

# DCP-X PROBE

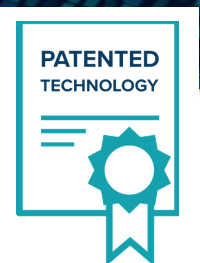
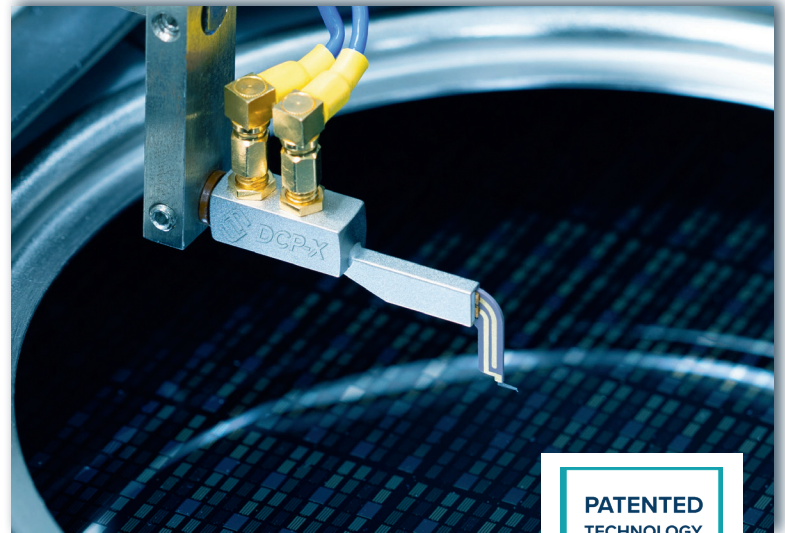
Advanced MEMs technology measures devices error-free

## ➤ Description

The new DCP-X probe is designed for Device characterization, R&D, and Test Services Engineers, and Scientists, who need to perform highest accuracy and repeatable on-wafer device electrical measurements (IV, CV, LFN) for device characterization and modelling, and general DC testing on small pads.

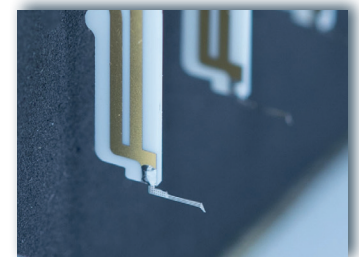
The DCP-X probe with MEMs technology measures existing and leading-edge (2, 3, 5 nm) devices error-free, on all pad materials, micro-bumps, & slotted pads down to 20  $\mu\text{m}$  size, virtually eliminating “re-testing” due to poor contact, and with little to no cleaning, over the full thermal range with significantly lower CoT (cost of test).

Traditional DC probes using single cantilever tungsten needles have high series resistance (probe and pad  $R_c$ ) causing inaccurate data, damage pads with heavy overdrive/skating, and require frequent cleaning. But the new Formfactor DCP-X probe with “World’s First” true-kelvin, guarding & advanced MEMs contacting technology, delivers revolutionary performance with 1000x lower probe  $R_c$ , 0.15% error on 2 $\Omega$  RDS device, low skate, and long lifetime >500K contacts.



## ➤ Features & Benefits

<b>Eliminate errors</b>	<ul style="list-style-type: none"> <li>• Virtually error free (0.15% on 2<math>\Omega</math> RDS device) vs typical wafer process 0.3% variation</li> <li>• High accuracy with no misleading test data</li> <li>• 1000x lower probe contact resistance (1-5 m<math>\Omega</math>)</li> <li>• Low leakage fA guard plane (force/sense)</li> </ul>
<b>Reduce pad damage</b>	<ul style="list-style-type: none"> <li>• Small scrub (7<math>\mu\text{m}</math>) with only 20<math>\mu\text{m}</math> overdrive</li> <li>• Minimal pad damage with optimized micro-scrub</li> <li>• Small 6<math>\mu\text{m}</math> tip size, and 20<math>\mu\text{m}</math> pitch (Kelvin version)</li> </ul>
<b>Probe smaller</b>	<ul style="list-style-type: none"> <li>• Advanced MEMs tip with ruggedized design</li> <li>• Probe all pad materials &amp; slotted pads without tip deformation</li> <li>• Probe micro bumps down to ~50 <math>\mu\text{m}</math></li> <li>• Supports temperatures from -55°C to 175°C</li> </ul>



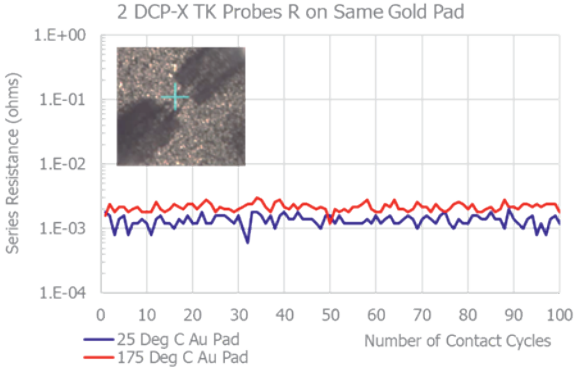
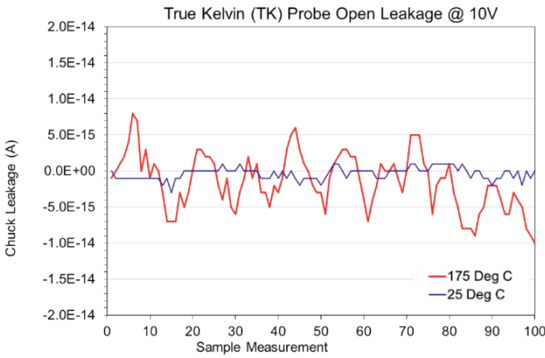
<b>Save Time</b>	<ul style="list-style-type: none"> <li>• Quick probe setup using standard probe mount</li> <li>• Easy probe tip replacement in prober with special tool</li> <li>• Reduced tip damage / contamination</li> <li>• Use with manual or motorized positioners</li> <li>• Optimized for fast testing with Autonomous DC probing</li> </ul>
<b>Lower Costs</b>	<ul style="list-style-type: none"> <li>• Production level quality in engineering probe</li> <li>• Replaceable blade/tip design</li> <li>• Long lifetime with &gt;500,000 touchdowns (Kelvin version)</li> <li>• 98% cost reduction (tips) compared to DCP-HTR</li> </ul>
<b>Test faster</b>	<ul style="list-style-type: none"> <li>• Less time cleaning with low scrub MEMS tip minimizes debris</li> <li>• Minimum to no cleaning with Kelvin tip</li> <li>• Low cleaning with Single (Quasi-kelvin) tip</li> </ul>



## Product Specifications

### Electrical Performance

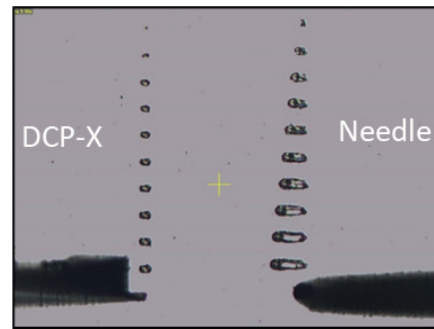
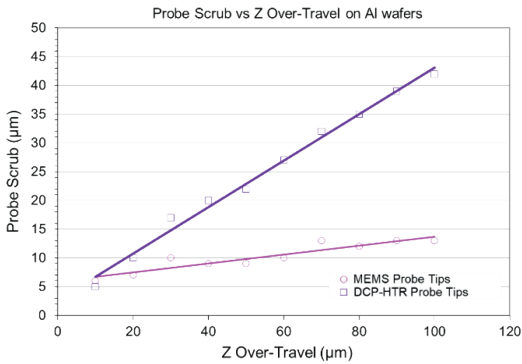
Breakdown voltage	> 500 V
Isolation resistance	> 1 x 10E13 Ω
Frequency response (3 dB)	150 MHz
Typical leakage & noise current	±10 fA at -65°C to 175°C
Residual capacitance	<100 fF (probe tip in air at room temperature)
Characteristic impedance	50 Ω
Contact resistance	Al/Cu pads <5 mΩ Au pads 1-3 mΩ



### MEMS Tip Performance

Tip size	6μm x 6μm
Tip pitch (kelvin)	20μm
Tip material	Rhodium
Contact force	1 gram/mil (25 μm)
Scrub	Typically 4μm + 10% Overdrive (10:1 skate ratio)
Optical fiducial position	50μm vertically above probe tip
Cleaning cycle	Single: Between 200-1000 contacts (based on pad material, temperature & overdrive) Kelvin: Not required to maintain Rc

Cleaning substrate	Single: Use P/N 908-014 "probe clean XTRA" Kelvin: Use P/N 908-014 "probe clean"
Typical tip lifetime	>500,000 Kelvin tip (using Autonomous DC) >300,000 Single tip (using Autonomous DC)

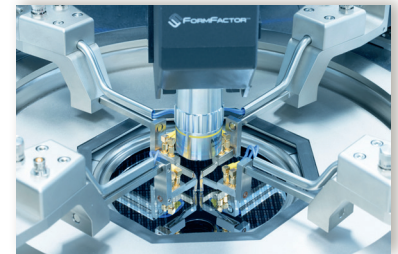


**General**

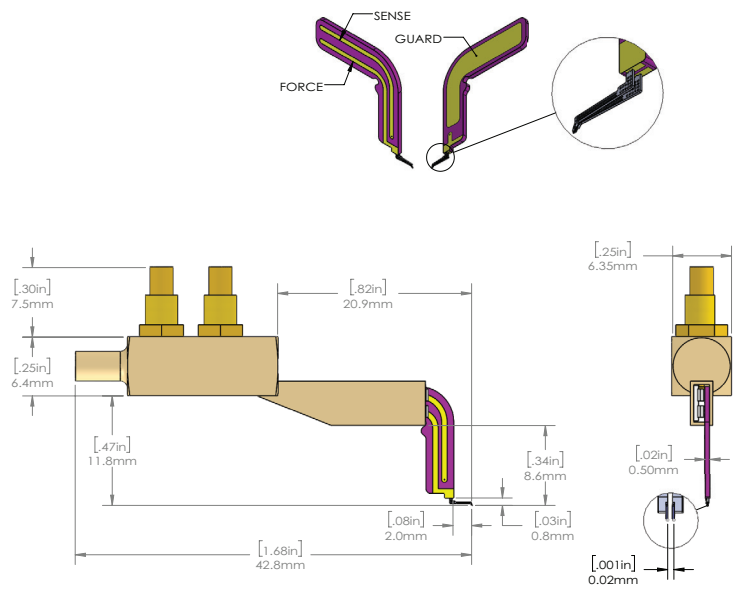
Probe body material	Nickel plated brass
Connector type	SSMC (dual)
MicroChamber compatible	Yes
AttoGuard compatible	Yes

**Probe Station Compatibility**

Hardware	<ul style="list-style-type: none"> <li>• DCP-X-Body compatible exclusively with FormFactor probe systems</li> <li>• DCP-X Top-Hat FlexShield &amp; dual-triax probe adapter</li> </ul>
Software support	<ul style="list-style-type: none"> <li>• Velox Prober Control (Ver 3.4.2 onwards)</li> <li>• VueTrack and VueTrack PRO</li> <li>• Autonomous DC Assistant</li> </ul>



**DCP-X Dimensions**



## › Ordering Information

Part number	Description
DCP-X-Body	Probe Body, DCP-X series MEMs probe, Kelvin, 2 SSMC connectors, qty 1
DCP-X-Single-106	Probe TIP blade, DCP-X Series MEMs Probe, SINGLE, Quasi-Kelvin, 6um tip, Box of 4 (2 left, 2 right)
DCP-X-Kelvin-206-20	Probe TIP blade, DCP-X Series MEMs Probe, DUAL, True-Kelvin, 6um tips, 20um pitch, Box of 4
DCP-X-Tool	Tool, hand tweezers with blade gripper for DCP-X series MEMs probe, Box of 2 (1 left, 1 right)
908-014	Probe needle cleaning pads, .5 x .75 inches, "probe clean XTRA", for DCP-X single probes, pkg of 5
134-208	Probe needle cleaning pads, .5 x .75 inches, "probe clean", pkg of 5
144-362	Top-Hat slider assembly, Standard (Non RF version)
	Dual-triax adapter box & FlexShield for Top-hat, optimized for DCP-X, manual & programable positioners
	DCP-X probe mount with 15 deg offset, for DC positioners

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DCP-X-DS-0424