ULTRA-BROADBAND ISOLATION BALUN (300 kHz to 50 GHz)

BAL-0050

Features

- 300 kHz to 50 GHz Balun (Balanced to Unbalanced 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-0050.s3p

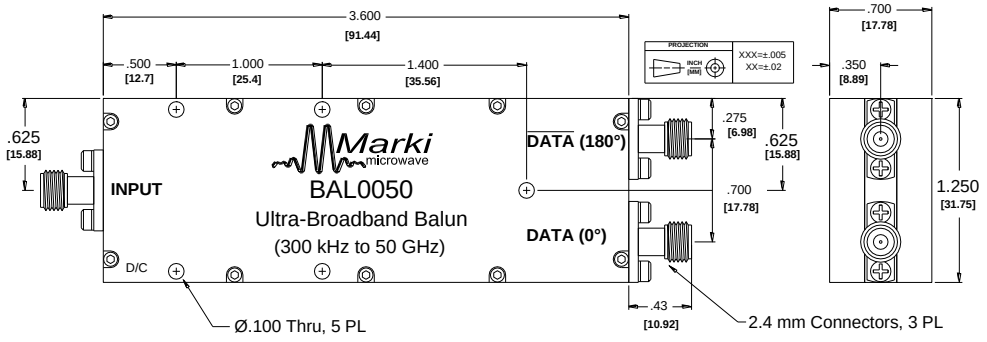
Electrical Specifications - Specifications guaranteed from -55 to +100°C, measured in a 50Ω system.

Parameter	Frequency Range	Min	Typ	Max
Insertion Loss (dB)	300 kHz to 35 GHz 35 to 50 GHz		6 10	9
Isolation (dB)	1 to 50 GHz		25	
Nominal Phase Shift (Degrees)	300 kHz to 50 GHz		180	
Amplitude Balance (dB)			±0.7	±1.4
Phase Balance (Degrees)			±4	±10
Common Mode Rejection (dB)		20	28	
VSWR (Common) VSWR (Output)			1.5 1.6	
Group Delay (ps)			520	
RMS Group Delay Ripple (ps)			8	
Risetime /Falltime (ps)[1]			5	
Total Input Power (W)				1
Weight (g)			125	

[1]Specified as 80%/20%. Calculated from $\tau_{balun}^2 = (\tau_{out}^2 - \tau_{in}^2)$

Model Number	Description
BAL-0050	300 kHz to 50 GHz Balun with 2.40 mm connectors[1]

[1]Default is 2.40 mm female connectors. Consult factory for other connector options.



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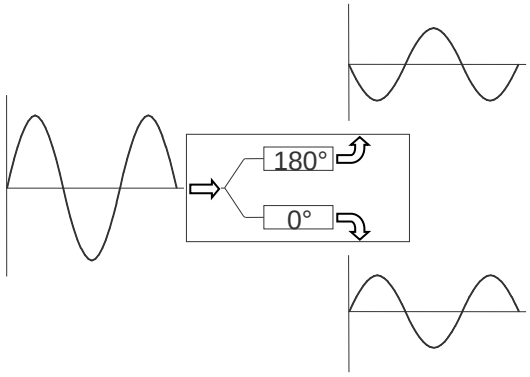
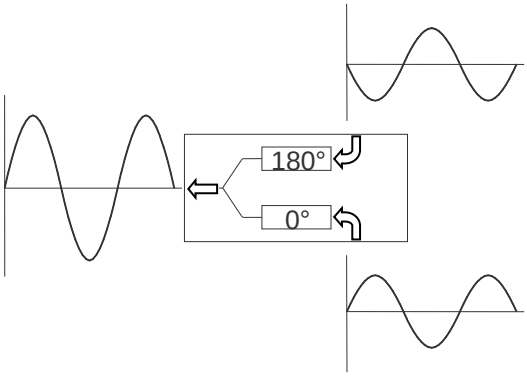
Block Diagram



Single ended to differential



Differential to single ended

Typical Performance

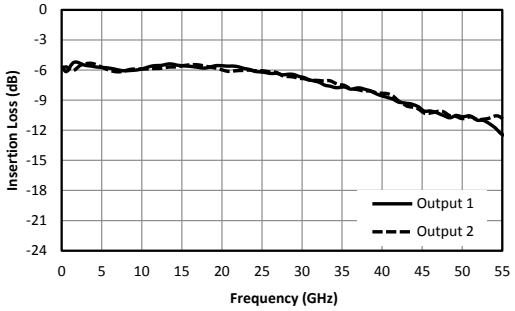


Fig. 1. Common to output port insertion loss.

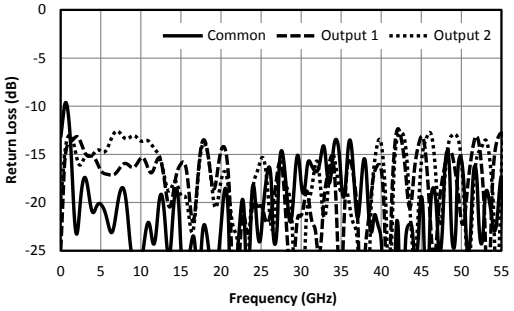


Fig. 2. Return loss for common port and output ports.

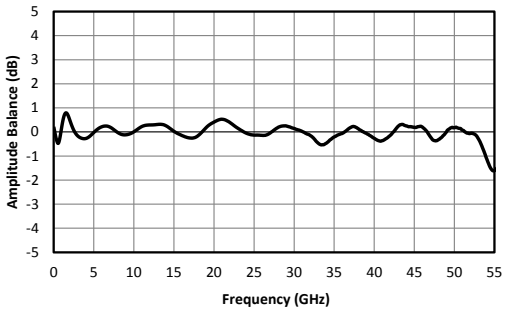


Fig. 3. Amplitude balance between output ports.

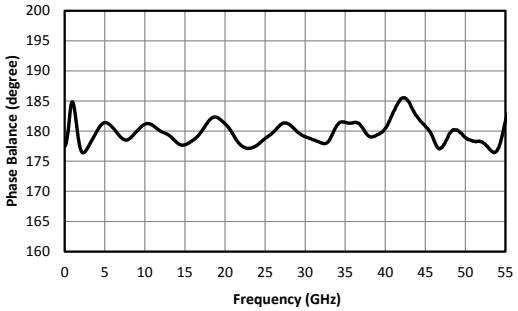


Fig. 4. Phase balance between output ports.

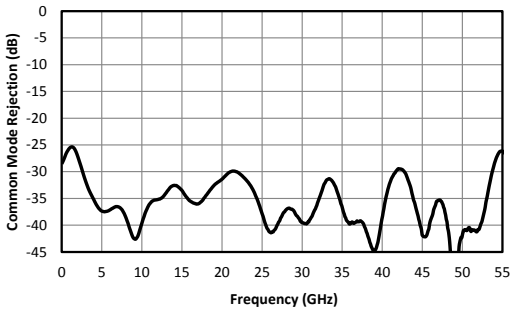


Fig. 5. Common mode rejection.

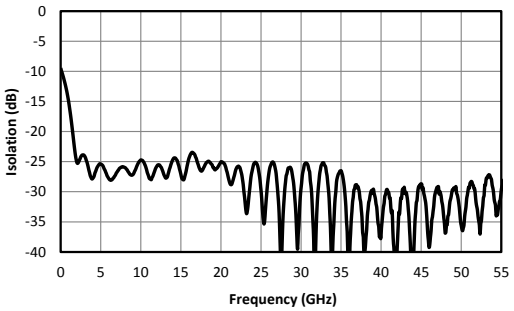


Fig. 6. Output to output port isolation.

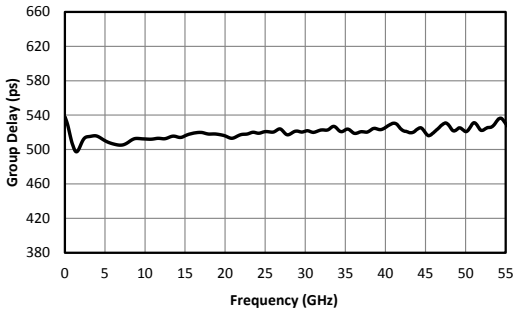


Fig. 7. Group delay.

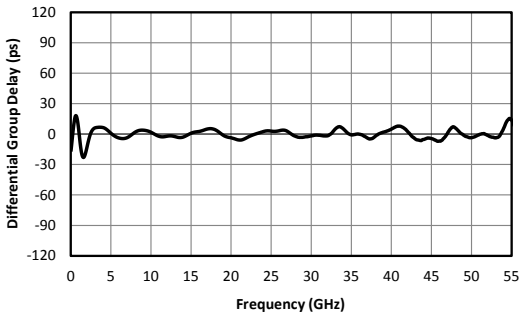


Fig. 8. Differential group delay.

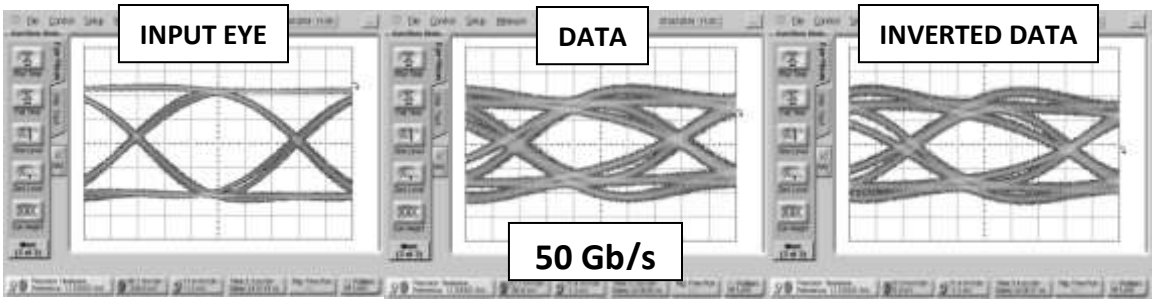


Fig. 9. Oscilloscope measurements of the BAL-0050 with a 50 Gb/s PRBS pattern in single ended-to-differential mode. Eye diagrams are taken with a 2^{31}-1 PRBS input demonstrating minimal eye distortion/closure afforded by the extremely low frequency operation of the balun (<300 kHz).

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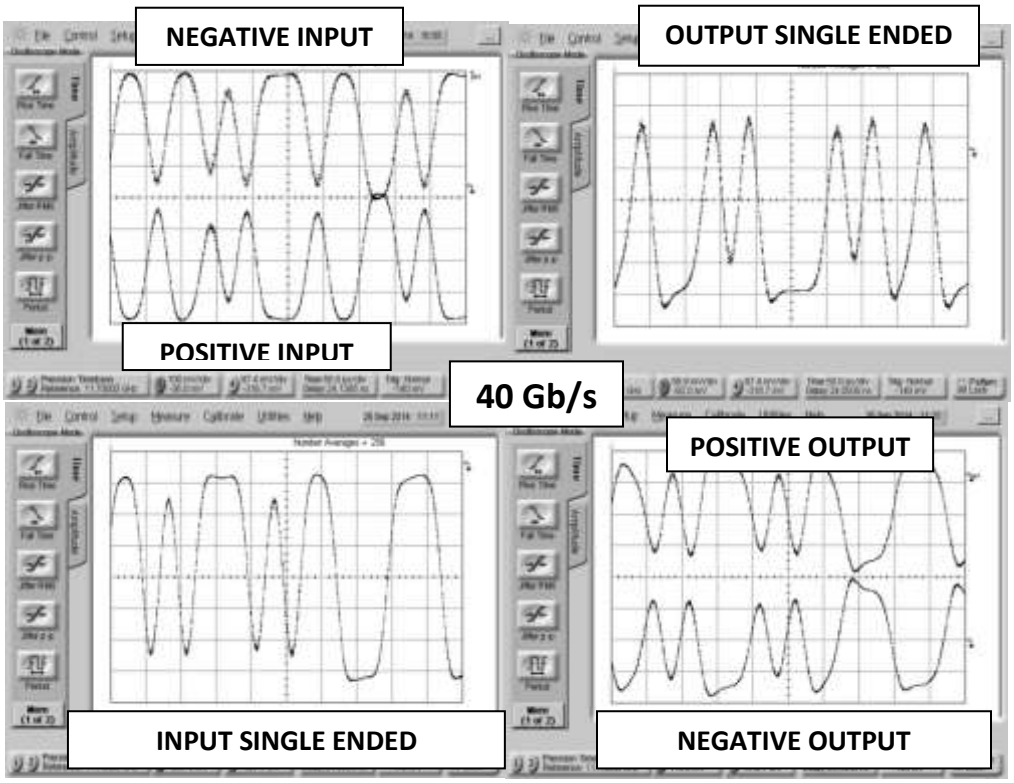
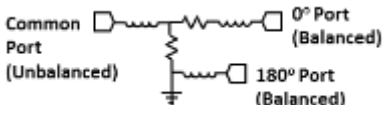


Fig. 10. Oscilloscope measurements of the BAL-0050 with a 40 Gb/s PRBS pattern. Bit pattern is measured with a 2^7-1 PRBS input demonstrating extremely good pulse fidelity for both differential-to-single ended and single ended to differential mode conversions.

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.	