



CURRENT SENSOR

—— *Coreless solution*
无磁芯方案



Founded in 2013, Sinomags is dedicated to the development and production of magnetic sensors. We have Wuxi Lertech, Ningbo, Bengbu and SENSITEC in Germany.

The company's R&D team consists of more than 150 R&D personnel with a number of experts in the field of magnetism and power electronics as the core, covering the design development and production of the whole industrial chain from xMR wafers to sensor modules.

1200/150 people

1200 employees, 150 R&D staff

150 Mpcs

Wafer capacity 150 million pcs/year

100 Mpcs

2022 *current sensor* production capacity exceeds 100 million

250 Mpcs

Cumulative *current sensor* shipments of approximately 250 million units per year



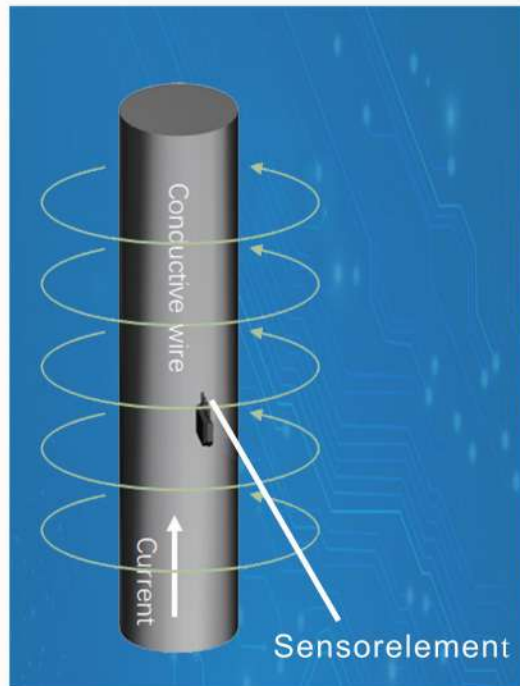
- Wuxi
R&D & Headquater
- Bengbu
Production for Current Sensor
- Ningbo
R&D & Production for Current Sensor
- Mainz
Waferfab for magnetic sensor
- Wetzlar
R&D Center for magnetic sensor



Current sensor

Coreless solution

The Sinomags and Sensitec chip level sensor types offers developers from the fields of power electronics the possibility of integrating a measuring point in a very small space.

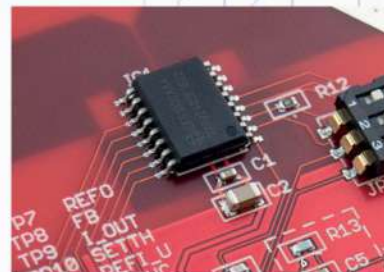


Due to the compact design, these sensors can be easily integrated into existing constructions. New developments, on the other hand, can be significantly reduced in their overall size. The trend in power electronics is no different than in other areas of electronics, the smaller the parts, the more compact the overall design can be at the end. The Sinomags and Sensitec chip level sensors were developed to meet this trend towards higher integration. In contrast to the modul level products, in which the current conductor is integrated, the concept of the chip level types is different.

Working principle:

The sensor brought close to an existing conductor, which can be a cable, a current bar or a conductor track within a circuit board. The sensing element (AMR or TMR) detects the magnetic field of the conductor and converts it into an output voltage. This is the basic principle of open loop technology.

Important is the galvanic isolation of the sensor to the conductor. In the 616 product series, this is performed by the printed circuit board on which the TMR sensor is bonded. At the CFS1000 the SO16w package has an integrated galvanic isolation and over the pins a correct distance is ensured. The sensed current can be either positive or negative. This polarity of the magnetic field is sensed to produce either a positive or negative voltage output around a voltage reference. Both, the distance from the sensor to the conductor and the design of the conductor track itself affect the sensitivity. A narrow track has a higher sensitivity, but also increase in temperature easier. There are different ways around to achieve a balanced configuration between sensitivity and temperature. The engineers at Sinomags and Sensitec support you with their experience and know-how with this challenges. Therefore, it is important that you involve them early in your design phase, so you avoid mistakes that are difficult to correct afterwards.



The chip-level sensors from Sinomags and Sensitec are used wherever a cost attractive and integrated solution is required.

Product Series: STK-616



Features

- Frequency band width of up to 150~2000 kHz
- Response time of down to 0.05~1.5 μ s
- Open loop design
- Coreless design enables the small dimensions
- Differential magnetic field detection design supports the common-mode field rejection.
- OCD (over current detection) function available
- Support supply voltage of 3.3 V or 5.0 V

Application

- Solar energy
- Motor driver
- Uninterruptible power supply
- Switching Mode Power Supply
- EV charger
- EV OBC
- EV DC/DC

● Electrical parameters

Product	Partnumber	Normal Current	Current detection range	Supply Voltage	Sensitivity	Frequency Bandwidth	Step response time	Clearance	OCD Function	Trigger Delay	Trigger Holding	Accuracy Error	PRODUCT PACKAGE	COMPANY PRODUCT
		I _{pn} (A)	I _{pm} (A)	V _{cc} (V)	Gain (mV/A, mA/A)	f _{band} (kHz)	t _r (μs)	mm	OCD	t _{mask} (μs)	t _{hold} (ms)	Acc (%FS)		
STK-616K	STK-616K-30GB	±30	±34.5	5	66.7	150	1.5	6	YES	0~3	0~4.5	3	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-732/3
	STK-616K-40GB	±40	±46	5	50	150	1.5	6	YES	0~3	0~4.5	3		
	STK-616K-65GB	±65	±74.7	5	30	150	1.5	6	YES	0~3	0~4.5	3		
	STK-616K-65GC	±65	±74.7	3.3	20	150	1.5	6	YES	0~3	0~4.5	3		
	STK-616K-40GC	±40	±46	3.3	33	150	1.5	6	YES	0~3	0~4.5	3		
	STK-616K-75GB	±75	±74.7	5	26.6	150	1.5	7	YES	0~3	0~4.5	3		
STK-616T	STK-616T-40GB	±40	±46	5	50	150	1.5	7	YES	0~3	0~4.5	3	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-37002
	STK-616T-65GB	±65	±74.7	5	30	150	1.5	7	YES	0~3	0~4.5	3		
	STK-616T-66GC	±66	±75.9	3.3	19.8	150	1.5	7	YES	0~3	0~4.5	3		
	STK-616T-100GB	±100	±115	5	20	150	1.5	7	YES	0~3	0~4.5	3		
	STK-616T-133GU	133	152	3.3	19.8	150	1.5	7	YES	0~3	0~4.5	3.5		
	STK-616T-30GB	±30	±34.5	5	66.67	150	1.5	7	YES	0~3	0~4.5	3		
STK-616H	STK-616T-30GC	±30	±34.5	3.3	44	150	1.5	7	YES	0~3	0~4.5	3	SOIC16W Like 11.2 × 11.7 mm	LEM HMSR
	STK-616H-20GB	±20	±23	5	40	300	2	7	YES	0~3	0~4.5	3		
STK-616H	STK-616H-30GB	±30	±34.5	5	26.67	300	2	7	YES	0~3	0~4.5	3	SOIC16W Like 11.2 × 11.7 mm	LEM HMSR
	STK-616H-30GB	±30	±34.5	5	26.67	300	2	7	YES	0~3	0~4.5	3		
STK-616V	STK-616V-50AB	±50	±57.5	5	40	150	1.5	1.2	N/A	N/A	N/A	3.5	SOIC8 Like 5.5 × 6.2 mm	ALLEGRO ACS-780
	STK-616V-100AB	±100	±115	5	20	150	1.5	1.2	N/A	N/A	N/A	3.5		
	STK-616V/150AB	±150	±172	5	13.33	150	1.5	1.2	N/A	N/A	N/A	3.5		
	STK-616V-50AC	±50	±55	3.3	26.4	150	1.5	1.2	N/A	N/A	N/A	3.5		
	STK-616V-100AC	±100	±110	3.3	13.2	150	1.5	1.2	N/A	N/A	N/A	3.5		
	STK-616V-150AC	±150	±165	3.3	8.8	150	1.5	1.2	N/A	N/A	N/A	3.5		
STK-616Y	STK-616V-150GB	±150	±172	5	13.33	150	1.5	1.2	N/A	N/A	N/A	3.5	SOIC8 Like 5.5 × 6.2 mm	ALLEGRO ACS-712 ACS-725, ACS-730
	STK-616Y-20B3	±20	±22	3.3	66	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-20B5	±20	±23	5	100	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-30B3	±30	±33	3.3	44	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-30B5	±30	±34.8	5	66	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-40B3	±40	±44	3.3	33	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-50B3	±50	±55	3.3	26.4	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-50B5	±50	±57.5	5	40	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-30U3	30	33	3.3	88	150	1.5	2.5	N/A	N/A	N/A	3.5		
	STK-616Y-250B3	250	-50~300	3.3	6.24	150	1.5	1.5	N/A	N/A	N/A	3.5		

● Electrical parameters

Product	Partnumber	Normal Current	Current detection range	Supply Voltage	Sensitivity	Frequency Bandwidth	Step response time	Clearance	OCD Function	Trigger Delay	Trigger Holding	Accuracy Error	PRODUCT PACKAGE	COMPANY PRODUCT
		I _{pn} (A)	I _{pm} (A)	V _{cc} (V)	Gain (mV/A, mA/A)	f _{band} (kHz)	t _r (μs)	mm	OCD	t _{mask} (μs)	t _{hold} (ms)	Acc (%FS)		
STK-616E	STK-616E/20GB	±20	±23	5	100	150	1.5	6	YES	0~3	0~4.5	3.5	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-724
	STK-616E/30GB	±30	±34.5	5	66	150	1.5	6	YES	0~3	0~4.5	3.5		
	STK-616E/50GB	±50	±57.5	5	40	150	1.5	6	YES	0~3	0~4.5	3.5		
	STK-616E/65GB	±65	±74.5	5	30.75	150	1.5	6	YES	0~3	0~4.5	3.5		
STK-616KMF	STK-616K-40MFB3	40	±40	3.3	33	1000	0.5	7.5	YES	0~3	0~4.5	3	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-732/3
	STK-616K-65MFB3	65	±65	3.3	20	1000	0.5	7.5	YES	0~3	0~4.5	3		
STK-616ZMF	STK-616Z-20MFB5	20	±20	5	10	2000	0.05	4.2	YES	0~3	0~4.5	3.5	SOIC8 Like 4.9 × 6.0 mm	NA
	STK-616Z-30MFB5	30	±30	5	66	2000	0.05	4.2	YES	0~3	0~4.5	3.5		
	STK-616Z-40MFB5	40	±40	5	50	2000	0.05	4.2	YES	0~3	0~4.5	3.5		
	STK-616Z-50MFB5	50	±50	5	40	2000	0.05	4.2	YES	0~3	0~4.5	3.5		
STK-616EML	STK-616E-20MLB5	20	±20	5	100	600	0.9	8	YES	0~3	0~4.5	3.5	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-724
	STK-616E-30MLB5	30	±30	5	66	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616E-50MLB5	50	±50	5	40	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616E-65MLB5	65	±65	5	30.75	600	0.9	8	YES	0~3	0~4.5	3.5		
STK-616TML	STK-616T-20MLB3	20	±20	3.3	66	600	0.9	8	YES	0~3	0~4.5	3.5	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-37002
	STK-616T-40MLB3	40	±40	3.3	33	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616T-65MLB3	65	±65	3.3	19.8	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616T-40MLB5	40	±40	5	50	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616T-65MLB5	65	±65	5	30	600	0.9	8	YES	0~3	0~4.5	3.5		
	STK-616T-40MFB3	40	±40	3.3	66	1500	0.2	8	YES	0~3	0~4.5	3.5		
STK-616TMF	STK-616T-65MFB3	65	±65	3.3	33	1500	0.2	8	YES	0~3	0~4.5	3.5	SOIC16W Like 10.3 × 10.3 mm	ALLEGRO ACS-37002
	STK-616T-40MFB5	40	±40	5	50	1500	0.2	8	YES	0~3	0~4.5	3.5		
	STK-616T-65MFB5	65	±65	5	30	1500	0.2	8	YES	0~3	0~4.5	3.5		
STK-616YML	STK-616Y-20MLB5	20	±20	5	10	350	1.2	2	YES	0~3	0~4.5	3.5	SOIC8 Like 4.9 × 6.0 mm	ALLEGRO ACS-712 ACS-725 ACS-730
	STK-616Y-30MLB5	30	±30	5	66	350	1.2	2	YES	0~3	0~4.5	3.5		
	STK-616Y-40MLB5	40	±40	5	50	350	1.2	2	YES	0~3	0~4.5	3.5		
	STK-616Y-50MLB5	50	±50	5	40	350	1.2	2	YES	0~3	0~4.5	3.5		
	STK-616Y-50MLB3	50	±50	3.3	26.4	300	1.2	2	YES	0~3	0~4.5	3.5		
	STK-616Y-50MLB3	50	±50	3.3	26.4	300	1.2	2	YES	0~3	0~4.5	3.5		

Product Series: STK-LBS



STK-LBS/6G



STK-LBS/S

Features

- High frequency band width of 250 kHz
- Response time of down to 3 μ s
- Open loop design
- Coreless design enables the small dimensions
- Ampere circuital theorem design supports the common-mode field rejection.
- Support supply voltage of 3.3 V or 5.0 V

Application

- Motor driver

Electrical parameters

Product	Partnumber	Primary Current range		Sensitivity	Frequency Bandwidth	Step response time	Clearance	OCD Function	Trigger Delay	Trigger Holding	Fluxgate	Close-loop	Open-loop
		I _{pm} (A)	V _{cc} (V)										
STK-LBS/S	STK-200LBS/S	± 200	3.3	6	250	3	1	N/A	N/A	N/A			○
STK-LBS/6G	STK-100LBS/6G	± 100	5	20	250	3	0.5	N/A	N/A	N/A			○
	STK-200LBS/6G	± 200	5	10	250	3	0.5	N/A	N/A	N/A			○
	STK-300LBS/6G	± 300	5	6.66	250	3	0.5	N/A	N/A	N/A			○
	STK-400LBS/6G	± 400	5	5	250	3	0.5	N/A	N/A	N/A			○
	STK-500LBS/6G	± 500	5	4	250	3	0.5	N/A	N/A	N/A			○
	STK-600LBS/6G	± 600	5	3.33	250	3	0.5	N/A	N/A	N/A			○
	STK-700LBS/6G	± 700	5	2.85	250	3	0.5	N/A	N/A	N/A			○
	STK-800LBS/6G	± 800	5	2.5	250	3	0.5	N/A	N/A	N/A			○
	STK-900LBS/6G	± 900	5	2.22	250	3	0.5	N/A	N/A	N/A			○
	STK-1000LBS/6G	± 1000	5	2	250	3	0.5	N/A	N/A	N/A			○

Product Series: CFS-1000



Integrated MagnetoResistive Current Sensor

The sensor device includes a high-precision sensor signal conditioner IC providing internal feedback of a compensation current for optimum linearity. The IC output is an offset calibrated and prescaled current which is proportional to the primary current measured. This output is easily converted to a voltage with an external resistor at the post-processing device (usually ADC or amplifier). A precision chip voltage reference is generated. Alternatively, an external reference can be used. Total accuracy of a multi-sensor system is improved by sharing one voltage reference for all sensors. Additionally, a fast overcurrent alarm output allows immediate reaction to overload events independent of controller and software.

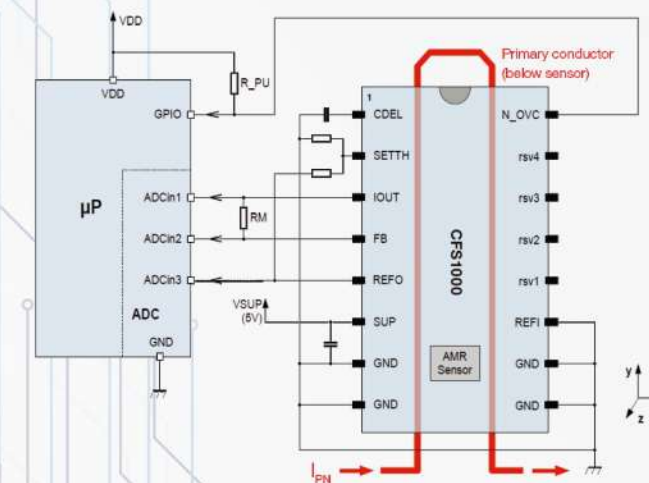
Product Overview

Article Description	Package	Delivery Type
CFS1000AAA-AE	SOIC16w (300 mil)	Tape on reel

Quick Reference Guide

Parameter	Description	Min.	Typ.	Max.	Unit
V _{SUP}	Supply voltage	4.75	5.0	5.25	V
I _{PN}	Primary nominal current (RMS) ¹⁾	10		1000	A
I _{OUT}	Output current at I _{PN}		2		mA
f _{CO}	Upper cut-off frequency (-3 dB)		500		kHz
ϵ_z	Overall accuracy ²⁾ (T = 25 °C; calibrated)			± 1.3	%
T _{LT}	Overall accuracy ²⁾ (T = -40 °C to +125 °C; calibrated)			± 2	%
T _{amb}	Ambient temperature	-40		+125	°C

Application Circuitry



Features and Benefits

- AEC-Q100 Rev-H, Grade 1 qualified
- Based on Anisotropic Magneto-Resistive (AMR) effect
- Galvanic isolation: Contactless current sensing
- Differential field measurement: High immunity to magnetic stray fields
- High bandwidth current measurement: DC to 500 kHz
- Very fast response time: < 1 μ s
- Coreless measurement: Negligible output hysteresis
- Excellent accuracy
- Factory programmed zero-offset temp-coefficient
- Internal precision reference or external reference input
- Fast overcurrent detection with tunable threshold

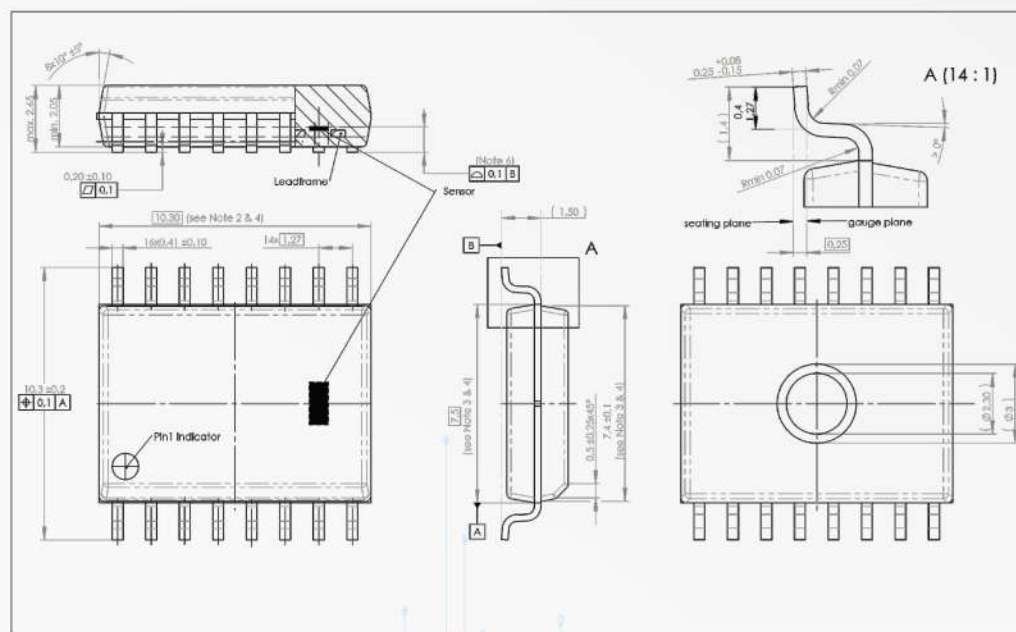
Main Application Fields

- E-Mobility
- EV traction
- Electrical motor controls, AC variable speed drives
- Power inverters
- Photovoltaics (micro-inverters)
- Switch mode power supplies (SMPS)
- Current measurement for safety switch control
- Battery management

Package Information

The CFS1000 is available in a Pb free, RoHs compliant, SO16w plastic package according to JEDEC MS-013-F, variant AA.

The package is classified to Moisture Sensitivity Level 3 (MSL 3) according to JEDEC J-STD-020 with a soldering peak temperature of $(260 \pm 5) ^\circ\text{C}$.



Product Code Calibration Module

Product code	Number of connectors	Illustration
CFP1000AAA	1 x	
CFP1000ABA	4 x	

Product Code Sensor

Product code	Package	Packaging	Illustration
CFS1000AAA	SOIC16w	Tape & Reel	

Product Codes Evaluation Boards

Product code	I_{PR} (A)	I_{PR} (A)	Illustration
CFK1015AAA	15	45	
CFK1025AAA	25	75	
CFK1050AAA	50	150	
CFK1100ABA	100	300	
CFK1250ABA	250	750	
CFK1400ABA	400	1200	
CFK1200ACA	3 x 200	3 x 600	

Analytical simulation software



Analytical simulation of CFS1000 sensor for standard current bar designs