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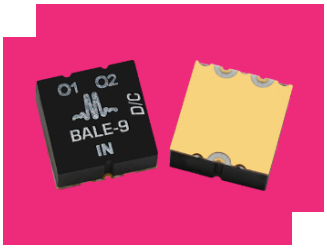
BALE-0009SMG

BROADBAND SURFACE MOUNT BALUN

DEVICE OVERVIEW

General Description

The BALE-0009SMG is a surface-mount broadband balun, hand-tuned for optimal phase and amplitude balance over 10 MHz to 9 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-0009SMG offers performance down to 500 kHz in the same package.



Download s-parameters here

Features

§ 10MHz to 9GHz 1:2 Balun (Balanced to Unbalanced Transformer)

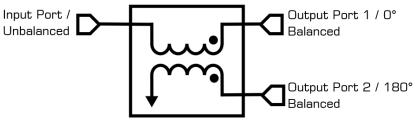
§ Transforms 50Ω to 100Ω Differential Output

§ 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-0009SMG	BROADBAND SURFACE MOUNT BALUN	SMG	-	RoHS	Released	EAR99

Table Of Contents

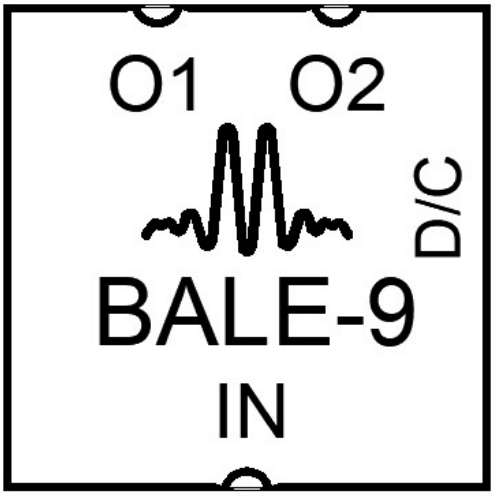
Revision History

Revision Code	Revision Date	Comment
-	2023-07-03	Datasheet Initial Release

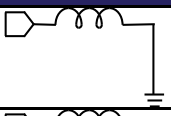
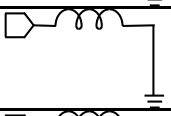
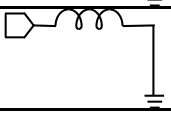
Port Configuration and Functions

Port Diagram

A top-down view of the BALE-0003SMG 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	Description	Equivalent Circuit for Package
Common Port / In (Unbalanced)	RF Input	The common port is DC short to ground.	
Out 1 / 0° Port (Balanced)	0° Port	The 0o port is DC short to ground.	
Out 2 / 180° Port (Balanced)	180° Port	The 180o port is DC short to ground.	

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

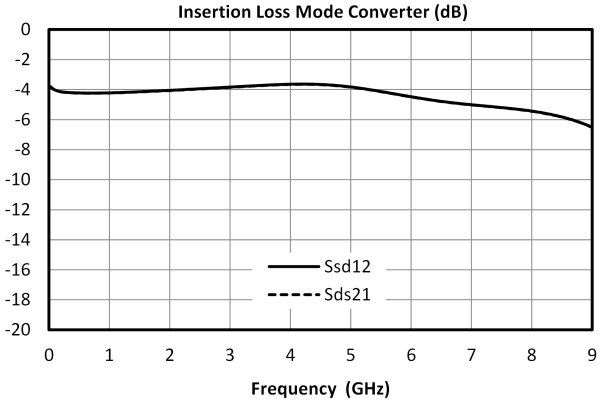
Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

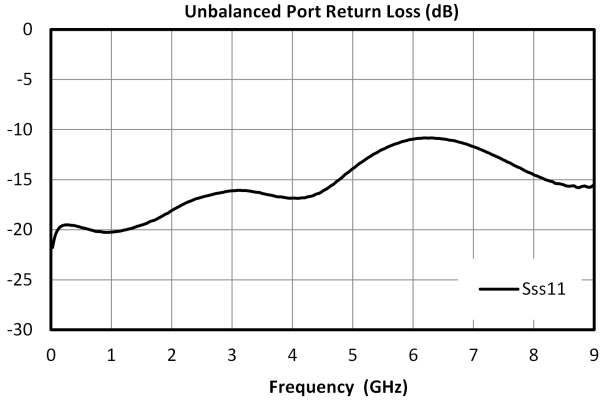
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss as a Mode Converter	-	0.01	9	-	4.5	7	dB
Nominal Phase Shift	-	0.01	9	-	180	-	°
Amplitude Balance	-	0.01	9	-	0.5	1.6	dB
Phase Balance	-	0.01	9	-	0.4	12	°
Common Mode Rejection	-	0.01	9	22	36	-	dB
Isolation	-	0.01	9	-	9	-	dB
Impedance	-	-	-	-	50	-	Ω
Return Loss (Common)	-	0.01	9	-	16	-	dB
Return Loss (Output)	-	0.01	9	-	19	-	dB

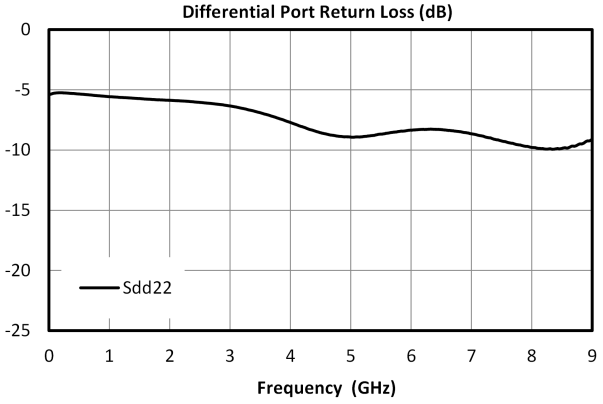
Electrical Specifications - Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

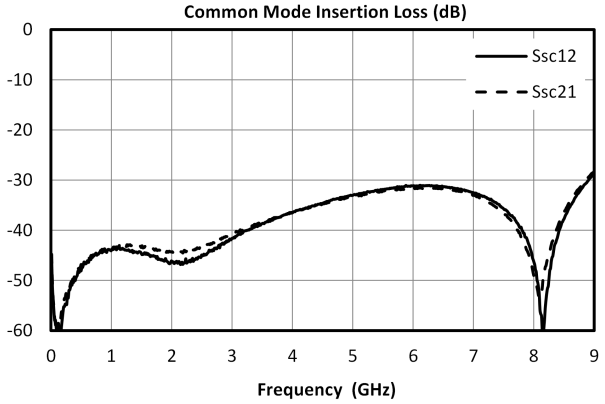
Typical Mixed Mode Performance Plots

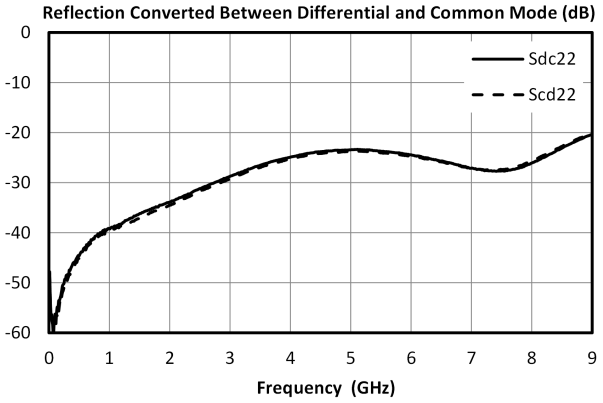
Mixed mode scattering parameters are used to characterize differential circuits. For baluns, this means that the 0° and 180° ports become a single 100Ω differential port and the common port remains the same 50Ω common port. The two-port s-parameters of the balun are then characterized based on differential (d), common mode (c), or single-ended (s) signals. Sds21 is the differential output response given a single ended input.

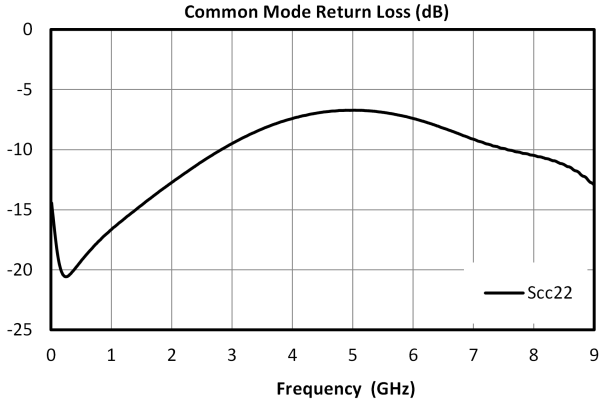






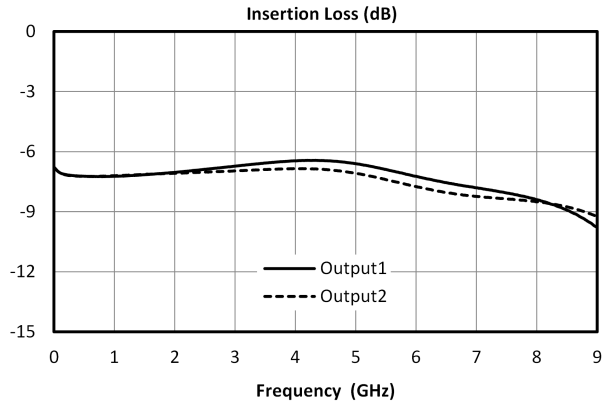


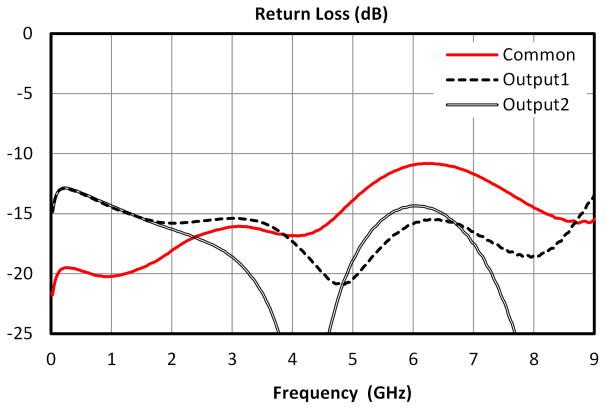


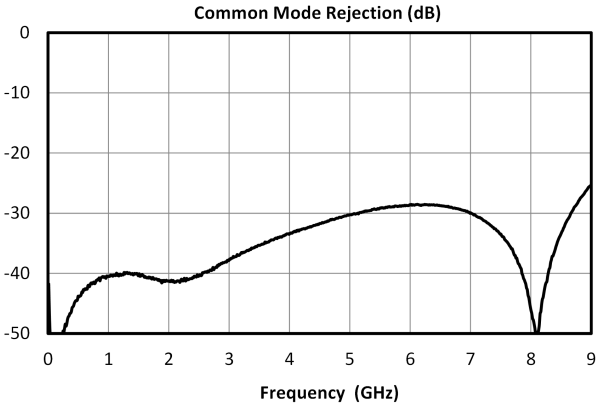


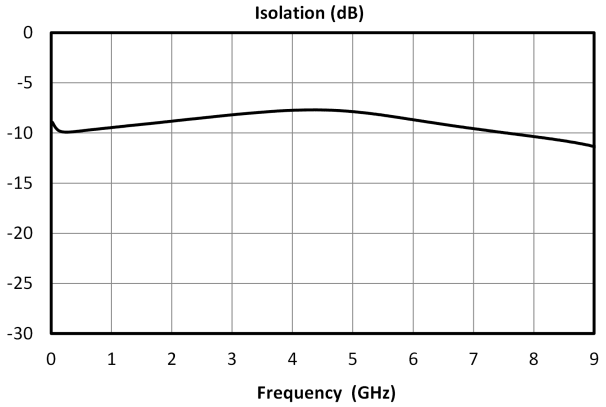
Typical Performance Plots

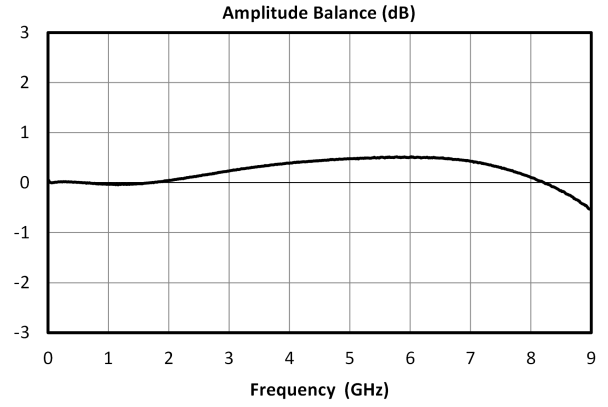
Three port scattering parameters measured as three single-ended 50Ω ports showing relationship between any two ports.

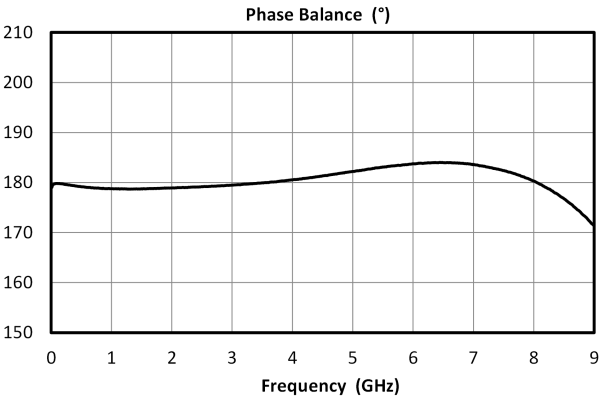






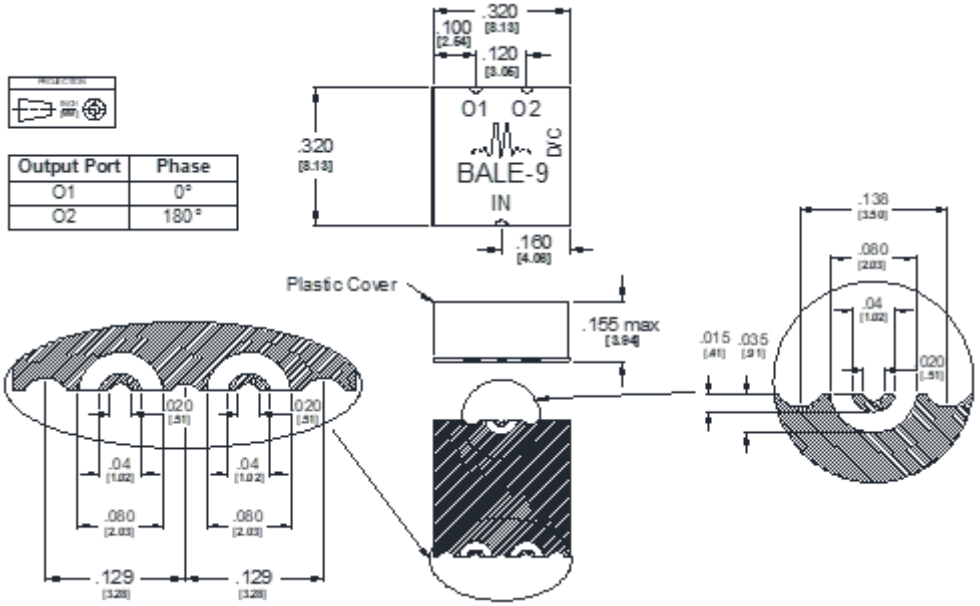






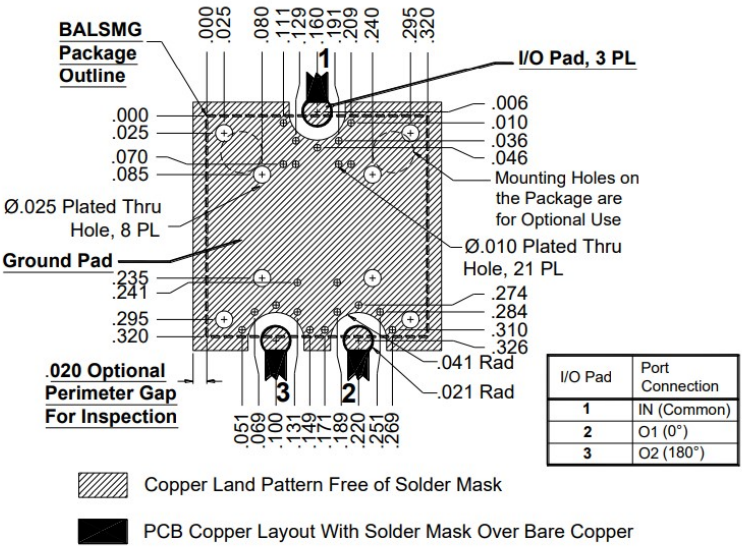
Mechanical Data

Outline Drawing



Output Port	Phase
O1	0°
O2	180°

Footprint Image



I/O Pad	Port Connection
1	IN (Common)
2	O1 (0°)
3	O2 (180°)

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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