Microprobe PCB Testing Industry Standard

Technical Specification Sheet

Microprobe Technical Standard | January 2026 | IPC-MP-STD-2026

What is a Microprobe?

A microprobe is a core technical component in the field of PCB testing. It measures the electrical characteristics, dimensional parameters, or functional performance of the tested object by contacting specific points with high-precision probes. Originating in the mid-20th century, this technology has become a key link in ensuring product quality, improving yield rates, and optimizing production processes.

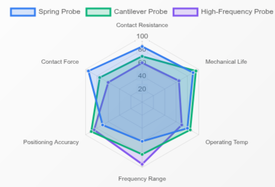
Core Technical Component

Key Application Fields

- Semiconductor Wafer Testing
- PCB Circuit Testing
- 5G/IoT Devices
- AI Device Testing

Multi-Field Applications

Comparison of Key Technical Parameters



Target Audience

- Engineers
- Procurement Departments
- Testing Departments

3 Core Audiences

Basic Types and Structures of Microprobes

Spring Probe

- Outer diameter 1.6mm (industry standard)
- Contact force 150-200g
- Rebound cycle >100,000 times
- Operating temperature 125℃

Cantilever Probe

- Material: Silicon or Silicon Nitride
- Thickness 0.6-4.5μm
- Spring constant 0.03-150 N/m
- Resonance frequency 160-410 kHz

High-Frequency Probe

- Frequency range DC-500GHz
- Coaxial probe: Below 500GHz
- Waveguide probe: Above 110GHz
- Indentation size 40μm×40μm

Performance Indicator System

Electrical Performance	Voltage Measurement Accuracy	±0.1%
Mechanical Performance	Contact Force Consistency	≤±5%
Environmental Adaptability	Operating Temperature Range	-40℃ to +150℃

Material and Manufacturing Standards

Material Requirements

- Probe body: Brass, Beryllium Copper Alloy
- Surface treatment: Gold/Nickel plating (≥0.5μm)
- Spring material: Stainless steel or Music wire
- Insulation material: UL94 V-0 flame retardant rating

Manufacturing Process

- Dimensional accuracy: ±5μm
- Surface roughness: Ras0.8μm
- Perpendicularity: ≤0.002mm/mm
- Concentricity: ≤0.005mm

PCB Test Types and Applications

In-Circuit Test (ICT)

Short circuit, open circuit, component value verification

Accuracy ±0.1%

Functional Test (FCT)

Simulate actual working conditions to verify module performance

Timing Accuracy ±10ns

Flying Probe Test

4-8 independent probe system

Positioning Accuracy ±15μm

Automated Optical Inspection (AOI)

Collaborative testing technology

Detection Accuracy ±15μm

International Standard System

IPC Standards

- IPC-610: Acceptability of Electronic Assemblies
- IPC-9252: Electrical Test Requirements
- IPC-TM-650: Test Methods Manual
- IPC-A-600: Acceptability of Printed Boards
- IPC-A-610: Acceptability of Electronic Assemblies

JEDEC Standards

- JESD22-A114: Electrostatic Discharge Test
- J-STD-002E: Soldering Reliability Standard
- Other relevant JESD series standards

ISO Standards

- ISO 19463:2018: Quality Assurance Procedures
- ISO 14595:2023: Certified Reference Materials
- ISO 23833:2013: Terminology Standard
- ISO 16592:2012: Carbon Content Determination in Steel

Technology Development Trends

- Intelligence & Automation
- Miniaturization & Precision
- New Materials & Processes
- Non-Contact Testing

Selection Guide

Application Scenario	Recommended Probe Type	Key Parameters	Budget Range (USD)
Consumer Electronics PCB	Spring Probe	Contact Resistance <50mΩ	0.1-1.0
Automotive Electronics	High-Temperature Spring Probe	-40℃ to +150℃	0.5-5.0
High-Frequency PCB Testing	Microwave Probe	Frequency >10GHz	10-100
Wafer Testing	Cantilever Probe	Accuracy ±2μm	50-500

Maintenance Guide

Daily Maintenance

- Visual inspection: Probe bending or damage
- Clean contaminants on probe surface
- Measure contact resistance (≤120% of initial value)
- Check insulation resistance (≥100MΩ)
- Verify probe pressure is normal

Regular Maintenance

- Weekly: Pressure calibration, visual inspection
- Monthly: Full electrical performance testing
- Monthly: Mechanical performance testing
- Quarterly: System calibration
- Semi-annually: Comprehensive preventive maintenance

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