Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

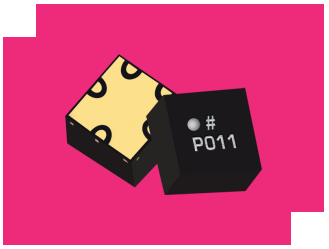
MPD4-0R504CSP2

0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter

DEVICE OVERVIEW

General Description

The MPD4-0R404CSP2 is a small footprint MMIC 0.5-4.5 GHz 4-Way power divider/power splitter featuring high 16 dB isolation and low 1.4 dB insertion loss in our compact CSP2 chip scale package. It is much smaller than a printed PCB Wilkinson Power Divider/Combiner. It can be used as an equal amplitude/phase power splitter or a power combiner with excellent isolation. Tight fabrication tolerances result in less unit-to-unit variation than traditional power divider technologies, allowing for accurate simulations using the provided S5P file taken from measured production units. The 2.5 mm CSP2 package enables extreme miniaturization of SMT footprint making the MPD4-0R504CSP2 ideal for applications prioritizing low SWaP.



Download s-parameters here

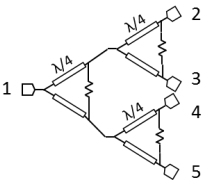
Features

- 4-way splitter or combiner in a compact 2.5mm package
- Low 1.4 dBtypical insertion loss
- High 16 dB isolation
- Excellent 0.1 dB amplitude and 0.3° phase balance
- This product embodies Marki Microwave's U.S. Pat. 11,869,858.

Applications

- Test Equipment
- Electronic Warfare
- Radar and satellite communications
- High Channel Count Systems

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MPD4-0R504CSP2	0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter	CSP2	REACH RoHS	Released	EAR99
EVB-MPD4-0R504	Evaluation Board, 0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter	EVB	RoHS REACH	Released	EAR99

Table Of Contents

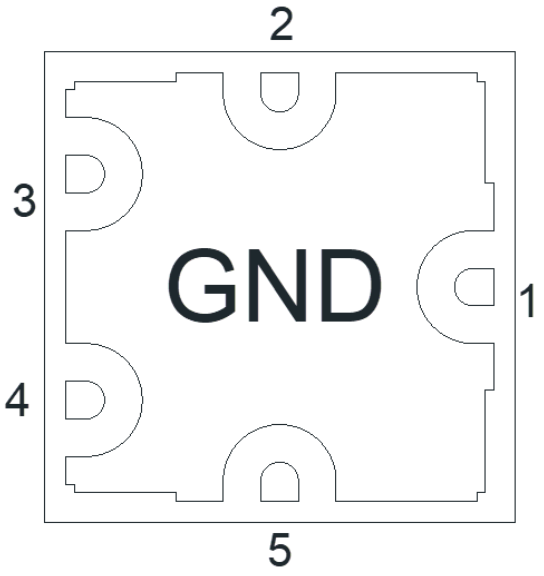
Revision History

Revision Code	Revision Date	Comment
-	2024-12-13	Initial Release
A	2025-04-28	Updated Moisture Sensitivity from MSL3 to MSL1

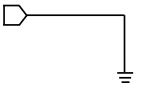
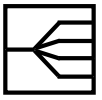
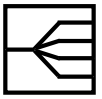
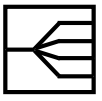
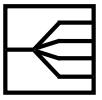
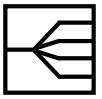
Port Configuration and Functions

Port Diagram

A bottom-up view of the MPD4-0R504CSP2 package outline drawing is shown below. The MMIC Power dividers are passive reciprocal devices allowing either power splitting or power combining.



Port Functions

Port	Function	Description	Equivalent Circuit for Package
Ground Paddle	Gnd	Ground paddle should be connected to RF ground	
Pin 1	Common	Pin 1 is the common input/output pin. It is DC short to the other 4 pins and open to ground.	
Pin 2	Input/Output 1	Pin 2 is an input/output pin. It is DC short to the other 4 pins and open to ground.	
Pin 3	Input/Output 2	Pin 3 is an input/output pin. It is DC short to the other 4 pins and open to ground.	
Pin 4	Input/Output 3	Pin 4 is an input/output pin. It is DC short to the other 4 pins and open to ground.	
Pin 5	Input/Output 4	Pin 5 is an input/output pin. It is DC short to the other 4 pins and open to ground.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
DC Current	40	mA
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C

Package Information

Parameter	Details	Rating
Dimensions	-	2.50 x 2.50 mm
Moisture Sensitivity Level	-	MSL 1

Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits are guaranteed at TA=+25°C.

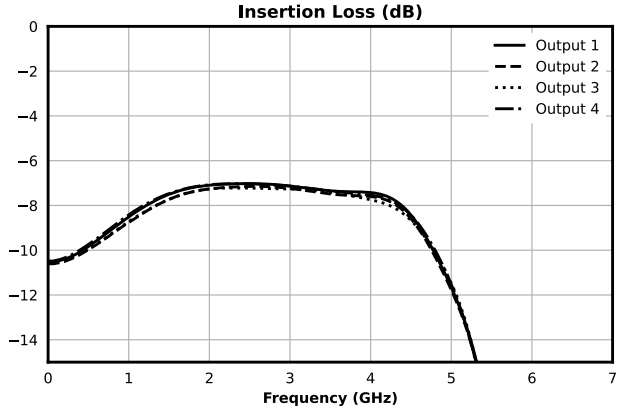
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Excess Insertion Loss [1]	-	1.5	4.5	-	1.4	-	dB
Amplitude Balance	Adjacent Ports	0.5	4.5	-	0.16	-	dB
Amplitude Balance	Non-Adjacent Ports	0.5	4.5	-	0.04	-	dB
Common Return Loss	-	0.5	4.5	-	17	-	dB
Excess Insertion Loss [2]	-	0.5	1.5	-	2.8	-	dB
Impedance	-	-	-	-	50	-	Ω
Isolation	Adjacent Ports	0.5	4.5	-	16	-	dB
Isolation	Non-Adjacent Ports	0.5	4.5	-	16	-	dB
Nominal Phase Shift	-	0.5	4.5	-	0	-	°
Nominal Power Splitting (dB)	-	0.5	4.5	-	6	-	dB
Output Return Loss	-	0.5	4.5	-	13	-	dB
Phase Balance	Adjacent Ports	0.5	4.5	-	0.37	-	°
Phase Balance	Non-Adjacent Ports	0.5	4.5	-	0.26	-	°

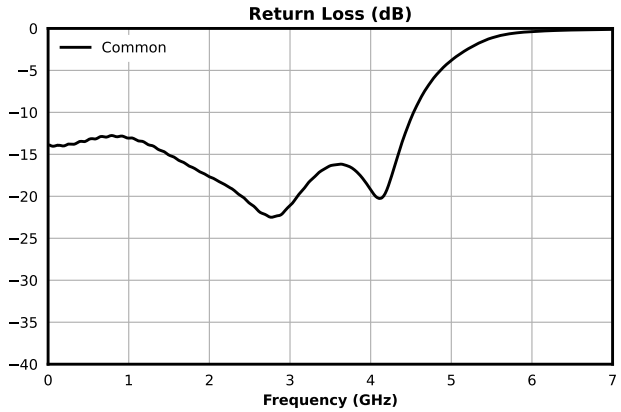
[1][2] Excess Insertion Loss is loss in addition to power splitting loss, calculated as (Common Port to Output Port Insertion Loss) – (Power splitting loss of 6 dB)

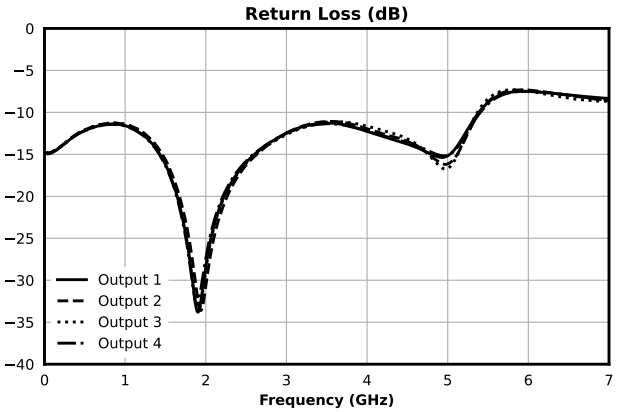
MPD4-0R504CSP2

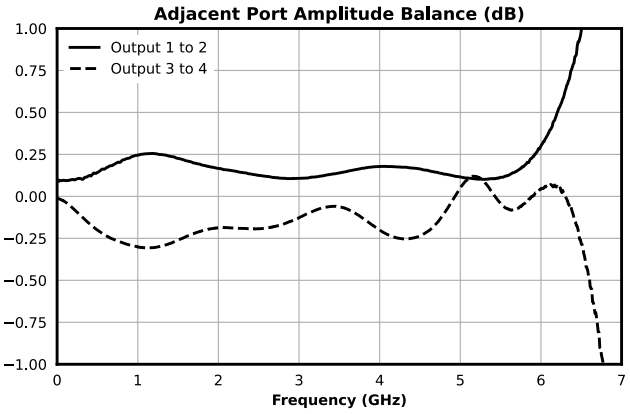
0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter

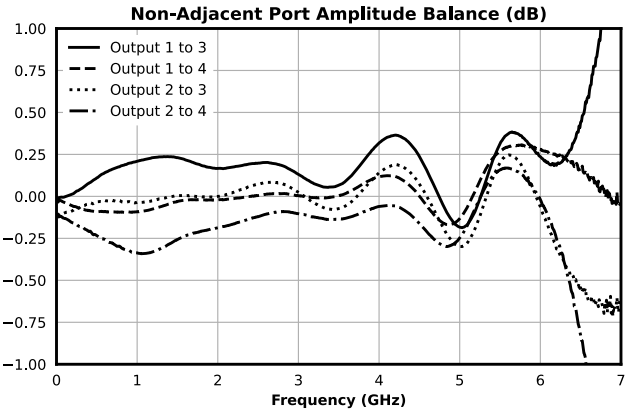
Typical Performance Plots

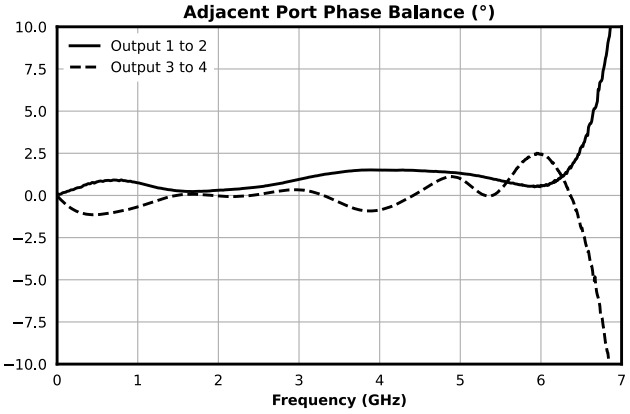


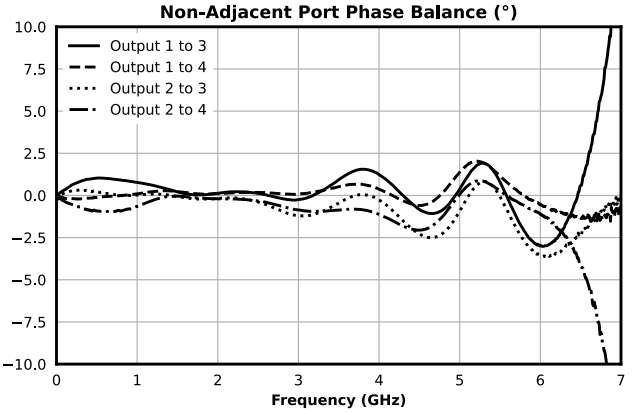


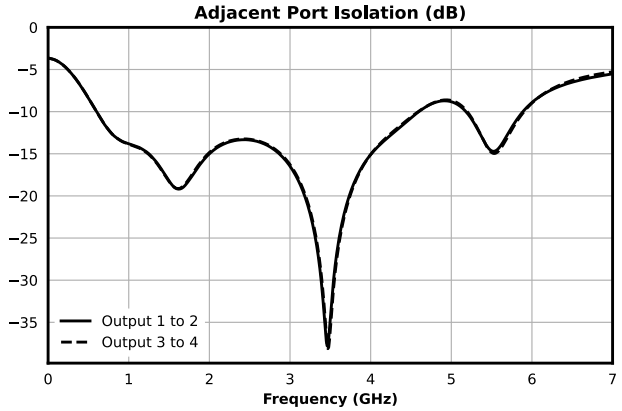


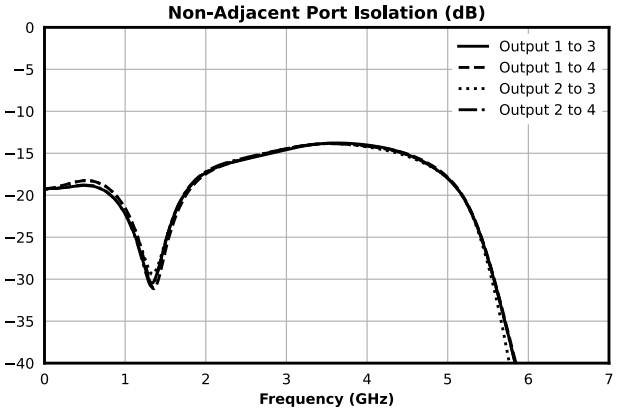












Measured data is de-embedded from fixture using automatic fixture removal (AFR).

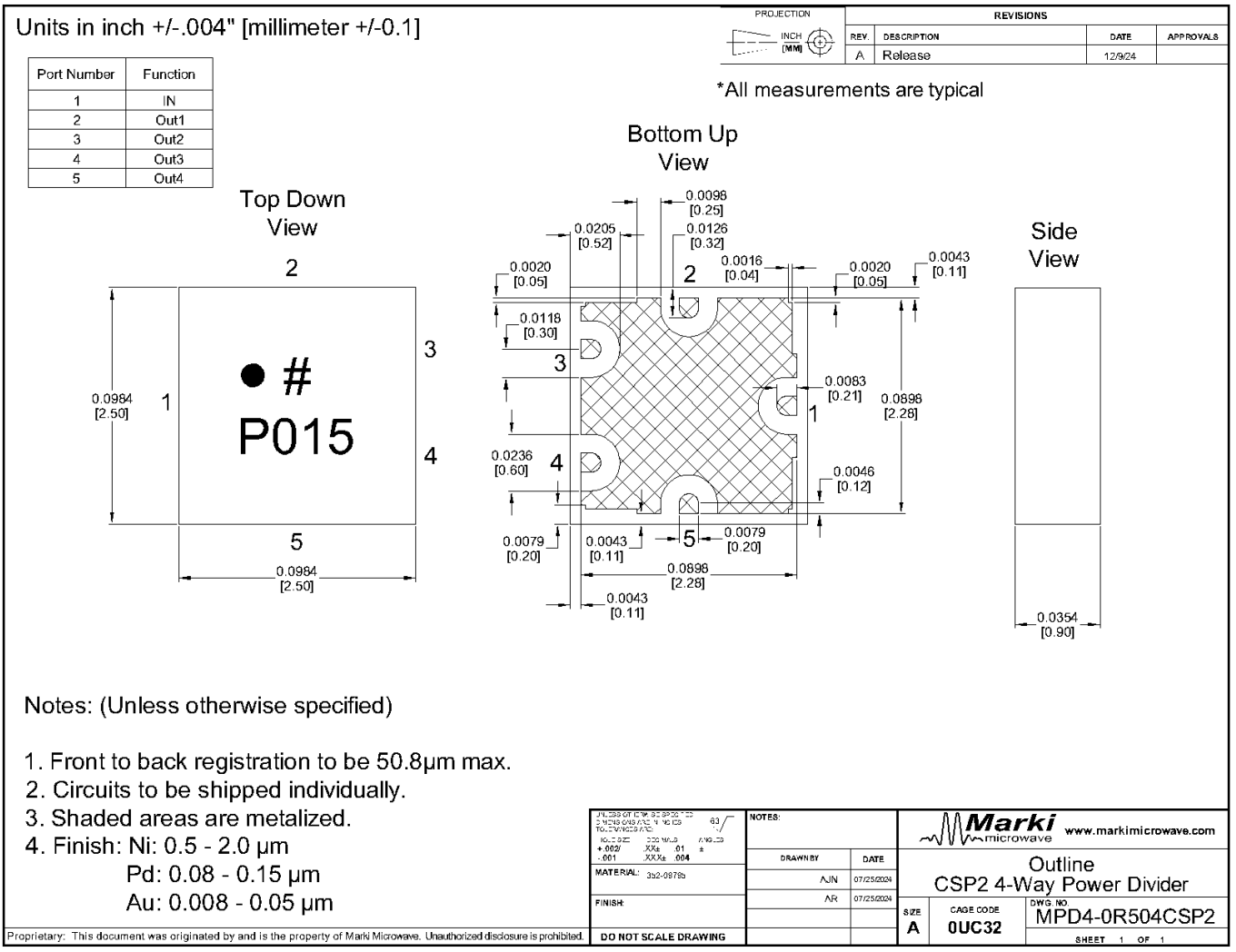
MPD4-0R504CSP2

0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter

Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP

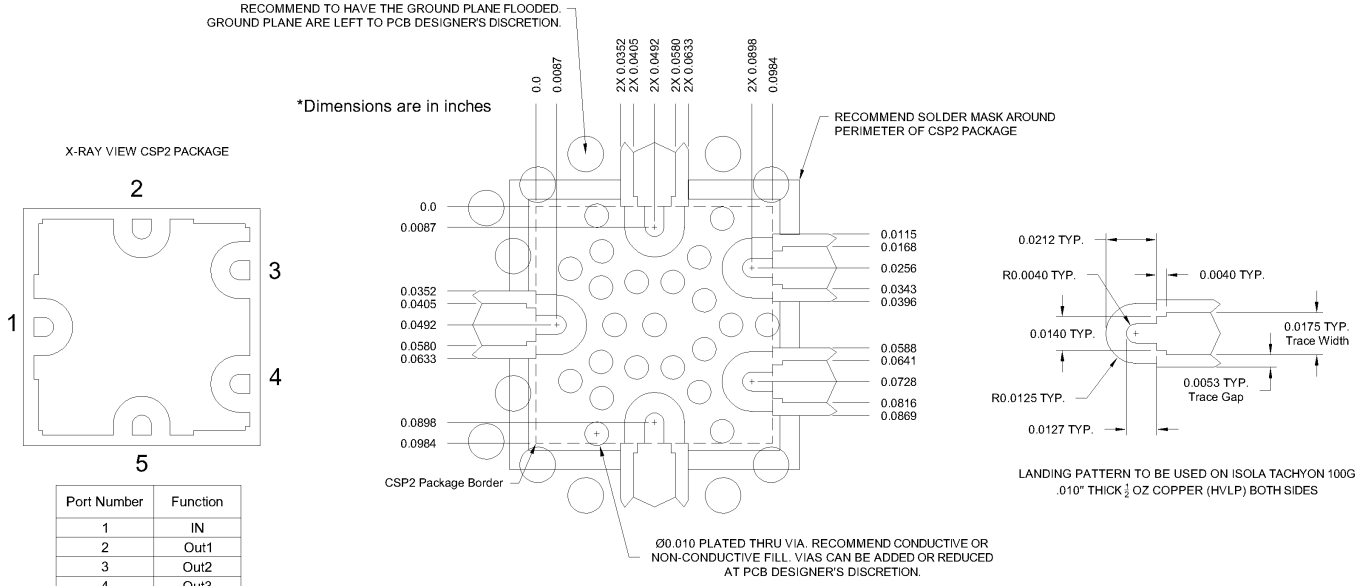


MPD4-0R504CSP2

0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter

Footprint Image

Download : Footprint Drawing

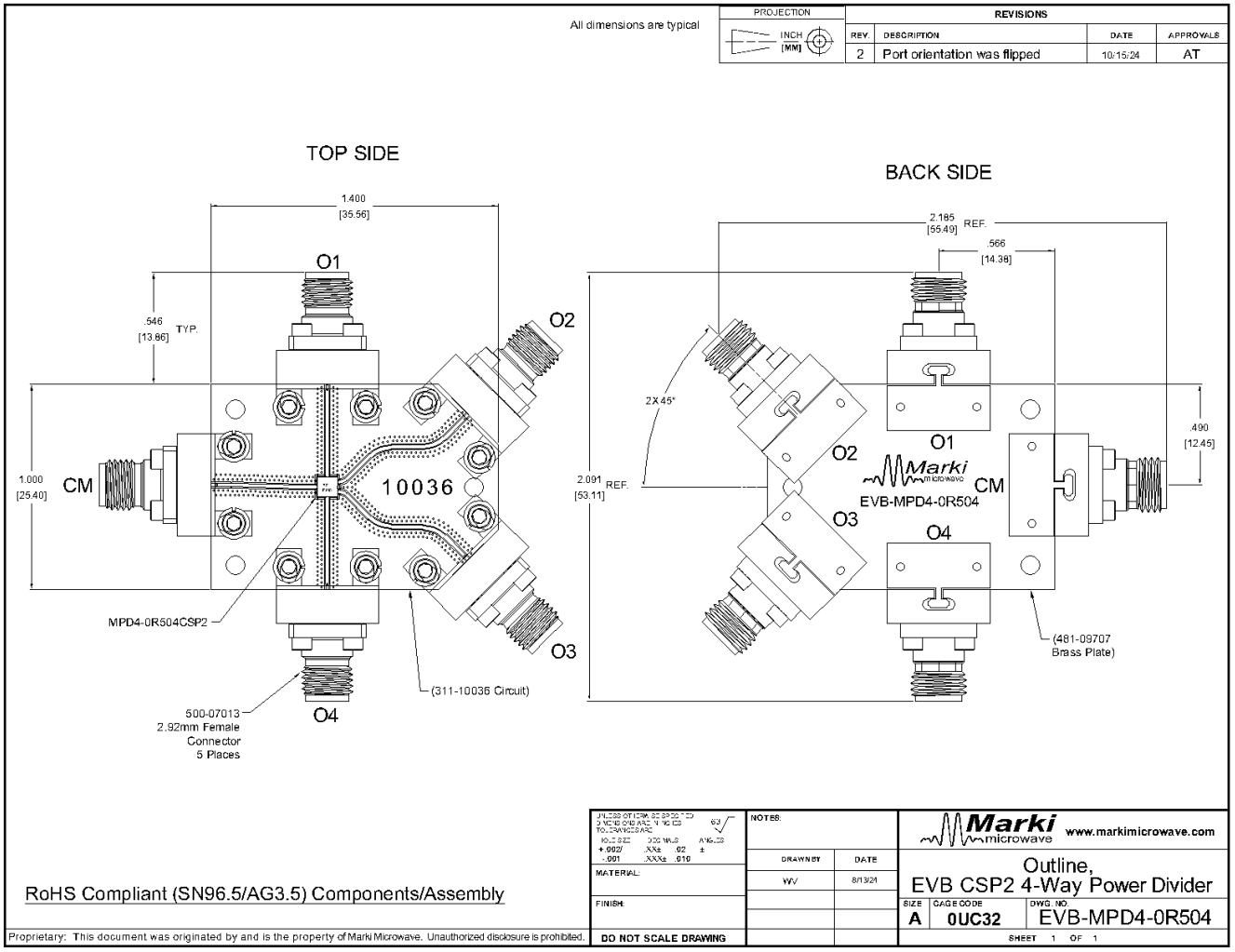


Port Number	Function
1	IN
2	Out1
3	Out2
4	Out3
5	Out4

MPD4-0R504CSP2

0.5 - 4.5 GHz MMIC 4-Way Wilkinson Power Divider/Power Splitter

Evaluation Board - Outline Drawing



DISCLAIMER

MARKI MICROWAVE, INC., (“MARKI”) PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES “AS IS” AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.

Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.

MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, Inc. All other trademarks used are the property of their respective owners.