Avantek Products

Surface Mount Resistive Power Divider/Combiner DC to 10 GHz

Technical Data

PSP-1002

Features

- **Surface Mount - 1/4 Inch Square Package**
- **Excellent Phase and Amplitude Match**
- **Hermetically Sealed**
- **DC to 10 GHz Performance**
- **Optimized for Best Insertion Loss**

Applications

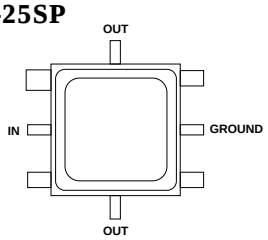
- **Instrumentation**
- **Missile Systems**
- **Measurement**
- **Multi-Channel Receivers**
- **LO Splitting**

Description

The PSP-1002 is a DC to 10 GHz resistive power divider/combiner designed for surface mounting to microstrip systems. This divider uses a symmetrical, three resistor **t**$_{EE}$ design to be used in applications where signals must be accurately divided or combined. This design approach permits a true 50 ohm match at all three ports over a broad frequency range. Insertion loss has been optimized and guaranteed to a maximum of 1.0 dB over the nominal 6 dB characteristic of resistive power dividers. The PSP-1002 power divider is complementary to the HP PlanarPak line of surface mount products, and uses the "1/4" square PP-25 package.

Pin Configuration

PP-25SP



Maximum Ratings

Parameter	Maximum
Continuous RF Power (CW or Pulse)	+30 dBm
Operating Case Temperature	–55 to +125°C
Storage Temperature	–62 to +150°C
"R" Series Burn-In Temperature	+125ºC

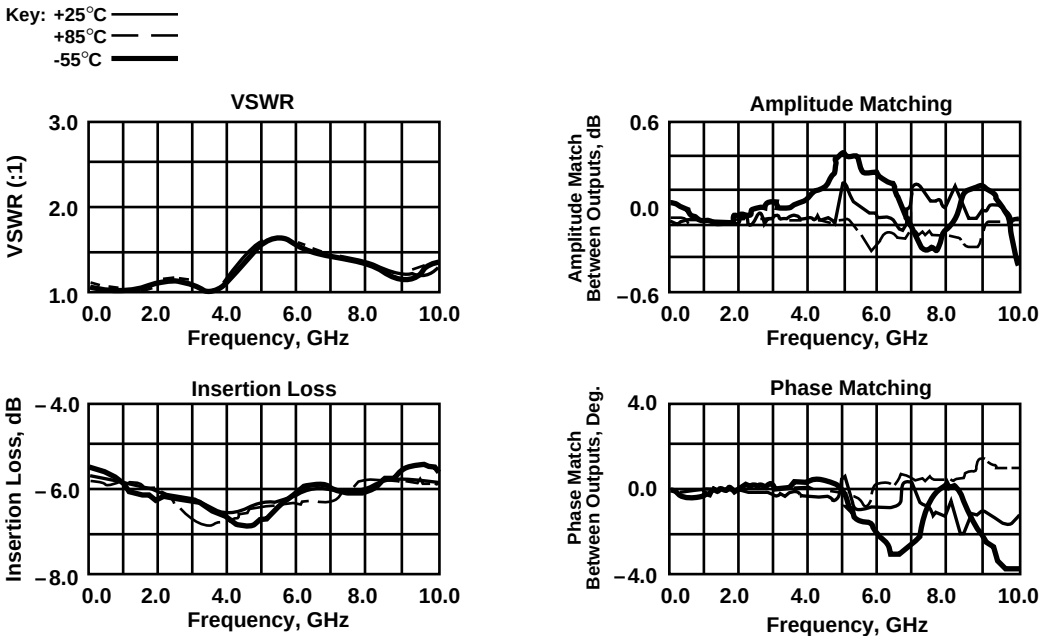
Weight: (typical) .21 grams

Electrical Specifications

(Measured in a 50 Ω system)

Characteristic	Typical T_C = 25°C	Guaranteed Specifications		Unit
		T_C = 0 to 50°C	T_C = –55 to +85°C	
Frequency Range	DC-10	DC-10	DC-10	GHz
VSWR, IN/OUT (Max.)	1.4:1	1.7:1	1.7:1	—
Insertion Loss Over 6 dB Nominal (Max.)	.7	1.0	1.0	dB
Amplitude (Max.) (Arm to Arm)	.35	.7	.7	±dB
Phase Balance (Arm to Arm)	3.0			±Degrees

Typical Performance Over Temperature

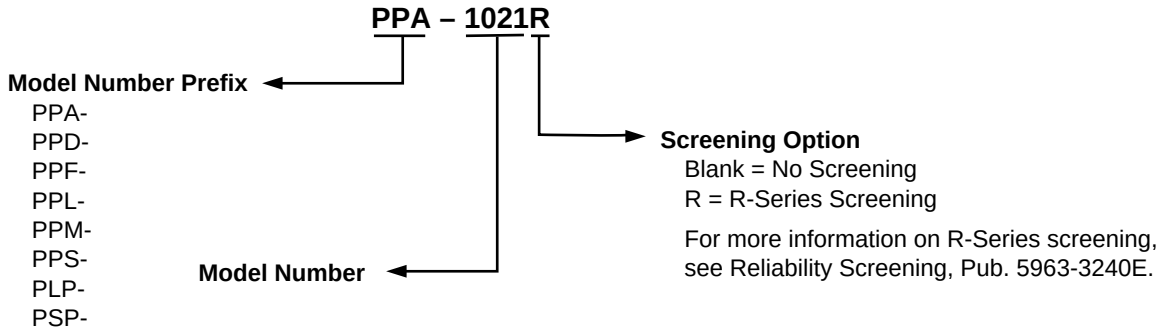


Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

S-Parameters and Group Delay

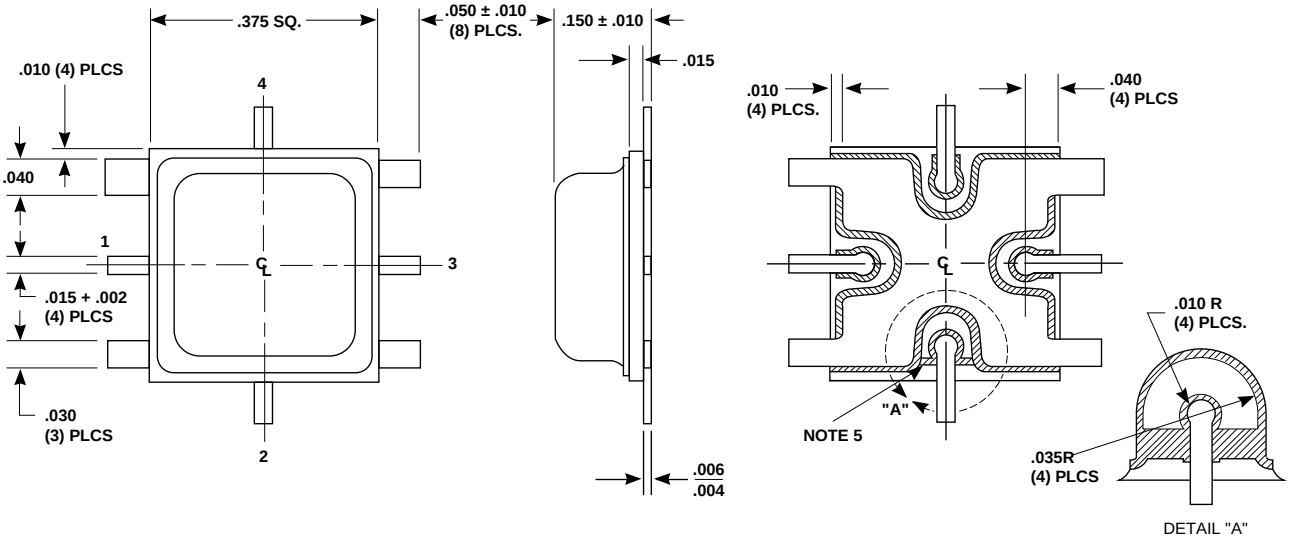
FREQUENCY GHz	S_{11}		S_{21}		S_{31}		GPDEL ps
	Mag	Ang	dB	Ang	dB	Ang	
0.50000	0.029	–176.579	–5.790	–8.627	–5.790	–8.331	47.475
1.00000	0.040	–156.992	–5.875	–17.170	–5.867	–16.604	44.676
1.50000	0.060	–147.101	–5.988	–25.220	–5.970	–24.362	43.949
2.00000	0.081	–142.756	–6.135	–33.134	–6.110	–32.005	32.677
2.50000	0.089	–135.708	–6.305	–39.014	–6.269	–37.650	39.459
3.00000	0.070	–123.581	–6.505	–46.116	–6.450	–44.437	38.100
3.50000	0.047	–65.065	–6.682	–52.977	–6.587	–50.980	35.719
4.00000	0.105	–14.523	–6.793	–59.407	–6.651	–57.232	35.001
4.50000	0.183	–5.055	–6.772	–65.704	–6.585	–63.485	37.309
5.00000	0.235	–4.694	–6.649	–72.417	–6.428	–70.223	39.156
5.50000	0.261	–6.847	–6.612	–79.466	–6.329	–77.529	44.288
6.00000	0.254	–9.981	–6.283	–87.430	–6.073	–85.966	50.968
6.50000	0.230	–12.971	–6.251	–96.604	–5.994	–93.884	33.681
7.00000	0.204	–13.151	–6.186	–102.665	–5.969	–101.513	40.300
7.50000	0.185	–13.098	–6.089	–109.916	–5.976	–108.204	48.009
8.00000	0.167	–19.204	–5.959	–118.555	–5.864	–116.647	50.415
8.50000	0.155	–20.322	–5.898	–127.624	–5.788	–126.010	55.306
9.00000	0.133	–4.808	–5.697	–137.577	–5.732	–135.760	60.918
9.50000	0.124	22.213	–5.680	–148.538	–5.781	–146.266	63.782
10.00000	0.151	38.160	–5.934	–160.020	–6.090	–157.370	63.818

Product Options



Case Drawings
PP-38

.375 x .375 PLANARPAK SURFACE MOUNTED COMPONENTS



TYPICAL WEIGHT 0.5 GRAMS

CASE	PIN DESIGNATION			
	1	2	3	4
PP-38	RF_{IN}	GROUND	RF_{OUT}	V^+
PP-38M	RF	LO	IF	N/C
PP-38F	RF_{IN}	GROUND	RF_{OUT}	GROUND

NOTES (UNLESS OTHERWISE SPECIFIED):
1. **DIMENSIONS ARE SPECIFIED IN INCHES**
2. **TOLERANCES: xxx ± .005**
3. **LEADS ARE FOR TESTING ONLY AND MAY BE TRIMMED FLUSH AT TIME OF INSTALLATION.**
4. **N/C = NOT CONNECTED**
5. **PIN 2 IS NOT AT GROUND POTENTIAL FOR PP-38M. IT LOOKS THE SAME AS PINS 1, 3, AND 4.**

Recommended Assembly Procedure

1. Chemically clean the PC board and the unit to be mounted using a vapor degreaser or acetone followed by an isopropol alcohol wash. Do not use ultrasonic cleaning.
2. Mask the backside of the PC board to prevent solder from reflowing through the plated thru-holes causing a rough ground plane surface. A suggested masking material is 2 mil thick Kapton® film with silicone adhesive back (Permacel part #P-222).
3. Apply solder cream (suggest Multicore SN62PRMAB3 or equivalent) using screen printing techniques or careful hand application. A layer 4 to 6 mils thick is adequate.
4. Reflow of the unit to the board may be done in many ways. Using a hot plate is one of the most simple. During reflow, pressure (with a clamping arrangement) on the unit is recommended, but not absolutely necessary. Absolute maximum reflow temperature is 260°C for not more than 10 seconds.
5. Chemically reclean the unit using the procedures given in step one. Make sure that a flux remover is used which is appropriate for the type of solder cream used (Multicore PC81 is the recommended flux remover for the above mentioned cream).

It should be noted that there are many alternatives for component attachment. This procedure has been found to be simple and effective. For more detailed instructions on how to use PlanarPak Products, please see the application note "*PlanarPak* Users Information" Pub.□5963-3232E.

For more information:

United States*

Europe*

Far East/Australasia: (65) 290-6305

Canada: (416) 206-4725

Japan: (81 3) 3331-6111

*Call your local HP sales office listed in your telephone directory. Ask for a Components representative.

Printed in U.S.A. 5963-3265E (10/94)