

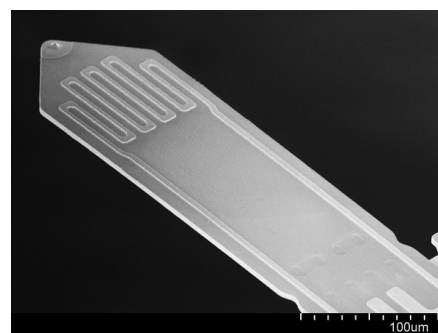
# PRSA-L300-F50/60-80-Si-PCB/CHP

Silicon piezo-resistive sensing cantilevers

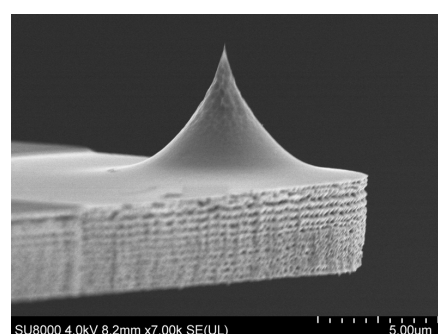


## General description

Piezo-Resistive Sensing Active (PRSA) probes are silicon cantilevers with on chip integrated piezo-resistors 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-L300 cantilever with Al tracks for reading out the sensor signal



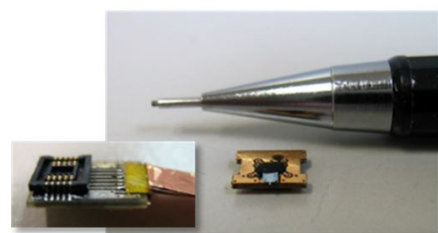
Side view of a PRSA-L300 cantilever

Specifications	PRSA-L300-F60-Si-CHP	
	PRSA-L300-F50-Si-PCB	PRSA-L300-F80-Si-PCB
Model **		
Tip radius (apex)	<15 nm	
Tip height	4...6 µm	
Tip material	silicon	
Resonant frequency **	30..65 kHz	65...95 kHz
Spring constant **	1...15 N/m	15...56 N/m
AFM mode	contact, non-contact	non-contact
sensitivity*	1...2 µV/nm	
force sensitivity*	0.5...56 nN/µV	
Length, width	300 ±5 µm, 110 ±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 (20-45 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 / 2.5 mm	
* not amplified (signal direct at the chip), 2.048 V bridge supply		
** Cantilever models are divided in two parameter ranges when electrical characterization is possible with bonded cantilevers		

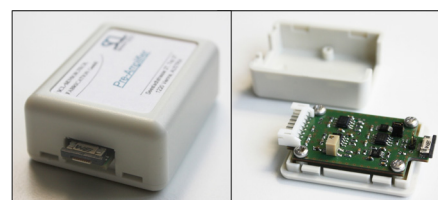
## Applications:

- 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!**



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



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

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