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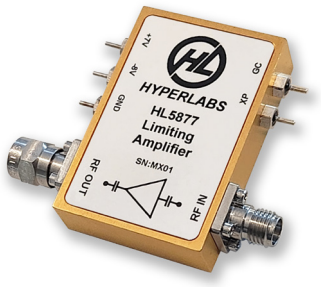
HL5877 Broadband Limiting Amplifier (24 GHz)

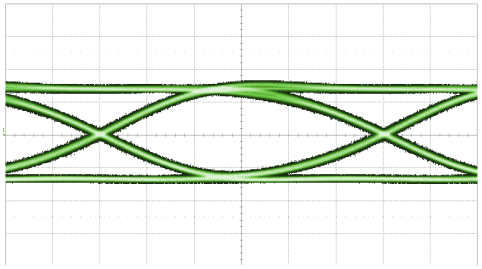
Key Features and Technical Specifications[1]

Bandwidth (3 dB)	35 kHz to 24 GHz
Small Signal Gain	27 dB See *Fig. 1*
Amplitude Deviation	± 3%, 0-60° C See *Fig. 3*
XP Deviation	± 2%, 0-60° C See *Fig. 4*
Return Loss	10 dB, input 10 dB, output See *Fig. 2*
Dimensions	47.24 x 42.16 x 10.2 mm (opt. -29-JJ) 1.86" x 1.66" x 0.400"
Weight	27 g (0.95 oz)
Temperature Limits	0° to +60° C, operating
RoHS Compliant	Yes, assembled with lead-free solder
REACH Compliant	Yes
Warranty	1 year, see website

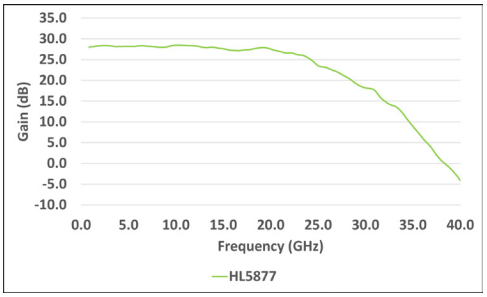
NOTE 1 - The specifications in this table are typical based on configuration -29-JP. Full specifications, are available on Pages 2-3 of this datasheet.



HL5877, option -29-JP shown



24 Gbps PRBS7pattern on the RF Out port of HL5877-29-JP; see also Figs. 5-10



Typical Small Signal Gain of HL5877-29-JP; see also Fig. 1

PRODUCT SUMMARY

The HL5877 is an ultra-broadband, thermally-compensated limiting amplifier. The HL5877 demonstrates exceptional input sensitivity, allowing amplification of very small input signals while responding with a limited range of output amplitude. The HL5877 allows user control of both output amplitude and eye pattern crossing point.

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:

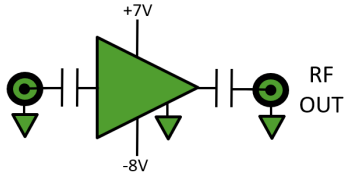
- ***-24***, 2.4 mm connectors
- ***-29***, 2.92 mm connectors

- ***-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.



HL5877 Full Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Comments
Upper 3 dB Frequency	-30 dBm ≤ P_{in} ≤ -5 dBm		24 GHz		3 dB roll-off point, relative to avg. gain from 35 MHz to 2 GHz
Lower 3 dB Frequency			35 kHz		3 dB roll-off point
Small Signal Gain	Input signal = -30 dBm	24 dB	27 dB		Avg. from 35 MHz to 2 GHz
Calibrated Output Amplitude	V_{in} = 100 mV_{P-P}	0.95 V_{P-P}	1.0 V_{P-P}	1.05 V_{P-P}	
Output Amplitude at Maximum Input	V_{in} = 850 mV_{P-P}	1.0 V_{P-P}			
Return Loss, Input			10 dB		35 MHz < f < 24 GHz
Return Loss, Output			10 dB		35 MHz < f < 24 GHz
Group Delay			320 ps		
Input Referred Noise Voltage			290 µV rms		20 GHz broadband measurement
Impedance			50 Ω		
Polarity		Non-inverting			
Coupling		AC, input and output			
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 (+)			220 mA		
Supply Current (-)			30 mA		
Power Dissipation			1.8 W	2.75 W	

HL5877 Full Specifications (continued)

Parameter	Conditions	Minimum	Typical	Maximum	Comments
Recommended Input Range		25 mV_{P-P}		850 mV_{P-P}	
Damage Threshold Input				900 mV_{P-P}	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
Amplitude Control	0V on GC pin V_{in} = 100 mV_{P-P}		1 V_{P-P}		V_{out}
Amplitude Control	5V on GC pin V_{in} = 100 mV_{P-P}			0.5 V_{P-P}	V_{out}
Crossing % Point Control	-5 to +5 V on XP pin	35%		65%	V_{XP} sensitivity is a function of V_{in} amplitude
Operating Temperature		0° C		60° C	Ambient temperature
Storage Temperature		-40° C		125° C	
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)	47.24 x 42.16 x 10.2 mm (opt. -29-JJ) 1.86” x 1.66” x 0.400”				
Weight	27 g. (0.95 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/jack). Specifications may vary slightly for other configurations.

HL5877 Gain

Figure 1 shows the small signal gain of the HL5877 to 40 GHz.

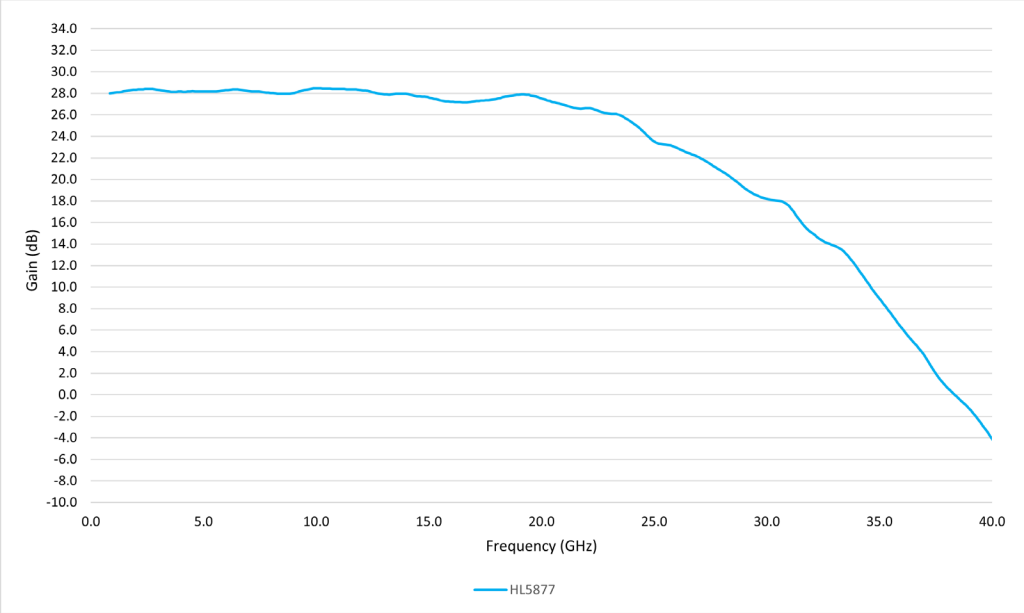


Figure 1: HL5877 Gain (opt. -29-JP), P_{in} = -30 dBm

HL5877 Return Loss

Figure 2 shows the return loss of the HL5877 to 40 GHz.

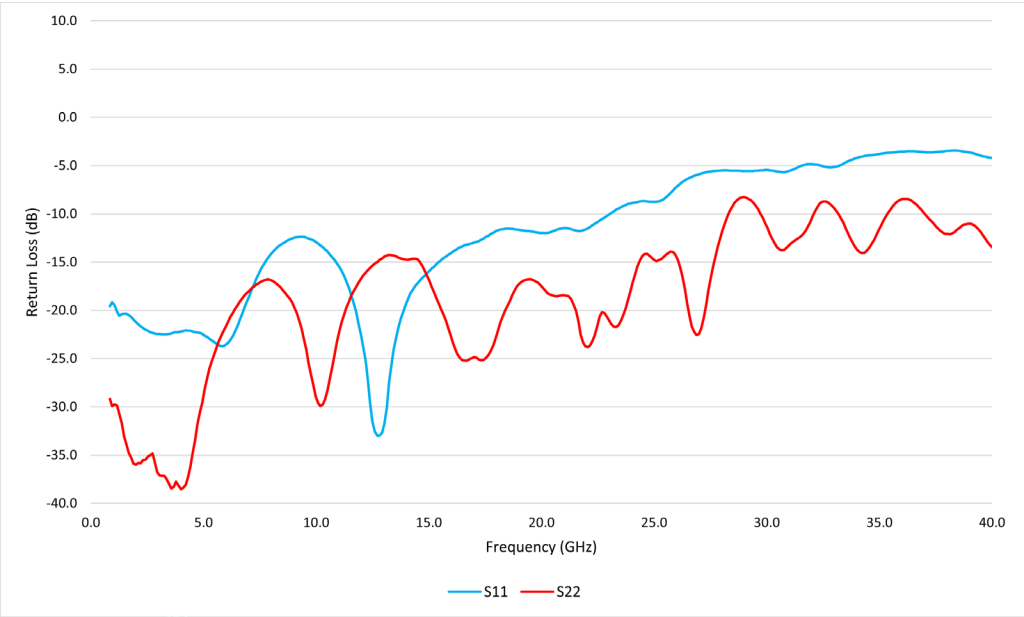


Figure 2: HL5877 Return Loss (opt. -29-JP)

HL5877 Performance Over Temperature

Figures 3-4 show the typical amplitude deviation and the typical crossing point (XP) deviation, respectively, over the operating temperature range of 0 to +60 °C, when the input signal amplitude = 100 mV.

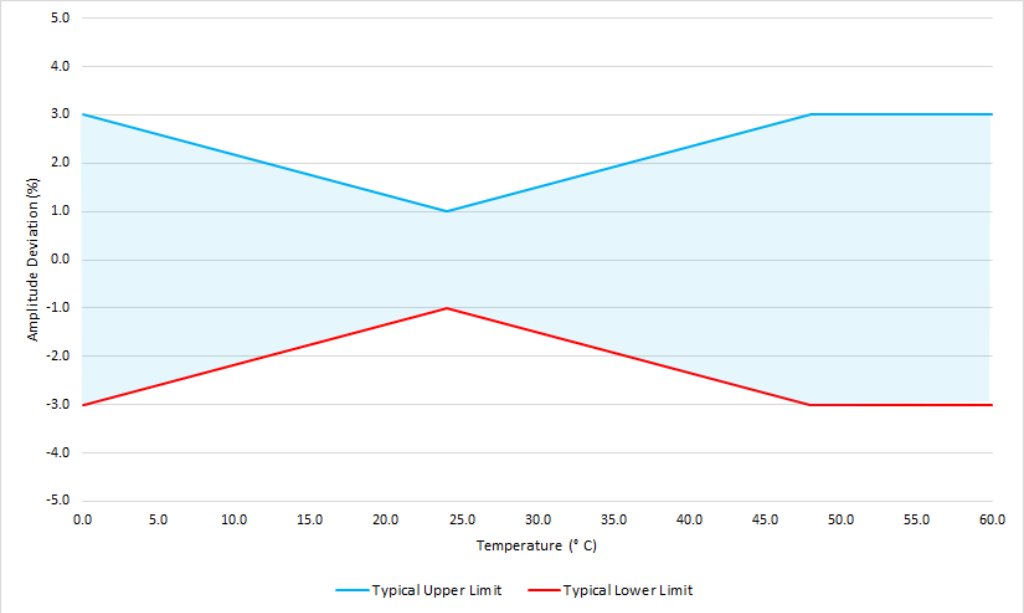


Figure 3: HL5877 Amplitude Deviation

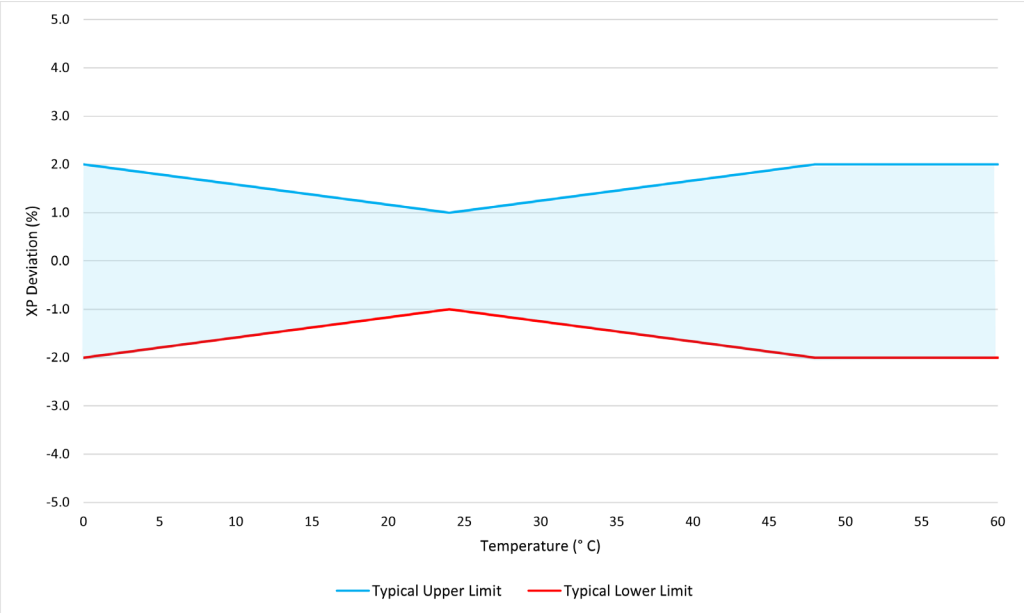


Figure 4: HL5877 Crossing Point Deviation

HL5877 Eye Diagrams

Figures 5, 7, and 9 show input signals at 3 different amplitude levels.

Figures 6, 8, and 10 show output eyes generated from the corresponding input signal levels.

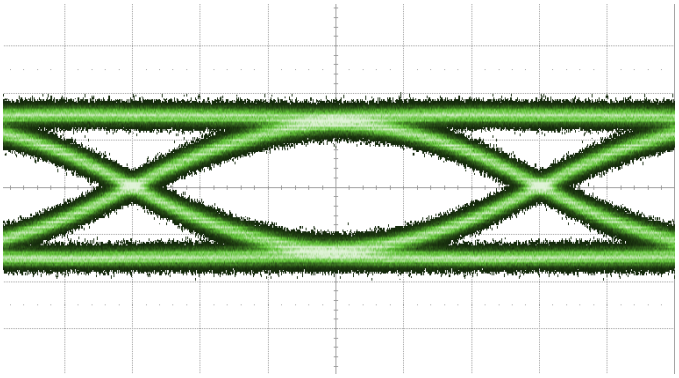


Fig. 5: 24 Gbps PRBS7 pattern on RF In, 16mV/div.

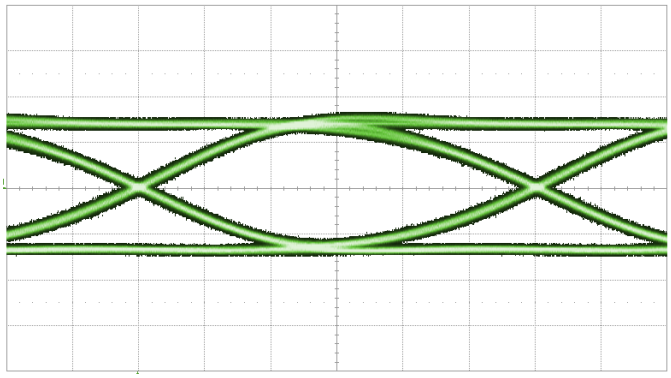


Fig. 6: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

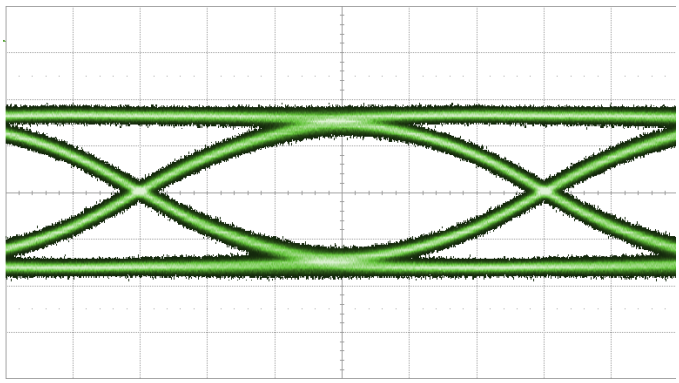


Fig. 7: 24 Gbps PRBS7 pattern on RF In, 30mV/div.

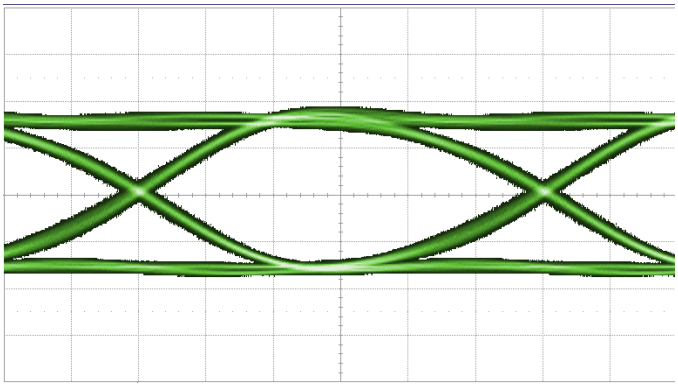


Fig. 8: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

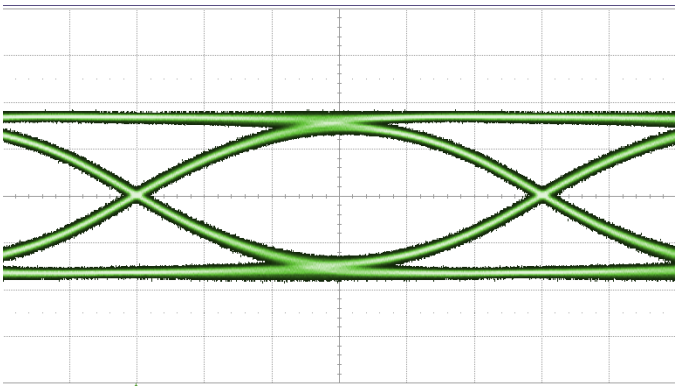


Fig. 9: 24 Gbps PRBS7 pattern on RF In, 260mV/div

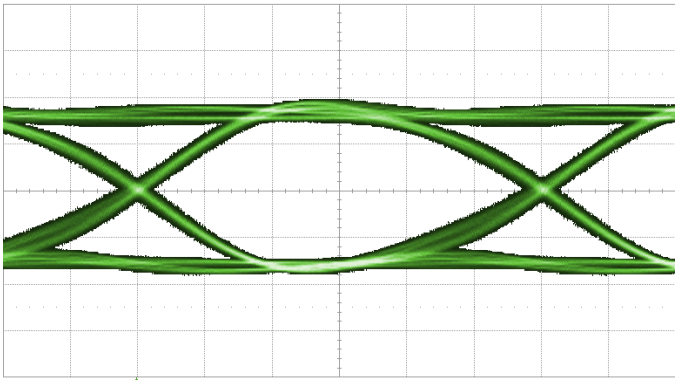


Fig. 10: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

HL5877 Dimensional Drawing

Figure 11 shows a mechanical drawing of an HL5877, option -29-JP. Unless otherwise noted, all units are in inches.

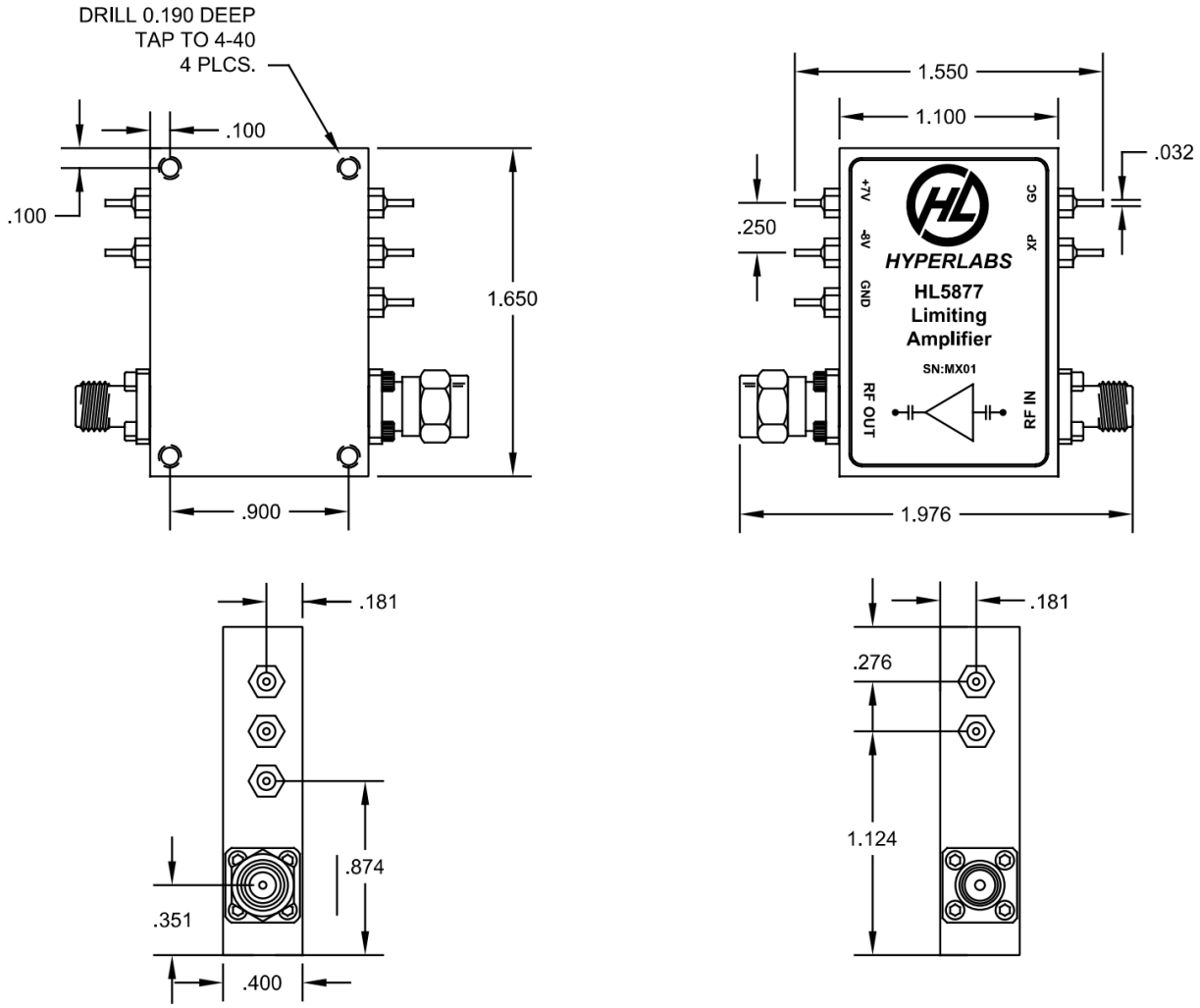


Figure 11: HL5877 mechnical drawing (opt. -29-JP), inches