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HL943x Series DC Blocks (35 kHz to 67 GHz)

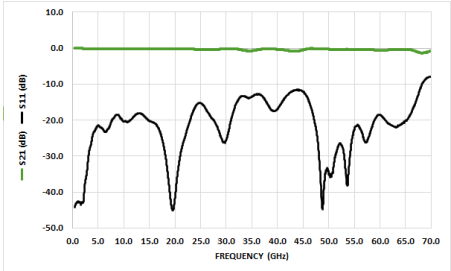
Features and Technical Specifications[1] (HL9437 shown)

Bandwidth	16 kHz to 65 GHz (opt. -10) 35 kHz to 67 GHz (opt. -11) 70 kHz to 67 GHz (opt. -30)
Amplitude Match	± 0.1 dB, f ≤ 67 GHz (opt. -M) See *Fig. 6*
Phase Match	± 4°, f = 40 GHz (opt. -M)
Insertion Loss	< 1 dB, f ≤ 65 GHz (opt. -10) < 1 dB, f ≤ 67 GHz (opt. -11, -30) See *Fig. 1-2*
Return Loss	20 dB, f ≤ 40 GHz (opt. -10) 10 dB, f > 40 GHz (opt. -10) 15 dB, f ≤ 30 GHz (opt. -11, -30) 10 dB, f > 30 GHz (opt. -11, -30) See *Fig. 4-5*
Breakdown Voltage	10 V, max (opt. -10) 11 V, max (opt. -11) 30 V, max (opt. -30)
Group Delay	≈ 105 ps See *Fig. 7*
Rise Time (10-90%)	5 ps, all options
Connectors (PORT 1 / PORT 2)	1.85 mm, jack/jack (opt. -JJ) 1.85 mm, jack/plug (opt. -JP) 1.85 mm, plug/plug (opt. -PP)
Temperature Limits	-40° to +70° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

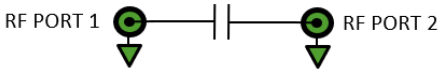
NOTE 1 - Unless otherwise noted, the specifications in this table are typical for Model Number HL9437 using the standard connector configuration (-JP, jack/plug). Full specifications for this and related models are available on Page 2 of this datasheet.



HL9437, Option -M-JP shown



Typical HL9437 Insertion and Return Loss



HL943x Schematic and Port Assignments

PRODUCT SUMMARY

The HL943x series are ultra-broadband DC Blocks with a typical insertion loss of < 1 dB throughout the specified bandwidth range.

The DC block will remove DC bias from the input signal to prevent damage to DC-sensitive devices or equipment.

These devices are suitable for use in 112 Gbps PAM4 communications systems, optical communication systems, high-speed data systems, level shifting, cascading, and interfacing between devices with incompatible DC operating points.

They can also be used to improve RF power measurements when a power meter with DC sensitivities is used.

These DC blocks use silicon-based capacitors which provide excellent thermal and voltage stability,

MODELS & OPTIONS

The following models are available:

- ***HL9434***, 40 GHz
- ***HL9435***, 50 GHz
- ***HL9437***, 67 GHz

The following options are available:

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

- ***-10***, 10 V breakdown
- ***-11***, 11 V breakdown
- ***-30***, 30 V breakdown

- ***-JJ***, jack RF 1 and RF 2
- ***-JP***, jack RF 1, plug RF 2
- ***-PP***, plug RF 1 and RF 2

HL943x Full Specifications

Parameter	HL9434	HL9435	HL9437	Comments
Upper Frequency Limit	40 GHz	50 GHz	65 GHz (opt. -10) 67 GHz (opt. -11, -30)	1 dB typical, relative to nominal insertion loss
Lower Frequency Limit See *Fig. 3*	16 kHz (opt. -10) 35 kHz (opt. -11) 70 kHz (opt. -30)	16 kHz (opt. -10) 35 kHz (opt. -11) 70 kHz (opt. -30)	16 kHz (opt. -10) 35 kHz (opt. -11) 70 kHz (opt. -30)	3 dB roll-off point
Breakdown Voltage	10 V, max (opt. -10) 11 V, max (opt. -11) 30 V, max (opt. -30)			
Amplitude Match See *Fig. 6*	± 0.1 dB, all options			Typical, opt. -M
Phase Match	± 4°, f = 20 GHz			Typical, opt. -M
Insertion Loss *See Fig. 1-2*	< 1 dB, f ≤ 40 GHz	< 1 dB, f ≤ 50 GHz	< 1 dB, f ≤ 67 GHz	All options
Return Loss *See Fig. 4-5*	20 dB, f ≤ 40 GHz (opt. -10) 10 dB, f > 40 GHz (opt. -10) 15 dB, f ≤ 30 GHz (opt. -11, -30) 10 dB, f > 30 GHz (opt. -11, -30)			
Rise Time	8.75 ps	7 ps	5 ps	All options
Group Delay *See Fig. 7*	100 ps	100 ps	105 ps	All options
Capacitance	100 nF ±15% (opt. -10) 47 nF ±15% (opt. -11) 22 nF ±15% (opt. -30)			Silicon capacitors
Impedance	50 Ω			Input and Output
Connectors (PORT 1 / PORT 2)	2.92 mm, jack-jack 2.92 mm, jack-plug 2.92 mm, plug-plug	2.4 mm, jack-jack 2.4 mm, jack-plug 2.4 mm, plug-plug	1.85 mm, jack-jack 1.85 mm, jack-plug 1.85 mm, plug-plug	According to specified option -JJ, -JP, or -PP
Dimensions (W x D x H)	1.23” x 0.375” x 0.375” 31.24 x 9.52 x 9.52 mm	1.29” x 0.375” x 0.375” 32.7 x 9.52 x 9.52 mm	1.11” x 0.375” x 0.375” 28.2 x 9.52 x 9.52 mm	Revised (July 2022) package including connectors
Weight	8 g (0.28 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.

HL9437 Plot Diagrams

Figures 1-5 show the typical S-parameter characteristics of an HL9437. Other models show similar performance within their respective specified bandwidths.

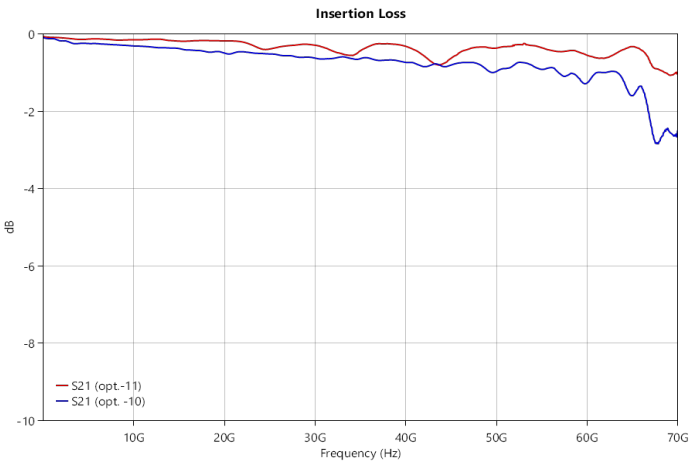


Figure 1: HL9437 (opt.-11) Insertion Loss

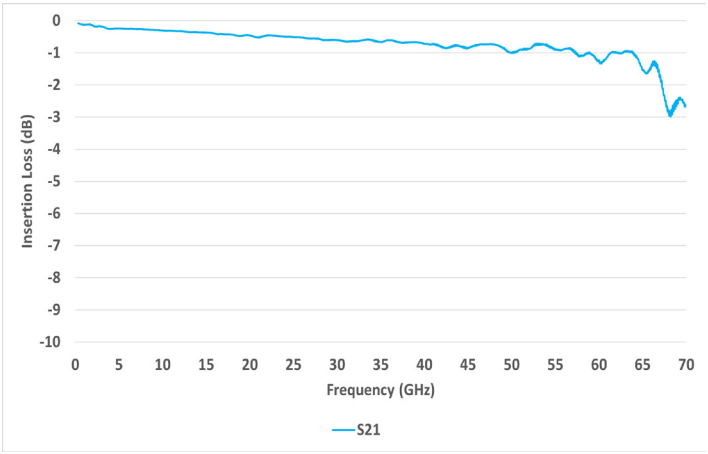


Figure 2: HL9437 (opt.-10) Insertion Loss

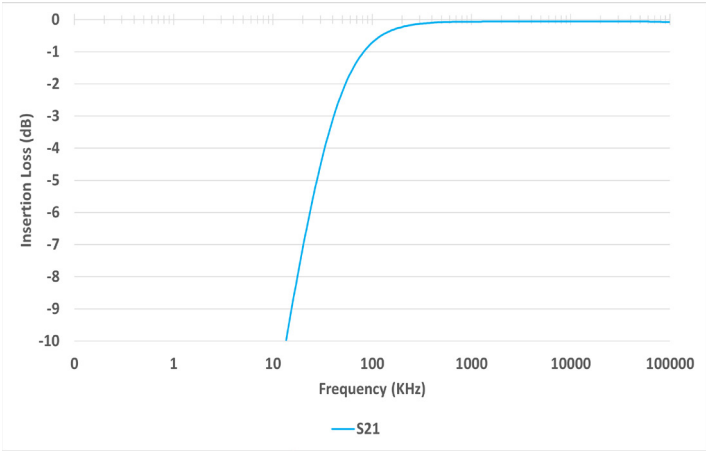


Figure 3: HL9437 (opt. -11) Low Frequency Performance

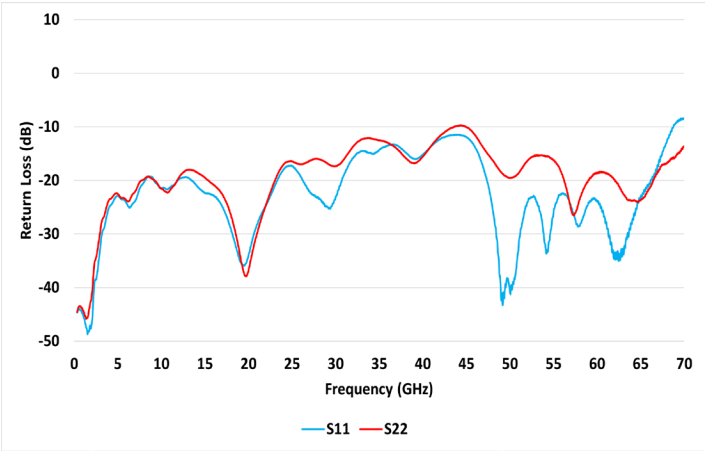


Figure 4: HL9437 (opt. -11) Return Loss

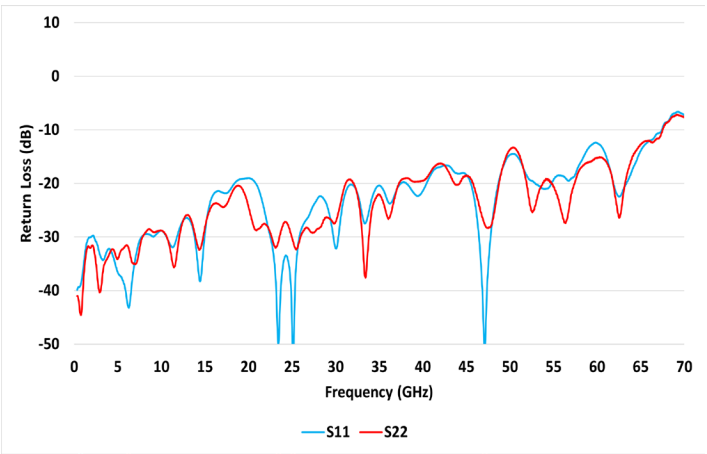


Figure 5: HL9437 (opt. -10) Return Loss

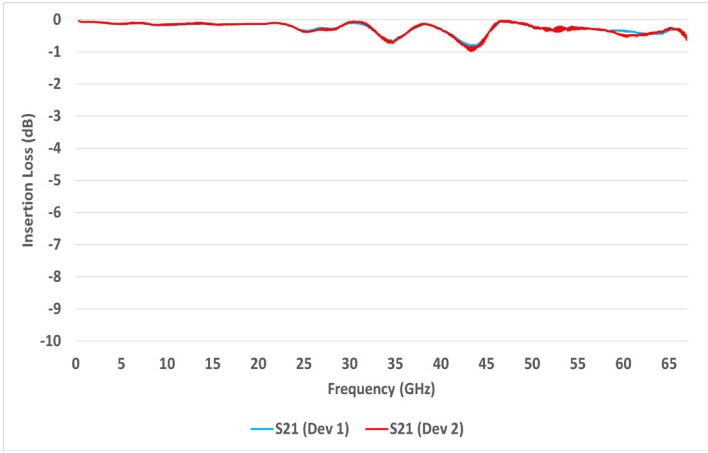


Figure 6: HL9437 Amplitude Matching (opt. -M)

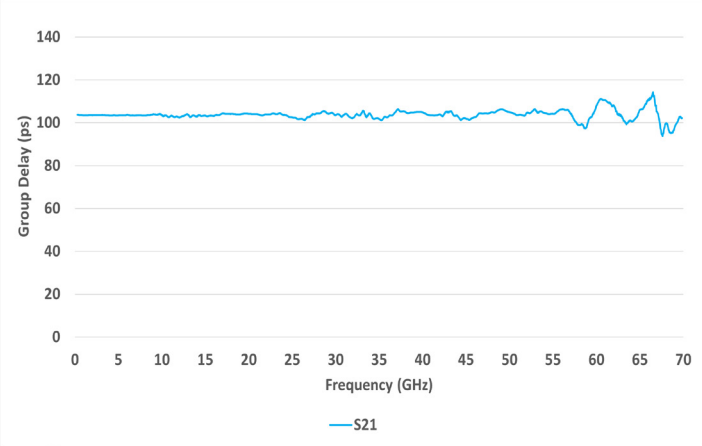


Figure 7: HL9437 Group Delay

HL943x Eye Diagrams

The eye diagrams in *Figures 8-9* show a 56 Gbps PRBS11 pattern passed through an HL9437 (opt. -30).

Figures 10-11 show a 112 Gbps PAM4 signal passed through the HL9437 (opt. -30).

All plots have an input signal amplitude of 395 mV and are shown at 89 mV/div.

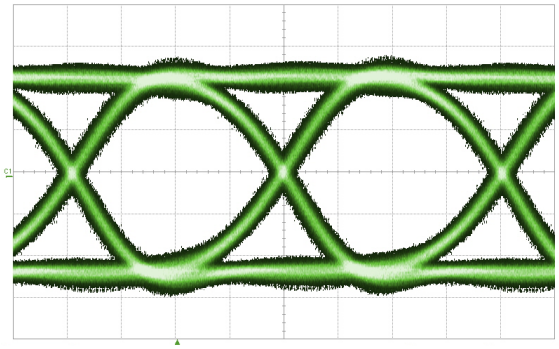


Figure 8: HL9437 56 Gpbs PRBS 11, RF Input

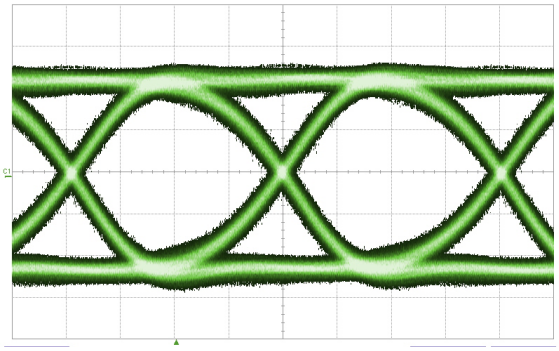


Figure 9: HL9437 56 Gpbs PRBS 11, RF Output

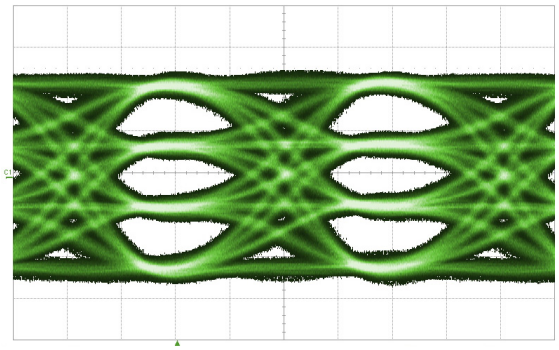


Figure 10: HL9437 112 Gbps PAM4, RF Input

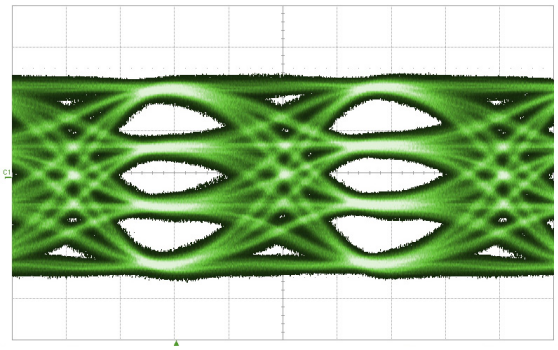


Figure 11: HL9437 112 Gbps PAM4, RF Output

HL943x Dimensional Drawing

Figure 12 shows a mechanical drawing of an HL9434. A new, smaller housing design was introduced in July 2022. Unless otherwise noted, all units are in inches. Other models vary in width based on connectors. See page 2 for full dimensions.

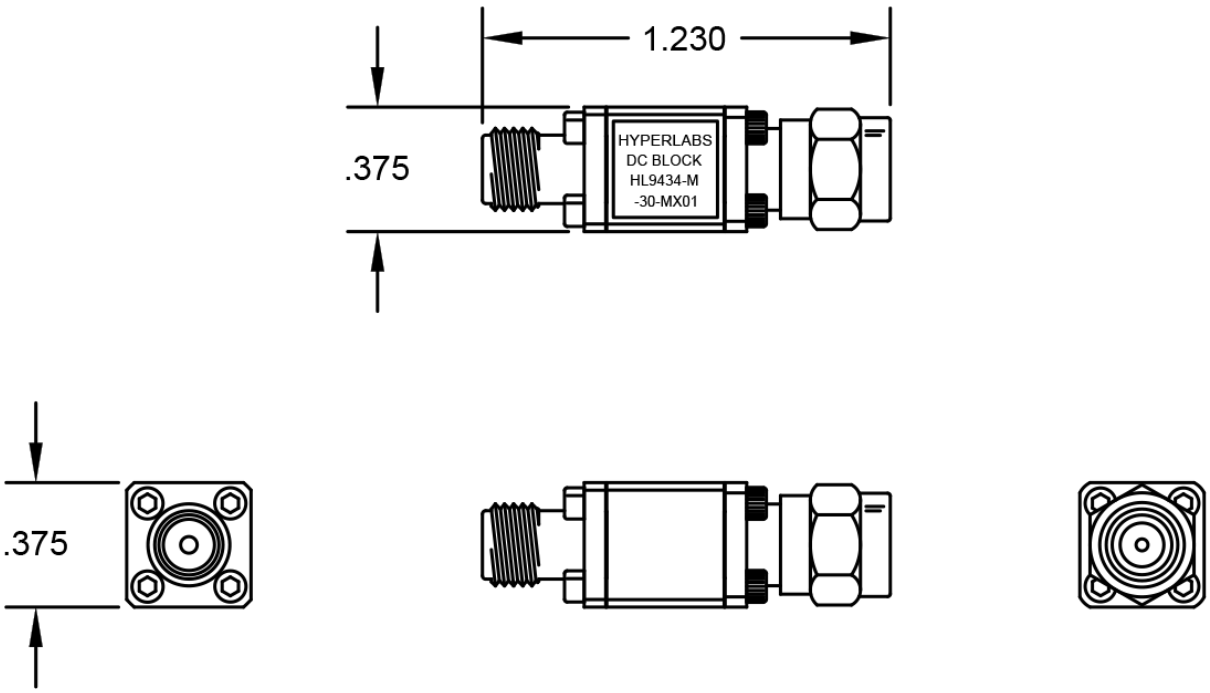


Fig 12: HL9434 Mechanical Drawing