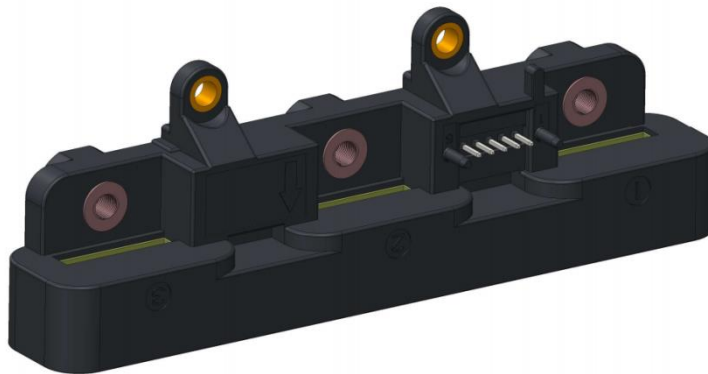


# Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-TM-600-S3  
SHK-VBS-TM-800-S3  
SHK-VBS-TM-900-S3  
SHK-VBS-TM-1000-S3

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	105

### 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	9	Shortest distance through air
Creepage distance (pri. -sec)	$d_{Cp}$	mm	9	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	-600		600	SHK-VBS-TM-600-S3
			-800		800	SHK-VBS-TM-800-S3
			-900		900	SHK-VBS-TM-900-S3
			-1000		1000	SHK-VBS-TM-1000-S3
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		3.33		SHK-VBS-TM-600-S3
				2.5		SHK-VBS-TM-800-S3
				2.22		SHK-VBS-TM-900-S3
				2.0		SHK-VBS-TM-1000-S3
Load resistance	$R_L$	k $\Omega$	10		100	
Ratiometricity error	$\epsilon_r$	%		$\pm 0.5$		@ $4.75\text{ V} \leq V_{CC} \leq 5.25\text{ V}$
Sensitivity error	$\epsilon_G$	%		$\pm 1$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Electrical offset voltage error	$V_{OE}$	mV	-20	$\pm 10$	20	@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	$V_{OM}$	mV		$\pm 5$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , after $\pm I_{PM}$
Ave. Temp. coefficient of $V_{OE}$	$TCV_{OEAV}$	mV/ $^\circ\text{C}$		$\pm 0.15$		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of G	$TCG_{AV}$	%/ $^\circ\text{C}$		$\pm 0.03$		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Linearity	$\epsilon_L$	%		$\pm 1$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , $-800\text{ A} < I_P < 800\text{ A}$
				$\pm 3$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , $800\text{ A} < I_P < 1000\text{ A}$ $-1000\text{ A} < I_P < -800\text{ A}$
Response time	$T_r$	$\mu\text{s}$		2	6	@ 90% of $I_{PM}$

Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	V <sub>no</sub>	mVpp		20		@ DC ~ 10 kHz

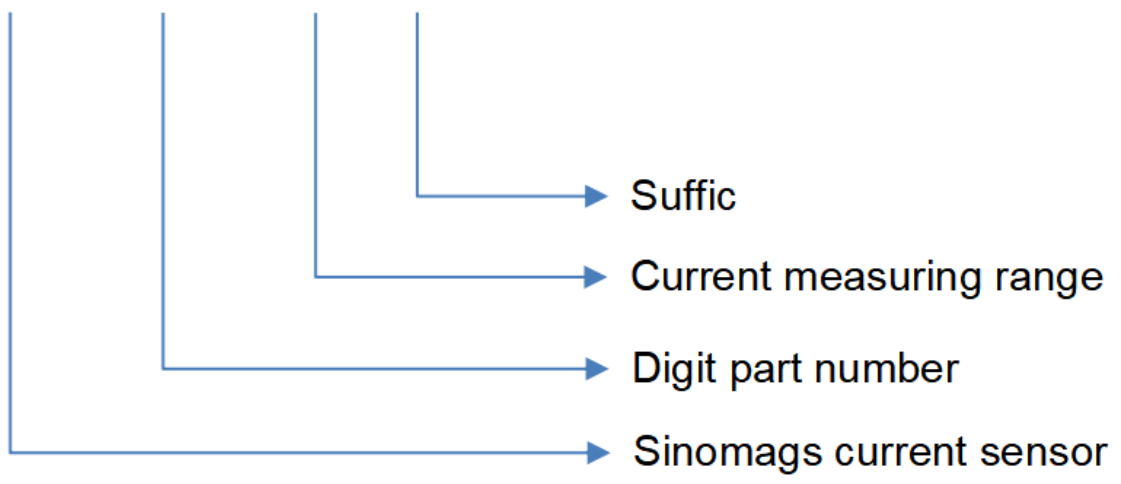
**SHK-VBS-TM-S3: Total error  $\epsilon_{tot}$**



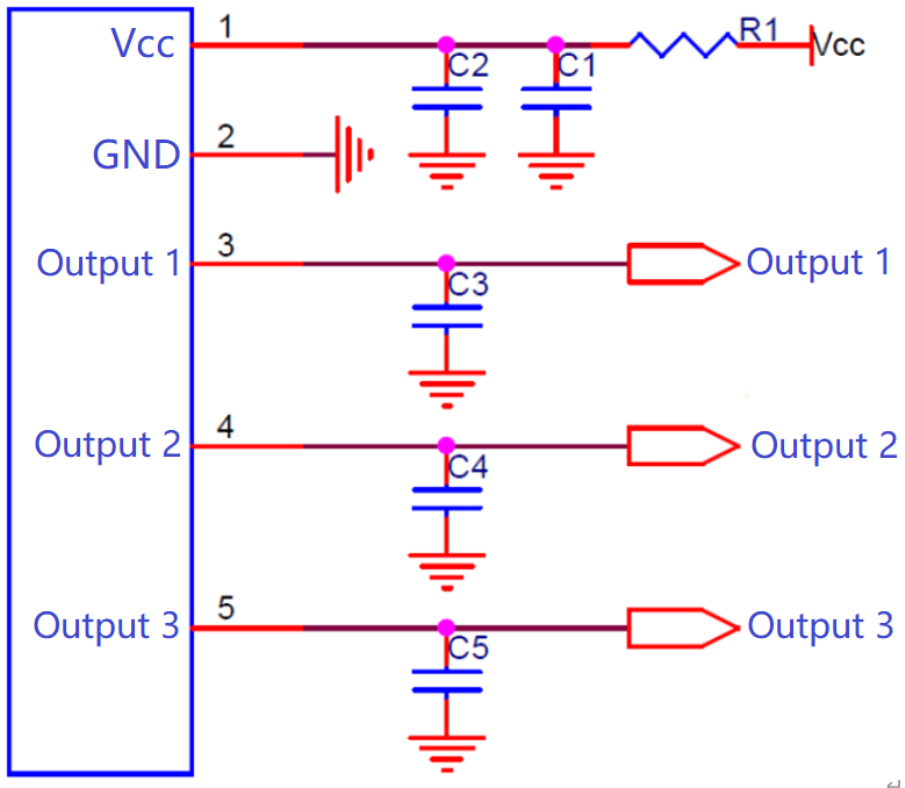
Total error $\epsilon_{tot}$ specification(mV)						
I <sub>PM</sub> (A)	@Ta=25°C, V <sub>cc</sub> =5.0V			@-40°C ≤ Ta ≤ 125°C, V <sub>cc</sub> =5.0V		
-1000	90mv	45A	4.50%	110mv	55A	5.50%
-800	50mv	25A	2.50%	70mv	35A	3.50%
0	20mv	10A	1.00%	30mv	15A	1.50%
800	50mv	25A	2.50%	70mv	35A	3.50%
1000	90mv	45A	4.50%	110mv	55A	5.50%

### 3. Product definition statement

SHK - VBS-TM - 1000 - S3



### 4. Electrical circuit diagram





## 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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