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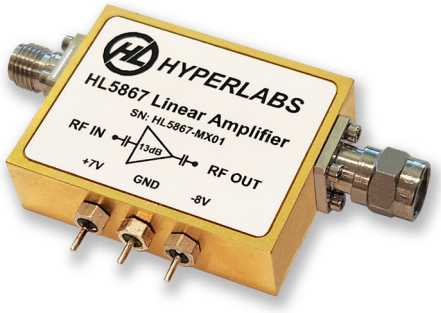
HL5867 Broadband Linear Amplifier (30 GHz)

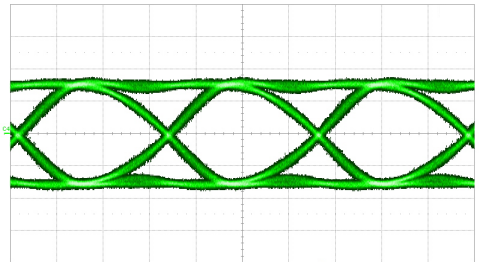
Key Features and Technical Specifications[1]

Bandwidth (3 dB)	35 kHz to 30 GHz
Small Signal Gain	13 dB See *Fig. 1*
Amplitude Deviation	± 2.5%, 0-60° C See *Fig. 3*
XP Deviation	± 2%, 0-60° C See *Fig. 4*
Return Loss	12 dB, input 12 dB, output See *Fig. 2*
Max Power Out (-1 dB gain comp.)	12.5 dBm
Dimensions	55.9 x 33.7 x 10.2 mm (opt. -29-JP) 2.2" x 1.326" x 0.400"
Weight	25 g (0.88 oz)
Temperature Limits	0° to +60° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

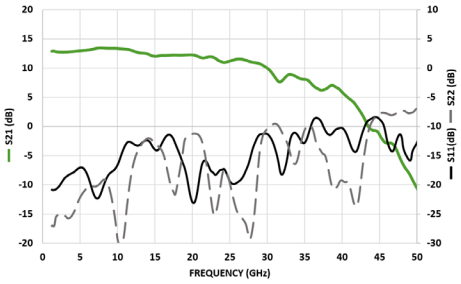
NOTE 1 - The specifications in this table are typical based on configuration -29-JP. Full specifications, are available on Page 2 of this datasheet.



HL5867, option -29-JP shown



28 Gbps PRBS31 pattern on the RF Out port of HL5867-29-JP; see also Figs. 7-12



Typical Small Signal Gain and Return Loss of HL5867-29-JP; see also Figs. 1-2

PRODUCT SUMMARY

The HL5867 is an ultra-broadband, thermally-compensated linear amplifier that demonstrates exceptional gain flatness over a typical bandwidth of 35 kHz to 30 GHz.

The HL5867 is optimized as a data driver to amplify signals with a minimum amount of eye distortion. This is ideal for use as a linear gain block in applications such as fiber optic receiver channels or PAM4 signaling up to 32 Gbps.

DEPLOYMENT NOTES

All specifications contained herein are typical unless otherwise noted.

S-PARAMETERS

S-parameters files are available on our website.

AVAILABLE OPTIONS

Connector size and configuration must be specified from the available options:

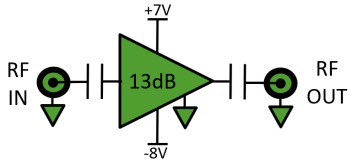
- ***-24***, 2.4 mm connectors
- ***-29***, 2.92 mm connectors

- ***-JP***, jack in, plug out
- ***-PJ***, plug in, jack out
- ***-PP***, plug in & out
- ***-JJ***, jack in & out

Standard configuration is 2.92 mm jack in / plug out (opt. -29-JP)

DEVICE PORT ASSIGNMENTS

For the purposes of this datasheet, the below port assignments are used.



HL5867 Full Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Comments
Upper 3 dB Frequency	-30 dBm ≤ P_{in} ≤ -5 dBm	27 GHz	30 GHz		3 dB roll-off point, relative relative to small signal gain
Lower 3 dB Frequency			35 kHz		3 dB roll-off point,
Small Signal Gain	Input signal = -30 dBm	12 dB	13 dB	14 dB	Avg. from 35 MHz to 2 GHz
Gain Flatness			± 0.5 dB		50 MHz < f < 15 GHz
Deviation from LInear Phase			± 7 deg.		50 MHz < f < 20 GHz
Amplitude Deviation			± 2.5%, 0-60° C		
XP Deviation			± 2%, 0-60° C		
Return Loss, Input			12 dB		50 MHz < f < 30 GHz
Return Loss, Output			12 dB		50 MHz < f < 30 GHz
Group Delay			303 ps		
Input Referred Noise Voltage			105 µV rms		20 GHz broadband measurement
Noise Figure			5 dB	5.5 dB	f = 1 GHz
Max Power Out (1 dB gain compression)			12.5 dBm		
Impedance			50 Ω		
Supply Voltage (+)		+6.5 V_{DC}	+7 V_{DC}	+10 V_{DC}	
Supply Voltage (-)		-8.5 V_{DC}	-8 V_{DC}	-7.5 V_{DC}	
Supply Current (+)			110 mA		
Supply Current (-)			40 mA		
Power Dissipation			1.1 W	2 W	

HL5867 Full Specifications (continued)

Parameter	Conditions	Minimum	Typical	Maximum	Comments
Maximum Allowed Input				15 dBm	Input damage threshold
Input DC Bias Range		-20 V_{DC}		+20 V_{DC}	Input is AC coupled
Output DC Bias Range		-20 V_{DC}		+20 V_{DC}	Output is AC coupled
Operating Temperature		0° C		60° C	Ambient temperature
Storage Temperature		-40° C		125° C	
Polarity	Inverting				
Coupling	AC, input and output				
RF Connectors	2.92 mm (opt. -29); specify jack or plug for both input and output ports 2.4 mm (opt. -24); specify jack or plug for both input and output ports *Standard configuration is 2.92 mm jack/plug (opt. -29-JP)* *Other configurations also available*				
DC Connector	Solder pins				
Dimensions (W x D x H)	55.9 x 33.7 x 10.2 mm (opt. -29-JP) 2.2” x 1.325” x 0.400”				
Weight	25 g. (0.88 oz.)				
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 connector configuration (-29-JP, 2.92 mm jack/plug). Specifications may vary slightly for other configurations.

HL5867 Performance Characteristics

Figures 1-5 show the typical performance characteristics of the HL5867-29-JP

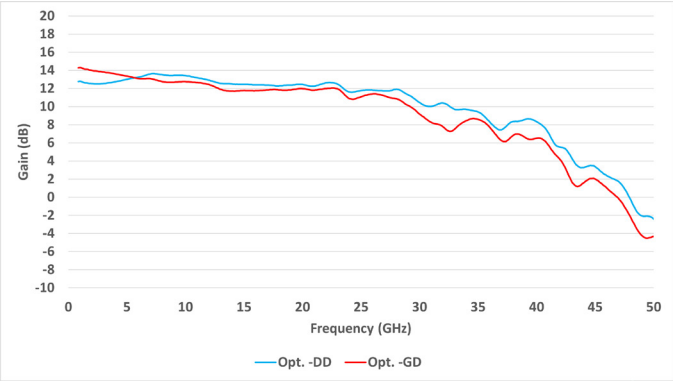


Fig. 1: HL5867 Small Signal Gain

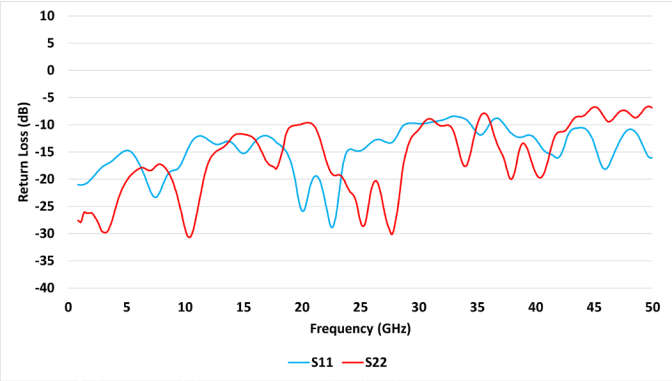


Fig. 2: HL5867 Return Loss

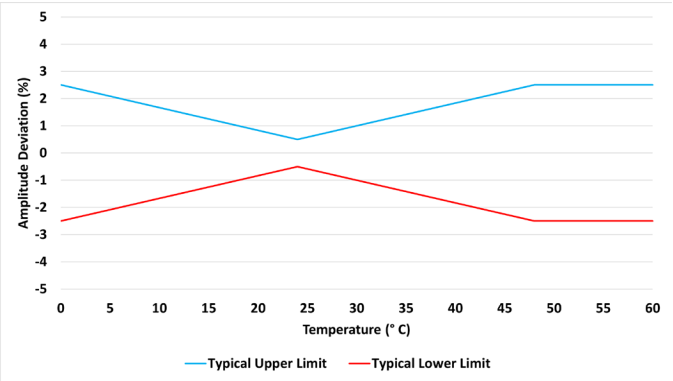


Fig. 3: HL5867 Amplitude Deviation

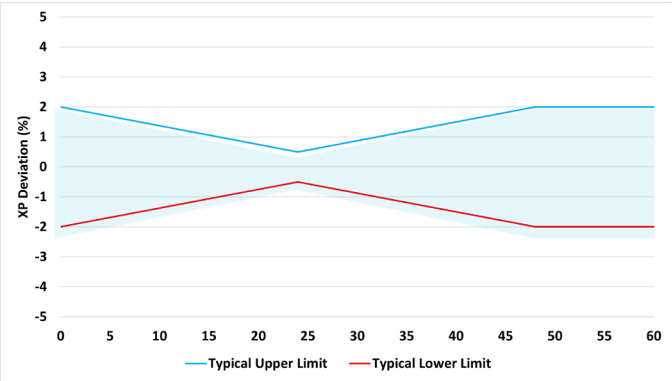


Fig. 4: HL5867 Crossing Point Deviation

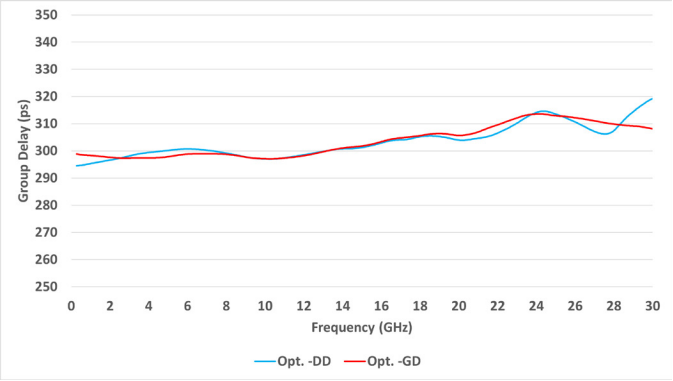


Fig. 5: HL5867 Group Delay

HL5867 Eye Diagrams

The HL5867 is optimized as a data driver and outputs exceptionally clean eyes. *Figure 6* shows an input signal with 250 mV amplitude at 85 mV/div. Figures 7-11 show output eyes generated from a variety of input patterns. All have an amplitude of 360 mV/div

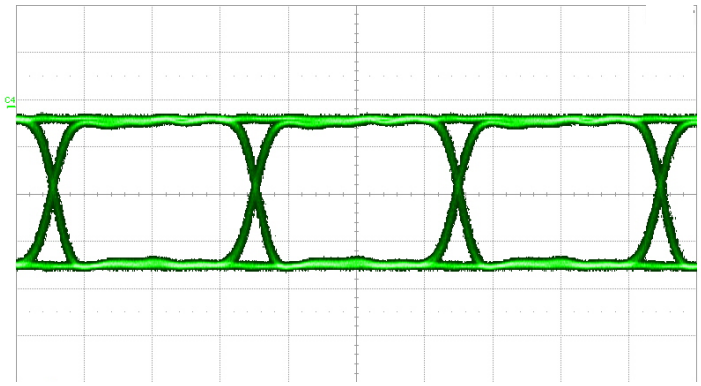


Fig. 6: 12.5 Gbps PRBS31 pattern on RF In

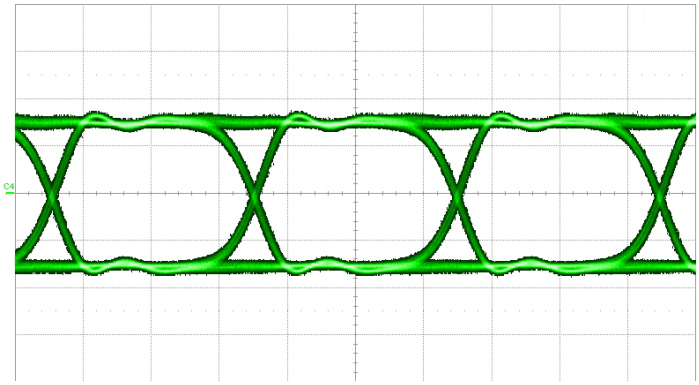


Fig. 7: 12.5 Gbps PRBS31 pattern on RF Out

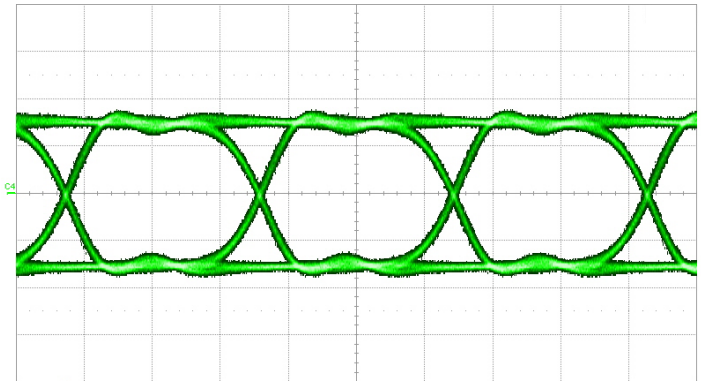


Fig. 8: 16 Gbps PRBS31 pattern on RF Out

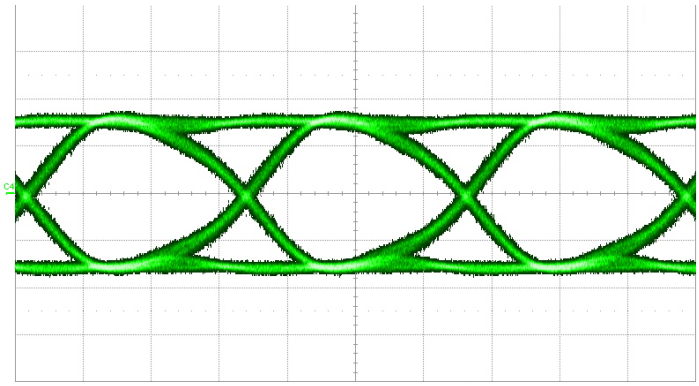


Fig. 9: 25 Gbps PRBS31 pattern on RF Out

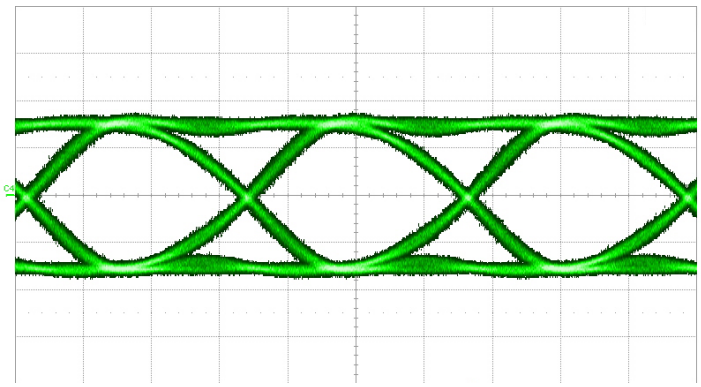


Fig. 10: 28 Gbps PRBS31 pattern on RF Out

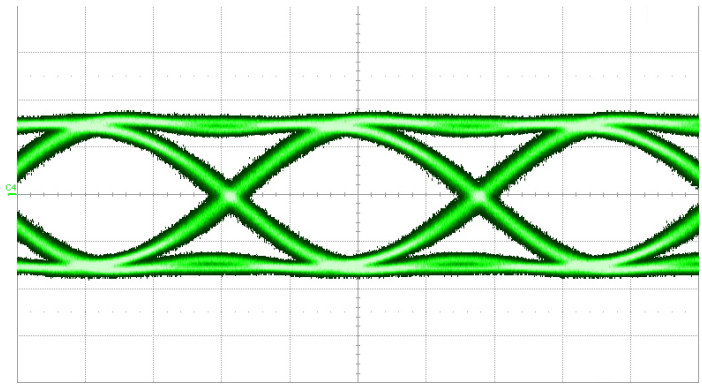


Fig. 11: 32 Gbps PRBS31 pattern on RF Out

HL5867 Dimensional Drawing

Figure 12 shows a mechanical drawing of an HL5867, option -29-JP. Unless otherwise noted, all units are in inches.

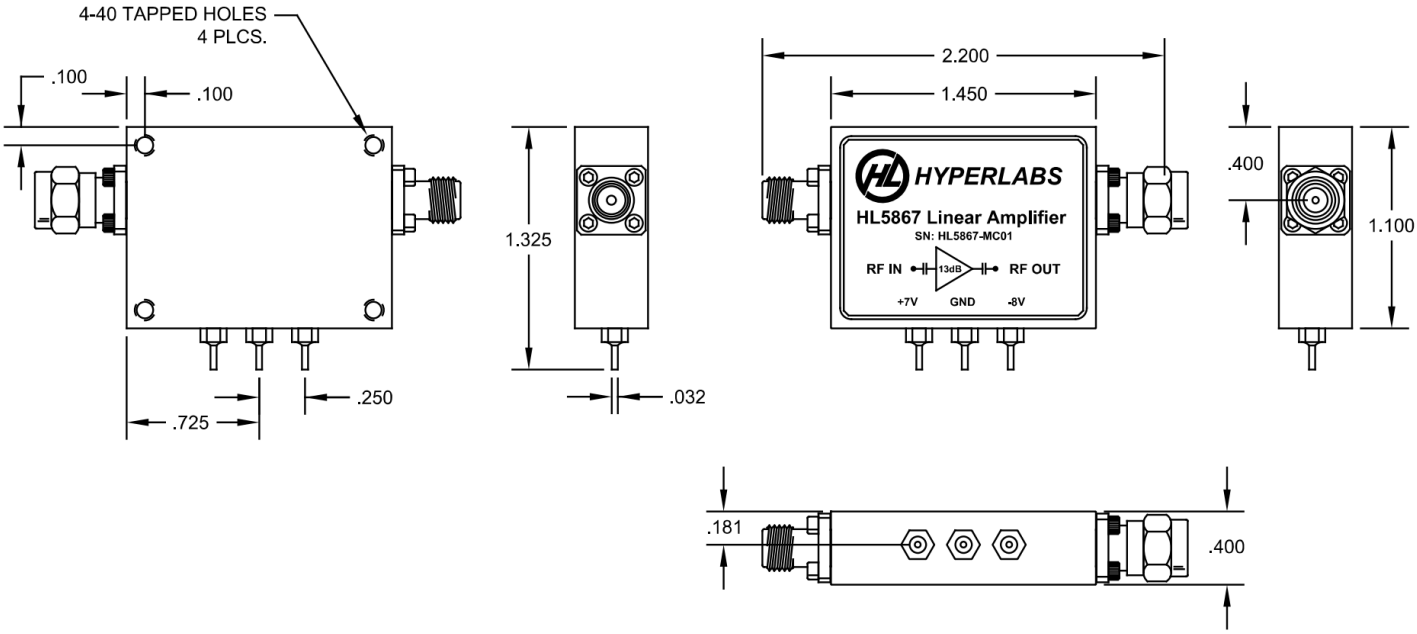


Fig. 12: HL5867 mechnical drawing (opt. -29-JP)