

# Agilent Waveguide Directional Couplers, 8.2 to 60 GHz, 752 Series

## Data Sheet

### Features

- High coupling accuracy
- Excellent directivity
- Low SWR

### Applications

- Measure reflection coefficient (SWR)
- Mix two signals
- Monitor power
- Isolate signal source or wave meter

### Description

High directivity makes the Model 752 particularly well suited for measuring very small reflections and for rapidly adjusting transmission line flatness over the entire wave guide frequency range.

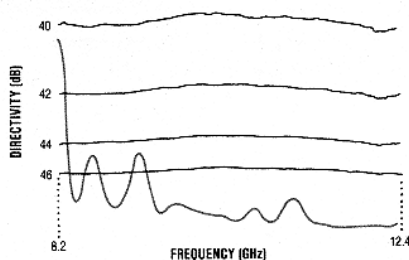


Figure 1. Directivity of an X752C. All couplers are tested over their full band for directivity.

Each coupler has an overall directivity of better than 40 dB (see figure 1), very low reflections, and a smooth coupling variation vs. frequency (see Figure 2).

Performance characteristics are unaffected by humidity, temperature, or time, making these units especially useful as standards of microwave attenuation. Coupling factors are 3, 10, and 20 dB; mean coupling accuracy is  $\pm 0.4$  dB ( $\pm 0.7$  dB for K- and R-bands), and coupling variation vs. frequency is  $\pm 0.5$  dB (0.6 dB for R752D). Each coupler is supplied with coupling factor data at five frequencies across the band.

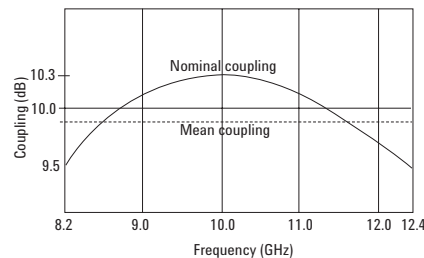
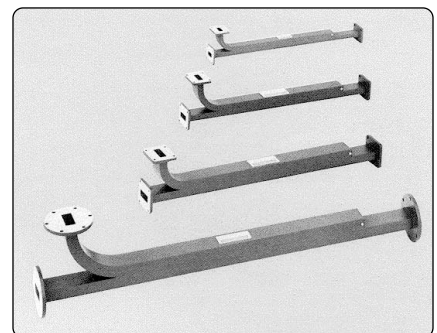


Figure 2. Typical coupling characteristic of model X752C.

Used together and connected back-to-back, the directional couplers are most useful with the 8350 or 8340 Series sweepers in broadband reflection and SWR measurements. One directional coupler samples power traveling to the load, while the other samples power reflected from the load. Used with two 424A crystal detectors, measurements of SWR versus frequency can be made easily. The detected output of the forward coupler is used to level the sweeper, and the detected output of the reverse coupler is presented on an oscilloscope calibrated in SWR.\* When used with unlevelled sweepers, the output of both couplers can be applied to the 8510 network analyzer or the 8756 or 8757 scalar network analyzers to display reflection coefficient directly.

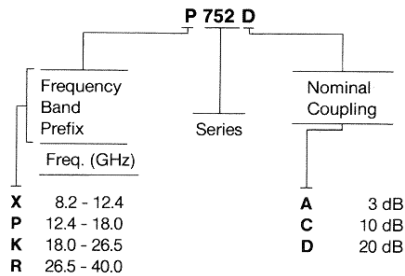


## A Matched "Hybrid Tee" with Low SWR

Since the 3 dB coupler has the high directivity of the 10 and 20 dB couplers, it can usually be used in place of the hybrid tees. The 3 dB multi-hole coupler, unlike the hybrid tee, is a matched device, having an output SWR (either arm) of 1.15 or less over a waveguide frequency range.

## Ordering Information

For more information on the Agilent U752D waveguide coupler (40 to 60 GHz, 20 dB), please go to [www.agilent.com](http://www.agilent.com) and search on "waveguide coupler".



## Waveguide Couplers and Accessories up to 60 GHz

Millimeter wave test equipment and measurement accessories include quality waveguide couplers in the Q band (33 to 50 GHz) and U band (40 to 60 GHz) frequency ranges. The Q and U752A/B/D are split block design couplers that feature exceptionally high directivity of at least 36 dB, low SWR of 1.1 or better and a smooth coupling variation of no more than  $\pm 0.7$  dB.

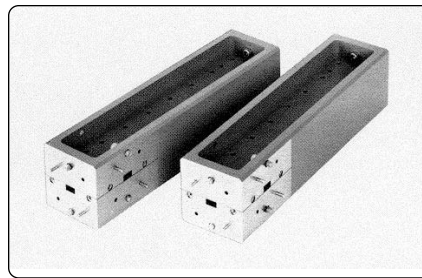


Figure 3. Q752 (33 to 50 GHz) and U752 (40 to 60 GHz) waveguide couplers.

[www.agilent.com](http://www.agilent.com)

### Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

### Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

### Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office.

### Phone or Fax

**United States:**  
(tel) 800 829 4444  
(fax) 800 829 4433  
**Canada:**  
(tel) 877 894 4414  
(fax) 800 746 4866  
**China:**  
(tel) 800 810 0189  
(fax) 800 820 2816  
**Europe:**  
(tel) 31 20 547 2111  
**Japan:**  
(tel) (81) 426 56 7832  
(fax) (81) 426 56 7840

**Korea:**  
(tel) (080) 769 0800  
(fax) (080)769 0900  
**Latin America:**  
(tel) (305) 269 7500  
**Taiwan:**  
(tel) 0800 047 866  
(fax) 0800 286 331  
**Other Asia Pacific Countries:**  
(tel) (65) 6375 8100  
(fax) (65) 6755 0042  
Email: [tm\\_ap@agilent.com](mailto:tm_ap@agilent.com)  
Contacts revised: 05/27/05

Frequency Band <sup>1</sup> (Prefix)	Frequency (GHz)	Fits Waveguide Size		Mean Coupling Accuracy <sup>2</sup>	Coupling Variation <sup>3</sup>	Directivity <sup>4</sup>	SWR <sup>4,5</sup> Main Guide		Average Power Aux Guide Load (W)	
		Nominal	OD mm (in.)				752A	752C/D		
X	8.2 - 12.4	25.4 x 12.7	(1.0 x 0.5)	WR 90	$\pm 0.4$ dB	$\leq \pm 0.5$ dB	$\geq 40$ dB	$\leq 1.1$	$\leq 1.05$	1
P	12.4 - 18.0	17.8 x 9.9	(0.7 x 0.39)	WR 62	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	1
K†	18.0 - 26.5	12.7 x 6.4	(0.5 x 0.25)	WR 42	$\pm 0.7$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	0.5
R†	26.5 - 40.0	9.1 x 5.6	(0.36 x 0.22)	WR 28	$\pm 0.7$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	0.5

Frequency Band <sup>1</sup> (Prefix)	Length						Weight			
	752		752C		752D		Net		Shipping	
	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(kg)	(lb)	(kg)	(lb)
X	424	16 <sup>7</sup> / <sub>16</sub>	399	15 <sup>11</sup> / <sub>16</sub>	399	15 <sup>11</sup> / <sub>16</sub>	0.8	1 <sup>3</sup> / <sub>4</sub>	1.4	3
P	349	13 <sup>3</sup> / <sub>4</sub>	311	12 <sup>1</sup> / <sub>4</sub>	311	12 <sup>1</sup> / <sub>4</sub>	0.34	3/4	0.9	2
K†	270	10 <sup>5</sup> / <sub>8</sub>	252	9 <sup>9</sup> / <sub>16</sub>	252	9 <sup>9</sup> / <sub>16</sub>	0.23	1/2	0.45	1
R†	295	11 <sup>5</sup> / <sub>8</sub>	219	8 <sup>5</sup> / <sub>8</sub>	222	8 <sup>23</sup> / <sub>32</sub>	0.11	1/4	0.45	1

<sup>1</sup>Letter suffix indicates nominal coupling. "A" for 3 dB, "C" for 10 dB, "D" for 20 dB (example: P-band, 3-dB coupling, Model P752A).  
<sup>2</sup>Mean coupling is the average of the maximum and minimum coupling values in the rated frequency range.  
<sup>3</sup> $\pm 0.6$  dB for R752D.  
<sup>4</sup>Swept-frequency tested.  
<sup>5</sup>Auxiliary arm SWR is 1.15 except for P, K and R band, for which it is 1.2.  
†Circular flange adapters available: HP 11515A for K-band (UG-425) HP 11516A for R-band (UG-381)

The complete list is available at: [www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 1985, 2005

Printed in USA, August 12, 2005

5954-6383



Agilent Technologies