



LEAD-FREE / RoHS-COMPLIANT

SURFACE-MOUNT BROADBAND BALUN

BAL-0416SMG

The BAL-0416SMG is a Surface Mount Microlithic™ balun. As with all Microlithic™ baluns, it features excellent amplitude balance, phase balance, and common mode rejection across a broad bandwidth and in a miniaturized form factor. It has significant isolation, reducing the reflection of unwanted common mode signals. The BAL-0416SMG is a lead free, RoHS compliant package compatible with standard leaded and lead-free solder reflows. SMA connectorized evaluation packages are available. The BAL-0416SMG is an excellent choice for balanced amplifiers, clock distribution, and higher order Nyquist sampling in analog to digital converters



Features

- 4 GHz to 16 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, Balanced Amplifiers, Mixers, Clock Distribution, Signal Integrity
- [BAL-0416SMG.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)	4 GHz to 16 GHz		3	
Nominal Phase Shift (Degrees)			180	
Amplitude Balance (dB)			±0.4	±0.8
Phase Balance (Degrees)	4 GHz to 12 GHz		±1	±5
	12 GHz to 16 GHz		±6	±15
Common Mode Rejection (dB)	4 GHz to 12 GHz	25	35	
	12 GHz to 16 GHz	15	26	
Excess Insertion Loss (dB) ¹	4 GHz to 16 GHz		3.3	5
Isolation (dB)			15	
VSWR			2.5	5.5
Total Input Power (W)				1

¹Excess Insertion Loss = (Common Port to Output Port Insertion Loss) – 3 dB.

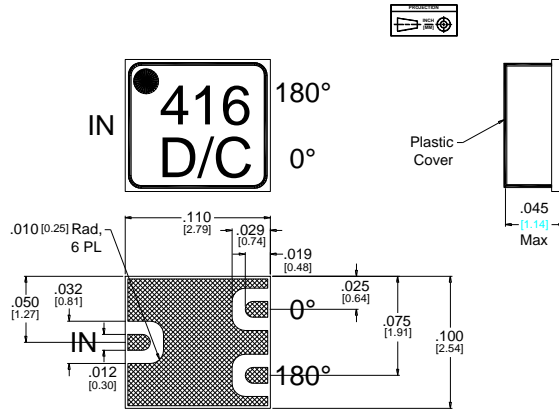
²Includes fixture losses.

Model Number	Description
BAL-0416SMG	4 GHz to 16 GHz Balun, Surface Mount, LEAD-FREE/RoHS COMPLIANT

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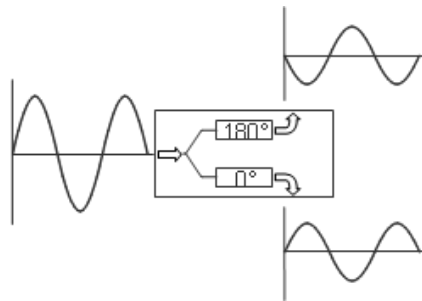
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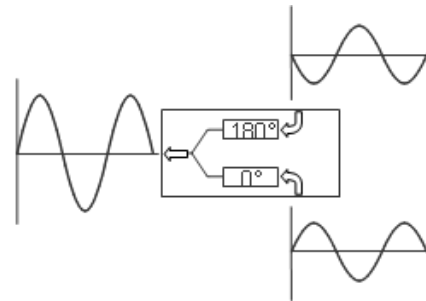


I/O traces and ground plane finish is TiW/NiAu, 0.5 microns Au max over 0.15 microns Ni.
See [BALSM-ML-PCB](#) for suggested PCB layout.

Block Diagram



Single ended to differential



Differential to single ended

Typical Performance

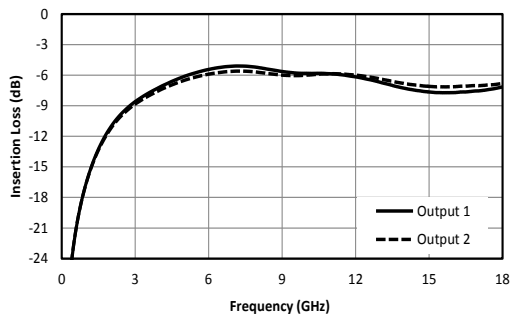


Fig. 1. Common to balanced port insertion loss¹

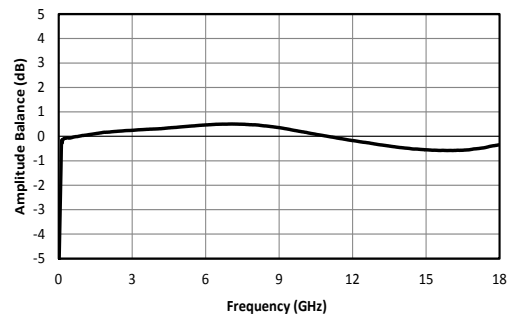


Fig. 2. Amplitude balance between balanced ports.

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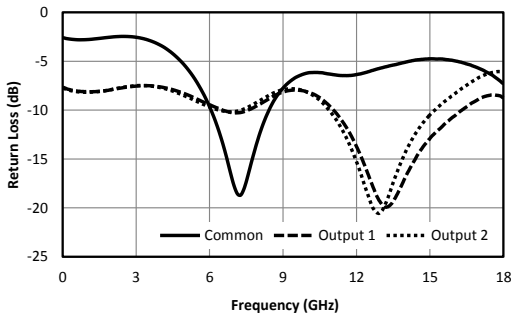


Fig. 3. Return loss for common port and balanced ports.

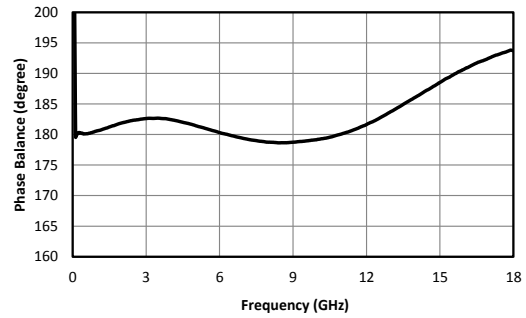


Fig. 4. Phase balance between balanced ports.

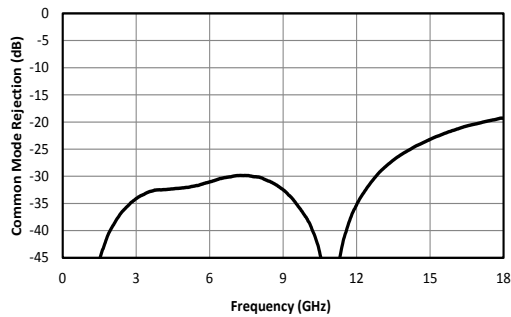


Fig. 5. Common mode rejection

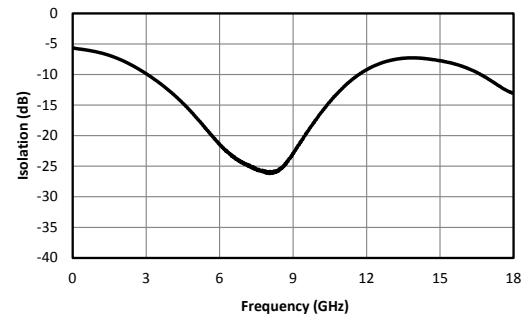
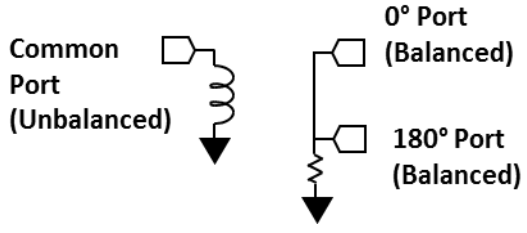


Fig. 6. Balanced port to balanced port isolation

¹Includes test fixture loss. Results are not de-embedded.

DC Interface

Port	Description	DC Interface Schematic
Common Port (Unbalanced)	The common port is DC short to ground.	
0° Port (Balanced)	The 0° port is DC short to the 180° port and passes through a resistor to ground.	
180° Port (Balanced)	The 180° port is DC short to the 0° port and passes through a resistor to ground.	

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