

Cascade

# InfinityXT™ Probe

RF/mmW Probe Series

000111100010

## Overview

Introducing the InfinityXT probe series. InfinityXT enhances and extends FormFactor's industry-leading Infinity probe family, which has set the benchmark for accuracy and repeatability in the device characterization and modeling community for more than a decade. The new InfinityXT series advances the industry standard with higher temperature range, better tip visibility and durability, and support for narrower pitches as the market evolves.

Recently, the industry has experienced explosive growth in the RF and microwave devices, driven by the automotive, mobile communications/5G and IoT device markets. The development of the new InfinityXT probe has been guided by the requirements of these high-growth markets. The requirements include ultra-wide bandwidth and wide temperature ranges for device modeling and characterization. Device measurements for modeling is one of the most demanding on-wafer measurement applications, requiring extremely high measurement accuracy and repeatability, since extracted parameters are highly sensitive to very slight differences.



## Features / Benefits

<b>Superior high-frequency and electrical performance</b>	<ul style="list-style-type: none"><li>• 40 GHz, 50 GHz, 67 GHz and 110 GHz versions available.</li><li>• Excellent return and insertion loss combined with low and repeatable contact resistance on aluminum pads. This helps to ensure high-accuracy S-parameter measurements to meet the requirements of the most demanding applications.</li></ul>
<b>Full-range thermal coverage</b>	<ul style="list-style-type: none"><li>• Performance from -50°C to +175°C, without compromising accuracy or life (demonstrated useable to 200 °C).</li></ul>
<b>Small, lithographic fabricated contacts</b>	<ul style="list-style-type: none"><li>• Industry-leading solution for small pad, tight pitch, RF probing needs. Small, lithographically-defined contacts with a contact area of 12 µm W x 5 µm L. When combined with a new mechanical architecture to improve the skate vs overtravel ratio and excellent probe tip visibility for precise probe placement, enables probing of tight pitch, small pads.</li><li>• Standard pitches down to 45 µm with the ability to support pitches as small as 25 µm (for pitches &lt;45 µm contact your field sales or applications team to discuss your requirements).</li></ul>
<b>Durable probe structure</b>	<ul style="list-style-type: none"><li>• Highly durable, solid rhodium contacts and new mechanical architecture help to provide an RF probe with extremely high durability and long probe life.</li></ul>

## > Specifications

### Mechanical Specifications

Available contact configurations	IXT40 - GS /SG/GSG, IXT50 - GS /SG/GSG, IXT67 - GS /SG/GSG, IXT110 GSG Only Recommended
Available contact pitches	45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 125, 150, 175, 200, 225, and 250 $\mu\text{m}$ (pitches between 25 – 40 $\mu\text{m}$ , contact field sales or applications to discuss your requirements)
Contact material	Non-oxidizing solid rhodium tips
Minimum recommended pad size	20 $\mu\text{m}$ x 40 $\mu\text{m}$ (but can be used on small pads in Y, with careful probe placement)
Contact area	W12 $\mu\text{m}$ x L5 $\mu\text{m}$ (nominally, at initial use, length will extend some with use)
Operating temperature	-40°C to +175°C (maximum temperature range: -55°C to +200°C)
Recommended overtravel	30-75 $\mu\text{m}$
Maximum safe overtravel	150 $\mu\text{m}$
Overtravel to skate ratio	2.5:1 (50 $\mu\text{m}$ overtravel : 20 $\mu\text{m}$ skate)
Body Styles	IXT40, IXT50 Angled only, IXT67, IXT110 Angled and vertical

### S-Parameter Specifications

IXT40 (GSG)	0-20 GHz	20-40 GHz
Return Loss (S11)	20 dB	15 dB
Insertion loss (S12)	0.8 dB	1 dB

IXT40 (GS/SG)	0-20 GHz	20-40 GHz
Return Loss (S11)	20 dB	13 dB
Insertion loss (S12)	0.8 dB	1.2 dB

IXT50 (GSG)	0-20 GHz	20-50 GHz
Return Loss (S11)	20 dB	13 dB
Insertion loss (S12)	1 dB	1.5 dB

IXT50 (GS/SG)	0-20 GHz	20-50 GHz
Return Loss (S11)	20 dB	13 dB
Insertion loss (S12)	1 dB	1.5 dB

IXT67 (GSG)	0-25 GHz	25-40 GHz	40-67 GHz
Return Loss (S11)	20 dB	15 dB	12dB
Insertion loss (S12)	0.8 dB	1 dB	1.5 dB

IXT67 (GS/SG)	0-25 GHz	25-40 GHz	0-67 GHz
Return Loss (S11)	20 dB	13 dB	11 dB
Insertion loss (S12)	0.8 dB	1.2 dB	1.8 dB

IXT110 (GSG)	0-35 GHz	35-80 GHz	80-110 GHz
Return Loss (S11)	20 dB	15 dB	11 dB
Insertion loss (S12)	1 dB	1.5 dB	2 dB

Note: Probe S-Parameter files “s2p” are available at the following [link](#). You will need the exact PN and SN of the probe to download the s2p file.

## > Specifications (continued)

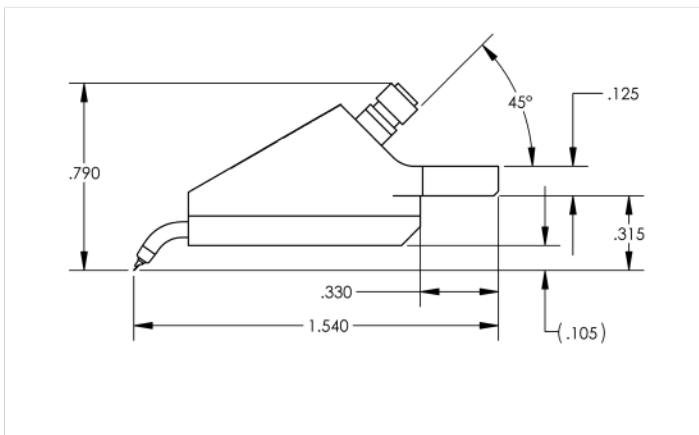
### DC Specifications:

Maximum DC voltage	250 V
Maximum DC current	500 ma
Isolation resistance	200 M $\Omega$

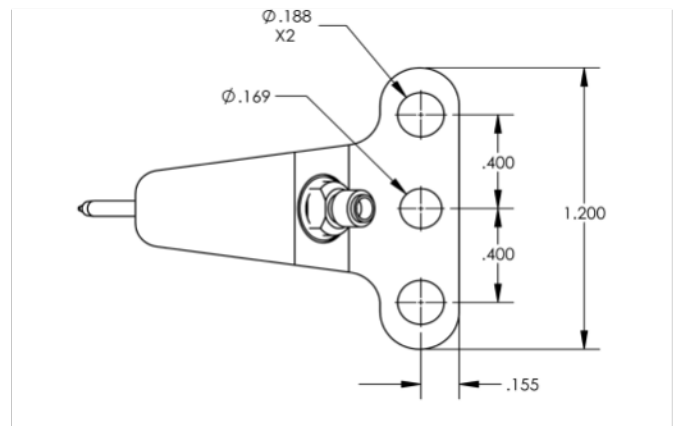
### Miscellaneous:

RF signal line connector	Female 50 Ohm coaxial connector on the probe as follows: IXT67 version uses a 1.85mm V style connector IXT110 version uses a 1mm W style connector
Typical contact resistance on Al pads at 25 °C	< 0.05 $\Omega$ (< 0.02 $\Omega$ on Au pads), Temperature, cleaning material and frequency (as well as many other variables) affect actual contact resistance values. Consult field sales or applications to discuss your requirements.
Maximum RF power handling	> 4 W (20 GHz), 2 W (67 GHz), 1 W (110 GHz)

## > Physical Dimensions (measurements in inches)

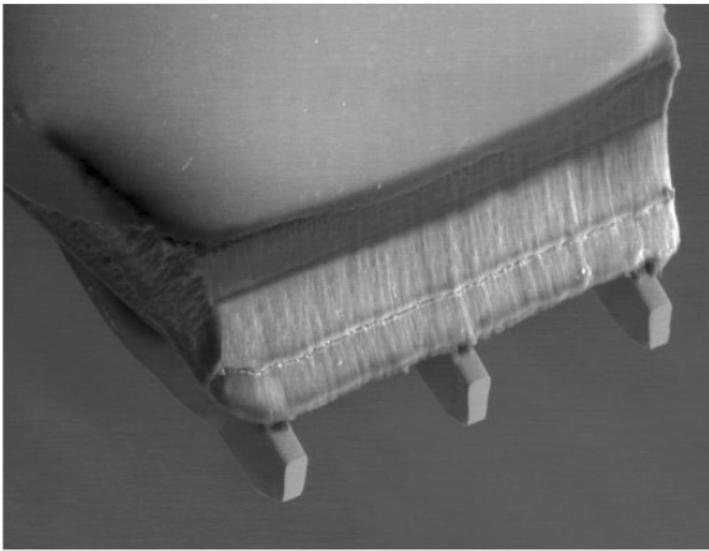


InfinityXT angled body style dimensions side view

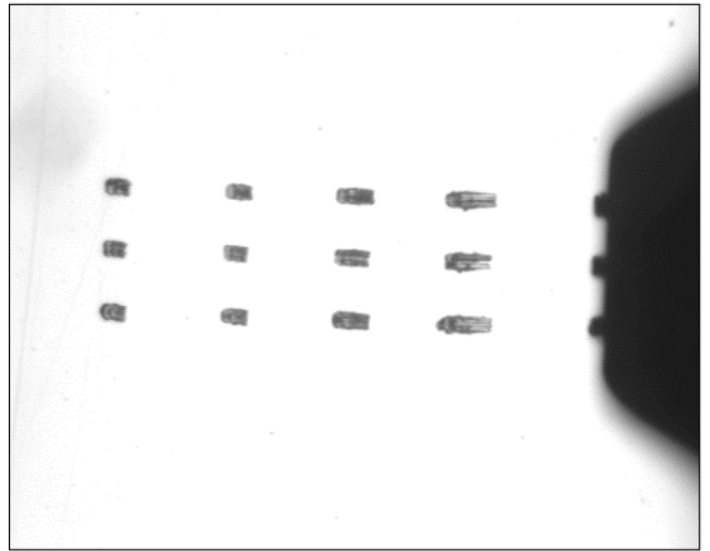


InfinityXT angled body style mounting hole dimensions / top view.

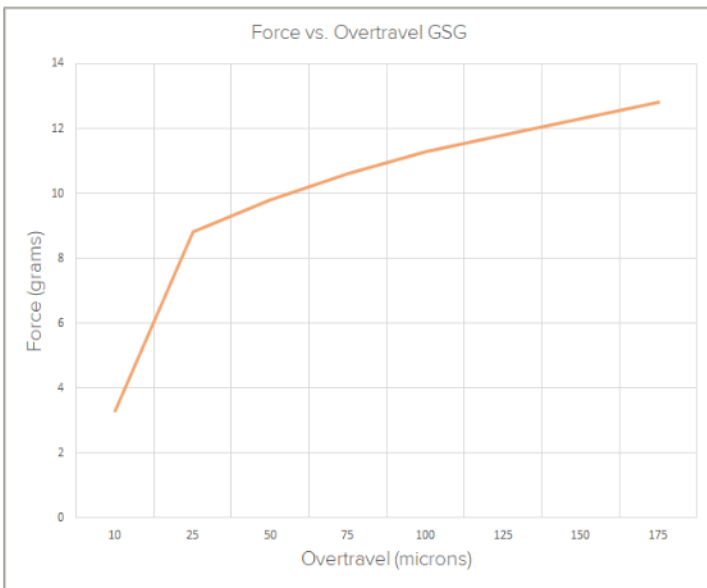
## > Contacts/Scrub/Performance Examples



SEM image of InfinityXT 100  $\mu\text{m}$  pitch contacts highlights the highly visible, small 12  $\mu\text{m}$  wide contacts.

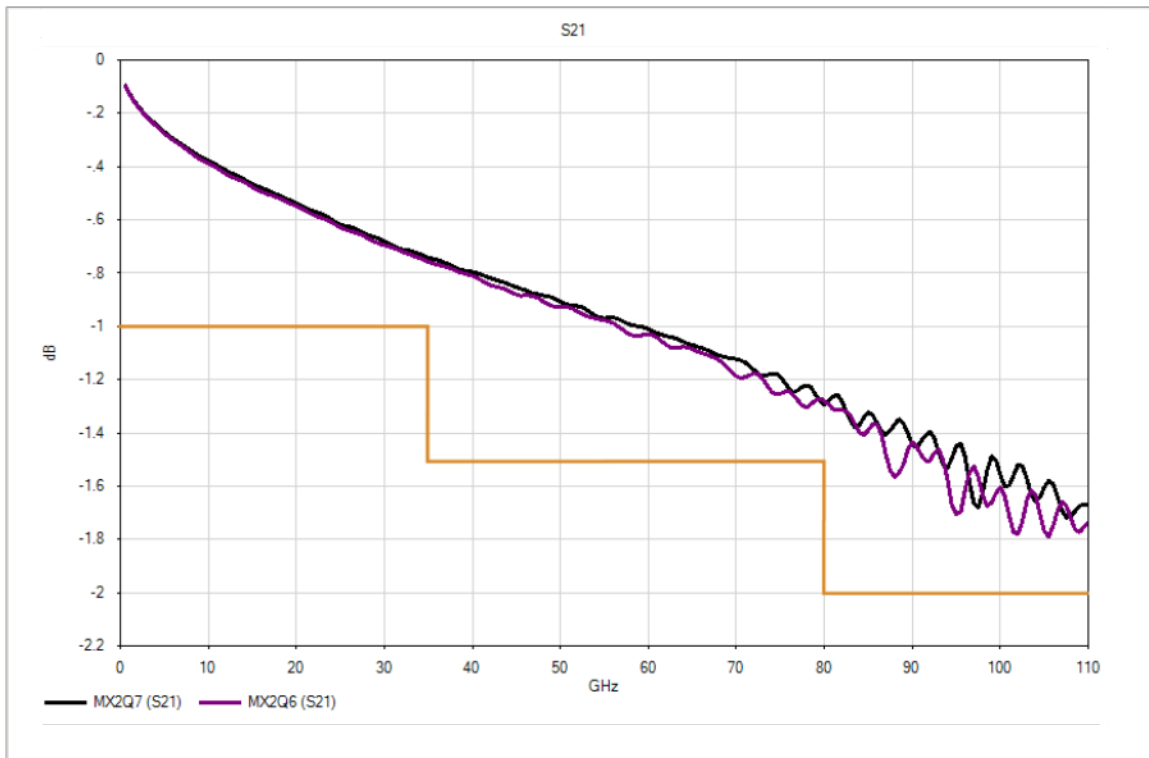


InfinityXT GSG-50 scrub marks at progressively higher overtravel levels of 13, 25, 50 and 75  $\mu\text{m}$ . Highly uniform scrub yields very high repeatability in your measurements.

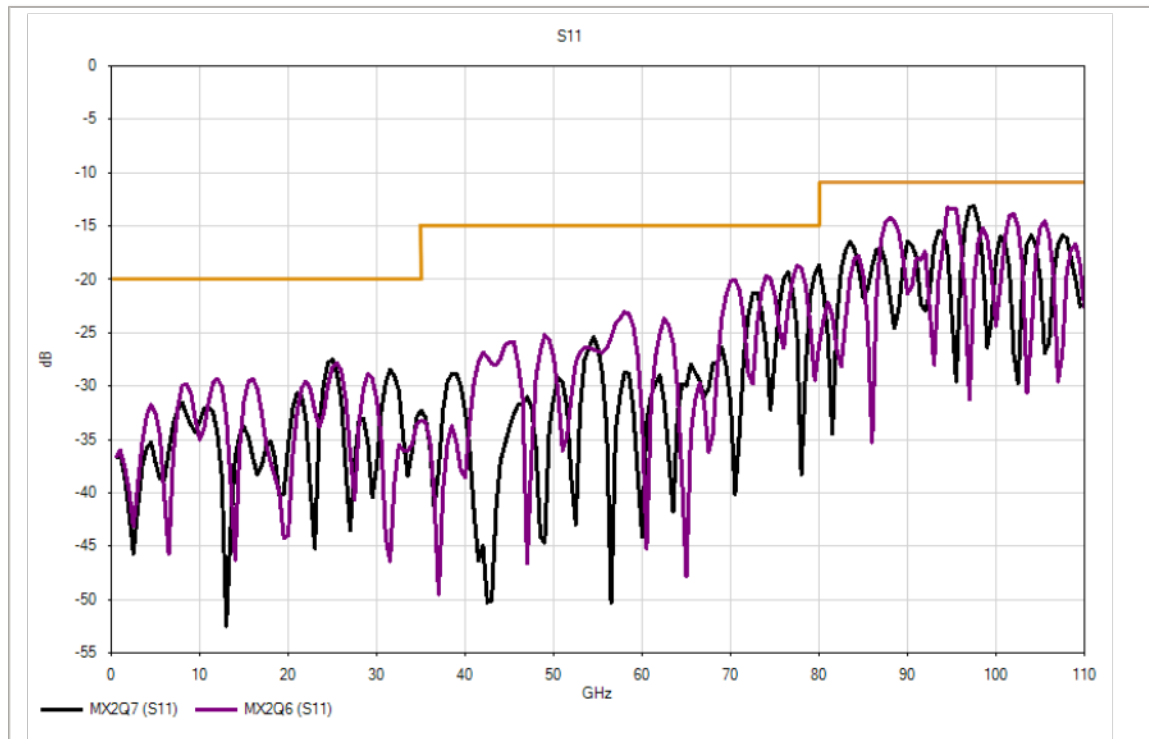


The unique mechanical architecture of the InfinityXT probes provide higher force with less overtravel (OT) during the first 2 mils of overtravel. This helps to ensure that you achieve good contact resistance at lower OT settings, mean less skate and the ability to probe on smaller pads. This same unique architecture enables significantly higher OT levels without damage to the probe as the force levels off at higher levels of overtravel.

## > Performance Examples (continued)

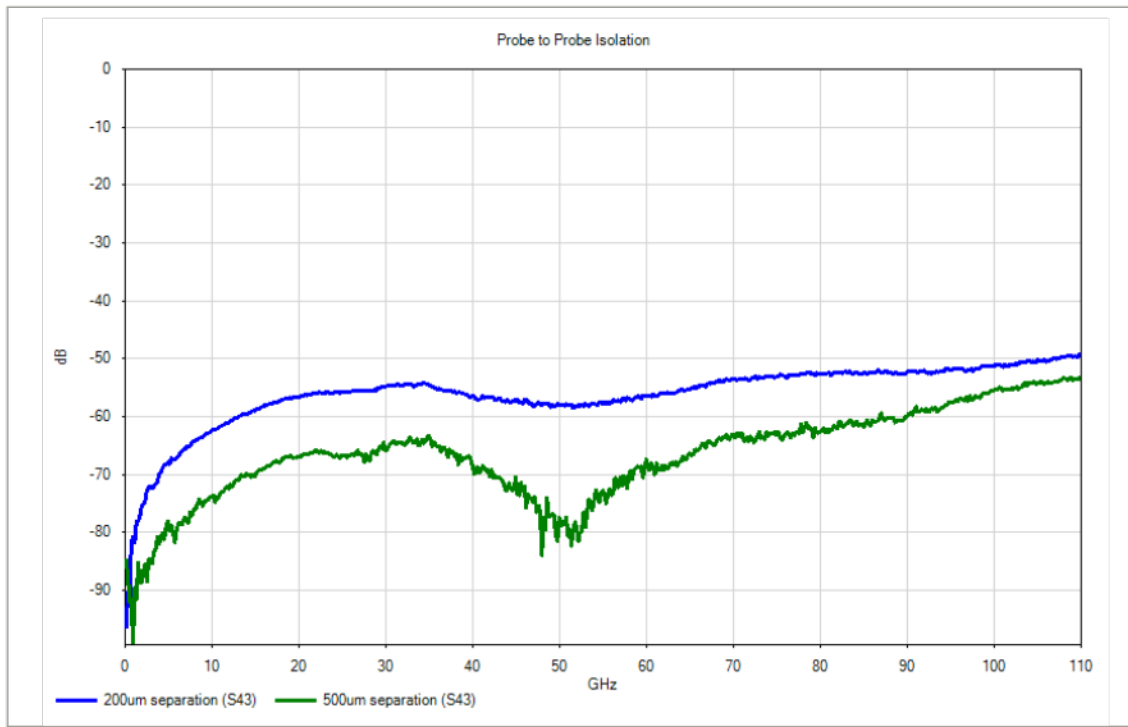


Typical Insertion Loss thru 110 GHz for a GSG 50  $\mu\text{m}$  ( — spec limit)



Typical Return Loss thru 110 GHz for a GSG 50  $\mu\text{m}$  probe (specifications can vary slightly by pitch; — spec limit)

## > Performance Examples (continued)

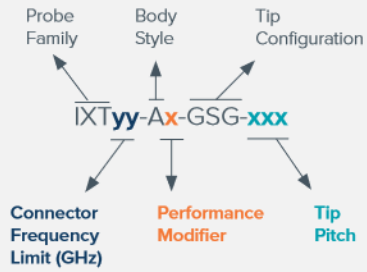


Probe to probe isolation, shown at two separations. The blue curve shows 200 µm probe-to-probe separation and the green curve shows 500 µm separation.

## Ordering Information

Contact your local sales representative for a price and delivery quotation or help with any questions. You can also request a quote on our website: [www.formfactor.com/products/probes/infinityxt](http://www.formfactor.com/products/probes/infinityxt)

### Part Number Key



Characteristic	Available values
Coaxial Conn. (Frequency)	40 GHz = 2.92 mm, 50 GHz = 2.4 mm, 65 GHz = 1.85 mm, 110 GHz = 1 mm
Body Style	Blank = Vertical, A = Angled
Performance Modifier	Blank = Standard, M = Modeling Version
Tip Configuration	GS, SG, GSG
Tip Pitches	45-250 in 25 $\mu$ m increments, larger values may be available (check with factory)

Note: Not all combinations are available.

### Examples:

IXT67-A-GS-50 is a 67 GHz 1.85 mm connector probe, in a angled connector body style, with GS contacts at a 50  $\mu$ m pitch

IXT67-A-GSG-250 is a 67 GHz 1.85 mm connector probe, in an angled connector body style, with GSG contacts at a 250  $\mu$ m pitch

## Recommended Accessories

PART NUMBER	DESCRIPTION
168-690	WinCal, advanced VNA calibration software and analysis tools
RF cables	Many versions and lengths available (dependent on probe body style and system type used) Please consult with your sales representative

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