QUADRATURE 3dB COUPLERS

5.24.10

DATA SHEET **HPG REV G**

FEATURES

- High Power
- Low Profile Surface Mount Package
- Very Low Insertion Loss
- Excellent Amplitude and Phase Balance
- High Isolation
- RoHS
- Tape and Reel for High Volume Production

APPLICATIONS

- Power Amplifiers
- Signal Distribution Networks
- Antenna Feeds
- Switch Networks
- High Power Combiners/Splitters
- Phase Shifters

GENERAL DESCRIPTION

The HPG is a high performance 3dB hybrid coupler in a surface mount package. This low profile coupler handles up to 60 watts of CW power. The HPG is designed for those demanding applications where low loss, excellent amplitude and phase balance are required.

The HPG is manufactured with materials that have thermal expansion characteristics compatible with industry standard board materials like RO3003, RO4350, FR4 and others. The couplers are available in a RoHS complaint finish and packaged in both reel and tube.

ELECTRICAL SPECIFICATIONS*

Frequency MHz	Isolation dB (min)	Insertion Loss dB (max)	VSWR	Amplitude Balance dB (max)	Phase Error ° (max)	Power Handling ** Watts CW	Operating Temperature °C
1400 – 1500	18	0.25	1.28	± 0.5	90 ± 4	60	-55 to +85
1500-1700	18	0.25	1.28	± 0.4	90 ± 4	60	-55 to +85

Specification Notes:

* Measured on Florida RF Labs test fixture 008-40-074. Specifications are subject to change without notice.
** Power rating is specified at 85˚C base temperature

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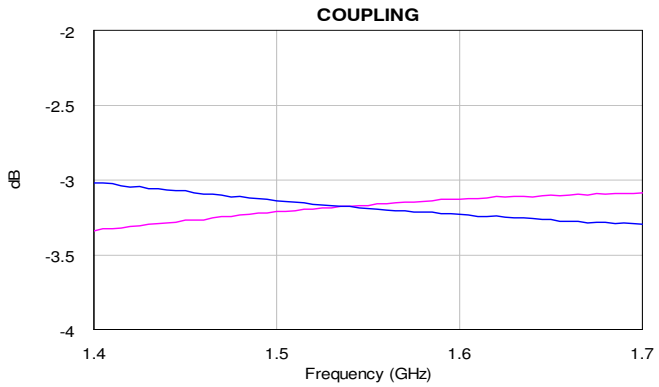
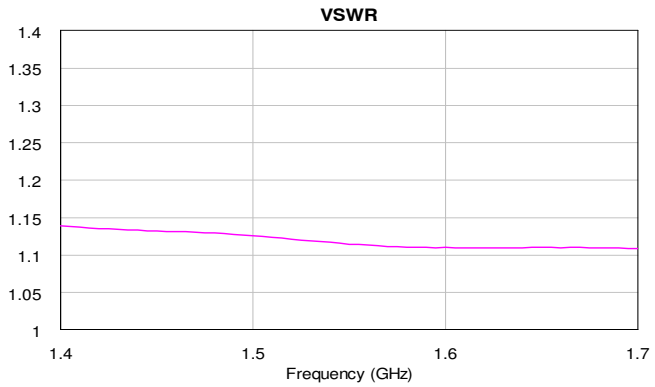
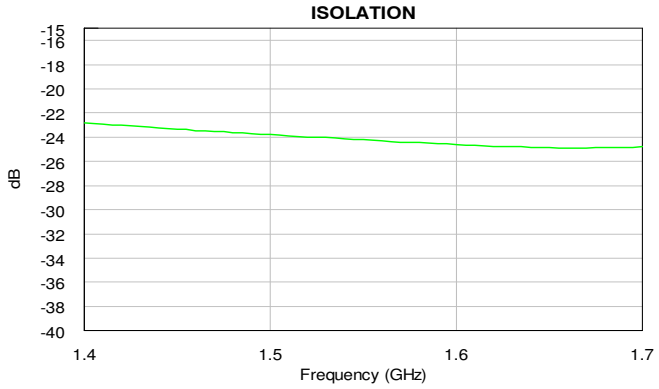
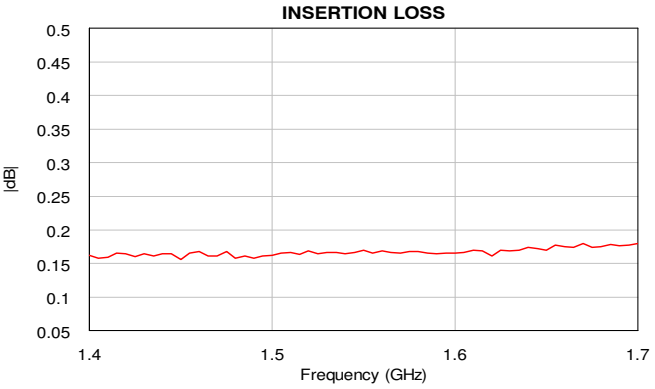
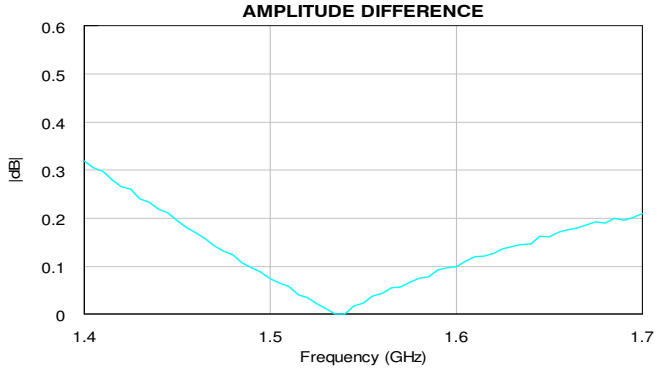
1400MHZ - 1700MHZ RF PERFORMANCE AT 25°C

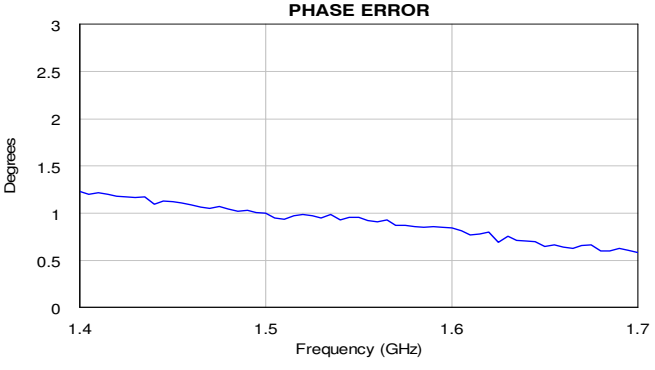




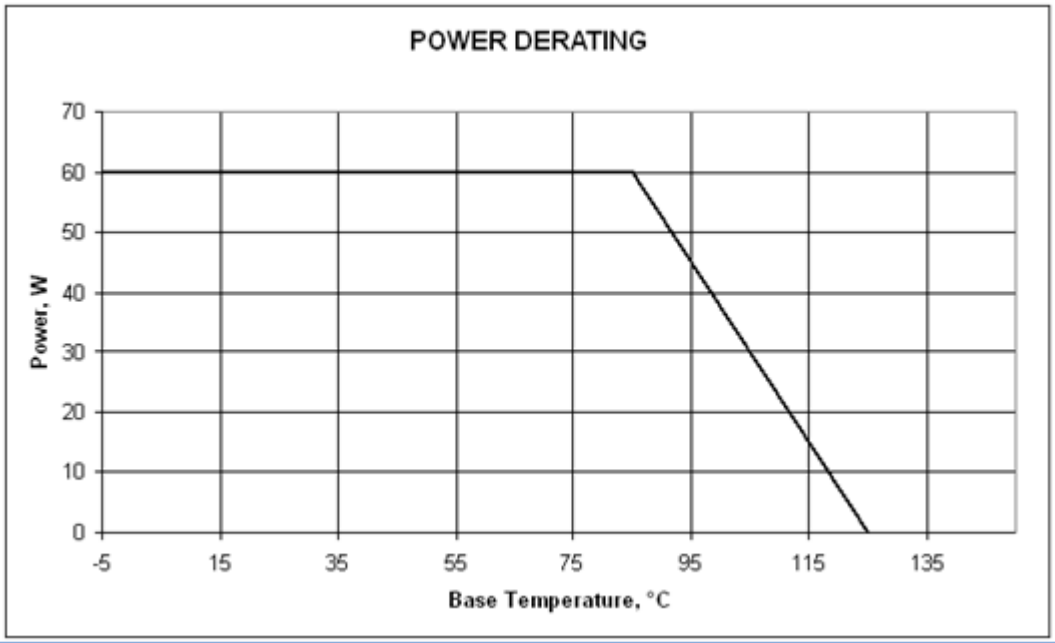








POWER


POWER DERATING
Power, W
70
60
50
40
30
20
10
0
-5
15
35
55
75
95
115
135
Base Temperature, °C

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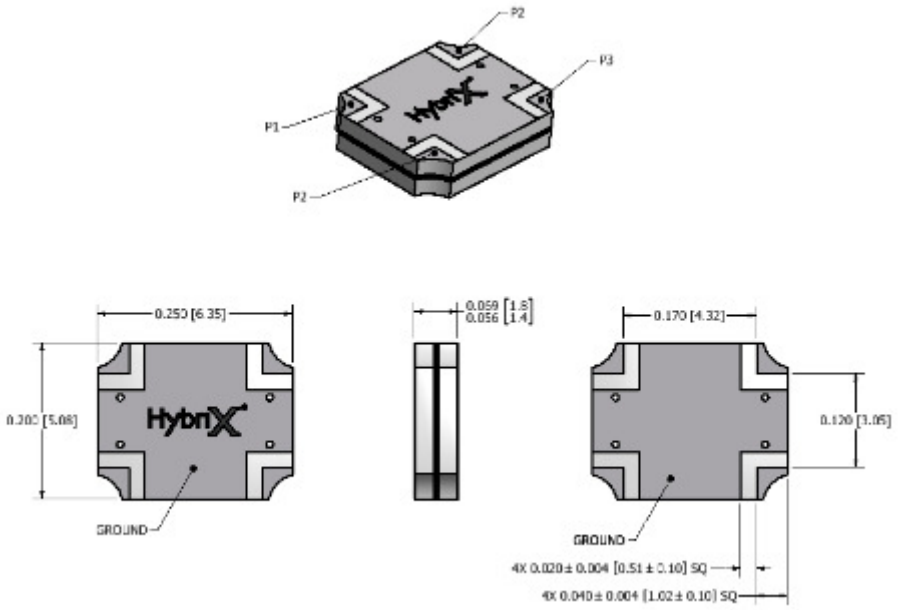
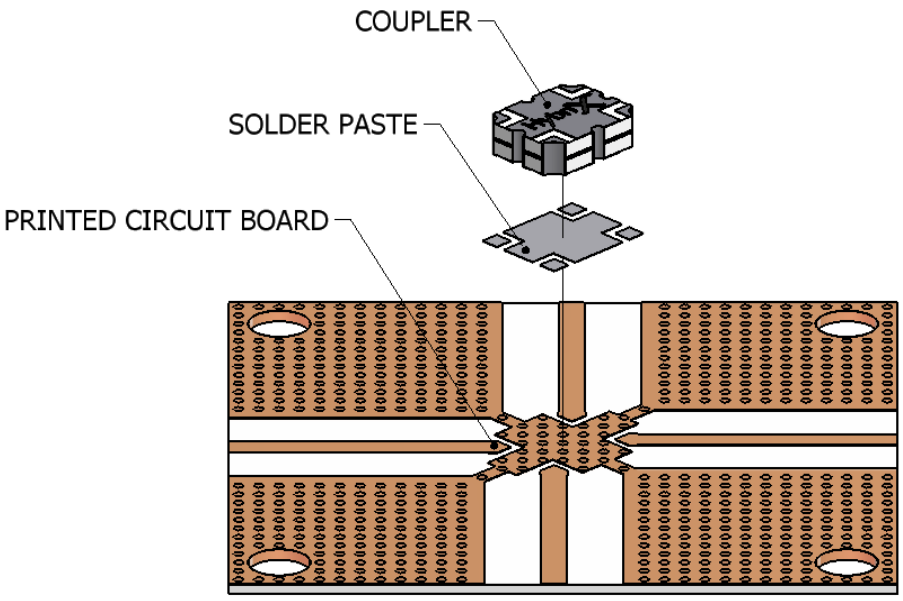
COUPLER PIN CONFIGURATION AND MECHANICAL OUTLINE

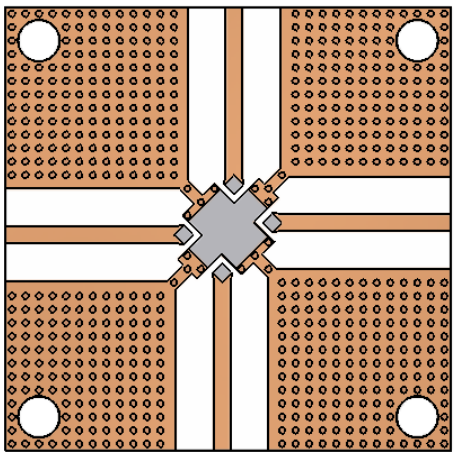
PHASE TABLE				
PORTS	P1	P2	P3	P4
P1	-	ISO	-90°	0°
P2	ISO	-	0°	-90°
P3	-90°	0°	-	ISO
P4	0°	-90°	ISO	-

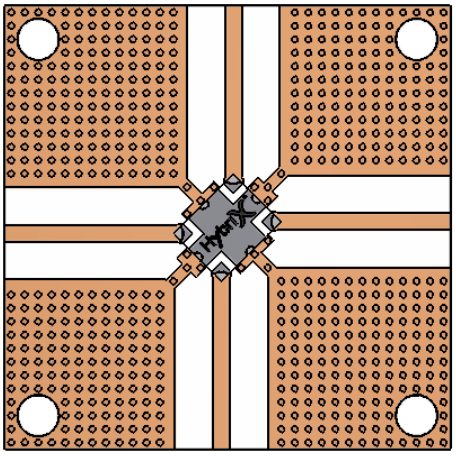


MOUNTING INSTRUCTIONS

To ensure proper operation, all transmission lines must have a characteristic impedance of 50Ω. Grounding is also vital for proper performance. Grounding can be improved by increasing the number of vias to minimize ground inductance. In creased vias allow for low impedance ground connection and good thermal conduction. The device is attached to the PCB by using solder paste positioned at the location where RF terminals come into contact with the trace and where the device contact ground. The coupler is then positioned in such a way that the RF terminals must come into contact and align with the PCB trace and solder. In addition, the device ground plane must align with the solder to have good connection to ground. The conventional reflow method, where controlled temperature hot air is used to cause solder reflow, is the recommended to attach the device to the PCB. The max reflow temperature should never exceed 260°C. The use of conventional irons may cause damage to the device and should be avoided.







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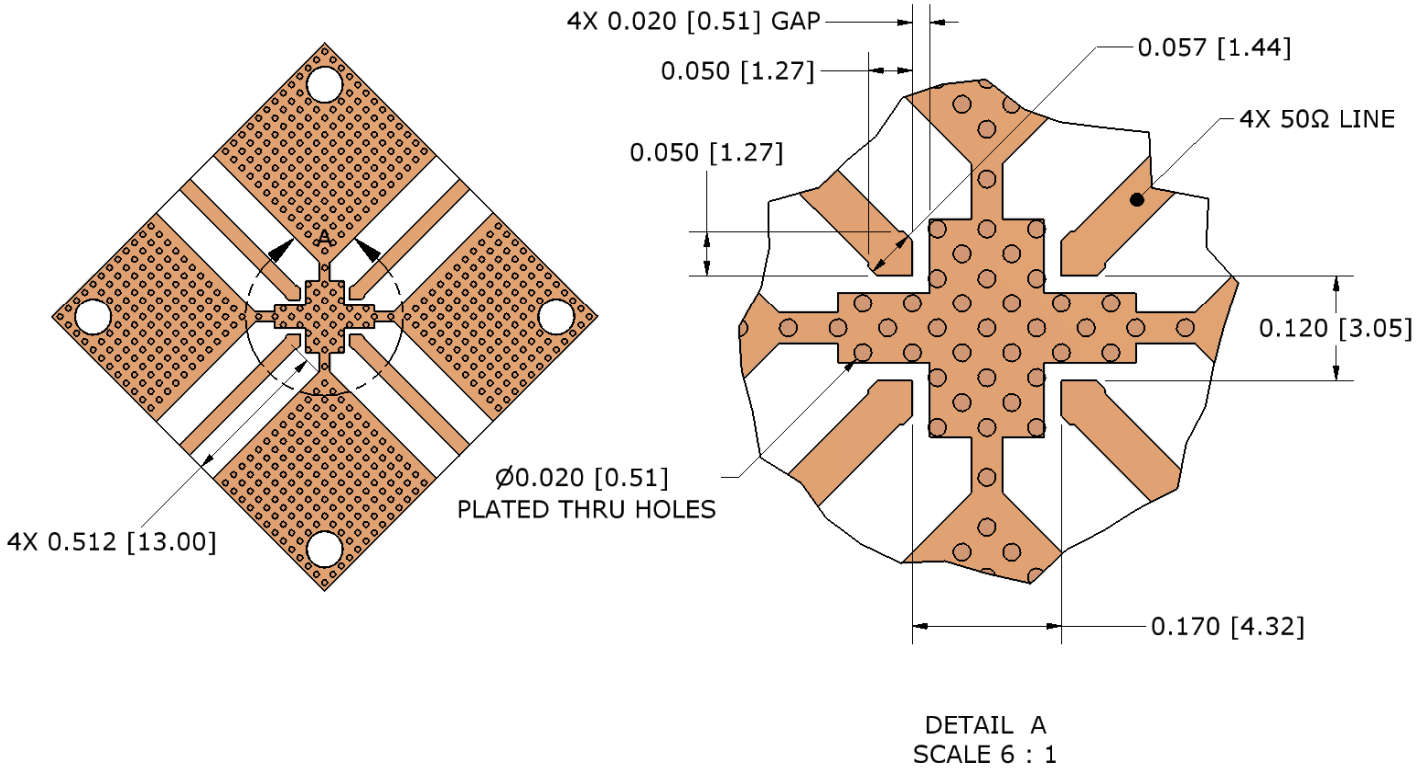
COMMONLY USED ATTACHMENT MATERIALS

Material	Composition	Thermal Conductivity (Watts/cm/°C)	Melting Temperature (°C)
Gold-Tin Solder	80% Gold / 20% Tin	0.58	280
Lead-Free Solder	99.3% Tin – 0.7% Copper	N/A	227
Lead-Free Solder	96.5% Tin / 3.5% Silver	0.33	221
Lead-Free Solder	96.5% Tin / 3% Silver / 0.5% Copper	N/A	217 - 220
Sn63 Solder	63% Tin / 37% Lead	0.49	183
Conductive Epoxy	Silver Filled	0.01 to 0.29	N/A

CIRCUIT BOARD LAYOUT

In order to achieve the specified RF performance, an optimized RF test board must be used for testing this hybrid coupler. Florida RF Labs test board (008-40-074) constructed with Rogers RO3003 high frequency board material is shown below.



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SOLDERING PROFILE