

Current Sensor

Product Series: SHK-VBS-S3

Part number: SHK-VBS-S3-50AB
SHK-VBS-S3-100AB
SHK-VBS-S3-150AB

Version: Ver 1.2



CONTENT

1.	Description	2
2.	Electrical data	3
3.	Frequency band width	4
4.	Step response time	4
5.	Dimensions & Pin Definition	5

1. Description

The SHK-VBS-S3 series current sensor is based on HALL technology and open-loop design. It is suitable for DC, AC, pulsed and any kind of irregular current measurement under the isolated conditions.

Typical applications

- Motor driver unit
- Inverter
- Power supply

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_A	°C	-40 ~ 125
Storage temperature	T_stg	°C	-40 ~ 125
Mass	m	g	0.1

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	V _{cc}	V	5
ESD rating (HBM)	U_ESD	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
RMS voltage for AC test 50 Hz, 1 min	U _d	V	200	Pollution degree 2
Clearance distance (pri. -sec)	d _{Cl}	mm	0.5	After soldered on PCB
Creepage distance (pri. -sec)	d _{Cp}	mm	0.5	

Measuring current table

Part number	Meas. Range I _{pn} (A)	Sensitivity (mV/A)	V _{cc} (V)	T (°C)
SHK-VBS-S3-50AB	±50A	40	5	-40 ~ 105
SHK-VBS-S3-100AB	±100A	20	5	-40 ~ 105
SHK-VBS-S3-150AB	±150A	13.33	5	-40 ~ 105

2. Electrical data

Condition: $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I _{pn}	A	-50		50	SHK-VBS-S3-50AB
			-100		100	SHK-VBS-S3-100AB
			-150		150	SHK-VBS-S3-150AB
Supply voltage	V _{CC}	V	4.75	5	5.25	
Current consumption	I _{CC}	mA		7	12	
Full scale voltage	V _{FS}	V		1.5		Output @ I _{pm}
Theoretical gain	G	mV/A		40		SHK-VBS-S3-50AB
				20		SHK-VBS-S3-100AB
				13.33		SHK-VBS-S3-150AB
Gain Error @ 25°C	G _{error}	% of Gain	-1		1	@ 25°C
Gain Error @ -40°C~105°C	G _{error_T}	% of Gain	-1.5		1.5	@ -40°C~105°C
Primary conductor resistance	R _{IP}	mΩ		0.25		
Offset voltage	V _{off}	V	2.45	2.5	2.55	
Internal output resistance	R _{out}	Ω	1	15	30	
Step response time	t _{res}	μs		3		TBD
Frequency bandwidth (-3dB)	BW	kHz		120		TBD
Noise (r.m.s)	I _{noise}	%I _{pm}		1		10 ~ 120 kHz
Non-linearity @ 25°C	ξ	%		±1.5		% of I _{pm}
Accuracy @ 25°C	X	% of I _{pn}	-2		2	@ 25°C
Accuracy @ -40°C~105°C	X _{TRang}	% of I _{pn}	-3		3	@ -40°C~105°C
Thermal drift of Gain	Gain _T	% of Gain	-1.5		1.5	Drift value related to R.T. over -40°C~105°C
Thermal drift of V _{off}	V _{off_T}	mV	-15		15	

Remarks: ②.the accuracy @ -40°C~105°C, $X_{TRang} = ((V_{out} - V_{ref})@ I_n @ T_x) - V_{oe}@ 25^\circ\text{C} - G_{th} * I_n) / V_{FS}$, where T_x represents present temperature, G_{th} is fitted gain at room temperature.

3. Frequency band width

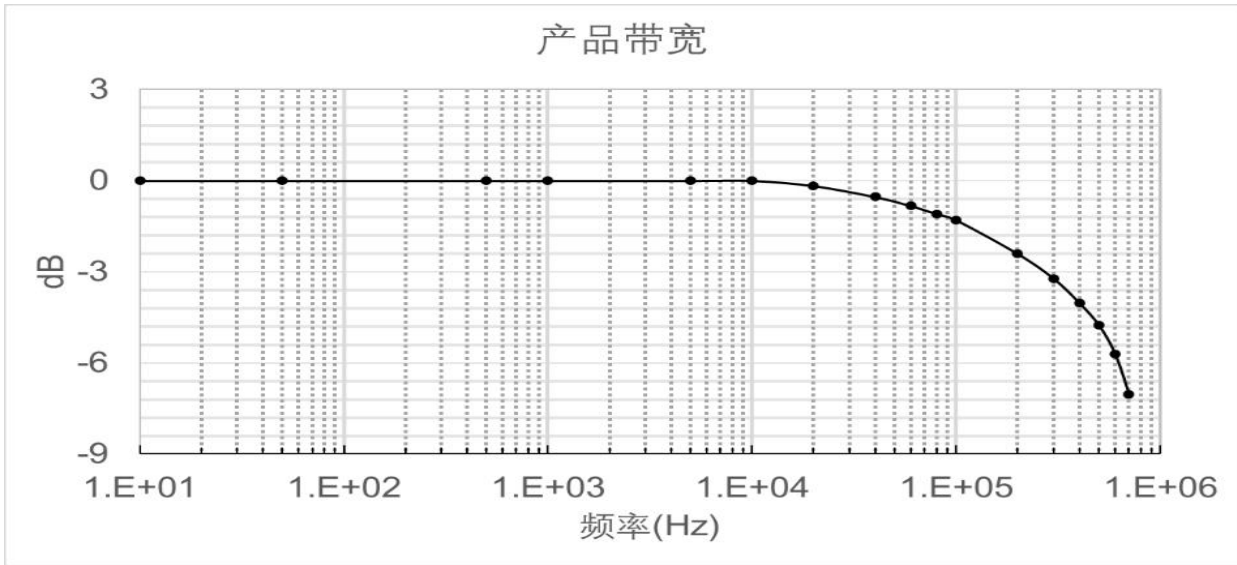


Fig.3 The frequency band width of SHK-VBS-S3 series current sensors.

4. Step response time

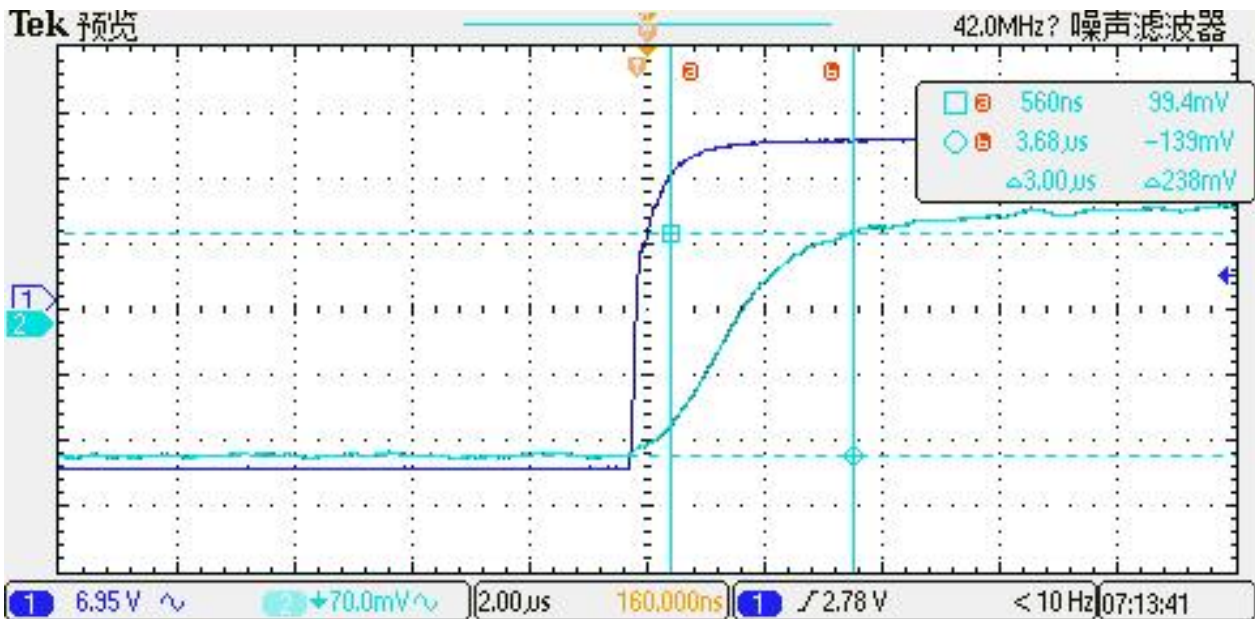
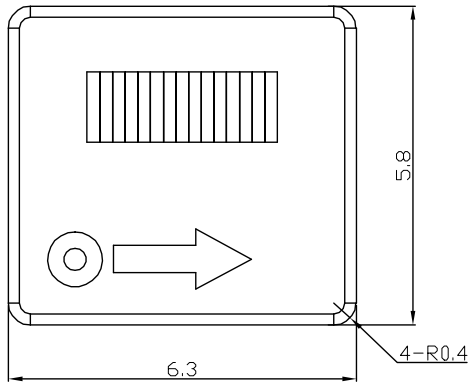
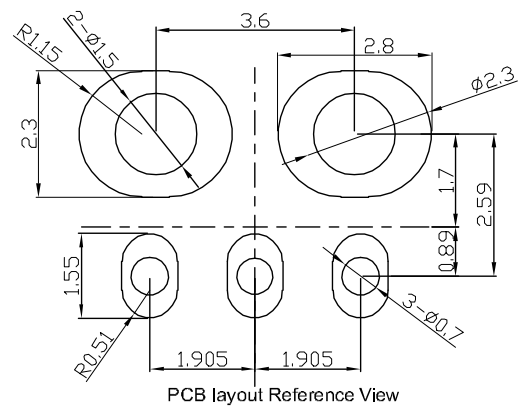
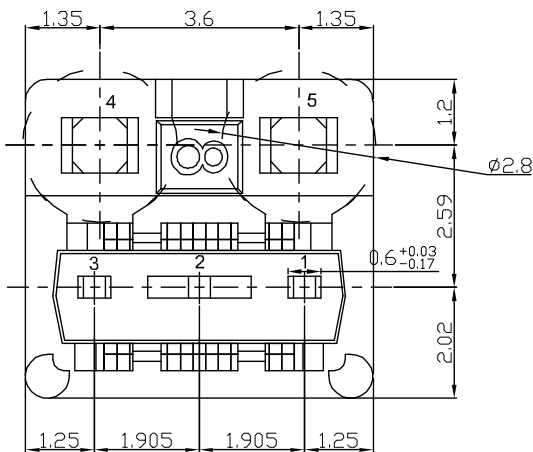
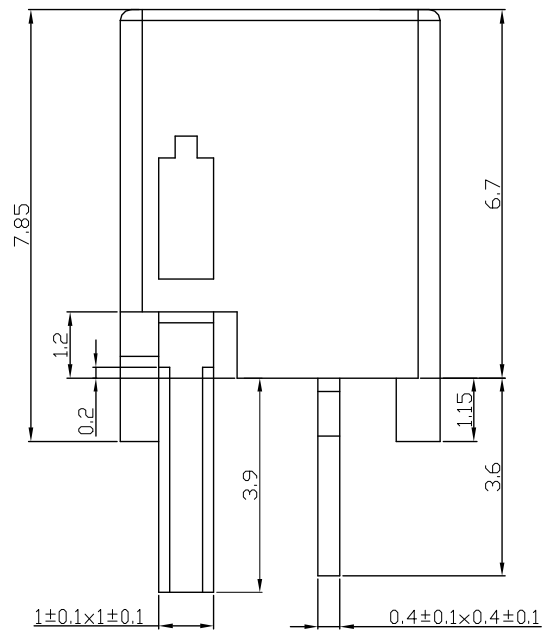
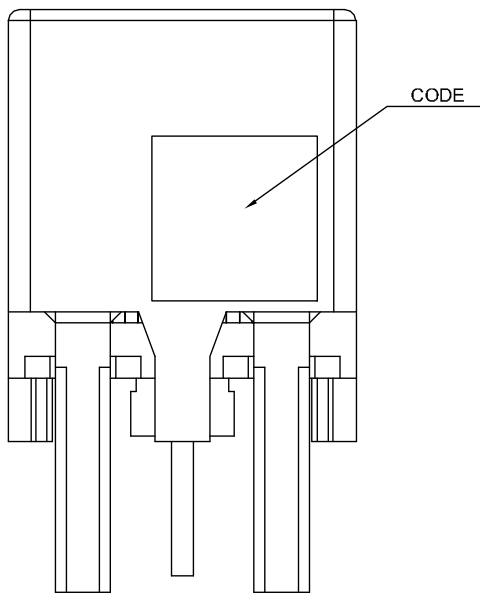
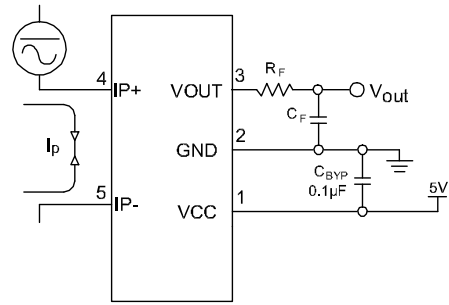


Fig.4 The step response time of SHK-VBS-S3 current sensors. The dark light blue is primary current, while the light blue is output signal of current sensor. The step response time is about 3μs.

5. Dimensions & Pin Definition



Connection



Terminals

1	VCC	4	IP+
2	GND	5	IP-
3	VOUT		

Material : Fit UL94V-0 & RoHS requirements ;
General tolerance : ±0.5
Unit : mm

