

Current Sensor

Product Series: SHK-VBS-T

Part number: SHK-VBS-T8-300-S3
SHK-VBS-T8-600-S3
SHK-VBS-T8-700-S3
SHK-VBS-T8-800-S3
SHK-VBS-T8-900-S3
SHK-VBS-T8-1000-S3
SHK-VBS-T8-1100-S3
SHK-VBS-T8-1200-S3

Version: Ver 1.2



CONTENT

1.	Description	2
2.	Electrical data	3
3.	Dimension & Pin definitions	6

1. Description

The SHK-VBS-T8-S3 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

- AC Variable speed drives
- Electric welder power supply
- Inverter
- Switched model power supplies (SMPS)

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	-0.5 ~ 8 (Not operating)
			6.5
Electrostatic discharge voltage	$U_{ESD\ HBM}$	kV	2

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_{INS}	MΩ	500	DC 500V, ISO 16750
Clearance distance (pri. -sec)	d_{Cl}	mm	5.08	Shortest distance through air
Creepage distance (pri. -sec)	d_{Cp}	mm	5.08	Shortest path along device body
Comparative tracking index	CTI		PLC 3	
Case material			V0 according to UL 94	

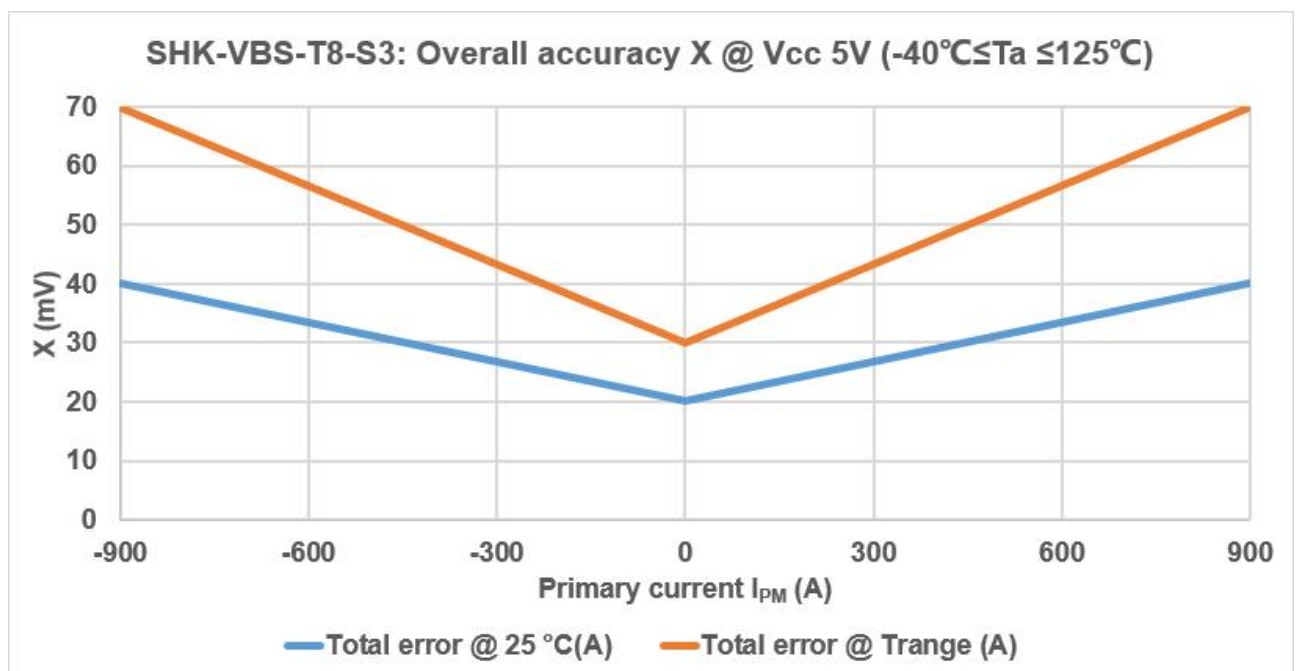
2. Electrical data

 Condition : $T_a = 25^{\circ}\text{C}$, $V_{CC} = 5.0\text{ V}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary current measuring range	I_{PM}	A	-300		300	SHK-VBS-T8-300-S3
			-600		600	SHK-VBS-T8-600-S3
			-700		700	SHK-VBS-T8-700-S3
			-800		800	SHK-VBS-T8-800-S3
			-900		900	SHK-VBS-T8-900-S3
			-1000		1000	SHK-VBS-T8-1000-S3
			-1100		1100	SHK-VBS-T8-1100-S3
			-1200		1200	SHK-VBS-T8-1200-S3
Supply voltage	V_{CC}	V	4.75	5	5.25	All
Current consumption	I_{CC}	mA		45	60	@ $V_{CC} = 5.0\text{ V}$
Output voltage	V_{OUT}	V	$(V_{CC}/5) \times (V_{off} + G \times I_{PM})$			@ $T_a = 25^{\circ}\text{C}$
Quiescent voltage	V_{off}	V		2.5		@ $T_a = 25^{\circ}\text{C}$, $V_{CC} = 5.0\text{ V}$
Sensitivity	G	mV-A		6.67		SHK-VBS-T8-300-S3
				3.33		SHK-VBS-T8-600-S3
				2.86		SHK-VBS-T8-700-S3
				2.50		SHK-VBS-T8-800-S3
				2.22		SHK-VBS-T8-900-S3
				2.00		SHK-VBS-T8-1000-S3
				1.82		SHK-VBS-T8-1100-S3
				1.67		SHK-VBS-T8-1200-S3
Load resistance	R_L	k Ω	10			
Ratiometricity error	ϵ_r	%		± 0.5		@ $4.75\text{ V} \leq V_{CC} \leq 5.25\text{ V}$
Sensitivity error	ϵ_G	%		± 0.5		@ $T_a = 25^{\circ}\text{C}$
				± 1		@ $T_a = 25^{\circ}\text{C}$, After T° Cycles
Electrical offset voltage error	V_{OE}	mV		± 4.0		@ $T_a = 25^{\circ}\text{C}$, $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	V_{OM}	mV	-7.5		7.5	@ $T_a = 25^{\circ}\text{C}$, $V_{CC} = 5.0\text{ V}$

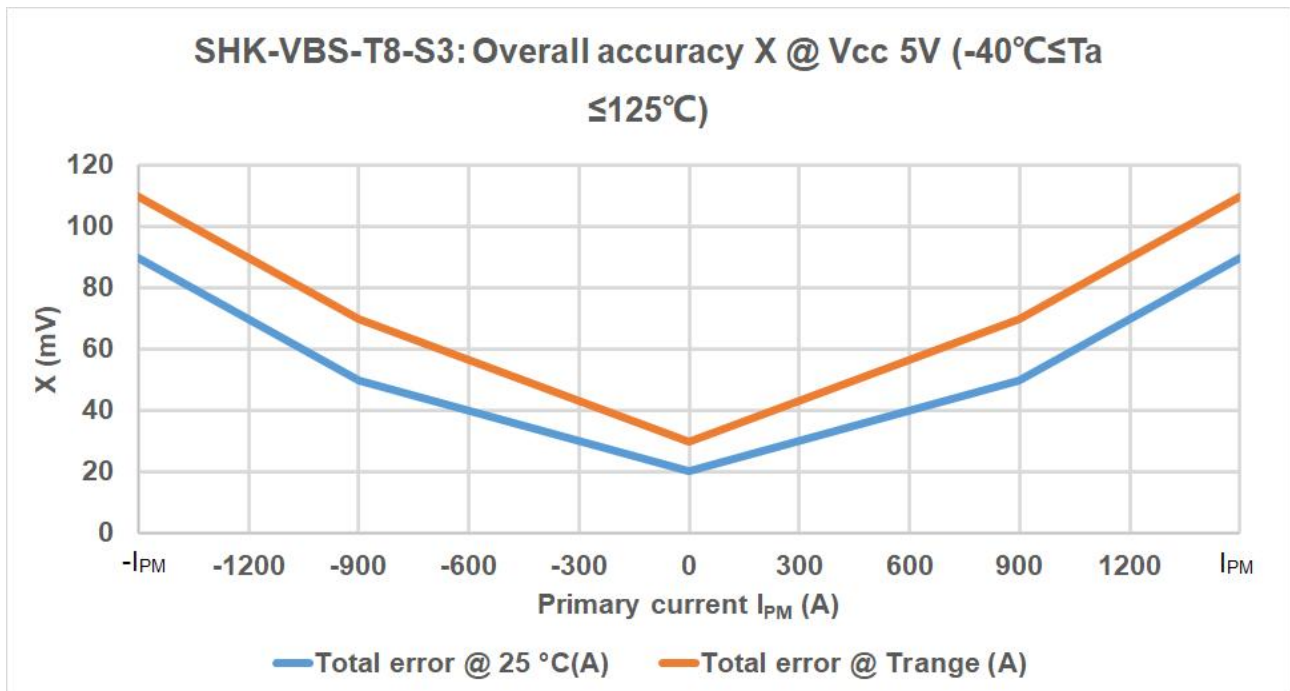
Ave. Temp. coefficient of V_{OE}	TCV_{OEAV}	mV/°C	-0.08		0.08	@ -40°C < T_a < 125°C
Ave. Temp. coefficient of S	TCS_{AV}	%/°C	-0.03	±0.01	0.03	@ -40°C < T_a < 125°C
Linearity error	ϵ_L	% I_P	-3		3	of Full range, $I_P > 900$ A or < -900 A @ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0$ V
			-1		1	of Full range, -900 A ≤ I_P ≤ 900 A @ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0$ V
Response time	T_r	μs		4	6	@ 90% of I_{PM}
Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	V_{no}	mVpp		20		@ DC ~ 10 kHz

Total error(mV) for ≤900A



Overall accuracy X specification						
$I_{PM}(A)$	@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$			@ -40°C ≤ T_a ≤ 125°C, $V_{CC} = 5.0\text{V}$		
-900	40mV	4.00A	2.00%	70mV	7.00A	3.50%
0	20mV	2.00A	1.00%	30mV	3.00A	1.50%
900	40mV	4.00A	2.00%	70mV	7.00A	3.50%

Total error(mV) for $I_{PM} > 900A$



Overall accuracy X specification						
$I_{PM}(A)$	@ $T_a=25^{\circ}C$, $V_{CC}=5.0V$			@ $-40^{\circ}C \leq T_a \leq 125^{\circ}C$, $V_{CC}=5.0V$		
I_{PM}	90mV	9.00A	4.50%	110mV	11.00A	5.50%
-900	50mV	5.00A	2.50%	70mV	7.00A	3.50%
0	20mV	2.00A	1.00%	30mV	3.00A	1.50%
900	50mV	5.00A	2.50%	70mV	7.00A	3.50%
$-I_{PM}$	90mV	9.00A	4.50%	110mV	11.00A	5.50%

3. Dimension & Pin definitions

