

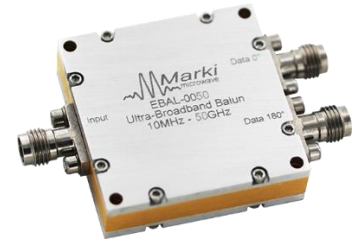
10MHz to 50GHz BROADBAND BALUN

EBAL-0050

1 Device Overview

1.1 General Description

The EBAL-0050 is a broadband balun, hand-tuned for optimal phase and amplitude balance over a 10 MHz to 50 GHz bandwidth. The EBAL-0050 operates as an excellent choice for analog to digital converters, balanced receivers, baseband digital modulations, and signal integrity

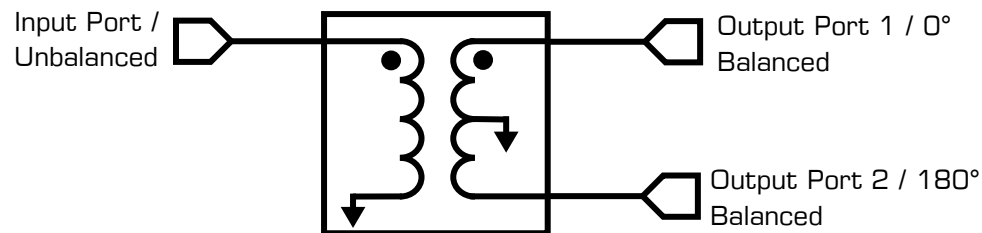


Module

1.2 Features

- 10MHz to 50GHz 1:2 Balun (Balanced to Unbalanced Transformer)
- Transforms 50 Ω to 100 Ω Differential Output
- Designed for Optimal Phase/Amplitude Balance
- [S3P Data EBAL-0050.zip](#)

1.3 Functional Block Diagram



1.4 Part Ordering Options¹

Part Number	Description	Green Status	Product Lifecycle	Export Classification
EBAL-0050	Connectorized Module	RoHS	Active	EAR99

¹ Refer to our [website](#) for a list of definitions for terminology presented in this table.



Table of Contents

1	Device Overview	1	3	Specifications	4
1.1	General Description	1	3.1	Absolute Maximum Ratings	4
1.2	Features	1	3.2	Package Information.....	4
1.3	Functional Block Diagram	1	3.3	Electrical Specifications	4
1.4	Part Ordering Options.....	1	3.4	Typical Mixed Mode Performance Plots	5
2	Port Configurations and Functions	3	3.5	Typical Performance Plots	6
2.1	Port Diagram	3	4	Mechanical Data	7
2.2	Port Functions	3	4.1	Outline Drawing.....	7

Revision History

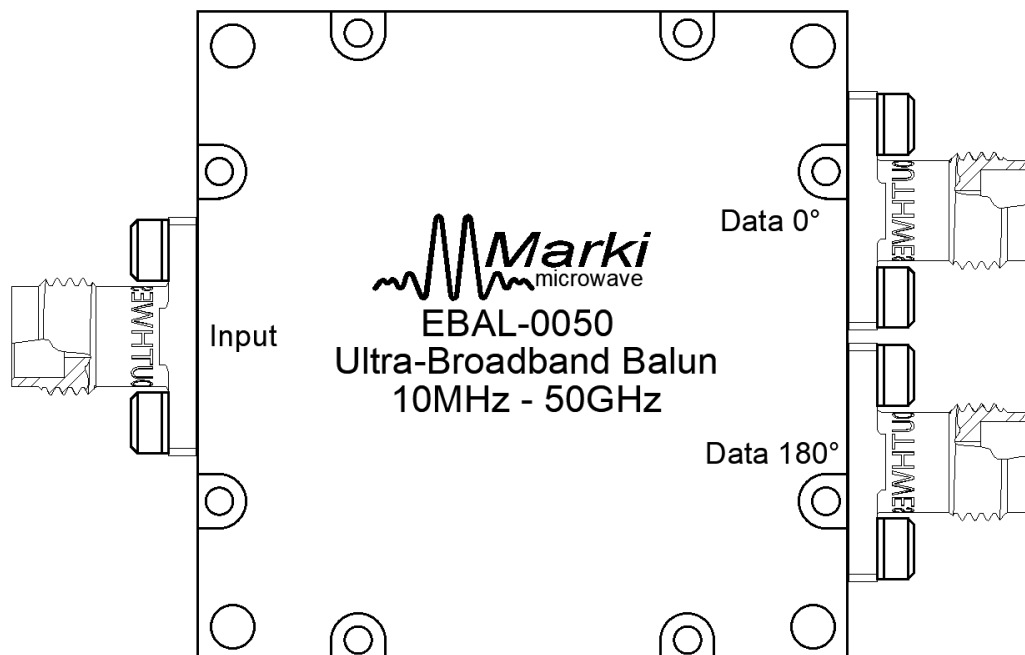
Revision Code	Revision Date	Comment
-	June 2023	Datasheet Initial Release



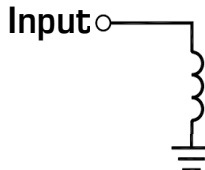
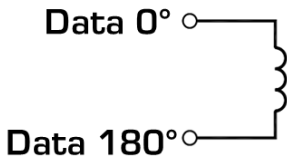
2 Port Configurations and Functions

2.1 Port Diagram

A top-down view of the EBAL-0050 package outline drawing is shown below. Marki baluns are passive reciprocal devices allowing either single ended to differential or differential to single ended conversion.



2.2 Port Functions

Port	Function	Description	Equivalent Circuit
Input	Common Port / SE (Unbalanced)	The common port is DC short to ground.	
Data 0°	D+ / 0° Port (Balanced)	The 0° port is DC short to the 180° port and DC open to ground and common.	
Data 180°	D- / 180° Port (Balanced)	The 180° port is DC short to the 0° port and DC open to ground and common.	

3 Specifications

3.1 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	Units
Operating Temperature	-55 to +100	°C
Storage Temperature	-65 to +125	°C

3.2 Package Information

Parameter	Details	Rating
ESD	Human Body Model (HBM), per MIL-STD-750, Method 1020	1A

3.3 Electrical Specifications

The electrical specifications apply at $T_A = +25^{\circ}\text{C}$ in a 50Ω system.

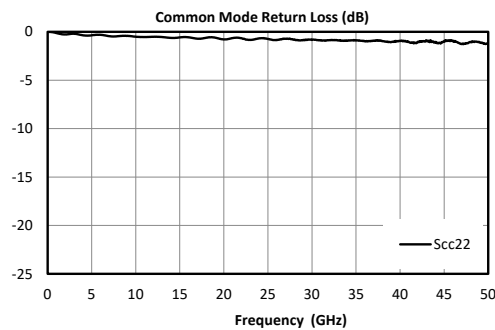
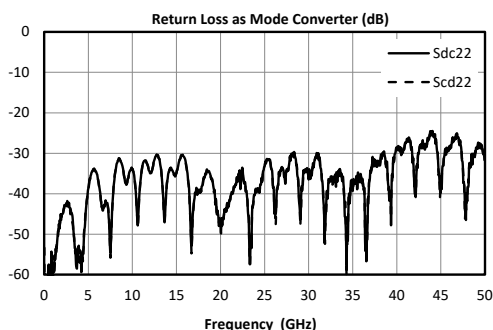
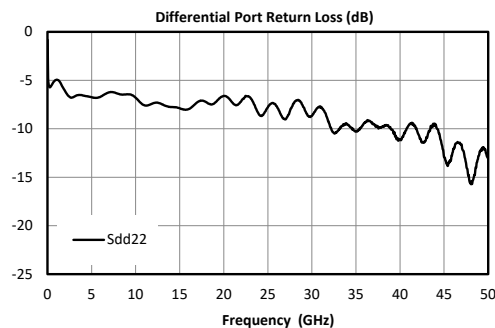
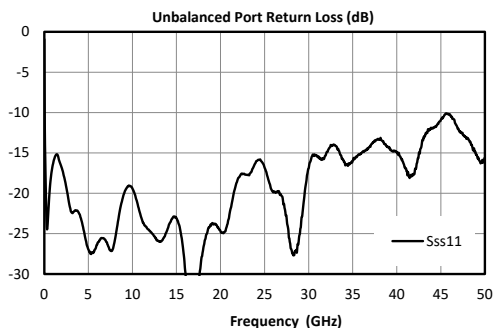
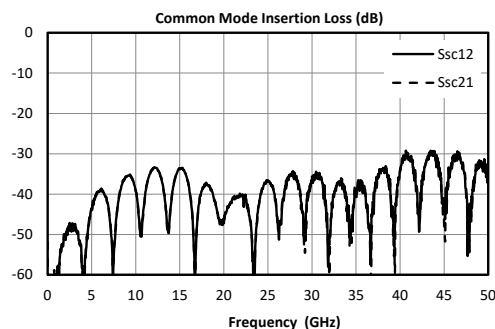
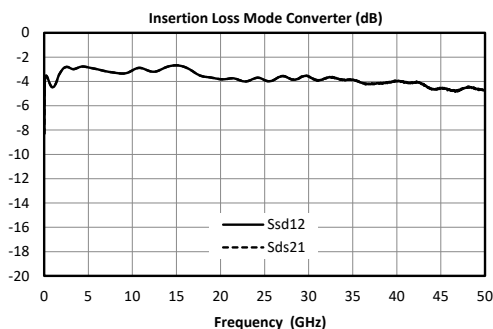
Min and Max limits are guaranteed at $T_A = +25^{\circ}\text{C}$.

Parameter	Frequency (GHz)	Min	Typ.	Max	Units
Insertion Loss as a mode converter	10MHz – 50GHz		4	8	dB
Nominal Phase Shift			180		°
Isolation			5		dB
Return Loss (Common)			20		dB
Return Loss (Output)			10		dB
Common Mode Rejection	10MHz – 40GHz	25	39		dB
	40GHz – 50GHz	20	31		
Amplitude Balance	10MHz – 40GHz		0.1	1.0	dB
	40GHz – 50GHz		0.2	1.5	
Phase Balance	10MHz – 40GHz		1.5	10	°
	40GHz – 50GHz		3	15	
Impedance			50		Ω



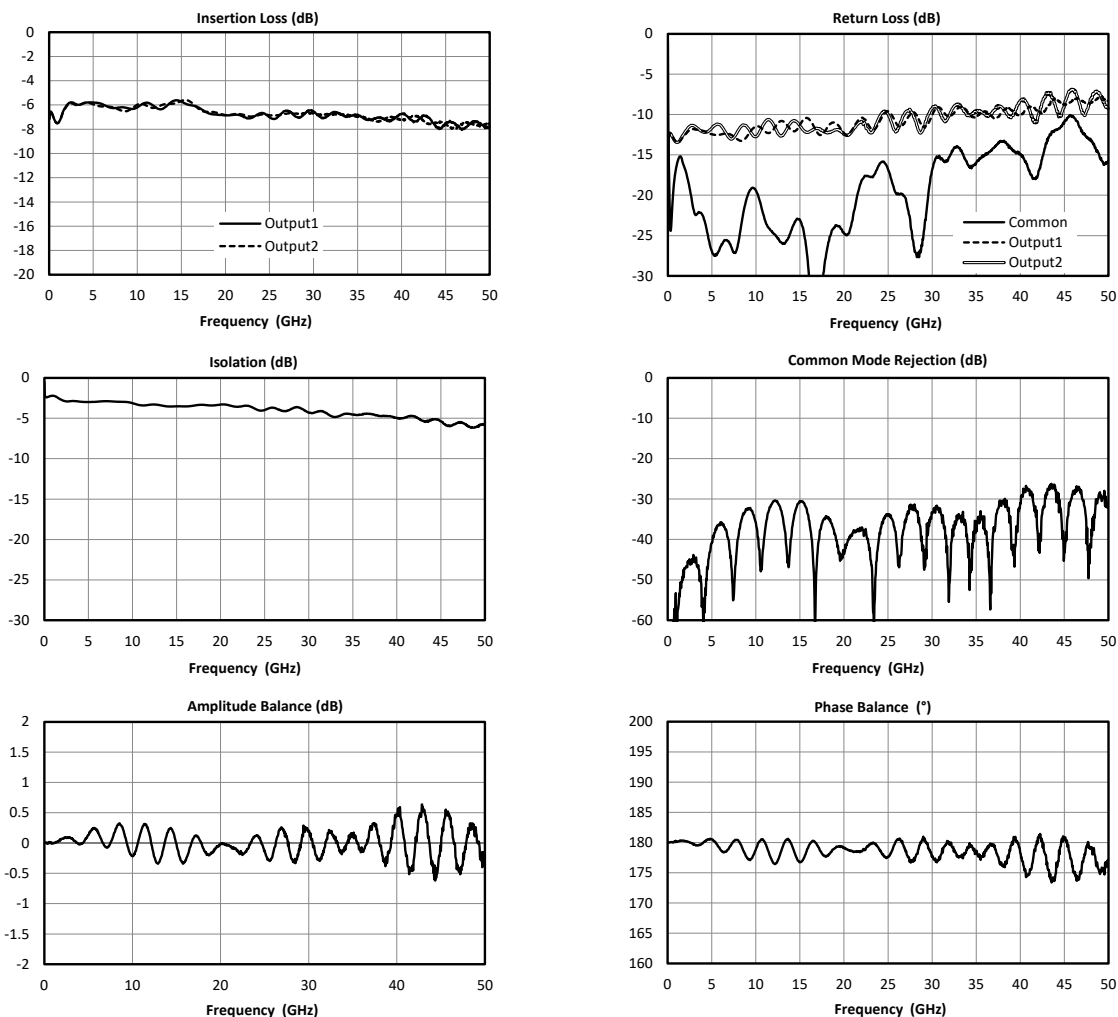
3.4 Typical Mixed Mode Performance Plots

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: Sds21 is the differential output response given a single ended input.



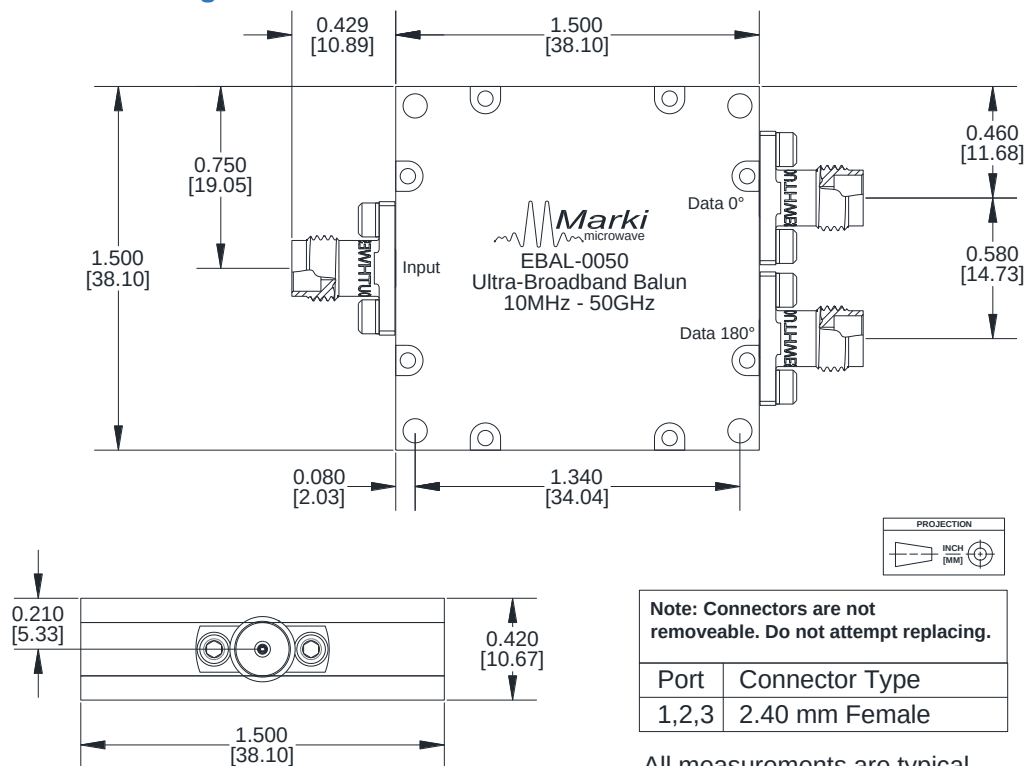
3.5 Typical Performance Plots

Three port scattering parameters measured as three single-ended 50Ω ports showing relationship between any two ports.



4 Mechanical Data

4.1 Outline Drawing



All measurements are typical

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