

Current Sensor

Product Series: STK-616E

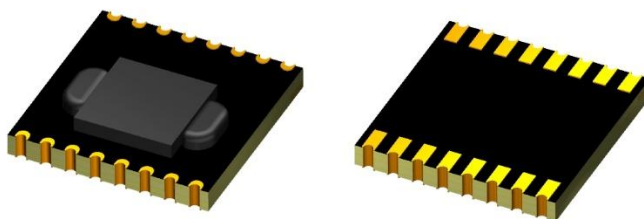
STK-616E-20GB

STK-616E-30GB

Part number: STK-616E-50GB

STK-616E-65GB

Version: Ver 5.1



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Web site: www.sinomags.com

CONTENT

1.	Description	2
2.	Electrical data	3
3.	Dimension & Pin definitions	4
4.	PCB Layout	5
5.	Working temperature vs Current	5
6.	Typical Application of STK-616E	6
7.	Frequency band width	7
8.	Step response time	7

1. Description

The STK-616E 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
- Electric welder power supply
- Solar energy
- 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	0.5

Absolute maximum rating

Parameter	Symbol	Unit	Value
Supply voltage	V _{cc}	V	6
ESD rating (HBM)	U_ESD	kV	4
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 50Hz/1 min	U _d	kV	4	
Impulse withstand voltage 1.2/50μs	Ū _w	kV	6	
Clearance distance (pri. -sec)	d _{Cl}	mm	6	Determined by customer's layout
Creepage distance (pri. -sec)	d _{Cp}	mm	6	

Measuring current table

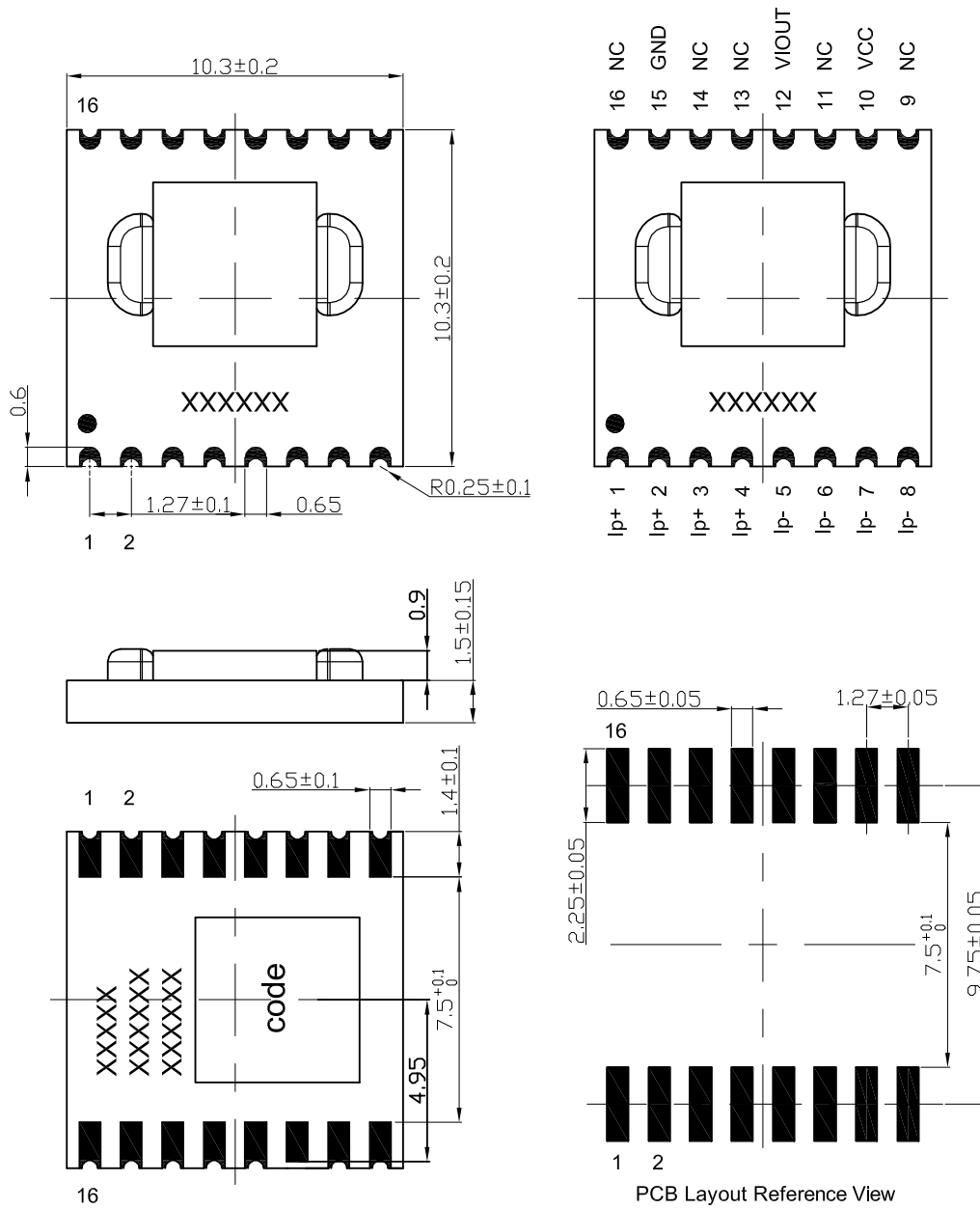
Product	Optimized Range	Sensitivity, (mV/A)	T(°C)
STK-616E-20GB	± 20 A	100	-40 ~ 125
STK-616E-30GB	± 30 A	66	-40 ~ 125
STK-616E-50GB	± 50 A	40	-40 ~ 125
STK-616E-65GB	± 65 A	30.75	-40 ~ 125

2. Electrical data

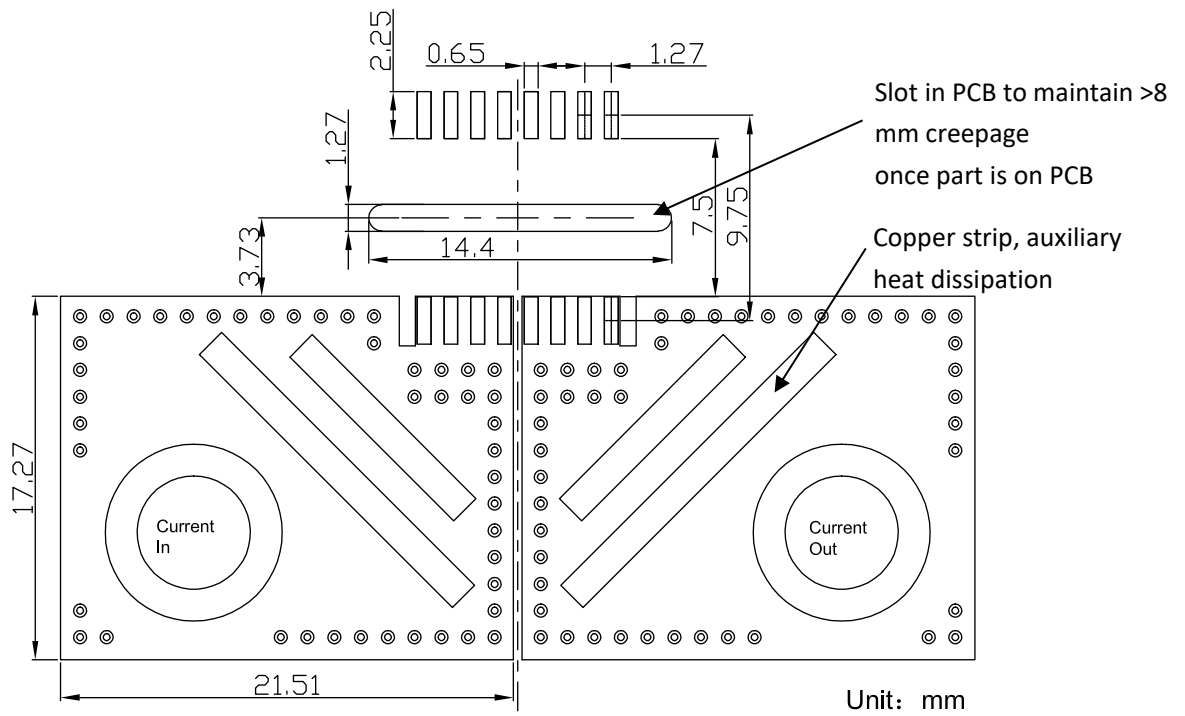
 Condition: $T_A = 25^{\circ}\text{C}$, $V_{CC} = 5\text{ V}$

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal current	I_{pn}	A	-20		20	STK-616E-20GB
			-30		30	STK-616E-30GB
			-50		50	STK-616E-50GB
			-65		65	STK-616E-65GB
Supply voltage	V_{CC}	V	4.75	5	5.25	STK-616E-20GB
						STK-616E-30GB
						STK-616E-50GB
						STK-616E-65GB
Current consumption	I_{CC}	mA		5	10	
Primary Conductor Resistance	R_{IP}	m Ω		0.6		
Quiescent voltage	V_{off}	V	2.48	2.5	2.52	$V_{out} @ I_P=0\text{ A}$
Output Specifications	V_{out}	Ω	13		27	
	V_{ref}		12		80	
Theoretical gain	G_{th}	mV/A		100		STK-616E-20GB
				66		STK-616E-30GB
				40		STK-616E-50GB
				30.75		STK-616E-65GB
Error of gain	Err_G	% G_{th}	-1		1	Trimmed in the factory @ 25°C Note 2)
Rated linearity error	Non-L	% I_{pn}		± 1		$\pm I_{pn}$
Step response time	t_{res}	μs			1.5	@90% of I_{pn}
Frequency bandwidth (-3dB)	BW	kHz		150		No RC circuit
Regulator PSRR		dB		50		From DC to 1kHz
Output voltage noise DC ~ 100 kHz @250 kHz Sampling Rate	V_{noise}	mVpp		20		
Accuracy @ 25°C	X	% of I_{pn}		± 1		@ 25°C
Accuracy @ $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$	X_{TRange}	% of I_{pn}	-3.5		3.5	$-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$

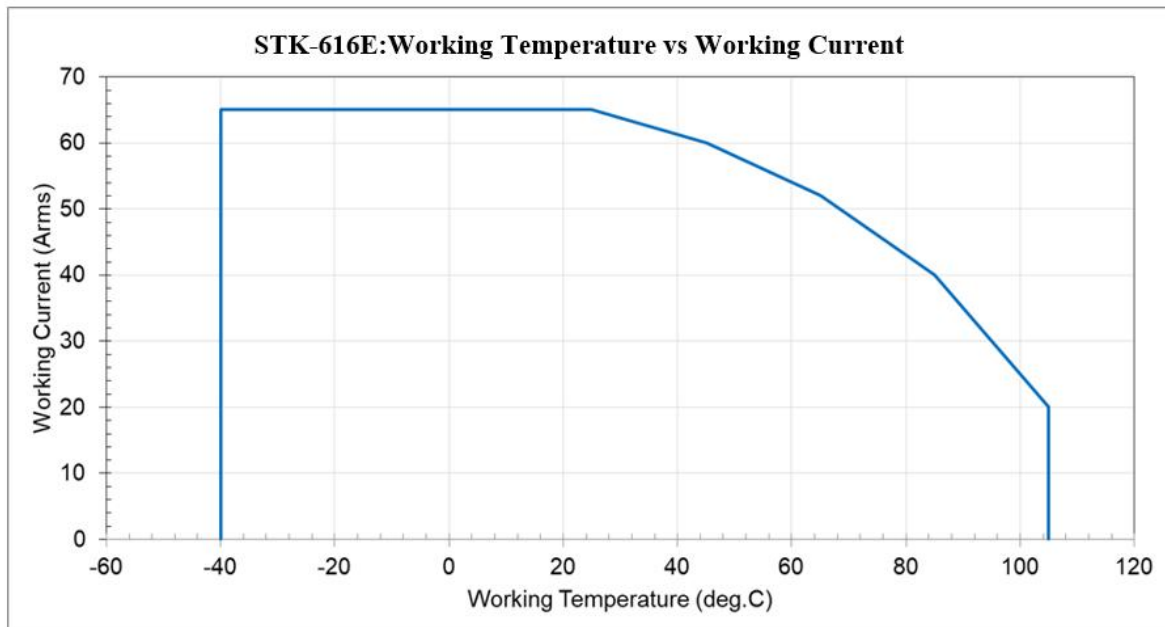
3. Dimension & Pin definitions



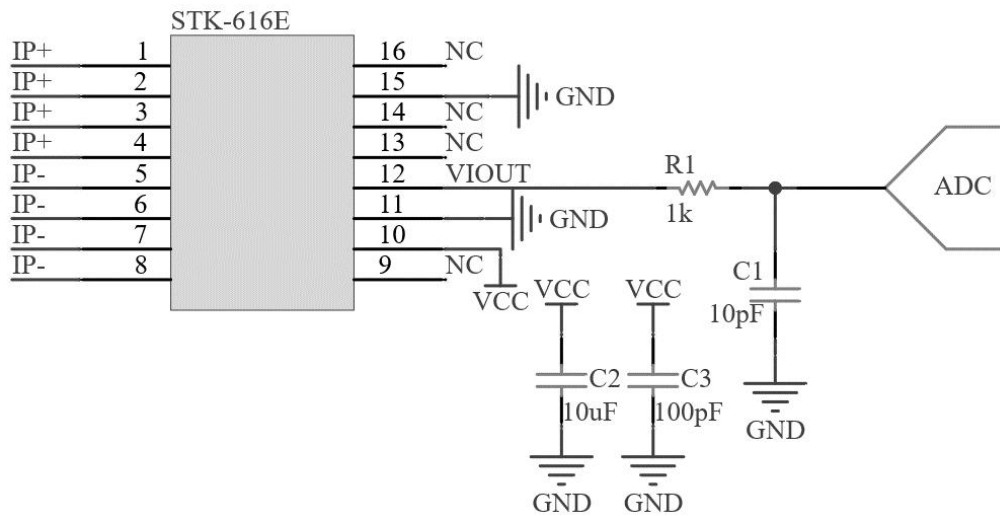
4. PCB Layout



5. Working temperature vs Current



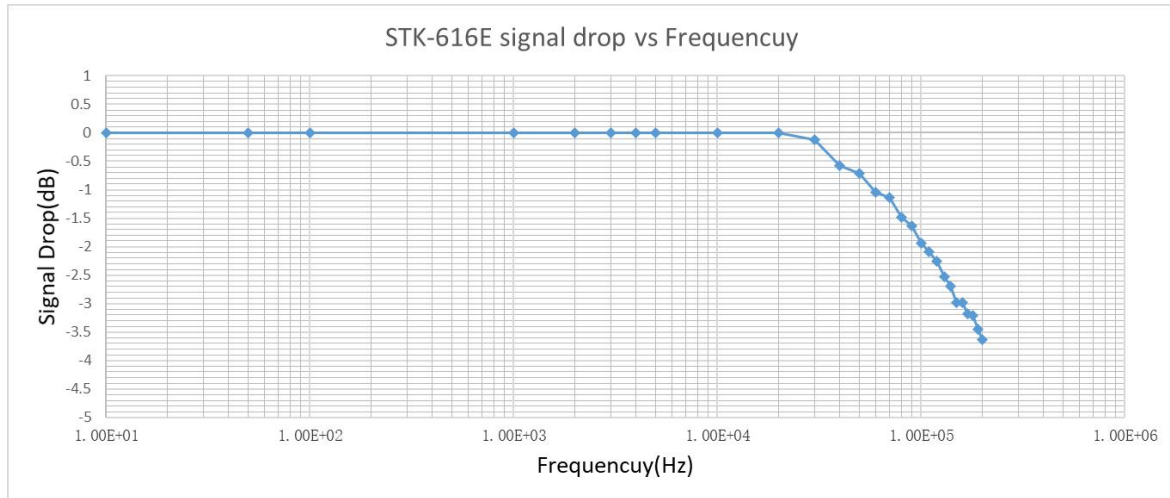
6. Typical Application of STK-616E



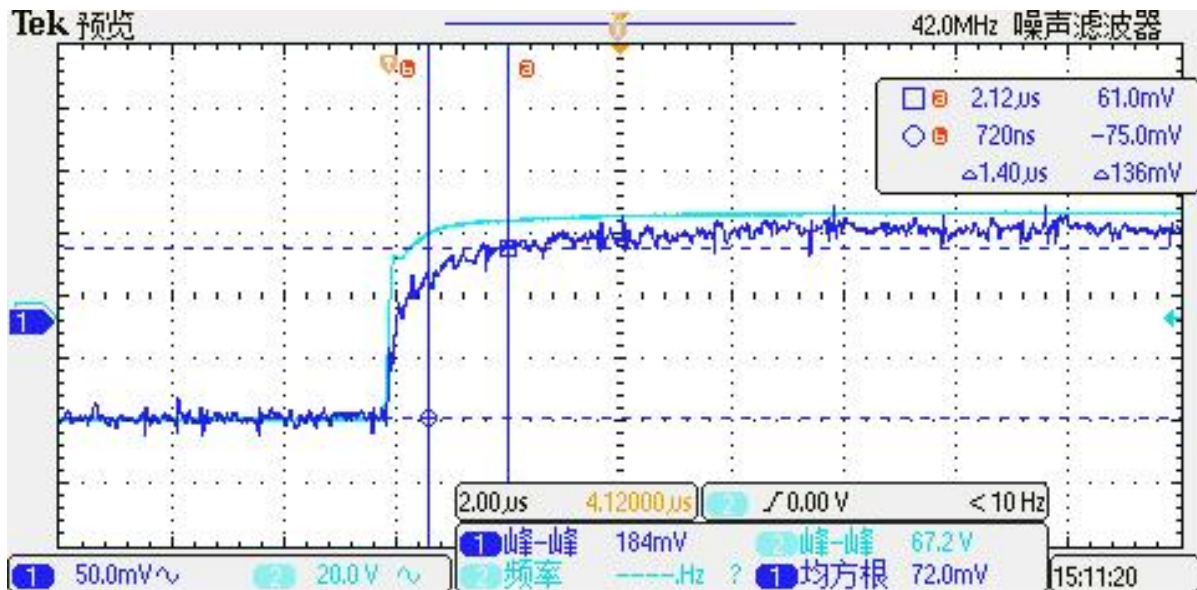
R1 (kohm)	C1 (pF)	Theoretical -3dB $f = 1/(2\pi RC)$ (kHz)	Measured -3dB (kHz)
20	81	98	~ 100
20	810	10	~ 10

The frequency characteristics of STK-616 series current sensor are not affected by the R-C setting (according to recommended R-C setting), therefore the active filter circuit or R-C circuit can be applied to modulate the sensor's frequency characteristics.

7. Frequency band width



8. Step response time



The typical frequency response of STK-616E current sensor. The response time from 90% of the primary current (pink) to 90% of the secondary output (blue) is 1.5 μ s.