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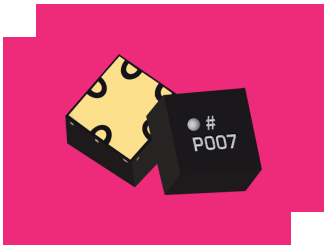
MPD-0R402SCSP2

0.4 - 2.5 GHz MMIC 2-Way Wilkinson Power Divider/Power Splitter, Side Ports

DEVICE OVERVIEW

General Description

The MPD-0R402SCSP2 is a small footprint MMIC 0.4-2.5 GHz 2-Way power divider/power splitter featuring high 20 dB isolation and low 1 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 S3P file taken from measured production units. The MPD-0R402SCSP2 features side port outputs. For front port outputs, refer to the MPD-0R402FCSP2. The 2.5 mm CSP2 package enables extreme miniaturization of SMT footprint making the MPD-0R402SCSP2 ideal for applications prioritizing low SWaP.



Download s-parameters here

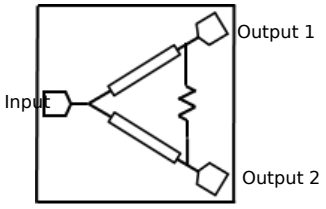
Features

- 2-way splitter or combiner in a compact 2.5mm package
- Side ports
- Low 1 dB typical insertion loss
- High 20 dB isolation
- Excellent 0.05 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
MPD-0R402SCSP2	0.4 - 2.5 GHz MMIC 2-Way Wilkinson Power Divider/Power Splitter, Side Ports	CSP2	REACH RoHS	Released	EAR99
EVB-MPD-0R402S	Evaluation Board, 0.4 - 2.5 GHz MMIC 2-Way Wilkinson Power Divider/Power Splitter, Side Ports	EVB	RoHS REACH	Released	EAR99

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Table Of Contents

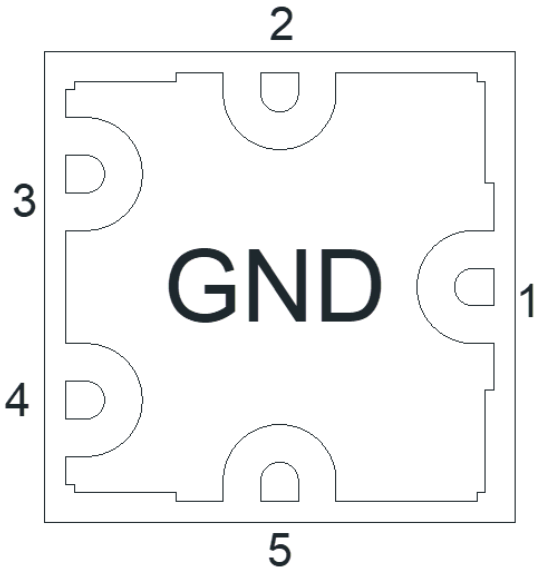
Revision History

Revision Code	Revision Date	Comment
-	2024-10-24	Initial Release
A	2025-02-12	Updated new footprint
B	2025-04-28	Updated Moisture Sensitivity from MSL3 to MSL1
C	2025-08-15	Added ESD Class
D	2025-12-11	Updated Port Functions Table
E	2025-12-17	Power Handling Updated

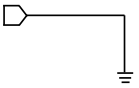
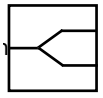
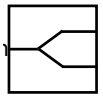
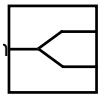
Port Configuration and Functions

Port Diagram

A bottom-up view of the MPD-0R402SCSP2 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	DC Equivalent Circuit
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 Pin 2 and Pin 5 and open to ground.	
Pin 2	Input/Output 1	Pin 2 is an input/output pin. It is DC short to the common and Pin 5 and open to ground.	
Pin 5	Input/Output 2	Pin 5 is an input/output pin. It is DC short to the common and Pin 2 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
RF Power Handling as a Power Divider	25	W

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
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
Amplitude Balance	-	0.4	2.5	-	0.05	-	dB
Common Return Loss	-	0.4	2.5	-	20	-	dB
Excess Insertion Loss [1]	-	0.4	2.5	-	1	-	dB
Impedance	-	-	-	-	50	-	Ω
Isolation	-	0.4	2.5	-	20	-	dB
Nominal Phase Shift	-	0.4	2.5	-	0	-	°
Nominal Power Splitting (dB)	-	0.4	2.5	-	3	-	dB
Output Return Loss	-	0.4	2.5	-	16	-	dB
Phase Balance	-	0.4	2.5	-	0.26	-	°

[1] Excess Insertion Loss is loss in addition to power splitting loss, calculated as (Common Port to Output Port Insertion Loss) – (Power splitting loss of 3 dB)

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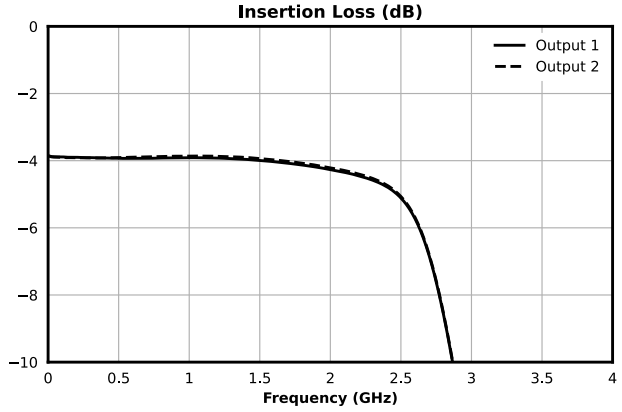
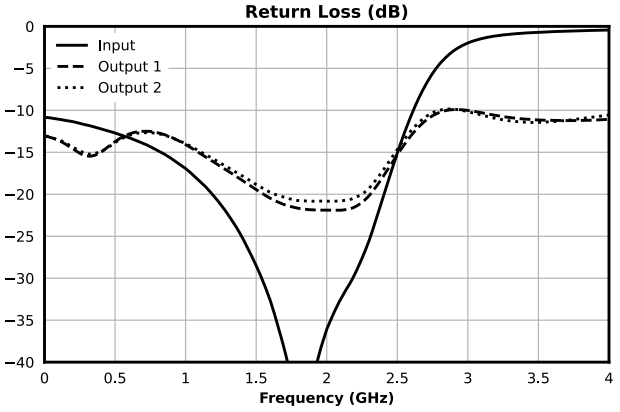
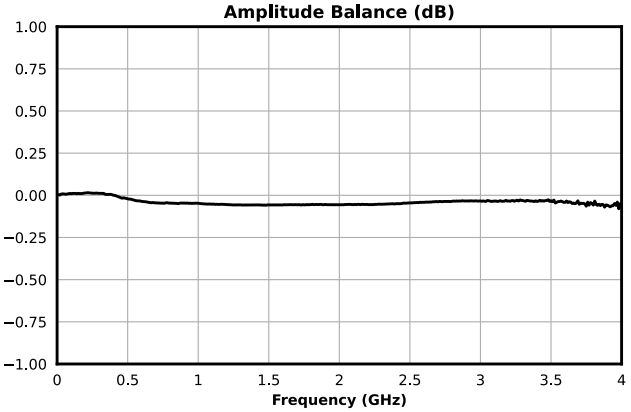
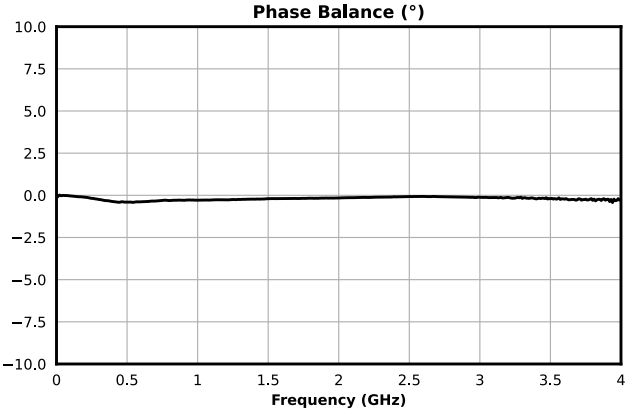
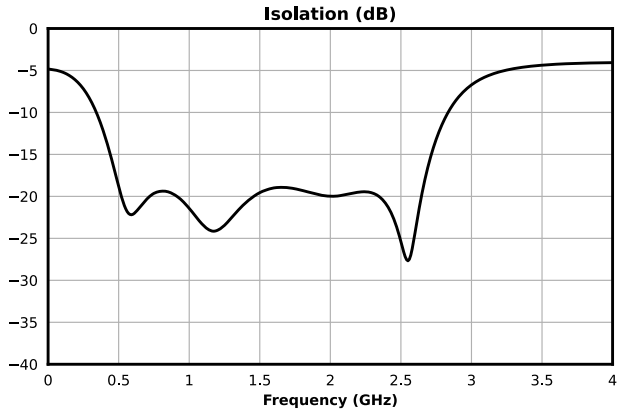
Typical Performance Plots











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

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Mechanical Data

Outline Drawing

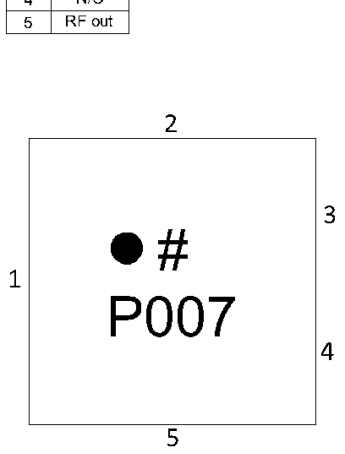
Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP

Pin #	Function
1	RF in
2	RF out
3	N/C
4	N/C
5	RF out

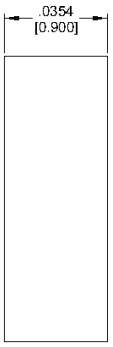
Units in inch +/-.004" [millimeter +/-0.1]

PROJECTION: INCH [MM]

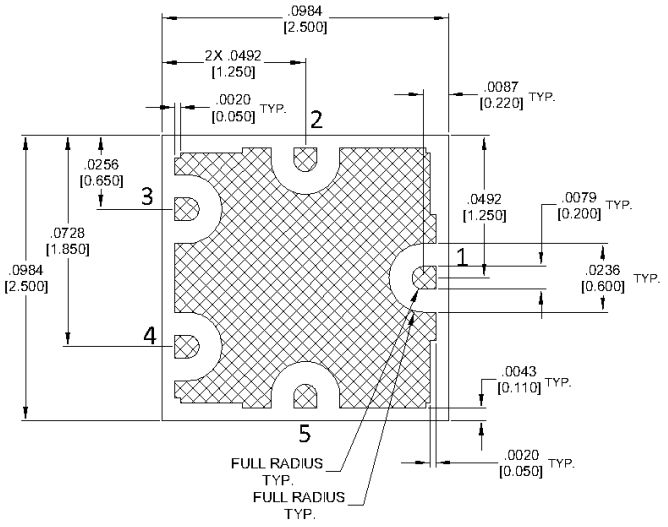
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	1/28/25	AT



Top Down View



Side View



Bottom Up View

Notes: (Unless otherwise specified)

1. Shaded areas are metalized.
2. Finish: Ni: 0.5 - 2.5 µm
   Pd: 0.02 - 0.15 µm
   Au: 0.003 - 0.015 µm

NOTES:

DRAWN BY	DATE
TNN	08-06-2024

MATERIAL: 210-09181

FINISH:

DO NOT SCALE DRAWING

Marki microwave www.markimicrowave.com

OUTLINE, CSP2 Power Divider

SIZE	CAGE CODE	DWG. NO.
A	0UC32	MPD-0R402SCSP2

SHEET 1 OF 1

MPD-0R402SCSP2

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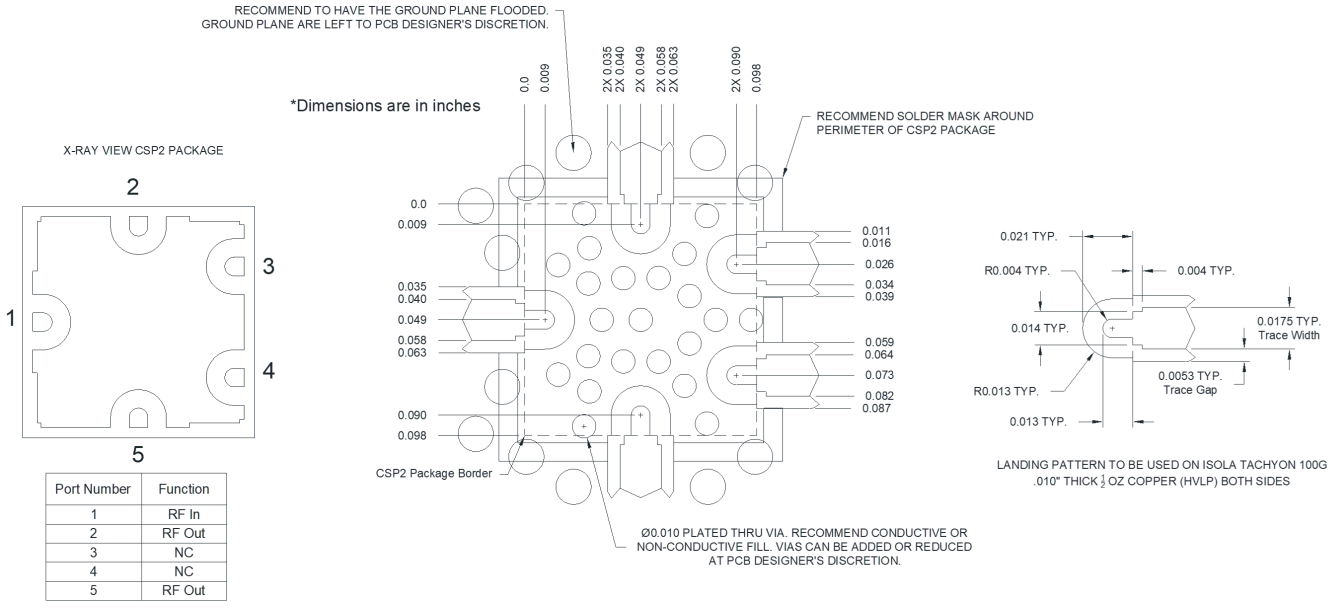
Footprint Image

Download : Footprint Drawing



Port Number	Function
1	RF In
2	RF Out
3	NC
4	NC
5	RF Out

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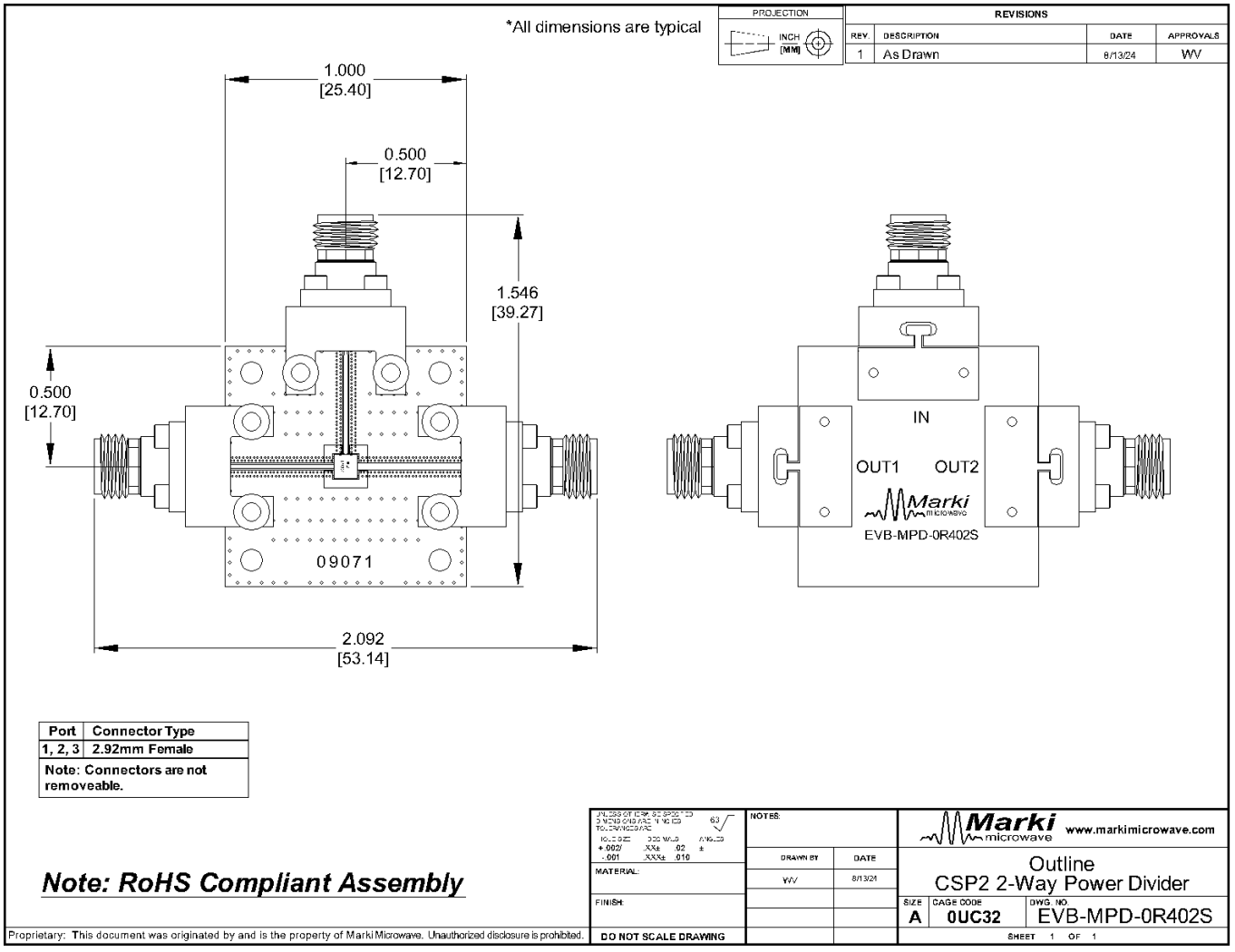
Evaluation Board - Outline Drawing



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