PRSA-L100-F500-Si-PCB

Silicon piezo-resistive sensing cantilevers

General description

Piezo-**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.

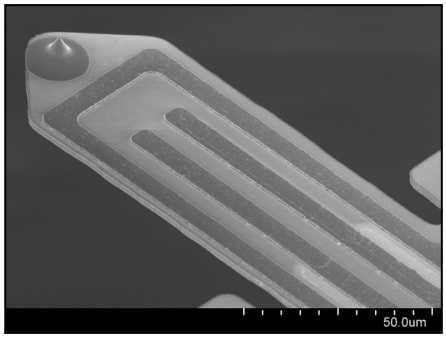
Specifications

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*	

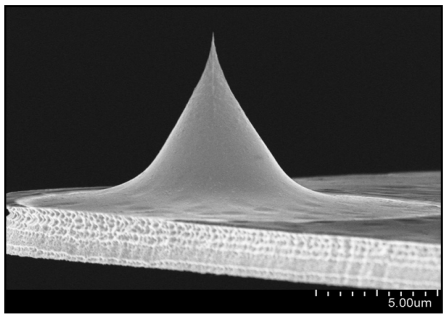
Applications:

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

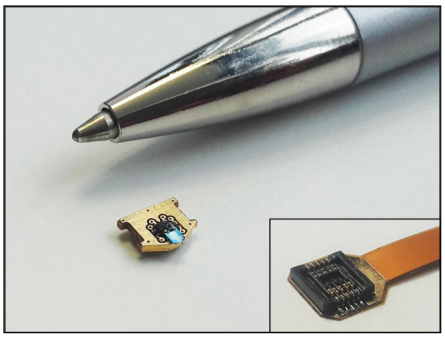
What about your application? Contact us!



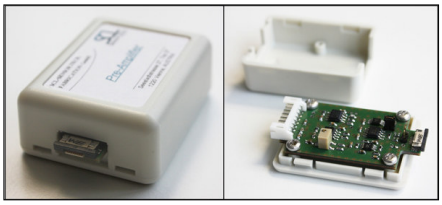
Tip side of a PRSA-L100 cantilever with Al tracks for reading out the deflection signal



Side view of a PRSA-L100 cantilever



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



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