LEAD-FREE / RoHS-COMPLIANT

SURFACE-MOUNT BROADBAND BALUN BAL-0009SMG

Features

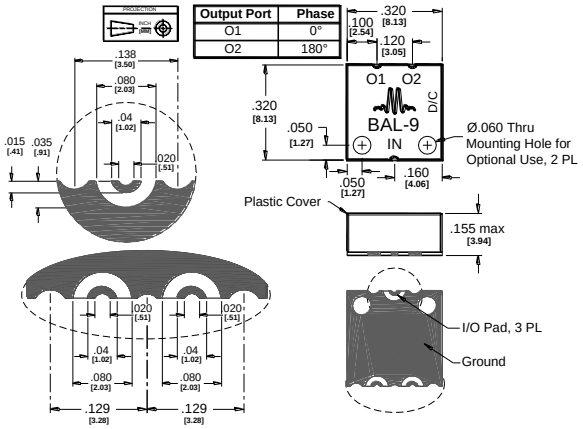
- 500 kHz to 9 GHz 1:2 Balun (Balanced to Unbalanced Transformer)
- Transforms 50 Ω Input to 100 Ω Differential (50 Ohm Single) Output
- Tuned for Optimal Phase/Amplitude Balance
- Applications: Analog to Digital Converters, Balanced Receivers, Baseband Digital Modulation, Signal Integrity
- BAL-0009SMG.s3p

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

Parameter	Frequency Range	Min	Typ	Max
Nominal Insertion Loss (dB)	500 kHz to 9 GHz		6	
Nominal Phase Shift (Degrees)			180	
Amplitude Balance (dB)			±0.6	±1.6
Phase Balance (Degrees)			±5	±12
Common Mode Rejection (dB)		18	26	
Excess Insertion Loss (dB)[1]			1.5	3.5
Isolation (dB)			8	
VSWR			1.5	
Total Input Power (W)				1
Risetime /Falltime (ps)[2]			16	

[1]Excess Insertion Loss = (Common Port to Output Port Insertion Loss) – 6 dB.
[2]Specified as 90%/10%. Calculated from $\tau_{balun}^2 = (\tau_{out}^2 - \tau_{in}^2)$

Model Number	Description
BAL-0009SMG	500 kHz to 9 GHz Balun, Surface Mount, LEAD-FREE/RoHS COMPLIANT
EVAL-BAL-0009	Connectorized Evaluation Fixture, LEAD-FREE/RoHS COMPLIANT



Substrate material is 8-mil thick Rogers 4003, 1 Oz Electrodeposited Cu. I/O Pads & Ground Plane Finish is Gold Flash, 5 to 10 µ-inches, over Electroplated Nickel, 100-200 µ-inches, over Cu. See BALSMG-PCB for suggested PCB layout.

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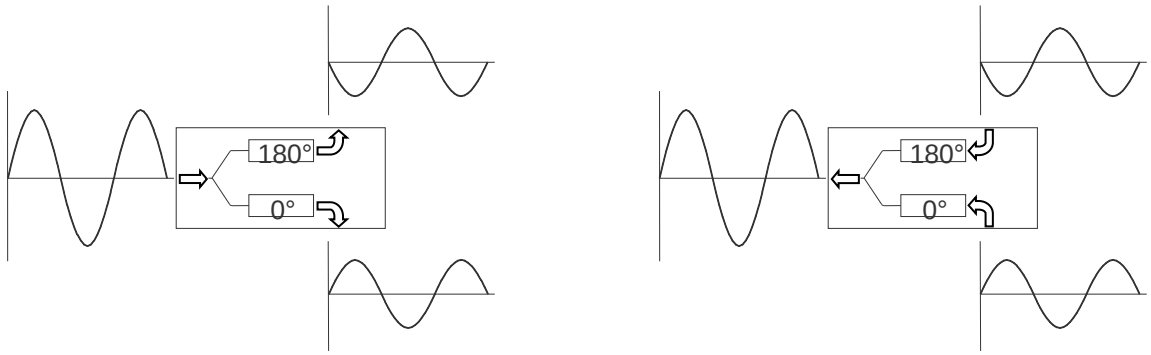
Block Diagram



Single ended to differential **Differential to single ended**

Typical Performance

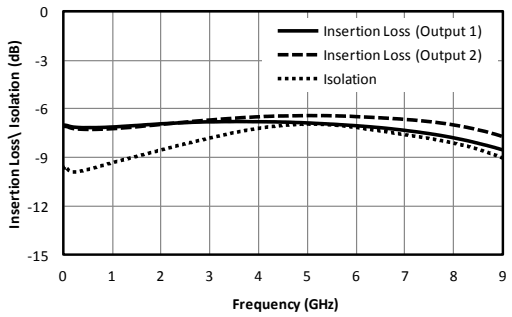


Fig. 1. Common to output port insertion loss and output to output port Isolation.

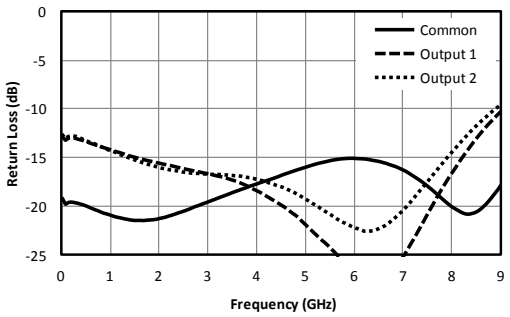


Fig. 2. Return loss for common port and output ports.

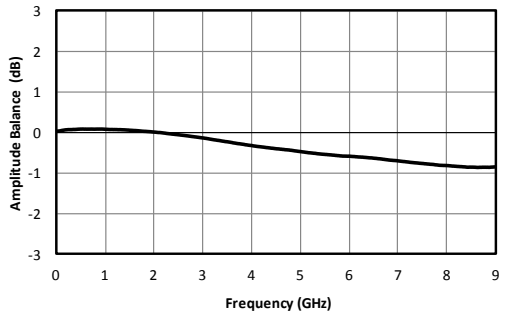


Fig. 3. Amplitude balance between output ports.

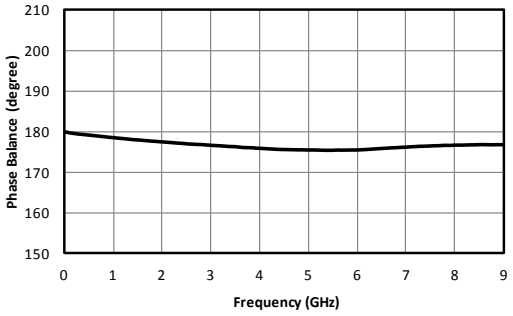


Fig. 4. Phase balance between output ports.

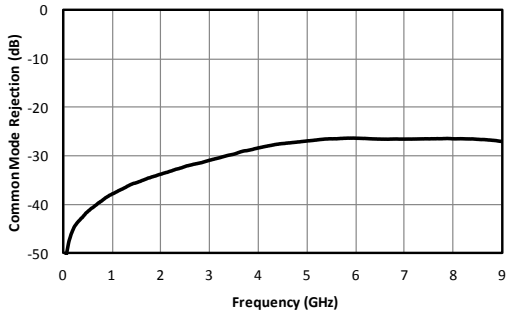


Fig. 5. Common mode rejection.

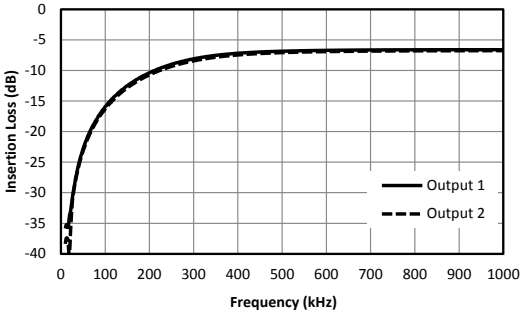


Fig. 6. Low Frequency Response

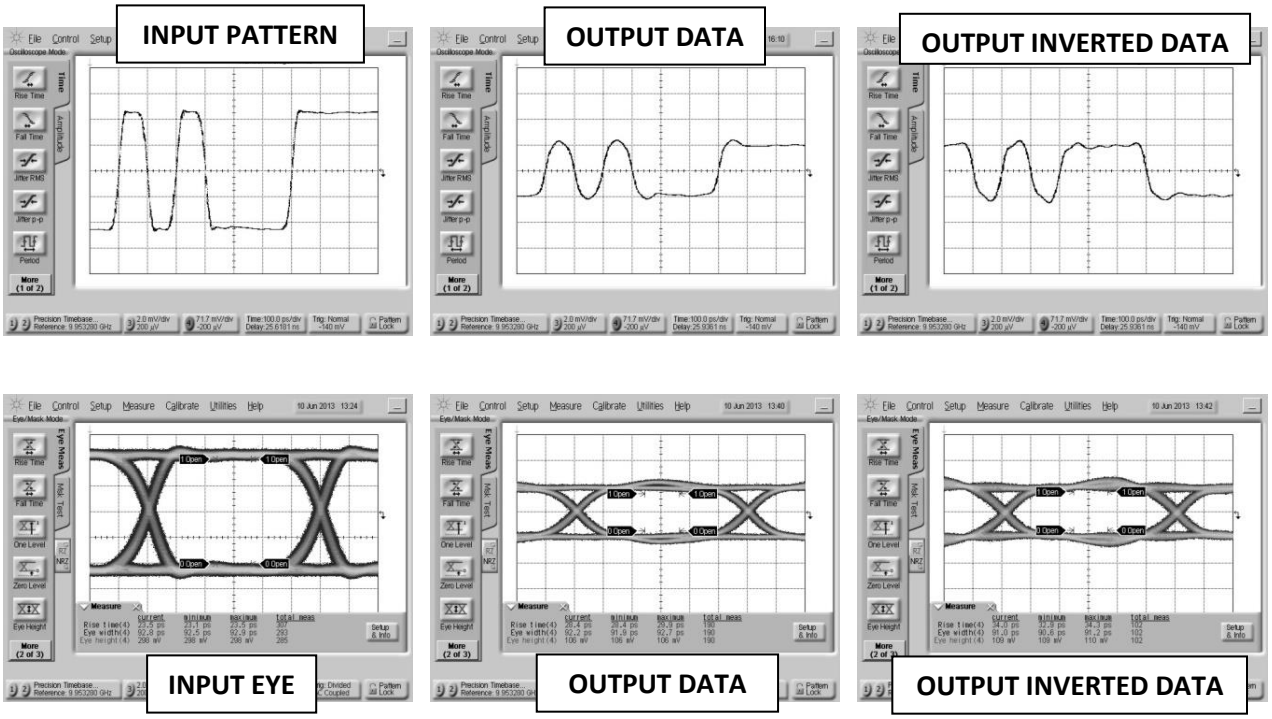
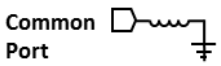
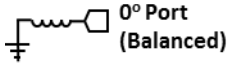


Fig. 6. Oscilloscope measurements of the BAL-0009SMG with a 10 Gb/s PRBS pattern. Bit pattern is measured with a 2^7-1 PRBS input demonstrating extremely good pulse fidelity for both inverted and non-inverted output. Eye diagrams are taken with a 2^{31}-1 PRBS input demonstrating minimal eye distortion/closure afforded by the extremely low frequency operation of the balun (<500 kHz).

DC Interface

Port	Description	DC Interface Schematic
Common Port / In (Unbalanced)	The common port is DC short to ground.	
Out 1 / 0° Port (Balanced)	The 0° port is DC short to ground.	
Out 2 / 180° Port (Balanced)	The 180° port is DC short to ground.