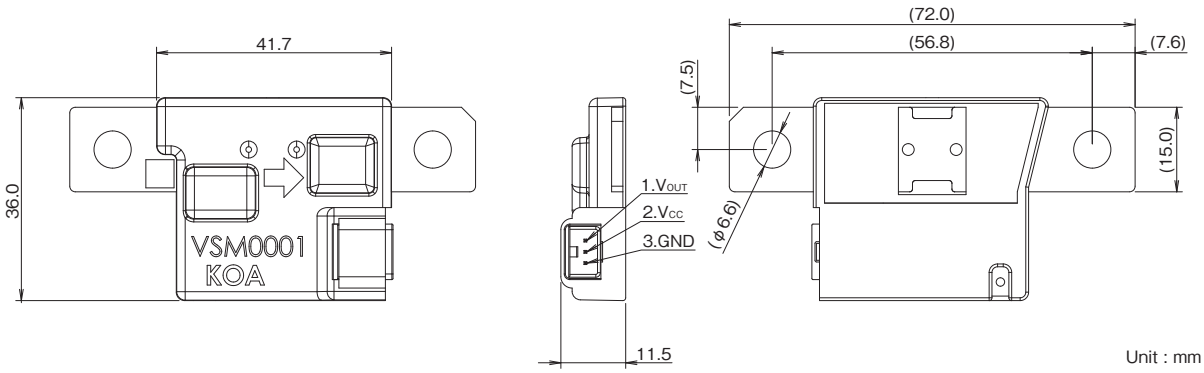
Low-pass filter is recommended on the output terminal for noise suppression.




## ■Output Characteristics




## ■Dimensions




Unit : mm

## ■Connector Information

| | | |
|---|---|---|
| ・Pin Header | : GT8E-3P-2H(55) | (HIROSE) |
| ・Housing | : GT8E-3S-HU | (HIROSE) |

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## ■Precautions

- This product is intended for use in general electronic equipment. It is neither designed nor manufactured for applications requiring high reliability, such as transportation equipment (automobiles, aircraft, trains, ships), medical devices, space-related equipment, energy-related facilities, or infrastructure systems (transportation or information systems), where a failure or malfunction of the equipment may result in injury or damage to life or property. Unless otherwise specifically agreed upon in a written contract defining the scope of responsibility between the customer and our company, we shall not be held liable for the use of this product in such high-reliability applications.
- When using this product in applications requiring high reliability, please ensure the implementation of appropriate fail-safe designs. Incorporate protective circuits and redundant systems to ensure that a single failure of this product does not lead to unsafe operation of the equipment or system.
- This product does not contain built-in protective components such as fuses. A possible failure mode of the sensor includes internal short circuits, which may cause abnormal heat generation in the internal circuit, potentially leading to smoke emission or fire from the resin casing. For applications involving safety-critical components, appropriate protection measures such as protective circuits and elements must be implemented.
- This product is calibrated based on a specified current sensor. Under different measurement environments, various characteristics (e.g., output characteristics, offset characteristics) and their deviations may vary. Please note that this specification document does not list all characteristics that may vary depending on the measurement environment.
- This product may be heated due to the heat generation of the current path (e.g., cable, busbar). Please ensure that the connected current path does not exceed its allowable current. If the temperature at the fastening point exceeds 75° C, reduce the current according to the derating curve.
- The rated current is defined under direct current conditions.
- To reduce current sensing errors, it is recommended to share $V_{CC}$ with the 5V supply of the downstream microcontroller.
- If a temperature difference exists between both ends of the shunt resistor, errors may occur due to thermal electromotive force (EMF).
- Do not clean the product as this will degrade its performance.
- This product is not certified under safety standards such as UL, CSA, or EN (CE marking). The molding material is equivalent to UL94 V-0.
- Avoid storage in high temperature and high humidity environments. After opening the package, care should be taken to prevent oxidation of the shunt resistor caused by exposure to heat, humidity, or corrosive gases.
- When fastening bolts at the connection points, follow the torque specifications defined in the DIN standard (T-series). Also, ensure that excessive stress is not applied to either side of the fastening parts during assembly.
  Recommended bolt: M6 / Standard tightening torque: 5.2 N·m