

Current Sensor

Product Series: SHK-VBS-TB

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

Version: Ver 1.6



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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	

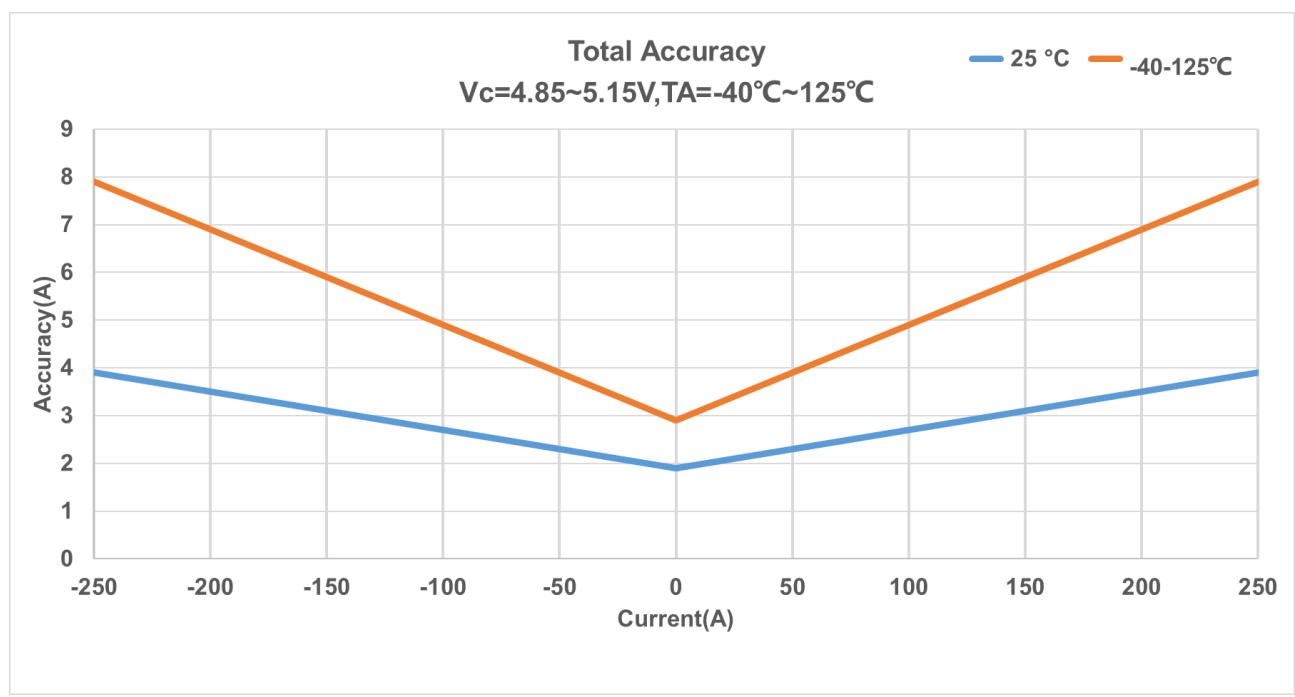
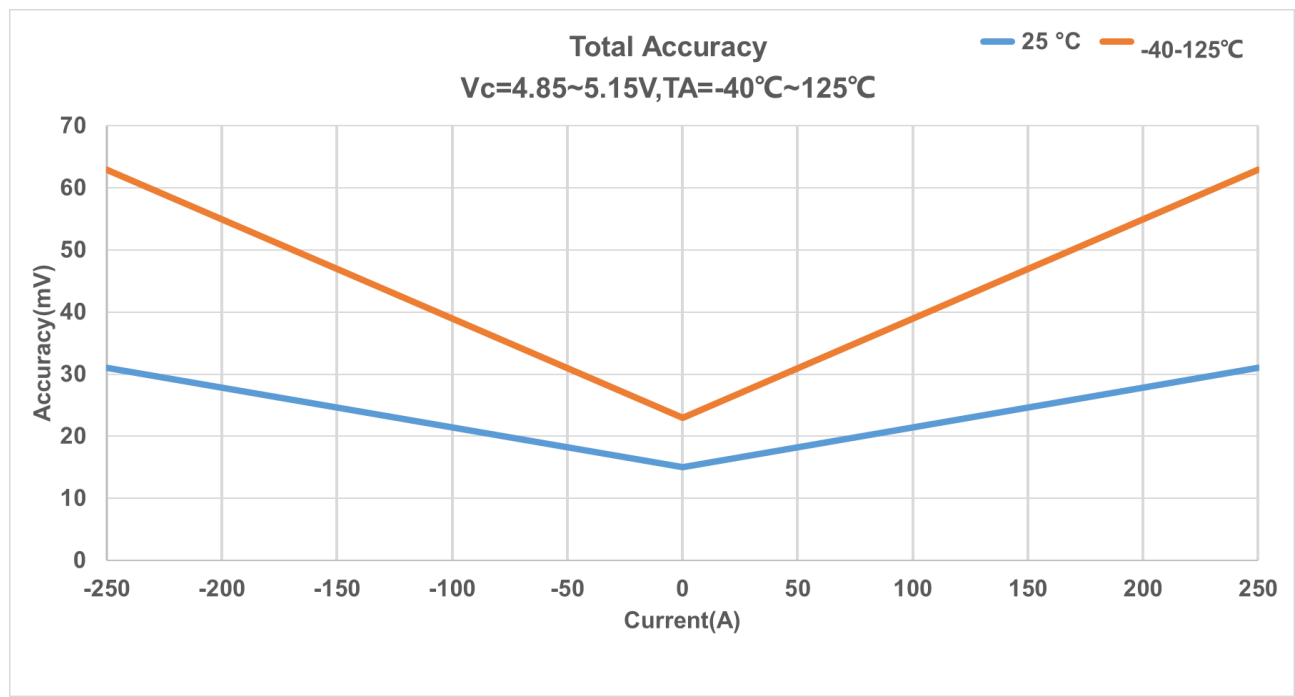
Selection Guide

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

2. Electrical data

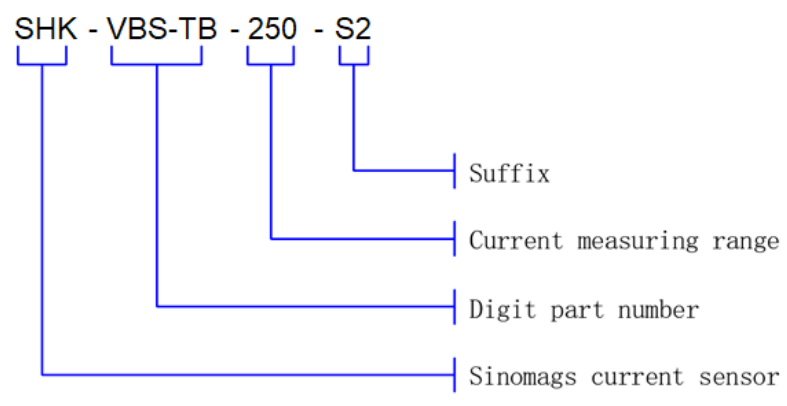
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary current measuring range	I_{PM}	A	-250		250	SHK-VBS-TB-250-S2
Supply voltage	V_{CC}	V	4.85	5	5.15	
Current consumption	I_{CC}	mA		39	45	@ $V_{CC} = 5.0\text{ V}$
Output voltage	V_{OUT}	V	$(V_{CC}/5) \times (V_{off} + G \times I_{PM})$			@ $T_a = 25^\circ\text{C}$
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 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	@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of G	TCG_{AV}	%/ $^\circ\text{C}$	-0.025	± 0.01	0.025	@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
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 $\leq 250A$

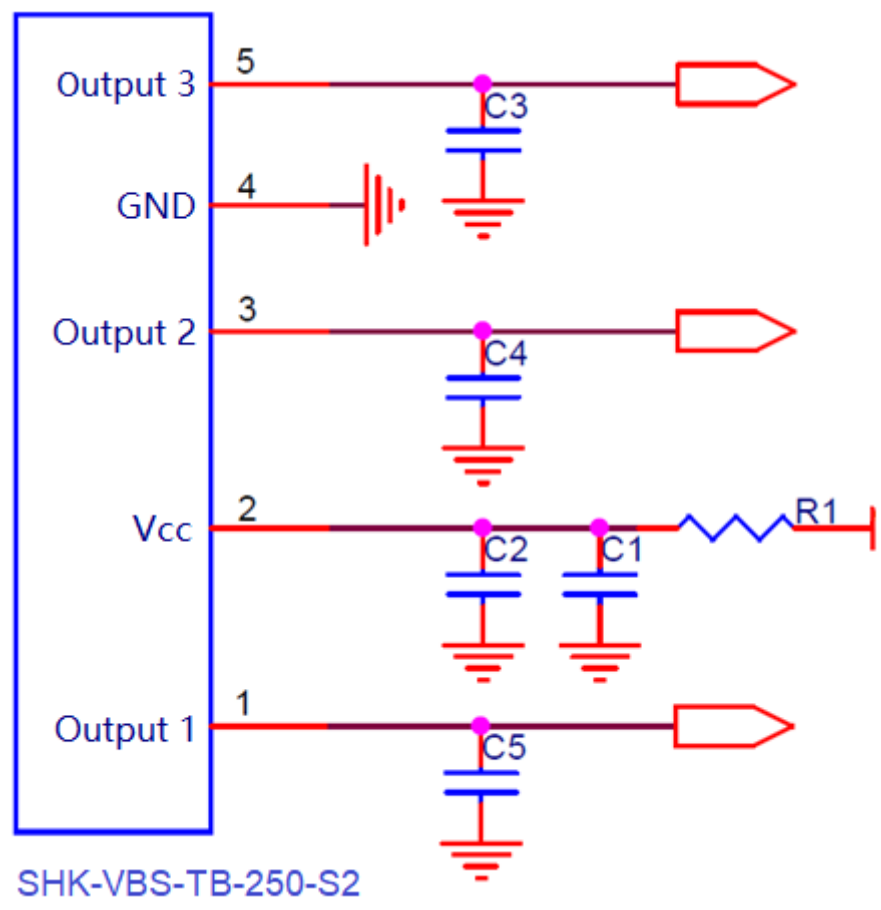


Accuracy	Specification			Unit	Note	Accuracy	Specification			Unit	Note
	-250A	0A	250A				-250A	0A	250A		
25°C	31	15	31	mv		25°C	3.9	1.9	3.9	A	
-40°C~125°C	63	23	63	mv		-40°C~125°C	7.9	2.9	7.9	A	

3. Product definition statement



4. Electrical circuit diagram



5. Dimension & Pin definitions

Dimension reference		Class P Metal Stamp	Class M Resin Molding	Class D Die-casting	Angle	R/C Radius, Chamfering	Design	Draw	Check	Approval	Signature	Date	SHK-VBS-TB-XXX-S2		Drawing No.
More than	Up to												Quantity	Proportion	Edition
—	0.5	±0.1	±0.1	±0.1		±0.1	△								A1
0.5	3	±0.1	±0.1	±0.1		±0.5									
3	10	±0.3	±0.2	±0.2	±3°	±1.0									
10	50	±0.5	±0.3	±0.4											
50	100	±0.7	±0.4	±0.6											
100	200	±1.0	±0.7	±0.8											
200	400	±1.0	±1.2	±1.2			±5.0								
400	1000	±1.5	±1.6	±1.6											

GENERAL TOLERANCES

1. The parameters of the materials used and the composition should be marked.

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20. The parameters of the materials used and the composition should be marked.

Pin :065 , nickel plating 30 u², surface gold plating 1 u²

BLACK PPS/Z-650-02

Terminals

1	Output 3
2	Output 2
3	Vcc
4	Output 1

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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