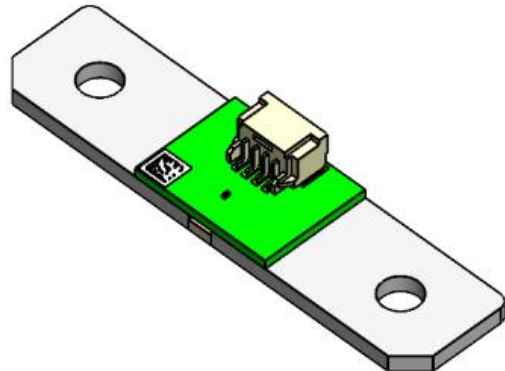


REVERSION HISTORY:

Date	Revision	Changes	Author
2021.10.03	A0	Initial released for preliminary datasheet	Renee.chen
2021.11.10	A1	a. SHUNT hole from 8.3MM to 7.00MM b. NTC changed direction c. QR-CODE to DATA MATRIX	Renee.chen Mila.Kuo
2021.11.30	A2	1.Change PCB dimension to 26mm	Renee.chen
2021.12.22	A3	SHUNT hole from 8.3MM to 7.00M	Renee.chen
2021.01.27	A4	data-matrix PCB use Laser marking Add Type Designation Add Packing	RENEE
2022.07.11	A4	Add Preliminary specification	Vivian
2023.07.28	A4	Type1: VSMB8420SY-M050J	Cody
2023.08.01	A5	1. P1 change the Schematic 2. P2 update the drawing 3. P4 change the Schematic	Renee.chen
2023.08.03	A5	4. Delete Preliminary specification	Vivian
2023.10.31	A6	Change the feature description 1. Low inductance < 3nH 2.Low thermal EMF (< 0.6μV/°C)	Renee.Chen

FEATURES:

- Nominal Current Up to 500A
- High pulse current rating
- Low inductance (< 3nH)
- Low thermal EMF (< 0.6 μ V/ $^{\circ}$ C)
- Welding construction; Excellent long-term stability
- Pb-free for RoHS compliant
- Ni & Sn plating assists with PCB mounting and corrosion protection



APPLICATIONS:

- EV/HEV BMS
- Battery and storage based application

GENERAL DESCRIPTION:

The shunt module is a PCBA which include a thermistor and a connector mount on the shunt resistor. User can easy mount the module on current sense location and connect to signal processing side via board to wire connection.

ELECTRICAL SPECIFICATIONS:

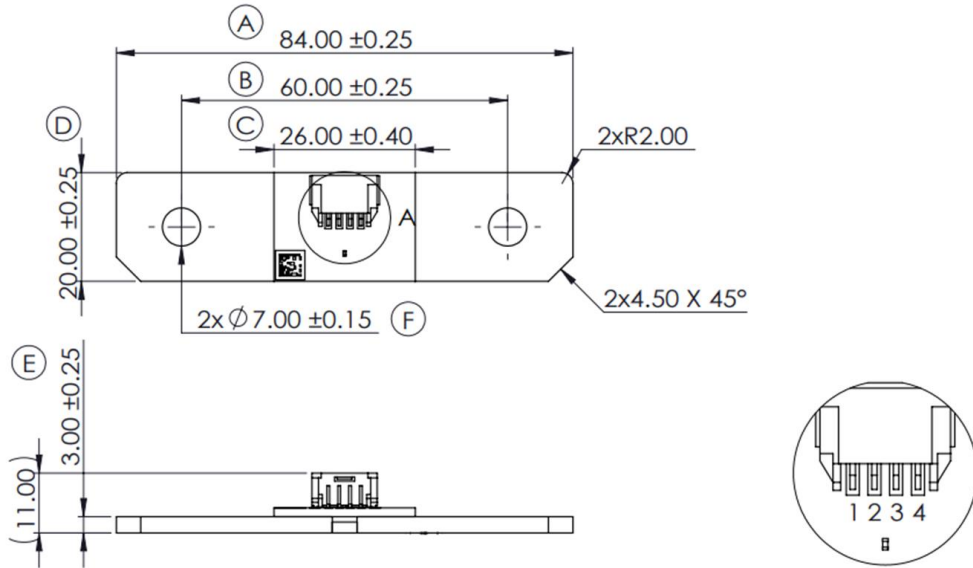
Characteristics	Feature
Nominal current	500A
Resistance value	50 μ Ω
Temperature coefficient of resistance(25 $^{\circ}$ C/125 $^{\circ}$ C)	\pm 100 ppm/ $^{\circ}$ C
Storage and Operating Temperature* ^{Note1}	-40~125 $^{\circ}$ C
Resistance tolerance	\pm 5%

*Note1: Operating temperature means that NTC temperature need to be between -40 $^{\circ}$ C to 125 $^{\circ}$ C.

OUTLINE DRAWING:

Unit: mm

Dimension



*Connector Mates Part(s): 560123-0400, 505151-0401

Component	Manufacturer	Part No.	Pin Definition
Connector	MOLEX	502352-0400	1: TEMP_P 2: SHUNT SENSE_P 3: SHUNT SENSE_N 4: TEMP_N
Thermistor	Thinking	TSM0C103F34D1R	

Type Designation :

VGA 00 - 500 VN - 010

(1) (2) (3) (4) (5)

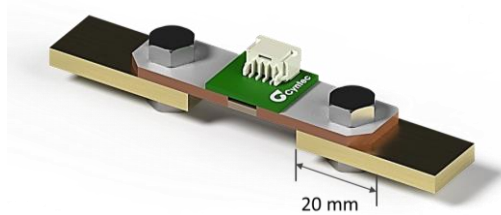
Note :

- (1) Series No.
- (2) Connector type
- (3) Nominal Current
- (4) Series No.
- (5) Hardware Format

Bus bar Connection:

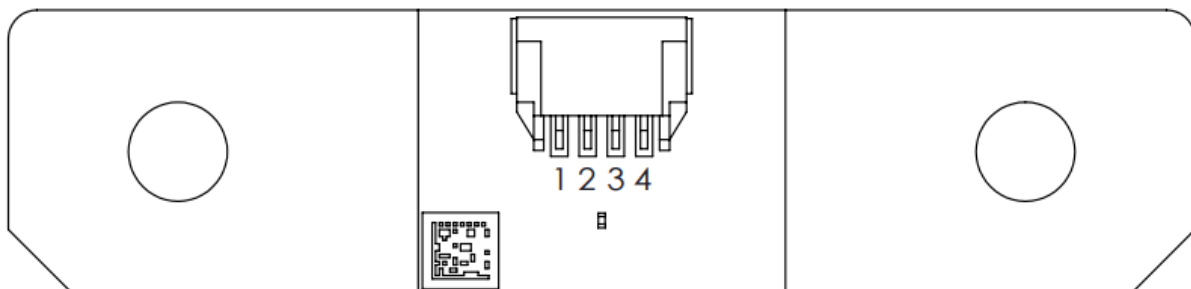
There are a few recommendations for a good connection.

- Always use screws with an outer diameter of 6 mm (M6)
- The recommended torque is 8~10Nm
- Shunt and bus bar must be clean.
- Correct mounting 20mm overlap ad shown in below figure.



Data matrix Information for reference:

1. PCB Top overlay (for laser marking) dimension : 5mm x 5mm (ref.)
2. Data-matrix dimension : 4mm x 4mm (ref.)



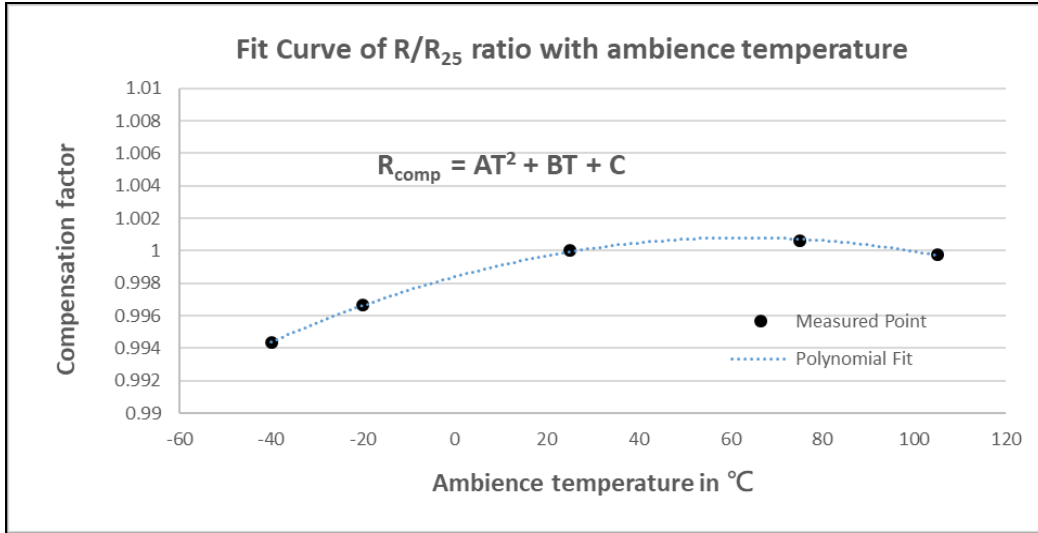
3. Data matrix information for reference :

	Year	Month	Day	Module ID	Resistance R ₂₅ *	Quadratic coefficient	First-order coefficient	Constant term
Form	YYYY	MM	DD	XXXXX	Rxxxxxn	±x.xxxxxxxxxx	±x.xxxxxxxxxx	±x.xxxxxxxxxx
Example	2020	11	25	00001	R50123n	-0.000000250	+0.000088011	+0.997754842
2020112500001R50123n-0.000000250+0.000088011+0.997754842*NOTE2								

* R₂₅ is shunt resistance at 25°C, unit: nOhm

*Note2 : Total Characters are 56.

Shunt Temperature Compensation Function:



Generic compensation factor the resistance of shunt need to be multiplied with:

$$R_{comp} = A \cdot T^2 + B \cdot T + C$$

Where:

R_{comp} is the compensation factor for Shunt resistance drift over ambience temperature normalized

to 1 at 25°C.

T is temperature reading from PCB temperature sensor NTC.

A is quadratic coefficient, the default value is -0.000000250*.

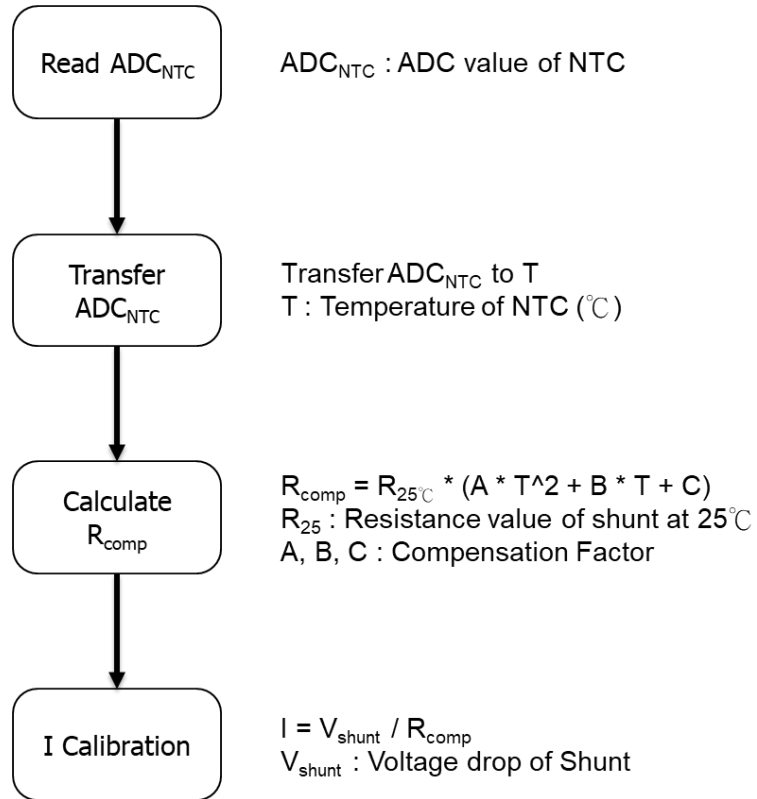
B is first-order coefficient, the default value is +0.000088011*.

C: constant term coefficient, the default value is +0.997754842*.

The compensated shunt resistance value = $R_{25} \cdot R_{comp}$.

R_{25} is resistance value of shunt at 25°C.

*Value is for reference only.

Compensated Flow:

Reliability Test :

Test Item	Test Condition	Spec
Low temperature storage	ISO 16750-4 IEC 60068-2-1 Ad Temperature: -40°C, Time: 240hrs, 500hrs	$\Delta R: \pm 1\%$
High temperature storage	ISO 16750-4 IEC 60068-2-2 Temperature: 125°C, Time: 1000hrs, 2000hrs	$\Delta R: \pm 1\%$
Temperature cycling storage	IEC 60068-2-14, Nb -40°C to 125°C, Dwell time ≥ 15 min, 1000 cycles	$\Delta R: \pm 1\%$
Thermal shock storage	IEC 60068-2-14, Na -40°C to 125°C, Dwell times ≥ 15 min Transfer time: ≤ 30 s, 500, 1000 cycles	$\Delta R: \pm 1\%$
Cycling moisture resistance storage	MIL-STD-883. METHOD 1004.7 -10°C to 70°C ; 90% ~ 100%RH @ 70°C, 20 cycles	$\Delta R: \pm 1\%$
Damp heat storage	JESD22-A 101 Temperature: 85 ; Humidity: 85%; Time : 1000hrs	$\Delta R: \pm 1\%$
Vibration	ISO 16750-3 IEC 60068-2, 64 Random 10~1000Hz, profile: 8hrs/axis The r.m.s. acceleration value shall be 27,1 m/s ² .	$\Delta R: \pm 0.5\%$
Mechanical Shock	ISO 16750-3 6 axis, 50G, 6ms, half-sine, 10 times/axis	$\Delta R: \pm 0.5\%$
Free Fall	ISO 16750-3 3 axis, 2 falls per DUT by axis, 1m, concrete ground or steel plate	$\Delta R: \pm 0.5\%$

Packing:

Tray packaging dimensions :325mm*295mm*45.9mm

Label Marking :

The following items shall be marked on tray

- (1) Description
- (2) Quantity
- (3) Part No.
- (4) Tapping No.

Quantity: 30 Pcs / Tray

90 Pcs / Box