

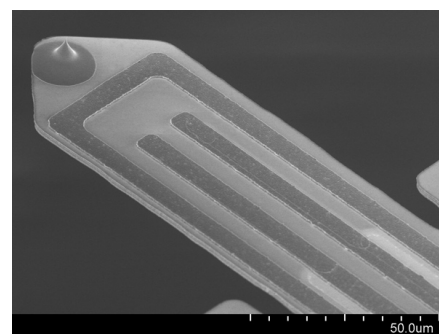
PRSA-L100-F400-Si-PCB

Silicon piezo-resistive sensing cantilevers

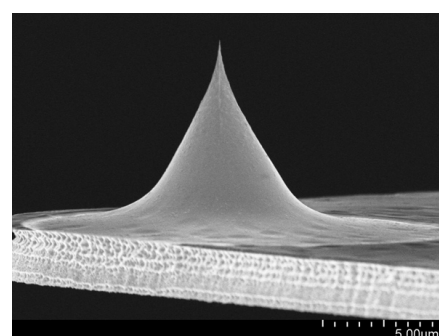


General description

Piezo-Resistive Sensing Active (PRSA) probes are silicon cantilevers with an integrated piezo-resistor and a thermal actuator for self-sensing and self-actuating 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 PRSA-L100 cantilever with Al tracks for reading out the deflection signal

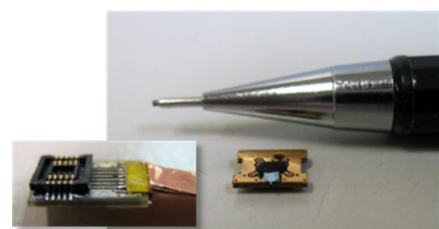


Side view of a PRSA-L100-F400 cantilever

Specifications

Model	PRSA-L100-F400-Si-PCB
Tip radius (apex)	<20 nm
Tip height	4...6 µm
Tip material	silicon
Resonant frequency	250..550 kHz
Spring constant	14...170 N/m
AFM mode	contact, tapping
sensitivity*	1...3 µV/nm
force sensitivity*	4...170 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 +/-1 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 / 2.7 mm

* not amplified, 2.048 V bridge supply

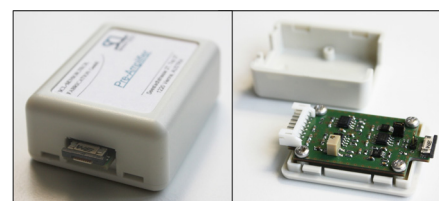


Cantilever is bonded onto a 6 x 4.5 mm PCB (height with connector 1.6 mm, with CP-PCB: 2.5 mm); left: counter part PCB

Applications:

- Integration on a standard AFM scanner
- Force or deflection measurements within TEM, SEM, XPS, etc.
- Tip scanning high-speed AFM
- Various cantilever based sensor applications (media properties, air pressure/acoustic wave, etc.)

What about your application? Contact us!



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

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