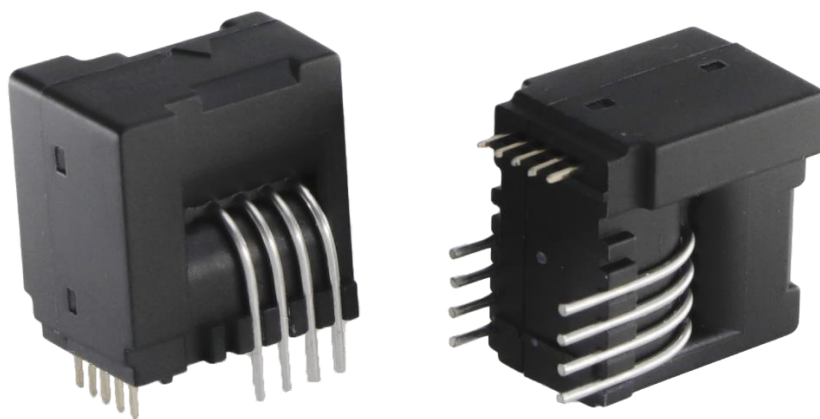


CURRENT SENSOR

PRODUCT SERIES: STB-CAS/FC

PRODUCT PART NUMBER: STB-25CAS/K/FC
STB-50CAS/K/FC
STB-75CAS/K/FC
REVISION: Ver 1.4.1



Sinomags Technology Co., Ltd.

Web site: www.sinomags.com

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1. Description

For the electronic measurement of current: DC, AC, pulsed..., with galvanic separation between the primary and the secondary circuit.

Typical application

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

General parameters

Parameter	Symbol	Unit	Value
Working temperature	T_A	°C	-40 ~ 105
Storage temperature	T_S	°C	-40 ~ 105
Mass	m	g	16

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage	$V_{CC_{max}}$	V	7
ESD rating (HBM)	U_ESD	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 parameters

Parameter	Symbol	Unit	Value	Remark
RMS voltage for AC test 50Hz/1 min	U_d	kV	4	
Impulse withstand voltage 1.2/50μs	U_w	kV	6	
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	When mounted on PCB with recommended layout
Case material			V0 according to UL 94	
Comparative tracking index	CTI	V	600	

2. STB-25CAS/K/FC 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	I_{PN}	A		25		
Primary current, measuring range	I_{PM}	A	-85		85	
Number of primary turns	N_P			1,2,4		
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		15 + $I_P \cdot N_P / NS \cdot 1000$		NS =1212
Reference voltage@ $I_{PN}=0\text{A}$	V_{ref}	V	2.495	2.5	2.505	
Output voltage @ I_{PN}	V_{out}	V		$V_{ref} \pm 0.625$		
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K		± 5	± 50	Internal reference
Electrical offset voltage	V_{oe}	mV	-1.35		1.35	100 % tested $V_{out} - V_{ref} @ 0\text{ A}$
Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$	TCV_{out}	ppm/K		± 1.4	± 4	ppm/K of 2.5V (-40 °C ... 105 °C)
Theoretical sensitivity	G_{th}	mV/A		25		0.625V @ I_{PN}
Temperature coefficient of G	TCG	ppm/K			± 40	-40 °C ... 105 °C
Linearity error 0 ~ I_{PN}	ε_L	% of I_{PN}		0.3		Tested @25°C
Reaction time	t_{ra}	μs			0.3	@ 10 % of I_{PN}
Response time	t_r	μs			0.3	@ 90 % of I_{PN}
-3 dB band width	BW	kHz		400		
Noise DC ~ 10 kHz	V_{no}	mVpp		5		
Noise DC ~ 100 kHz				6		
Accuracy	X	% of I_{PN}			0.8	@ 25°C
					1.15(1.25)	@ -40°C ~ 105°C
Primary current, detection threshold	I_{PTh}	A	$4.02 \times I_{PN}$	$4.1 \times I_{PN}$	$4.17 \times I_{PN}$	
Overcurrent detection response time	t_{rTh}	μs		1	1.5	Overcurrent detection measured over temperature -40 °C . 105 °C with a I_P step of $5 \times I_{PN}$ and $di/dt = 50\text{ A}/\mu\text{s}$
Overcurrent detection hold	t_{holdTh}	ms		3		

3. STB-50CAS/K/FC 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	I_{PN}	A		50		
Primary current, measuring range	I_{PM}	A	-150		150	
Number of primary turns	N_P			1,2,4		
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		$15 + I_P \cdot N_P / NS \cdot 1000$		NS =1212
Reference voltage@ $I_P=0\text{A}$	V_{ref}	V	2.495	2.5	2.505	
Output voltage @ I_{PN}	V_{out}	V		$V_{ref} \pm 0.625$		
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K		± 5	± 50	Internal reference
Electrical offset voltage	V_{oe}	mV	-0.725		0.725	100 % tested $V_{out} - V_{ref} @ 0\text{ A}$
Temperature coefficient of V_{out} @ $I_P=0\text{A}$	TCV_{ouf}	ppm/K		± 0.7	± 3	ppm/K of 2.5V ($-40^\circ\text{C} \dots 105^\circ\text{C}$)
Theoretical sensitivity	G_{th}	mV/A		12.5		0.625V @
Temperature coefficient of G	TCG	ppm/K			± 40	$-40^\circ\text{C} \dots 105^\circ\text{C}$
Linearity error $0 \sim I_{PN}$	ε_L	% of I_{PN}		0.3		Tested @ 25°C
Reaction time	t_{ra}	μs			0.3	@10 % of I_{PN}
Response time	t_r	μs			0.3	@90 % of I_{PN}
-3 dB band width	BW	kHz		400		
Noise DC ~ 10 kHz Noise DC ~ 100 kHz	V_{no}	mVpp		5 6		
Accuracy	X	% of I_{PN}			0.8	@ 25°C
					1.1(1.3)	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Primary current, detection threshold	I_{PTh}	A	$4.02 \times I_{PN}$	$4.1 \times I_{PN}$	$4.17 \times I_{PN}$	
Overcurrent detection response time	t_{rTh}	μs		1	1.5	Overcurrent detection measured over temperature $-40^\circ\text{C} \dots 105^\circ\text{C}$ with a I_P step of $5 \times I_{PN}$ and $di/dt = 50\text{ A}/\mu\text{s}$
Overcurrent detection hold	t_{holdTh}	ms		3		

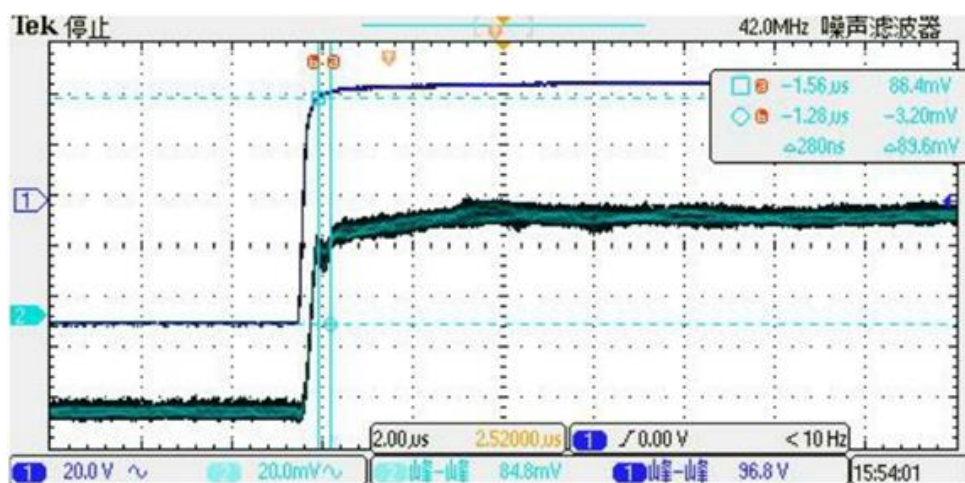
4. STB-75CAS/K/FC parameters

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		75		
Primary current, measuring range	I_{PM}	A	-220		220	With $V_c = 5\text{ V}$, $T_A = 25^\circ\text{C}$, $R_L = 10\text{ k}\Omega$.
			180		180	With $V_c = 4.75\text{ V}$, $T_A = 85^\circ\text{C}$, $R_L = 10\text{ k}\Omega$.
Number of primary turns	N_P	-		1,2,4		
Supply voltage	V_{CC}	V	4.75	5	5.25	
Current consumption	I_{CC}	mA		15 + $I_P \cdot N_P / N_S \cdot 1000$		$N_S = 1200$
Reference voltage@ $I_P = 0\text{ A}$	V_{ref}	V	2.495	2.5	2.505	
Output voltage @ I_{PN}	V_{out}	V		$V_{ref} \pm 0.46875$		
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K		± 5	± 50	Internal reference
Electrical offset voltage	V_{oe}	mV	-0.5		0.5	100 % tested $V_{out} - V_{ref} @ 0\text{ A}$
Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$	TCV_{ouf}	ppm/K		± 0.7	± 3	ppm/K of 2.5V ($-40^\circ\text{C} \dots 105^\circ\text{C}$)
Theoretical sensitivity	G_{th}	mV/A		6.25		0.46875V @ I_{PN}
Temperature coefficient of G	TCG	ppm/K			± 40	$-40^\circ\text{C} \dots 105^\circ\text{C}$
Linearity error $0 \sim I_{PN}$	ε_L	% of I_{PN}		0.3		Tested @ 25°C
Reaction time @ 10 % of I_{PN}	t_{ra}	μs			0.3	
Response time @ 90 % of I_{PN}	t_r	μs			0.3	
-3 dB band width	BW	kHz		400		
Noise	V_{no}	mVpp		5		
DC ~ 10 kHz				6		
Accuracy @	X	% of I_{PN}			0.8	@ 25°C
					1.1(1.3)	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Primary current, detection threshold	I_{PTh}	A	$2.66 \times I_{PN}$	$2.73 \times I_{PN}$	$2.8 \times I_{PN}$	

Overcurrent detection response time	$t_{r Th}$	μs		1	1.5	Overcurrent detection measured over temperature -40 °C . 105 °C with a I_P step of $5 \times I_{PN}$ and $di/dt = 50 \text{ A}/\mu\text{s}$
Overcurrent detection hold time	$t_{hold Th}$	ms		3		

5. Step response time



The step response time of STB-xxCAS/FC 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 μs.

