

**800A, Shunt current module****VGB00-800VN-050****REVERSION HISTORY:**

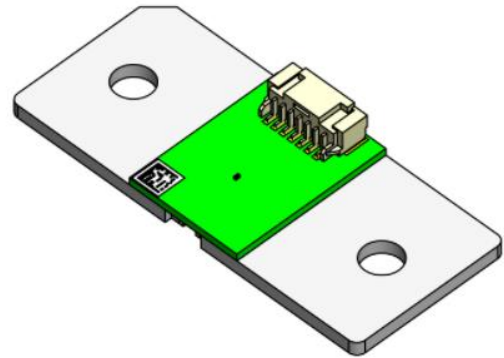
Date	Revision	Changes	
2021.09.23	A0	Initial released for preliminary datasheet	RENEE.CHEN
2021.11.30	A1	1. PCB width is changed from 22mm to 26mm 2. QR code to Data-matrix	RENEE.CHEN
2021.12.15	A2	1. Original: Label Size: 5 x 5 x 0.1 mm(ref), Data-matrix Size: 4mm x 4mm(ref) Update: Label Size: 7 x 7 x 0.1 mm(ref), Data-matrix Size: 5mm x 5mm(ref)	RENEE.CHEN
2022.01.18	A3	1. Change the description on page1 2. Update the drawing 3. Label QR code to data-matrix PCB Laser marking 4. Add "Type Designation" 5. Add "Packing"	RENEE.CHEN
2022.03.03	A4	1. Change the Schematic on page1 2. update drawing 3. update data-matrix Schematic	RENEE.CHEN
2022.05.06	A5	1. Recommended screw size is changed from M8 to M6 2. change "Shunt Temperature Compensation Function" figure 3. Add Packing tray drawing	RENEE.CHEN
2022.06.16	A6	1. Add SHUNT spec 2. Delete Connector mate PN: 505151-0701	Renee.Chen
2022.07.08	A7	Put TCR ABC parameters	Renee.Chen
2022.08.12	A8	Change Low thermal EMF from 3 μ V/ $^{\circ}$ C to 1 μ V/ $^{\circ}$ C	Renee.Chen
2023.3.6	A8	Delete (Preliminary specification)	vivian
2023.04.14	A9	Add Shunt item G in the drawing	RihYang Huang
2023.04.21	B0	Add definition redundant voltage sense pair	RihYang Huang
2023.10.31	B1	Update the electric performance 1. Low inductance < 3nH 2. Low thermal EMF (< 0.6 μ V/ $^{\circ}$ C)	Renee.Chen

FEATURES:

- Nominal Current Up to 800A
- High pulse current rating
- Low inductance (< 3nH)
- Low thermal EMF (< 0.6μV/°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	800A
Resistance value	25μΩ
Temperature coefficient of resistance(25°C/125°C)	± 100 ppm/°C
Storage and Operating Temperature*NOTE1	-40~125°C
Resistance tolerance*NOTE2	± 5%
Redundant resistance tolerance*NOTE3	± 0.8%

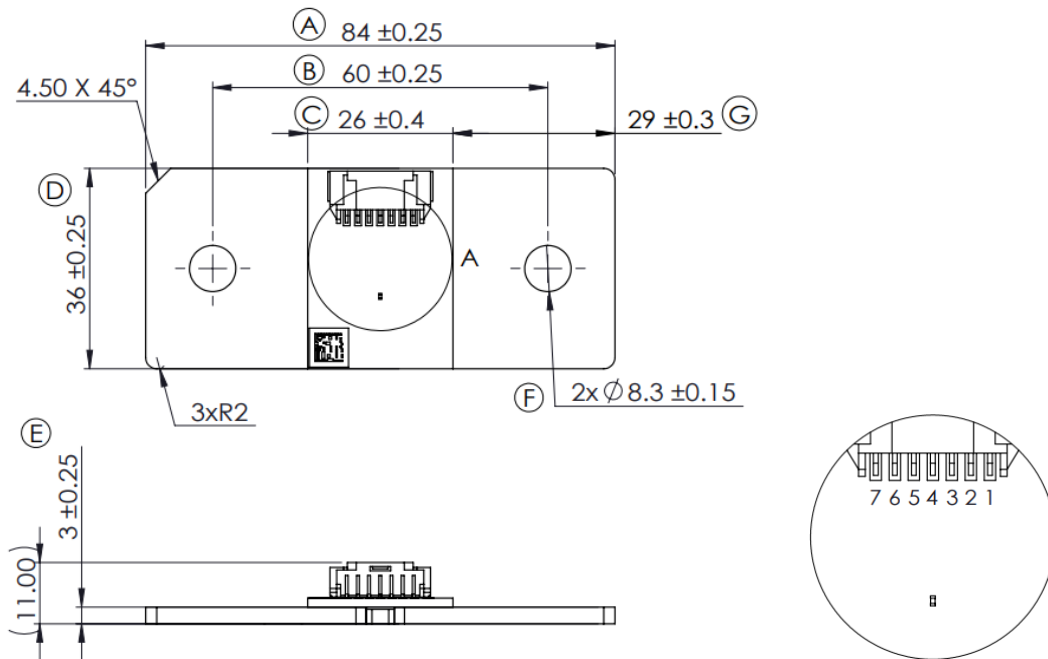
*Note1: Operating temperature means that NTC temperature need to be between -40°C to 125°C.

*Note2: Definition of resistance tolerance is measuring between PIN 3 and PIN 4.

*Note3: The resistance differences between PIN3-4 and PIN2-5 is ±0.8%. ($\Delta R = (R_{PIN2-5}/R_{PIN34} - 1) * 100\%$)

OUTLINE DRAWING:
Dimension

Unit: mm



Component	Manufacturer	Part No.	Pin Definition
Connector	MOLEX	502352-0700	1: TEMP_P 2: SHUNT_0_P 3: SHUNT_1_P 4: SHUNT_1_N 5: SHUNT_0_N 6: TEMP_N 7: Shunt_GND
Thermistor	Thinking	TSM0C103F34D1R	

*Connector Mates Part(s): 560123-0700

Type Designation :

VGB 00 - 800 VN - 050

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

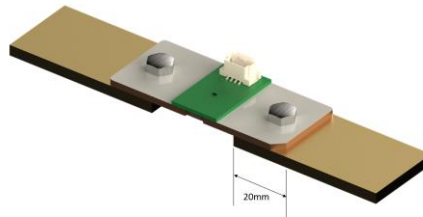
Note :

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

Bus bar Connection:

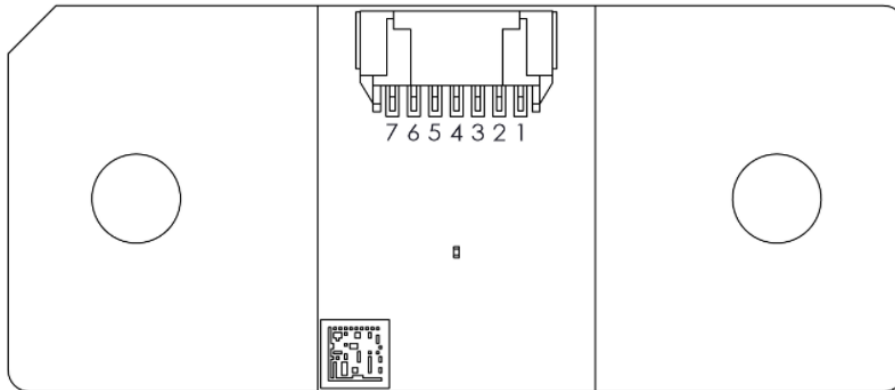
There are a few recommendations for a good connection.

- Use screws with a size of 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 : 7mm x 7mm (ref.)
2. Data-matrix dimension : 5mm x 5mm (ref.)

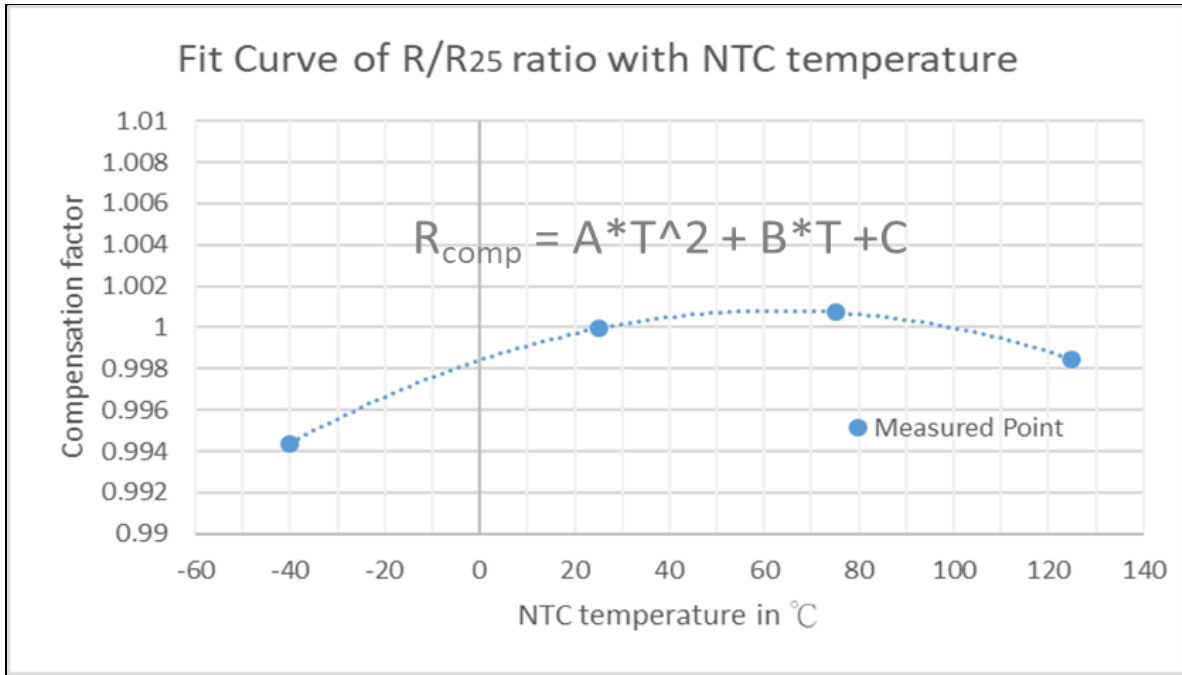


3. Data-matrix information for reference :

	Year	Month	Day	Module ID	Resistance R ₂₅ *	Quadratic coefficient	First-order coefficient	Constant term
Form	YYYY	MM	DD	XXXXX	Rxxxxxn	±x.xxxxxxxxx	±x.xxxxxxxxx	±x.xxxxxxxxx
Example	2020	11	25	00001	R25123n	-0.000000607	+0.000076355	+0.998410031
2020112500001R25123n-0.000000607+0.000076355+0.998410031*Note4								

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

*Note4: Total Characters are 56.

Shunt Temperature Compensation Function:


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

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

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 -0.000000607*.

B is first-order coefficient, the default value is +0.000076355*.

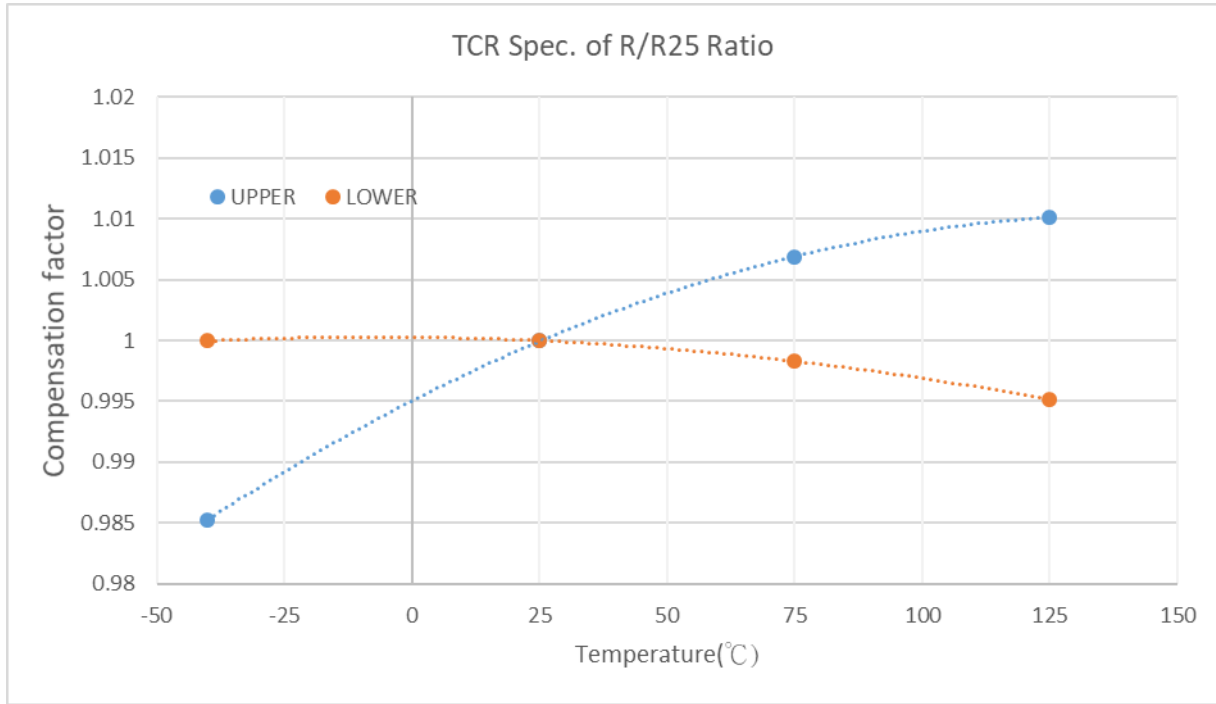
C: constant term coefficient, the default value is +0.998410031*.

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

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

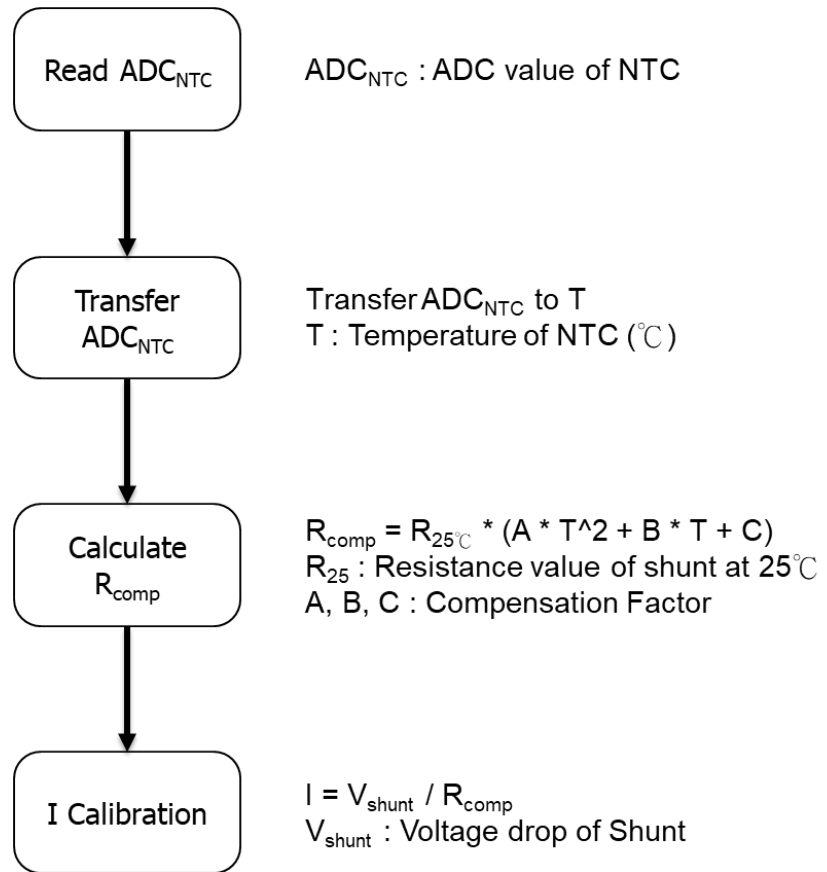
*Value is for reference only.

Shunt Temperature Compensation Specification:



The specification of compensation factor as below table:

Temperature(°C)	Upper Limit	Lower Limit
-40	0.9852	0.9999
25	1	1
75	1.0068	0.9982
125	1.0101	0.9951

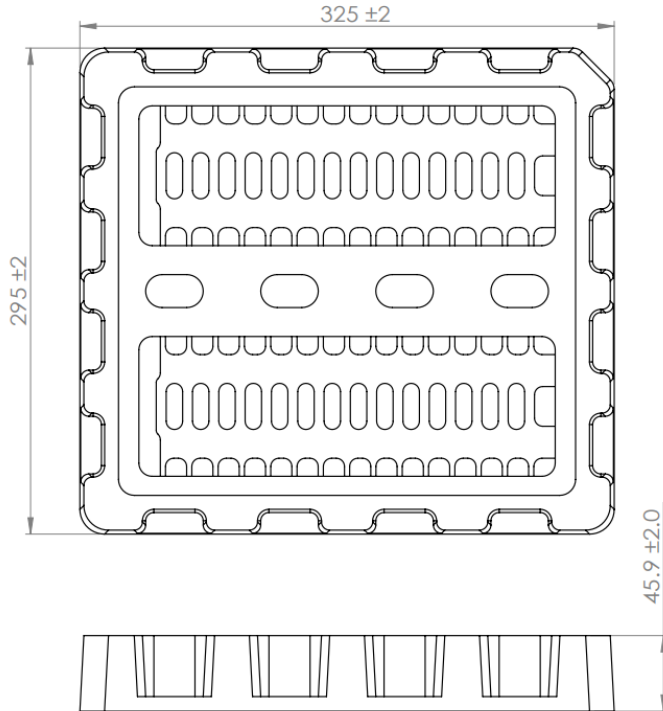
Compensated Flow:

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

60 Pcs / Box