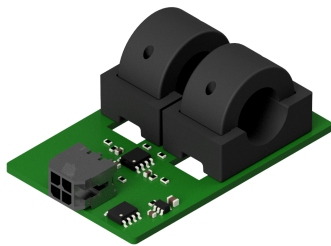


MDC-DI-10S-A

Differential Current Sensor with Analog Output

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® 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

Revision/Changes	Page
• Revision A: initial datasheet	all

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	± 25 A
MDC-DI-10S-A	500	40.00 mV/A	± 50 A
MDC-DI-10S-A	101	20.00 mV/A	± 100 A
MDC-DI-10S-A	201	10.00 mV/A	± 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}	± 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 Ω
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	$\Delta^T V_{OQ}$			± 5		mV
Thermal Sens. Drift	$\Delta^T S$			± 1		%S
RMS Output Noise	N_{RMS}			8		mV $_{RMS}$
V_{OQ} Ratiometry	$\Delta^R V_{OQ}$	$V_{DD} = 5V \pm 10\%$		± 0.4		% V_{OQ}
Sensitivity Ratiometry	$\Delta^R S$	$V_{DD} = 5V \pm 10\%$		± 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

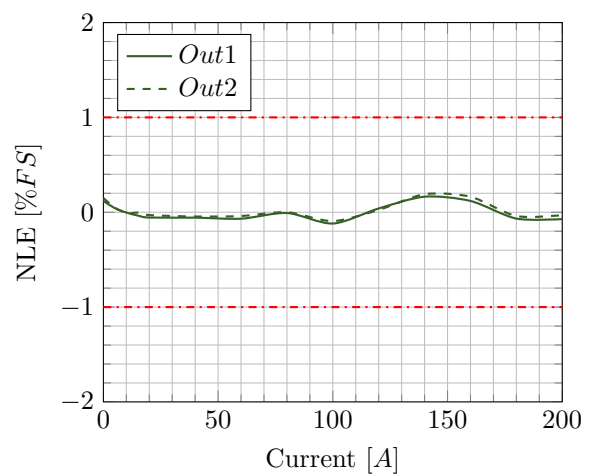
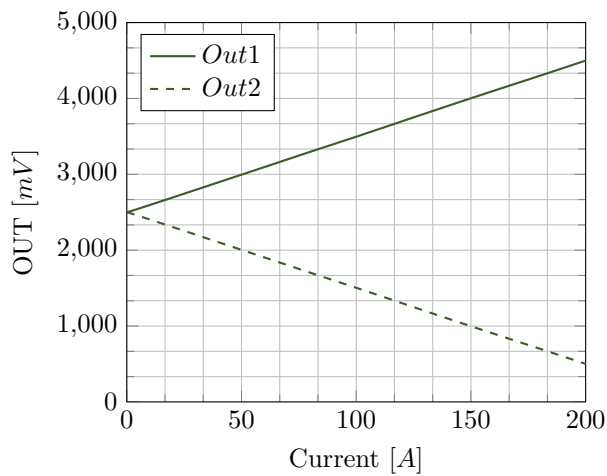
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Refresh Rate	T_{RR}			1		μs
Step Response Time	T_R	Delay time to 90% of I_{PN}		2		μs
Bandwidth	BW			30		kHz

10 Application Diagram



11 Typical performance

11.1 MDC-DI-10S-A-201



12 Dimensions

