

Current Sensor

Product Series: STK-616V

Part number: STK-616V-50AB
STK-616V-100AB
STK-616V-150AB
STK-616V-50AC
STK-616V-100AC
STK-616V-150AC
STK-616V-100AW

Version: Ver 1.7



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1. Description

The STK-616V series current sensor is based on TMR (tunnel magnetoresistance) 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

- AC Variable speed drives
- Power supply
- Inverter

General parameter

Parameter	Symbol	Unit	Value
Working temperature	T_A	°C	-40 ~ 125
Storage temperature	T_stg	°C	-40 ~ 125
Mass	m	g	0.5
Primary resistance	R_p	mohm@ RT	0.27
		mohm@ 150°C	0.39

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	Vcc	V	6
ESD rating (HBM)	U_ESD	Kv	2
Junction temperature	T_J	°C	150

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.

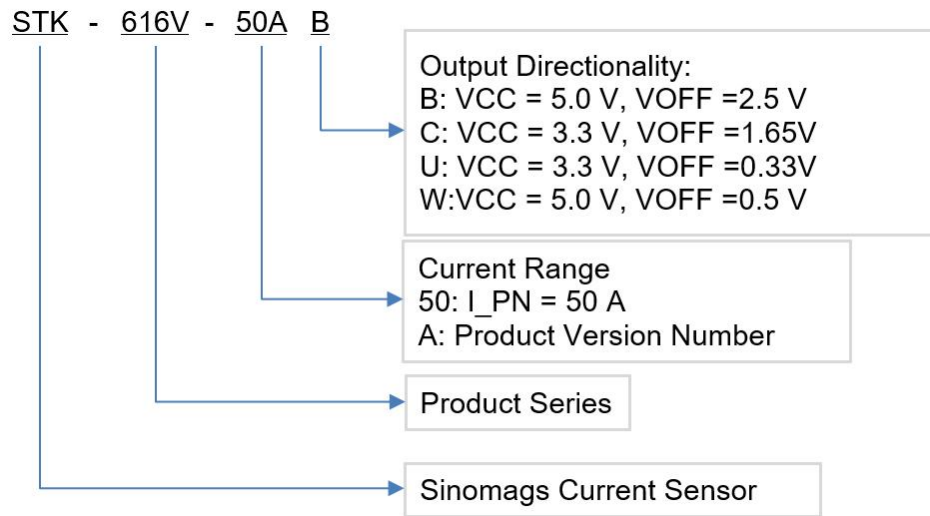
Isolation parameter

Parameter	Symbol	Unit	Value	Comment
RMS voltage for AC test 50 Hz, 1 min	Ud	Kv	1	
Clearance distance (pri. -sec)	Dci	mm	1.2	Refer the PCB layout recommendationshucai
Creepage distance (pri. -sec)	dCp	mm	1.2	

2. Selection Guide

Part number	Current Range	Sensitivity (mV/A)	T (°C)
STK-616V-50AB	±50 A	40	-40 ~ 125
STK-616V-100AB	±100 A	20	-40 ~ 125
STK-616V-150AB	±150 A	13.33	-40 ~ 125
STK-616V-50AC	±50 A	26.4	-40 ~ 125
STK-616V-100AC	±100 A	13.2	-40 ~ 125
STK-616V-150AC	±150 A	8.8	-40 ~ 125
STK-616V-100AW	+100A	26.6	-40 ~ 125

3. Production Information



4. Electrical data STK-616V-xxAB

 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	STK-616V-50AB
			-100		100	STK-616V-100AB
			-150		150	STK-616V-150AB
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6		
Quiescent voltage	V_{off}	V	2.45	2.5	2.55	$V_{out} @ I_{pn} = 0\text{ A}$
Internal output resistance	R_{out}	Ω	1		30	
GAIN	G_{th}	mV/A		40		STK-616V-50AB
				20		STK-616V-100AB
				13.33		STK-616V-150AB
Step response time	t_{res}	μs		3.5		@90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		150		No RC circuit
Noise	I_{noise}	mArms		40		DC ~ 100 kHz
Non-linearity @ 25°C	ξ	% of I_{pn}		± 1.5		@ 25°C
Thermal drift of G_{th} @ $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	$GAIN_T$	% of G_{th}		± 1.5		Drift value related to the value @ 25°C
Thermal drift of V_{off} @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	V_{off_T}	mV		± 20		
Total Accuracy @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	X_T	% of I_{pn}		± 3.5		

5. Electrical data STK-616V-xxAC

 Condition: $T_A = 25^{\circ}\text{C}$, $V_{CC} = 3.3\text{V}$

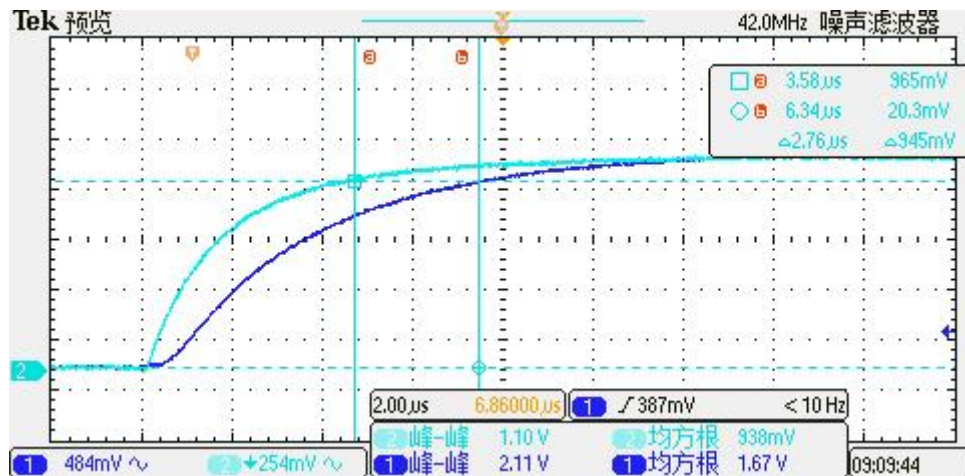
Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{pn}	A	-50		50	STK-616V-50AC
			-100		100	STK-616V-100AC
			-150		150	STK-616V-150AC
Supply voltage	V_{CC}	V	3.135	3.3	3.465	
Current consumption	I_{CC}	mA		6		
Quiescent voltage	V_{off}	V	1.6	1.65	1.7	$V_{out} @ I_{pn} = 0\text{ A}$
Internal output resistance	R_{out}	Ω	1		30	
GAIN	G_{th}	mV /A		26.4		STK-616V-50AC
				13.2		STK-616V-100AC
				8.8		STK-616V-150AC
Step response time	t_{res}	μs		3.5		@90% of I_{pn}
Frequency bandwidth (-3Db)	BW	kHz		150		No RC circuit
Noise	I_{noise}	mArms		40		DC ~ 100 kHz
Non-linearity @ 25°C	ξ	% of I_{pn}		± 1.5		@ 25°C
Thermal drift of G_{th} @ $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	$GAIN_T$	% of G_{th}		± 1.5		Drift value related to the value @ 25°C
Thermal drift of V_{off} @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	V_{off_T}	mV		± 20		
Total Accuracy @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	X_T	% of I_{pn}		± 3.5		

6. Electrical data STK-616V-xxAW

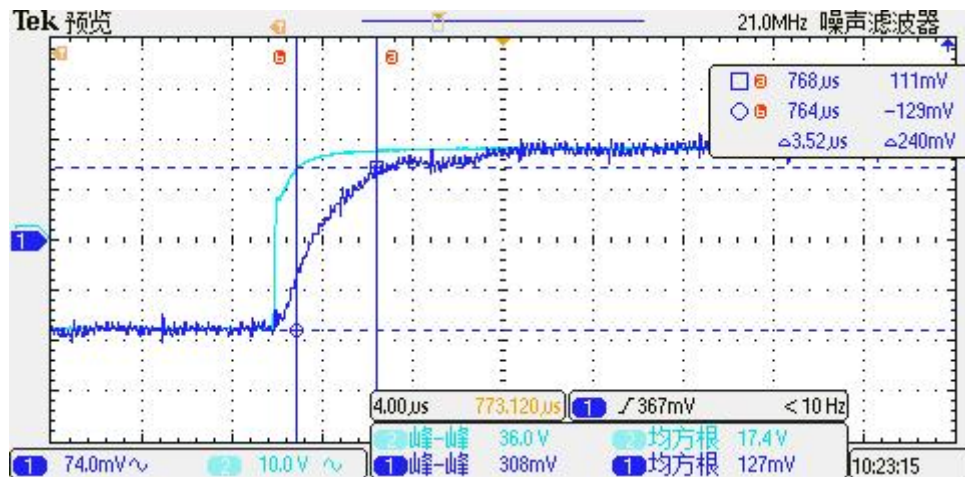
 Condition: $T_A = 25^{\circ}\text{C}$, $V_{CC} = 5\text{V}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{pn}	A	0		100	STK-616V-100AW
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		6		
Quiescent voltage	V_{off}	V	0.45	0.5	0.55	$V_{out} @ I_{pn} = 0\text{ A}$
Internal output resistance	R_{out}	Ω	1		30	
GAIN	G_{th}	mV /A		26.6		STK-616V-100AW
Step response time	t_{res}	μs		3.5		@90% of I_{pn}
Frequency bandwidth (-3Db)	BW	kHz		150		No RC circuit
Noise	I_{noise}	mArms		40		DC ~ 100 kHz
Non-linearity @ 25°C	ξ	% of I_{pn}		± 1.5		@ 25°C
Thermal drift of G_{th} @ $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$	G_{AIN_T}	% of G_{th}		± 1.5		Drift value related to the value @ 25°C
Thermal drift of V_{off} @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	V_{off_T}	mV		± 20		
Total Accuracy @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	X_T	% of I_{pn}		± 3.5		

7. Frequency response time

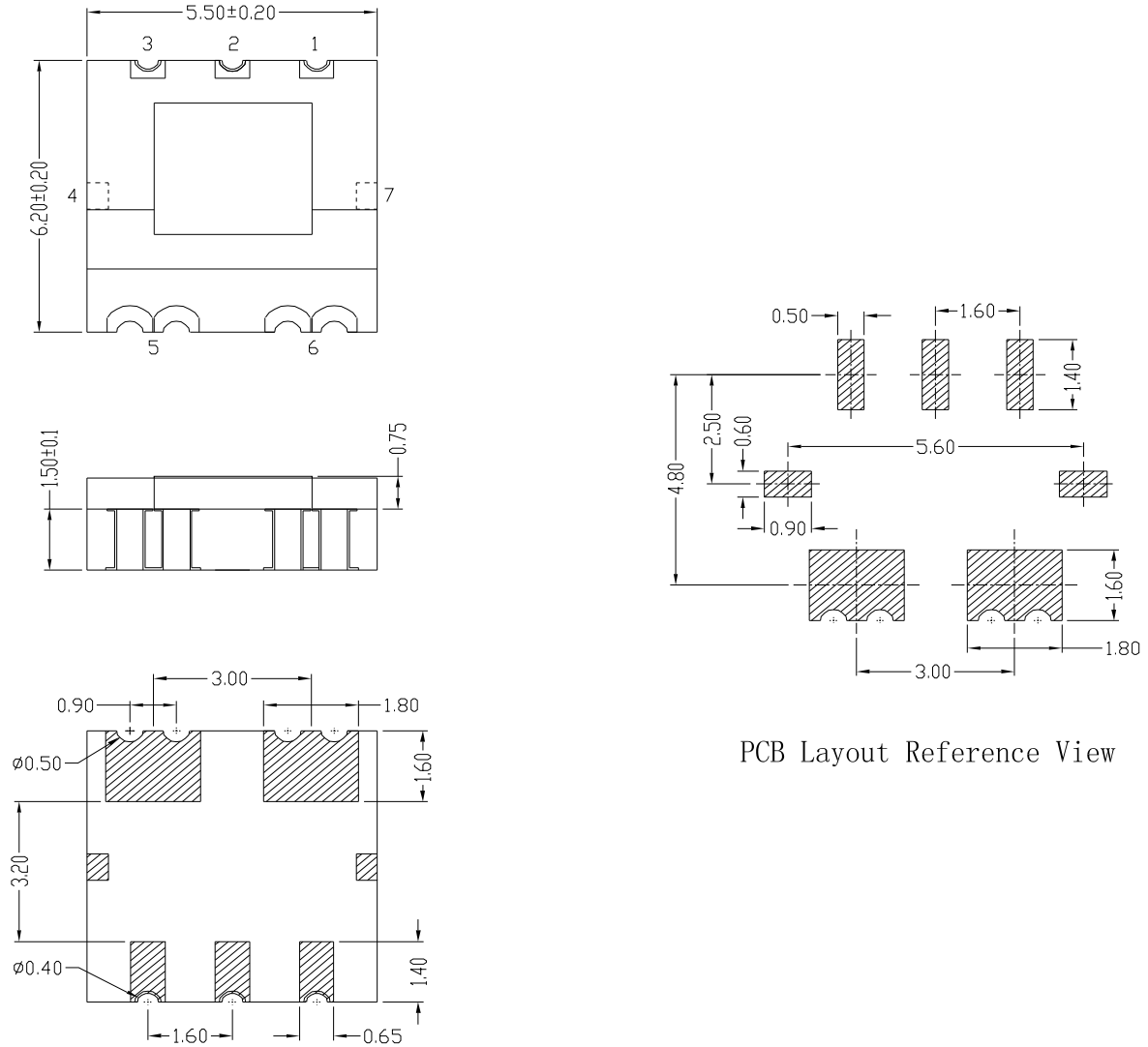


A response time of ~ 2.8 μs can be seen for a big current (~ 100 A) with $di/dt \sim 10$ A/μs.



A response time of ~ 3.5 μs can be seen for a small current (~ 10 A) with $di/dt \sim 20$ A/μs

8. Dimensions



PCB Layout Reference View

9. Pin definitions

PIN	Symbol	Description
1	VCC	Power supply pin
2	GND	Ground pin (GND)
3	VOU	Sensor output pin
4	NC	NC
5	IP+	Primary conductor pin (+)
6	IP-	Primary conductor pin (-)
7	NC	NC