

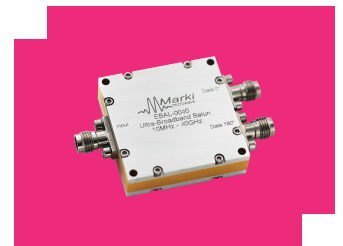
EBAL-0040

10 MHz to 40 GHz Broadband Balun

DEVICE OVERVIEW

General Description

The EBAL-0040 is an ultra-broadband 2:1 balun (unbalanced to balanced transformer), hand-tuned for optimal amplitude and phase balance. The EBAL-0040 transforms between a 50Ω common input and a 100Ω differential output. It operates over a 10 MHz to 40 GHz bandwidth, with typical 0.25 dB amplitude and 2° phase balance, low 3 dB insertion loss as a mode converter. The EBAL-0040 can be used for performing measurements on high frequency differential devices, including cables, microchips, and communication systems. It is an excellent choice for test & measurement benches, high speed analog-to-digital converters, balanced receivers, baseband digital modulations, and signal integrity. For accurate simulations, use the provided S3P file taken from measured production units. The EBAL-0040 is in a 1.5 x 1.5 inch connectorized package and features 2.92 mm Female connectors on the common input and differential output ports.



[Download s-parameters here](#)

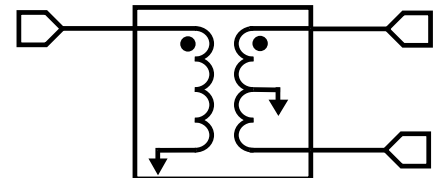
Features

- 2:1 Impedance Ratio
- 10MHz to 40GHz Balun (Unbalanced to Balanced Transformer)
- Transforms 50Ω to 100Ω Differential Output
- Designed for Optimal Phase/Amplitude Balance

Applications

N/A

Functional Block Diagram



Part Ordering Options

| Part Number | Description | Connectors | Green Status | Product Lifecycle | Export Classification |
|-------------|----------------------------------|-----------------|---------------|-------------------|-----------------------|
| EBAL-0040 | 10 MHz to 40 GHz Broadband Balun | <u>Standard</u> | REACH RoHS | Released | EAR99 |

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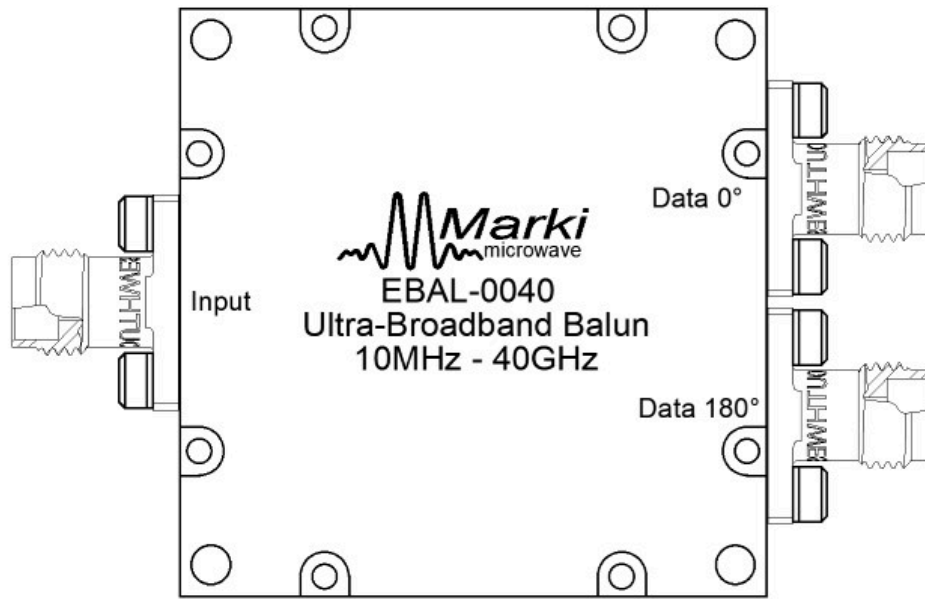
Revision History

| Revision Code | Revision Date | Comment |
|---------------|---------------|---------------------------|
| - | 2023-06-01 | Datasheet Initial Release |



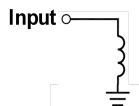
Port Configuration and Functions

Port Diagram

A top-down view of the EBAL-0040 package outline drawing is shown below. Marki baluns are passive reciprocal devices allowing either single ended to differential or differential to single ended conversion.



Port Functions

| Port | Function | Connector Type | Description | DC Equivalent Circuit |
|-----------|-------------------------------|----------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Data 0° | D+ / 0° Port (Balanced) | 2.92F | The 0° port is DC short to the 180° port and DC open to ground and common. |  |
| Data 180° | D- / 180° Port (Balanced) | 2.92F | The 180° port is DC short to the 0° port and DC open to ground and common. |  |
| Input | Common Port / SE (Unbalanced) | 2.92F | The common port is DC short 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 |

Package Information

| Parameter | Details | Rating |
|------------|--------------------|----------------|
| ESD | 250 to < 500 Volts | HBM Class 1A |
| Dimensions | - | 38.10x38.10 mm |

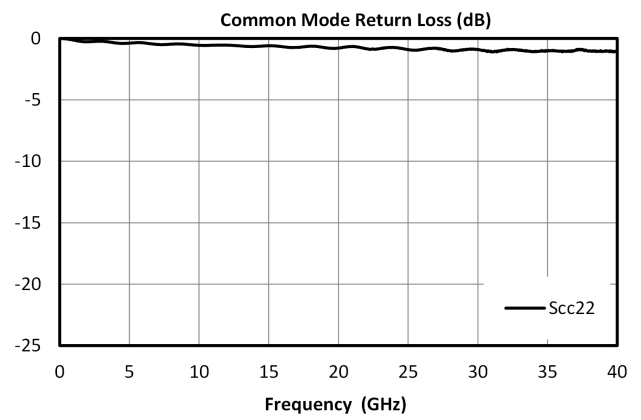
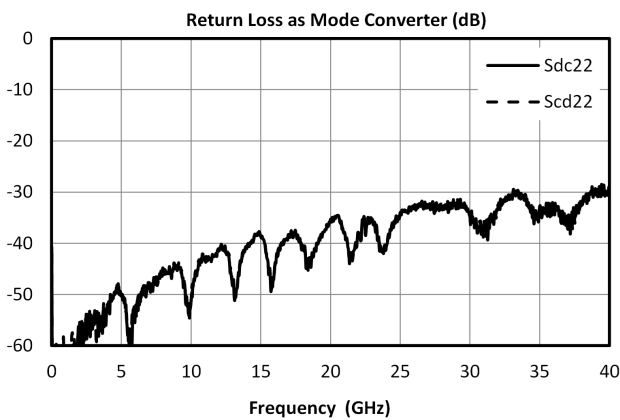
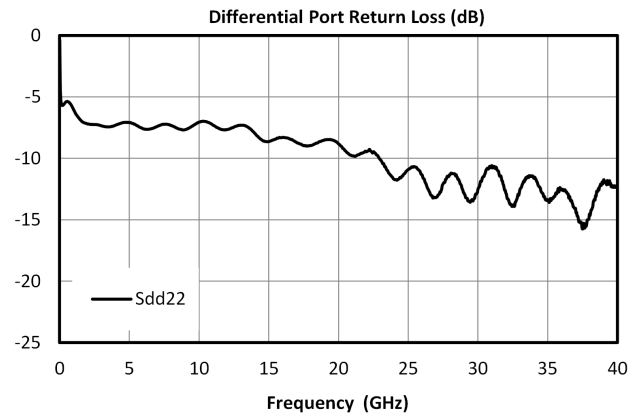
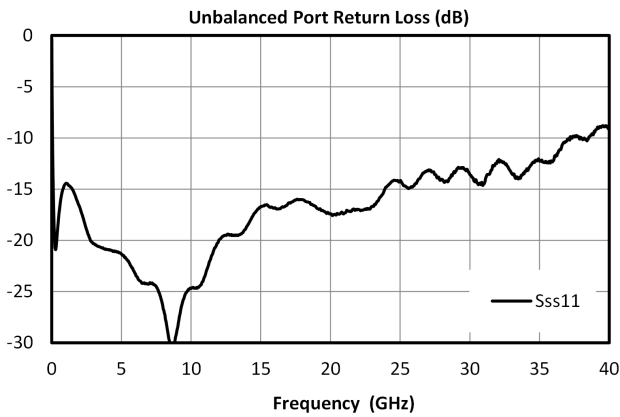
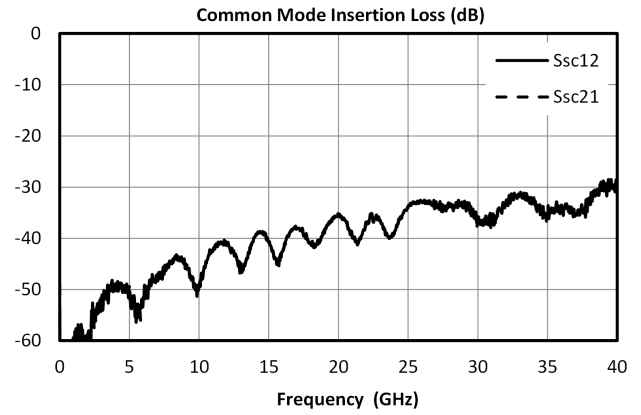
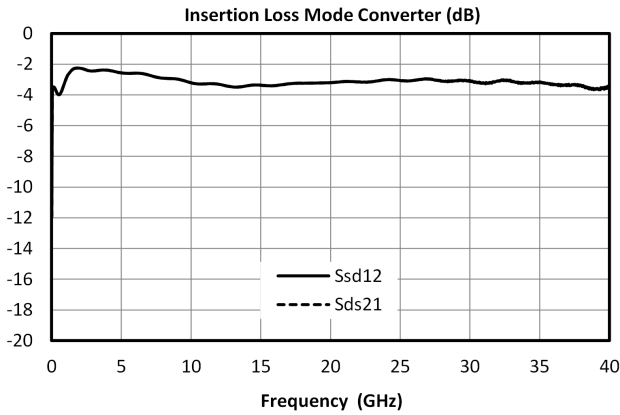
Electrical Specifications

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 | - | 0.01 | 40 | - | 0.25 | 1 | dB |
| Common Mode Rejection | - | 0.01 | 40 | 20 | 38 | - | dB |
| Insertion Loss as a Mode Converter | - | 0.01 | 40 | - | 3 | 6 | dB |
| Isolation | - | 0.01 | 40 | - | 5 | - | dB |
| Nominal Phase Shift | - | 0.01 | 40 | - | 180 | - | ° |
| Phase Balance | - | 0.01 | 40 | - | 2 | 10 | ° |
| Return Loss (Common) | - | 0.01 | 40 | - | 17 | - | dB |
| Return Loss (Output) | - | 0.01 | 40 | - | 10 | - | dB |
| Impedance | - | - | - | - | 50 | - | Ω |
| Impedance Ratio | - | - | - | - | 2:1 | - | |

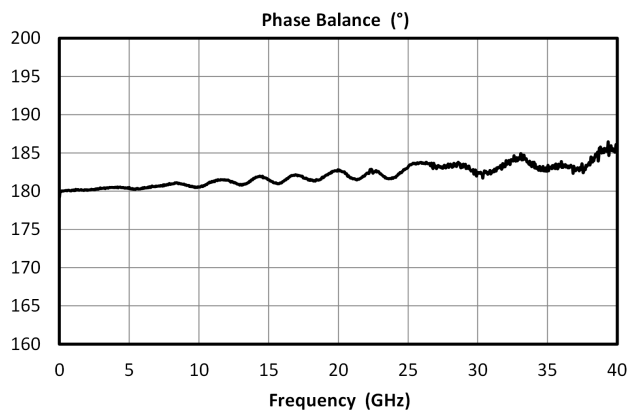
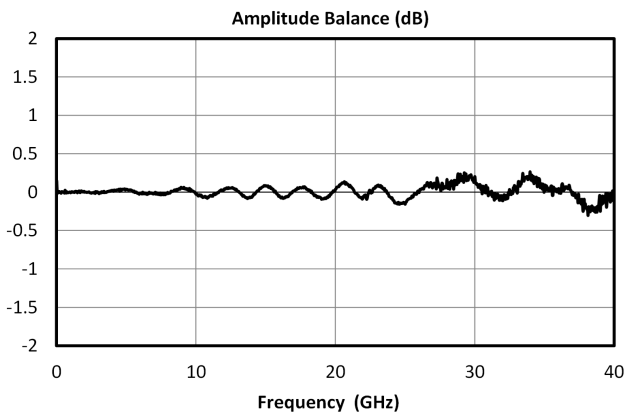
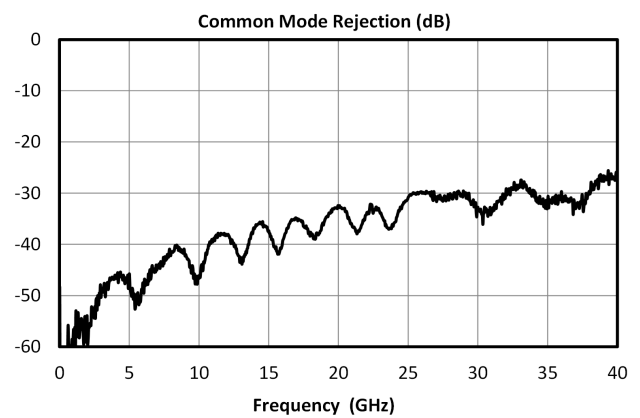
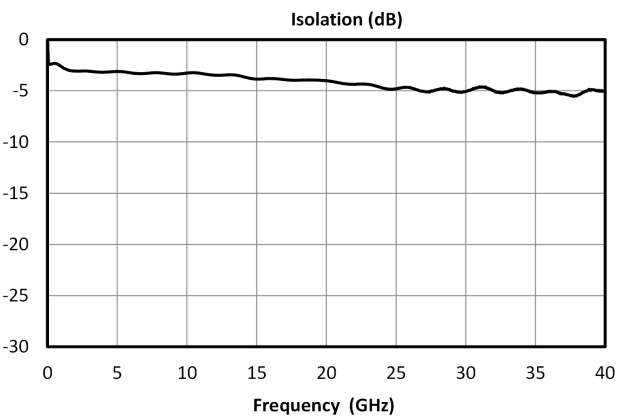
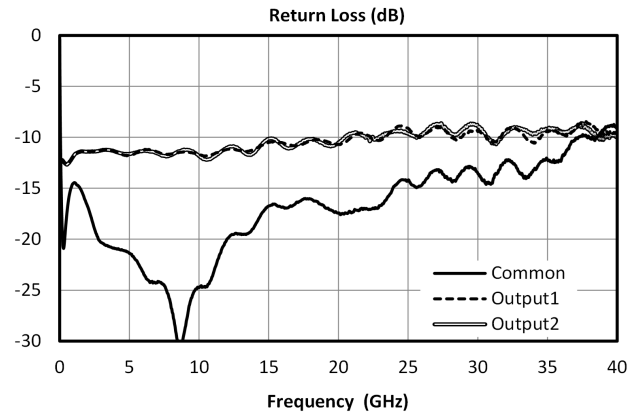
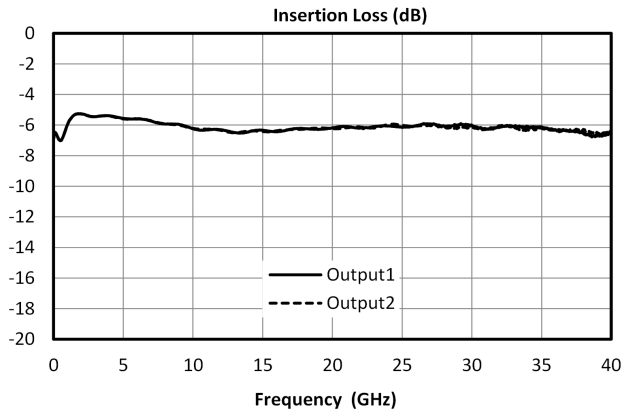
Typical Mixed Mode Performance Plots

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.



Typical Performance Plots

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

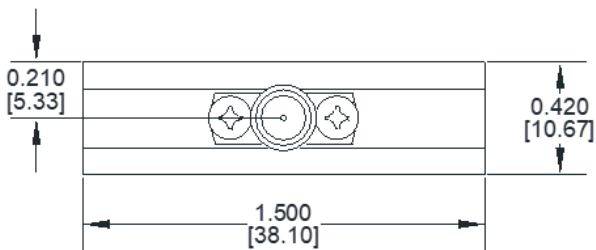
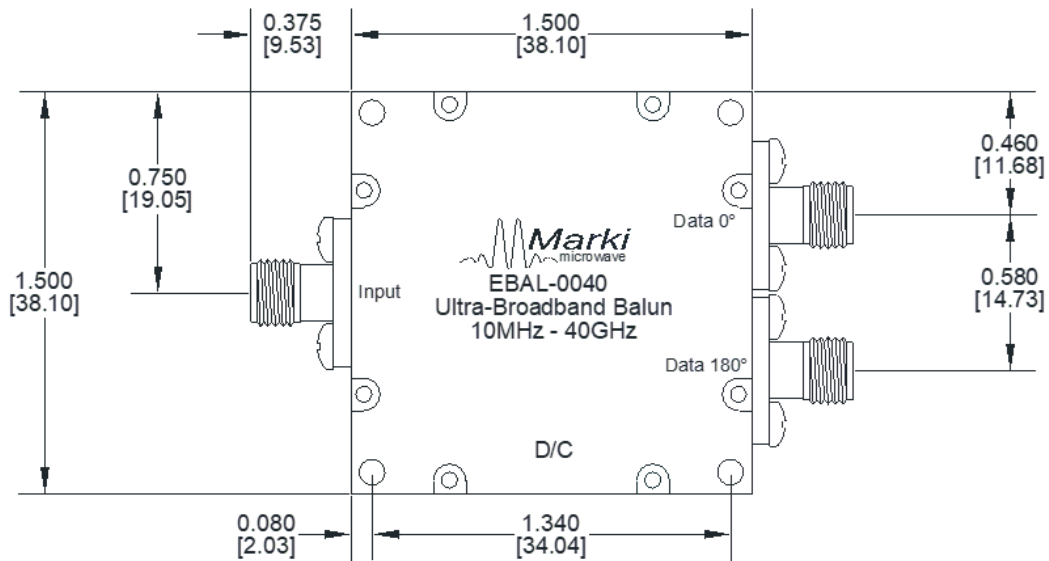


Mechanical Data

Outline Drawing

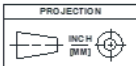
Download : [Outline 2D Drawing](#) | [Outline 3D Drawing](#) | [Outline 3D STP](#)

All measurements are typical



Note: Connectors are not removable. Do not attempt replacing.

| Port | Connector Type |
|-------|----------------|
| 1,2,3 | 2.92 mm Female |



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