

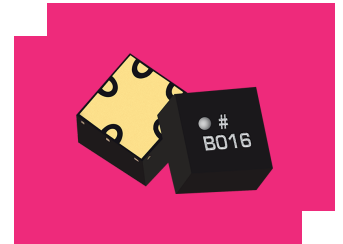
MBAL-0260CSP2

2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

DEVICE OVERVIEW

General Description

The MBAL-0260CSP2 is a GaAs passive MMIC 1:2 balun that features excellent 33 dB common mode rejection over a 2 to 60 GHz operational bandwidth. This device is an ideal solution for digital beamforming and other higher-order Nyquist sampling applications, as well as clock distribution and balanced amplifier interfaces. Available in a lead-free, RoHS compliant 2.5 x 2.5 mm CSP2 package, it is compatible with standard pick-and-place assembly processes.



[Download s-parameters here](#)

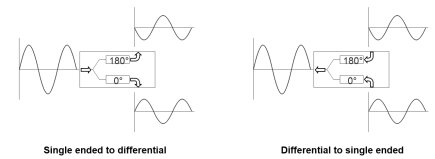
Features

- 2:1 Impedance Ratio
- 2 GHz to 60 GHz Balun (50Ω Common to 100Ω Differential)
- Optimal Phase and Amplitude Balance of 0.4° and 0.4 dB
- 33 dB Common Mode Rejection
- Compact 2.5mm chip scale package
- This product embodies Marki Microwave's U.S. Pat. 11,869,858.

Applications

- Balanced Receivers
- Signal Integrity
- Analog to Digital Converters
- Balanced Amplifiers
- Clock Distribution

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MBAL-0260CSP2	2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun	CSP2	REACH RoHS	Released	EAR99
<u>EVB-MBAL-0260</u>	Evaluation Board, 2-60 GHz Passive MMIC Chip Scale Package 1:2 Balun	EVB	REACH RoHS	Released	EAR99

MBAL-0260CSP2

2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

Table Of Contents

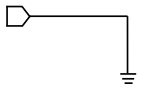
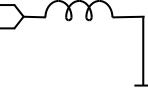
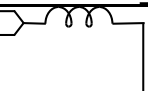
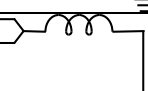
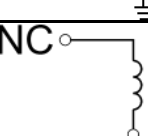
- **Device Overview**
 - General Description
 - Features
 - Applications
 - Functional Block Diagram
- **Port Configuration and Functions**
 - Port Functions
- **Revision History**
- **Specifications**
 - Absolute Maximum Ratings
 - Package Information
 - Electrical Specifications
 - Mixed Mode Scattering Parameters
 - Typical Performance Scattering Parameters
- **Mechanical Data**
 - Outline Drawing
- **Footprint Image**
- **Evaluation Board**
 - Evaluation Board - Performance Data
 - Evaluation Board Outline Drawing

Revision History

Revision Code	Revision Date	Comment
-	2025-06-04	Initial Release

Port Configuration and Functions

Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	Ground pad should be connected to RF/DC ground with low electrical and thermal resistance.	
Pin 1	Common Port / In (Unbalanced)	The common port is DC short to ground.	
Pin 3	Out 1 / 0° Port (Balanced)	The 0° port is DC short to ground.	
Pin 4	Out 2 / 180° Port (Balanced)	The 180° port is DC short to ground.	
Pins 2,5	NC	Pins 2 and 5 are not internally connected. They can be connected to ground for normal operation.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
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
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	2.50 x 2.50 mm
Moisture Sensitivity Level	-	MSL 1

MBAL-0260CSP2

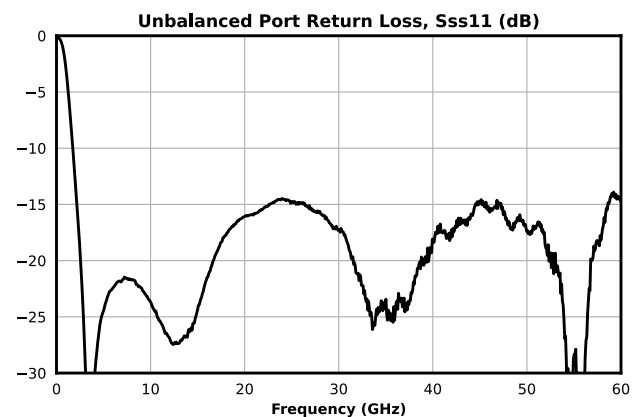
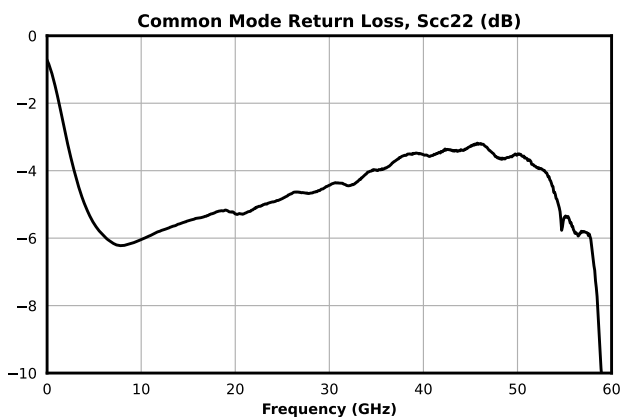
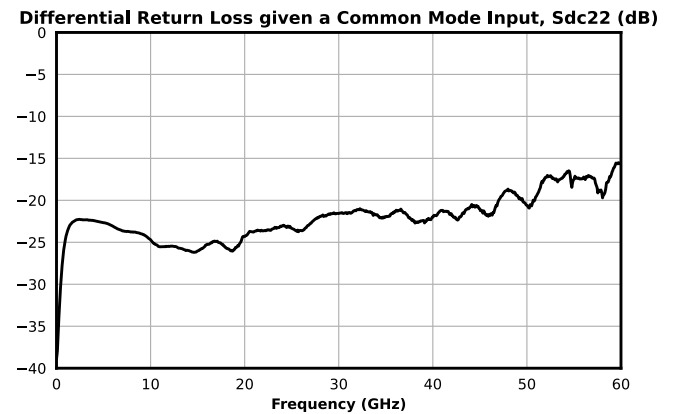
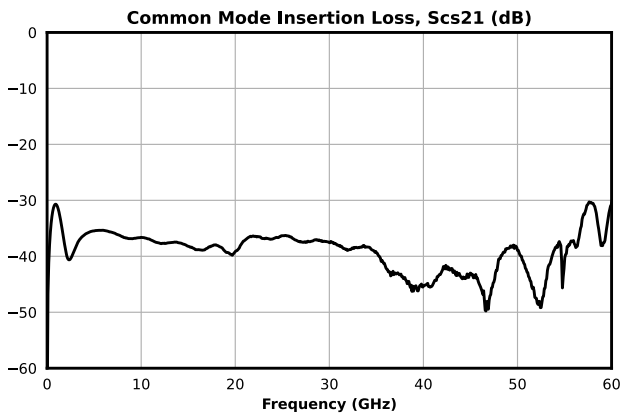
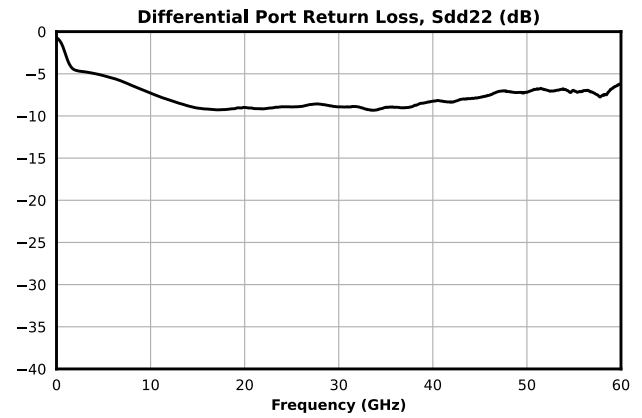
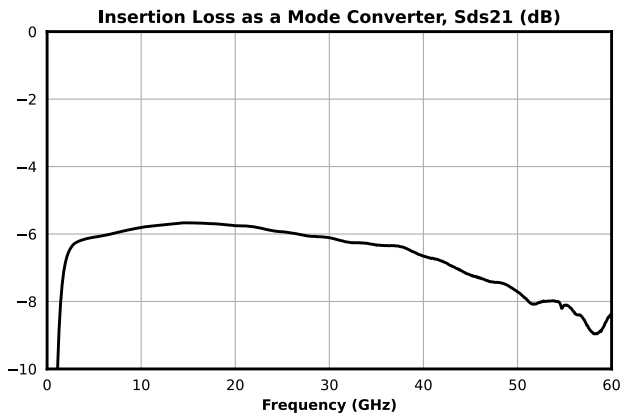
2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

Electrical Specifications

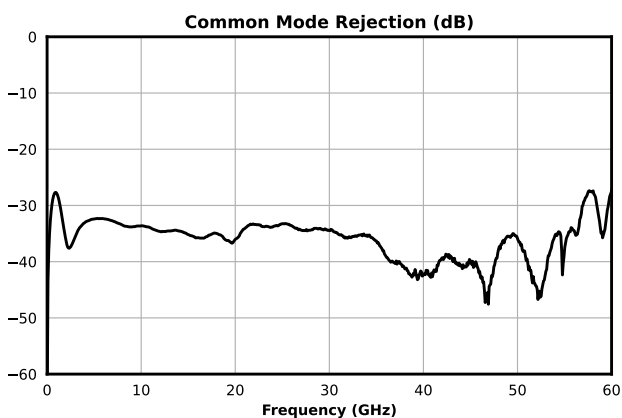
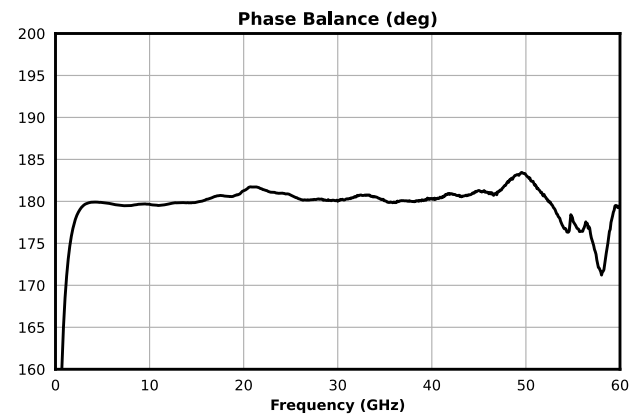
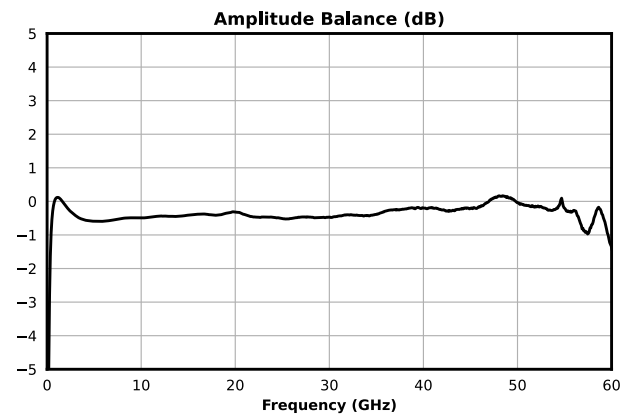
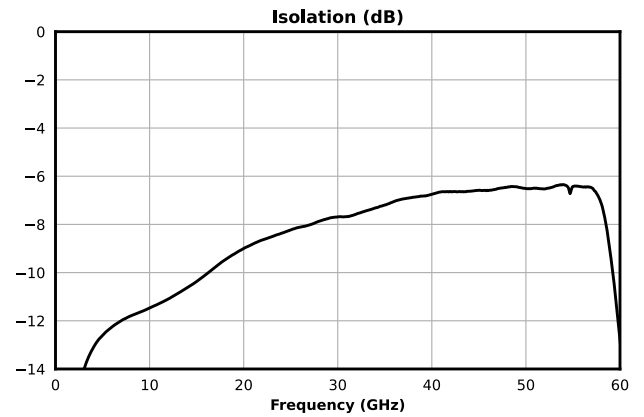
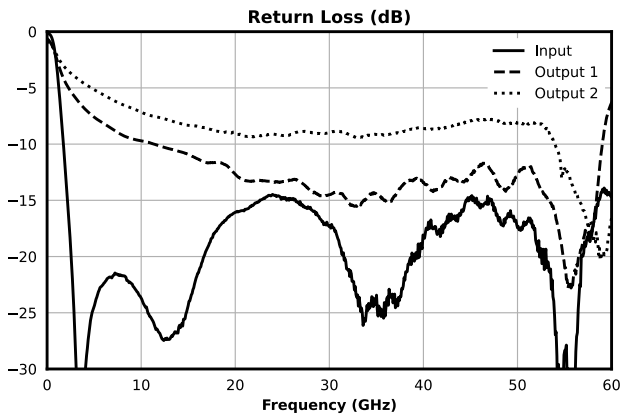
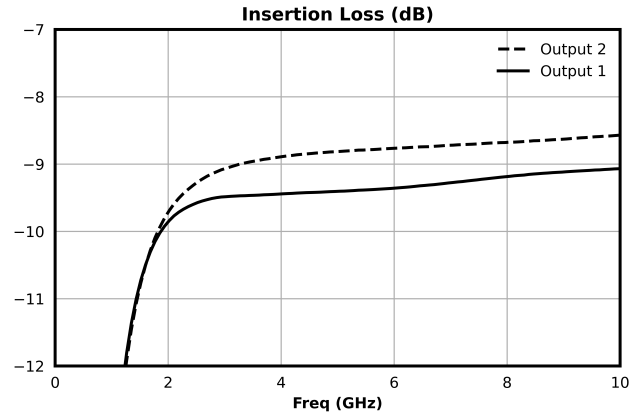
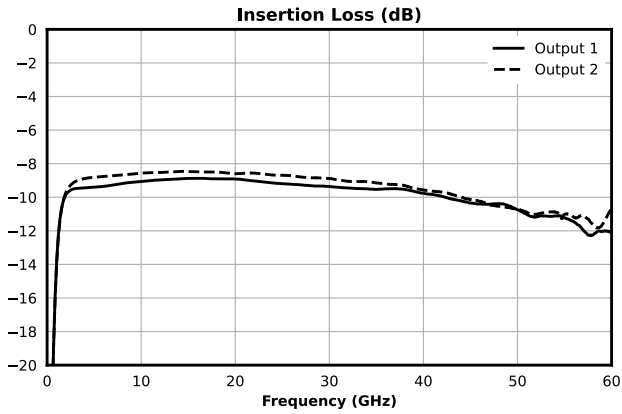
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Amplitude Balance	Configuration A, 25°C	2	60	-	0.4	-	dB
Common Mode Rejection	Configuration A, 25°C	2	60	-	33	-	dB
Common Port Return Loss	Configuration A, 25°C	2	60	-	19	-	dB
Impedance	Configuration A, 25°C	2	60	-	50	-	Ω
Insertion Loss as a Mode Converter	Configuration A, 25°C	2	60	-	6.3	-	dB
Isolation between differential ports	Configuration A, 25°C	2	60	-	8	-	dB
Nominal Phase Shift	Configuration A, 25°C	2	60	-	180	-	°
Output Return Loss	Configuration A, 25°C	2	60	-	9	-	dB
Phase Balance	Configuration A, 25°C	2	60	-	0.4	-	°
Impedance Ratio	-	-	-	-	2:1	-	

Mixed Mode Scattering Parameters

Mixed mode scattering parameters are used to characterize differential circuits. For baluns, this means that the 0° and 180° ports become a single 100Ω differential port and the common port remains the same 50Ω common port. The two-port s-parameters of the balun are then characterized based on differential (d), common mode (c), or single-ended (s) signals. For example: Scs12 is the Common output response given a single ended input.



Typical Performance Scattering Parameters



Measured data is de-embedded from fixture using AFR.

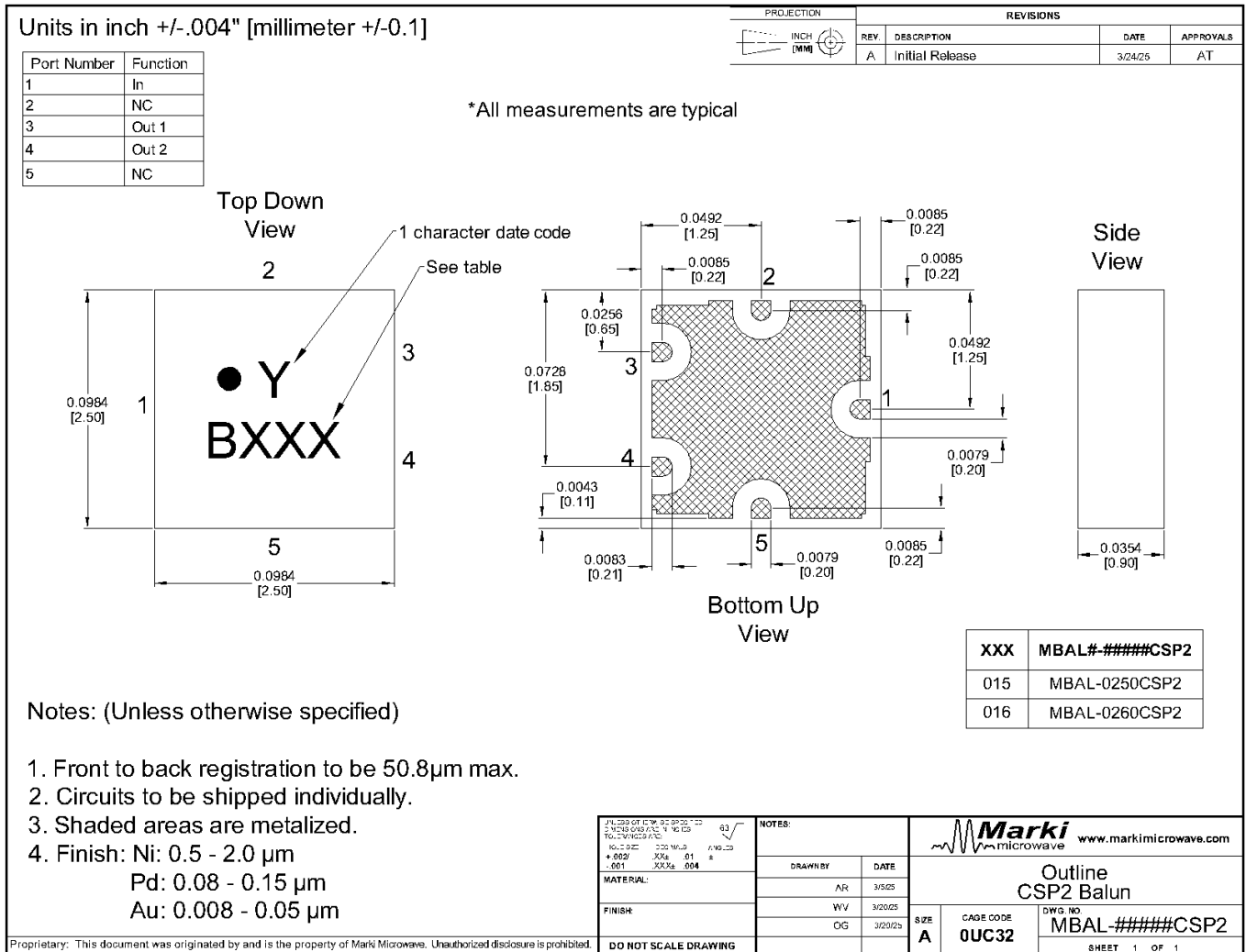
MBAL-0260CSP2

2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#) | [Outline 3D Drawing](#) | [Outline 3D STP](#)



EVB Out- refers to output Out 1

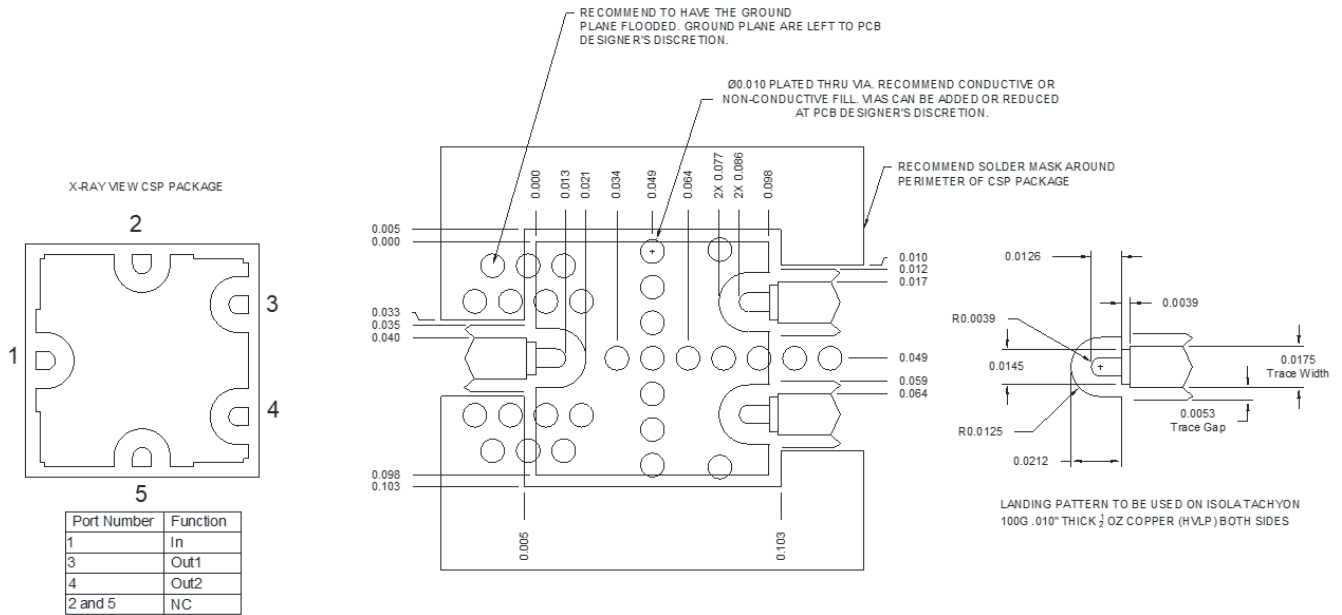
EVB Out+ refers to output Out 2

MBAL-0260CSP2

2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

Footprint Image

Download : [Footprint Drawing](#)



Evaluation Board - Performance Data

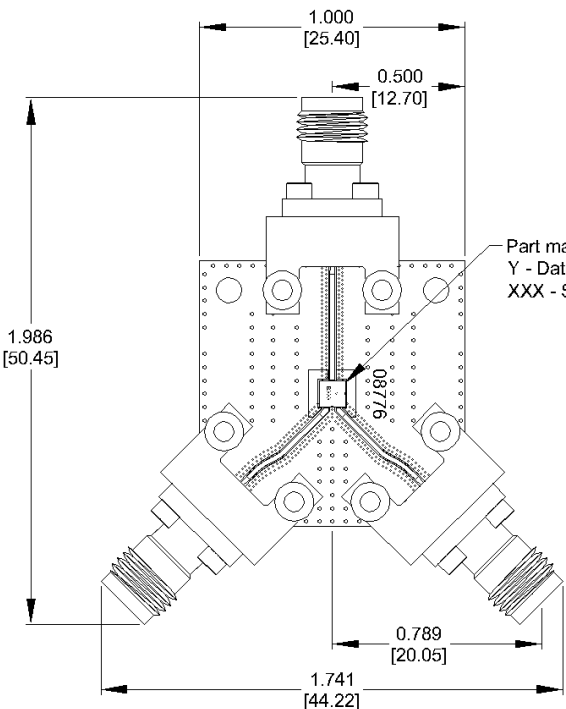
Parameter	Test Conditions	Frequency Range (GHz)	Min	Typ	Max	Unit
Impedance Ratio	-	-	-	2	-	

MBAL-0260CSP2

2-60 GHz Passive MMIC Chip Scale Package 2:1 Balun

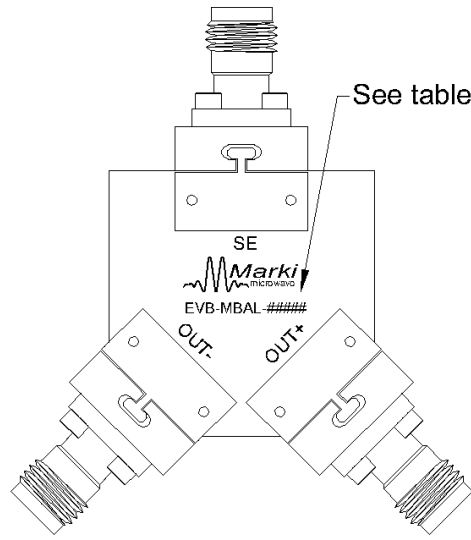
Evaluation Board - Outline Drawing

*All dimensions are typical



Part marking:
Y - Date code
XXX - See table

Bottom-up view:



See table for marking

Port	Connector Type
1, 2, 3	1.85mm Female

Note: Connectors are not removable.

XXX	EVB-MBAL-####	Surface Mount PN
015	EVB-MBAL-0250	MBAL-0250CSP2
016	EVB-MBAL-0260	MBAL-0260CSP2


RoHS Compliant (SN96.5/AG3.5) Components/Assembly

Proprietary: This document was originated by and is the property of Marki Microwave. Unauthorized disclosure is prohibited.

DO NOT SCALE DRAWING

NOTES:

DRAWN BY	DATE
AR	3/5/25
OG	3/20/25
WV	3/20/25



www.markimicrowave.com

Outline
2.5mm CSP2 HV Balun

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

SHEET 1 OF 1

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.

© 2025, Marki Microwave, LLC