

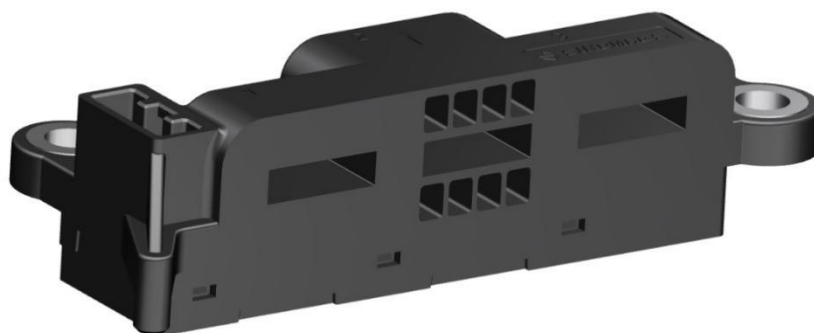
# Current Sensor

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Product Series: SHK-VBS-TB

Part number: SHK-VBS-TB-250-S2

Version: Ver 1.5



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## 1. Description

The SHK-VBS-TB 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 ~ 125
Storage temperature	$T_{stg}$	°C	-40 ~ 125
Mass	m	g	56

### Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	Vcc	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		PLC3	
Case material			V0 according to UL 94	

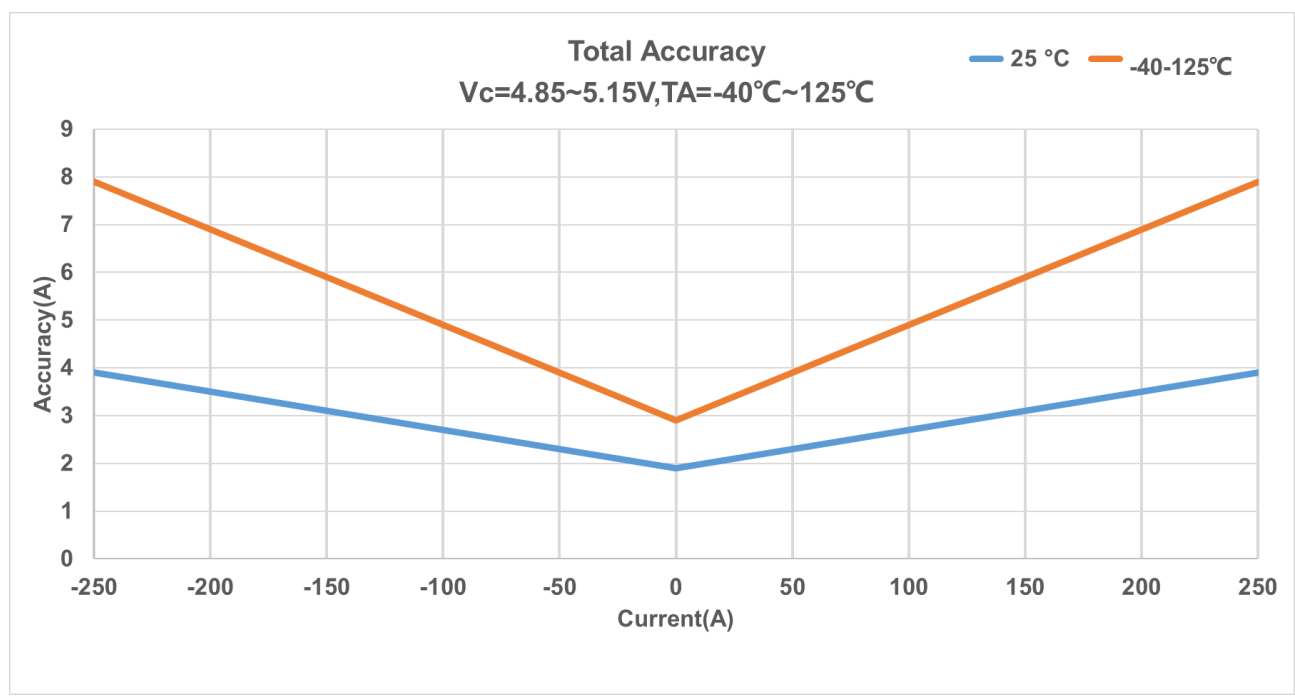
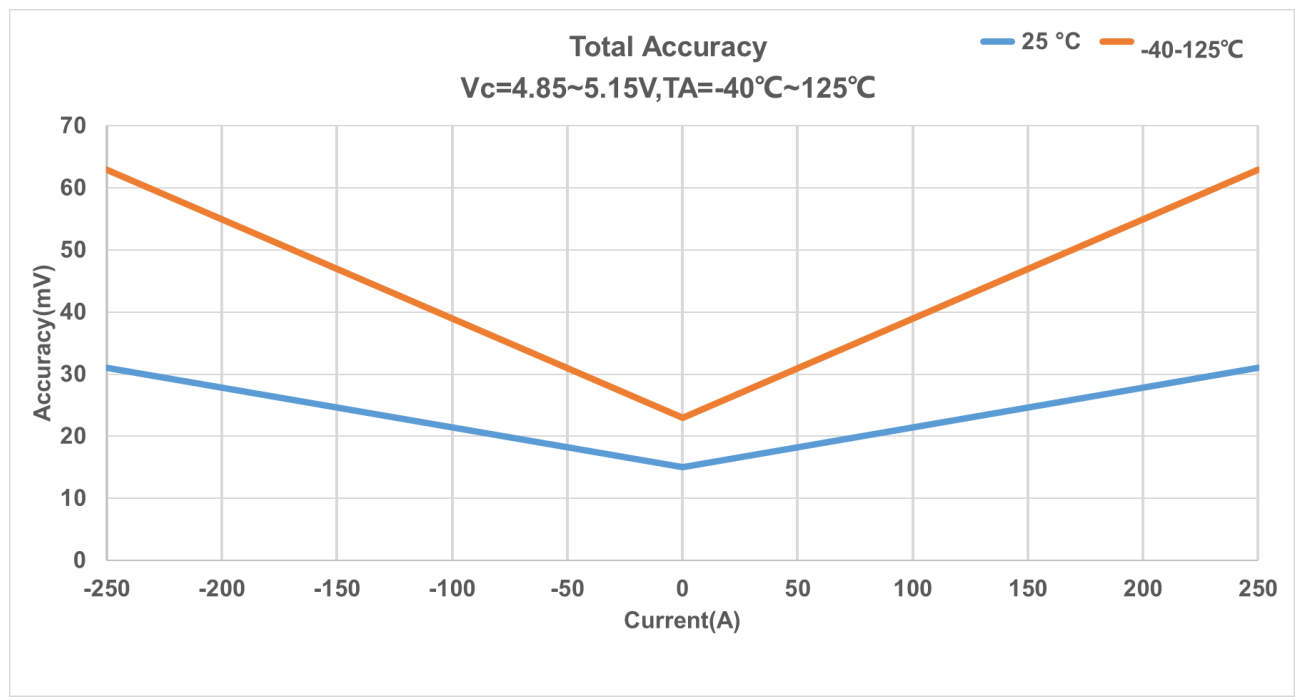
### Selection Guide

Product	Nominal current	Measuring range
SHK-VBS-TB-250-S2	250 A	250 A

## 2. Electrical data

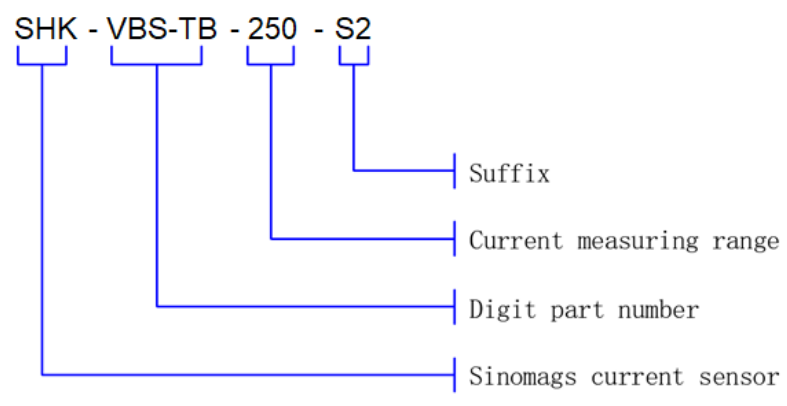
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary current measuring range	$I_{PM}$	A	-250		250	SHK-VBS-TB-250-S2
Supply voltage	$V_{CC}$	V	4.85	5	5.15	
Current consumption	$I_{CC}$	mA		39	45	@ $V_{CC} = 5.0\text{ V}$
Output voltage	$V_{OUT}$	V	$(V_{CC}/5) \times (V_{off} + G \times I_{PM})$			@ $T_a = 25^\circ\text{C}$
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		8		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Load resistance	$R_L$	k $\Omega$	10		100	
Ratiometricity error	$\epsilon_r$	%	-0.5		0.5	@ $4.85\text{ V} \leq V_{CC} \leq 5.15\text{ V}$
Sensitivity error	$\epsilon_G$	%	-0.75		0.75	@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	$V_{OM}$	mV	-3	$\pm 2$	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	$\pm 0.05$	0.15	@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of G	$TCG_{AV}$	%/ $^\circ\text{C}$	-0.025	$\pm 0.01$	0.025	@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Linearity	$\epsilon_L$	%	-0.75	$\pm 0.35$	0.75	@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , $I = I_{PM}$
Response time	$T_r$	$\mu\text{s}$		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  $\leq 250A$

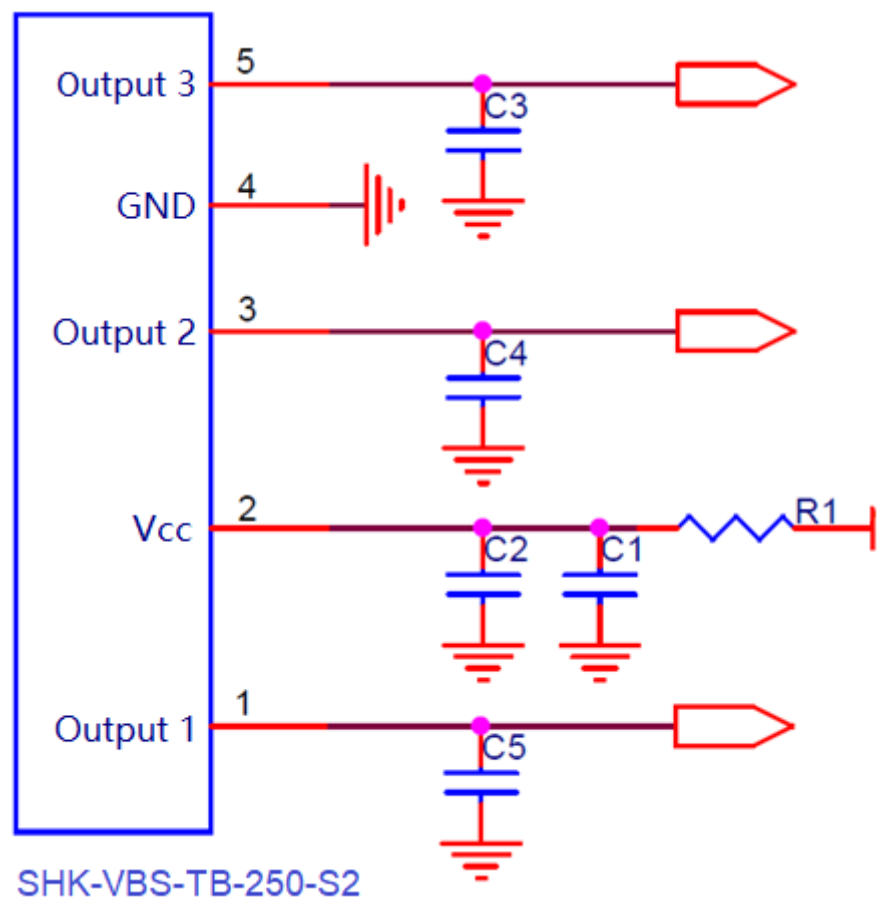


Accuracy	Specification			Unit	Note	Accuracy	Specification			Unit	Note
	-250A	0A	250A				-250A	0A	250A		
25°C	31	15	31	mv		25°C	3.9	1.9	3.9	A	
-40°C~125°C	63	23	63	mv		-40°C~125°C	7.9	2.9	7.9	A	

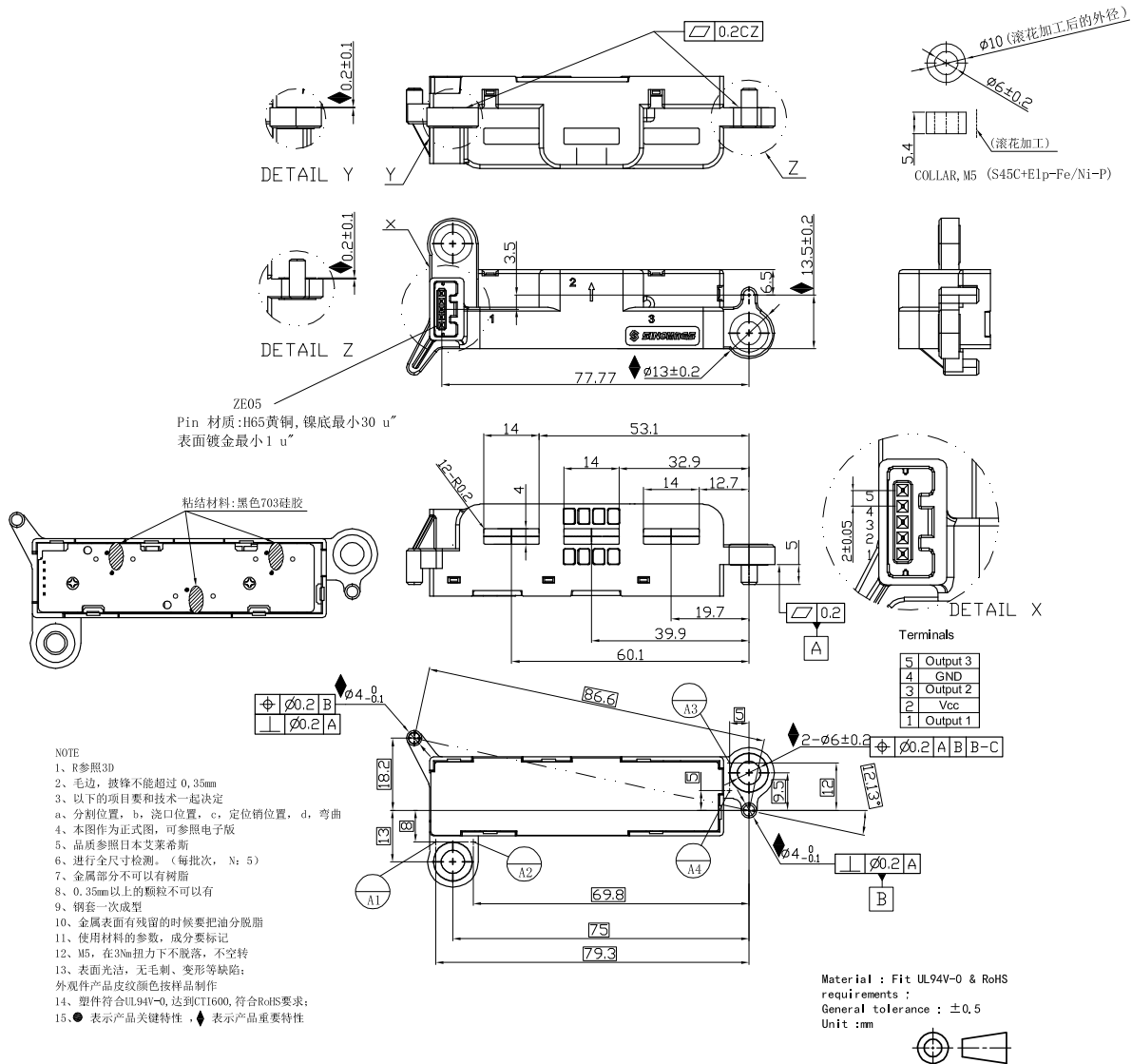
### 3. Product definition statement



### 4. Electrical circuit diagram



### 5. Dimension & Pin definitions



## 6. Environmental test

Name	Test condition
Environmental tests, electrical tests	
Humidity test	85°C/85%,1000hr
Thermal shock	-40°C/125°C, 1000cycles
High temperature test	125°C, 1000hr
Low temperature test	-40°C, 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

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