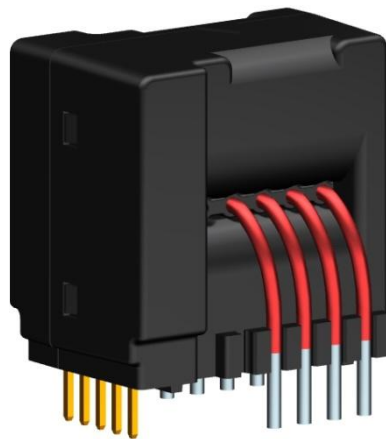


CURRENT SENSOR

PRODUCT SERIES: STB-CAS/K/FC

PRODUCT PART NUMBER: STB-25CAS/K/FC
STB-50CAS/K/FC

REVISION: Ver 1.1



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CONTENT

1.	Description	2
2.	STB-25CAS/K/FC parameters	3
3.	STB-50CAS/K/FC parameters	4
4.	Step response time	5
5.	Dimensions: STB-CAS/K/FC	6

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_stg	°C	-40 ~ 105
Mass	m	g	15

Absolute parameters

Parameters	Symbol	Unit	Value
Supply voltage	Vc	V	6
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	Ud	kV	4	
Impulse withstand voltage 1.2/50µs	Ūw	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	

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.

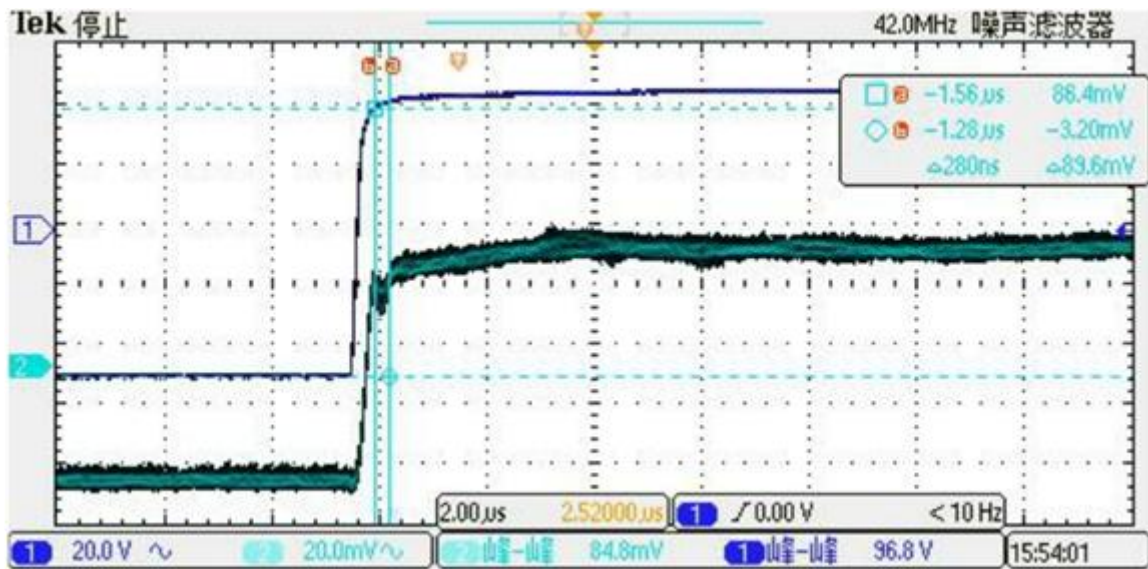
Parameters	Symbol	Unit	Min.	Typ.	Max.	Remark
Primary nominal RMS	I_{pn}	A		25		
Primary current, measuring range	I_{pm}	A	-85		85	
Number of primary turns	N_P			1,2,4		
Supply voltage	V_c	V	4.75	5	5.25	
Current consumption	I_c	mA		$15 + I_P \cdot N_P / N_S \cdot 1000$		$N_S = 1200$
Reference voltage@ $I_p=0A$	V_{off}	V	2.48	2.5	2.52	
Output voltage @ I_{pn}	V_{FS}	V		$V_{off} \pm 0.625$		
Output voltage @ I_{pm}	V_{FSM}	V		$V_{off} \pm 2.125$		
Temperature coefficient of V_{off}	TCV_{off}	ppm/K		± 5	± 50	Internal reference
Temperature coefficient of V_{out} @ $I_P = 0\text{ A}$	TCV_{FS}	ppm/K		± 1.4	± 4	ppm/K of 2.5V ($-40^\circ\text{C} \dots 105^\circ\text{C}$)
Theoretical sensitivity	G_{th}	mV/A		25		$0.625\text{V} @ I_{pn}$
Sensitivity error	ξ_G	%	-0.7		0.7	100 % tested
Temperature coefficient of G	TCG	ppm/K			± 40	$-40^\circ\text{C} \dots 105^\circ\text{C}$
Linearity error $0 \sim I_{pn}$	ξ_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 DC ~ 10 kHz	V_{noise}	mVpp		5		
DC ~ 100 kHz				6		
Accuracy @ RT	X	% of I_{pn}			0.8	@ 25°C
Accuracy @ $T_A = 85^\circ\text{C}$ (105°C)	X_{TRange}	% of I_{pn}			1.15(1.25)	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Primary current, detection threshold	I_{p_Th}	A	$4.02 \times I_{pn}$	$4.1 \times I_{pn}$	$4.17 \times I_{pn}$	
Overcurrent detection response time	Tr_Th	μs		1.4	2.2	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 $di/dt = 50$
Overcurrent detection hold	$Thold_Th$	ms		1		

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 current	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_c	V	4.75	5	5.25	
Current consumption	I_c	mA		15 + $I_P \cdot N_P / N_S \cdot 1000$		NS =1200
Reference voltage@ $I_p=0\text{A}$	V_{off}	V	2.48	2.5	2.52	
Output voltage @ I_{pn}	V_{FS}	V		$V_{off} \pm 0.625$		
Output voltage @ I_{pm}	V_{FSM}	V		$V_{off} \pm 1.875$		
Temperature coefficient of V_{off}	TCV_{off}	ppm/K		± 5	± 50	Internal reference
Temperature coefficient of V_{out} @ $I_P = 0\text{ A}$	TCV_{FS}	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 @ I_{pn}
Sensitivity error	ξ_G	%	-0.7		0.7	100 % tested
Temperature coefficient of G	TCG	ppm/K			± 40	$-40^\circ\text{C} \dots 105^\circ\text{C}$
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	
Response time @ 90 % of I_{pn}	t_r	μs			0.3	
-3 dB band width	BW	kHz		400		
Noise DC ~ 10 kHz	V_{noise}	mVpp		5		
DC ~ 100 kHz				6		
Accuracy @ RT	X	% of I_{pn}			0.8	@ 25°C
Accuracy @ $T_A = 85^\circ\text{C}$ (105 °C)	X_{TRange}	% of I_{pn}			1.1(1.3)	$-40^\circ\text{C} \sim 105^\circ\text{C}$
Primary current, detection threshold	I_{p_Th}	A	$4.02 \times I_{pn}$	$4.1 \times I_{pn}$	$4.17 \times I_{pn}$	
Overcurrent detection response time	Tr_Th	μs		1.4	2.2	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 $di/dt = 50$
Overcurrent detection hold	$Thold_Th$	ms		1		

4. Step response time



The step response time of STB-xxCAS/F 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.

5. Dimensions: STB-CAS/K/FC

