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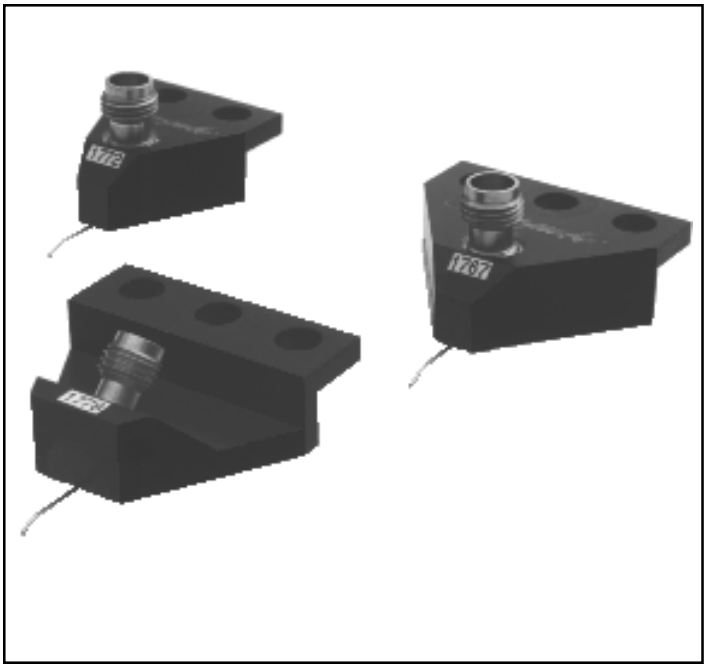
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Picoprobe®

BY GGB INDUSTRIES INC.

Model 40A

High Performance Microwave Probes



Model 40A probes mounted in three different adaptor styles

Features

- **Durable**
- **DC to 40 GHz**
- **Insertion loss less than 0.8 db**
- **Return loss greater than 18 db**
- **Measurement repeatability -80 db**
- **Individually spring loaded contacts**
- **BeCu or Tungsten tips available**
- **Any pitch from 50 to 1250 microns**
- **Variety of Footprints**
- **Patented coaxial design**

The GGB Industries, Inc., Model 40A Picoprobe® sets new standards in microwave probing performance. Using low loss coaxial techniques, the Model 40A achieves an insertion loss of less than 0.8 db and a return loss of greater than 18 db through 40 GHz.

With its individually spring loaded Beryllium-Copper or optional Tungsten tips, the Model 40A provides reliable contacts, even when probing non-planar structures. This reliable low resistance contact is one of the keys to providing highly repeatable measurements. The Model 40A also provides direct viewing of the probe tips for accurate positioning.

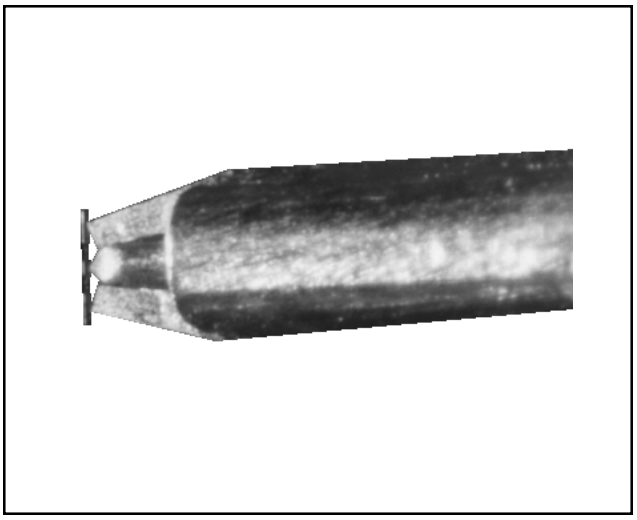
The Model 40A can be mounted in various adaptors for use with standard microwave probe stations or attached to thin blades for use with dc probe needles on a probe card or multi-contact wedge. Custom mounts are available.

Any pitch (tip spacing) from 50 to 1250 microns may be specified. Probe pitches greater than 1250 microns can be accommodated. The probe can be configured with Ground-Signal-Ground (G,S,G), Ground-Signal (G,S), or Signal-Ground (S,G) tip footprints. We recommend smaller pitches with a G,S,G footprint for best performance.

Connection to the Model 40A is through a female K connector and is compatible with the 3.5 mm and SMA connectors.

Flexible Tips for Flexible Probing

Each Model 40A has patented, independently spring loaded tips which ensure a reliable contact to the probing surface. Because the tips are flexible they minimize circuit damage, increase probe life, and most importantly, provide a reliable individually spring loaded contact for each point. With a small amount of overdrive, the point scrubs the surface to make a reliable contact free of dust, dirt, and oxide contamination. The ability to view the exact contact area eases probe positioning and allows for the precise positioning necessary for good LRM calibrations. The flexible tips even allow probing of non-planar surfaces such as ceramic substrates and laser diode structures.



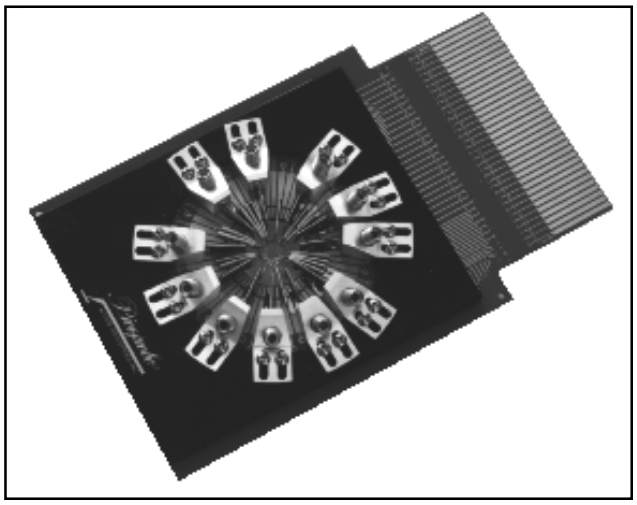
Closeup of Model 40A Tips with 150 Micron pitch almost touching a 50 Ω calibration load.

Coaxial Transmission Improves Performance

The Model 40A uses a precision miniature 50 ohm coaxial cable from the probe tips to the connector interface. The coaxial design provides lower loss and less radiation than coplanar designs. The miniature coaxial cable is fabricated from flexible Beryllium-Copper which greatly improves the probe's durability.

Probe Cards & Multi-Contact Wedges

Model 40A probes can be mounted on standard 4.5 inch probe cards, custom-sized cards, and our unique multi-contact wedge bodies to provide a convenient method for testing wafers at high frequencies using standard automatic or manual probe stations. Picoprobe Cards and Multi-Contact Wedges can be designed with 40, 50, 67, and/or 110 GHz probes for RF connections with DC needles for power and low frequency signals.



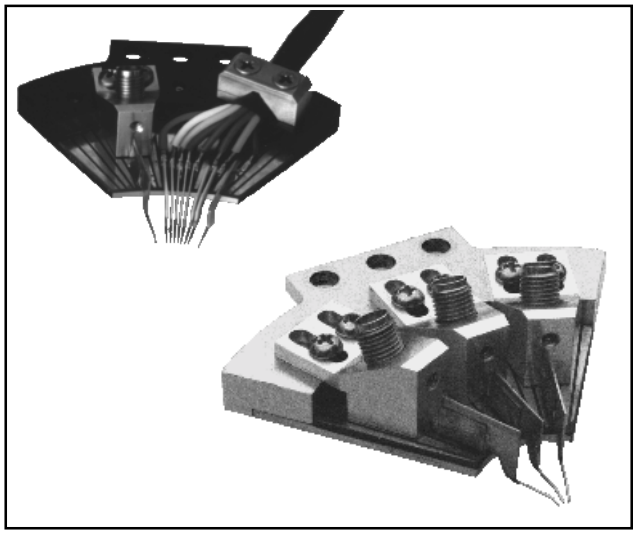
Typical Probe Card with Model 40A Probes

An Entire Line of Microwave Probes

For special applications, the Model 40A can be mounted in custom adaptors, the coaxial line can be bent to fit tight spaces, and the tips can be configured to match extremely non-planar surfaces or non-symmetrically placed grounds. Other options include: Tungsten probe tips; a high temperature version (40A-HT); and an integrated series or terminating resistor built into the signal tip. Many other types are available, please call.

For applications above 40 GHz, GGB Industries, Inc., offers the Model 50A, Model 67A, and Model 110A/H for DC to 110GHZ applications.

Several models are available with wave guide inputs including the Model 50, Model 75, Model 90, Model 120, Model 140, and Model 220. The wave guide probes have an optional integral bias T for active device measurements.



Examples of the Multi-Contact Wedge which combine Multiple RF and DC contacts .

Probing Expertise

GGB Industries, Inc., has broad capabilities in custom probe engineering and manufacturing and our staff is accustomed to creating unique solutions for the most difficult probing requirements. GGB Industries, Inc., is the leading supplier of high impedance active probes offering models with input capacitances of as low as .02 pF and frequency responses of up to 3.0 GHz.

Model 40A Performance Data[1]
G,S,G Configuration

Frequency Range: DC to 40 GHz

Insertion Loss: Less than 1.0 db to 40 GHz
(.70 db typical)

Return Loss: Less than 30 db to 4 GHz
(35 db typical)
Less than 20 db to 26 GHz
(23 db typical)
Less than 18 db to 40 GHz
(20 db typical)

Crosstalk[2]: Less than 38 db to 40 GHz

[1] Specifications are for the P-style Model 40A Picoprobes with G,S,G configurations and pitches of between 50 and 300 microns. The C and T style Model 40A Picoprobes (see following page for mounting styles) have the same specifications except for insertion loss, which is less than 1.2 db (0.9 db typical).

[2] Crosstalk is measured using two probes contacting a bare sapphire substrate 100 microns apart.

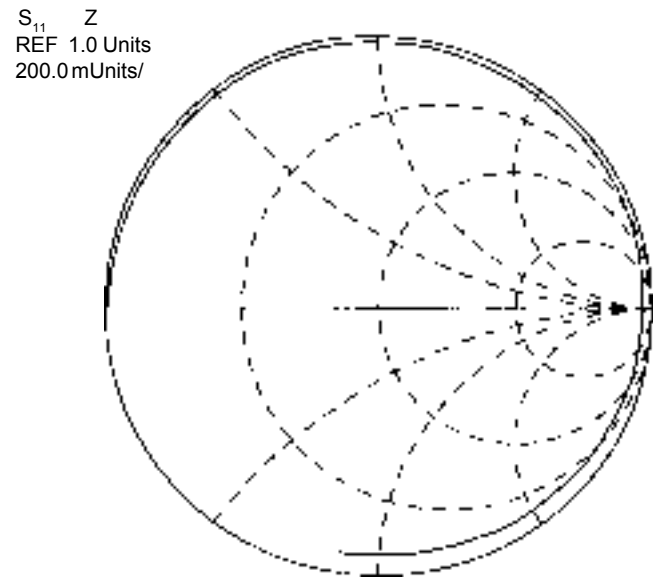
Model 40A Performance Data[3]
G,S and S,G Configuration

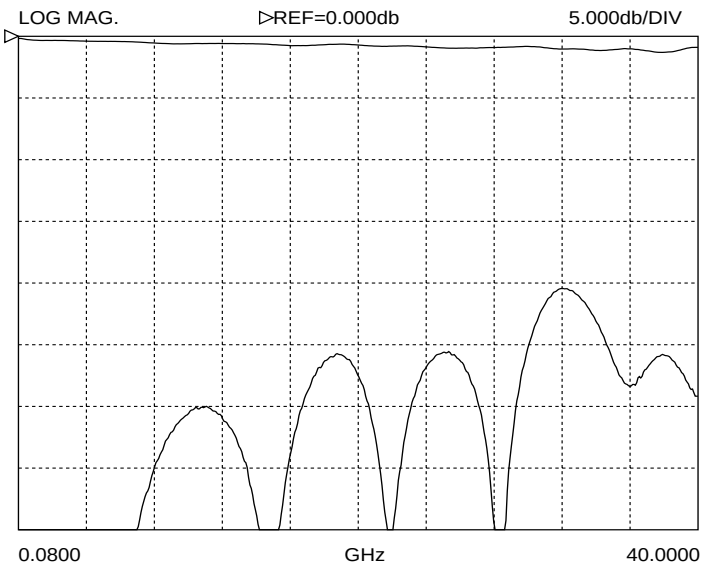
Frequency Range: DC to 40 GHz

Insertion Loss: Less than 2.0 db to 40 GHz
(1.6 db typical)

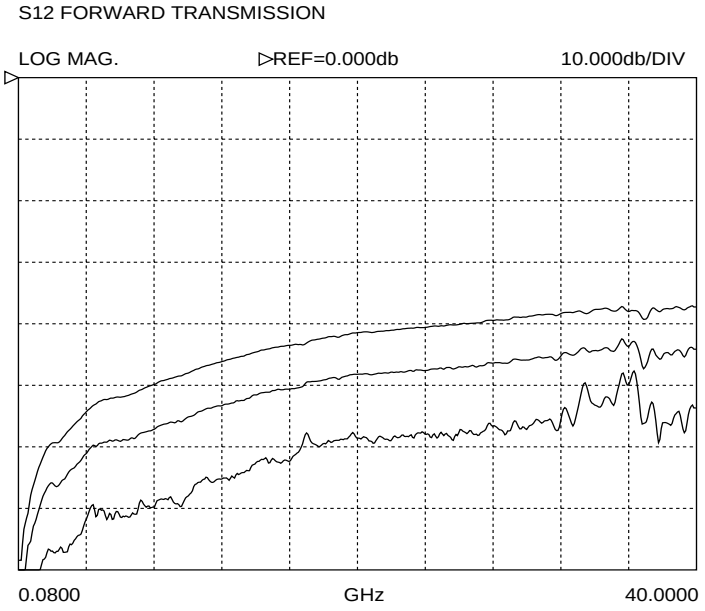
Return Loss: Less than 30 db to 4 GHz
Less than 15 db to 26 GHz
Less than 12 db to 40 GHz

[3] Specifications are for the P-style Model 40A Picoprobes





Typical uncalibrated performance of a Model 40A-GSG-150-P Picoprobe. The top trace is the round trip return loss into a short which is twice the probe's insertion loss. The bottom trace is the return loss into a 50 ohm load.



Crosstalk performance of two Model 40A-GSG-150-P Picoprobes while contacting a bare sapphire substrate with spacings of 100, 200, and 400 Microns.

LEFT: A Smith Chart showing the calibrated response of a Model 40A-GSG-150-P while contacting a coplanar offset short. The LRM method was used for calibration.

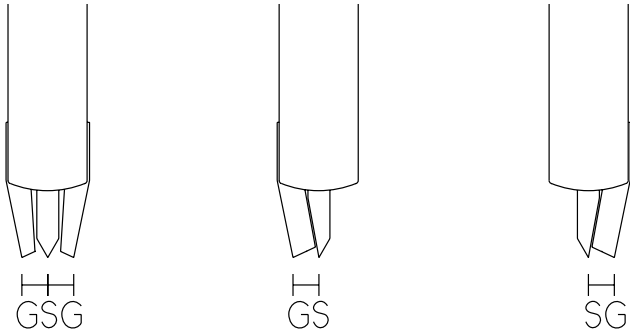
ORDERING INFORMATION

When ordering Model 40A probes, use the following part numbering convention:

Model 40A- _____ – ___ – _____
configuration - pitch - mounting style

Configuration: Specify GSG, GS, or SG for tip placement where S is the signal tip and G is a ground tip. Use the following diagram to determine the appropriate configuration.

Top View



Pitch: Specify ground (G) to signal (S) tip spacing in Microns from 50 to 1250 microns. For standard GSG probes, the two spacings are equal. Contact the factory for spacings larger than 1250 microns or unusual tip placement and spacings.

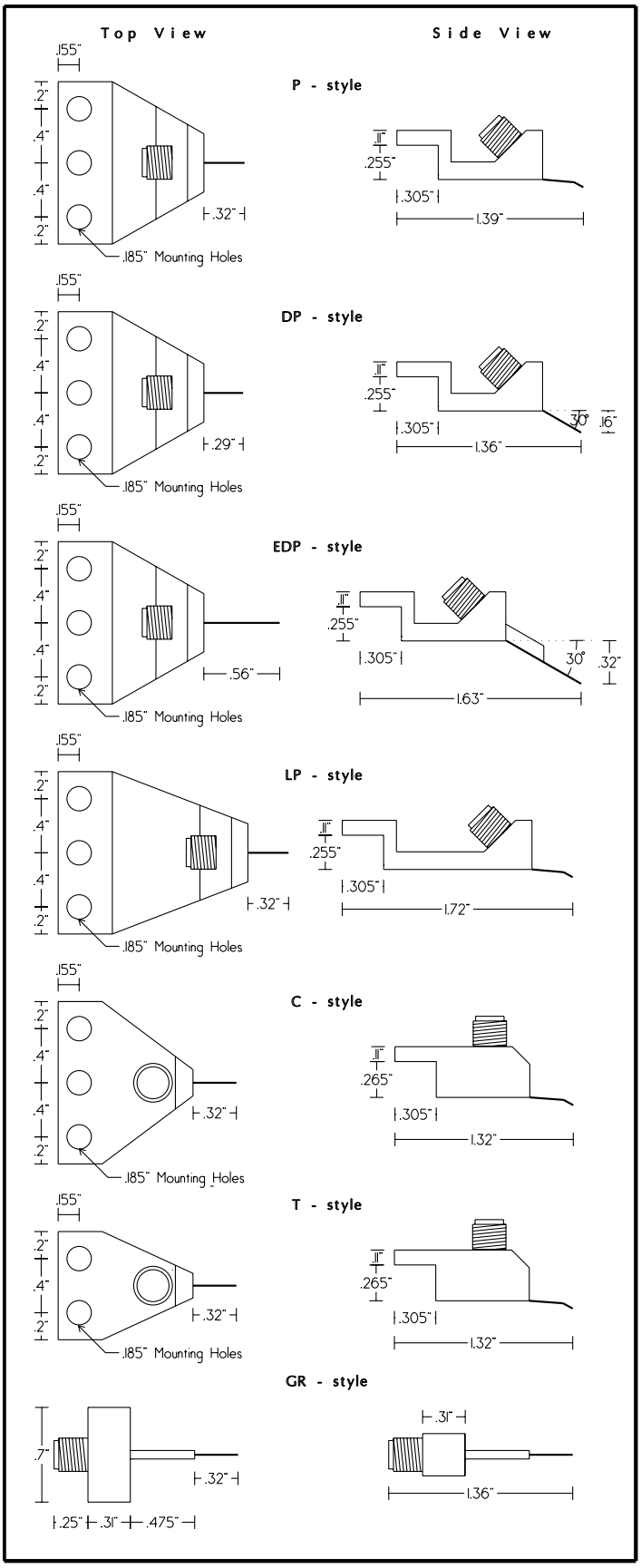
Mounting Style: Choose from thirteen adapter styles. Seven of the most common adapter styles are pictured on the right. Specify T, C, GR, P, DP, EDP, LP, Q, F, S, DS, VP, or RVP. Choose the appropriate mounting type for your application. The P, DP, EDP, LP, Q, S, DS, VP, and RVP styles have the connector pointing back at a 45 degree angle to give more working area above the probe. The DP, EDP, DS, VP, and RVP styles are used where extra clearance beneath the probe is needed. When using DP, EDP, and DS style probes, probe positioning is more difficult due to the increased probing angle since the probe points slide further forward for a given change in the Z axis than our other style probes. Custom mounting styles are available.

Example: A 40A-GSG-150-P is a Model 40A with Ground, Signal, Ground configuration with 150 microns between each contact mounted in a P style adaptor.

Right: Specifications for seven of our most common adapter styles. Please contact our office or visit our web site at: www.picoprobe.com for information on other adapter styles.

Covered by US patent # 4,871,964

Mounting Styles and Dimensions



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GGB INDUSTRIES, INC. • P.O. BOX 10958 • NAPLES, FL 34101
Telephone (239) 643-4400 • Fax (239) 643-4403 • E-mail email@ggb.com • www.picoprobe.com

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