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PRODUCT SUMMARY

The HL8448 is an ultra-broadband Kelvin bias tee with a typical insertion loss of 2 dB to 80 GHz.

A typical bias tee allows for insertion of a DC bias current into a circuit with minimal perturbation of a 50 Ω transmission line, but can suffer measurement errors due to voltage drop across the DC coil.

A Kelvin bias tee is designed for applications where both DC and RF signals are applied to the Device under Test (DUT) and precision DC measurements are required. It eliminates DC biasing errors as the sense coil allows accurate measurement of the DC voltage applied across the DUT.

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

Applications include 112 Gbps PAM4 signaling, optical communication systems, high-speed data systems, and interfacing between devices with incompatible DC operating points.

MODELS & OPTIONS

The following model is available:

HL8448, 90 GHz

The following options are available:

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

-11, 11 V breakdown
-30, 30 V breakdown

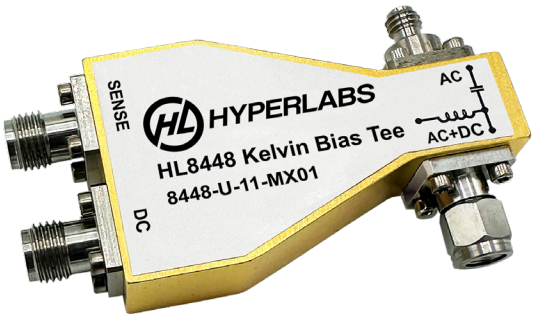
-JJ, jack AC, AC+DC
-JP, jack AC, plug AC+DC
-PJ, plug AC, jack AC+DC
-PP, plug AC, AC+DC

HL8448 Kelvin Bias Tee (160 kHz to 90 GHz, 175 mA)

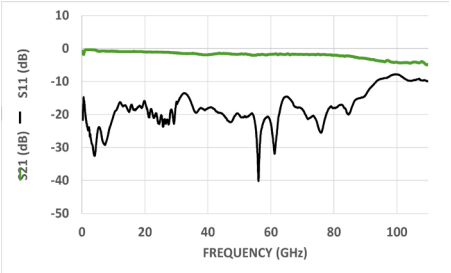
Features and Technical Specifications[1]

Bandwidth	160 kHz to > 90 GHz (opt. -11) 200 kHz to > 90 GHz (opt. -30)
Insertion Loss	2 dB typical, to 80 GHz 4.5 dB at 110 GHz See *Fig. 1*
Return Loss	15 dB, f ≤ 90 GHz See *Fig. 3*
Amplitude Match (opt. -M only)	± 0.2 dB, f ≤ 90 GHz, all options See *Fig. 5*
Phase Match (opt. -M only)	± 4°, f = 40 GHz
Breakdown Voltage	11 V, max (opt. -11) 30 V, max (opt. -30)
Maximum Current	175 mA
Group Delay	≈ 110 ps See *Fig. 4*
Rise Time (10-90%)	4 ps, all options
Connectors (AC / AC+DC)	1.0 mm Standard configuration is jack/plug See page 2 for other configurations
DC/Sense ports	SMA jack
Temperature Limits	-40° to +70° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

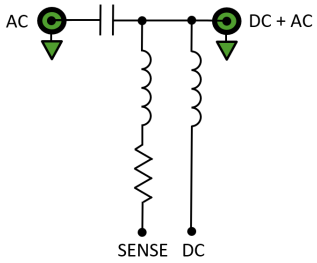
NOTE 1 - Unless otherwise noted, the specifications in this table are typical for Model Number HL8448 using the standard connector configuration (-JP, jack/plug). Full specifications for this and related models are available on page 2 of this datasheet.



HL8448, Option -U-11-JP shown



Typical HL8448 Insertion and Return Loss



HL8448 Schematic and Port Assignments

HL8448 Full Specifications

Parameter	HL8448	Comments
Upper Frequency Limit	> 90 GHz	3 dB roll-off point, relative to nominal insertion loss
Lower Frequency Limit See *Fig. 2*	160 kHz (opt. -11) 200 kHz (opt. -30)	3 dB roll-off point
Maximum Current	175 mA	
Breakdown Voltage	11 V, max (opt. -11) 30 V, max (opt. -30)	
Amplitude Match See *Fig. 5*	± 0.2 dB, f ≤90 GHz, all options	Typical, opt. -M
Phase Match	± 4°, f = 40 GHz (opt. -M)	Typical, opt. -M
Insertion Loss See *Fig. 1*	2 dB to 80 GHz 4.5 dB at 110 GHz	Typical
Return Loss See *Fig. 3*	15 dB, f ≤ 90 GHz	Typical, within specified operating frequency
Rise Time	4 ps	Typical
Group Delay See *Fig. 4*	110 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): jack (J) or plug (P) Port 2 (AC+DC): jack (J) or plug (P) *Standard configuration is -JP*	
Sense Port Connector DC Bias Port Connector	SMA jack SMA jack	
Dimensions (W x D x H)	2.09” x 1.17” x 0.425” 53.1 x 29.7 x 10.8 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	

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

HL8448 Plot Diagrams

Figures 1-5 show the typical S-parameter characteristics of an HL8448. Other models show similar performance within their respective specified bandwidths.

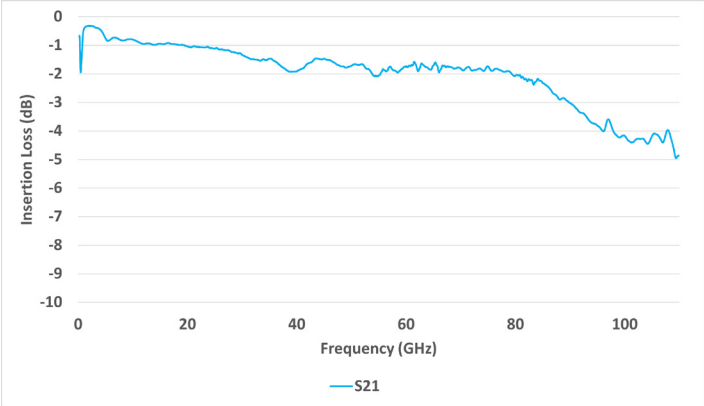


Figure 1: HL8448 Insertion Loss

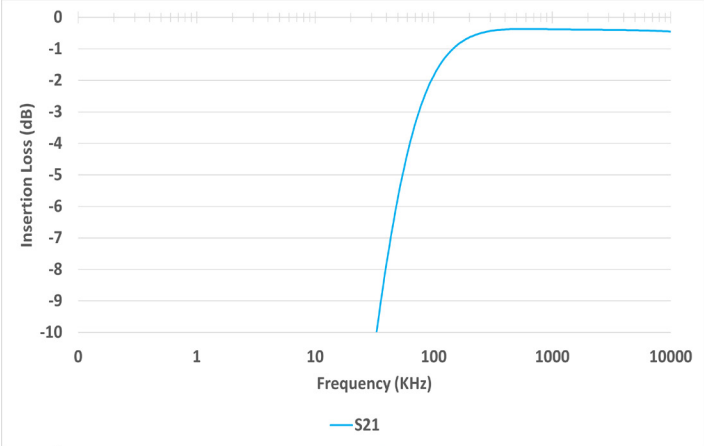


Figure 2: HL8448 Low-frequency Performance (opt. -30)

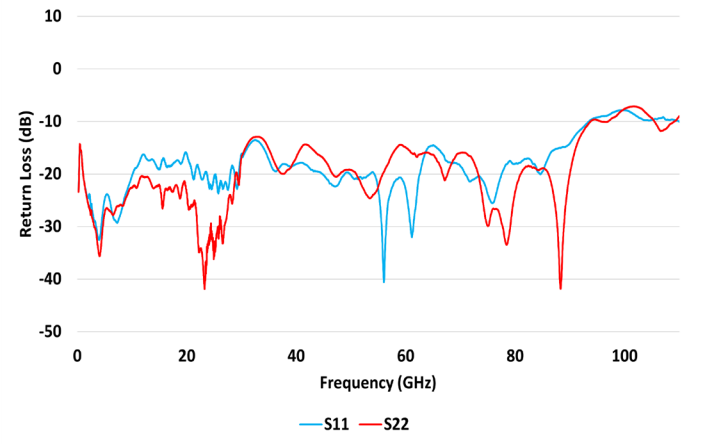


Figure 3: HL8448 Return Loss

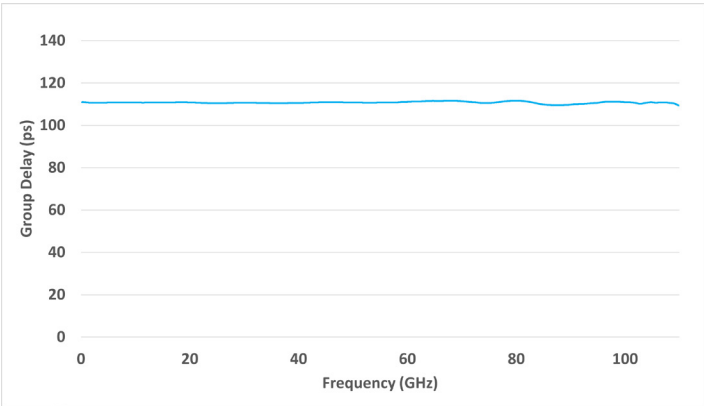


Figure 4: HL8448 Group Delay

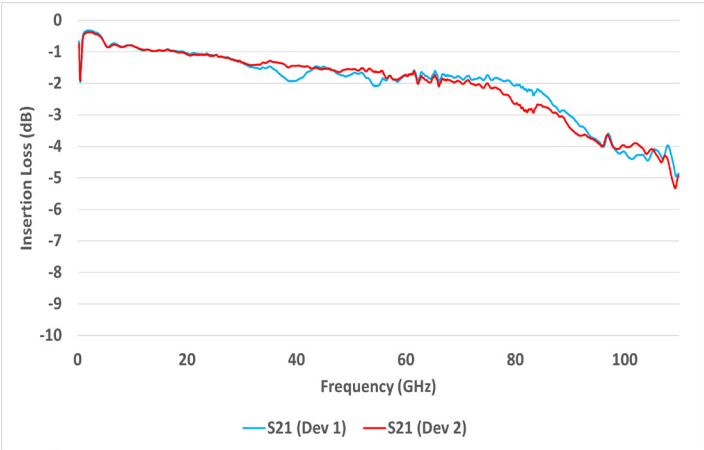


Figure 5: HL8448 Amplitude Matching (opt. -M)

HL8448 Dimensional Drawing

Figure 10 shows a mechanical drawing of an HL8448 (opt. -JJ). Unless otherwise noted, all units are in inches. See page 2 for full dimensions.

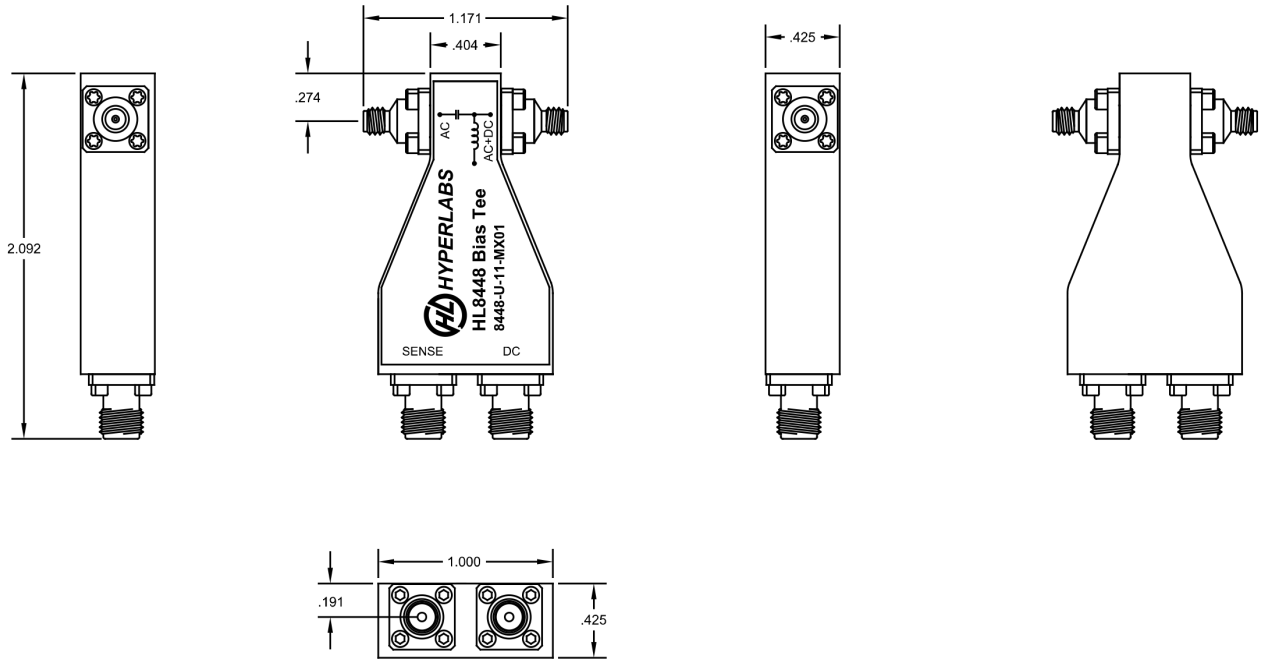


Fig 10: HL8448 Mechanical Drawing