

BAL-0020SLG

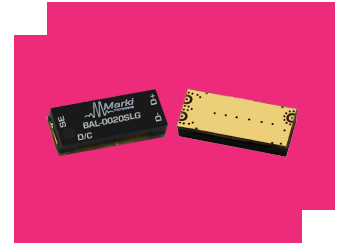
Surface-Mount Broadband Balun

DEVICE OVERVIEW

General Description

The BAL-0020SLG is a broadband surface mount balun, hand-tuned for optimal phase and amplitude balance over a 10 MHz to 20 GHz bandwidth. It serves as an excellent choice for analog to digital converters, balanced receivers, baseband digital modulations, and signal integrity enhancement.

[Download s-parameters here](#)



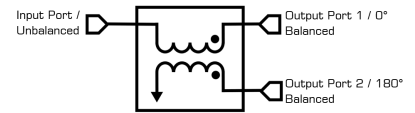
Features

- 2:1 Impedance Ratio
- 10 MHz to 20 GHz Balun (Balanced to Unbalanced Transformer)
- Transforms 50 Ω Input to 100 Ω Differential (50 Ohm Single) Output
- Tuned for Optimal Phase/Amplitude Balance

Applications

- Analog to Digital Converters
- Balanced Receivers
- Baseband Digital Modulation
- Signal Integrity

Functional Block Diagram



Part Ordering Options

| Part Number | Description | Package | Green Status | Product Lifecycle | Export Classification |
|----------------------|---|---------|---------------|-------------------|-----------------------|
| BAL-0020SLG | Surface-Mount Broadband Balun | SLG | REACH RoHS | Released | EAR99 |
| <u>EVAL-BAL-0020</u> | Evaluation Board, Surface-Mount Broadband Balun | EVAL | REACH RoHS | Released | EAR99 |

Table Of Contents

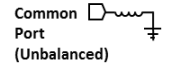
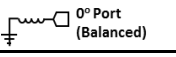
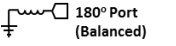
- **Device Overview**
 - General Description
 - Features
 - Applications
 - Functional Block Diagram
- **Port Configuration and Functions**
 - Port Functions
- **Revision History**
- **Specifications**
 - Absolute Maximum Ratings
 - Package Information
 - Electrical Specifications
 - Mixed Mode Scattering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

Revision History

| Revision Code | Revision Date | Comment |
|---------------|---------------|--|
| - | 2020-09-01 | Initial Release |
| A | 2021-05-01 | Temp data & insertion loss spec change |
| B | 2021-11-01 | Side vent Slot size reduced to 0.146 inch / 3.71 mm was 0.360 inches / 9.14 mm long. See Surface Mount Outline Drawing |
| C | 2024-04-08 | Updated Electrical Specifications minimum frequencies |
| D | 2025-02-14 | Updated Spread IL Mode Converter and Phase Balance Plot |
| E | 2025-07-29 | Power handling |

Port Configuration and Functions

Port Functions

| Port | Function | Description | DC Equivalent Circuit |
|-------------------------------|-----------|--|---|
| Common Port / In (Unbalanced) | RF Input | The common port is DC short to ground. |  |
| Out 1 / 0° Port (Balanced) | 0° Port | The 0° port is DC short to ground. |  |
| Out 2 / 180° Port (Balanced) | 180° Port | The 180° port is DC short to ground. |  |

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 |
| RF Power Handling | 30 | dBm |

Package Information

| Parameter | Details | Rating |
|----------------------------|---------|-----------------|
| Dimensions | - | 5.08 x 12.70 mm |
| Moisture Sensitivity Level | - | MSL 1 |

Electrical Specifications

Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

| Parameter | Test Conditions | Minimum Frequency (GHz) | Maximum Frequency (GHz) | Min | Typ | Max | Unit |
|------------------------------------|-----------------|-------------------------|-------------------------|-----|-----|-----|------|
| Amplitude Balance | - | 0.01 | 20 | - | 0.4 | 1.2 | dB |
| Common Mode Rejection | - | 0.01 | 20 | 22 | 35 | - | dB |
| Insertion Loss as a Mode Converter | - | 16 | 20 | - | 5 | 8 | dB |
| Insertion Loss as a Mode Converter | - | 0.01 | 16 | - | 4.5 | 7 | dB |
| Isolation | - | 0.01 | 20 | - | 12 | - | dB |
| Nominal Phase Shift | - | 0.01 | 20 | - | 180 | - | ° |
| Phase Balance | - | 0.01 | 20 | - | 5 | 10 | ° |
| VSWR (Common) | - | 0.01 | 20 | - | 1.5 | - | |
| VSWR (Output) | - | 0.01 | 20 | - | 1.6 | - | |
| 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: Sds21 is the differential output response given a single ended input.

Sdd22: differential return loss of the differential port driven with a differential signal

Sdc22: differential return loss of the differential port driven with a common signal

Sds21: insertion loss from a single ended input to a differential output

Scs22: common mode return loss of the differential port driven with a common signal

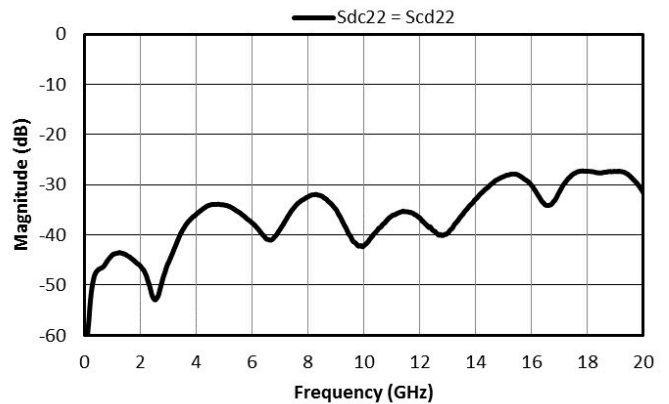
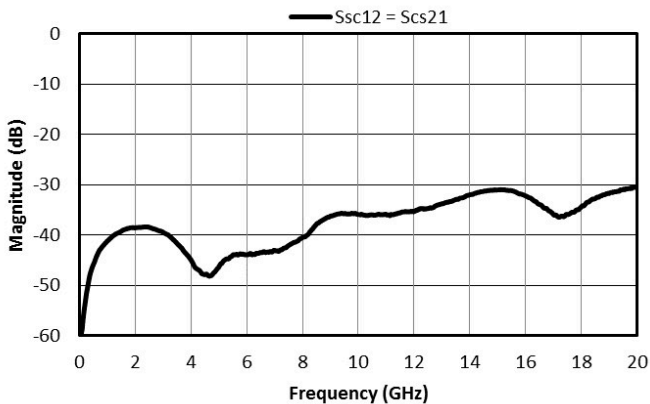
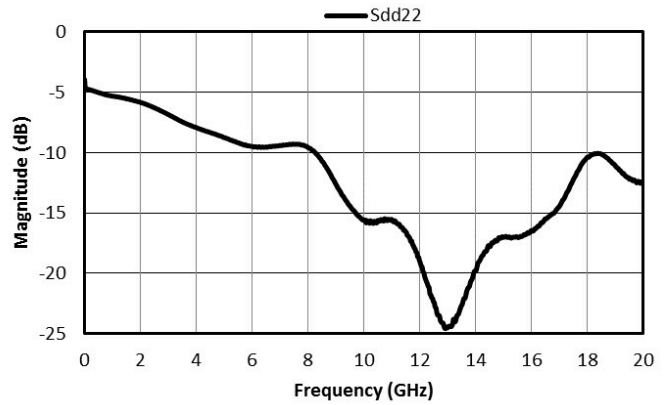
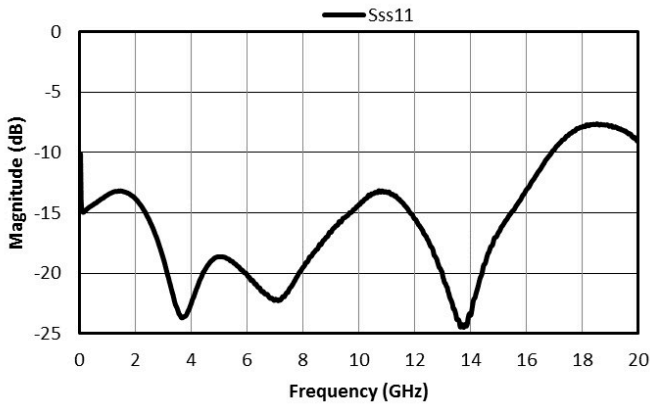
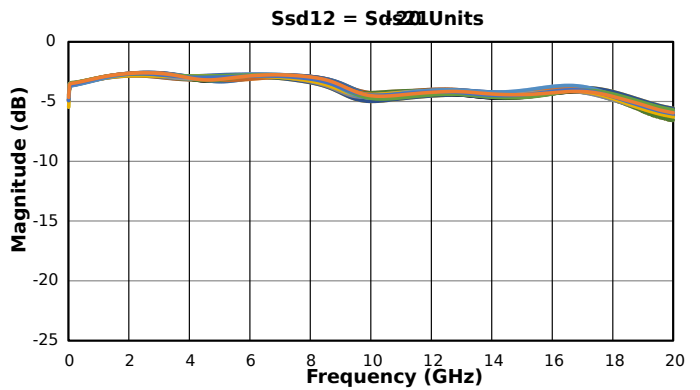
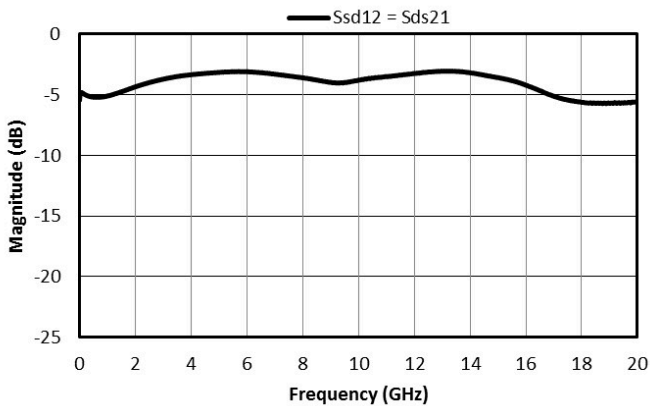
Scd22: common mode return loss of the differential port driven with a differential signal

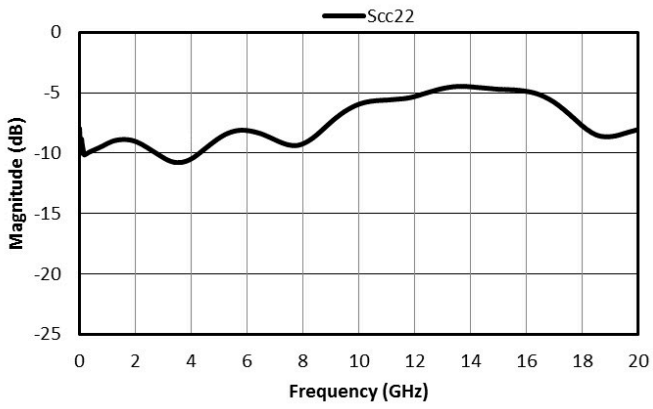
Scs21: insertion loss from a single ended input to a common output

Sss11: single ended return loss

Ssd12: insertion loss from a differential signal to single ended output

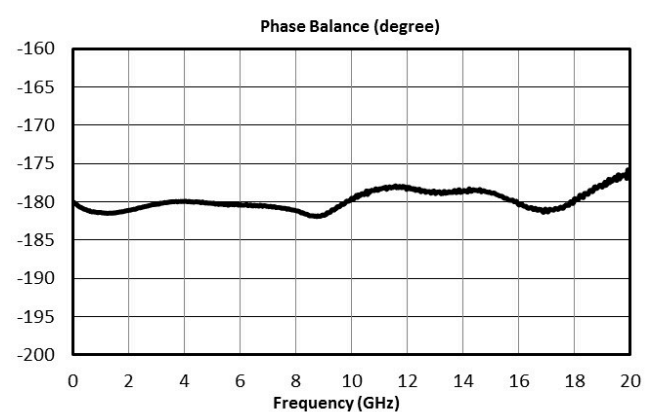
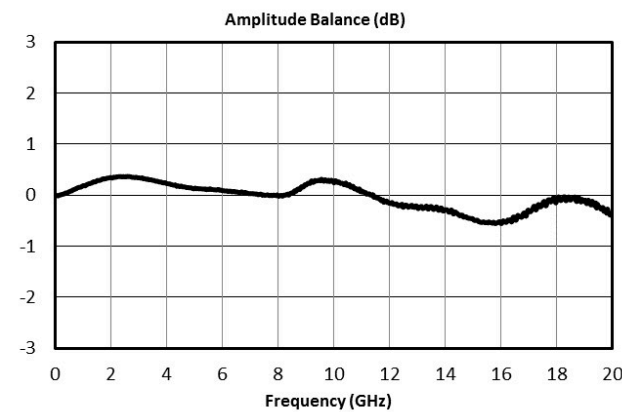
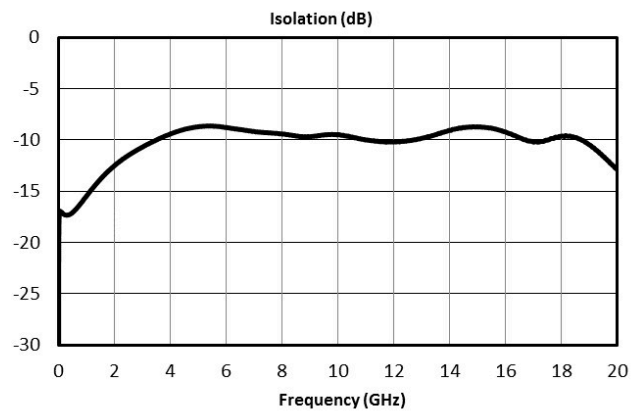
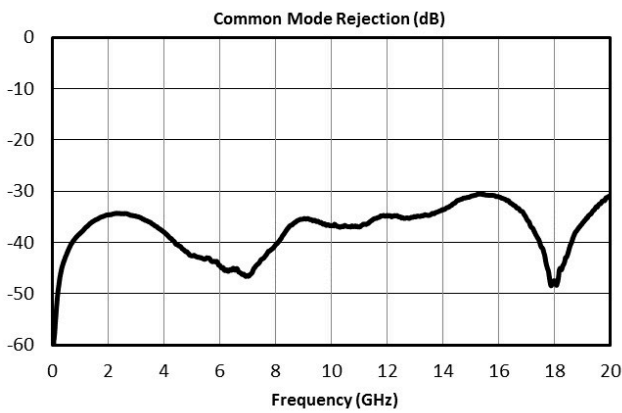
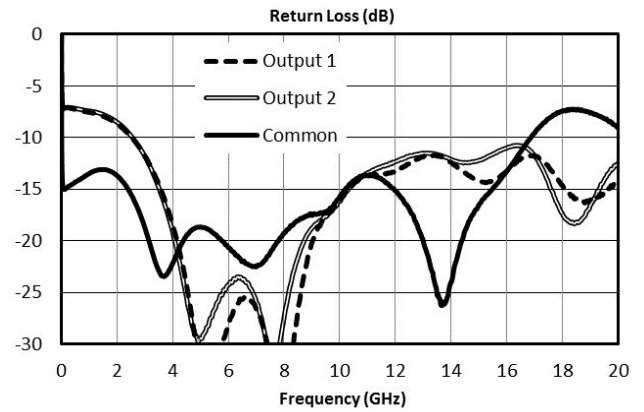
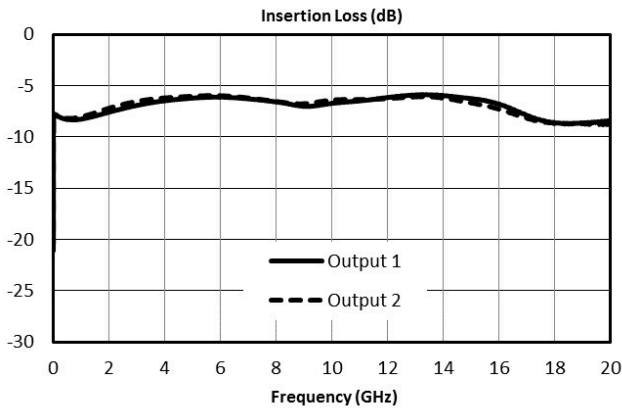
Ssc12: insertion loss from a common signal to single ended output

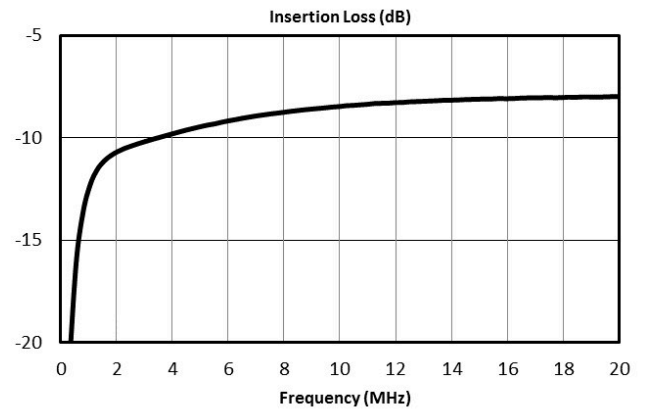
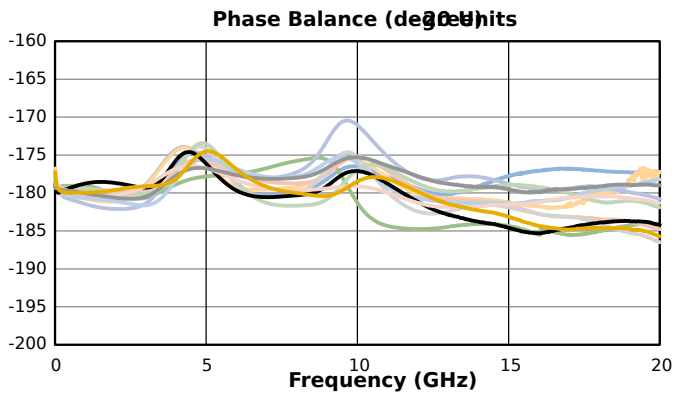




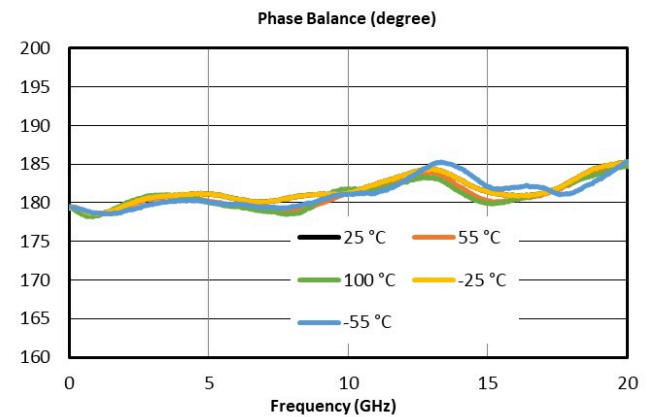
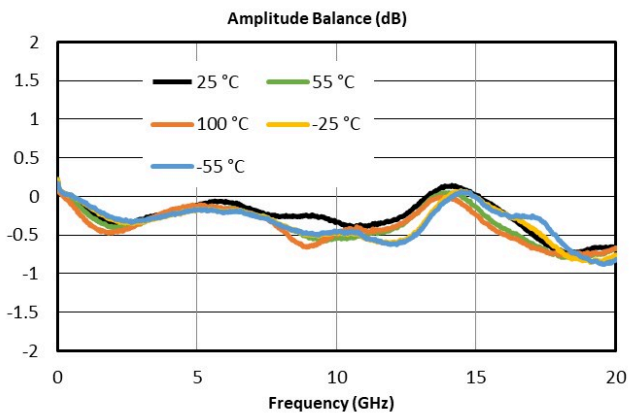
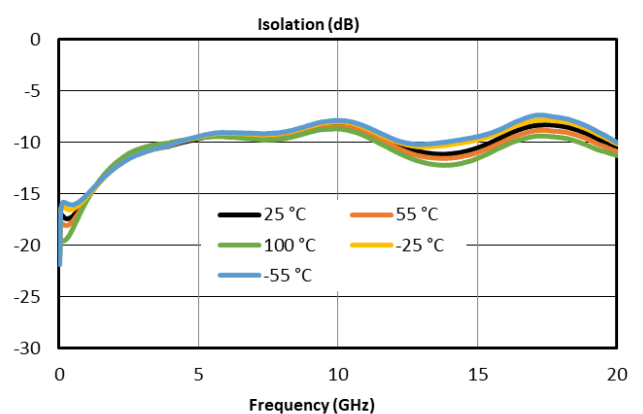
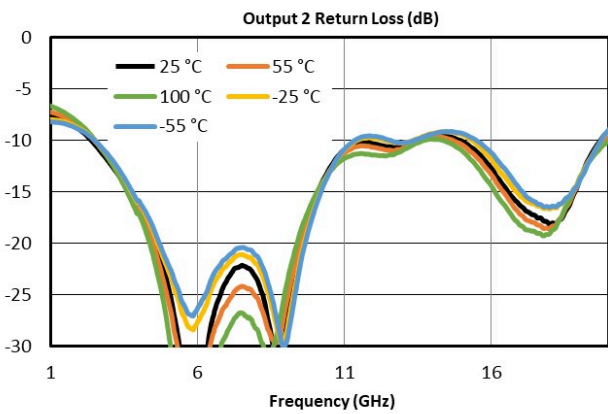
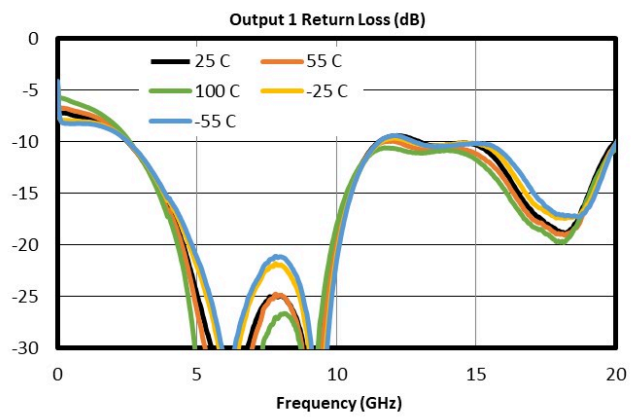
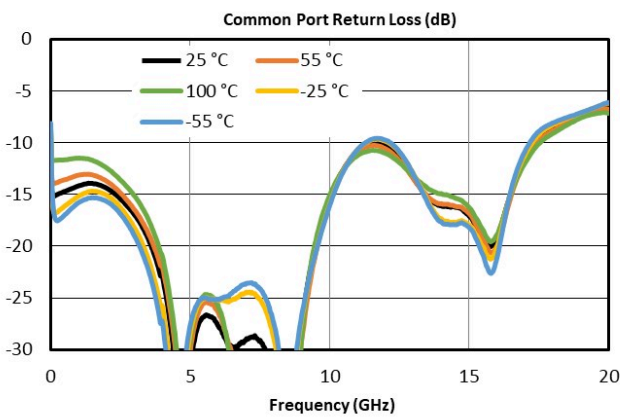
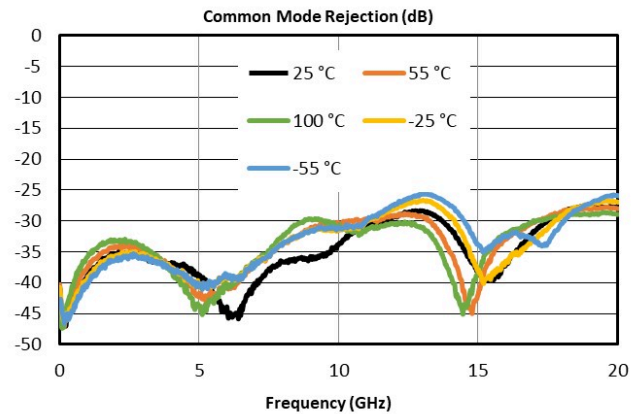
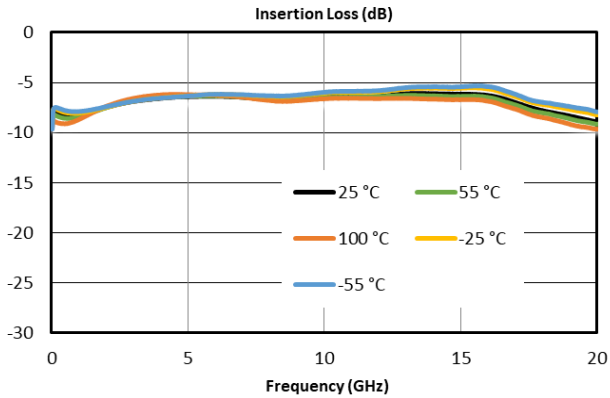
Typical Performance Scattering Parameter

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





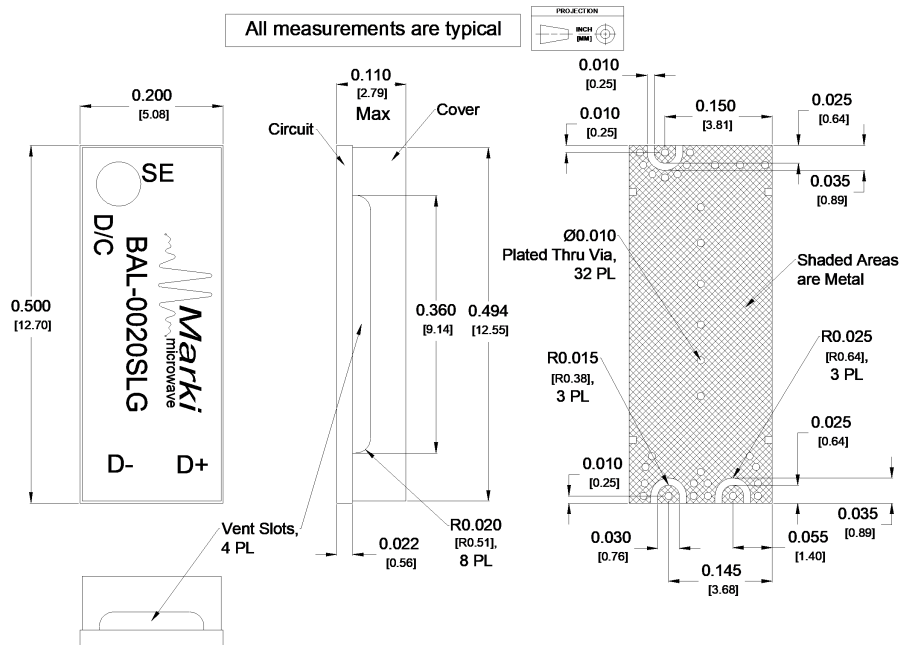
Typical Performance over Temperature



Mechanical Data

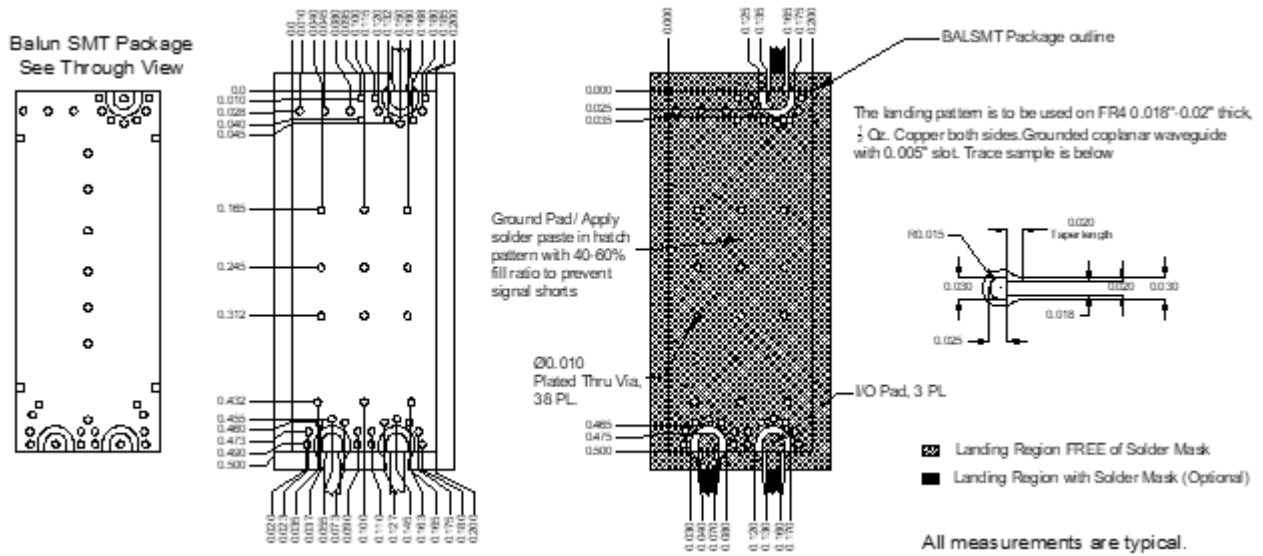
Outline Drawing

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



Footprint Image

Download : [Footprint Drawing](#)

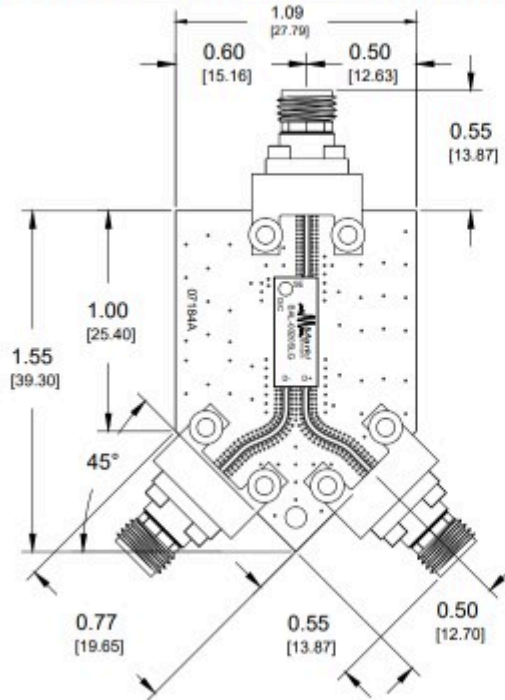


Evaluation Board - Performance Data

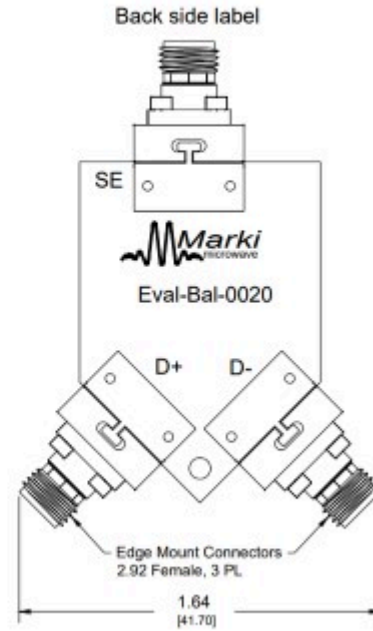
| Parameter | Test Conditions | Frequency Range (GHz) | Min | Typ | Max | Unit |
|-----------------|-----------------|-----------------------|-----|-----|-----|------|
| Impedance Ratio | - | - | - | 2 | - | |

Evaluation Board - Outline Drawing

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



All measurements are typical



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