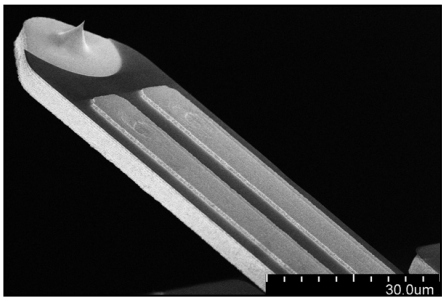
# PRS-L70-F900-Si-PCB/CHP

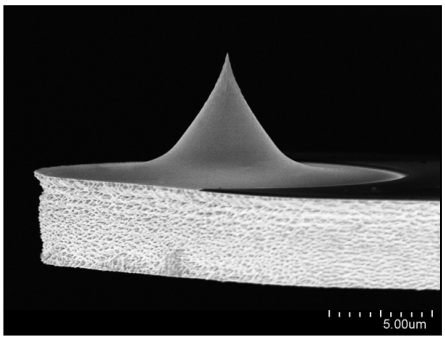
Silicon piezo-resistive sensing cantilevers

## General description

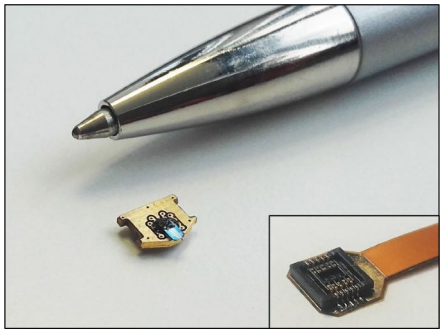
**P**iezo-**R**esistive **S**ensing (PRS) probes are silicon cantilevers with an integrated piezo-resistor for self-sensing scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate environmental thermal drift. By using the self-sensing readout no laser adjustment is necessary in comparison to conventional optical readout AFM systems. This saves time during a cantilever change. The free space above the cantilever enables new applications and combination of AFM with various instruments. The cantilever chip is bonded to a small printed circuit board (PCB) with a small connector for a quick cantilever change. The counter part PCB for the cantilever PCB can be connected to a low-noise pre-amplifier with a flat flex cable.



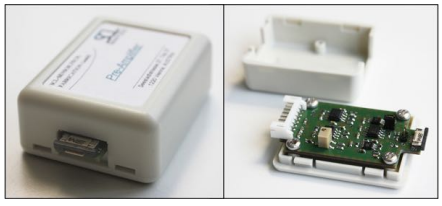

**Tip side of a PRS-L70 cantilever with Al tracks for reading out the sensor signal**




**Side view of a PRS-L70-F900 cantilever**



**Cantilever is bonded to a 6 x 4.5 mm PCB (height w. connector 1.6 mm, with CP-PCB: 2.5 mm); right: CP-flex-PCB**



**Hardware for amplified readout: Low-noise pre-amplifier (45x35 mm)**

**Specifications**

| Parameter | PRS-L70-F900-Si-PCB<br>PRS-L70-F900-Si-CHP |
|---|---|
| Tip radius (apex) | <15 nm |
| Tip height | 4…7 µm |
| Tip material | silicon |
| Resonant frequency | 500…1300 kHz |
| Spring constant | 35…400 N/m |
| AFM mode | tapping |
| sensitivity* | 3 µV/nm |
| Length, width | 70…85 µm, 30 ±1 µm |
| Material | silicon cantilever, boron doped 1k Ohm piezo resistors, aluminium tracks |
| Deflection sensing | on chip piezo-resistive bridge |
| Actuator | external shaker |
| Electrical connections | bonded to small PCB with connector (counter part PCB available) or optional bonding pads on chip |
| Chip dimensions (h, w, l) | 0.3 / 1 / 2.8 mm |
| ** not amplified, 2.048 V bridge supply* | |

## Applications:

- Integration on a standard AFM scanner and high-speed AFM
- Force or deflection measurements within TEM, SEM, XPS, etc.

***What about your application? Contact us!***

**SCL-Sensor.Tech. Fabrication GmbH**
Viktor-Kaplan Straße 2, Bauteil E
2700 Wiener Neustadt, AUSTRIA
web: www.sclsensortech.com

Contact: Fabian Edlinger
Phone: +43 660 4424 871
fabian.edlinger@c-sense.at
*Leaflet version: 2024-03-11*

# PRSA-L100-F500-Si-PCB

Silicon piezo-resistive sensing cantilevers

## General description

**P**iezo-**R**esistive **S**ensing **A**ctive (PRSA) probes are silicon cantilevers with an integrated piezo-resistor and a heater for self-sensing and self-actuating scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate environmental thermal drift. By using the self-sensing readout no laser adjustment is necessary in comparison to conventional optical readout AFM systems. This saves time during a cantilever change. The free space above the cantilever enables new applications and combination of AFM with various instruments. The cantilever chip is bonded to a small printed circuit board (PCB) with a small connector for a quick cantilever change. The counter part PCB for the cantilever PCB can be connected to a low-noise pre-amplifier with a flat flex cable.

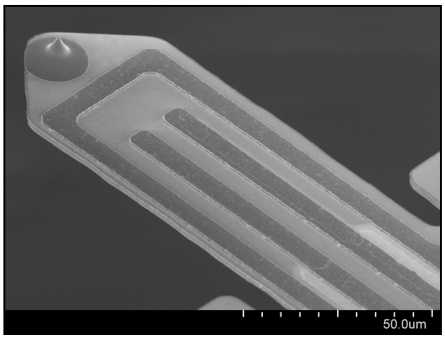
**Specifications**

| Model | **PRSA-L100-F500-Si-PCB** |
|---|---|
| Tip radius (apex) | <15 nm |
| Tip height | 4…6 µm |
| Tip material | silicon |
| Resonant frequency | 200..800 kHz |
| Spring constant | 8…530 N/m |
| Recomm. AFM mode | tapping, non-contact |
| sensitivity* | 1...3 µV/nm |
| force sensitivity* | 2.7…530 nN/µV |
| Length, width | 110 ±5 µm, 48 ±2 µm |
| Material | silicon cantilever, boron doped 1k Ohm piezo resistors, aluminium tracks |
| Deflection sensing | on chip piezo-resistive bridge |
| Actuator | external shaker or on chip heater (12 +/-3 Ohm) |
| Electrical connections | bonded to small PCB with connector (counter part PCB available) or optional bonding pads on chip |
| Chip dimensions (h, w, l) | 0.3 / 1.0 / 2.7 mm |
| ** not amplified, 2.048 V bridge supply* | |

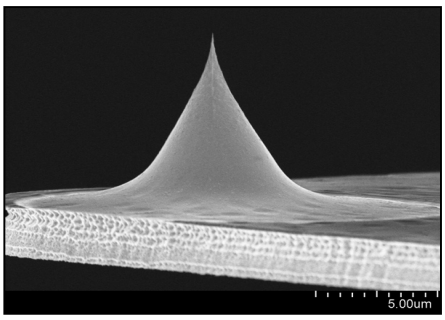
## Applications:

- Integration on a standard AFM scanner and high-speed AFM
- Force or deflection measurements within TEM, SEM, XPS, etc.

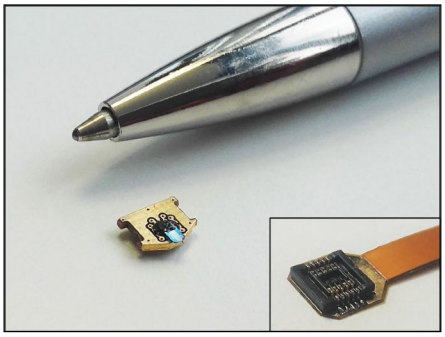
***What about your application? Contact us!***



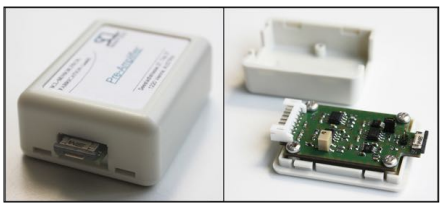

**Tip side of a PRSA-L100 cantilever with Al tracks for reading out the deflection signal**




**Side view of a PRSA-L100 cantilever**



**Cantilever is bonded to a 6 x 4.5 mm PCB (height with connector 1.6 mm, with CP-PCB: 2.5 mm); left: counter part PCB**



**Hardware for amplified readout: Low-noise pre-amplifier (45x35 mm)**

**SCL-Sensor.Tech. Fabrication GmbH**
Viktor-Kaplan Straße 2, Bauteil E
2700 Wiener Neustadt, AUSTRIA
web: www.sclsensortech.com

Contact: Fabian Edlinger
Phone: +43 660 4424 871
fabian.edlinger@c-sense.at
*Leaflet version: 2024-03-11*

# PRSA-L300-Fxx-Si-PCB/CHP

Silicon piezo-resistive sensing cantilevers
xx…50/60/80

## General description

**P**iezo-**R**esistive **S**ensing **A**ctive (PRSA) probes are silicon cantilevers with on chip integrated piezo-resistors and a heater for self-sensing and self-actuating scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate environmental thermal drift. By using the self-sensing readout no laser adjustment is necessary in comparison to conventional optical readout AFM systems. This saves time during a cantilever change. The free space above the cantilever enables new applications and combination of AFM with various instruments. The cantilever chip is bonded to a small printed circuit board (PCB) with a small connector for a quick cantilever change. The counter part PCB for the cantilever PCB can be connected to a low-noise pre-amplifier with a flat flex cable.

**Specifications**

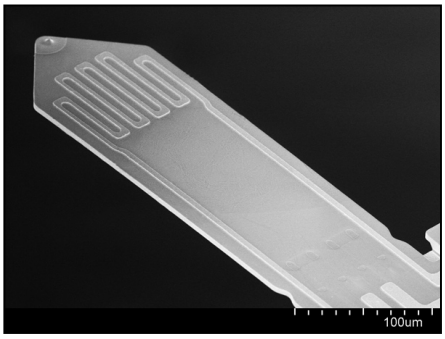
| Model ** | PRSA-L300-F60-Si-CHP | |
|---|---|---|
| | PRSA-L300-F50-Si-PCB | PRSA-L300-F80-Si-PCB |
| Tip radius (apex) | <15 nm | |
| Tip height | 4…6 µm | |
| Tip material | silicon | |
| Resonant frequency ** | 30..65 kHz | 65…95 kHz |
| Spring constant ** | 1…15 N/m | 15…56 N/m |
| AFM mode | contact, non-contact | non-contact |
| sensitivity* | 1…2 µV/nm | |
| force sensitivity* | 0.5…56 nN/µV | |
| Length, width | 300 ±5 µm, 110 ±3 µm | |
| Material | silicon cantilever, boron doped 1k Ohm piezo resistors, aluminium tracks | |
| Deflection sensing | on chip piezo-resistive bridge | |
| Actuator | external shaker or on chip heater (20-45 Ohm) | |
| Electrical connections | bonded to small PCB with connector (counter part PCB available) or optional bonding pads on chip | |
| Chip dimensions (h, w, l) | 0.3 / 1.2 / 2.5 mm | |

** not amplified (signal direct at the chip), 2.048 V bridge supply*
*** Cantilever models are divided in two parameter ranges when electrical characterization is possible with bonded cantilevers*

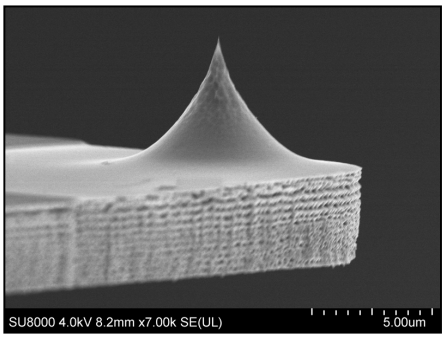
## Applications:

- Integration on a standard AFM scanner and high-speed AFM
- Force or deflection measurements within TEM, SEM, XPS, etc.

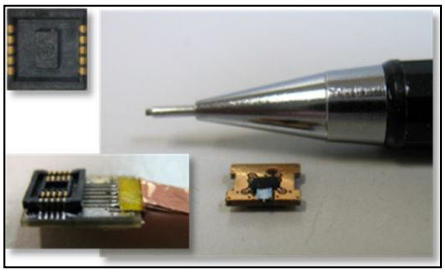
***What about your application? Contact us!***



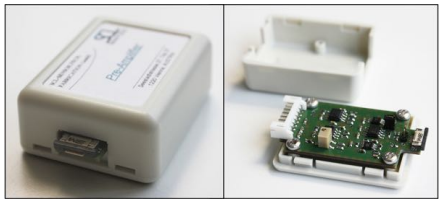

**Tip side of a PRSA-L300 cantilever with Al tracks for reading out the sensor signal**




**Side view of a PRSA-L300 cantilever**



**Cantilever is bonded to a 6 x 4.5 mm PCB (height with connector 1.6 mm, with CP-PCB: 2.5 mm); left: counter part PCB**



**Hardware for amplified readout: Low-noise pre-amplifier (45x35 mm)**

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2700 Wiener Neustadt, AUSTRIA
web: www.sclsensortech.com

Contact: Fabian Edlinger
Phone: +43 660 4424 871
fabian.edlinger@c-sense.at
*Leaflet version: 2024-03-11*

# PRSA-L400-F30-Si-PCB/CHP

Silicon piezo-resistive sensing cantilevers

## General description

**P**iezo-**R**esistive **S**ensing **A**ctive (PRSA) probes are silicon cantilevers with integrated piezo-resistors on-chip and a heater for self-sensing and self-actuating scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate environmental thermal drift. By using the self-sensing readout no laser adjustment is necessary in comparison to conventional optical readout AFM systems. This saves time during a cantilever change. The free space above the cantilever enables new applications and combination of AFM with various instruments. The cantilever chip is bonded to a small printed circuit board (PCB) with a small connector for a quick cantilever change. The cantilever PCB can be connected to a low-noise pre-amplifier by using our flexible counter-part PCB.

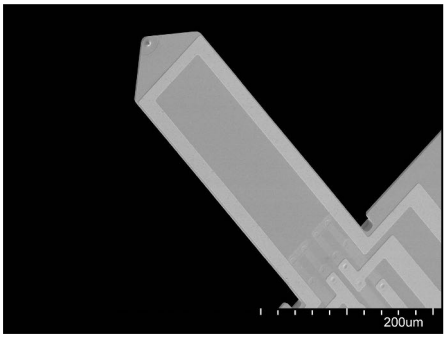
**Specifications**

| Model* | **PRSA-L400-F30-Si-PCB**<br>**PRSA-L400-F30-Si-CHP** |
|---|---|
| Tip radius (apex) | <15 nm |
| Tip height | 4.5…6.5 µm |
| Tip material | silicon |
| Resonant frequency | 15…40 kHz |
| Spring constant (calc.) | 0.4…8.3 N/m |
| Recomm. AFM mode | contact |
| sensitivity** | 1 µV/nm |
| force sensitivity** | 0.4…8.3 nN/µV |
| Length, width | 410 ±5 µm, 115 ±3 µm |
| Material | silicon cantilever, boron doped 1k Ohm piezo resistors, aluminium tracks |
| Deflection sensing | on chip piezo-resistive bridge |
| Actuator | external shaker or on-chip heater (11 +/-2 Ohm) |
| Electrical connections | bonded to small PCB with connector (counter part PCB available) or delivered as bare chip (bonding pads on-chip) |
| Chip dimensions (h, w, l) | 0.3 / 1.2 / 2.5 mm |
| ** Electrical characterization is only possible for bonded cantilevers.* | |
| *** measured without amplification, 2.048 V bridge supply* | |

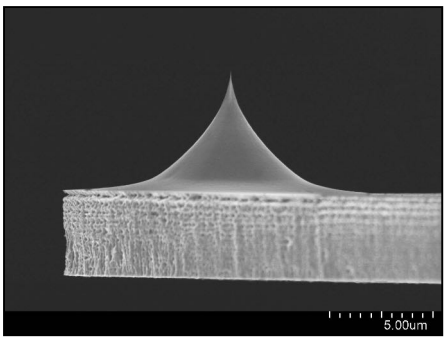
## Applications:

- Integration on a standard AFM scanner and high-speed AFM
- Force or deflection measurements within TEM, SEM, XPS, etc.

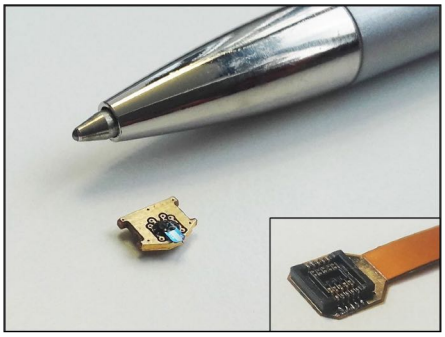
***What about your application? Contact us!***



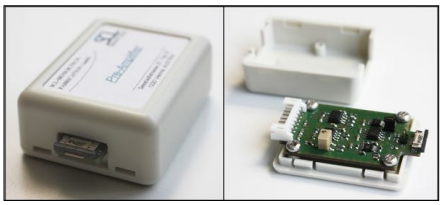

**Tip side of a PRSA-L400 cantilever with Al tracks for reading out the sensor signal**




**Side view of a PRSA-L400 cantilever**



**Cantilever is bonded to a 6 x 4.5 mm PCB (height with connector 1.6 mm, complete height connected to CP-PCB: 1.8 mm); left: counter part PCB**



**Hardware for amplified readout: Low-noise pre-amplifier (45x35 mm)**

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