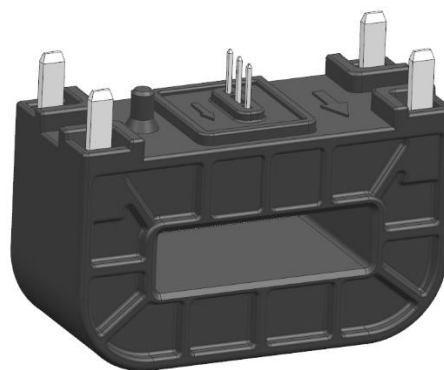


# Current Sensor

Product Series: SHK-VBS-A

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

Version: Ver 1.5



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## 1. Description

The SHK-VBS-A 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	Vcc	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
			-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		SHK-VBS-A3-1000-S3
				1.67		SHK-VBS-A3-1200-S3
Load resistance	$R_L$	k $\Omega$	10			
Ratiometricity error	$\epsilon_r$	%		$\pm 1$		@ $4.75\text{V} \leq V_{CC} \leq 5.25\text{V}$
Sensitivity error	$\epsilon_G$	%		$\pm 1.5$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Electrical offset voltage error	$V_{OE}$	mV		$\pm 2.0$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$
Magnetic offset voltage error	$V_{OM}$	mV		$\pm 4.0$		@ $T_a = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{ V}$ , after $\pm I_{PM}$
Ave. Temp. coefficient of $V_{OE}$	$TCV_{OEAV}$	mV/ $^\circ\text{C}$		$\pm 0.05$		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Ave. Temp. coefficient of S	$TCS_{AV}$	%/ $^\circ\text{C}$		$\pm 0.03$		@ $-40^\circ\text{C} \leq T_a \leq 125^\circ\text{C}$
Linearity error	$\epsilon_L$	% $I_P$	-1		1	% of Full range, $-1000\text{ A} < I_P < 1000\text{ A}$
			-1.5		1.5	% of Full range, $1000\text{ A} <  I_P  < 1200\text{ A}$
Response time	$T_r$	$\mu\text{s}$		2	6	@ 90% of $I_{PM}$

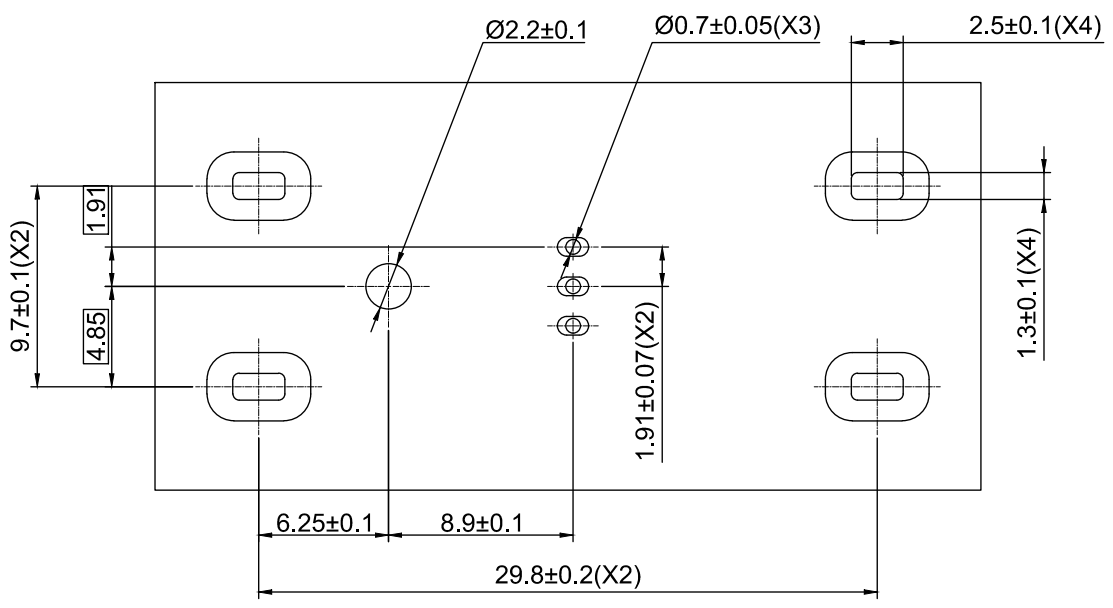
Frequency bandwidth (-3 dB)	BW	kHz	40			No RC circuit
Output voltage noise	$V_{no}$	mVpp		20		@ DC ~ 10 kHz

**SHK-VBS-A3-S3: Overall accuracy X**  
 @  $V_{CC} 5V (-40^{\circ}C \leq T_a \leq 125^{\circ}C)$   
 absolute error

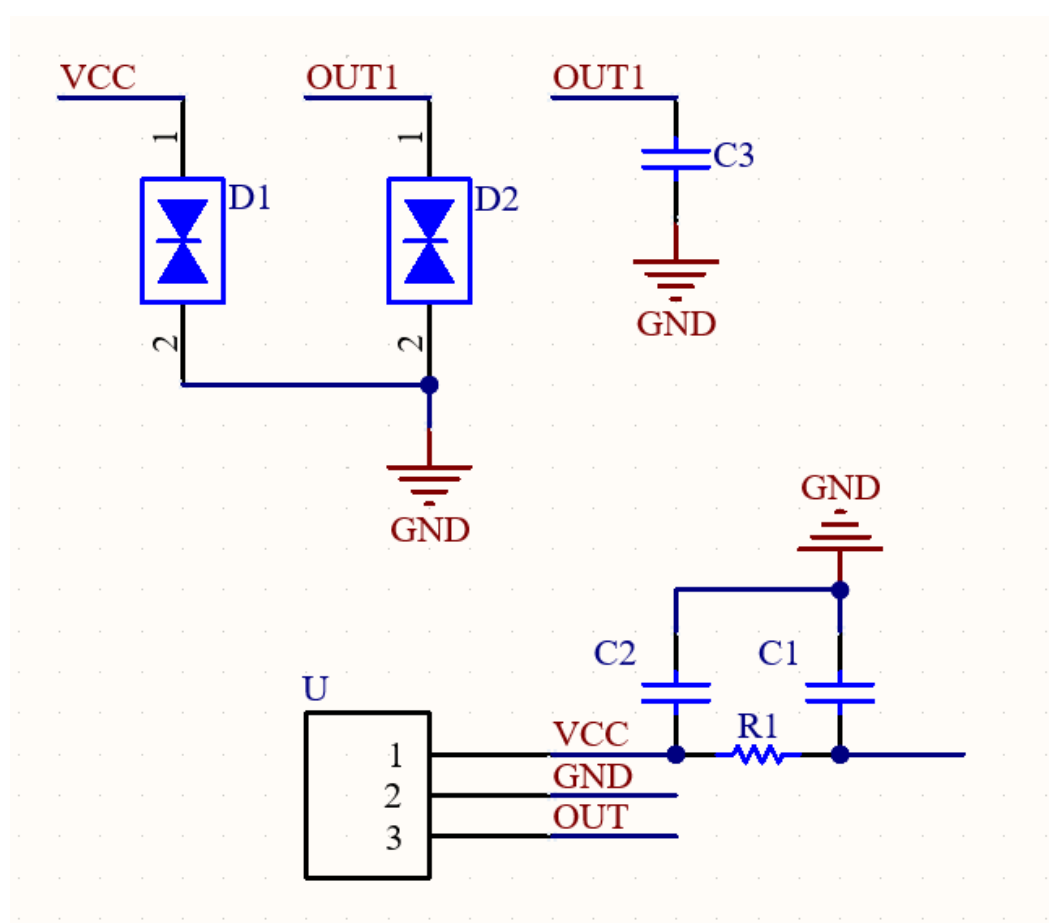


Overall accuracy X specification(mV)		
$I_{PM}(A)$	@ $T_a = 25^{\circ}C, V_{CC} = 5.0V$	@ $-40^{\circ}C \leq T_a \leq 125^{\circ}C, V_{CC} = 5.0V$
1200	55	80
900	45	63.8
600	35	47.5
0	15	15
-600	35	47.5
-900	45	63.8
-1200	55	80

### 3. PCB layout recommendation



### 4. Electrical circuit diagram

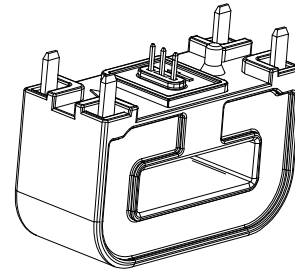
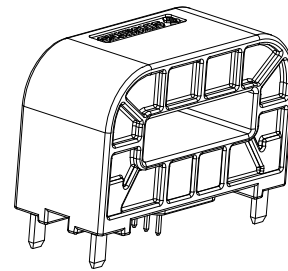
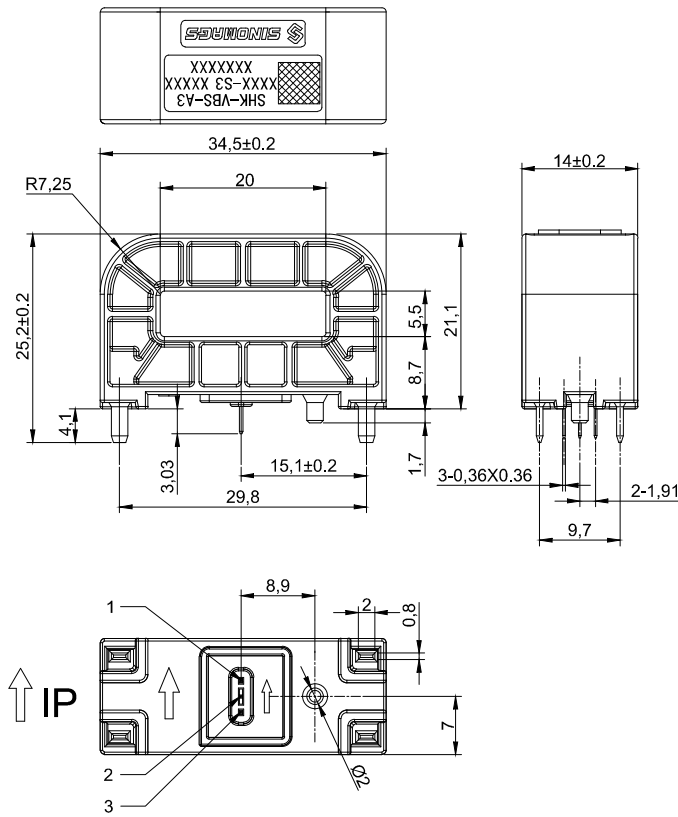


**Remarks:**

Capacitor recommended specification:

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

**5. Dimension & Pin definitions**



Material : Fit UL94V-0 & RoHS requirements ;  
General tolerance :  $\pm 0.5$   
Unit : mm

**Terminals:**

Pin1	VDD
Pin2	GND
Pin3	OUT

