

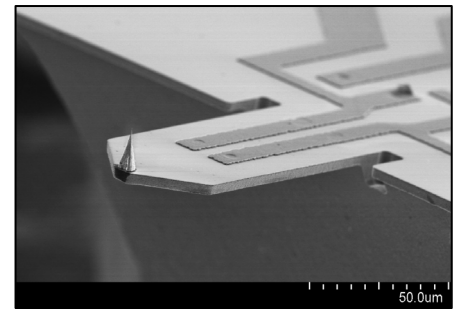
# PRS-L100-F500-SCD-PCB

Silicon piezo-resistive sensing cantilevers

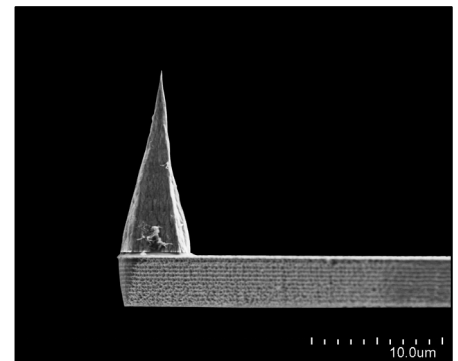


## General description

Piezo-Resistive Sensing (PRS) probes are silicon cantilevers with a long-life single crystal diamond tip (SCD). Integrated piezo-resistors are used for self-sensing the cantilever deflection. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate environmental thermal drift. Self-sensing readout technology makes laser adjustment obsolete and saves time during a cantilever change. The free space above the cantilever enables new applications and combination of AFM with various instruments. The SCD tip exhibits low surface energy, which prevents contamination when imaging sticky or biological samples. The cantilever chip is bonded to a small printed circuit board (PCB) with a small connector to enable a quick cantilever change. A cantilever PCB can be connected to a SCL's low-noise pre-amplifier via a SCL's flex PCB with its counter-part PCB.

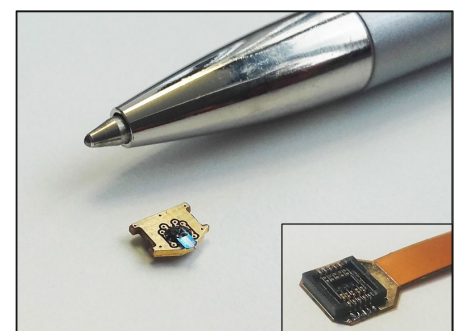


PRS-L100 cantilever with Al tracks for reading out the sensor signal



Side view of a SCD cantilever tip

| Specifications   |   |
|--|---|
| Model  | PRS-L100-F500-SCD-PCB   |
| Tip radius (apex)  | <15 nm  |
| Tip height   | 12...16 µm  |
| Tip material   | Long life Single Crystal Diamond (SCD)<br><100> along tip axis                                      |
| Glue between tip and cantilever                                    | non-conducting<br>temp-stability: up to 70°C  |
| Resonant frequency   | 250..750 kHz  |
| Spring constant  | 12...330 N/m  |
| AFM mode   | contact, tapping, non-contact   |
| Sensitivity*   | 1...3 µV/nm   |
| Force sensitivity*   | 4...330 nN/µV   |
| Length, width  | 100 ±5 µm, 48 ±2 µm   |
| Material   | silicon cantilever, boron doped 1k Ohm piezo resistors,<br>aluminium tracks                         |
| Deflection sensing   | on chip piezo-resistive bridge  |
| Actuator   | external shaker   |
| Electrical connections   | bonded to small PCB with connector (counter part PCB<br>available) or optional bonding pads on chip |
| Chip dimensions (h, w, l)  | 0.3 / 1.0 / 2.7 mm  |
| * not amplified (signal direct at the chip), 2.048 V bridge supply |   |

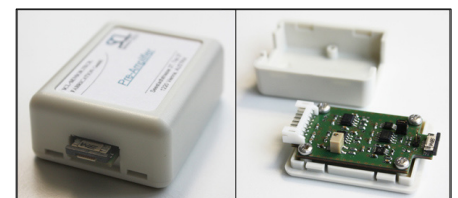


Cantilever is bonded to a 6 x 4.5 mm PCB (height with connector 1.6 mm, with CP-PCB: 2.5 mm); left: counter part PCB

## Applications:

- Integration on a standard AFM scanner
- Direct use on an AFSEM™ inside a SEM ([www.getec-afm.com](http://www.getec-afm.com))
- Force sensing within a SEM, TEM, etc.; nano-indentation

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



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

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