

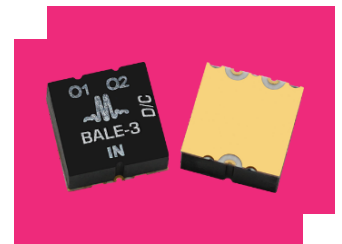
# BALE-0003SMG

## BROADBAND SURFACE MOUNT BALUN

### DEVICE OVERVIEW

#### General Description

The BALE-0003SMG is a surface-mount broadband balun, hand-tuned for optimal phase and amplitude balance over 10 MHz to 3 GHz bandwidth. Designed for high volume production with cost optimization in mind, it serves as an excellent choice for analog to digital converters, balanced receivers, baseband digital modulations, and signal integrity enhancement. If lower frequency operation is required, the BAL-0003SMG offers performance down to 500 kHz in the same package.



[Download s-parameters here](#)

#### Features

§ 10MHz to 3 GHz 1:2 Balun  
 (Balanced to Unbalanced Transformer)

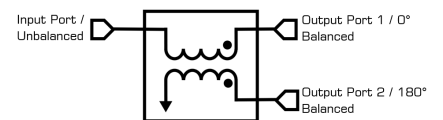
§ Transforms 50Ω to 100Ω  
 Differential Output

§ 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 | Packing Size | Green Status | Product Lifecycle | Export Classification |
|--------------|-------------------------------|---------|--------------|--------------|-------------------|-----------------------|
| BALE-0003SMG | BROADBAND SURFACE MOUNT BALUN | SMG     | -            | RoHS         | Released          | EAR99                 |

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## Revision History

| Revision Code | Revision Date | Comment                   |
|---------------|---------------|---------------------------|
| -             | 2023-07-01    | Datasheet Initial Release |

## Specifications

### Absolute Maximum Ratings

| Parameter                     | Maximum Rating | Unit |
|-------------------------------|----------------|------|
| DC Current                    | 1              | A    |
| 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 | -       | 8.13x8.13mm |

### Electrical Specifications

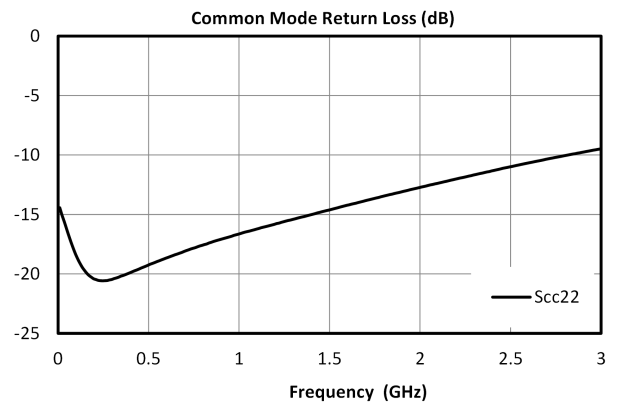
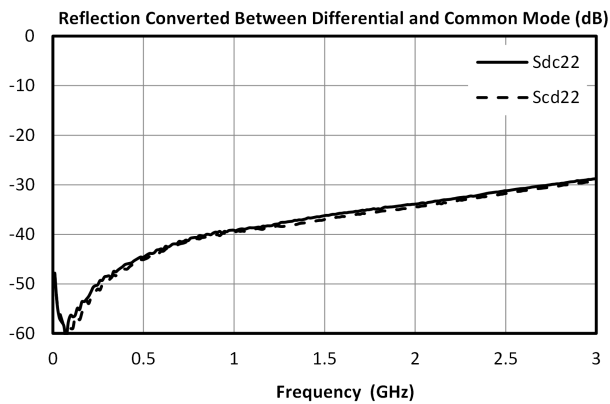
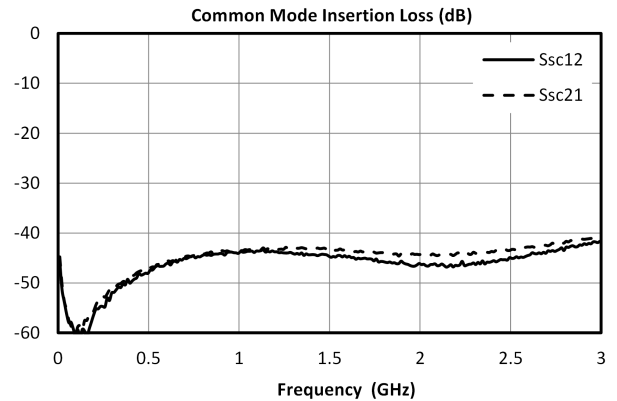
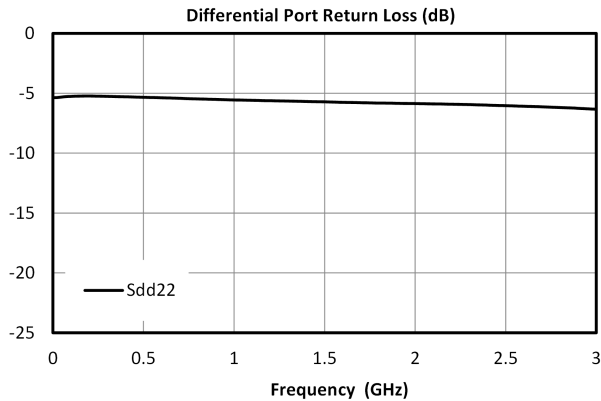
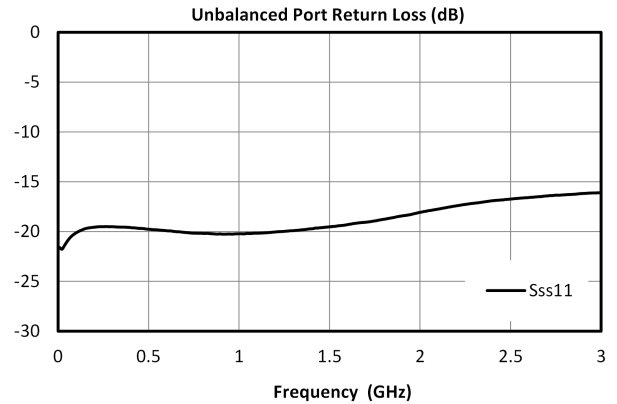
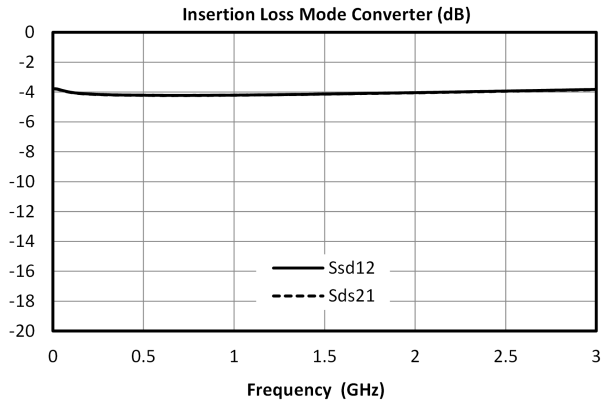
Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

| Parameter                          | Test Conditions | Minimum Frequency (GHz) | Maximum Frequency (GHz) | Min | Typ | Max | Unit |
|------------------------------------|-----------------|-------------------------|-------------------------|-----|-----|-----|------|
| Insertion Loss as a Mode Converter | -               | 0.01                    | 3                       | -   | 4   | 5   | dB   |
| Nominal Phase Shift                | -               | 0.01                    | 3                       | -   | 180 | -   | °    |
| Amplitude Balance                  | -               | 0.01                    | 3                       | -   | 0.2 | 0.8 | dB   |
| Phase Balance                      | -               | 0.01                    | 3                       | -   | 1   | 4.5 | °    |
| Common Mode Rejection              | -               | 0.01                    | 3                       | 30  | 42  | -   | dB   |
| Isolation                          | -               | 0.01                    | 3                       | -   | 9   | -   | dB   |
| Impedance                          | -               | -                       | -                       | -   | 50  | -   | Ω    |
| Return Loss (Common)               | -               | 0.01                    | 3                       | -   | 19  | -   | dB   |
| Return Loss (Output)               | -               | 0.01                    | 3                       | -   | 15  | -   | dB   |

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

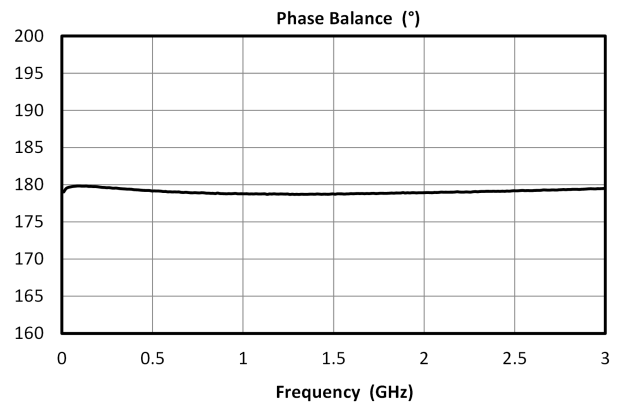
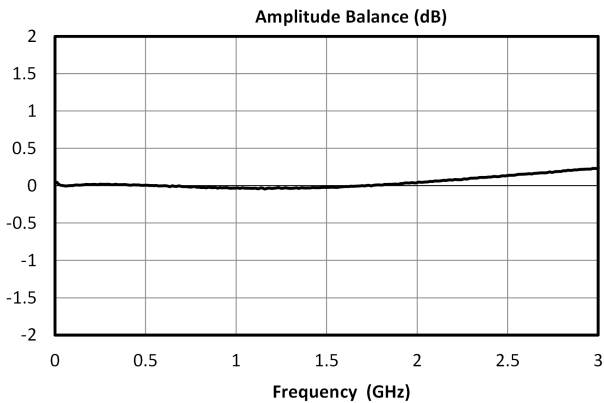
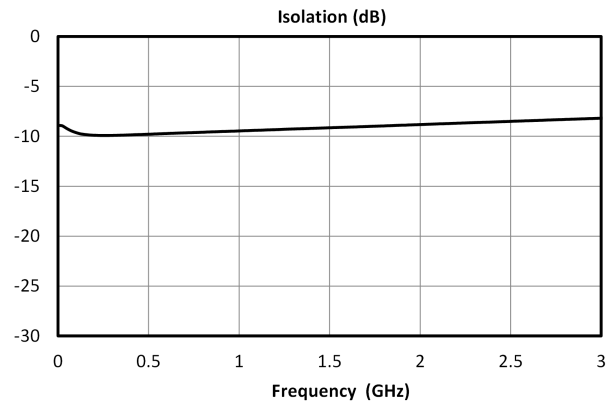
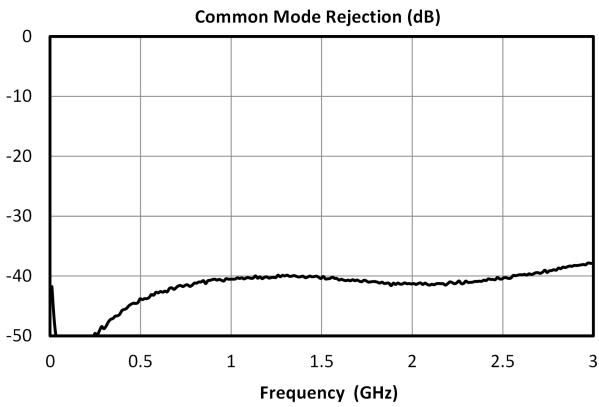
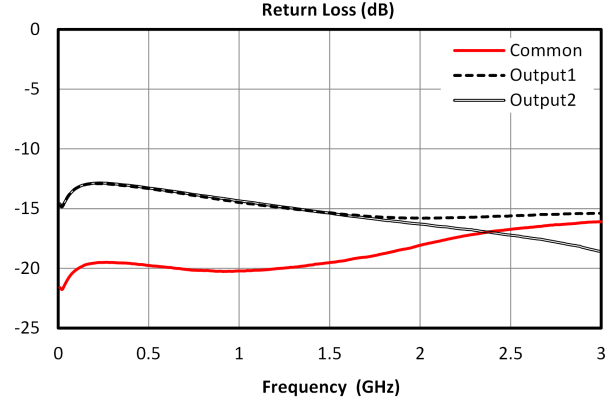
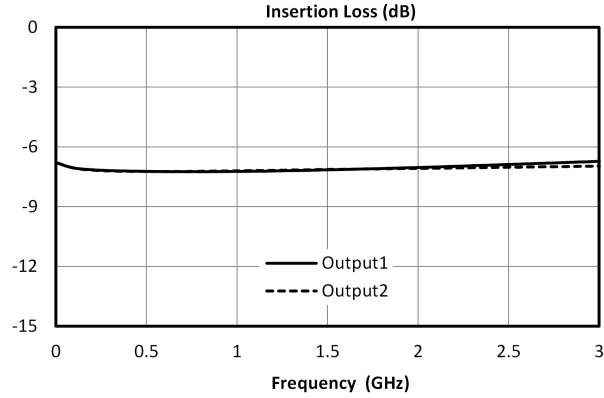
### Typical Mixed Mode Performance Plots

Mixed mode scattering parameters are used to characterize differential circuits. For Jbaluns, 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. Sds21 is the differential output response given a single ended input.



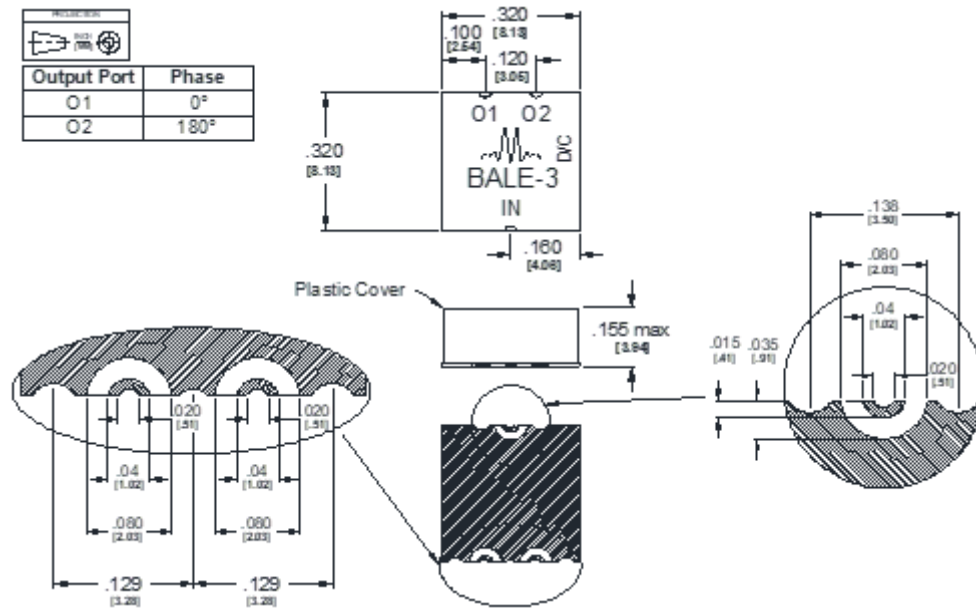
## Typical Performance Plots

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

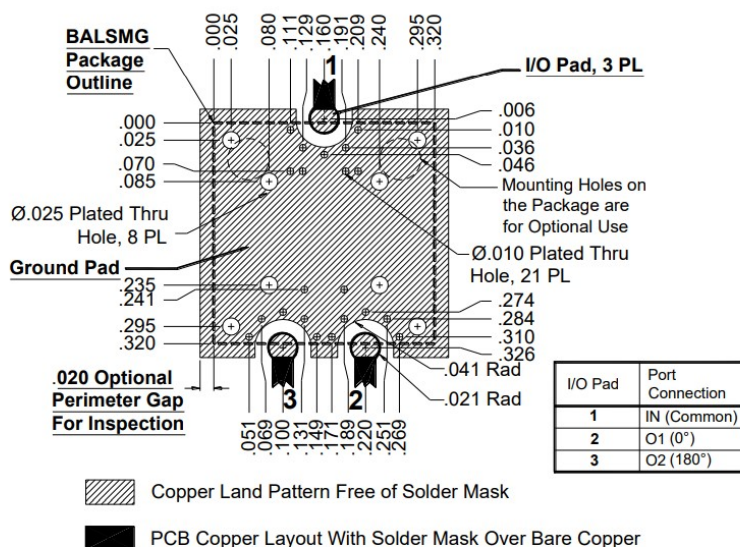


**Mechanical Data**

**Outline Drawing**



**Footprint Image**



**Note:** Trace widths shown are for Rogers RO5880/Taconic TLY-5, .010" thick, ½ Oz copper. Widths may need to be modified for other materials.



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