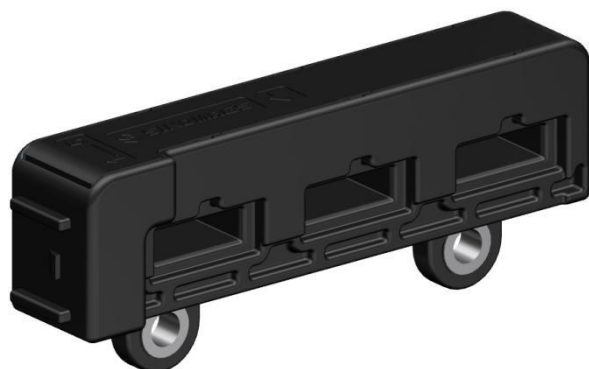


Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-TA-600-S2

Version: Ver 1.2.4



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1. Description

The SHK-VBS-TA current sensor is based on Hall and open-loop design. It is suitable for DC, AC pulsed and any kind of irregular current measurement under the isolated conditions.

Typical applications

- Electrical Power Steering
- Converters
- Motor drive application
- Battery Management

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_a	°C	-40 ~ 150
Storage temperature	T_{stg}	°C	-40 ~ 150
Mass	m	g	60

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	V_{cc}	V	-0.3 ~ 10 (Not operating)
			6.5
Electrostatic discharge voltage	U_{ESD}	kV	8 (HBM)

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.

Isolation parameter

Parameter	Symbol	Unit	Value	Comment
Insulation voltage	U_d	kV	2.5	RMS voltage for AC test 50Hz/1 min
Insulation resistance	R_{is}	MΩ	500	DC 1kV/1 min
Clearance distance (pri. -sec)	d_{Cl}	mm	8.0	Shortest distance through air
Creepage distance (pri. -sec)	d_{Cp}	mm	8.0	Shortest path along device body
Comparative tracking index	CTI		PLC 3	
Case material			V0 according to UL 94	

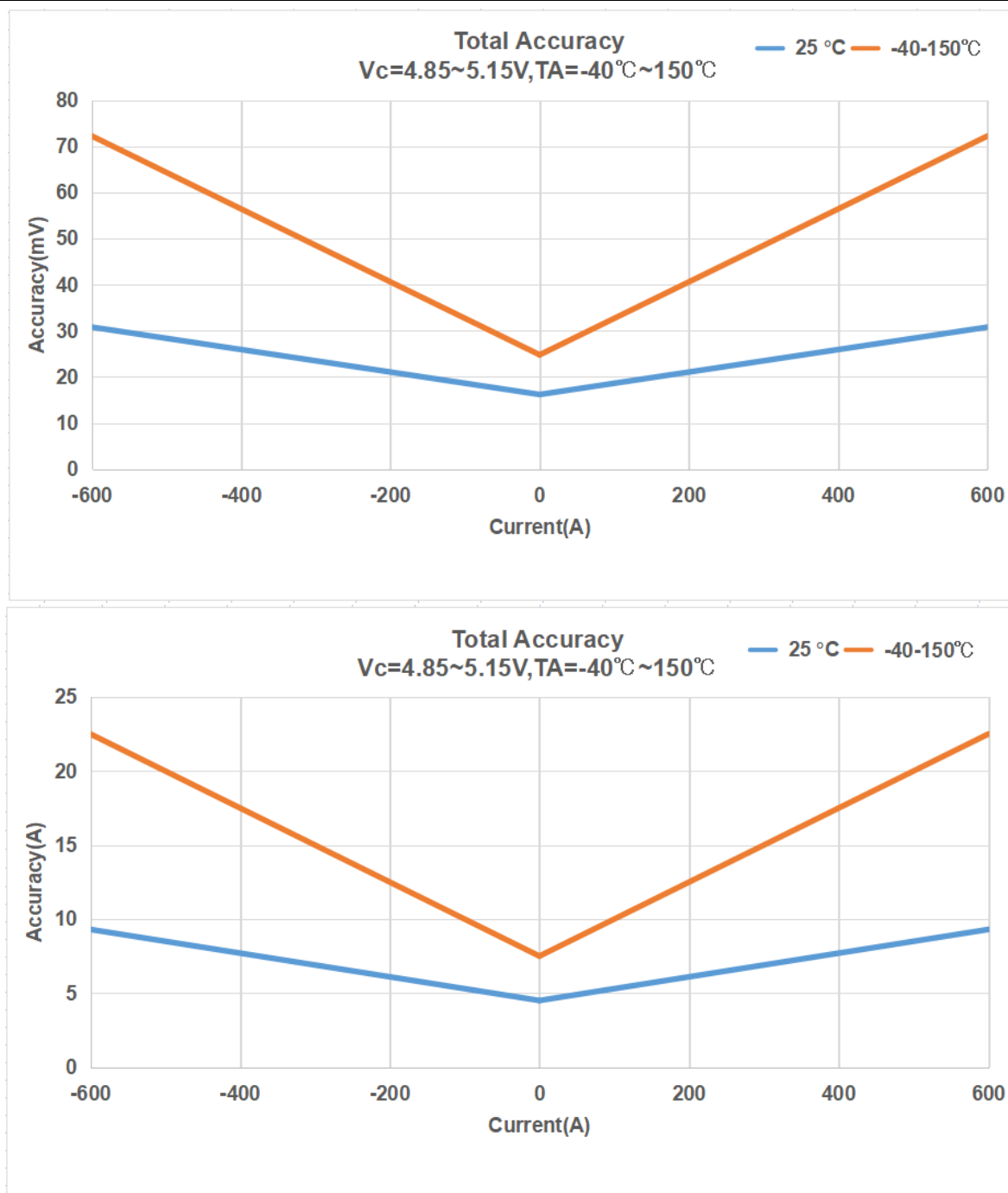
Selection Guide

Product	Nominal current	Measuring range
SHK-VBS-TA-600-S2	600 A	600 A

2. Electrical data

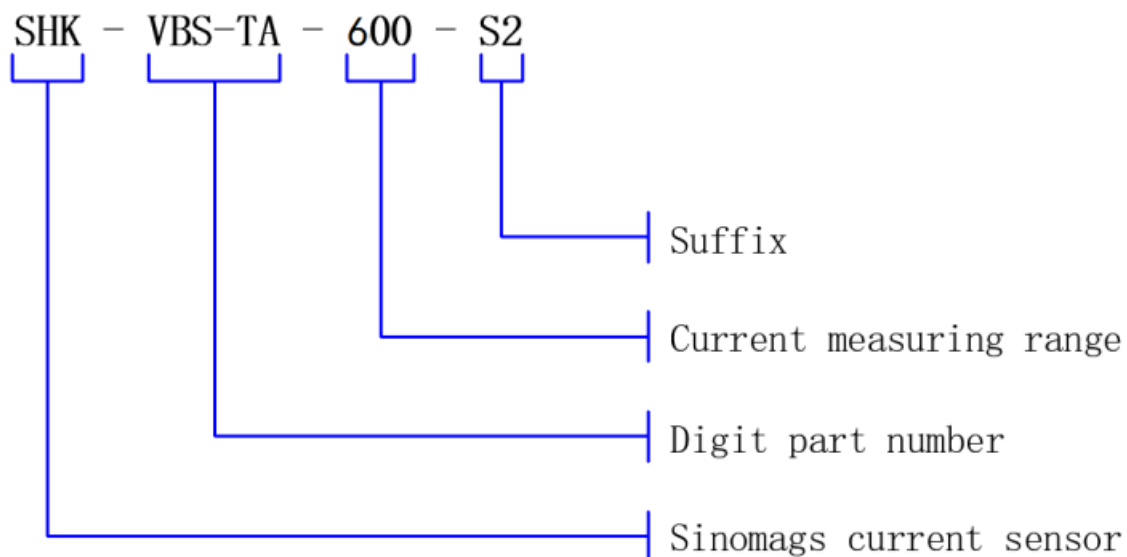
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary current measuring range	I_{PM}	A	-600		600	SHK-VBS-TA-600-S2
Supply voltage	V_{CC}	V	4.75		5.25	
Current consumption	I_{CC}	mA		39	45	@ $V_{CC} = 5.0\text{ V}$
Output voltage	V_{OUT}	V	$(V_{CC}/5) \times (V_{off} + G \times I_{PM})$			@ $T_a = 25^\circ\text{C}$
Quiescent voltage	V_{off}	V	2.49	2.5	2.51	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Sensitivity	G	mV/A		3.333		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Load resistance	R_L	k Ω	10		100	
Ratiometricity error	ϵ_r	%	-0.5		0.5	@ $4.85\text{V} \leq V_{CC} \leq 5.15\text{V}$
Sensitivity error	ϵ_G	%	-0.75		0.75	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	V_{OM}	mV	-3	± 2	3	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, after $\pm I_{PM}$
Ave. Temp. coefficient of V_{OE}	TCV_{OEAV}	mV/ $^\circ\text{C}$	-0.15	± 0.05	0.15	@ $-40^\circ\text{C} \leq T_a \leq 150^\circ\text{C}$
Ave. Temp. coefficient of G	TCG_{AV}	%/ $^\circ\text{C}$	-0.025	± 0.01	0.025	@ $-40^\circ\text{C} \leq T_a \leq 150^\circ\text{C}$
Linearity	ϵ_L	%	-0.75	± 0.35	0.75	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, $I = I_{PM}$
Response time	T_r	μs		2	5	@ 90% of I_{PM}
Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	V_{no}	mVpp		20		@ DC ~ 10 kHz
Power on delay	T_{POD}	ms			1	

Total error(mV) for $\leq 600\text{A}$

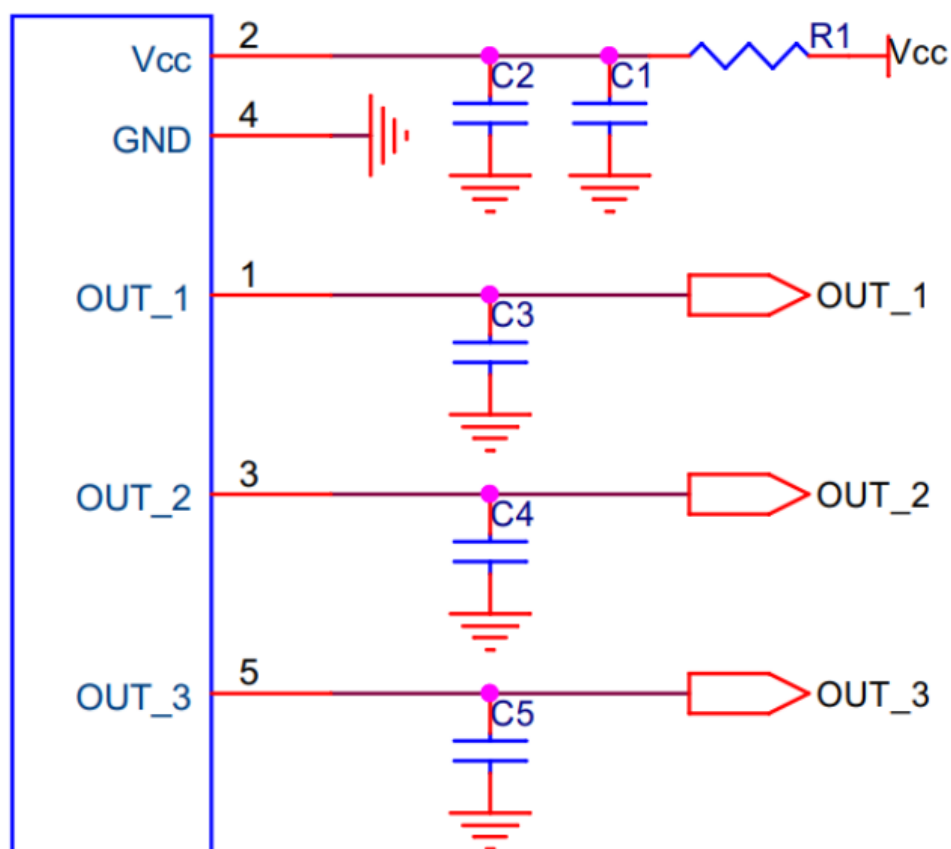


Accuracy	Specification			Unit	Note	Accuracy	Specification			Unit	Note
	-600A	0A	600A				-600A	0A	600A		
25°C	31.0	15.0	31.0	mv		25°C	9.3	4.5	9.3	A	
-40°C~125°C	63.0	23.0	63.0	mv		-40°C~125°C	18.9	6.9	18.9	A	
-40°C~150°C	75.0	25.0	75.0	mv		-40°C~150°C	22.5	7.5	22.5	A	

3. Product definition statement



4. Electrical circuit diagram



5. Dimension & Pin definitions

Top View Dimensions:

- Overall Length: 79.7
- Pin Pitch: 10
- Pin Width: 15.9
- Mounting Hole Diameter: $\phi 4.3^{+0.2}_{-0}$
- Section A-A: 11, 10.8 ± 0.2 , 11, 12.1 ± 0.1
- Section B-B: 11.1, 20.75, 5.0 ± 0.2 , 4, 2-12.5 ± 0.2 , 2-3.0 ± 0.2 , 7.9, 6.4 ± 0.2 , 3.2
- Detail C*: $\phi 4.3^{+0.2}_{-0}$
- Detail D*: 0.2 ± 0.1 , 0.2

Bottom View Dimensions:

- Overall Length: 78.1
- Pin Pitch: 10
- Pin Width: 13.7
- Mounting Hole Diameter: $\phi 4.3^{+0.2}_{-0}$
- Section A-A: 11, 10.8 ± 0.2 , 11, 12.1 ± 0.1
- Section B-B: 11.1, 20.75, 5.0 ± 0.2 , 4, 2-12.5 ± 0.2 , 2-3.0 ± 0.2 , 7.9, 6.4 ± 0.2 , 3.2
- Detail C*: $\phi 4.3^{+0.2}_{-0}$
- Detail D*: 0.2 ± 0.1 , 0.2

Cross-Sectional Views:

- SECTION 1: Shows the profile of the component with dimensions 13.3, 10, 13.7.
- SECTION 2: Shows the internal structure with dimensions 10.8 ± 0.2 , 0.7 ± 0.2 , R0.3, 3-16.4, 3-16.4, 76.7 ± 0.1 .
- SECTION 3: Shows the internal structure with dimensions 10.8 ± 0.2 , 0.7 ± 0.2 , R0.3, 3-16.4, 3-16.4, 76.7 ± 0.1 .

Notes:

- Refers to 3D.
- The burrs and edges should not exceed 0.35mm.
- The following projects need to be decided together with technology:
 - Split position.
 - gate position.
 - locating pin position.
 - bending
- As an official drawing, this image can be referred to in electronic format.
- Quality reference to Japanese Elexis.
- Perform full-scale inspection. (Each batch, N: 5).
- Metal parts cannot have resin.
- Cleanliness requirements: Refer to the regulations in document 1-R94SUN-6L8.
- Pre embedded injection molding of steel sleeve.
- When there is residue on the metal surface, the oil should be degreased.
- The parameters and components of the materials used should be labeled.
- M4, does not detach or idle under a torque of 3N·m.
- The material complies with UL94V-0, RoHS requirements, and REACH requirements.
- The material has reached CTI3 level.
- PIN pin made of brass, with a minimum nickel base of 30 u "and a minimum gold plating of 1 u" on the surface.

Material Requirements:

- Collar: M4
- Adhesive: 703 Black gel

6. Environmental test

Name	Test condition
Environmental tests, electrical tests	
Humidity test	85℃/85%,1000hr
Thermal shock	-40℃/125℃, 1000cycles
High temperature test	125℃, 1000hr
Low temperature test	-40℃, 1000hr
Insulation voltage	2.5kV, 50Hz, 1min
Insulation resistance	DC500V, 1min
Mechanical tests	
Shocks	ISO16750-3
Vibration test	ISO16750-3
EMC tests	
Electrostatic discharges	ISO10605(07/2008)
Bulk current injection	ISO11452-4(12/2011)
Immunity to Radiated disturbances	ISO11452-2(11/2004), ALSE
Emission radiated	CISPR25(03/2008), ALSE
Immunity power line magnetic fields	ISO11452-8(06/2015)

7. Important notice

This datasheet and any information contained therein may not be reproduced in whole or in part without the prior permission from Sinomags. The content of this information may be changed without notice for purposes such as improvement. Make sure you have the latest information when using the current sensor.