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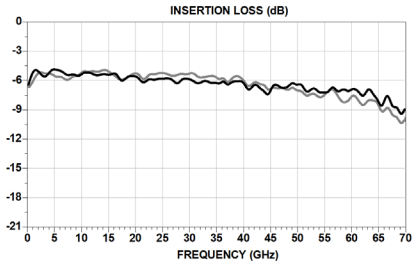
HL960x Series Isolation Baluns (150 kHz to 67 GHz)

Features and Technical Specifications[1] (HL9607 shown) PRELIMINARY

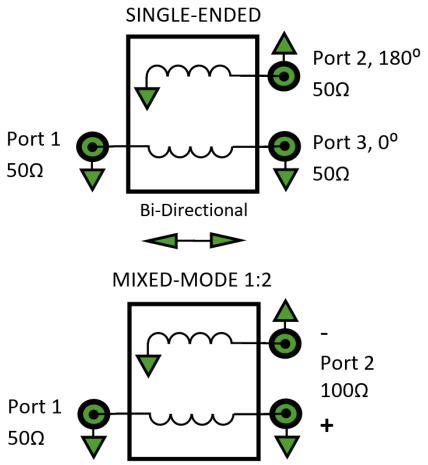
Bandwidth	150 kHz to 67 GHz
Insertion Loss as a Mode Converter	3 dB
Amplitude Balance	1 dB
Phase Balance	± 12°
CMRR	20 dB
Isolation	17 dB
Group Delay	≈ 450 ps
Max Input Power	1 W (+30 dBm)
VSWR Input	1.65
VSWR Output	1.45
Connectors	1.85 mm, 3 x jack/female
Temperature Limits	-40° to +100° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Export Classification	EAR99
Warranty	1 year, see website

NOTE 1 - Unless otherwise noted, the specifications in this table are typical for Model Number HL9607 using the standard configuration (-JJJ). Full specifications for this and related models are available on Page 2 of this datasheet.

HL9607, standard configuration shown



Typical HL9607 Insertion Loss



HL960x Schematic and Port Assignments

PRODUCT SUMMARY

The HL960x series are miniaturized broadband baluns featuring high isolation and designed for optimal phase and amplitude balance over a 3 dB bandwidth of 150 kHz to 67 GHz.

They are an excellent choice for use in high-speed analog- to-digital conversion, balanced receivers, baseband digital modulations, and signal integrity enhancement.

FEATURES

- 150 kHz to 67 GHz Balun (Balanced to Unbalanced Transformer)
- 1:2 Transformer (50 Ω unbalanced, 100 Ω differential/50 Ω balanced port
- Termination insensitive: Particularly suited to testing poorly matched or non-50 Ω devices or for extending 2-port VNAs for differential testing

APPLICATIONS

- Analog to Digital Converters
- Balanced Receivers
- Baseband Digital Modulation
- Signal Integrity

MODELS & OPTIONS

The following models, options are available:

HL9602, 26.5 GHz
HL9604, 40 GHz
HL9605, 50 GHz
HL9607, 67 GHz

The following connector options are available:

-JJJ, jack/jack/jack

Extra cost options:

-JPP, jack/plug/plug
-PJJ, plug/jack/jack
-PPP plug/plug/plug

HL960x Full Specifications[1]

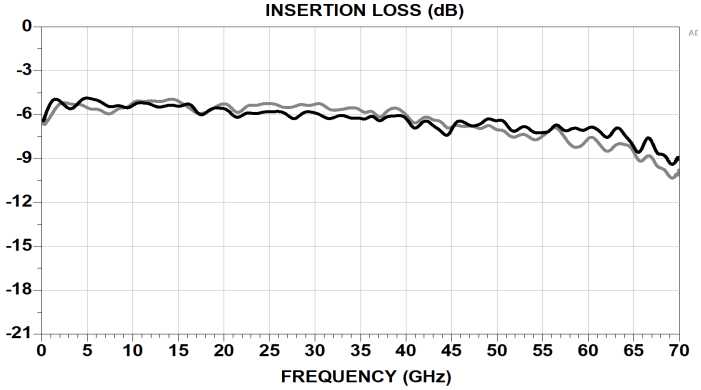
Parameter	HL9602	HL9604	HL9605	HL9607	Comments
Upper Frequency Limit	26.5 GHz	40 GHz	50 GHz	67 GHz	3 dB roll-off point, relative to low frequency insertion loss
Lower Frequency Limit	150 kHz	150 kHz	150 kHz	150 kHz	3 dB roll-off point
Insertion Loss as a Mode Converter	1 dB	2 dB	2.5 dB	3 dB	Typical
Nominal Phase Shift	180°	180°	180°	180°	Typical
Amplitude Balance	1 dB	1 dB	1 dB	1 dB	Typical
Phase Balance	± 5°	± 7°	± 9°	± 12°	Typical
Common Mode Rejection	25 dB	25 dB	20 dB	20 dB	Typical
Isolation	17 dB	17 dB	17 dB	17 dB	Typical
Group Delay	450 ps				
Group Delay Ripple	10 ps				
Rise Time / Fall Time[2]	13 ps	9 ps	7 ps	5 ps	90%/10%
Total Input Power	1 W (+30 dBm)				
VSWR Input	1.65				
VSWR Output	1.45				
Impedance	50 Ω				Input and Outputs
Connectors	SMA, 3x jack/female	2.92 mm, 3x jack/female	2.4 mm, 3x jack/female	1.85 mm, 3x jack/female	Plug/male connectors available at extra cost
Dimensions (W x D x H)	2.40” x 1.25” x 0.40” 60.1 x 31.7 x 10.1 mm				Package without connectors
Weight	52 g (1.8 oz.)				
Operating Temp.	-40° to +100° C				Case temperature
RoHS Compliant	Yes, assembled with lead-free solder				
REACH Compliant	Yes				
Warranty	1 year, repair or replacement; see website for details				

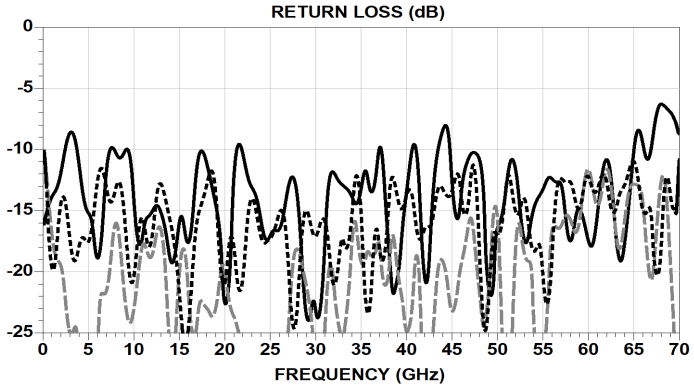
Note 1: All specifications are based on test results using the standard connector configuration (3 x jack). Specifications may vary slightly for other configurations.

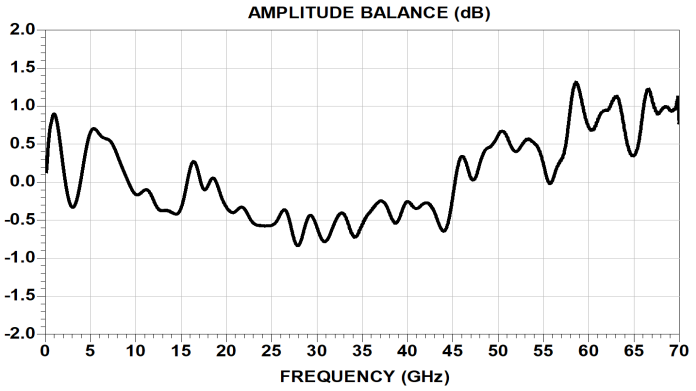
Note 2: Specified as 90%/10%. Calculated as t_f , t_r = 0.35 / f(-3dB)

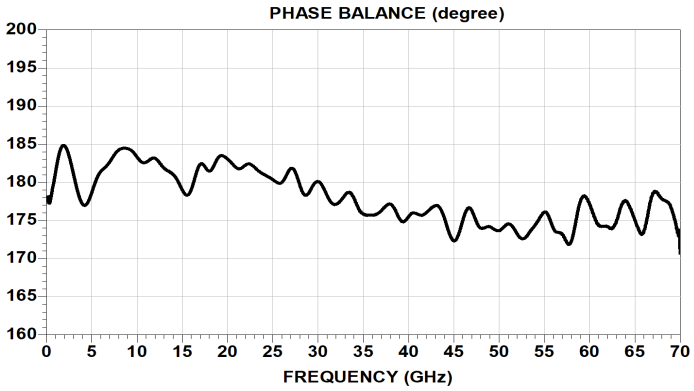
HL9607 Plot Diagrams

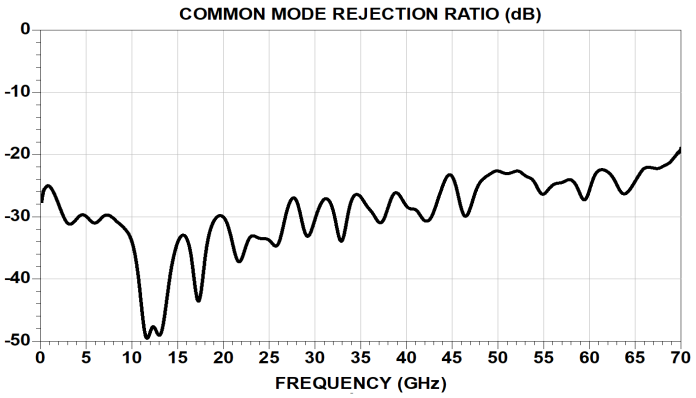
These plots show the typical S-parameter characteristics for the HL9607.

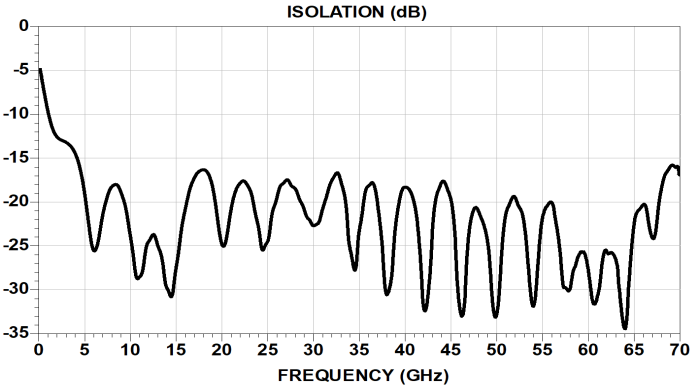


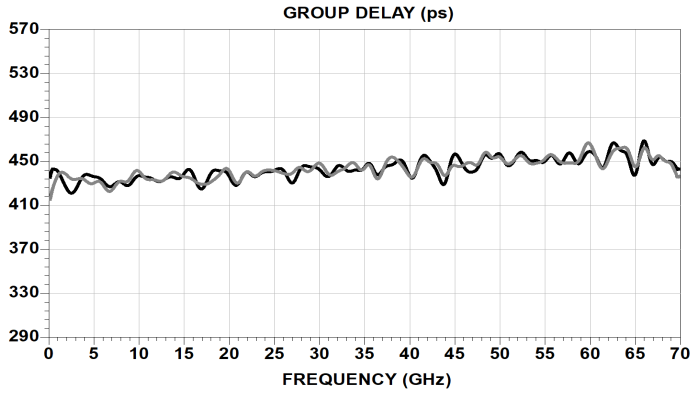


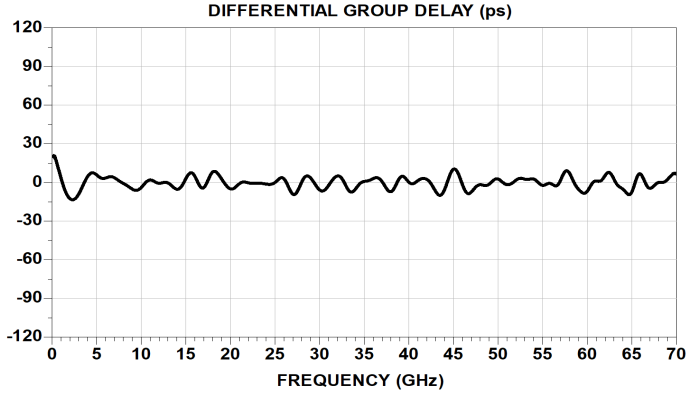






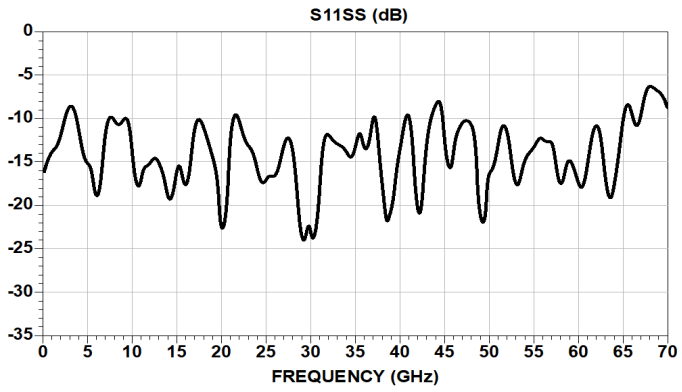


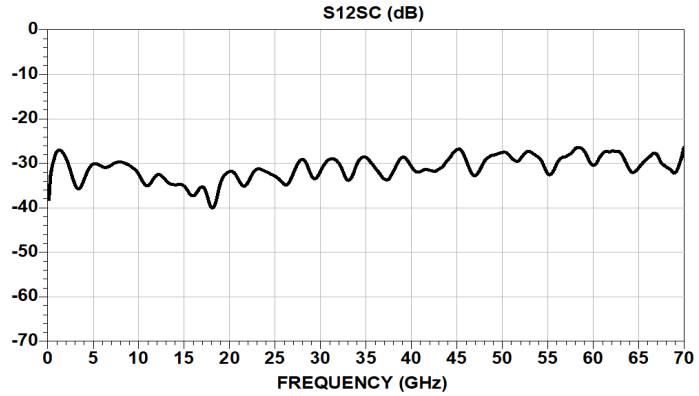


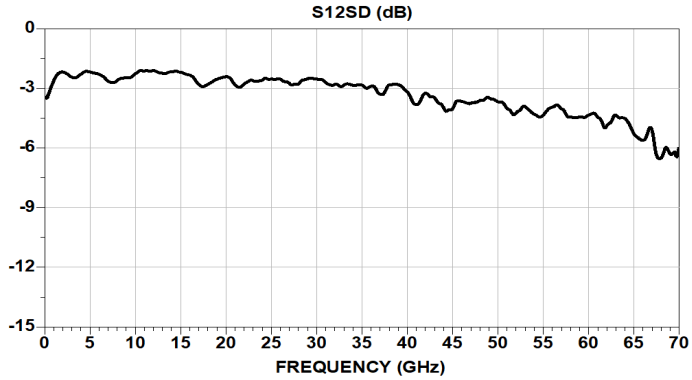


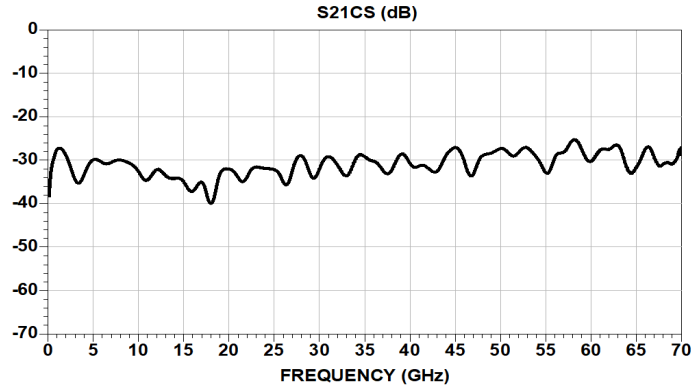
HL9607 Mixed-Mode Plot Diagrams

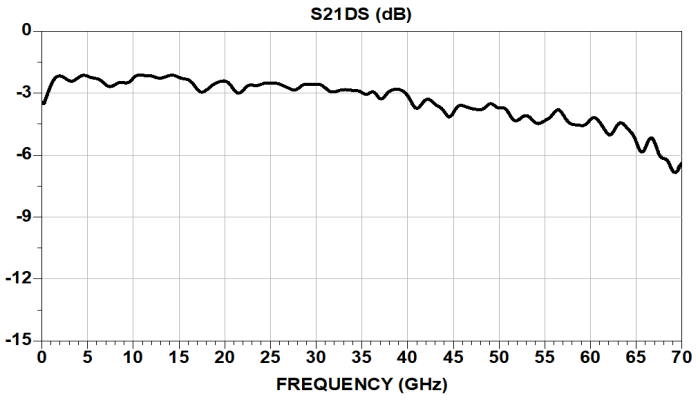
These plots show the typical mixed-mode S-parameter characteristics for the HL9607.

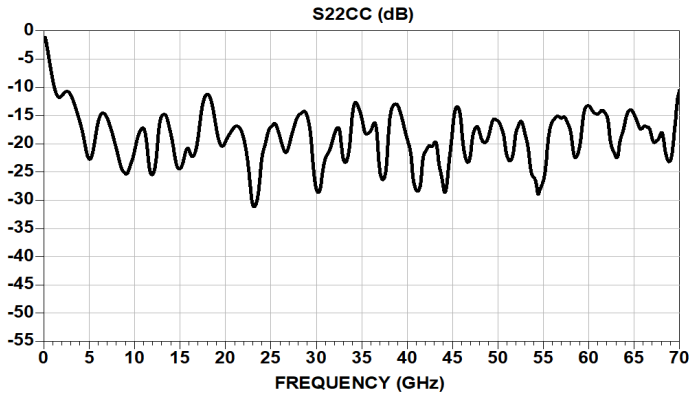


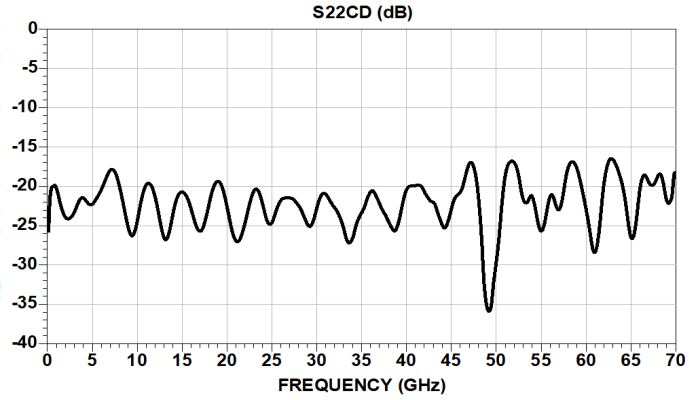


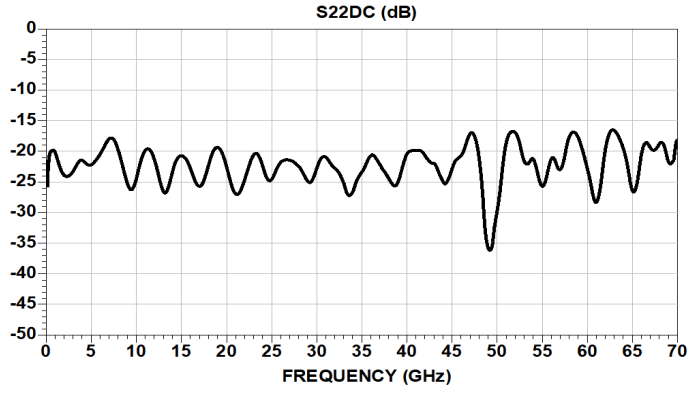












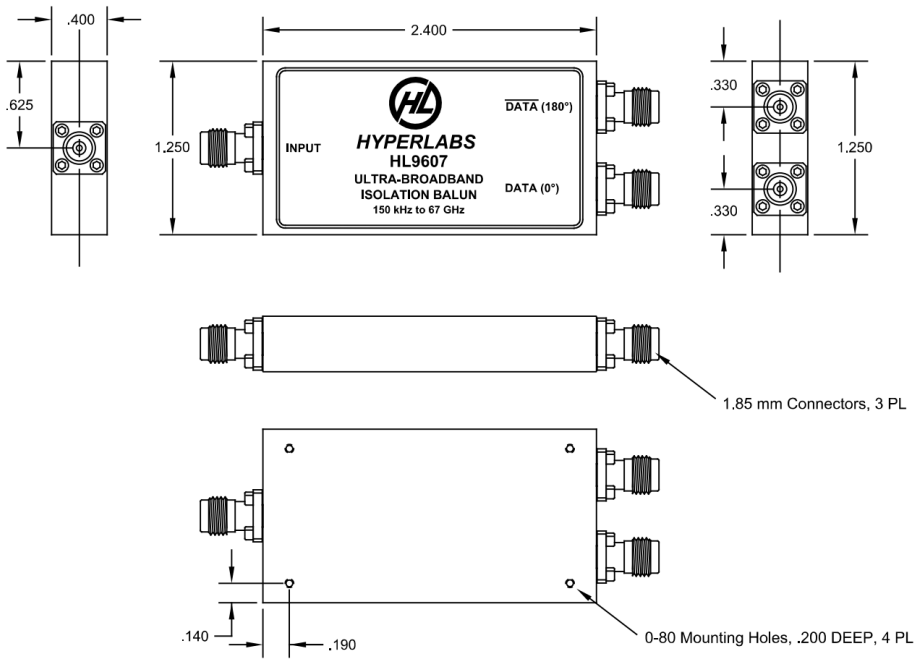
HL9607 Plot Diagrams (continued)

The figure below shows the low frequency response of the HL9607. Other models show similar performance within their respective specified bandwidths.

Low Frequency Response

HL960x Dimensional Drawing

This is the mechanical drawing of an HL9607. Unless otherwise noted, all units are in inches and do not include the dimensions of the connectors. The overall size will vary based on the connectors used for each model.



HL9607 Mechanical Drawing