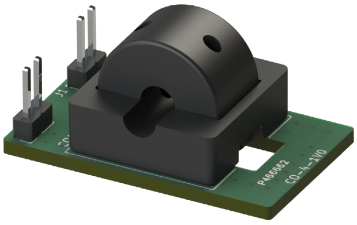
CO-04-SF-A

4[mm] Clamp-On Non-Intrusive Current Sensor Module

1 General Description



The CO-04-SF-A is an analog open loop current sensor module designed for non-intrusive and isolated measurement of electric currents. Thanks to the clamp-on design, the contactless current sensor can be safely installed without the need to interrupt or cut the cable.

The module consists of a PCB including Melexis IMC-Hall® planar current sensor, CO-04-SF Clamp-On shield and the necessary components to straightforwardly install and operate.

Supplied with a DC voltage of 5V, the module provides a linear analog output voltage between 500 mV and 4500 mV as a function of the primary input current. Thanks to its properties, CO-04-SF-A offers an excellent linearity error, below 0.5 %FS. Thanks to the integrated Melexis IMC-Hall® current sensor, the sensor module provides excellent offset as low as ±5 mV and sensitivity drift of 1 % over full temperature range.

Applications include DC and AC current sensing up to 30 kHz, motor control, battery monitoring, charge control, white goods, and many more.

2 Features

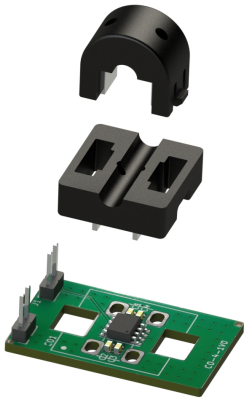
- Low hysteresis
- High Permeability
- Hall-Sensor Measurement
- High Linearity up to 150 A
- Temperature Range: 10 to 85 $°C$
- Low Offset drift <5 mV
- Low Sensitivity drift <1 %
- DC and AC (30 kHz)

3 Advantages

- Snap-Fit installation
- Non intrusive sensing
- Small Size, Lightweight
- Excellent output linearity

4 Applications

- IoT
- Industrial
- E-metering
- Photovoltaic



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5 Revision History

Revision/Changes	Page
• Revision A: initial datasheet	all

6 Ordering Information

CO-04-SF-A(Product) XXX(Option Code)

Option Codes ⇒ Current Range. Current Range defines the peak current value.

Product	Option Code	Typical Sensitivity	Current Range
CO-04-SF-A	100	200.00 mV/A	±10 A
CO-04-SF-A	250	80.00 mV/A	±25 A
CO-04-SF-A	500	40.00 mV/A	±50 A
CO-04-SF-A	101	20.00 mV/A	±100 A
CO-04-SF-A	151	13.33 mV/A	±150 A

Contact maglab AG / PML India for a different sensitivity requirement

7 Absolute Maximum Ratings

Non operating conditions

Table 1: Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Positive Supply Voltage	V_{DD}	+10	V
Reverse Supply Voltage	$V_{DD_{REV}}$	-0.3	V
Positive Output Voltage	V_{OUT}	+10	V
Reverse Output Voltage	$V_{OUT_{REV}}$	-0.3	V
Positive Output Current	I_{OUT}	+50	mA
Reverse Output Current	$I_{OUT_{REV}}$	-50	mA
Ambient Temperature	T_A	0 to +120	°C
ESD Human Body Model	ESD_{HBM}	2	kV

IMPORTANT: exceeding the absolute maximum ratings may cause permanent damage to the sensor module. Exposure to absolute maximum-rated conditions for extended periods of time may affect sensor module reliability.

8 General Electrical Specification

Operating conditions T_A = 10 to +85 °C, V_{DD} = 5V±10%, unless otherwise specified.

Table 2: Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Nominal Supply Voltage	V_{DD}		4.5	5	5.5	V
Supply Current	I_{DD}	No output load	9	12.5	15	mA
Output Resistive Load	R_L	For high linearity	10	25	200	kΩ
Linear Output Range	$V_{OUT_{LIN}}$	$R_L \geq 10k\Omega$	10		90	$\%V_{DD}$
Broken GND Ouptut Level		$R_L \geq 10k\Omega$, $V_{DD} = 5V$	96		100	$\%V_{DD}$
Broken VDD Ouptut Level		$R_L \geq 10k\Omega$, $V_{DD} = 5V$	0		4	$\%V_{DD}$
Output Quiescent Voltage	V_{OQ}	$R_L \geq 10k\Omega$, $V_{DD} = 5V$		50		$\%V_{DD}$

9 Analog Output Specification

9.1 Accuracy Specification

Operating conditions T_A = 10 to +85 °C, V_{DD} = 5V±10%, unless otherwise specified.

Table 3: Accuracy specification

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Thermal Offset Drift	$\Delta^T V_{OQ}$	T_A= 0 to 85 °C		±5		mV
Thermal Sens. Drift	$\Delta^T S$	T_A= 0 to 85 °C		±1		%S
RMS Output Noise	N_{RMS}	NOISE FILTER=0		8		mV_{RMS}
V_{OQ} Ratiometry	$\Delta^R V_{OQ}$	$V_{DD} = 5V$±5%		±0.4		$\%V_{OQ}$
Sensitivity Ratiometry	$\Delta^R S$	$V_{DD} = 5V$±5%		±0.4		$\%V_{OQ}$

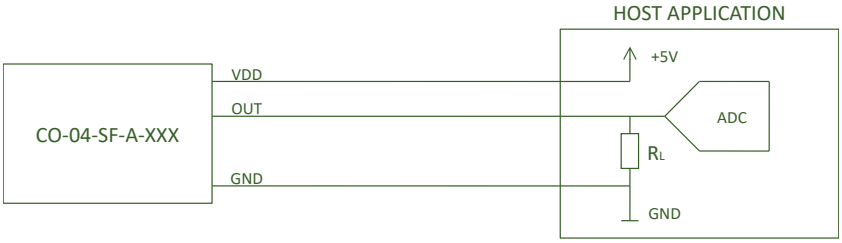
9.2 Timing Specification

Operating conditions T_A = 10 to +85 °C, V_{DD} = 5V±10%, unless otherwise specified.

Table 4: Timing Specification

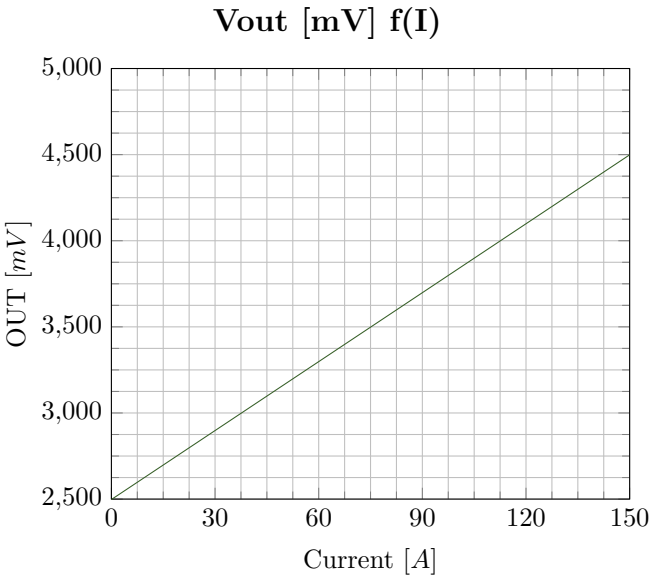
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Refresh Rate	T_{RR}			1		μs
Step Response Time	T_R			2		μs
Bandwidth	BW			30		kHz

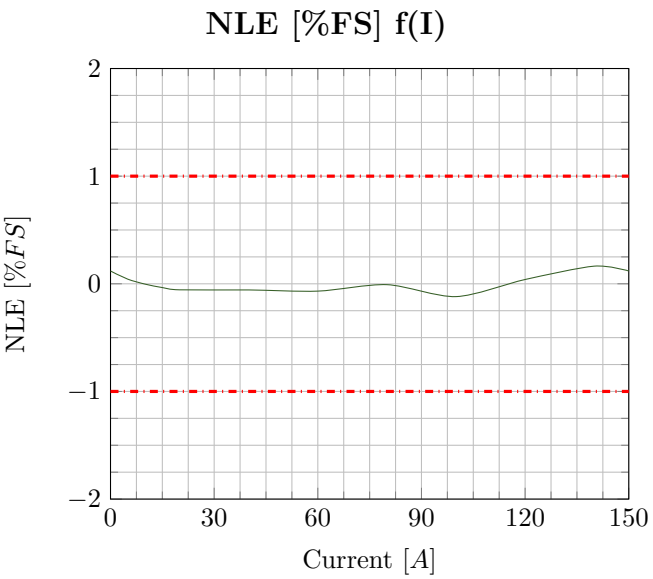
10 Application Diagram



11 Typical Performance

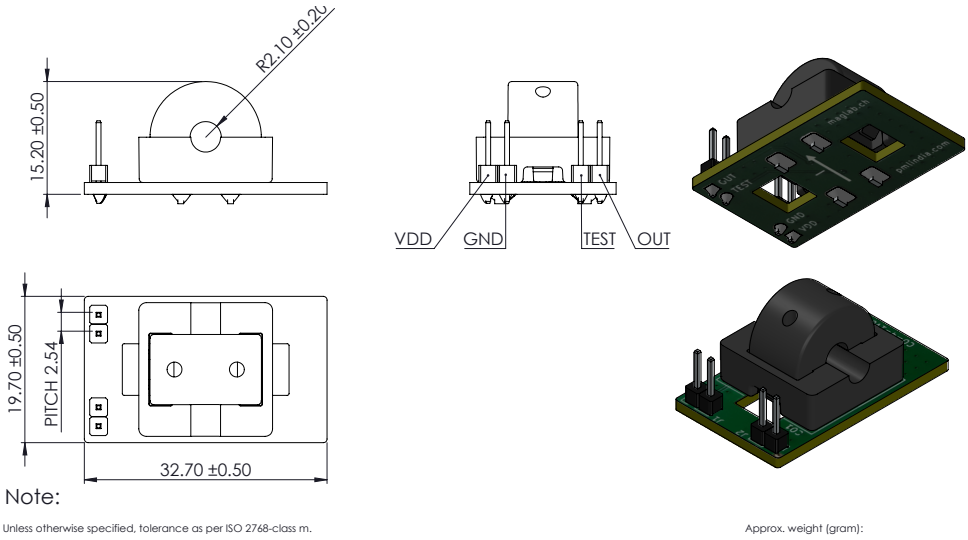
11.1 CO-04-SF-A-151





12 Dimensions

Dimensions are expressed in [mm]



Note:

Unless otherwise specified, tolerance as per ISO 2768-class m.

Approx. weight (gram):

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