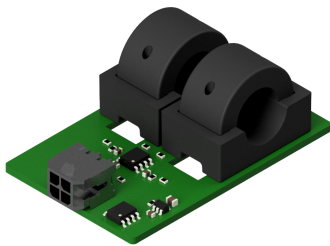


# MDC-DI-10S-A

Differential Current Sensor with Analog Output

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## 1 General Description



The DI-10S-A is a differential current Sensor for safety critical application, offering two independent analog outputs for full redundancy. Thanks to the non-intrusive clamp-on design, the sensor can be easily installed without requiring any disconnection, which makes it ideal for retrofit installations in industrial, IoT and metering applications. Furthermore, a broad dynamic range of currents can be measured and no calibration is required by the customer.

Supplied with a DC voltage of 5V or 10V, the module provides a linear analog output voltage between 0.5V and 4.5V or 1V to 9V as a function of the primary input current. Thanks to its properties, DI-10S-A offers an excellent linearity error, below 0.5 %FS. Thanks to the integrated Melexis IMC-Hall<sup>®</sup> current sensor, the sensor module provides excellent offset as low as  $\pm 5\text{mV}$  and sensitivity drift of 1 % over full temperature range.

The module has a differential output. Each Hall-Sensor will generate a rising or falling signal, depending on current the flow.

## 2 Features

- Supply Voltage: 5 VDC or 10 VDC
- Hall-Sensor Measurement
- Redundant Current Measurement
- Temperature Range: 10° to 85°C
- Low Offset Drift <5 mV
- Low Sensitivity drift <1 %
- DC and AC up to 30kHz

## 3 Advantages

- Snap-Fit installation
- Non intrusive sensing
- Small Size / Lightweight
- Redundant measurements
- Excellent output linearity

## 4 Applications

- Industrial
- E-metering
- E-mobility
- Photovoltaic
- Redundant measurements
- Battery management system

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## 5 Revision History

<b>Revision/Changes</b>	<b>Page</b>
• Revision A: initial datasheet . . . . .	all

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## 6 Ordering Information

MDC-DI-10S-A(Product) XXX(Option Code)

Option Codes  $\Rightarrow$  Current Range. Current Range defines the peak current value.

Product	Option Code	Typical Sensitivity	Current Range
MDC-DI-10S-A	250	80.00 mV/A	$\pm 25$ A
MDC-DI-10S-A	500	40.00 mV/A	$\pm 50$ A
MDC-DI-10S-A	101	20.00 mV/A	$\pm 100$ A
MDC-DI-10S-A	201	10.00 mV/A	$\pm 200$ A

Contact maglab AG for a different sensitivity requirement

## 7 Absolute Maximum Ratings

**Table 1: Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
Positive Supply Voltage	$V_{DD}$	+10	V
Reverse Supply Voltage	$V_{DDREV}$	-0.3	V
Positive Output Voltage	$V_{OUT}$	+10	V
Reverse Output Voltage	$V_{OUTREV}$	-0.3	V
Output Current	$I_{OUT}$	$\pm 50$	mA
Reverse Output Current	$I_{OUTREV}$	-50	mA
Ambient Temp.	$T_A$	0 to +105	$^{\circ}\text{C}$

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 Parameters  $T_A = +10$  to  $+85$  °C,  $V_{DD} = 5V \pm 10\%$ , unless otherwise specified.

**Table 2: Electrical Specification**

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	18	25	30	mA
Output Resistive Load	$R_L$	For high linearity	10	25	200	k $\Omega$
Linear Output Range	$V_{OUTLIN}$	$R_L \geq 10k\Omega$	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	% $V_{DD}$
Primary Current	$I_{PN}$	$R_L \geq 10k\Omega$ , $V_{DD} = 5V$	10		250	Apk
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 Parameters  $T_A = +10$  to  $+85$  C,  $V_{DD} = 5V \pm 10\%$ , unless otherwise specified.

**Table 3: Accuracy specification**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Thermal Offset Drift	$\Delta^T V_{OQ}$			$\pm 5$		mV
Thermal Sens. Drift	$\Delta^T S$			$\pm 1$		%S
RMS Output Noise	$N_{RMS}$			8		mV $_{RMS}$
$V_{OQ}$ Ratiometry	$\Delta^R V_{OQ}$	$V_{DD} = 5V \pm 10\%$		$\pm 0.4$		% $V_{OQ}$
Sensitivity Ratiometry	$\Delta^R S$	$V_{DD} = 5V \pm 10\%$		$\pm 0.4$		% $V_{OQ}$

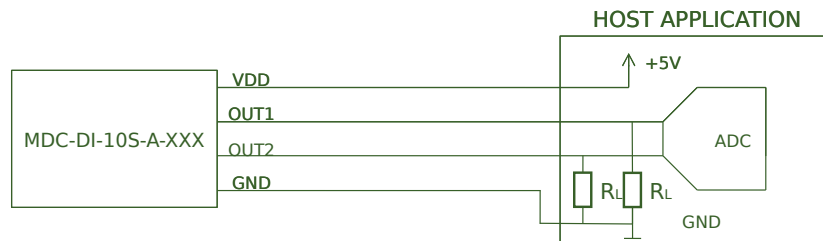
## 9.2 Timing and Frequency Specification

Operating Parameters  $T_A = +10$  to  $+85$  °C,  $V_{DD} = 5V \pm 10\%$ , unless otherwise specified.

**Table 4: Timing Specification**

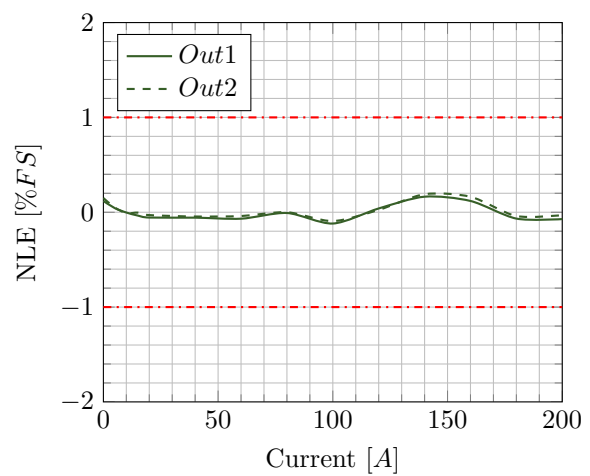
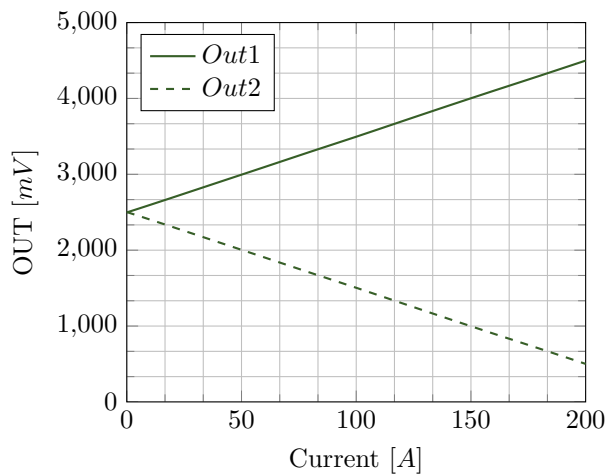
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Refresh Rate	$T_{RR}$			1		$\mu s$
Step Response Time	$T_R$	Delay time to 90% of $I_{PN}$		2		$\mu s$
Bandwidth	$BW$			30		$kHz$

## 10 Application Diagram

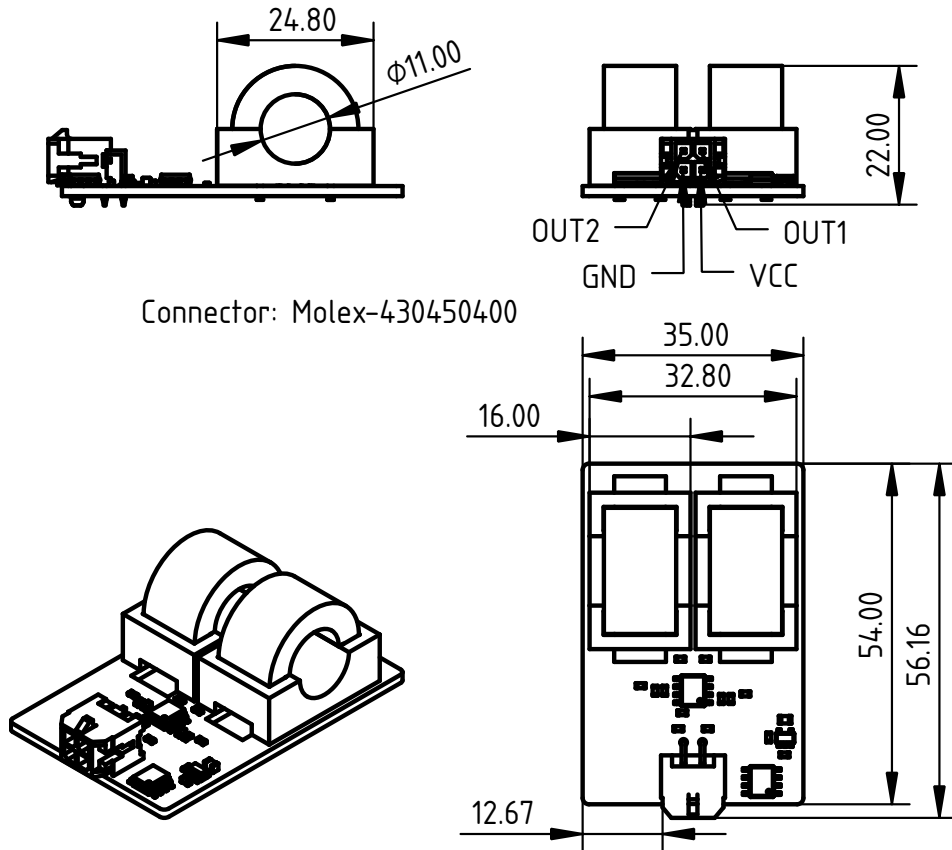


## 11 Typical performance

### 11.1 MDC-DI-10S-A-201



## 12 Dimensions



## 13 Disclaimer

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