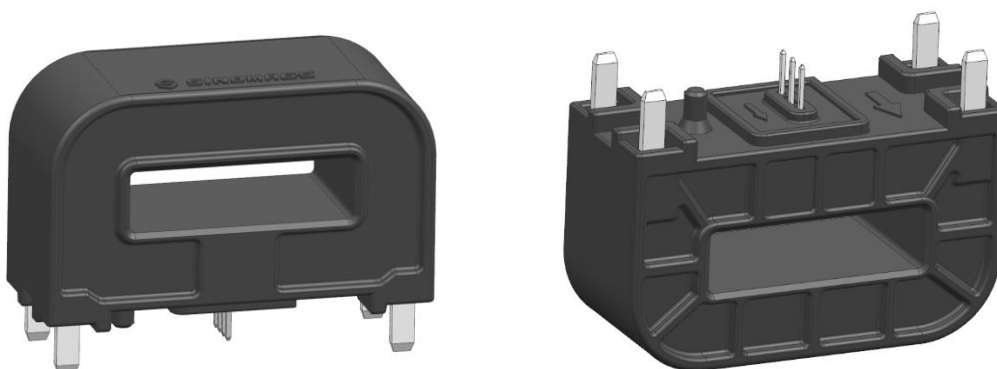


Current Sensor

Product Series: SHK-VBS

Part number: SHK-VBS-A3-500-S3
SHK-VBS-A3-600-S3
SHK-VBS-A3-800-S3
SHK-VBS-A3-1000-S3
SHK-VBS-A3-1200-S3

Version: Ver 2.3



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1. Description

The SHK-VBS-A3 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	30

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	4

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	RMS voltage for AC test 50Hz-1 min
Clearance distance (pri. -sec)	d_{Cl}	mm	12	Shortest distance through air
Creepage distance (pri. -sec)	d_{Cp}	mm	12	Shortest path along device body
Comparative tracking index	CTI		PLC 3	
Case material			V0 according to UL 94	

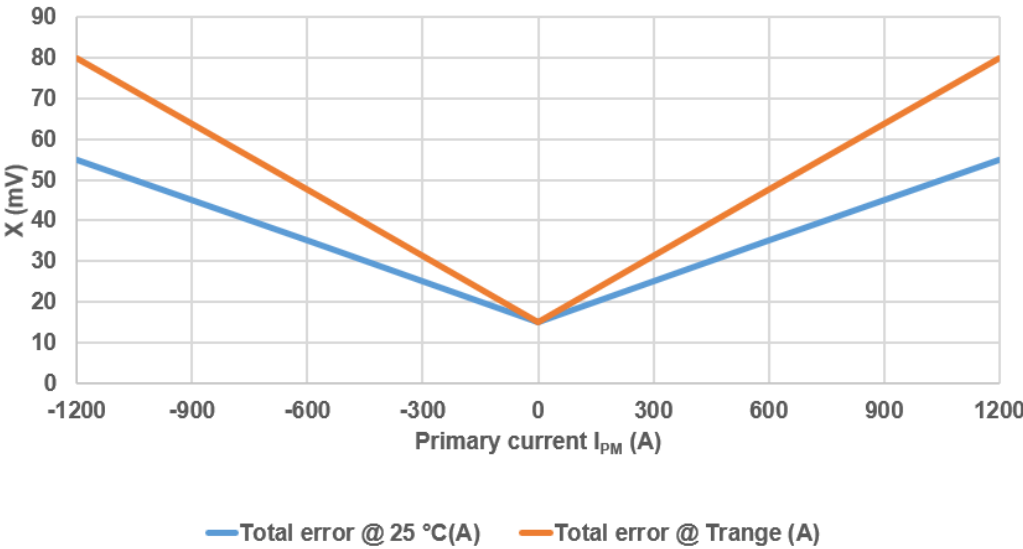
2. Electrical data

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	-500		500	SHK-VBS-A3-500-S3
			-600		600	SHK-VBS-A3-600-S3
			-800		800	SHK-VBS-A3-800-S3
			-1000		1000	SHK-VBS-A3-1000-S3
			-1200		1200	SHK-VBS-A3-1200-S3
Supply voltage	V_{CC}	V	4.75	5	5.25	All
Current consumption	I_{CC}	mA		12	18	@ $V_{CC} = 5.0\text{ V}$
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		4		SHK-VBS-A3-500-S3
				3.33		SHK-VBS-A3-600-S3
				2.5		SHK-VBS-A3-800-S3
				2		SHK-VBS-A3-1000-S3
				1.67		SHK-VBS-A3-1200-S3
Load resistance	R_L	k Ω	10			
Ratiometricity error	ϵ_r	%		± 1		@ $4.75\text{ V} \leq V_{CC} \leq 5.25\text{ V}$
Sensitivity error	ϵ_G	%		± 1.5		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Electrical offset voltage error	V_{OE}	mV		± 2.0		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	V_{OM}	mV		± 4.0		@ $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, after $\pm I_{PM}$
Ave. Temp. coefficient of V_{OE}	TCV_{OEAV}	mV/ $^\circ\text{C}$		± 0.05		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of S	TCS_{AV}	%/ $^\circ\text{C}$		± 0.03		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Linearity error	ϵ_L	% I_P	-1		1	% of Full range, $-1000\text{ A} < I_P < 1000\text{ A}$

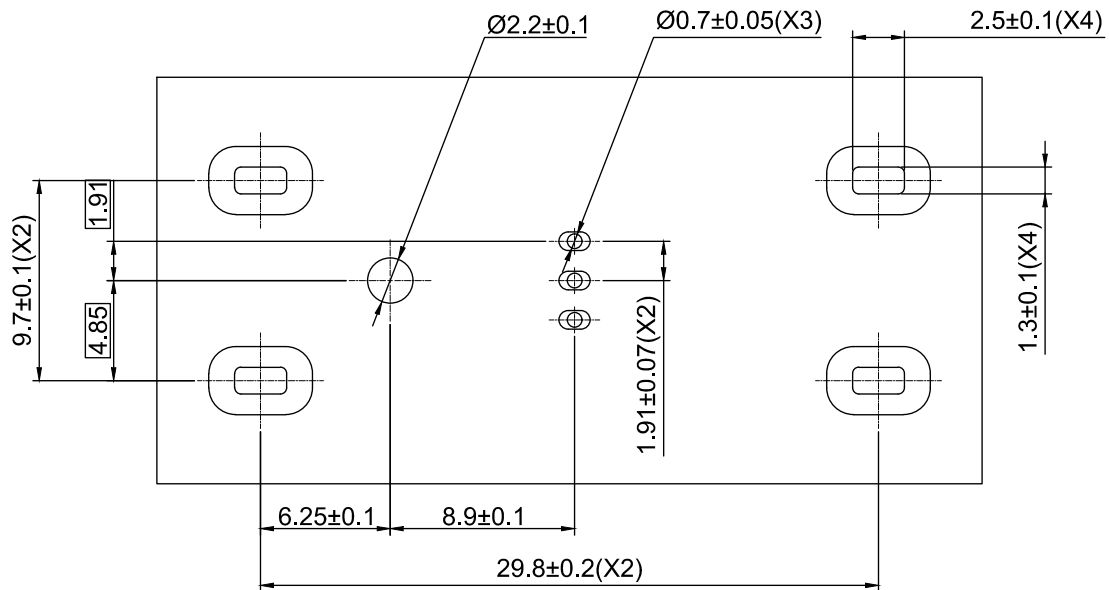
			-1.5		1.5	% of Full range, 1000 A < I _P < 1200 A
Response time	T _r	μs		2	6	@ 90% of I _{PM}
Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	V _{no}	mVpp		20		@ DC ~ 10 kHz

SHK-VBS-A3-S3: Overall accuracy X
@ Vcc 5V (-40℃≤ Ta ≤125℃)
absolute error

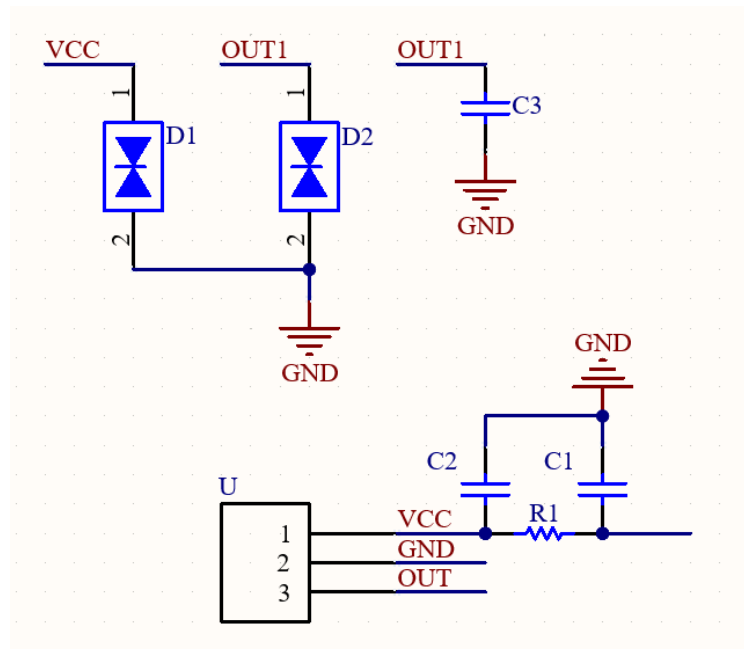


Overall accuracy X specification(mV)		
I _{PM} (A)	@Ta = 25℃, VCC = 5.0V	@-40℃ ≤ Ta ≤125℃, VCC = 5.0V
1200	55	80
900	45	63.8
600	35	47.5
0	15	15
-600	35	47.5
-900	45	63.8
-1200	55	80

3. PCB layout recommendation



4. Electrical circuit diagram



Remarks:

Capacitor recommended specification:

C1	100 nF
C2	1 uF
C3	1 nF
D1, D2	10 V

