HL9348/9 Series DC Feeder (to 110 GHz)

Features and Technical Specifications[1] (HL9349 shown)

PRODUCT SUMMARY

The HL9348 and HL9349 are utra-broadband DC Feeders with a typical insertion loss less than 2.5 dB throughout the specified bandwidth range. A DC Feeder is like a Bias Tee, but without a DC blocking capacitor on the RF input. DC Feeders are bidirectional.

The HL9348/9 allows for the insertion of a DC bias current or voltage onto the RF circuit path with minimal perturbation of the impedance of a 50 ohm transmission line.

These devices can be used for biasing amplifiers, lasers, optical modulators, and other devices.

Applications include 224 Gbps PAM4 communications systems, optical communication systems, high-speed data systems, level shifting, and cascading.

MODELS & OPTIONS

The following models are available:

HL9348, 95 GHz
HL9349, 110 GHz

The following options are available:

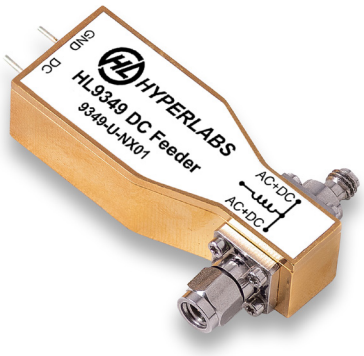
-M, matched pair
-U, unmatched part(s)

CONNECTORS

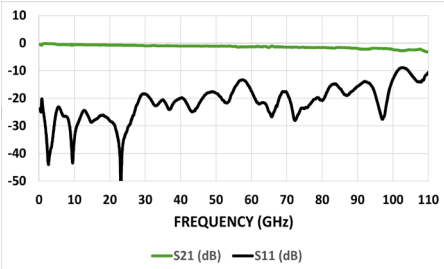
Connectors should be specified according to the configurations listed on Page 2

Bandwidth	13 kHz to > 110 GHz
Amplitude Match (opt. -M only)	± 0.1 dB, f ≤ 110 GHz, all options See *Fig. 5*
Phase Match (opt. -M only)	± 4°, f = 40 GHz
Insertion Loss	< 2.5 dB, 160 kHz to 110 GHz, (opt. -JJ) See *Fig. 1*
Return Loss	15 dB, f ≤ 55 GHz, all options 10 dB, 55 GHz < f ≤ 110 GHz, all options See *Fig. 2*
Maximum Current	175 mA
Rise Time (10-90%)	3.2 ps, all options
Impedance	50 Ω
Dimensions (W x D x H)	1.95" x 1.30" x 0.53" 49.53 x 33.02 x 13.46 mm
Weight	24 g (0.85 oz.)
Connectors (AC+DC / AC+DC)	1.0 mm Standard configuration is jack/plug with either pins or SMA jack for DC bias. See page 2 for other configurations
Temperature Limits	-40° to +70° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

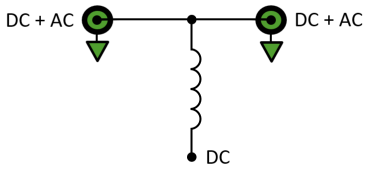
NOTE 1 - Unless otherwise noted, the specifications in this table are typical for Model Number HL9349 using the standard connector configuration (-JP, jack/plug). See page 2 for full specifications.



HL9349, Option -U-JPC shown



Typical HL9349 Insertion and Return Loss



HL9349 Schematic and Port Assignments

HL9348 and HL9349 Full Specifications

Parameter	HL9348	HL9349	Comments
Upper Frequency Limit	> 90 GHz	> 110 GHz	3 dB roll-off point, relative to nominal insertion loss
Lower Frequency Limit See *Fig. 3*	13 kHz		3 dB roll-off point
Maximum Current	175 mA		
Amplitude Match See *Fig. 5*	± 0.1 dB, f ≤110 GHz		Typical, opt. -M
Phase Match	± 4°, f = 40 GHz		Typical, opt. -M
Insertion Loss See *Fig. 1*	2 dB 13 kHz ≤ f ≤ 90 GHz	2.5 dB 13 kHz ≤ f ≤ 110 GHz	Typical
Return Loss See *Fig. 2*	15 dB, f ≤ 55 GHz 10 dB, 55 GHz < f ≤ 110 GHz		Typical, within specified operating frequency
Rise Time	3.7 ps	3.2 ps	Typical
Group Delay See *Fig. 4*	103 ps	104 ps	All options
Impedance	50 Ω		Input and Output
DC Resistance	2 Ω		DC to AC+DC
Connector Type	1.0 mm		AC and AC+DC ports
Connector Configurations (specify when ordering)	Port 1 (AC+DC input): jack (J) or plug (P) Port 2 (AC+DC output): jack (J) or plug (P) Port 3 (DC): SMA jack (S) or capacitive feedthru pins (C) *Standard configuration is -JPS or -JPC*		E.g. config -JPS: AC+DC jack, AC+DC plug, DC jack Or, config. -JJC: AC+DC jack, AC+DC jack, DC pins
Dimensions (W x D x H)	1.95” x 1.30” x 0.53” 49.53 x 33.02 x 13.46 mm		Package including connectors
Weight	24 g (0.85 oz.)		
Operating Temperature	-40° to +70° 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 - All specifications are based on test results using the standard connector configuration (-JP, jack/plug). Specifications may vary slightly for other configurations.

HL9349 Performance Characteristics

Figures 1-5 show the typical performance characteristics of the HL9349 from 10 MHz to 110 GHz, except Fig. 3 which shows low-frequency response to 100 Hz. Other models show similar performance within their specified bandwidth.

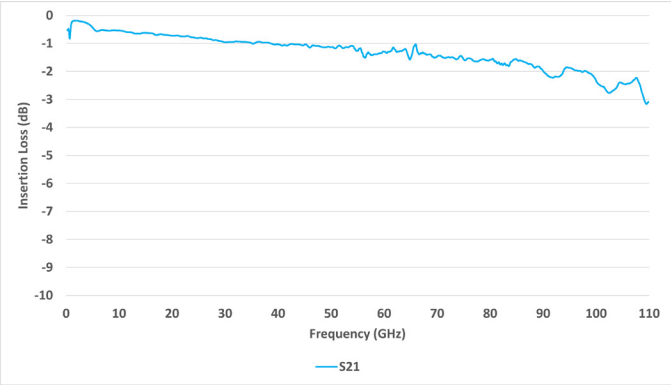


Fig. 1: Typical HL9349 Bandwidth and Insertion Loss

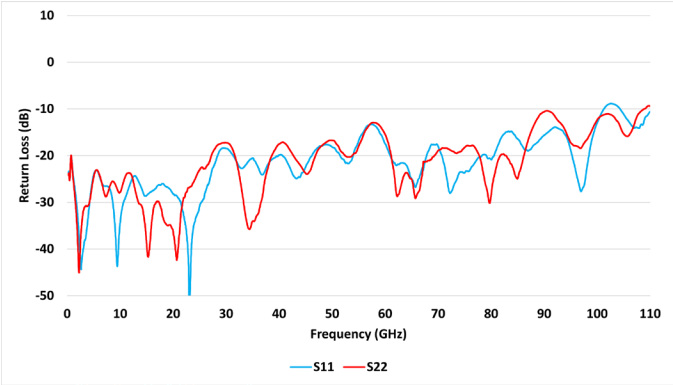


Fig. 2: Typical HL9349 Return Loss

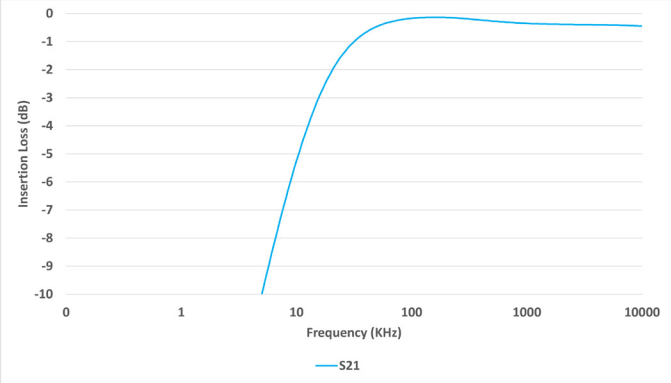


Fig. 3: Typical HL9349 Low Frequency Performance (opt. -30)

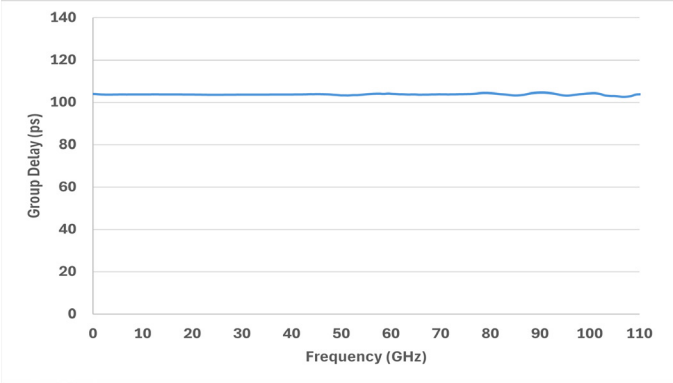


Fig. 4: Typical HL9349 Group Delay

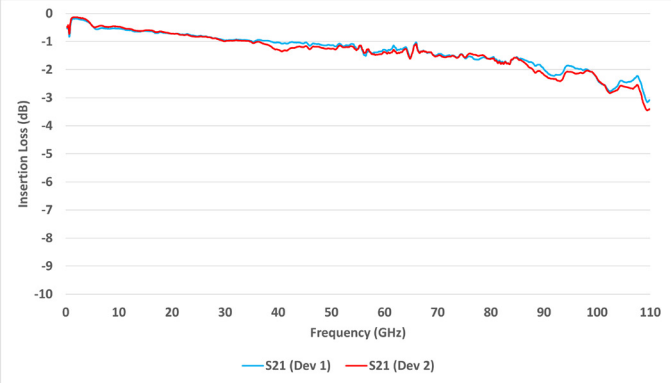


Fig. 5: Typical HL9349 Amplitude Matching (opt. -M)

HL9349 Dimensional Drawing

Figure 6 shows a mechanical drawing of an HL9349 (opt. -JJC) with pins for DC bias. *Figure 7* shows the HL9349 (opt. -JJS) with an SMA DC port. Unless otherwise noted, all units are in inches. See page 2 for full dimensions.

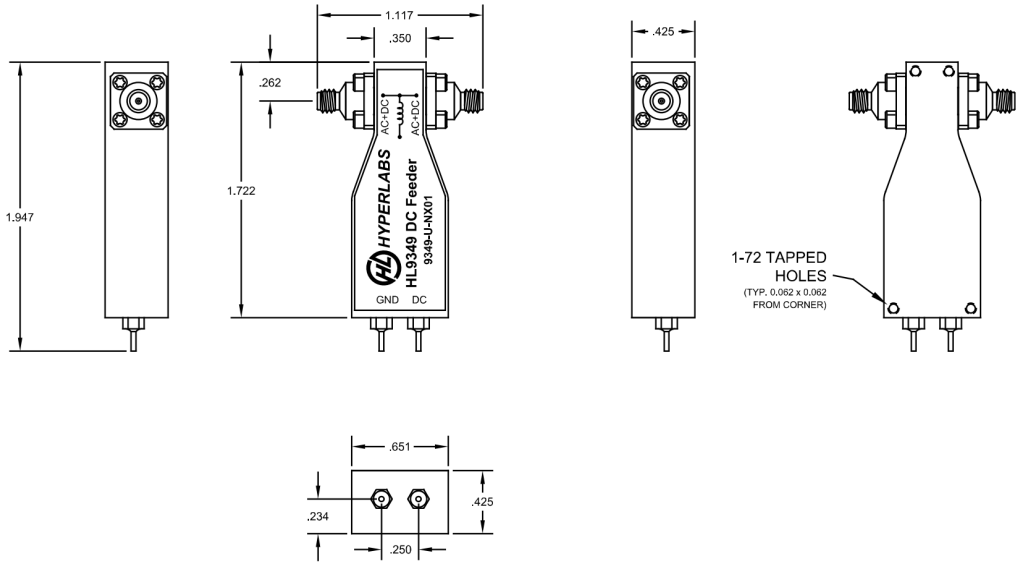


Fig 6: HL9349 with DC bias pins Mechanical Drawing

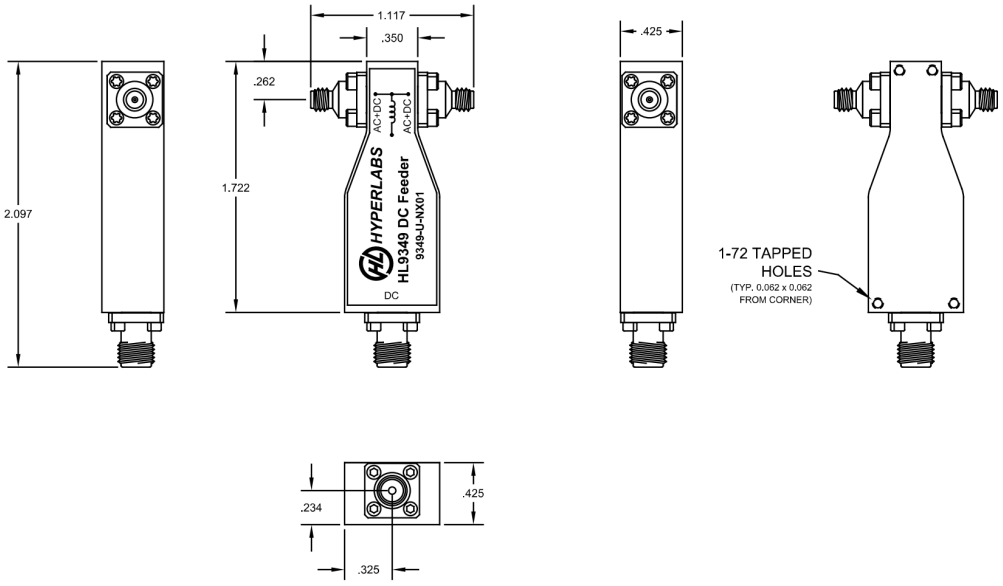


Fig 7: HL9349 with SMA DC bias port Mechanical Drawing