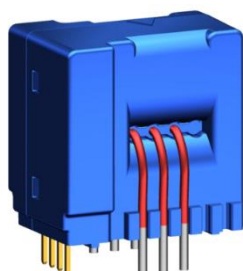


Current Sensor

Product Series: STB-CAS

Part number: STB-25CAS/RH

VERSION: Ver 2.0



Sinomags Technology Co., Ltd

Web site: www.sinomags.com

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1. Description

STB-CAS/RH series current sensors are based on close loop principle with TMR technology. The sensor can detect the current with DC, AC, pulse and irregular wave shape.

Typical application

- Variable frequency converter
- Direct-current dynamo
- Uninterruptible Power Supplies (UPS)
- Switched model power supplies (SMPS)
- Solar inverters.

General parameters

Parameter	Symbol	Unit	Value
Working temperature	T_A	°C	-40 ~ 105
Storage temperature	T_stg	°C	-40 ~ 105
Mass	m	g	13

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage	Vc	V	6
ESD rating (HBM)	U_ESD	kV	4
High temperature and humidity	T_HAST	-	85°C&85%RH (1000h)

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 parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	Ud	kV	4	
Impulse withstand voltage	Ūw	kV	6	

1.2/50 μ s				
Clearance distance (pri. - sec)	dCl	mm	9.5	Shortest distance through air
Creepage distance (pri. - sec)	dCp	mm	9.5	Shortest path along device body
Electrical clearance	dCe	mm	6.1 (CAS/R)	When mounted on PCB with recommended layout
			6.3 (CAS)	
			8.5 (CAS/K)	
Case material			V0 according to UL 94	
Comparative tracking index	CTI	V	600	

2. STB-25CAS/RH parameters

Condition: $V_{CC} = 5.0\text{ V}$, $N_P = 1$, $R_L = 10\text{ k}\Omega$, $T_A = 25^\circ\text{C}$, unless specified.

Parameters	Symbol	Unit	Min.	Typ.	Max.	Remark
Primary nominal rms current	I_{pn}	A		25		
Primary current measuring range	I_{pm}	A	-85		85	
Supply voltage	V_c	V	4.75	5	5.25	
Consumption current	I_c	mA		$15 + \frac{I_P \cdot N_P}{N_S \cdot 1000}$		$N_S = 1200$
Current turns	N_P	Turn		1、2、3		
Reference voltage	V_{ref}	V	2.48	2.5	2.52	
Output voltage @ I_{pn}	V_{FS}	V		$V_{ref} \pm 0.625$		
Output voltage @ I_{pm}	V_{FSM}	V		$V_{ref} \pm 2.125$		
Electrical offset voltage	V_{OE}	mV		5		100 % tested $V_{out} - V_{ref} @ 0\text{ A}$
Theoretical sensitivity	G_{th}	mV/A		25		$0.625\text{ V} @ I_{pn}$
Linearity error 0 ~ I_{pn}	ξ_L	% of I_{pn}		0.3		Tested @ 25°C
Reaction time @ 10 % of I_{PN}	t_{ra}	μs		0.3		
Step response time @ 90 % of I_{pn}	t_r	μs		0.3		

-3 dB band width	BW	kHz		400		
Noise						
DC ~ 10 kHz	Vnoise	mVpp		5		
DC ~ 100 kHz				6		
Accuracy @ RT	X	% of I _{pn}	-0.8		0.8	@ 25°C
Accuracy @ TA = 85 °C (105 °C)	X_TRange	% of I _{pn}	-1.15 (-1.3)		1.15 (1.3)	-40°C ~ 105°C

3. Frequency band width

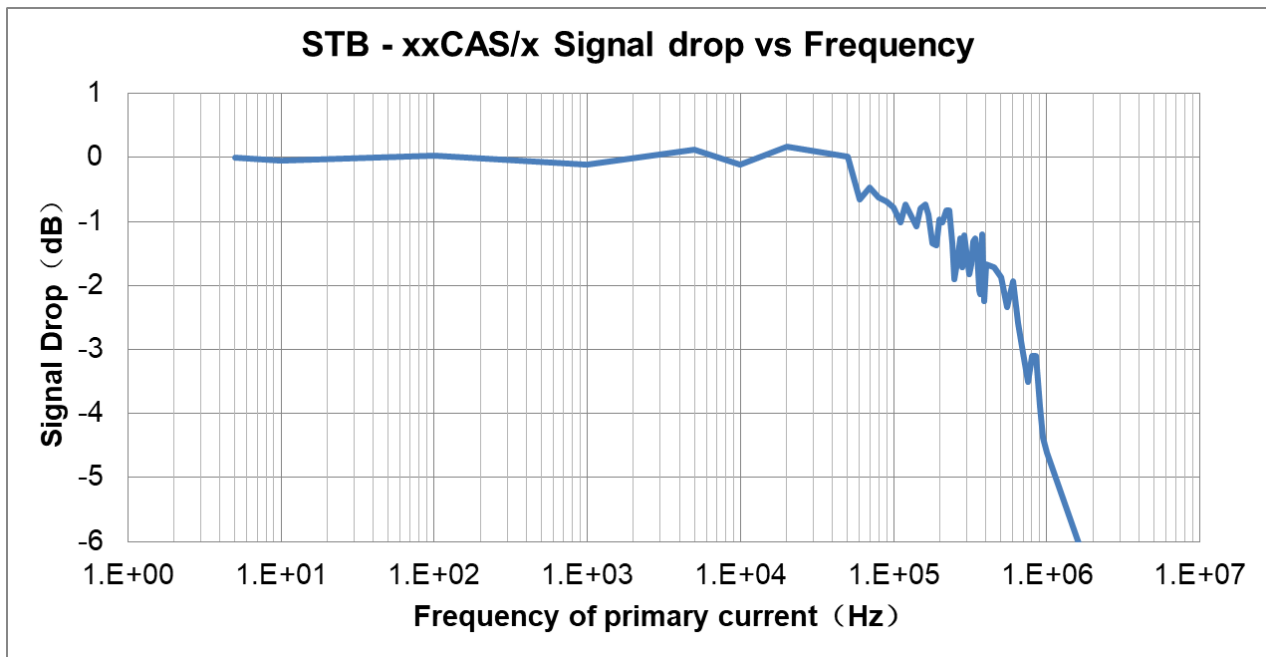


Fig.1 the band width of STB-xxCAS/x series current sensors. The bandwidth was tested after differential amplification with 1x magnification.

4. Step response time

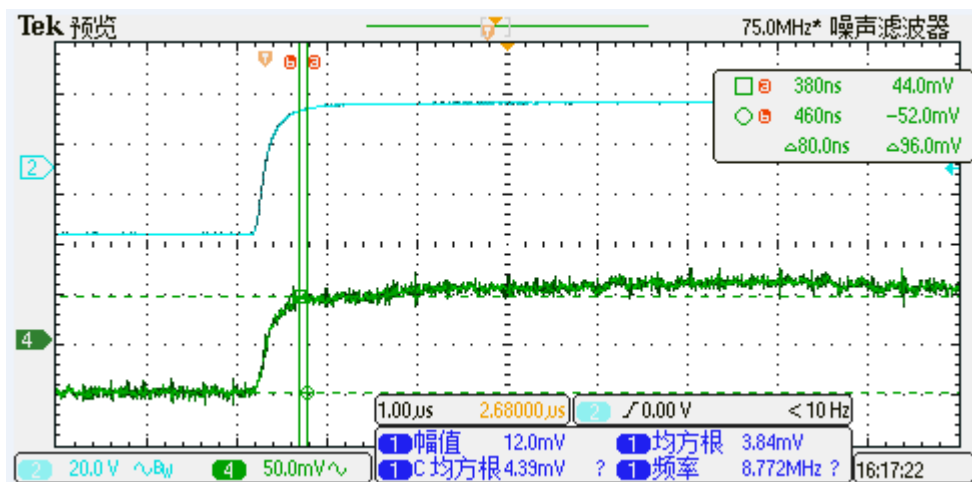


Fig.2 the step response time of STB-xxCAS current sensors. The blue is primary current, while the green is output signal of current sensor. The step response time is less than 0.3 μ s.

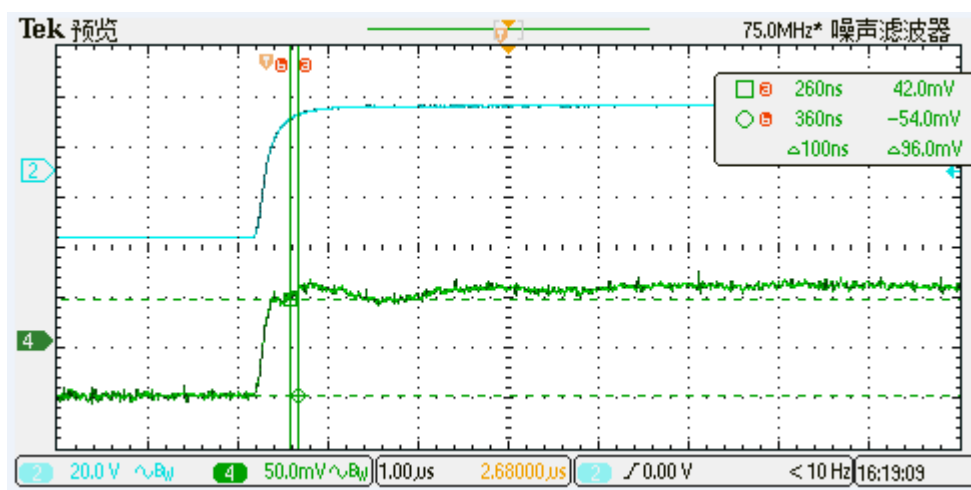


Fig.4 the step response time of STB-xxCAS/R & STB-xxCAS/K current sensors. The blue line is primary current, while the green line is output signal of current sensor. The step response time is less than 0.3 μ s.

5. Frequency delay performance

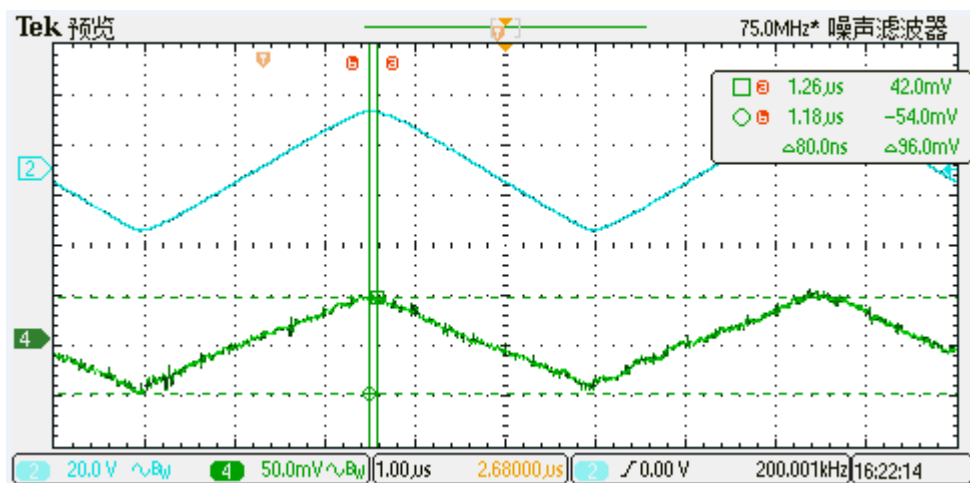
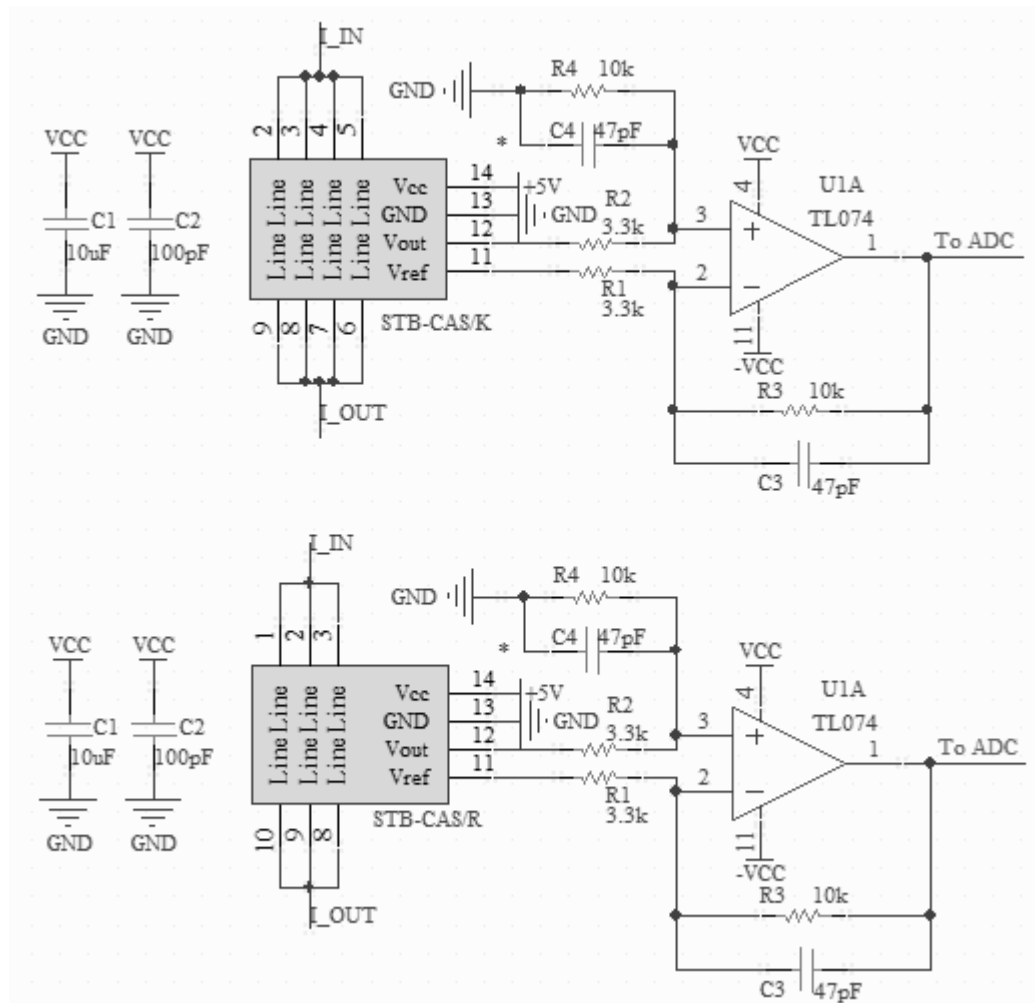
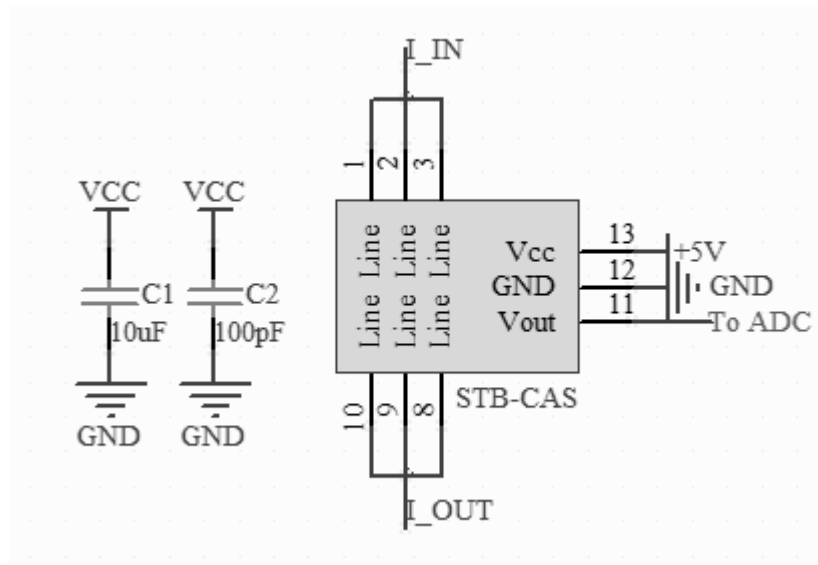
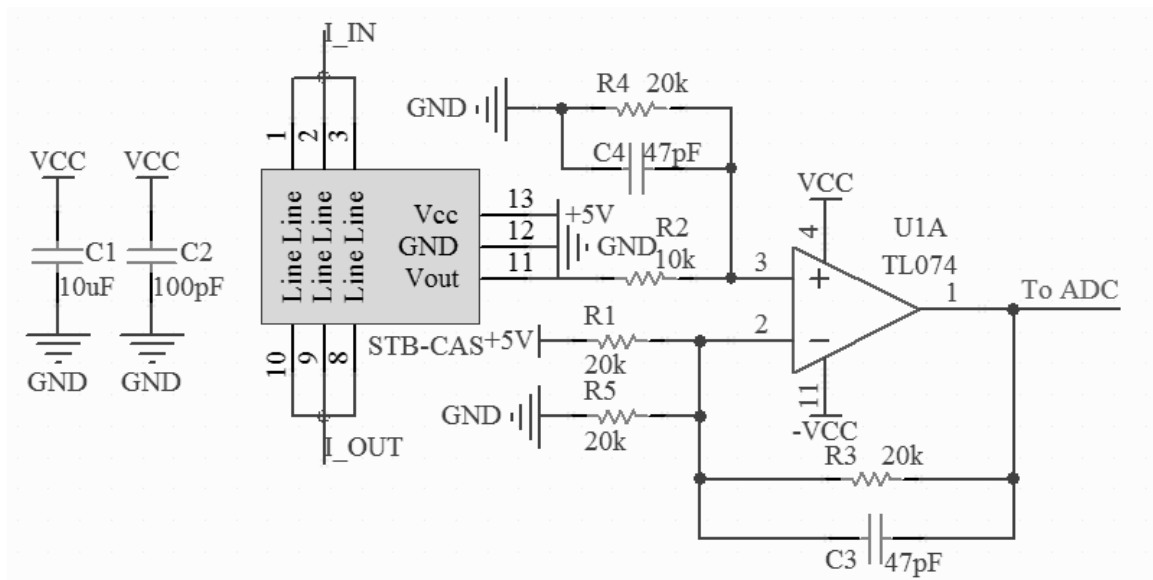


Fig.5 when detection the primary current with a frequency of 200 kHz. The delay time from primary current (blue) to the output of the sensor (green) is less than 0.3 μs.





Typical application circuits for STB-CAS current sensor. The output and reference voltage can directly input to the ADC.



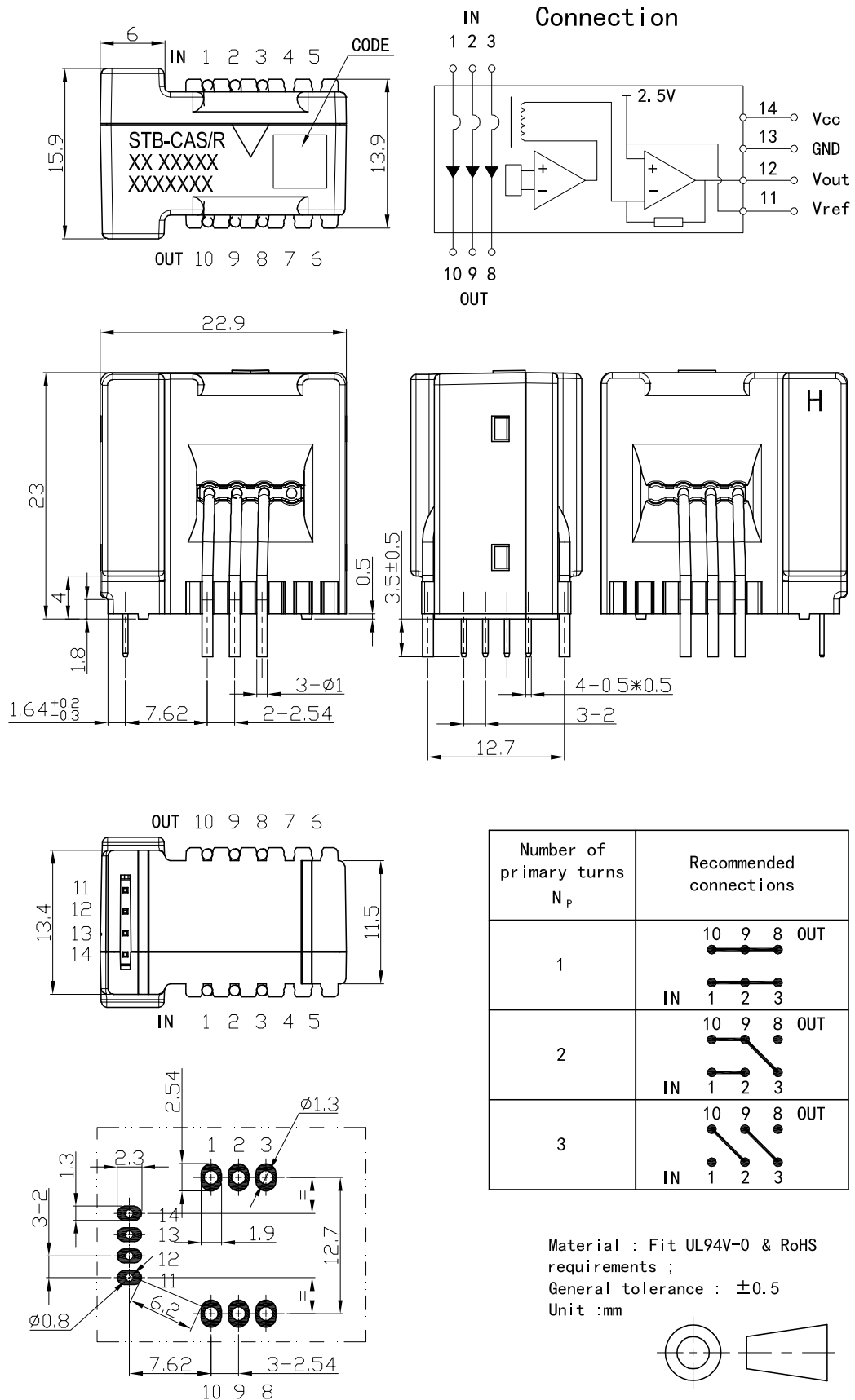
Typical application circuits for CTB-CAS current sensor. The magnification can be estimated as $M = R4 / R2$ with the condition of $R1 // R5 = R2$, $R1 = R5$, and $R3 = R4$. The magnification in the circuit above is around 2.

R3 (ohm) =	C3 (pF) =	Theoretical -3dB	Tested -3dB
R4 (ohm)	C4 (pF)	$f = 1/(2\pi RC)$	(kHz)

		(kHz)	
20000	20	398	~ 400
20000	81	98	~ 100
20000	810	10	~ 10

The frequency characteristics of STB-CAS/X 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. Dimensions:



变更履历

编写	审核	版本	日期	备注
张琪	朱海华	V1.0	2020-4-30	初版发布
张琪	朱海华	V2.0	2020-12.22	增加双 85 测试项目