

HL9401 Broadband Balun (20 GHz)

Features and Technical Specifications

Bandwidth (3 dB)	100 MHz to 20 GHz
Amplitude Match	± 0.1 dB to 20 GHz, typical ± 0.5 dB to 20 GHz, max See Fig. 1
Phase Match	$\pm 3^\circ$, $f = 10$ GHz, max $\pm 6^\circ$, $f = 20$ GHz, max See Fig. 8
Insertion Loss	6 dB, reference 7.5 dB, max ¹ See Figs. 1, 3-4
Return Loss	> 14 dB, unbalanced port > 8 dB, balanced ports See Figs. 2, 5
Rise Time	17.5 ps
CMRR	> 25 dB, typical See Fig. 6
Group Delay	≈ 280 ps See Fig. 7
Max Input Power	1 W (+30 dBm)
Impedance	50 Ω In, 2 x 50 Ω Out
Connectors	SMA, 3x jack/female (standard config) ² SMA plug connectors available at extra cost
Dimensions	55.88 x 27.94 x 10.16 mm 2.20" x 1.10" x 0.40"
Weight	26 g (0.92 oz)
Temperature Limits	-40° to +100° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

Note 1 - Curve fit using 6th order polynomial

Note 2 - All specifications based on test results using standard configuration. Plug specifications may vary slightly.

PRODUCT SUMMARY

The HL9401 is a 180° signal splitter and combiner that offers industry-best amplitude and phase match over a bandwidth of 100 MHz to 20 GHz.

It is suitable for use in 40 Gbps communications systems, high-speed analog-to-digital conversion, frequency response testing for differential devices, and many other applications.

DEPLOYMENT NOTES

All specifications contained herein are typical unless otherwise noted.

When the device is used as a signal combiner using differential signals with unmatched source impedance, attenuators (3-6 dB) may be required to improve isolation.

If the DC voltage of the input or output is not zero, DC blocks are required.

S-PARAMETERS

S-parameters for both single-ended and mixed-mode are available on our website.

MODELS & OPTIONS

The following model is available:

HL9401, 20 GHz

The following connector options are available:

-JJJ, jack/jack/jack

Extra cost options:

-JPP, jack/plug/plug

-PJJ, plug/jack/jack

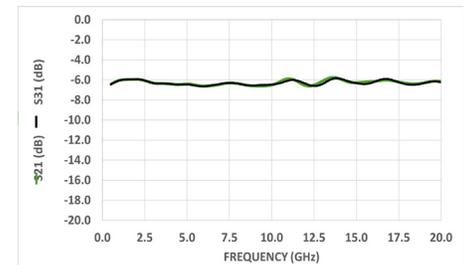
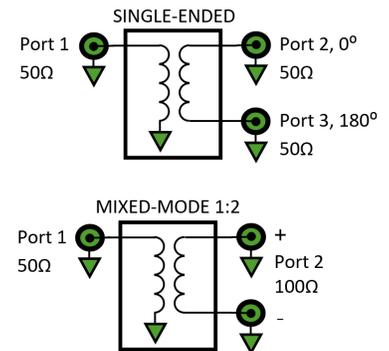
-PPP, plug/plug/plug



HL9401, standard configuration shown

DEVICE PORT ASSIGNMENTS

For the purposes of this datasheet and the S-parameter files available on our website, the below port assignments are used.



Typical HL9401 single-ended Insertion Loss

HL9401 Plot Diagrams

Figures 1-6 show the typical S-parameter characteristics for both single-ended and mixed-mode (differential) measurements.

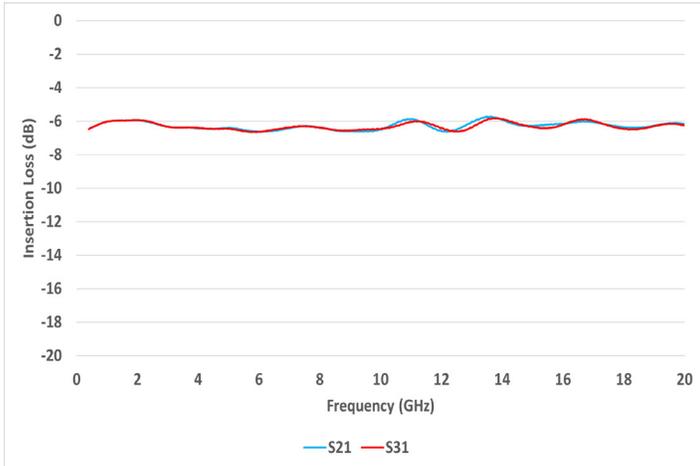


Figure 1: HL9401 Single-ended Insertion Loss

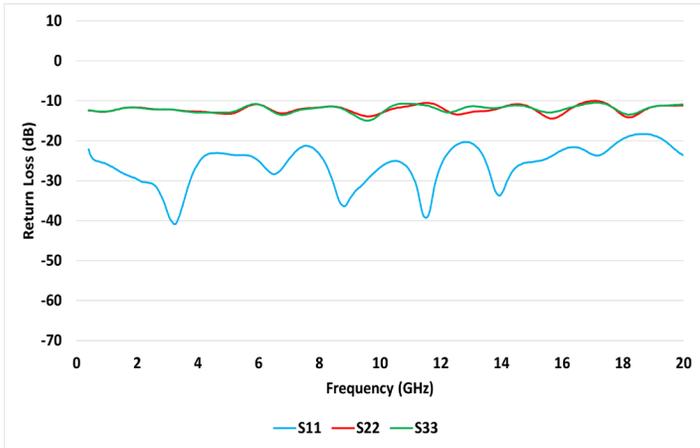


Figure 2: HL9401 Single-ended Return Loss

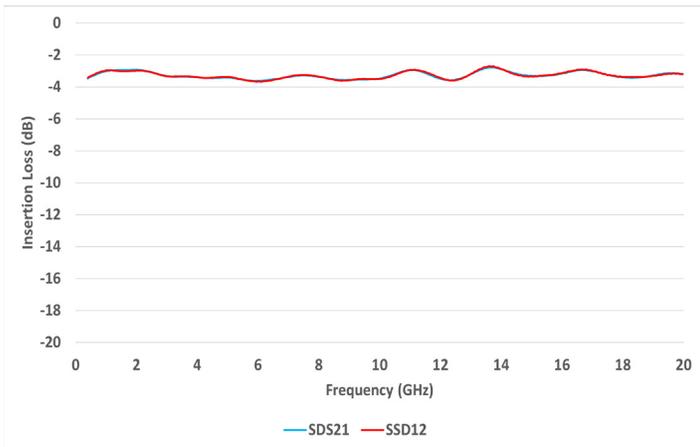


Figure 3: HL9401 Differential Mode Insertion Loss

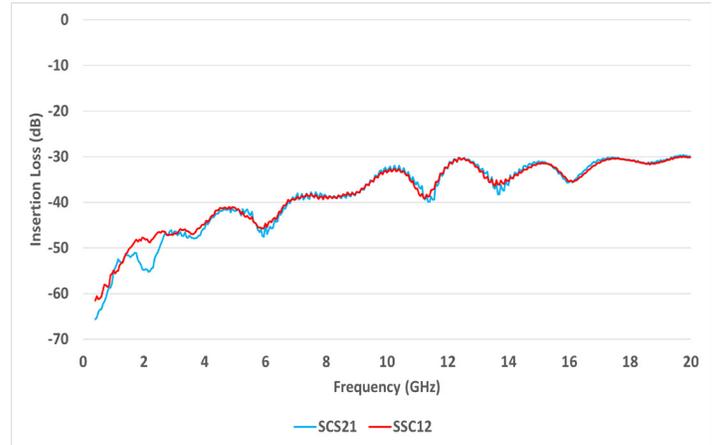


Figure 4: HL9401 Common Mode Insertion Loss

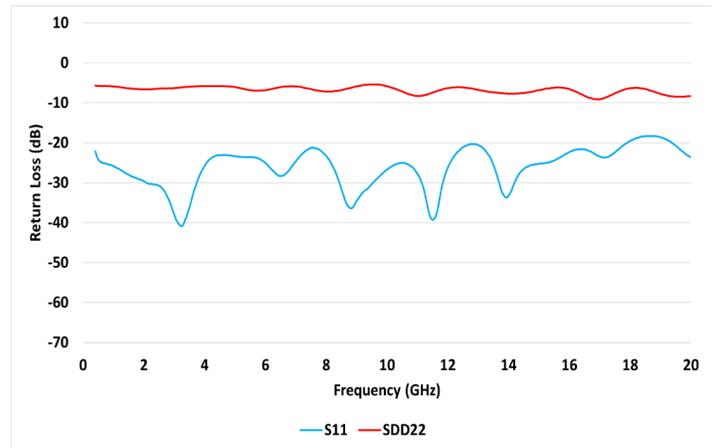


Figure 5: HL9401 Mixed-mode Return Loss

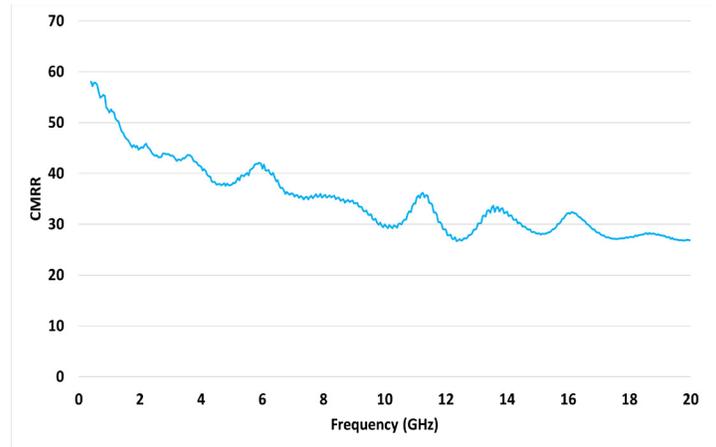


Figure 6: HL9401 Common Mode Rejection Ratio

HL9401 Plot and Eye Diagrams

Figures 7-11 show additional S-parameter characteristics and Eye Diagrams for the HL9401.

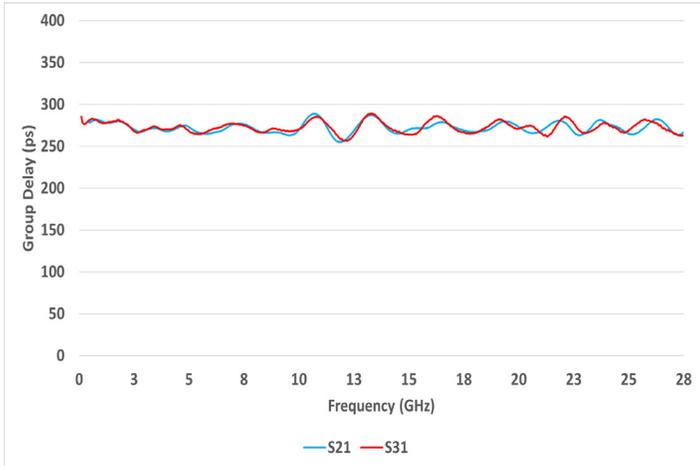


Figure 7: HL9401 Single-Ended Group Delay

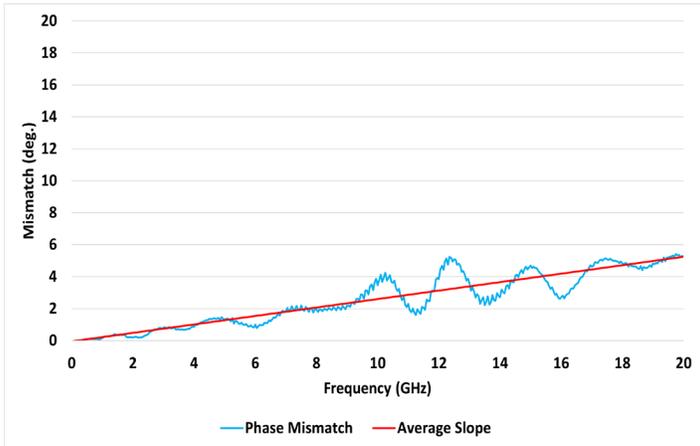


Figure 8: HL9401 Phase Mismatch

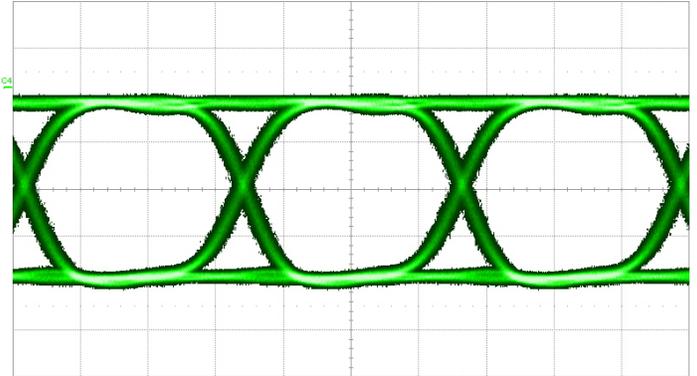


Figure 9: 28 Gbps PRBS31 Pattern on Input

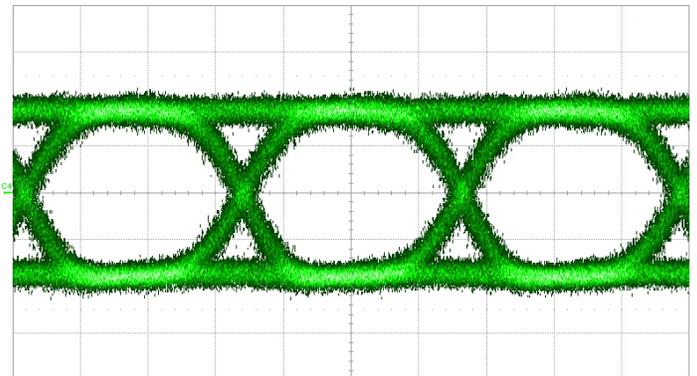


Figure 10: 28 Gbps PRBS31 Pattern on Non-Inverting Output

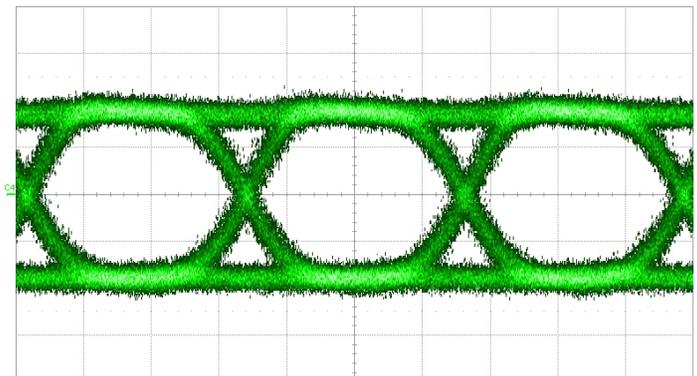


Figure 11: 28 Gbps PRBS31 Pattern on Inverting Output

HL9401 Dimensional Drawing

Figure 12 shows a mechanical drawing of an HL9401. Unless otherwise noted, all units are in inches.

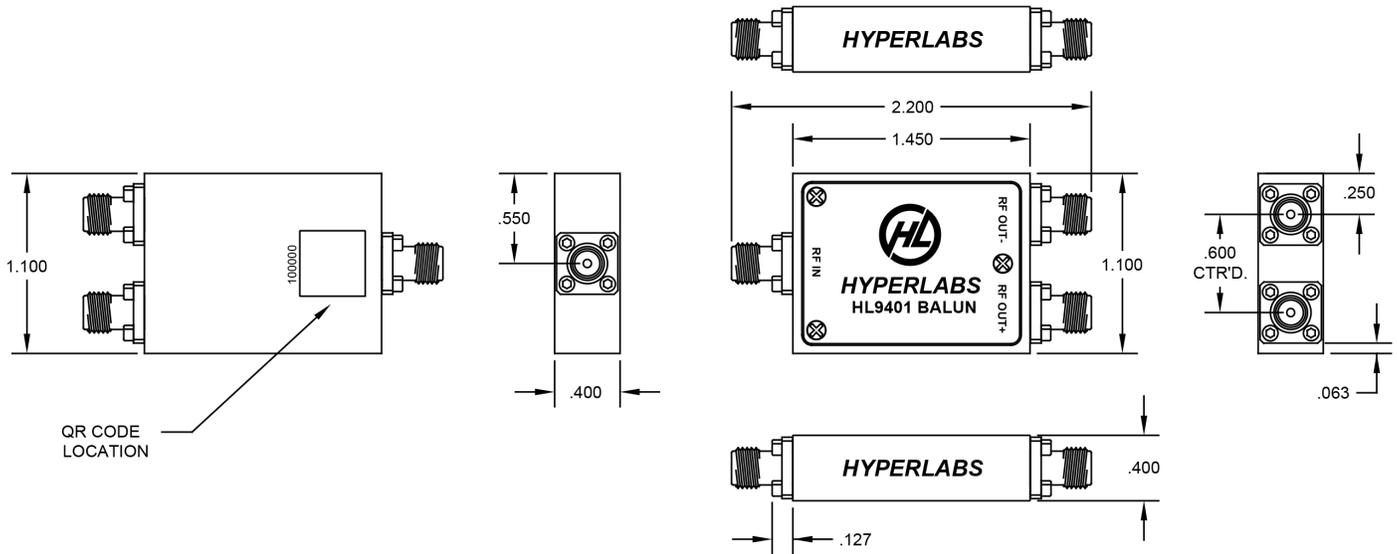


Figure 12: HL9401 mechanical drawing