

### DESCRIPTION:

The SENISENS CS series current sensors offer low current sensing with high voltage isolation capability. The SENISENS CS sensor incorporates the Melexis MLX91208 high sensitivity Hall IC and a multi-turn coil to further increase sensitivity.

#### FEATURES

- Low current - five ranges (0.1A to 8A)
- High current – two ranges (15A and 25A)
- High voltage isolation > 4KV
- Linear analog voltage output
- Accuracy <2% of FS
- Low current consumption
- Low input resistance
- Small size
- Through hole mounting

#### Low current:

CS0.1A-03: full scale  $\pm 0.1A$ , sensitivity 20V/A

CS0.2A-03: full scale  $\pm 0.2A$ , sensitivity 10V/A

CS0.25A-03-b: bidirectional full scale  $\pm 0.25A$ , sensitivity 8V/A

CS0.25A-03-u: unidirectional full scale 0.25A, sensitivity 16V/A

CS2.0A-03: full scale  $\pm 2A$ , sensitivity 1V/A

CS2.5A-03: full scale  $\pm 2.5A$ , sensitivity 0.8V/A

CS8A-03: full scale  $\pm 8A$ , sensitivity 0.25V/A

#### High current:

CS15A-03: full scale  $\pm 15A$ , sensitivity 0.13V/A

### TYPICAL APPLICATIONS:

- Process control.
- Application in laboratories and in production lines, etc.
- Due its design the CS sensor can be used in any application that requires continuous current sensing (no time limit).



Figure 1. Photo of the CS series current sensor

### SPECIFICATIONS CS sensor series:

The CS series current sensor contains a integrated circuit, multi turn coil and some other especially designed parts. Thanks to its unique design the CS series current sensors is capable to measure both a unidirectional and the bidirectional current. As an option it is possible to have the CS current sensor witch can measure only a unidirectional current, in this case sensitivity and an input resistance of the CS current sensor are doubled (this option is available only on the customer request). The rugged mechanical design and its small burden resistance make it useful in almost any application.

The CS series current sensors utilize a single side power supply (+5VDC). The output voltage is ratio metric to power supply. A output voltage range is 10-90 % of power supply:

The sensor is for a bidirectional and unidirectional current:

- If a current trough the sensor has maximum value with positive sign an output will be 90% of the power supply.
- If a current trough the sensor has maximum value with negative sign an output will be 10% of the power supply.
- If there is no current trough the sensor a output will be 50% of the power supply.

### Key features of the CS sensor series

The unique advantages of the CS current sensor series include:

- **Fully integrated analog ratio metric output current sensor**
- **Linear analog voltage output**
- **Measuring a unidirectional and bidirectional currents**
- **Accuracy <2% of FS**
- **High frequency bandwidth (from DC up to 5kHz)**
- **High disturbance immunity**
- **High voltage isolation >4KV**
- **Rugged package**
- **Wide working temperature range (from -40 to +85°C)**

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### Mechanical dimensions and schematics of the current sensors from CS0.1A-03 up to CS8A-03

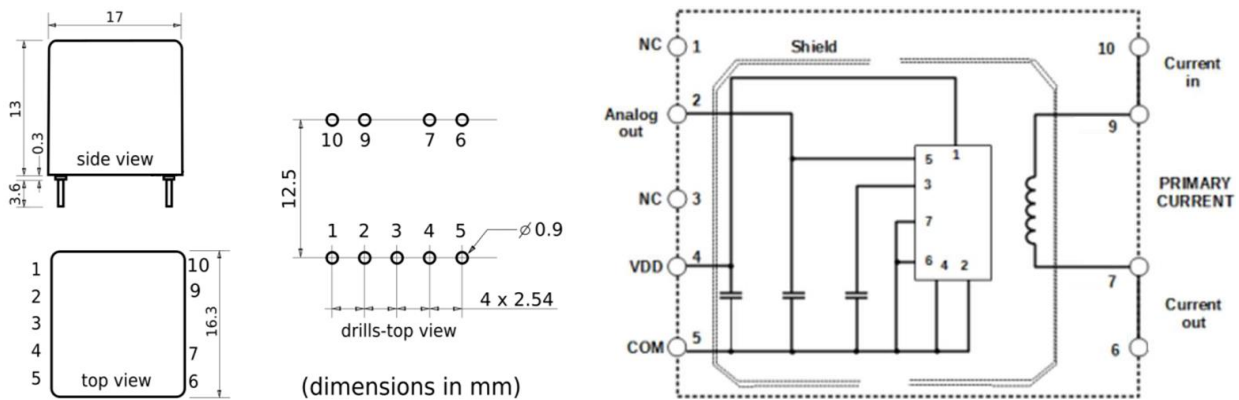


Figure 2. The CS low current series sensors outline drawing (mechanical dimensions) and pin out description.

### ELECTRICAL SPECIFICATIONS (from CS0.1A up to CS8A):

Unless otherwise noted, the given specifications apply at room temperature (23°C) and power supply of 5VDC.

CS-03 series current sensors	CS0.1A-03	CS0.2A-03	CS0.25A-03*	CS2.0A-03	CS2.5A-03	CS8A-03
<b>Vdd</b> – Normal Supply Voltage [V]	5	5	5	5	5	5
<b>Idd</b> – Supply Current [mA]	12	12	12	12	12	12
<b>Vout</b> - Analog Output Voltage Range [V]	0.5-4.5	0.5-4.5	0.5-4.5	0.5-4.5	0.5-4.5	0.5-4.5
<b>Iout</b> - Output Current [mA]	2	2	2	2	2	2
<b>Vq</b> - Quiescent voltage [V]	2.5	2.5	0.5	2.5	2.5	2.5
<b>S</b> – sensitivity [V/A]	20	10	16	1	0.8	0.25
<b>Ipri</b> - input circuit current [A]	0.1	0.2	0.25	2	2.5	8
<b>Rin</b> - input resistance [ $\Omega$ ]	3.54	1.2	1	0.021	0.01	0.009
<b><math>\Delta S/\Delta T</math></b> - sensitivity temperature drift [ppm/°C]	$\pm 200$	$\pm 200$	$\pm 200$	$\pm 200$	$\pm 200$	$\pm 200$
<b>T</b> - operating temperature [°C]	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85
<b>NL</b> - Nonlinearity [%]	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %
Resolution [mA]	0.04	0.08	0.1	0.8	1	3
Accuracy [% of FS]	<2					
<b>Voff</b> - offset (@ I = 0A) [V]	0.006					
<b>Viso</b> - dielectric isolation [kV]	$\geq 4$					
<b>L<sub>in</sub></b> – typical input inductance [ $\mu$ H]	225	60	139	0.45	0.42	0.08
<b>C<sub>in</sub></b> – typical input capacitance [pF]	< 1					
Noise Spectral Density @ f > 10 Hz (NSD <sub>w</sub> ) [ $\mu$ V/ $\sqrt{\text{Hz}}$ ] (**)	$\approx 25.9$	$\approx 23.8$	$\approx 23$	$\approx 20.5$	$\approx 20.5$	$\approx 24.8$
<b>BW</b> - Frequency Bandwidth [kHz]	5 kHz					
<b>Standards</b>	EN61000-4-2, EN61000-4-3, EN61000-4-8 EN61000-6-2:2008, EN55022:2011 EN50178 clause 9.4.1, 9.4.2, 9.4.3, 9.4.4 and 9.4.5					

note \* The CS0.25A-03 is programed as the unidirectional current sensor (DC)  **$V_q=0.5V @ I = 0A$  (on request can be programed as bidirectional with  $S=8V/A$ )**, all other CS-03 series sensors are programed as bidirectional (AC/DC) current sensors  **$V_q=2.5V @ I = 0A$** .

note \*\* Region of white noise

### Mechanical dimension of the CS15A-03 and CS25A-03

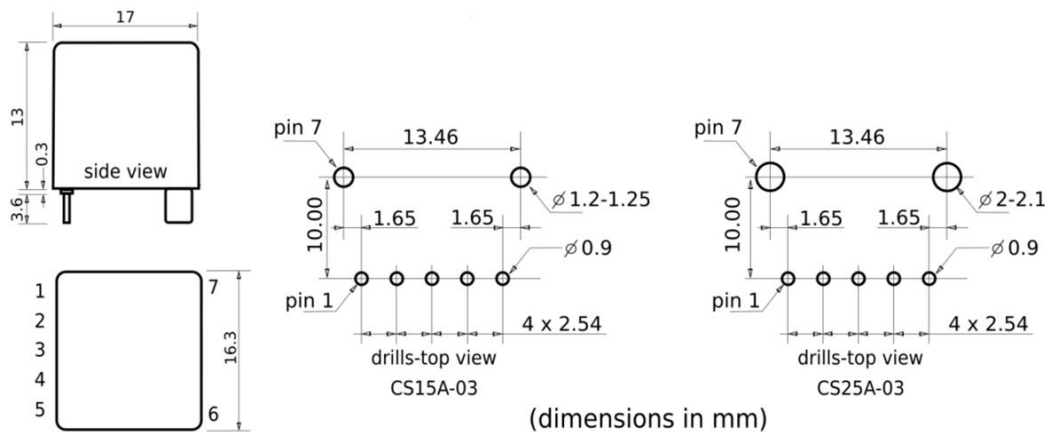


Figure 3. The CS high current series sensors outline drawing (mechanical dimensions).

### ELECTRICAL SPECIFICATIONS (of the CS15A-03 and CS25A-03):

Unless otherwise noted, the given specifications apply at room temperature (23°C) and power supply of 5VDC.

CS-03 series current sensors	CS15A-03	CS25A-03
<b>V<sub>dd</sub></b> – Normal Supply Voltage [V]	5	5
<b>I<sub>dd</sub></b> – Supply Current [mA]	12	12
<b>V<sub>out</sub></b> - Analog Output Voltage Range [V]	0.5-4.5	0.5-4.5
<b>I<sub>out</sub></b> - Output Current [mA]	2	2
<b>V<sub>q</sub></b> - Quiescent voltage [V] (*)	2.5	2.5
<b>S</b> – sensitivity [V/A]	0.13	0.08
<b>I<sub>pri</sub></b> - input circuit current [A]	15	25
<b>R<sub>in</sub></b> - input resistance [Ω]	0.002	0.001
<b>ΔS/ΔT</b> - sensitivity temperature drift [ppm/°C]	±200	±200
<b>T</b> - operating temperature [°C]	-40...+85	-40...+85
<b>NL</b> - Nonlinearity [%]	0.5 %	0.5 %
Resolution [mA]	4	10
Accuracy [% of FS]	<2	
<b>V<sub>off</sub></b> - offset (@ I = 0A) [V]	0.006	
<b>V<sub>iso</sub></b> - dielectric isolation [kV]	≥ 4	
<b>L<sub>in</sub></b> – typical input inductance [μH]	0.7	
<b>C<sub>in</sub></b> – typical input capacitance [pF]	< 1	
Noise Spectral Density @ f > 10 Hz (NSD <sub>w</sub> ) [μV/√Hz] (**)	≈ 25	
<b>BW</b> - Frequency Bandwidth [kHz]	5 kHz	
<b>Standards</b>	EN61000-4-2, EN61000-4-3, EN61000-4-8 EN61000-6-2:2008, EN55022:2011 EN50178 clause 9.4.1, 9.4.2, 9.4.3, 9.4.4 and 9.4.5	

note \* The CS15A-03 and CS25A-03 current sensors are programmed as bidirectional current sensors, **V<sub>q</sub>=2.5V @ I = 0A**.

note \*\* Region of white noise