

PRSA-L400-F30-Si-PCB/CHP

Silicon piezo-resistive sensing cantilevers



General description

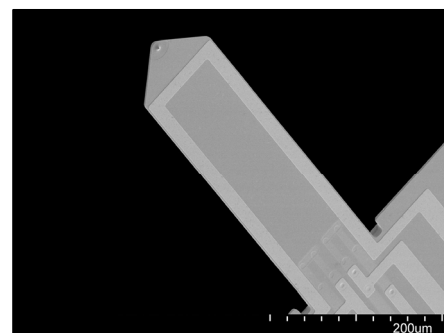
Piezo-Resistive Sensing Active (PRSA) probes are silicon cantilevers with integrated piezo-resistors on-chip and a heater for self-sensing and self-actuating scanning probe microscopy applications. The piezo-resistors are integrated into a matched Wheatstone bridge to raise the sensitivity and compensate 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 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	

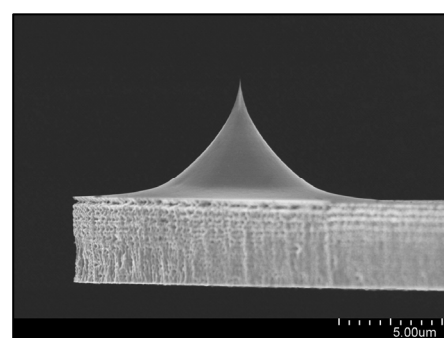
Applications:

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

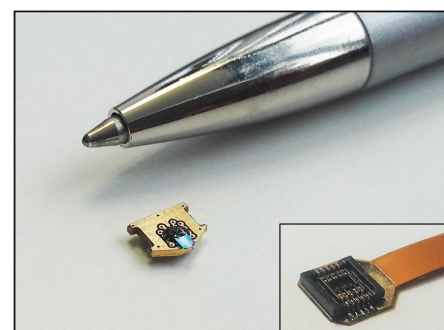
What about your application? Contact us!



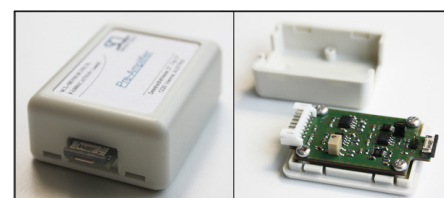
Tip side of a PRSA-L400 cantilever with Al tracks for reading out the sensor signal



Side view of a PRSA-L400 cantilever



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



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

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