# NANOSENSORS-

### The World Leader in Scanning Probes

#### AdvancedTEC Advanced Tip at the End of the Cantilever®

- REAL TIP VISIBILITY FROM TOP
- Monolithic Silicon-SPM-Probe for very high resolution imaging
- Typical tip radius of curvature <10 nm
- Tip height 15 –20 μm
- Aspect ratio of the last 0.5 μm of the tip >4:1 (seen from front and side)
- Half cone angle <12° seen along the cantilever axis and <8° seen from the side
- Tip shape defined by real crystal planes resulting in highly reproducible geometries and extremely smooth surfaces



## Akiyama-Probe

Self-sensing and self-actuating probe

 self-sensing and self-actuating probe based on a quartz tuning fork combined with a micromachined cantilever for dynamic mode AFM



## PointProbe<sup>®</sup> Plus (PPP)

- Minimized variation in tip shape resulting in more reproducible imaging
- Tip radius typically smaller than 7 nm
- Tips are shaped like a polygon based pyramid
- Macroscopic half-cone angles are 20° seen along the cantilever and 25° to 30° when seen from the side
- Also available with rotated tip
- Silicon-SPM-Probe for enhanced resolution imaging
- Rectangular cantilever with trapezoidal cross section
- Monolithic design of support chip, cantilever and tip
- Highly doped single crystal silicon (0.01-0.025 Ωcm)
- Fits to all well-known AFMs
- Alignment grooves on the detector side of the holder chip match alignment ridges of the NANOSENSORS ™ alignment chip

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# SuperSharpSilicon<sup>™</sup> Tip



- Probe for high resolution imaging of micro roughness and nanostructures
- Tip radius typically smaller than 2 nm
- Typical aspect ratio at 200 nm from tip apex in the order of 4:1
- Half cone angle at 200 nm from apex <10°

## High Aspect Ratio Probes



- High aspect portion (5:1 or 10:1) longer than 1.5 μm
- Symmetrical when seen from side as well as along the cantilever axis
- Half cone angle typically <5° for AR5 and <2.8° for AR10</li>
- Tip radius typically <10 nm
- Tip of tilt compensated version (AR5T and AR10T) tilted 13° with respect to the center axis of the tip in order to compensate the mounting angle of the AFM head

### Coatings

NOTE: Coatings are available for selected setypes only

#### **Reflex Coating**

- Aluminum coating on the detector side of the cantilever
- Enhanced reflectivity of the laser beam

#### **Gold Coating**

- Gold coating on the detector side or on both sides of the cantilever
- Enhanced reflectivity of the laser beam

#### **Platinum Coating**

- Chromium and platinum-iridium5 alloy coating on both sides of the cantilever
- High conductivity allows electrical measurements by using adjusted parameters

#### **Platinum Silicide**

 Highly conductive and wear resistant Platinum Silicide coating on both sides of the cantilever

#### Diamond Coating

- Polycrystalline electrically conductive diamond coating on the tip side of the cantilever
- Unsurpassed hardness of the tip

#### Magnetic Coating

• Different hard and soft magnetic coatings on the tip side of the cantilever



https://www.nanosensors.com/brochure

PDF Brochure Download





and resonance frequency

Typical tip height 7 µm

Unsurpassed uniformity of cantilever force constant

Reduced drift for applications in liquid enviroments

Typical tip radius of curvature smaller than 10 nm

Radial symmetric tip with a hyperbolic profile

probe

# NANOSENSORS —

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### Quick Selection Table

Туре	Application	Force Constant / [N/m] (nominal)	Resonance Frequency / [kHz] (nominal)	Coatings	Special Tip Versions
qp-CONT	Biological / Fluid-Tapping Lateral / Friction Force	0.1	30	Reflex (partial Au)	circular symmetric
qp-SCONT	Soft Contact / Force Curves	0.01	11	Reflex (partial Au)	circular symmetric
qp-BioT 2 cantilevers	Biological / Fluid-Tapping	CB1: 0.08 CB2: 0.3	CB1: 20 CB2: 50	Reflex (partial Au)	circular symmetric
ATEC-CONT	Contact Mode	0.2	15	Ptlr5, Au	visible tip
PPP-CONT	Contact Mode	0.2	13	Reflex (Al), Ptlr5, Au	PtSi, DT, CDT, RT, PL2, PLC, TL
PPP-CONTSC	Contact Mode (short cantilever)	0.2	25	Reflex (Al), Ptlr5, Au	
qp-HBC	ScanAsyst <sup>®</sup> */Peak Force Tapping™*	0.5	60	Reflex (Al)	circular symmetric
qp-fast 3 cantilevers	Fast-/ High-speed scaning Soft Tapping/ NC/ AC/ Tapping	CB1: 30 CB2: 15 CB3: 80	CB1: 420 CB2: 250 CB3: 800	Reflex (Au)	circular symmetric
qp-BioAC 3 cantilevers	Biological / Fluid-Tapping	CB1: 0.1 CB2: 0.06 CB3: 0.3	CB1: 50 CB2: 30 CB3: 90	Reflex (partial Au)	circular symmetric (rounded version available)
ATEC-NC	Non-Contact / Tapping Mode	45	335	Ptlr5, Au	visible tip
PPP-NCR	Non-Contact / Tapping Mode (high frequency)	26	300	Reflex (Al)	
PPP-NCH	Non-Contact / Tapping Mode (high frequency)	42	330	Reflex (Al), Ptlr5, Au	PtSi, SSS, RT, AR5, AR5T, AR10, AR10T, DT, CDT, PL2, PLC, TL
PPP-NCL	Non-Contact / Tapping Mode (long cantilever)	48	190	Reflex (Al), Ptlr5, Au	SSS, AR5, DT, CDT, PL2, PLC, TL
PPP-NCST	Non-Contact / Tapping Mode (soft tapping)	7.4	160	Reflex (Al), Ptlr5, Au	
PPP-SEIH	Non-Contact / Tapping Mode (Seiko Non-Contact Mode)	15	130	Reflex (Al)	SSS
ATEC-FM	Force Modulation Mode	2.8	85	Ptlr5, Au	
PPP-EFM	Electrostatic Force Microscopy	2.8	75	Ptlr5	
PPP-FM	Force Modulation Mode	2.8	75	Reflex (Al), Au	PtSi, SSS, DT, CDT, PL2, PLC, TL
PPP-LFM	Lateral / Friction Force Microscopy	0.2	25	Reflex (Al)	
PPP-MFMR	Magnetic Force Microscopy	2.8	75	Hard Magnetic & Reflex (Al)	SSS
PPP-LM-MFMR	Magnetic Force Microscopy (Iow momentum)	2.8	75	Hard Magnetic & Reflex (Al)	
PPP-LC-MFMR	Magnetic Force Microscopy (low coercivity)	2.8	75	Soft Magnetic & Reflex (Al)	
	qp-CONTqp-SCONTqp-BioT 2 cantileversATEC-CONTPPP-CONTPPP-CONTSCqp-fast 3 cantileversqp-fast 3 cantileversQp-BioAC 3 cantileversATEC-NCPPP-NCRPPP-NCRPPP-NCHPPP-NCHPPP-NCHPPP-NCLPPP-NCSTPPP-SEIHATEC-FMPPP-EFMPPP-LFMPPP-LFMPPP-NCR	qp-CONTBiological / Fluid-Tapping Lateral / Friction Forceqp-SCONTSoft Contact / Force Curvesqp-BioT 2 cantileversBiological / Fluid-TappingATEC-CONTContact ModePPP-CONTSCContact Mode (short cantilever)qp-HBCScanAsyst**/Peak Force Tapping***qp-fast 3 cantileversFast-/ High-speed scaning Soft Tapping/ NC/ AC/ Tappingqp-BioAC 3 cantileversBiological / Fluid-Tappingqp-BioAC 3 cantileversBiological / Fluid-TappingATEC-NCNon-Contact / Tapping ModePPP-NCRNon-Contact / Tapping ModePPP-NCRNon-Contact / Tapping ModePPP-NCLNon-Contact / Tapping ModePPP-NCSTNon-Contact / Tapping ModePPP-NCSTNon-Contact / Tapping ModePPP-SEIHNon-Contact / Tapping ModePPP-FMForce Modulation ModePPP-LFMForce Modulation ModePPP-LFMCorte of IcroscopyPPP-LFMIcateral / Friction Force MicroscopyPPP-LMFMRMagnetic Force MicroscopyPPP-LM-MFMRMagnetic Force Microscopy	TypeApplicationConstant / [N/m] [N/m]qp-CONTBiological / Fluid-Tapping Lateral / Friction Force0.1qp-SCONTSoft Contact / Force Curves0.01qp-BioT 2 cantileversBiological / Fluid-TappingCB1: 0.08 CB2: 0.3ATEC-CONTContact Mode0.2PPP-CONTContact Mode0.2PPP-CONTSCContact Mode (short contilever)0.2qp-fast 3 cantileversScan Asyst**/Peak Force Tapping***0.5qp-fast 3 cantileversFast-/ High-speed scaning Soft Tapping/NC/ AC/ TappingCB1: 30 CB2: 15 CB3: 80qp-fast 3 cantileversFast-/ High-speed scaning Soft Tapping/NC/ AC/ TappingCB1: 0.1 CB2: 0.06 CB3: 0.3ATEC-NCNon-Contact / Tapping Mode45PPP-NCRNon-Contact / Tapping Mode26PPP-NCRNon-Contact / Tapping Mode26PPP-NCLNon-Contact / Tapping Mode42PPP-NCLNon-Contact / Tapping Mode48PPP-NCSTNon-Contact / Tapping Mode15ATEC-FMForce Modulation Mode2.8PPP-EFMElectostatic Force Microscopy2.8PPP-LFMLateral / Fiction Force Microscopy2.8PPP-LFMMagnetic Force Microscopy2.8PPP-LC-MFMRMagnetic Force Microscopy2.8PPP-LC-MFMRMagnetic Force Microscopy2.8	TypeApplicationConstant / [N/m]Frequency / [kH2] (nominal)qp-CONTBiological / Fluid-Tapping Lateral / Friction Force0.130qp-SCONTSoft Contact / Force Curves0.0111qp-BioT 2 cantileversBiological / Fluid-TappingCB1:0.08 CB2:03CB1:20 CB2:03ATEC-CONTContact Mode0.215PPP-CONTContact Mode0.213PPP-CONTSCContact Mode (stort cantilever)0.225qp-HBCScanAsyst**/Peak Force Tapping**0.560qp-fast 3 cantileversFast-/ High-speed scaning Soft Tapping/ NC/ AC/ TappingCB1:01 CB2:0.05CB1:420 CB2:20 CB3:800qp-BioAC 3 cantileversBiological / Fluid-TappingCB1:01 CB2:0.05CB1:50 CB2:30 CB3:800qp-BioAC g antileversBiological / Fluid-TappingCB1:01 CB2:0.05CB1:50 CB3:800qp-BioAC g antileversNon-Contact / Tapping Mode (High frequency)45335PPP-NCRNon-Contact / Tapping Mode (High frequency)48190PPP-NCHNon-Contact / Tapping Mode (High frequency)15130PPP-NCLNon-Contact / Tapping Mode (High frequency)2.875PPP-NCHNon-Contact / Tapping Mode (High frequency)2.875PPP-NCHNon-Contact / Tapping Mode (High frequency)2.875PPP-NCHNon-Contact / Tapping Mode (High frequency)2.875PPP-LFMForce Modulation Mode2.875 <td>ItypeAppplicationConstant / INimiFrequency / Ight JCoaringsqp -CONTBiological / Fluid-Tapping0.130Reflex (partial Au)qp -SCONTSoft Contact / Force Curves0.0111Reflex (partial Au)qp-BioT 2 cantileversBiological / Fluid-TappingCB1: 0.08 (GB2: 0.01CB1: 200Reflex (partial Au)qp-BioT 2 cantileversContact / Force Curves0.0215Ptirs, AuPP-CONTContact Mode0.213Reflex (partial Au)ATEC-CONTContact Mode0.213Reflex (AI), Ptirs, Aupp-BCONTContact Mode0.225Reflex (AI), Ptirs, Auqp-HBCScanAsyst**/Peak force Tapping**0.560Reflex (AI), Ptirs, Auqp-fast 3 cantileversBiological / Fluid-TappingCB1: 30 CB2: 15CB1: 420 CB2: 250Reflex (Au)qp-fast 3 cantileversBiological / Fluid-TappingCB1: 0.0 CB2: 15Reflex (AI), Ptirs, Aupp-NCRNon-Contact / Tapping NC/AC/TappingCB1: 0.0 CB2: 0.0 CB2: 30Reflex (AI), Ptirs, AupP-NCRNon-Contact / Tapping NC/AC/Tapping263000Reflex (AI), Ptirs, AupPP-NCRNon-Contact / Tapping Mode423300Reflex (AI), Ptirs, AupPP-NCRNon-Contact / Tapping Mode7.4160Reflex (AI), Ptirs, AupPP-NCRNon-Contact / Tapping Mode7.4160Reflex (AI), Ptirs, AupPP-NCRNon-Contact / Tapping Mode2.875Ptirs, Au</br></br></br></td>	ItypeAppplicationConstant / INimiFrequency / Ight JCoaringsqp -CONTBiological / Fluid-Tapping0.130Reflex (partial Au)qp -SCONTSoft Contact / Force Curves0.0111Reflex (partial Au)qp-BioT 2 cantileversBiological / Fluid-TappingCB1: 0.08 (GB2: 0.01CB1: 200Reflex (partial Au)qp-BioT 2 cantileversContact / Force Curves0.0215Ptirs, AuPP-CONTContact Mode0.213Reflex (partial Au)ATEC-CONTContact Mode0.213Reflex (AI), Ptirs, Aupp-BCONTContact Mode0.225Reflex (AI), Ptirs, Auqp-HBCScanAsyst**/Peak force Tapping**0.560Reflex (AI), Ptirs, Auqp-fast 3 cantileversBiological / Fluid-TappingCB1: 30 CB2: 15CB1: 420 CB2: 250Reflex (Au)qp-fast 3 cantileversBiological / Fluid-TappingCB1: 0.0 

This list is not complete. For the full list of available AFM probes please check out our website.

\*ScanAsyst<sup>®</sup> and Peak Force Tapping<sup>™</sup> are trademarks of Bruker Corp.

#### **Special Developments List:**

You have AFM application requirements that cannot be met by standard AFM probes?



https://www.nanosensors.com/special-developments-list