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

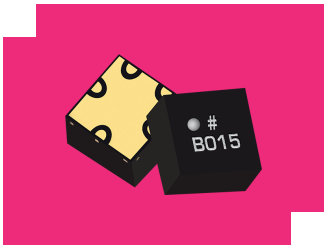
MBAL-0250CSP2

2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun

DEVICE OVERVIEW

General Description

The MBAL-0250CSP2 is a GaAs passive MMIC 2:1 balun that features excellent 35 dB common mode rejection over a 2 to 50 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

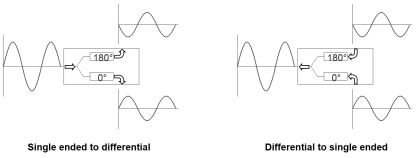
Features

- 2 GHz to 50 GHz
- 2:1 Balun (50Ω Common to 100Ω Differential)
- Optimal Phase and Amplitude Balance of 2° and 0.3 dB
- 35 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-0250CSP2	2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun	CSP2	REACH RoHS	Released	EAR99
EVB-MBAL-0250	Evaluation Board, 2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun	EVB	REACH RoHS	Released	EAR99

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2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun

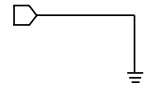
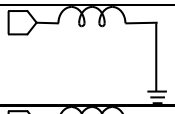
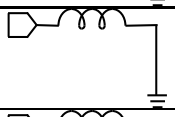
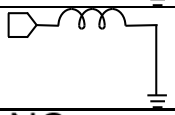
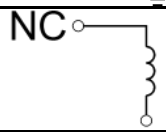
Table Of Contents

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

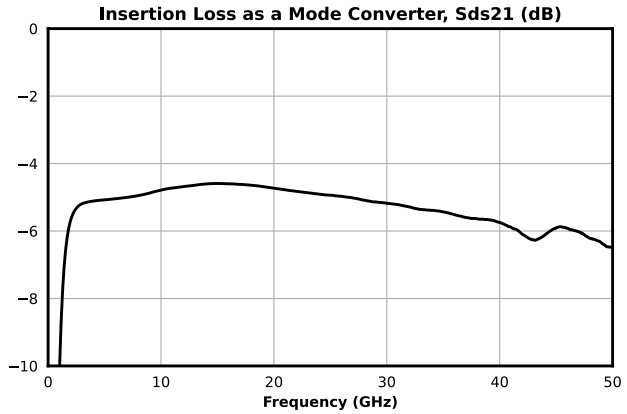
Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	2.50 x 2.50 mm
Moisture Sensitivity Level	-	MSL 1

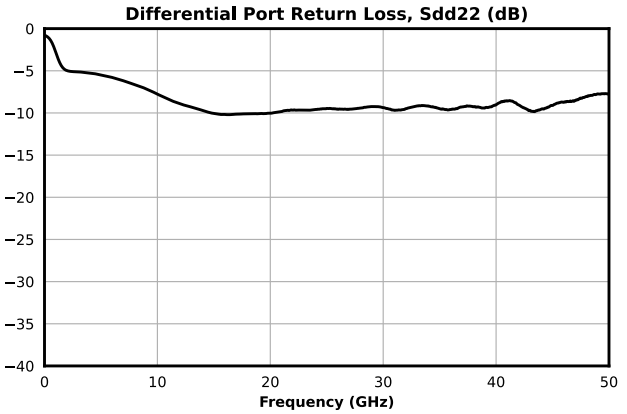
Electrical Specifications

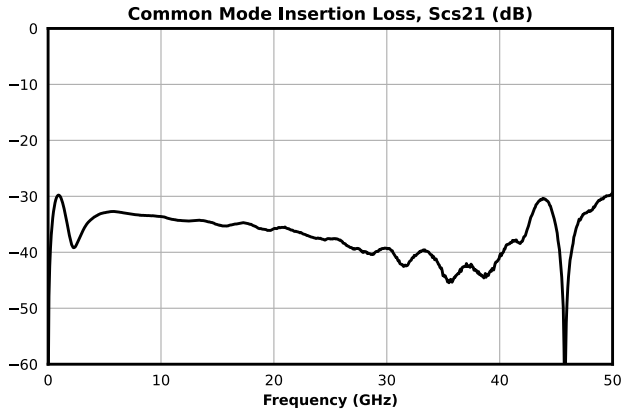
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Amplitude Balance	Configuration A, 25°C	2	50	-	0.3	-	dB
Common Mode Rejection	Configuration A, 25°C	2	50	-	35	-	dB
Common Port Return Loss	Configuration A, 25°C	2	50	-	16	-	dB
Impedance	Configuration A, 25°C	2	50	-	50	-	Ω
Insertion Loss as a Mode Converter	Configuration A, 25°C	2	50	-	5.3	-	dB
Isolation between differential ports	Configuration A, 25°C	2	50	-	7	-	dB
Nominal Phase Shift	Configuration A, 25°C	2	50	-	180	-	°
Output Return Loss	Configuration A, 25°C	2	50	-	9	-	dB
Phase Balance	Configuration A, 25°C	2	50	-	2.1	-	°
Impedance Ratio	-	-	-	-	2:1	-	

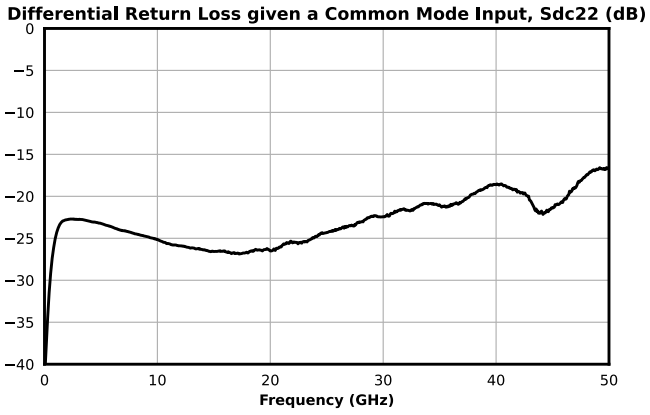
Mixed Mode Scattering Parameters

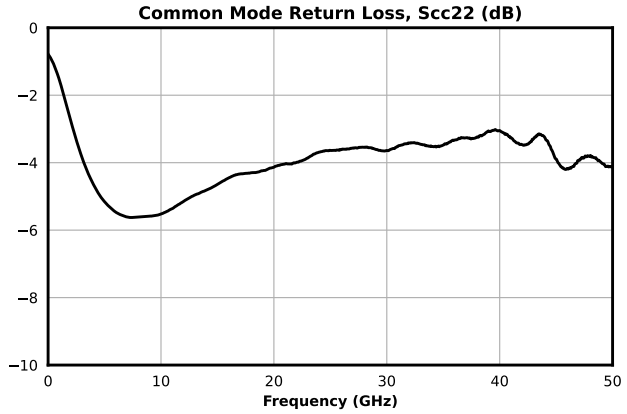
Mixed mode scattering parameters are used to characterize differential circuits. For baluns, this means that the 0° and 180° ports become a single 100Ω differential port and the common port remains the same 50Ω common port. The two-port s-parameters of the balun are then characterized based on differential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

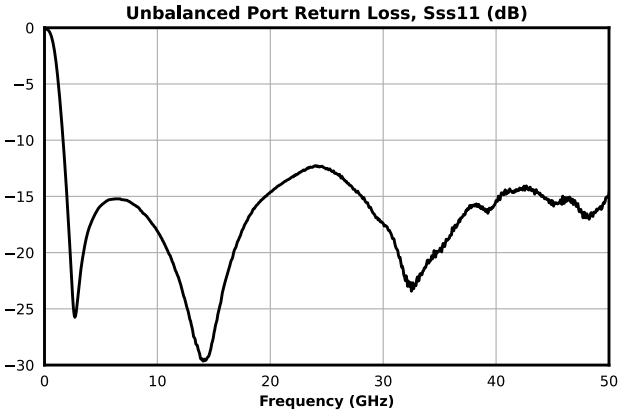












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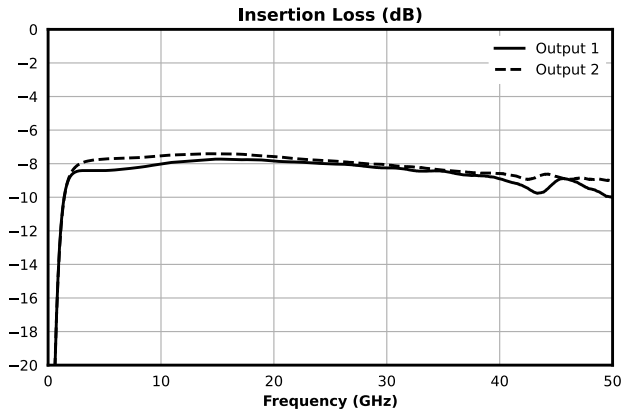
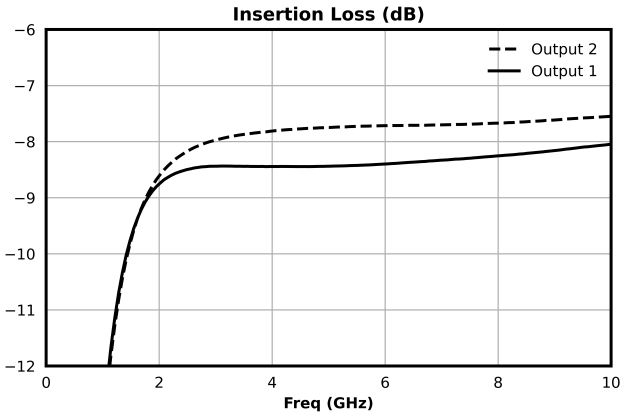
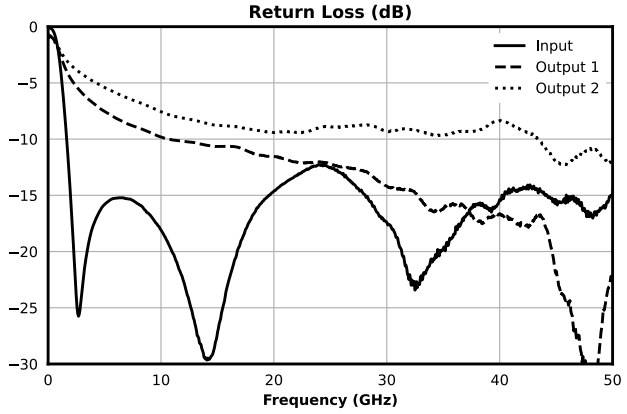
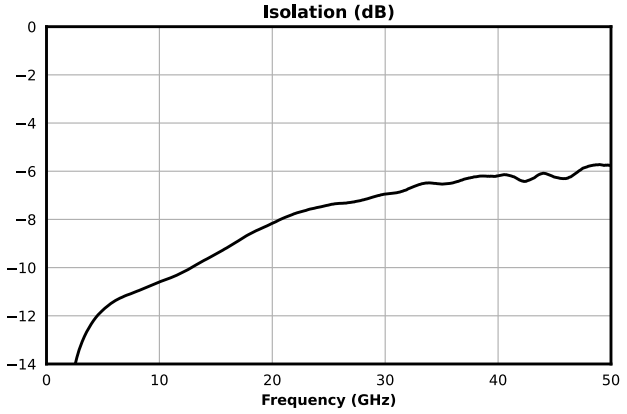
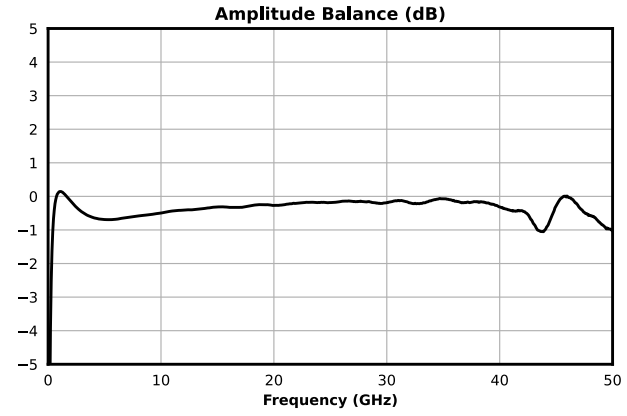
Typical Performance Scattering Parameters

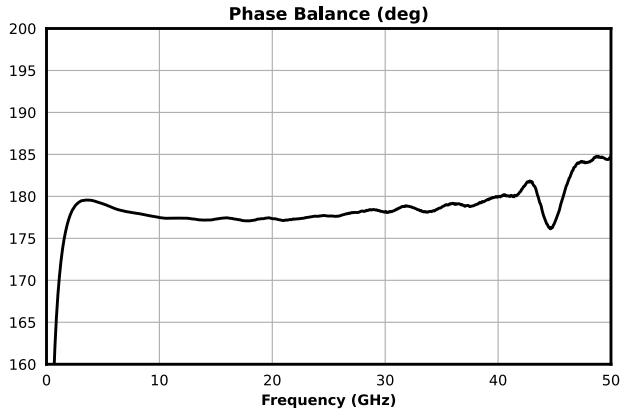


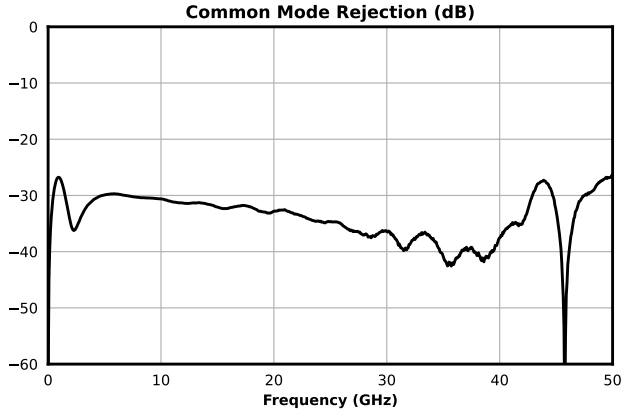












Measured data is de-embedded from fixture using AFR.

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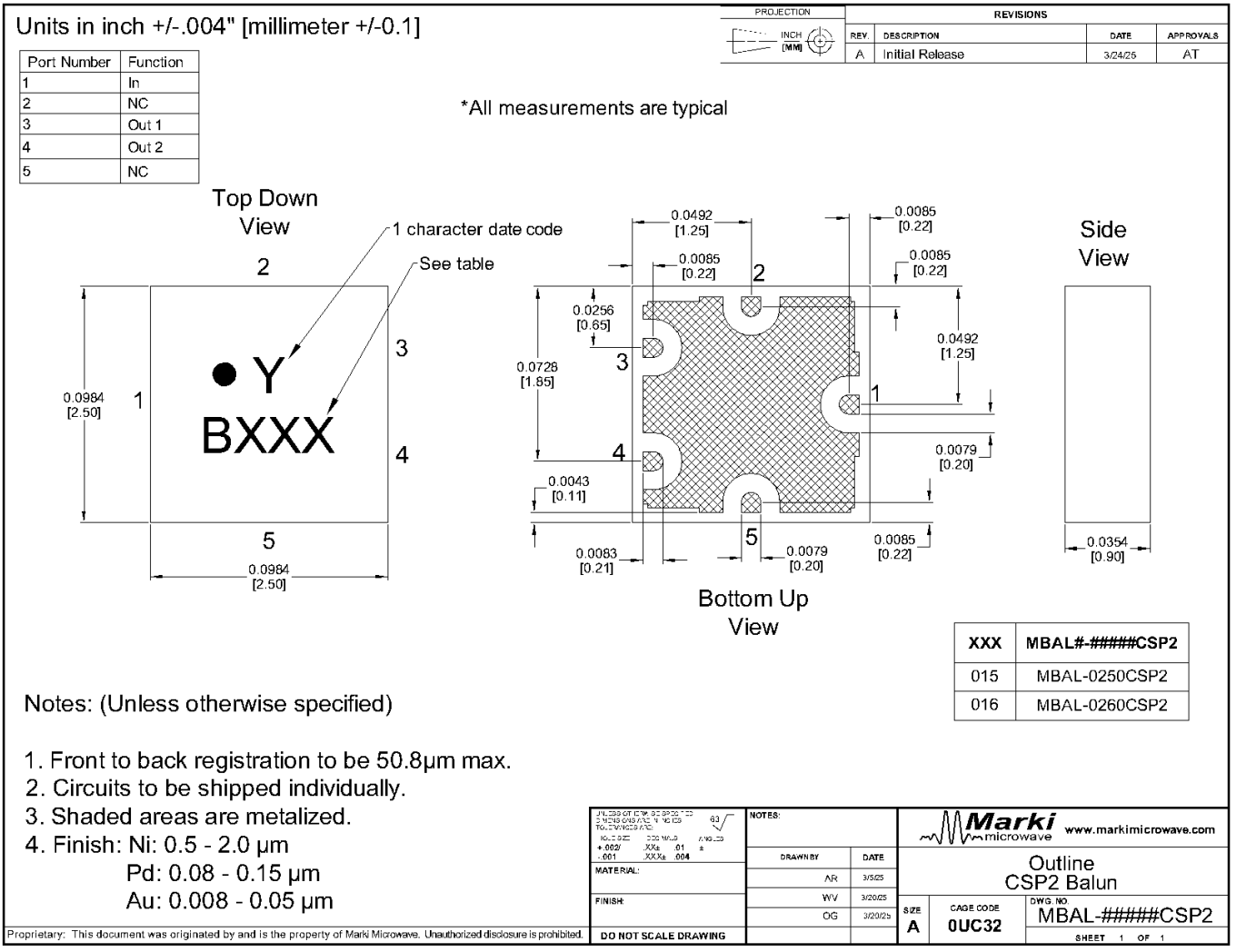
Mechanical Data

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

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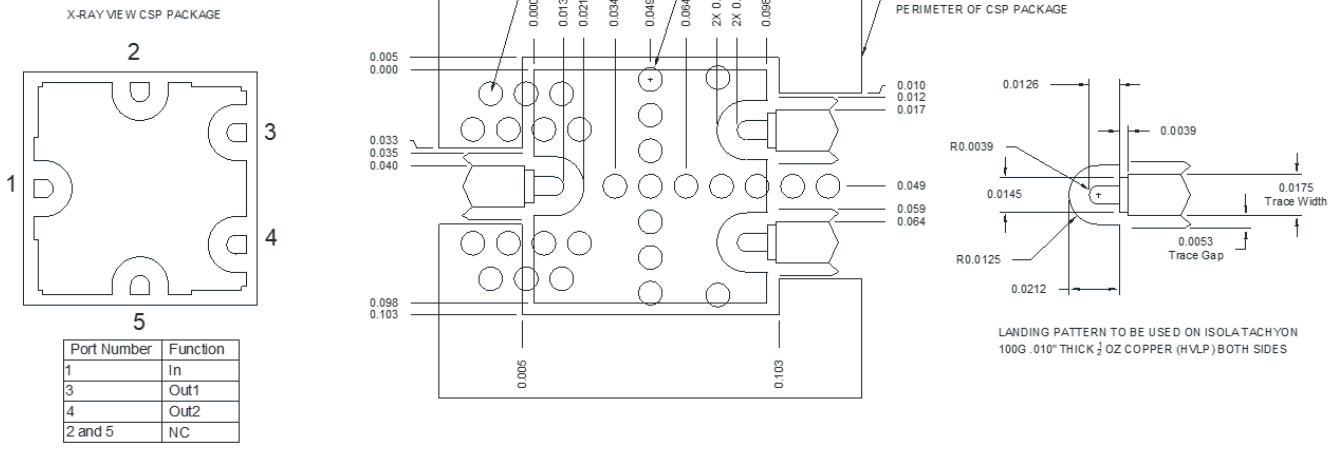
2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun

Footprint Image

Download : Footprint Drawing



Port Number	Function
1	In
3	Out1
4	Out2
2 and 5	NC

Evaluation Board - Performance Data

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

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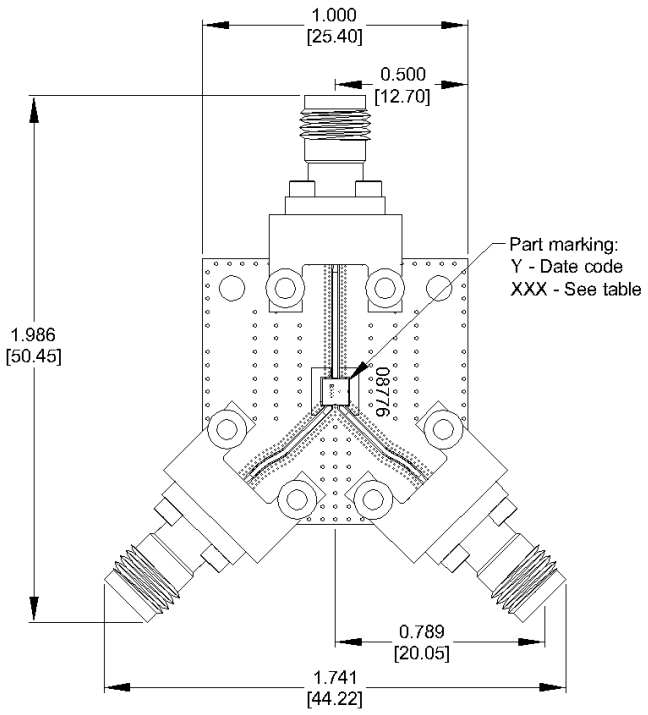
2-50 GHz Passive MMIC Chip Scale Package 1:2 Balun

Evaluation Board - Outline Drawing

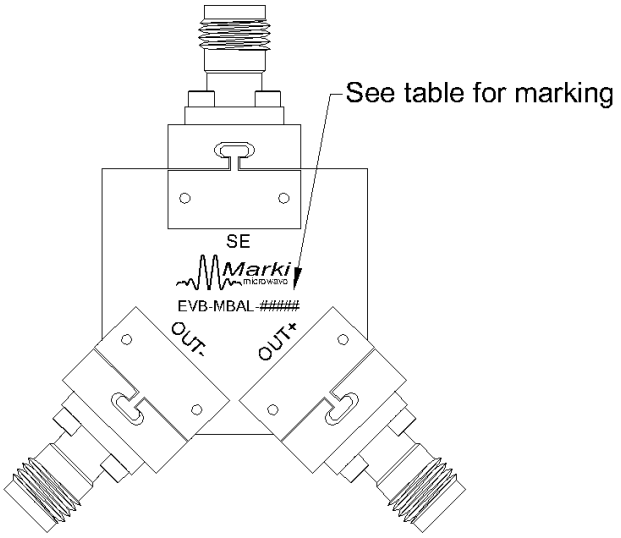
*All dimensions are typical

PROJECTION: INCH [MM]

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	3/24/25	AT



Bottom-up view:



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

Port	Connector Type
1, 2, 3	1.85mm Female
Note: Connectors are not removeable.	

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

NOTES:

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

MATERIAL:

FINISH:

DO NOT SCALE DRAWING

Marki microwave www.markimicrowave.com

Outline
2.5mm CSP2 HV Balun

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

SHEET 1 OF 1

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