

90° Quadrature Hybrid, 2-4GHz, SMA Female

WMQH-2-4-S

Key Features

- Octave band.
- High isolation.
- Excellent return loss.
- Low unbalance.

The 90-degree hybrid WMQH-2-4-S provides 3dB split with 90 degrees phase shift over the S band, in an aluminum enclosure measuring 1.15 x 0.50 x 0.38 inches with SMA connectors. The device is RoHS compliant but may be built using lead solder for military applications on special order. Return loss 24dB typical, isolation 23dB typical, phase balance 2.7 degrees typical. Werbel Microwave has designed this octave band quadrature hybrid with stripline technology. Parts are assembled and tested in the USA.



Photo is representative.

Specifications	Min.	Typ.	Max.	Units
Frequency	2	--	4	GHz
Impedance	--	50	--	Ohm
Phase Difference	--	90	--	Degrees
Total Loss ¹ (J1-J3 and J1-J4)	--	3.15±0.45	--	dB
Isolation	19	23	--	dB
Return Loss (all ports)	17	24	--	dB
Amplitude Balance	--	0.45	1.7	dB
Phase Balance (±)	--	2.7	4.0	Degrees
Input Power (CW) ²	--	--	50	Watts

Mechanical

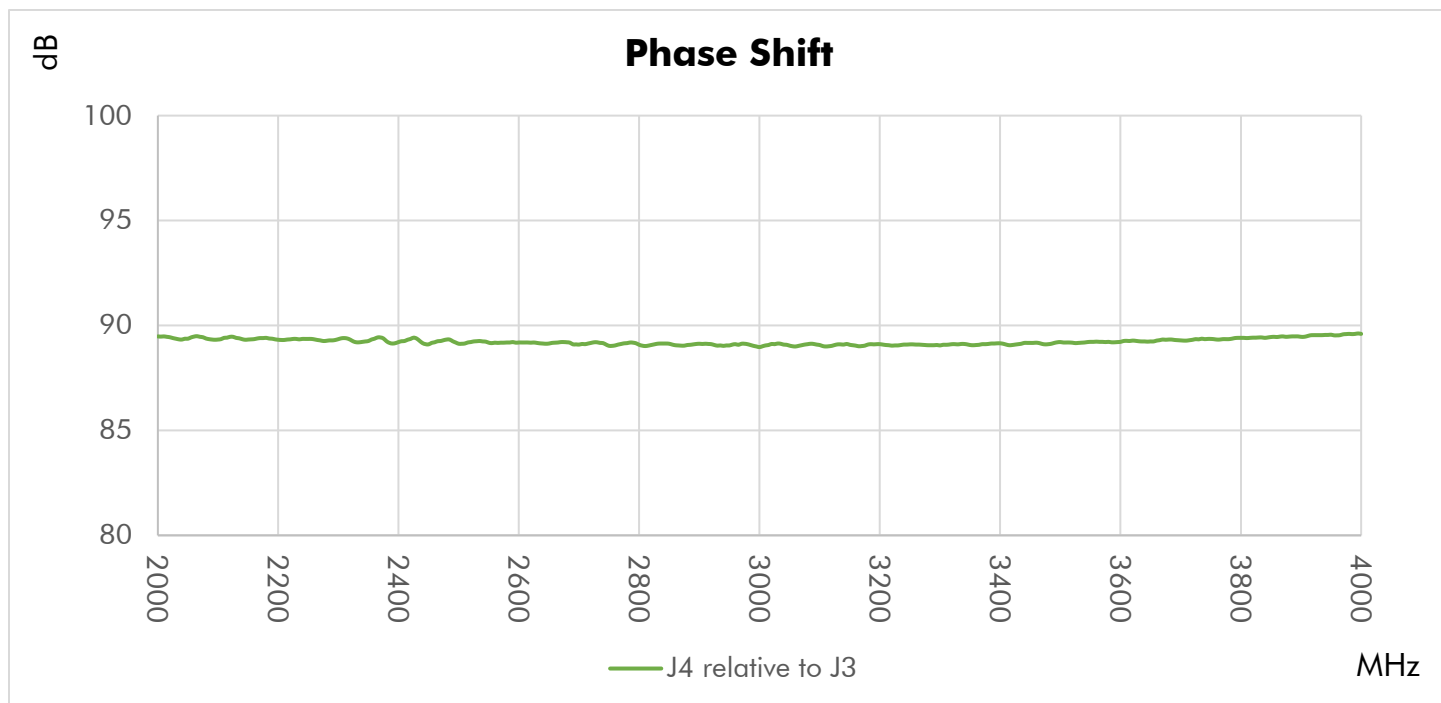
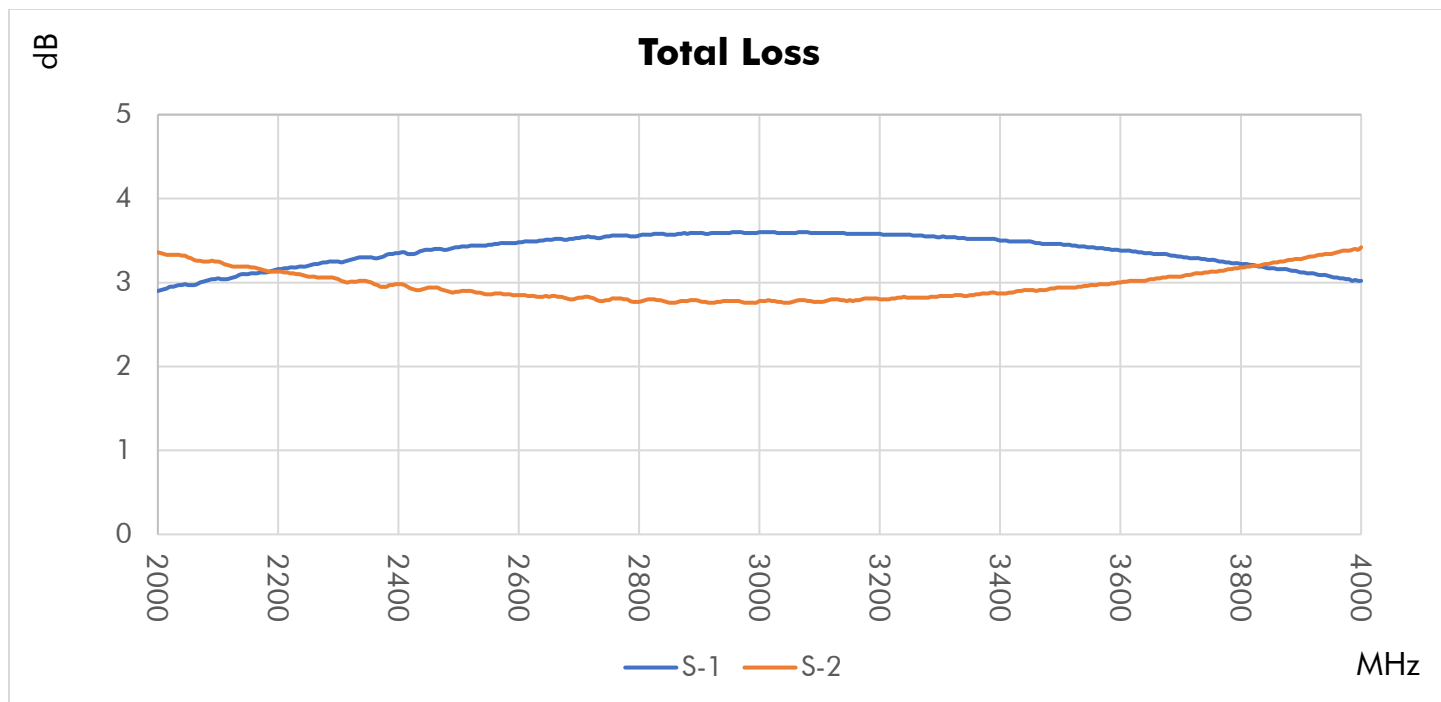
Connector Interface	SMA-Female
Operating Temperature ³	-40 to +85 °C
Storage Temperature	-55 to +100 °C
Weight	0.6 oz (17.9 g)
Humidity	10-90% non-condensing
Environment	Indoor Use Only

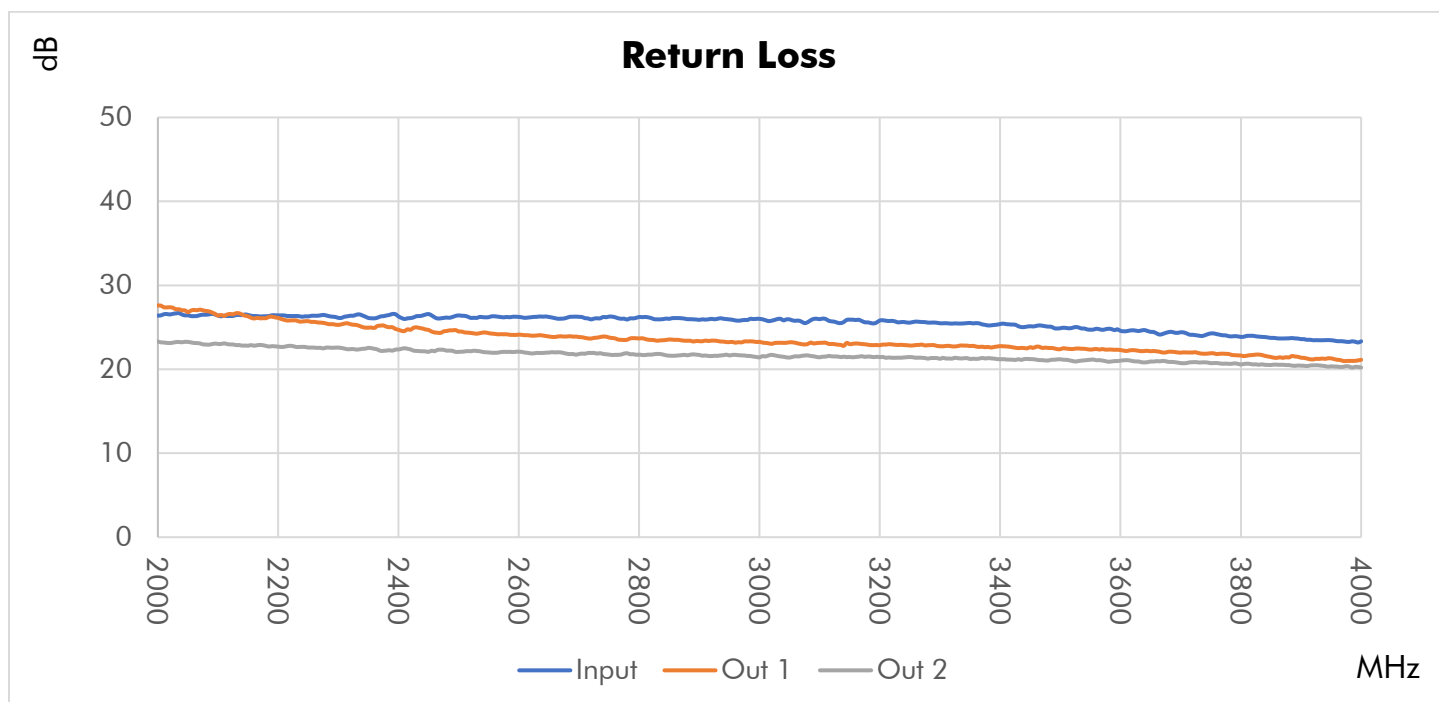
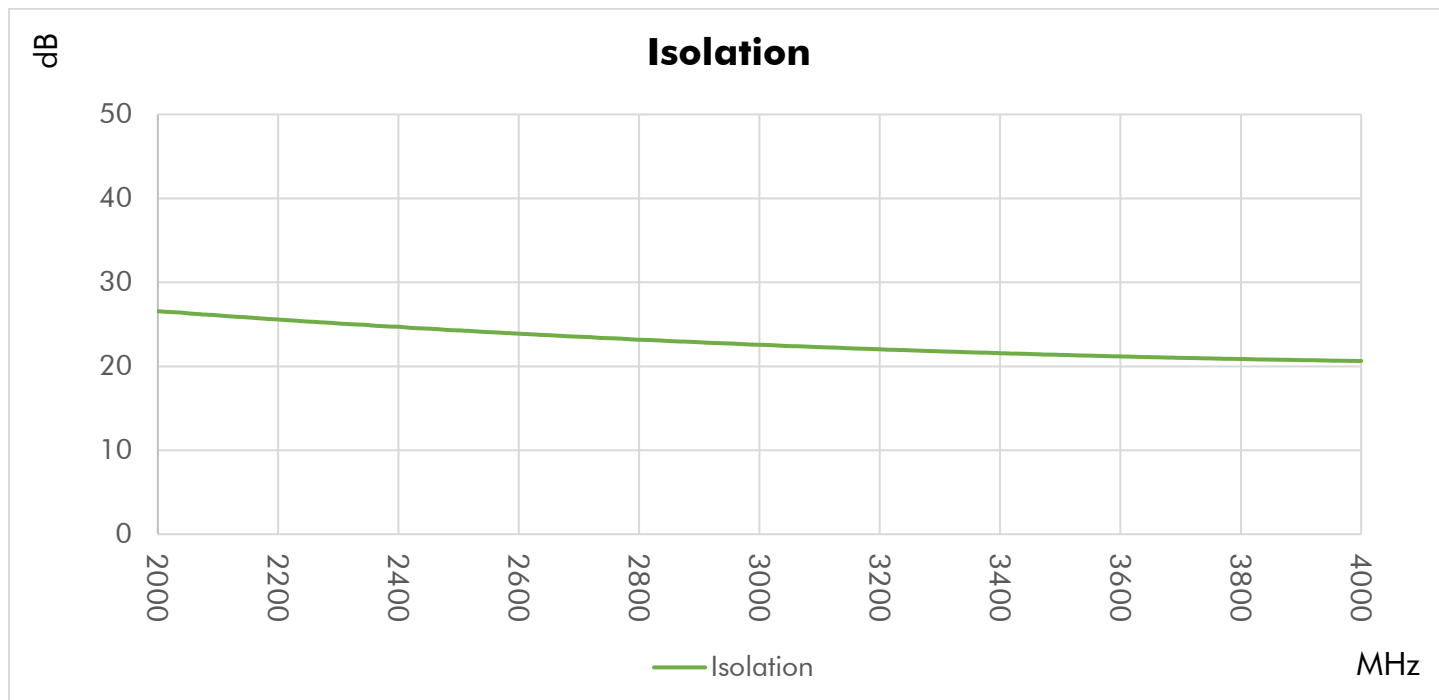
1. Total Loss includes insertion loss and frequency sensitivity.
2. All output ports should be terminated in a 50-ohm load with 1.2:1 max VSWR.
3. Specifications are at +25°C.
4. To the best of our knowledge at the time of publication.

Materials

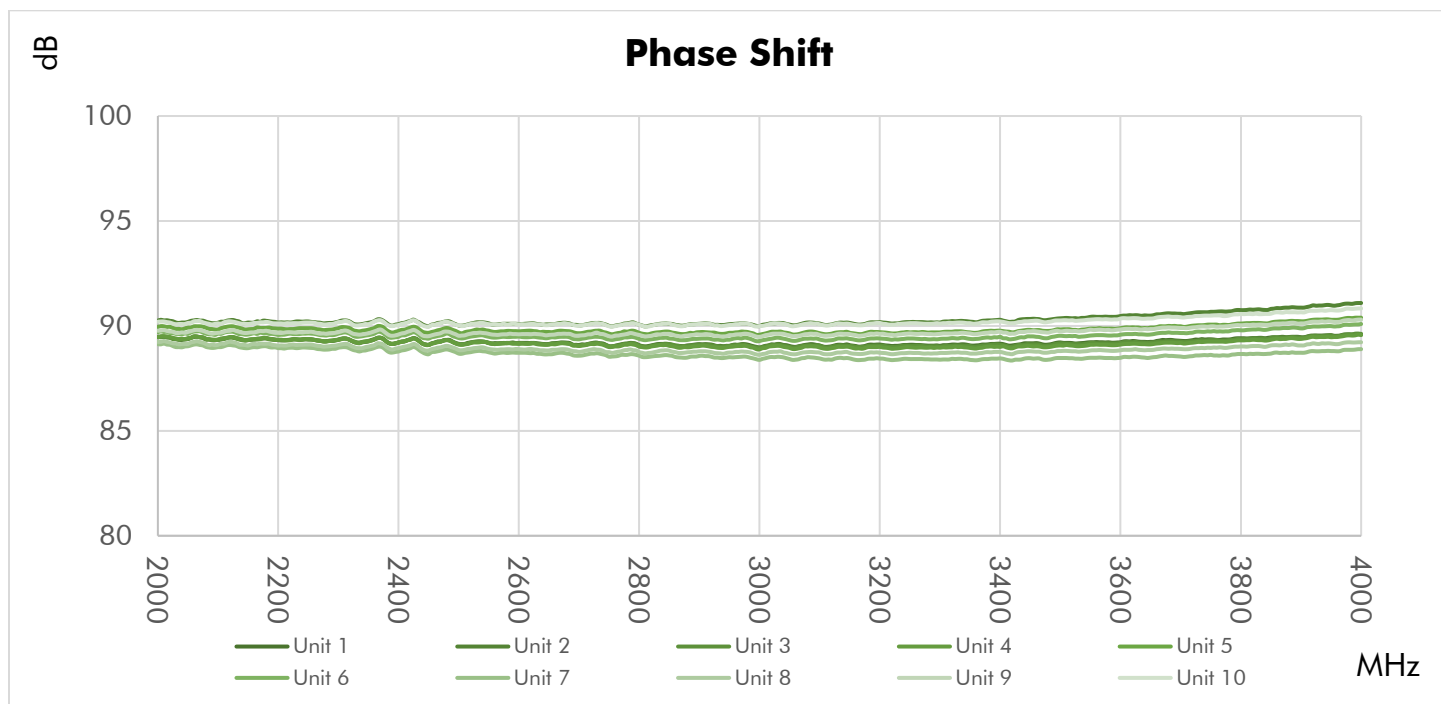
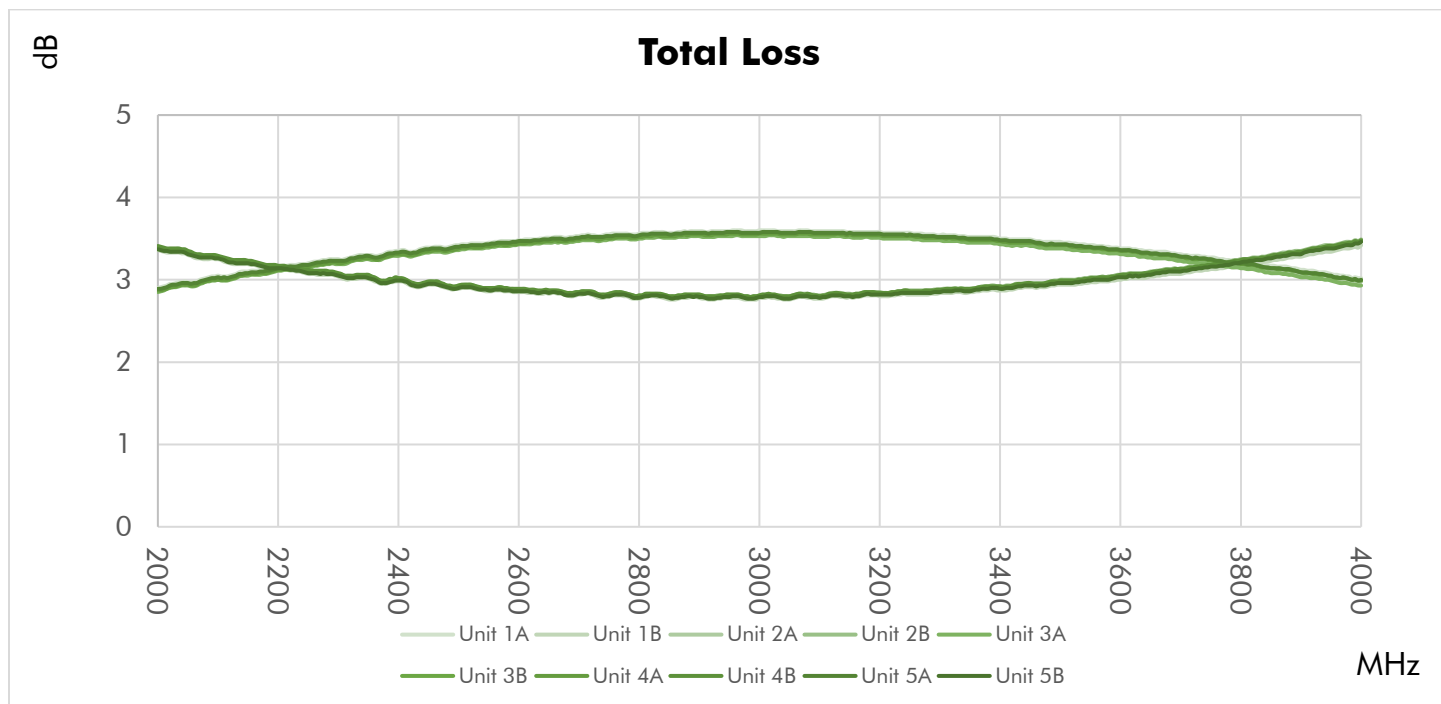
RoHS and REACH Compliant ⁴	
Enclosure	Aluminum
Connectors	Stainless Steel
Contacts	Be Cu, Gold Plated
Insulators	PTFE
Finish	Green Paint

Typical Performance at +25 °C





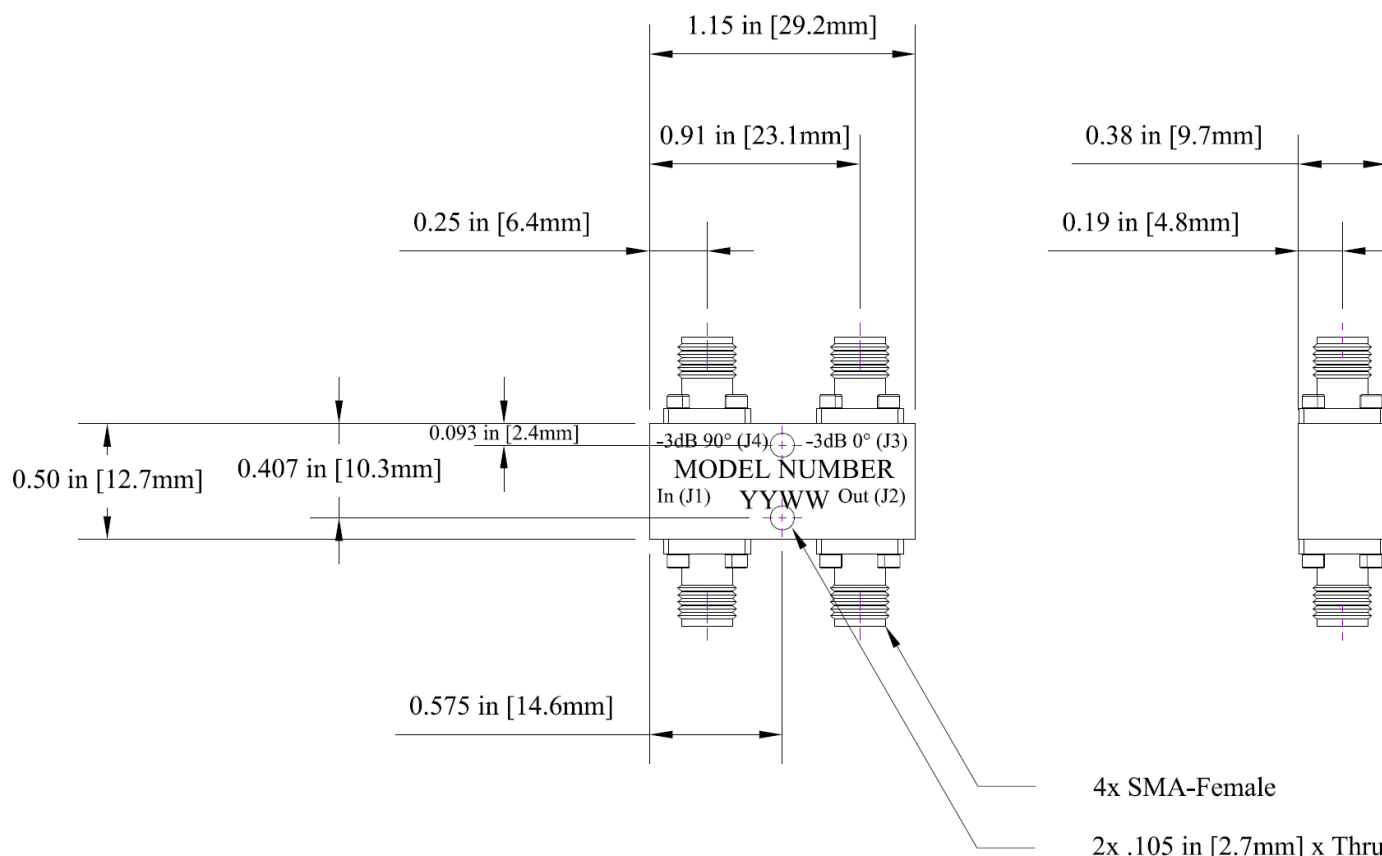
Repeatability in Production



Typical Performance at +25 °C

Frequency (MHz)	Insertion Loss (dB)	Coupling (dB)	Amplitude Unbalance	Phase Unbalance	Isolation (dB)	Return Loss (dB)
	J1-J3	J1-J4	(dB)	(deg)	J1-J2	J1
2000	2.8	3.3	0.5	89.6	25.4	25.3
2100	3.0	3.2	0.2	89.7	25.0	26.1
2200	3.1	3.2	0.0	89.3	24.7	25.5
2300	3.2	3.0	0.2	89.6	24.3	25.1
2400	3.2	2.9	0.3	89.8	23.9	24.8
2500	3.3	2.9	0.4	89.4	23.6	24.6
2600	3.4	2.9	0.5	89.6	23.4	24.7
2700	3.4	2.8	0.6	89.3	23.3	24.3
2800	3.5	2.8	0.7	89.3	23.0	23.9
2900	3.5	2.8	0.7	89.1	22.7	24.1
3000	3.6	2.9	0.7	88.6	22.5	24.8
3100	3.5	2.8	0.7	89.0	22.3	22.6
3200	3.5	2.9	0.6	88.3	22.2	22.0
3300	3.7	2.7	1.0	90.0	22.1	22.8
3400	3.4	3.0	0.4	88.6	22.0	22.5
3500	3.4	3.0	0.4	89.6	21.8	22.3
3600	3.6	3.5	0.1	87.5	21.7	21.3
3700	3.1	3.2	0.1	87.6	21.6	24.1
3800	3.2	3.1	0.2	88.3	21.4	21.3
3900	2.9	3.2	0.2	88.4	21.2	21.1
4000	2.9	3.5	0.5	91.1	21.2	20.9

Outline Dimensions



Outline # OL-Q0204

Dimensions are in inches, [mm] shown for convenience.

Tolerances on 2-pl decimals: $\pm .03$. 3-pl decimals: $\pm .015$.

Port Configuration

		OUTPUT			
		J1	J2	J3	J4
INPUT	J1	--	ISO	0°	+90°
	J2	ISO	--	+90°	0°
	J3	0°	+90°	--	ISO
	J4	+90°	0°	ISO	--

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