



## BROADBAND ISOLATION BALUN (300 kHz to 26.5 GHz)

**BAL-0026**

### Features

- 300 kHz to 26.5 GHz Balun (Balanced to Unbalanced Balun Transformer)
- 1:2 Transformer (50 Ω unbalanced, 100 Ω differential/50 Ω balanced port)
- Applications: Analog to Digital Converters, Balanced Receivers, Baseband Digital Modulation, Signal Integrity
- Termination insensitive: Particularly suited to testing poorly matched or non 50 Ω devices or for extending 2 port VNAs for differential testing
- [BAL-0026.s3p](#)

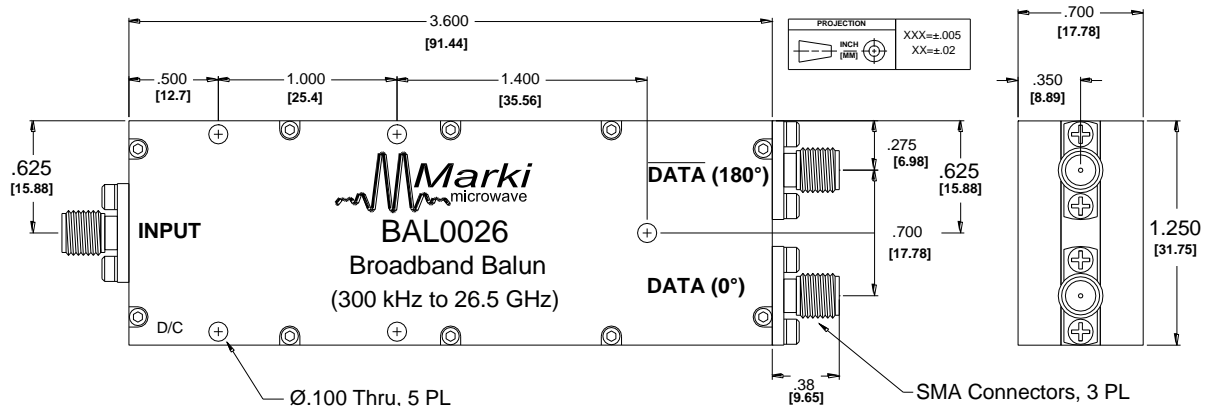
**Electrical Specifications** - Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

Parameter	Frequency Range	Min	Typ	Max	
Insertion Loss (dB)	300 kHz to 26.5 GHz		5.5	7.5	
Isolation (dB)	1 to 26.5 GHz		24		
Nominal Phase Shift (Degrees)	300 kHz to 26.5 GHz		180		
Amplitude Balance (dB)			±0.5	±1.2	
Phase Balance (Degrees)			±3	±10	
Common Mode Rejection (dB)		22	30		
VSWR (Input)			1.5		
VSWR (Output)			1.55		
Group Delay (ps)			520		
RMS Group Delay Ripple (ps)			8.2		
Risetime /Falltime (ps) <sup>1</sup>			7.5		
Total Input Power (W)					1
Weight (g)				125	

<sup>1</sup>Specified as 90%/10%. Calculated from  $\tau_{\text{balun}}^2 = (\tau_{\text{out}}^2 - \tau_{\text{in}}^2)$

Model Number	Description
BAL-0026	300 kHz to 26.5 GHz Balun with SMA connectors <sup>1</sup>

<sup>1</sup>Default is SMA female connectors. Consult factory for other connector options.

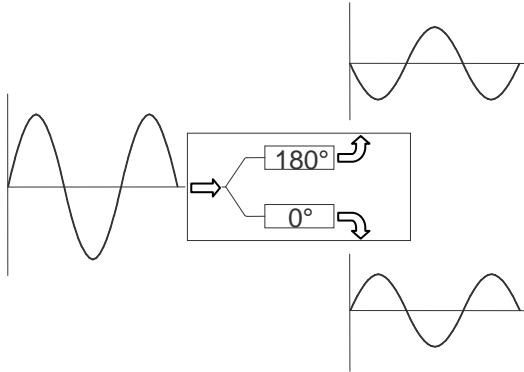


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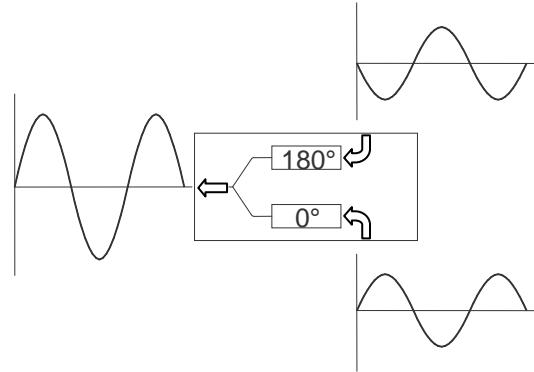
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**Block Diagram**



**Single ended to differential**



**Differential to single ended**

**Typical Performance**

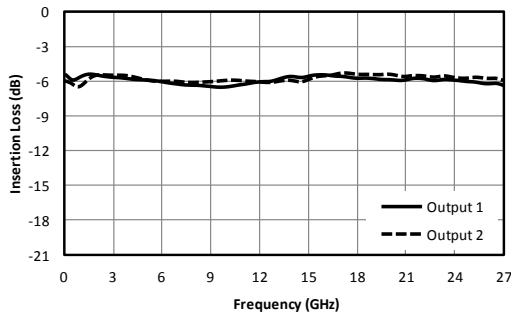


Fig. 1. Common to output port insertion loss.

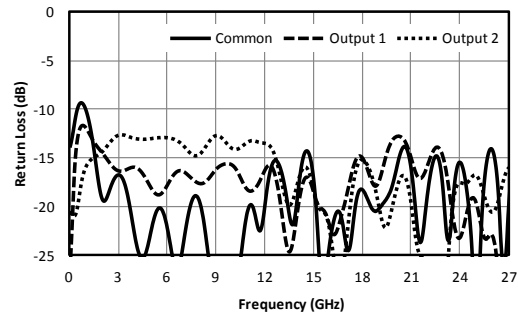


Fig. 2. Return loss for common port and output ports.

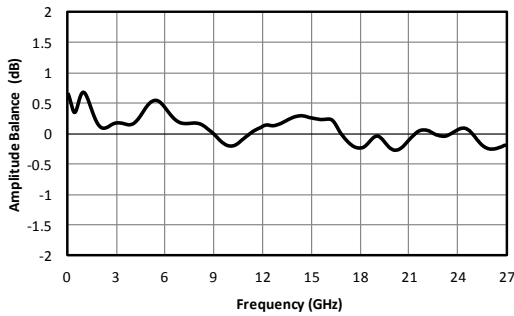


Fig. 3. Amplitude balance between output ports.

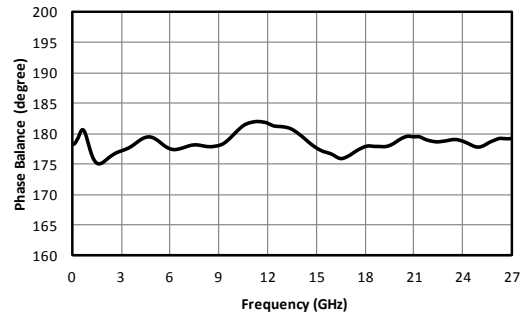


Fig. 4. Phase balance between output ports.

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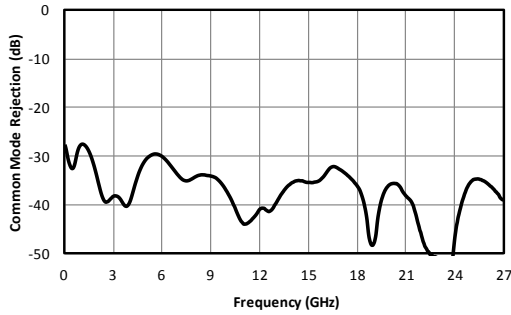


Fig. 5. Common mode rejection.

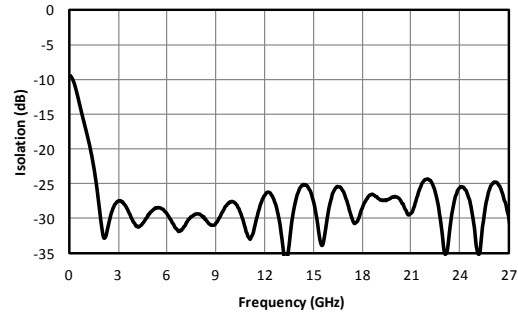


Fig. 6. Output to output port isolation.

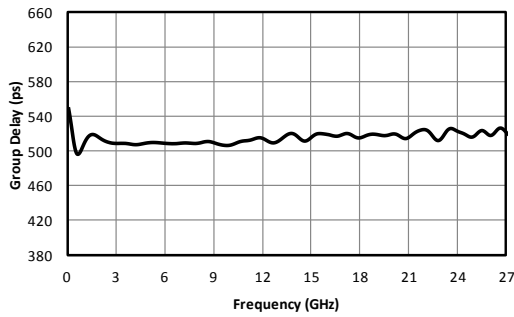


Fig. 7. Group delay.

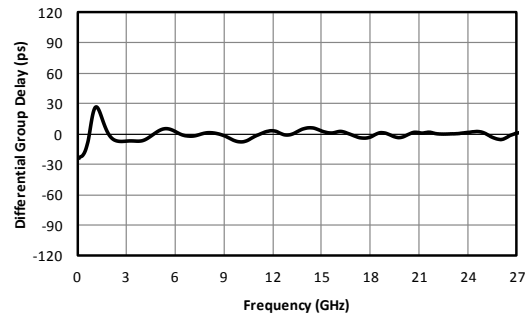


Fig. 8. Differential group delay.

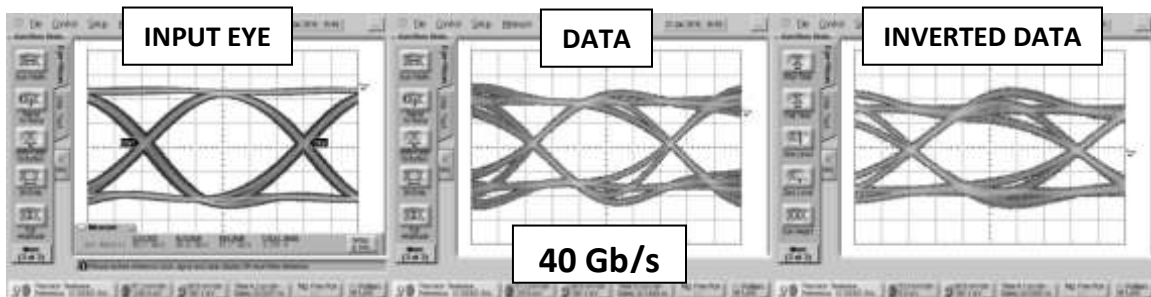


Fig. 9. Oscilloscope measurements of the BAL-0026 with a 40 Gb/s PRBS pattern in single ended-to-differential mode. Eye diagrams are taken with a  $2^{31}-1$  PRBS input demonstrating minimal eye distortion/closure afforded by the extremely low frequency operation of the balun (<300 kHz).

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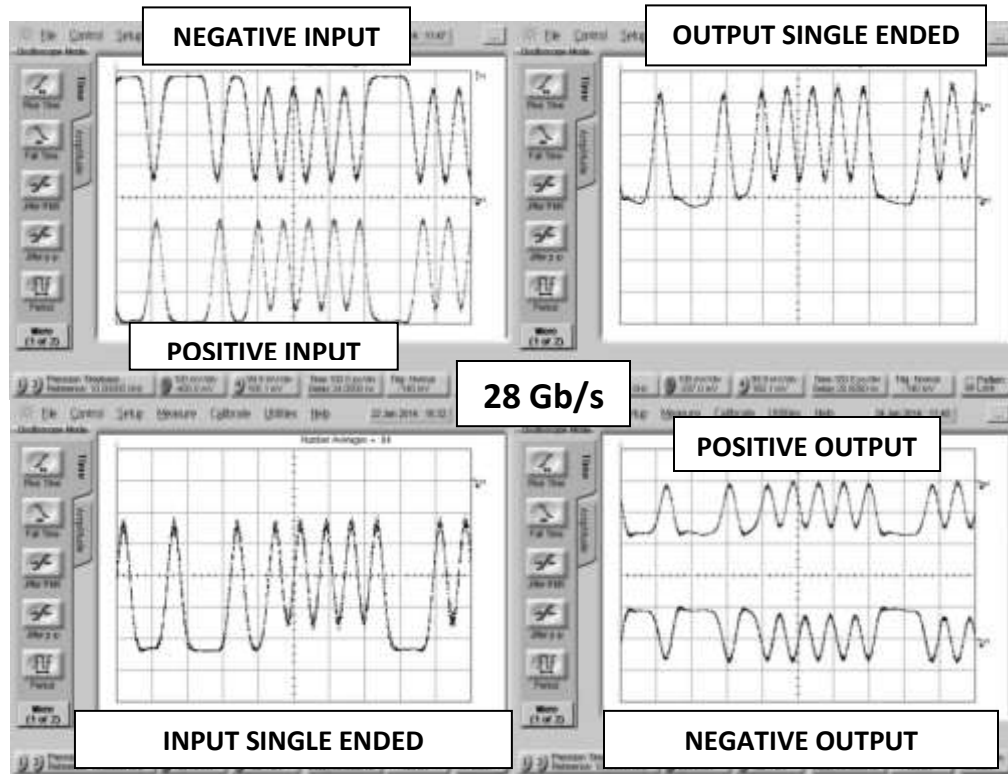
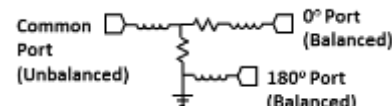


Fig. 10. Oscilloscope measurements of the BAL-0026 with a 28 Gb/s PRBS pattern. Bit pattern is measured with a  $2^7-1$  PRBS input demonstrating extremely good pulse fidelity for both differential-to-single ended and single ended to differential mode conversions. Apparent baseline wander in differential-to-single ended is due to low pass filtering by test cables.

**DC Interface**

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

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