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

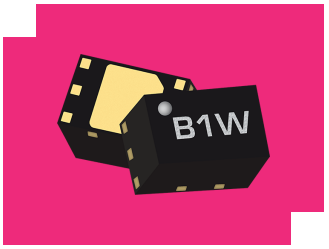
MBAL-0422PSM

4 - 22GHz MMIC Isolation Balun

DEVICE OVERVIEW

General Description

The MBAL-0422PSM is a GaAs passive MMIC balun in a DFN surface mount package. This high isolation balun features excellent amplitude and phase balance across its 4 to 22 GHz frequency range and offers a 2:1 impedance ratio. The compact DFN package allows for extreme miniaturization of SMT footprints. The MBAL-0422PSM is an excellent choice for balanced amplifiers, clock distribution, and higher order Nyquist sampling in analog to digital converters.



Download s-parameters here

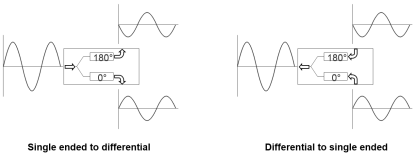
Features

- 2:1 Impedance Ratio
- 4 to 22 GHz Balun (Balanced to Unbalanced Transformer)
- Insertion Loss as a Mode Converter, 1.7 dB Typical
- Common Mode Rejection, 31 dB Typical

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
MBAL-0422PSM	4 - 22GHz MMIC Isolation Balun	DFN	REACH RoHS	Released	EAR99
EVB-MBAL-0422P	Evaluation Board, 4-22 GHz Passive MMIC DFN Package Balun	EVB	REACH RoHS	Released	EAR99

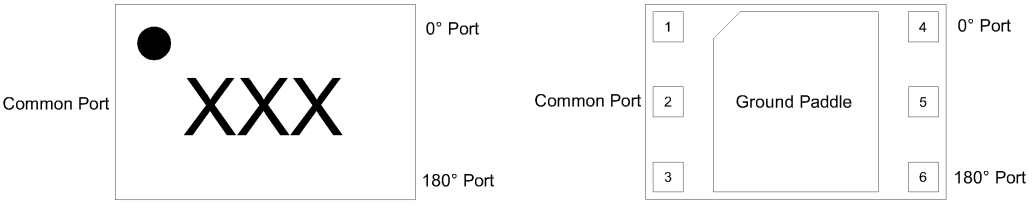
Table Of Contents

Revision History

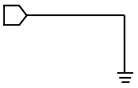
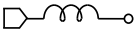
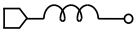
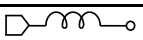
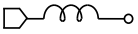
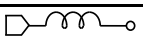
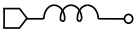
Revision Code	Revision Date	Comment
-	2026-02-24	Initial Release
A	2026-05-01	Updated RF Power Handling

Port Configuration and Functions

Port Diagram



Port Functions

Port	Function	Description	DC Equivalent Circuit
Ground Paddle	Gnd	Ground paddle should be connected to RF ground	
Pin 1	Non-connect (NC)	Pin 1 is not connected internally and should be tied to RF ground.	
Pin 2	Common	Pin 2 is the common input port. It is DC open to ground.	
Pin 3	Non-connect (NC)	Pin 3 is not connected internally and should be tied to RF ground.	
Pin 4	Out 1 / 0° Port (Balanced)	Pin 4 is an output port. It is DC open to ground.	
Pin 5	Non-connect (NC)	Pin 5 is not connected internally and should be tied to RF ground.	
Pin 6	Out 2 / 180° Port (Balanced)	Pin 6 is an output port. It is DC 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
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
RF Power Handling	30	dBm

Package Information

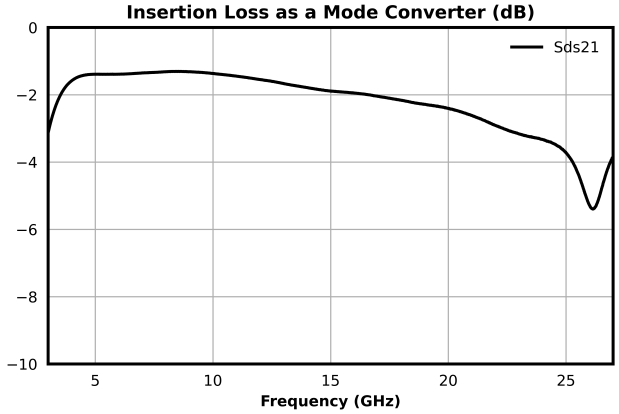
Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	2.0 x 1.3 mm
Moisture Sensitivity Level	-	MSL 1

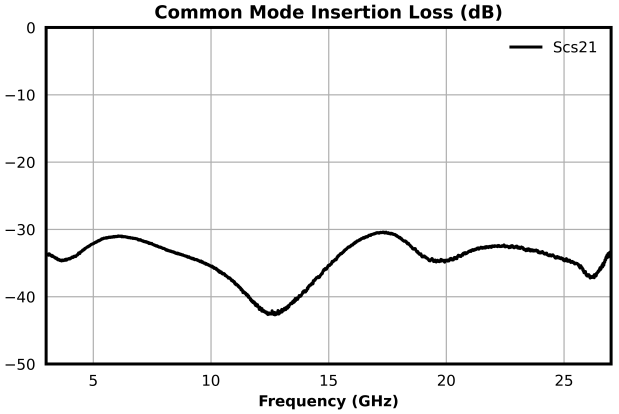
Electrical Specifications

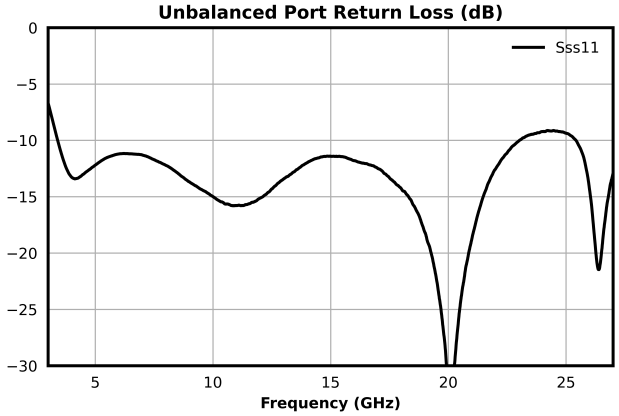
The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits are guaranteed at TA=+25°C.

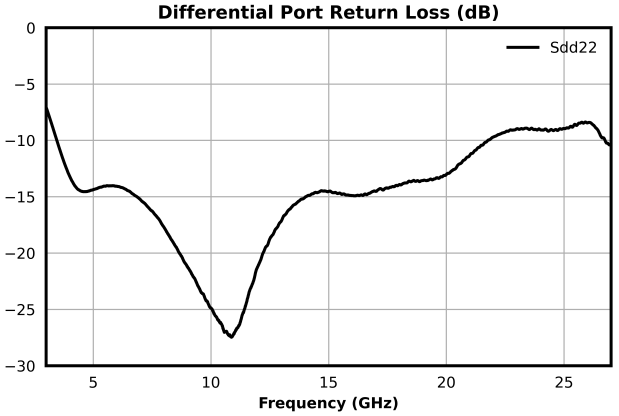
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss as a Mode Converter	Temp = 25°C	4	22	-	1.7	-	dB
Nominal Phase Shift	Temp = 25°C	-	-	-	180	-	°
Common Port Return Loss	Temp = 25°C	4	22	-	13	-	dB
Common Mode Return Loss	Temp = 25°C	4	22	-	6	-	dB
Output Return Loss	Temp = 25°C	4	22	-	11	-	dB
Isolation	Temp = 25°C	4	22	-	13	-	dB
Amplitude Balance	Temp = 25°C	4	22	-	0.2	-	dB
Phase Balance	Temp = 25°C	4	22	-	2.5	-	°
Common Mode Rejection	Temp = 25°C	4	22	-	31	-	dB
Impedance	Temp = 25°C	-	-	-	50	-	Ω
Impedance Ratio	-	-	-	-	2:1	-	

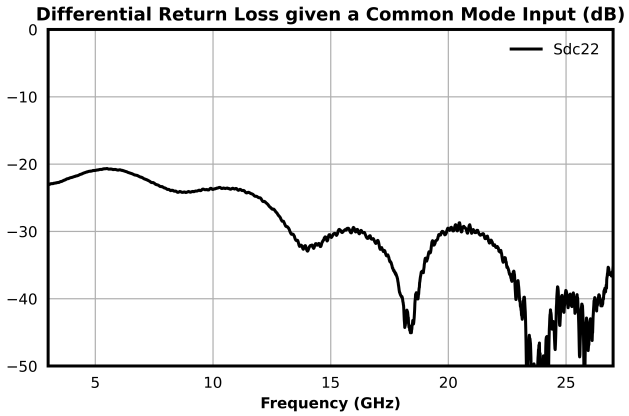
Mixed Mode Scattering Parameters

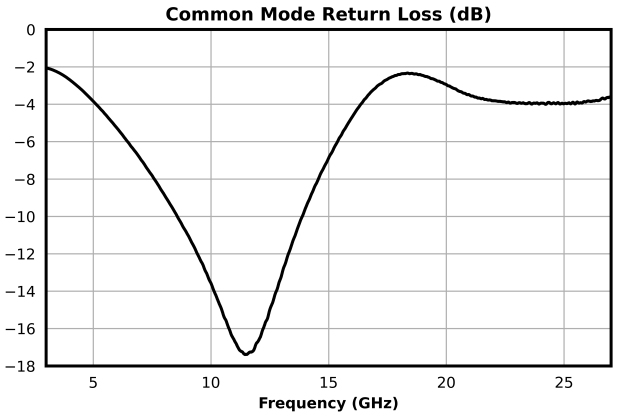




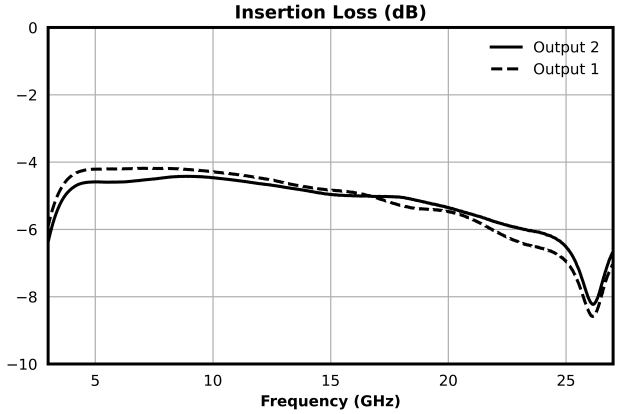


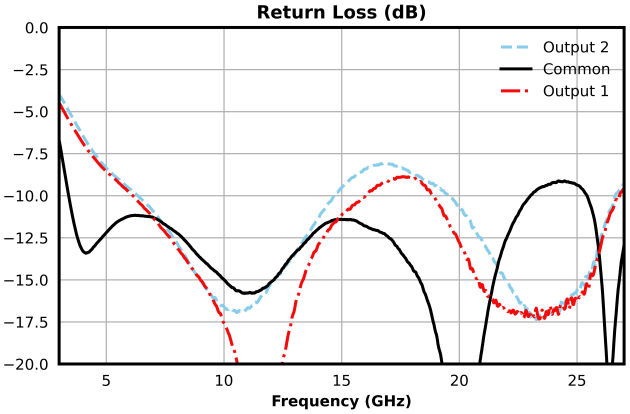


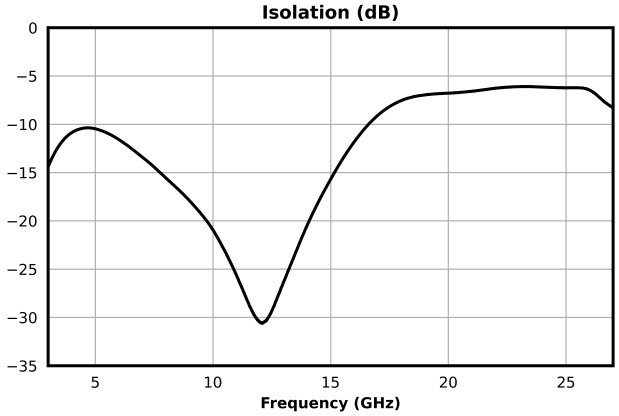


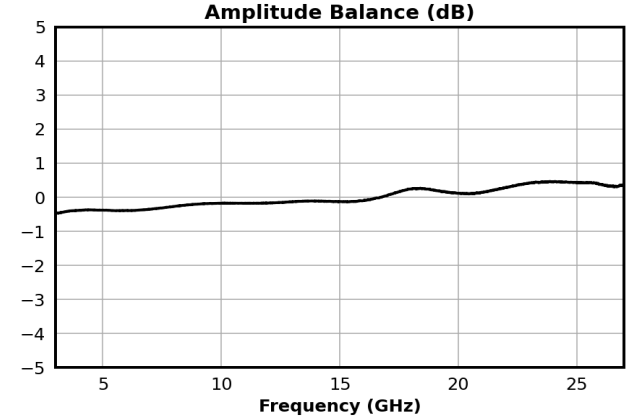


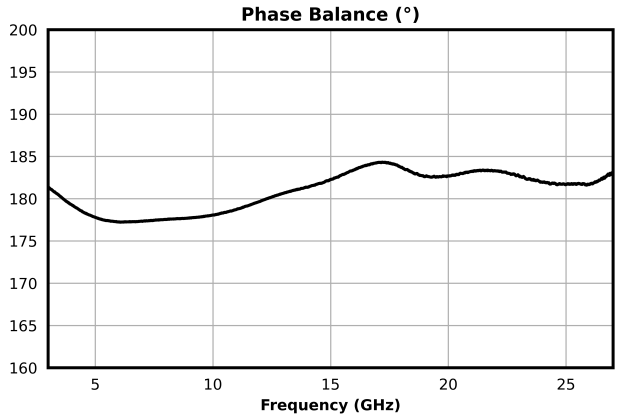
Typical Performance Scattering Parameters

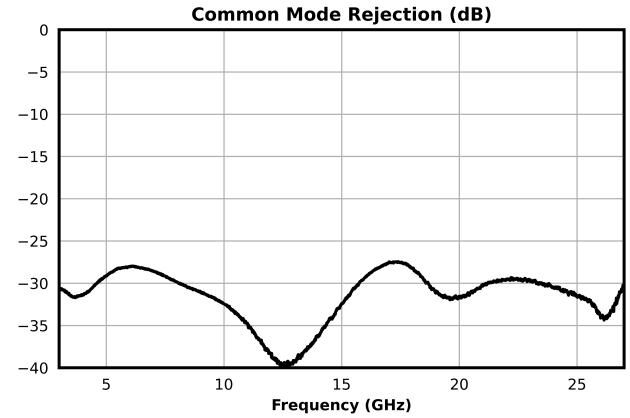










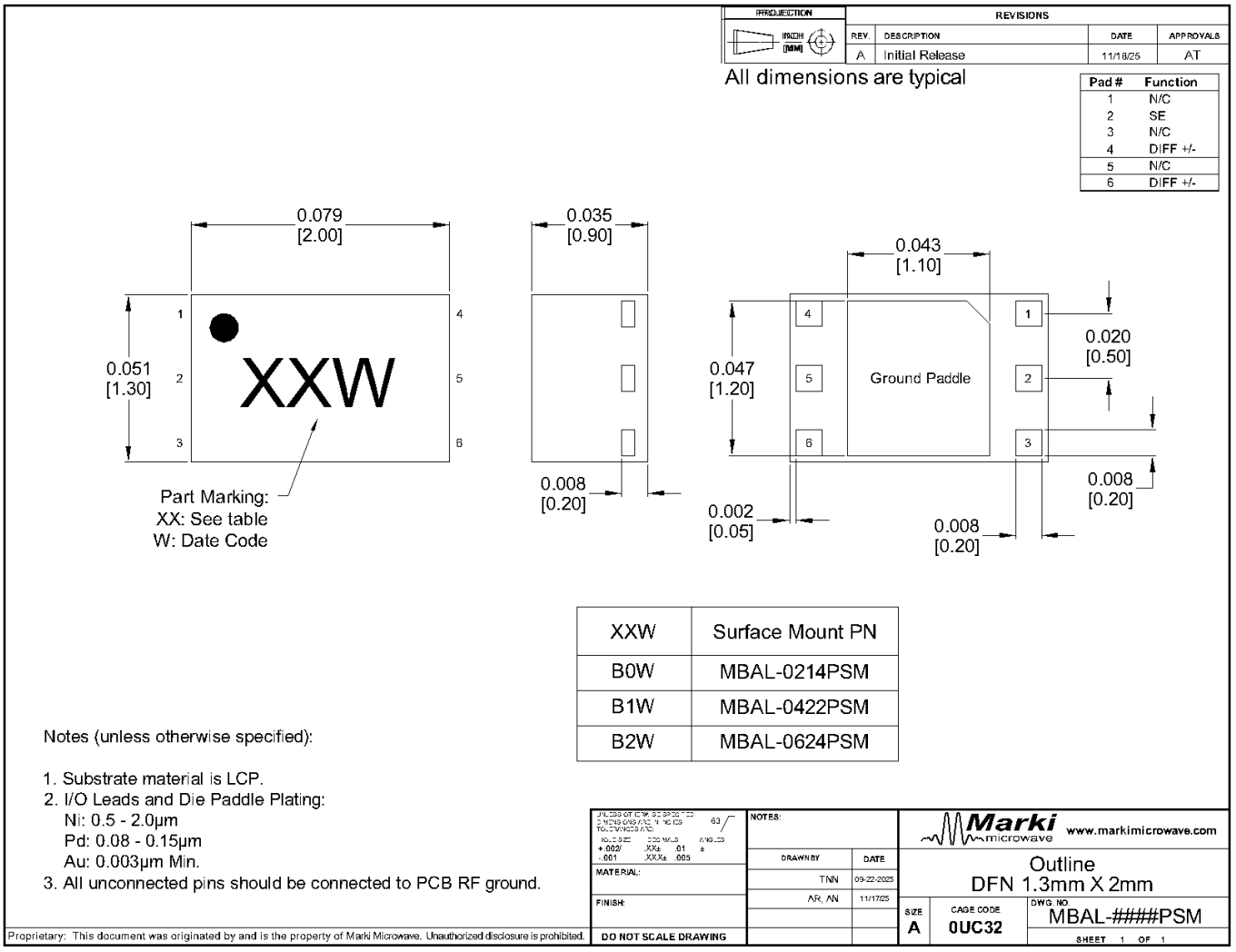


Measured data is de-embedded from fixture using AFR.

Mechanical Data

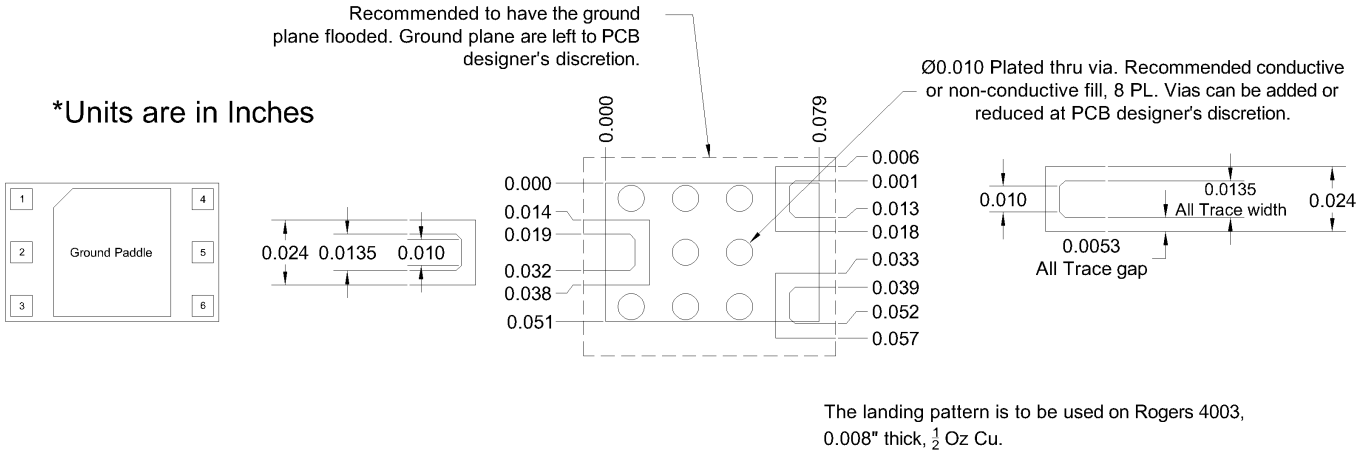
Outline Drawing

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



Footprint Image

Download : Footprint Drawing



The landing pattern is to be used on Rogers 4003, 0.008" thick, $\frac{1}{2}$ Oz Cu.

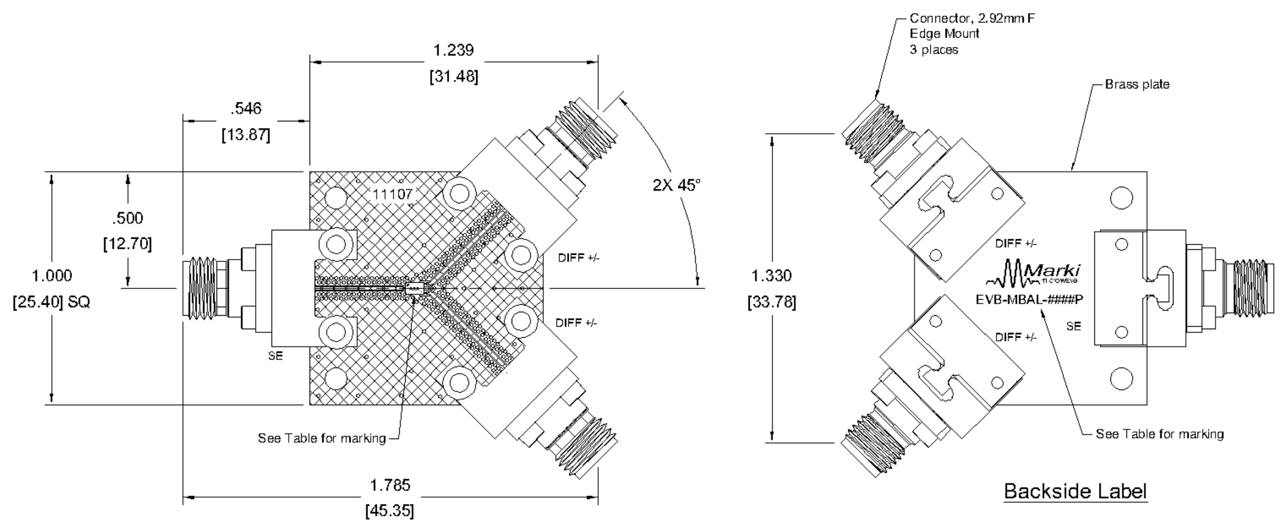
Evaluation Board - Outline Drawing

All measurements are typical

Port	Connector Type
RF in	2.92 mm F Edge Mount
RF out	2.92 mm F Edge Mount
RF out	2.92 mm F Edge Mount

Connectors are not removeable

REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	11/18/25	AT



EVB-MBAL-####P	Surface Mount PN	XXX
EVB-MBAL-0214P	MBAL-0214PSM	B0X
EVB-MBAL-0422P	MBAL-0422PSM	B1X
EVB-MBAL-0624P	MBAL-0624PSM	B2X

DRAWN BY	DATE
Tnn	09/22/2025
AR	11/17/25
AN	11/17/25

MATERIAL:

FINISH:

NOTES:

Marki microwave www.markimicrowave.com

Outline,
MBAL PSM Eval Board

SIZE A | CAGE CODE 0UC32 | DWG. NO. EVB-MBAL-####P

SHEET 1 OF 1

DO NOT SCALE DRAWING

DISCLAIMER

MARKI MICROWAVE, LLC., (“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, LLC. All other trademarks used are the property of their respective owners.