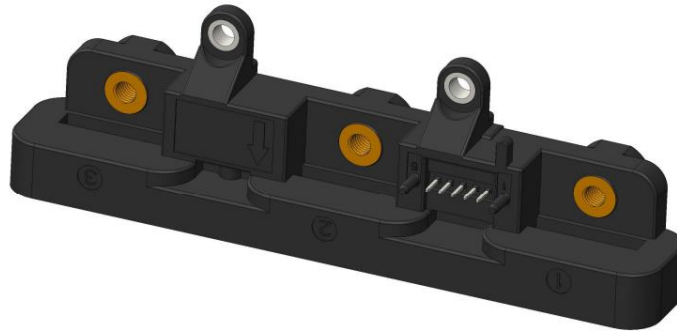


Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-TM-400-S5
SHK-VBS-TM-700-S5
SHK-VBS-TM-900-S5
SHK-VBS-TM-1000-S5
SHK-VBS-TM-1200-S5

Version: Ver 1.3



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1. Description

The SHK-VBS-T 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	100

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.

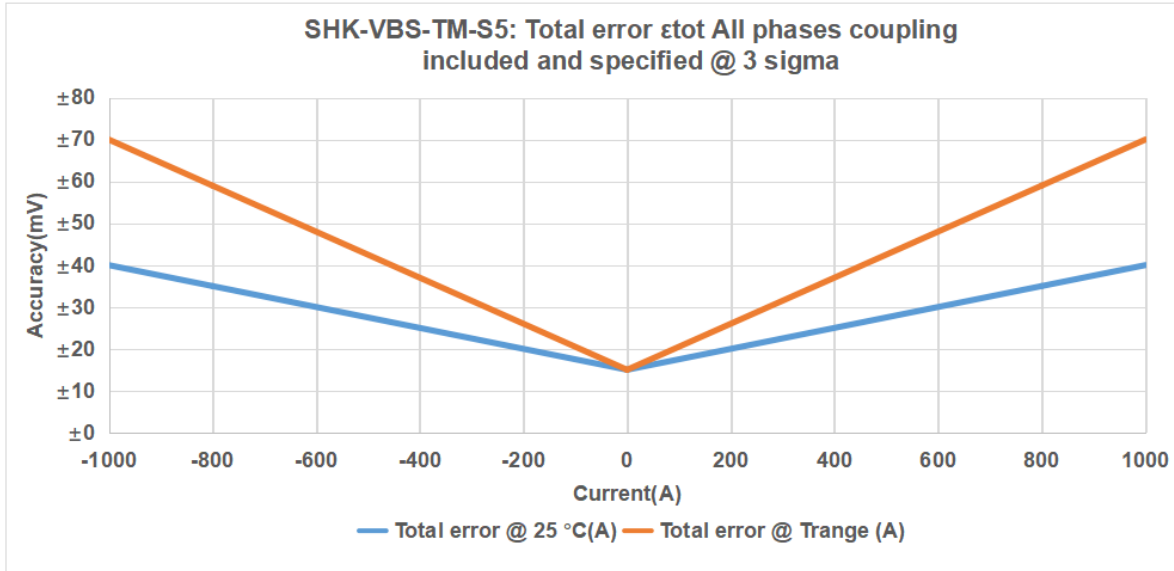
Isolation parameter

Parameter	Symbol	Unit	Value	Comment
Insulation voltage	U_d	kV	2.8	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	10	Shortest distance through air
Creepage distance (pri. -sec)	d_{Cp}	mm	10	Shortest path along device body
Comparative tracking index	CTI	0	600	IEC60112
Case material			V0 according to UL 94	

2. Electrical data

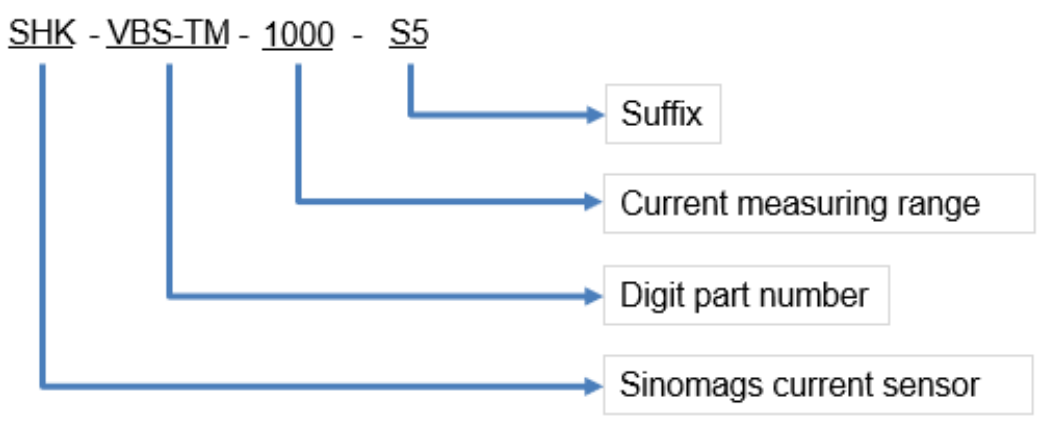
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary current measuring range	I_{PM}	A	-400		400	SHK-VBS-TM-400-S5
			-700		700	SHK-VBS-TM-700-S5
			-900		900	SHK-VBS-TM-900-S5
			-1000		1000	SHK-VBS-TM-1000-S5
			-1200		1200	SHK-VBS-TM-1200-S5
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		45	60	@ $V_{CC} = 5.0\text{ V}$
Output voltage	V_{OUT}	V	$(V_{CC}/5) \times (V_{off} + G \times I_P)$			@ $T_a = 25^\circ\text{C}$
Quiescent voltage	V_{off}	V		2.5		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Sensitivity	G	mV/A		5		SHK-VBS-TM-400-S5
				2.86		SHK-VBS-TM-700-S5
				2.22		SHK-VBS-TM-900-S2
				2.0		SHK-VBS-TM-1000-S2
				1.67		SHK-VBS-TM-1200-S2
Load resistance	R_L	k Ω	10		100	
Ratiometricity error	ϵ_r	%		± 0.5		@ $4.75\text{V} \leq V_{CC} \leq 5.25\text{V}$
Sensitivity error	ϵ_G	%		± 1		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Electrical offset voltage error	V_{OE}	mV	-20	± 10	20	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	V_{OM}	mV		± 5		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, after $\pm I_{PM}$
Ave. Temp. coefficient of V_{OE}	TCV_{OEAV}	mV/ $^\circ\text{C}$		± 0.15		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of G	TCG_{AV}	%/ $^\circ\text{C}$		± 0.03		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Linearity	ϵ_L	%		± 1		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, $-800\text{A} < I_P < 800\text{A}$
				± 3		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, $800\text{A} < I_P < 1000\text{A}$

						-1000A < I _p < -800A
Response time	T _r	μs		2	6	@ 90% of I _{PM}
Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	V _{no}	mVpp		10		@ DC ~ 10 kHz

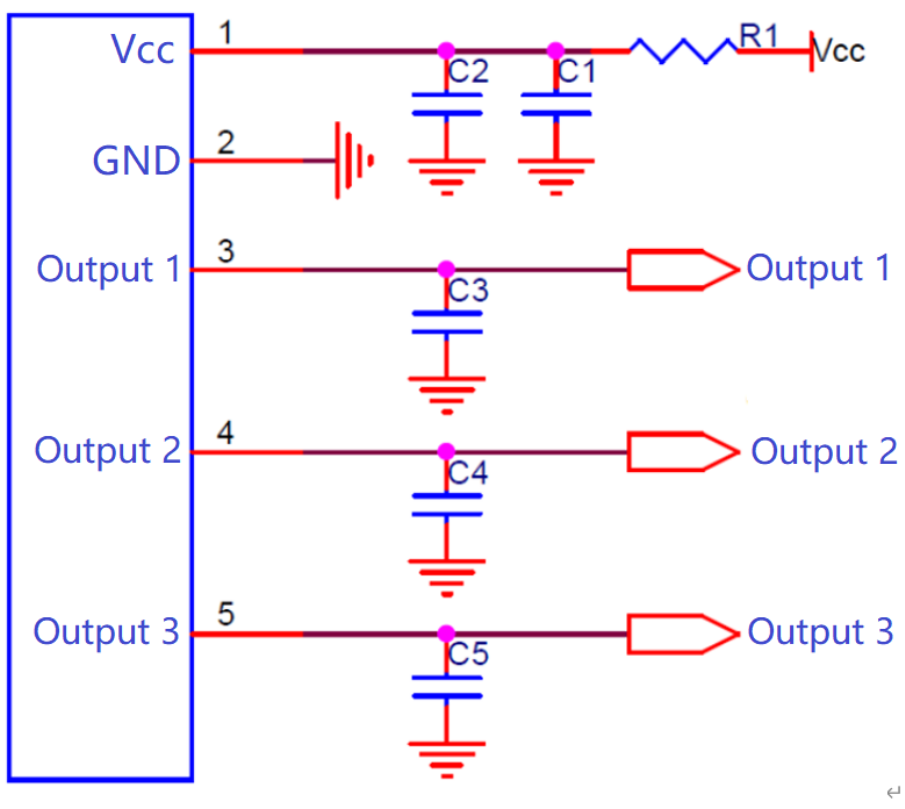


Total error specification				
I _{PM} (A)	@Ta=25°C, VCC=5.0V		@-40°C ≤ Ta ≤ 125°C, VCC=5.0V	
1000	±40mV	±2%	±70mV	±3.5%
800	±35mV	±1.75%	±59mV	±2.95%
0	±15mV	±0.75%	±15mV	±0.75%
-800	±35mV	±1.75%	±59mV	±2.95%
-1000	±40mV	±2%	±70mV	±3.5%

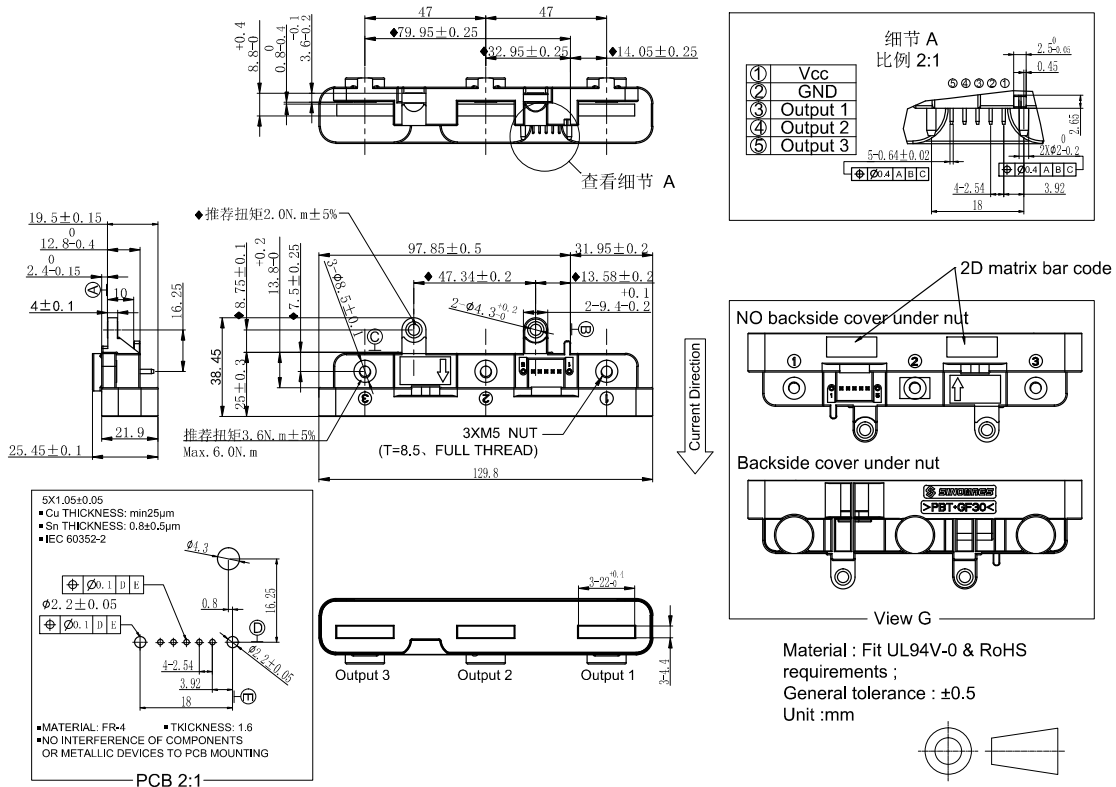
3. Product definition statement



4. Electrical circuit diagram

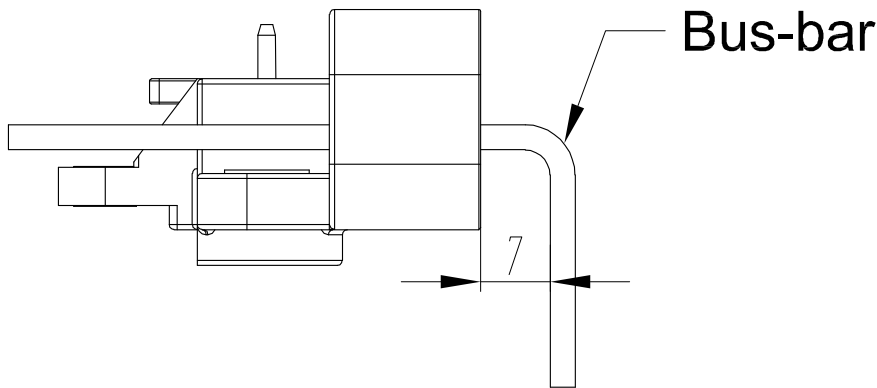


5. Dimension & Pin definitions



Remarks:

- The clearance distance of the product is related to the installation mode of bus-bar .



6. Environmental test

Name	Test condition
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	2.8kV, 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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