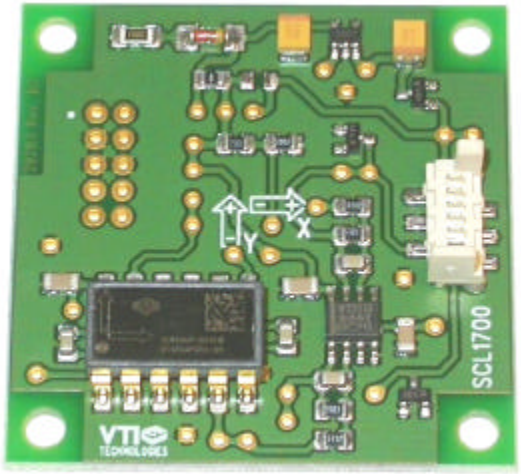
SCL1700-D11

PRODUCT SPECIFICATION

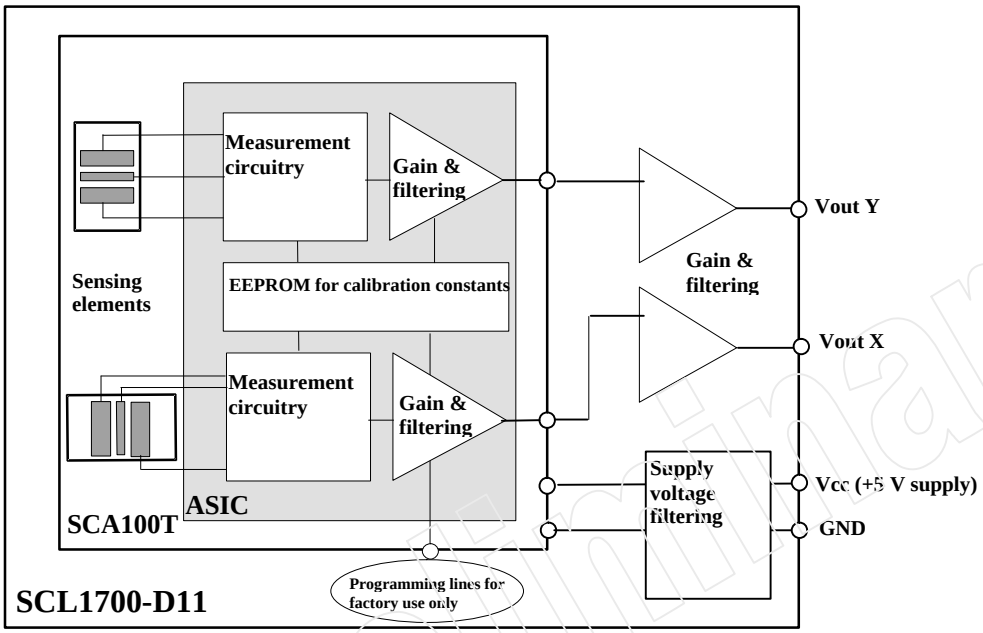


1 General description

This document describes an inclination module, suitable for various industrial applications. Inclinometer is available in 2-axis configuration. The sensor used is a VTI standard inclinometer component SCA100T-D01. Output interface is analogue voltage.

1.1 Block diagram

Products are based on SCA100T-D01 components, mounted on PCB. Electronics are not encapsulated.



1.2 Inclinometer Features

- Measuring range: ±10°
- Controlled frequency response
- Easy to use and design in
- High resolution analogue output
- Dual axis inclination measurement
- Advanced failure detection
- Wide supply voltage range

Benefits

- Excellent long term stability
- Outstanding shock durability
- Harsh environment robustness
- Fit, form and function compatible with commonly used 45 x 45mm dual axis inclination board

2 Electrical specifications

2.1 Electrical Connection

Connector: Molex, Picoflex PF-50, see picture 2.

Name	Function	Connector pin #
V_{cc}	Power supply	1
NC	Internally not connected	2
GND	Ground	3
Out X	Analogue X-direction output	4
Out Y	Analogue Y-direction output	5
NC	Internally not connected	6

2.2 Absolute maximum ratings

Parameter	Condition	Min.	Typ	Max.	Units
Supply voltage	(ratiometric output)	4.5	5.0	5.5	V
Current consumption	No load		4	6	mA
Output load	Resistive	30	50		kΩ
	Capacitive			20	nF
Storage temp		-40		125	°C
Operating temp		-25		85	°C
Mechanical shock	1m drop on concrete		20 000		g

2.3 Electrical Specification

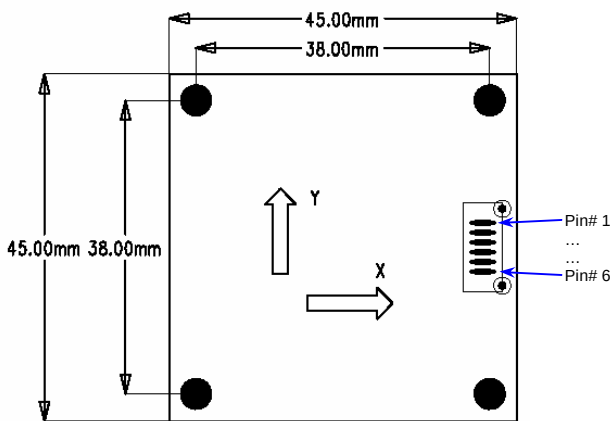
Parameter	Condition	Min.	Typ	Max.	Units
Supply voltage		4.75	5.0	5.25	V
Measuring range (1			± 10		°
Offset (2,3,4	Output @ 0°		2.5 ± 0.02		V
Offset calibration point error (3,4,5			± 0.1		°
Offset temperature error (3,4,5	0°C…70°C		± 0.2		°
	-25°C…85°C		± 0.5		°
Sensitivity (3,4,7	@ 0° (offset position)	198	200	202	mV/ °
Sensitivity calibration error (3,4,8				1%	%
Sensitivity temperature error (3,4,9	0°C…70°C		± 0.5		%
	-25°C…85°C		± 1.0		%
Nonlinearity (10	Sine fitting		± 0.03		°
Ratiometric error (11			±2		%
Frequency response –3dB	True DC response		3		Hz
Output noise DC…10 Hz	@ 0° (offset position)		< 0.001		°

Note 1. The measuring range is limited by sensitivity, offset and supply voltage rails of the device.
Note 2. Offset specified as Voffset = Vout(@0°) [V].
Note 3. +5.0V supply voltage used in calibration and testing.
Note 4. See proposed connection of SCL1700 in picture 2.
Note 5. Offset calibration error specified as Offset_Calib_error = arcsin(Offset_Calib_error_in_g) [°],
Offset_Calib_error_in_g = {Vout(@0°) – 2.5 V} / Vsens [g], Vsens=11.46 V/g.
Note 6. Offset temperature error specified as Offset_Error_@_temp. = arcsin(Offset_Error_@_temp_in_g) [°],
Offset_Error_@_temp_in_g = {Vout @ temp. – Vout @ room temp.} / Vsens [g], Vsens=11.46 V/g.
Note 7. Sensitivity target in calibration 11.46 V/g (→ 200 mV/°)
Sensitivity specified as Vsens = {Vout(@+10°) - Vout(@+10°)}/(2*sin(10°) g) [V/g].
Note 8. Sensitivity calibration error specified as Sensitivity_calibr_error = {Vsens - Vsens_nom} / Vsens_nom x 100% [%],
Vsens_nom = nominal sensitivity.

Note 9. Sensitivity temperature error specified as
Sensitivity_temp_error = {Vsens @ temp – Vsens @ room temp} / Vsens @ room temp} x 100% [%].
Note 10. From best fit sine function top output through: -10°, 0°, +10°.
Note 11. Ratiometric error specified as:

$$RE = 100\% \times \left(1 - \frac{Vout(@Vx) \times \frac{5.00V}{Vx}}{Vout(@5V)} \right)$$

3 Mechanical specification



- PCB Material: FR4
- PCB thickness: 1.6 mm
- Size: 45 mm × 45 mm
- Mounting holes: ∅ 3.5 mm
- Height: max 10 mm
- Weight: < 10 g
- Connector: Molex, Picoflex PF-50, 1.27mm pitch, mates with Molex 90327

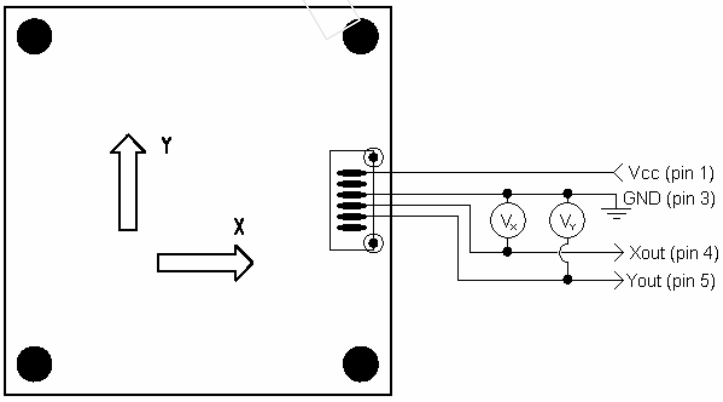
Picture 1. SCL1700-D11 mechanical dimensions.

4 Mounting

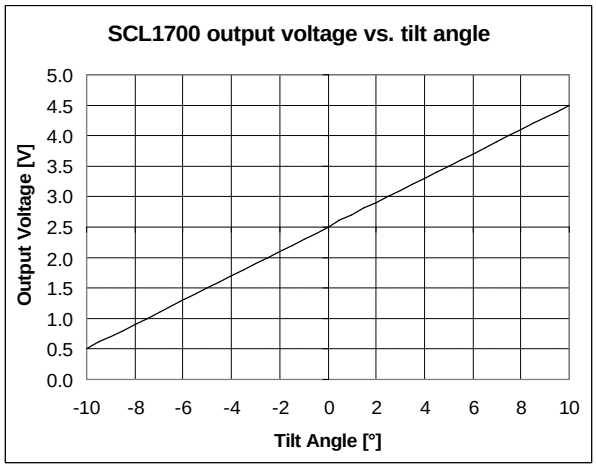
The sensor module is to be mounted with 4 screws, dimension M3.

5 Connection and output signal

Proposed connection in applications.



Picture 2. Proposed connection for SCL1700-D11.



Picture 3. SCL1700-D11 output signal.