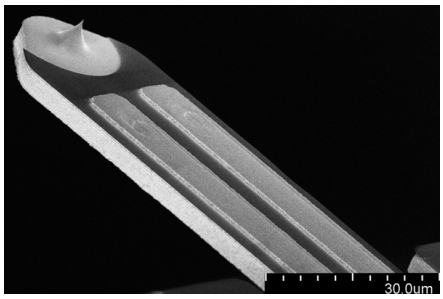
# PRS-L70-F900-Si-PCB/CHP

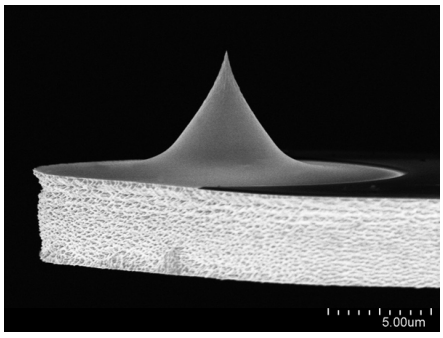
Silicon piezo-resistive sensing cantilevers

## General description

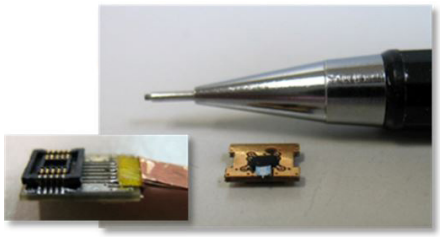
**P**iezo-**R**esistive **S**ensing (PRS) probes are silicon cantilevers with an integrated piezo-resistor for self-sensing scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to optimize the sensitivity and compensate environmental thermal drift. 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. Furthermore the new free space above the cantilever enables new applications and combination of AFM with various instruments. The cantilever chip is bonded onto 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.



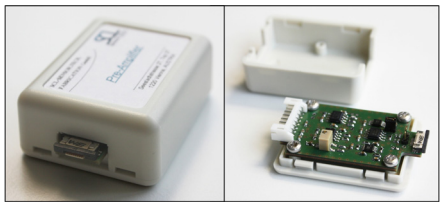

**Tip side of a PRS-L70 cantilever with Al tracks for reading out the sensor signal**




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



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



**Available 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
- Force or deflection measurements within TEM, SEM, XPS, etc.
- Torque magnetometry
- Tip scanning high-speed AFM
- Various cantilever based sensor applications (media properties, air pressure/acoustic wave, etc.)

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

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