

HL5877 Broadband Limiting Amplifier (24 GHz)

Key Features and Technical Specifications¹

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. Full specifications, are available on Pages 2-3 of this datasheet.

PRODUCT SUMMARY

The HL5877 is an ultra-broadband, thermal-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.

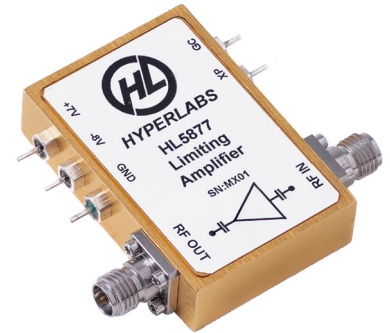
S-PARAMETERS

S-parameters files are available on our website.

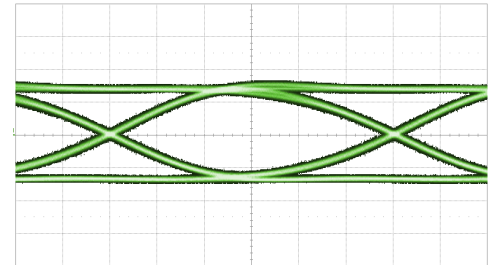
AVAILABLE OPTIONS

The following options and configurations are available for this product:

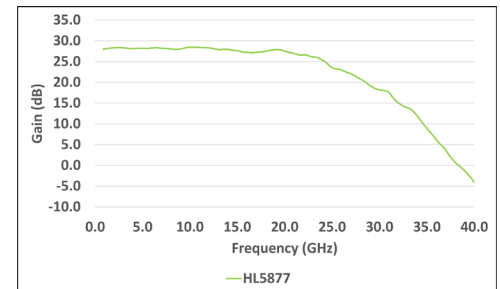
- 24, 2.4 mm connectors
- 29, 2.92 mm connectors
- PP, plug in & out
- PJ, plug in, jack out
- JJ, jack in & out
- JP, jack in, plug out



HL5877, option -29-JJ shown



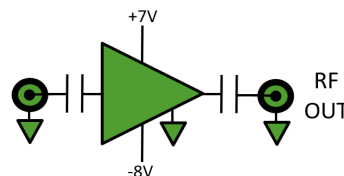
24 Gbps PRBS7 pattern on the RF Out port of HL5877-29-JJ; see also Figs. 5-10



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

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	$-30 \text{ dBm} \leq P_{in} \leq -5 \text{ dBm}$	22 GHz	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	$V_{in} = 100 \text{ mV}_{P-P}$	$0.95 V_{P-P}$	$1.0 V_{P-P}$	$1.05 V_{P-P}$	
Output Amplitude at Maximum Input	$V_{in} = 850 \text{ mV}_{P-P}$	$1.0 V_{P-P}$			
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			500 $\mu\text{V rms}$		
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			3.5 W	3.75 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 jack/female (opt. -29) 2.4 mm jack/female (opt. -24)				
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				

HL5877 Gain

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

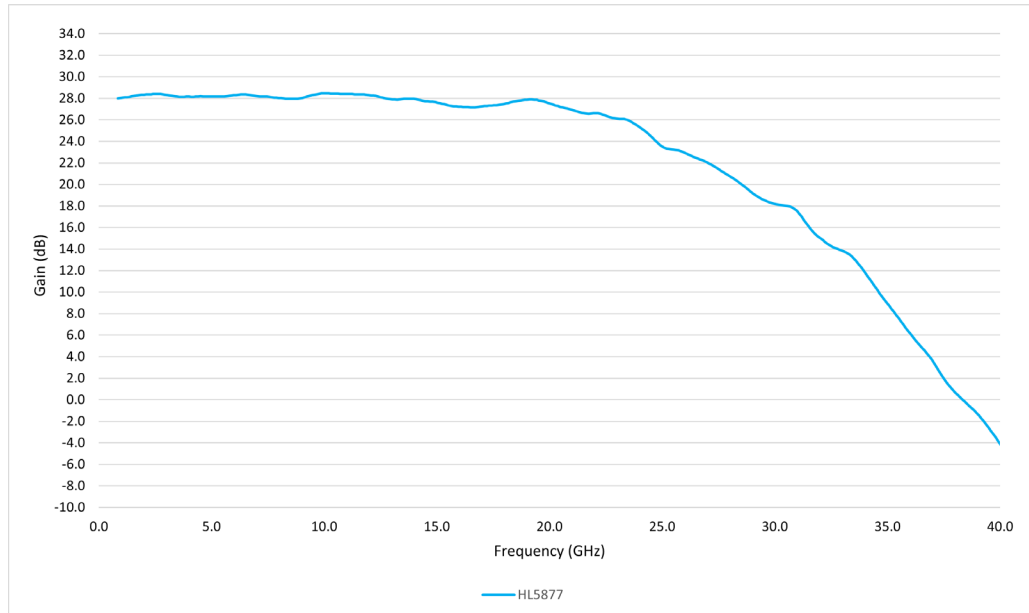


Figure 1: HL5877 Gain (opt. -29-JJ), $P_m = -30$ dBm

HL5877 Return Loss

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

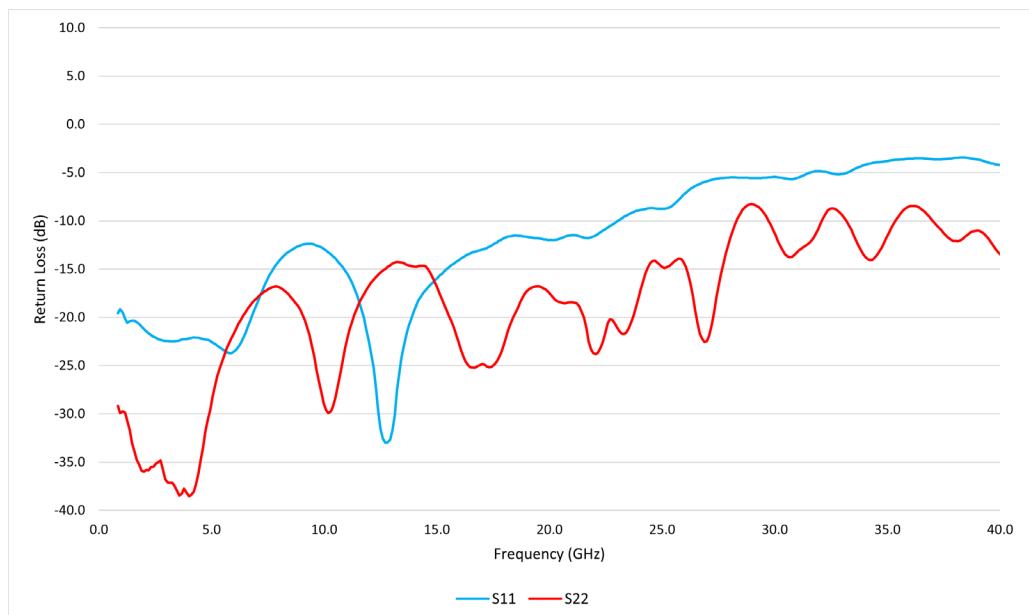


Figure 2: HL5877 Return Loss (opt. -29-JJ)

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.

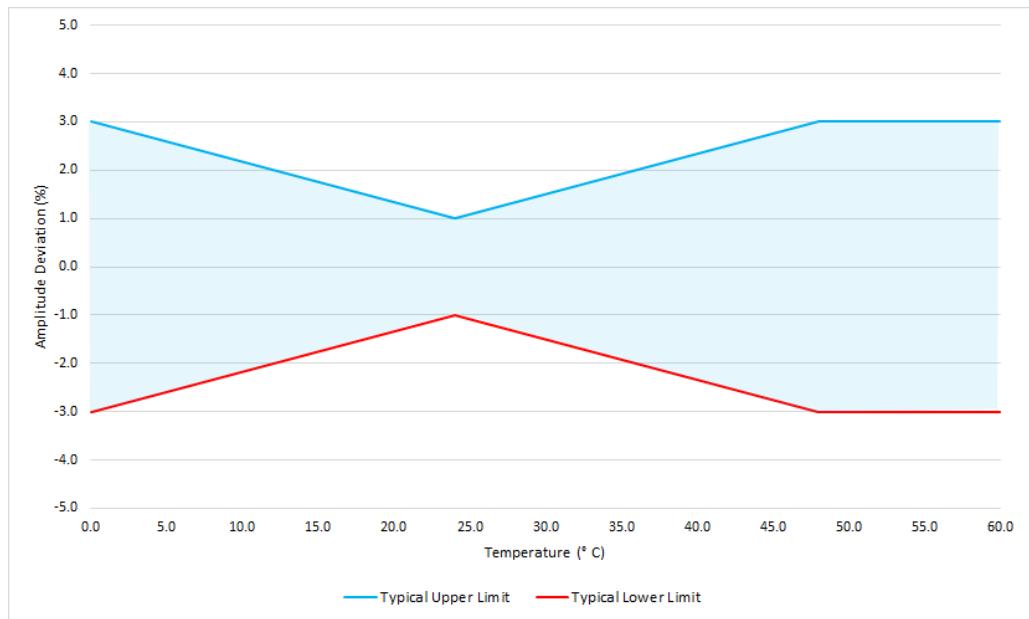


Figure 3: HL5877 Amplitude Deviation (all options)

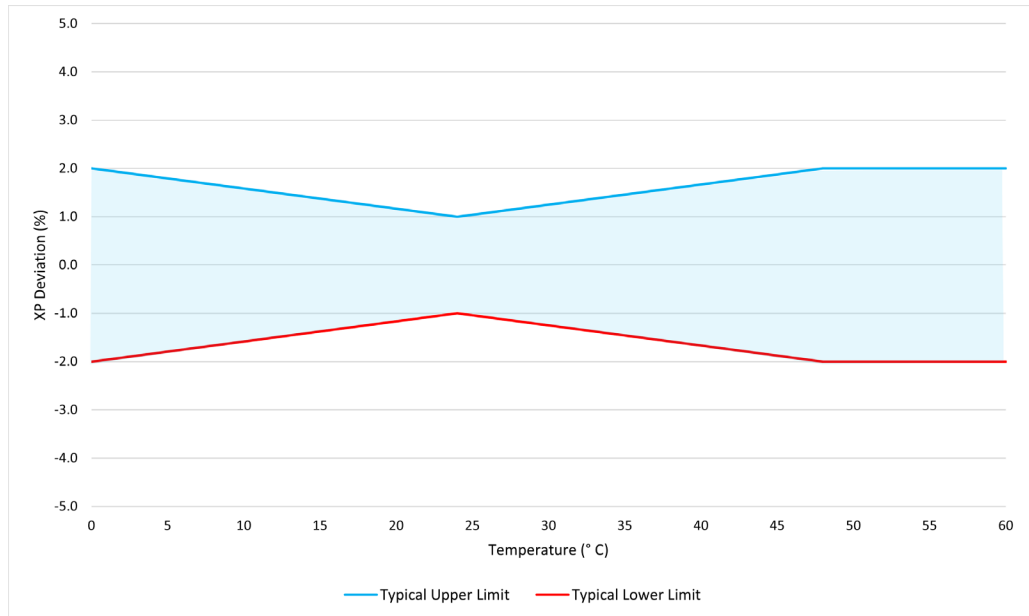


Figure 4: HL5877 Crossing Point Deviation (all options)



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.

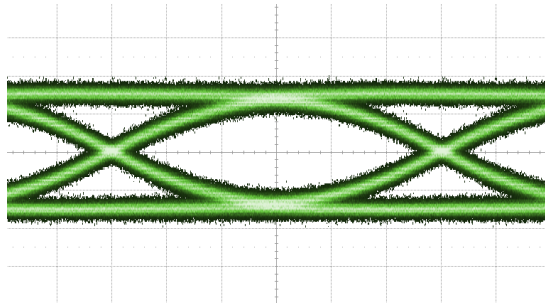


Fig. 5: 24 Gbps PRBS7 pattern on RF In, 16mV/div.

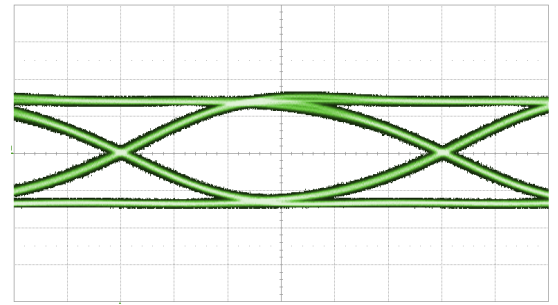


Fig. 6: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

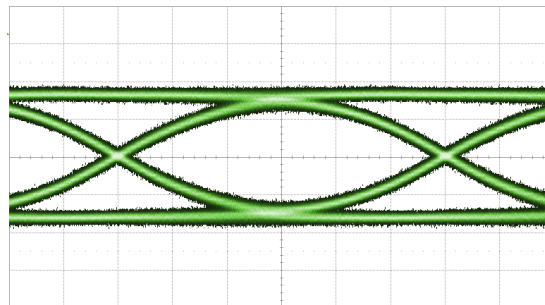


Fig. 7: 24 Gbps PRBS7 pattern on RF In, 30mV/div.

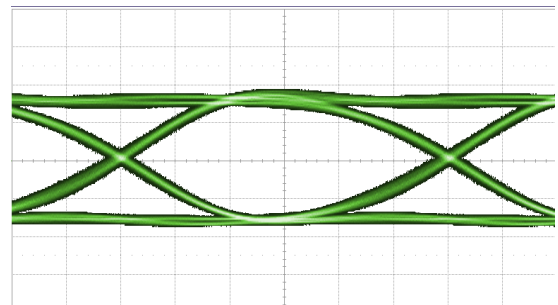


Fig. 8: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

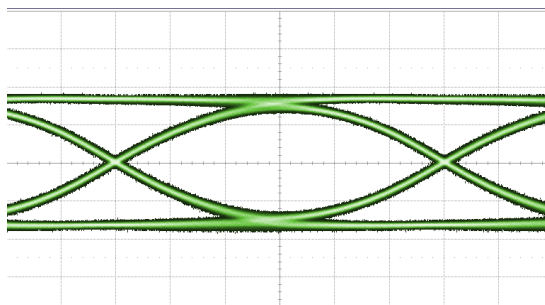


Fig. 9: 24 Gbps PRBS7 pattern on RF In, 260mV/div

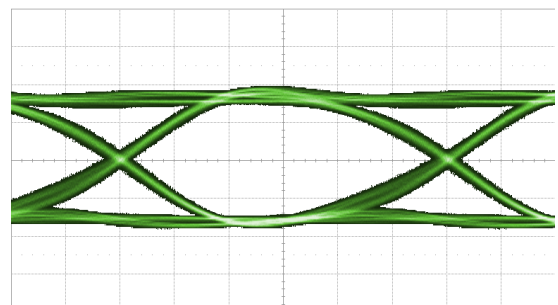


Fig. 10: 24 Gbps PRBS7 pattern on RF Out, 325mV/div.

HL5877 Dimensional Drawing

Figure 13 shows a mechanical drawing of an HL5877, option -29-JJ. Unless otherwise noted, all units are in inches.

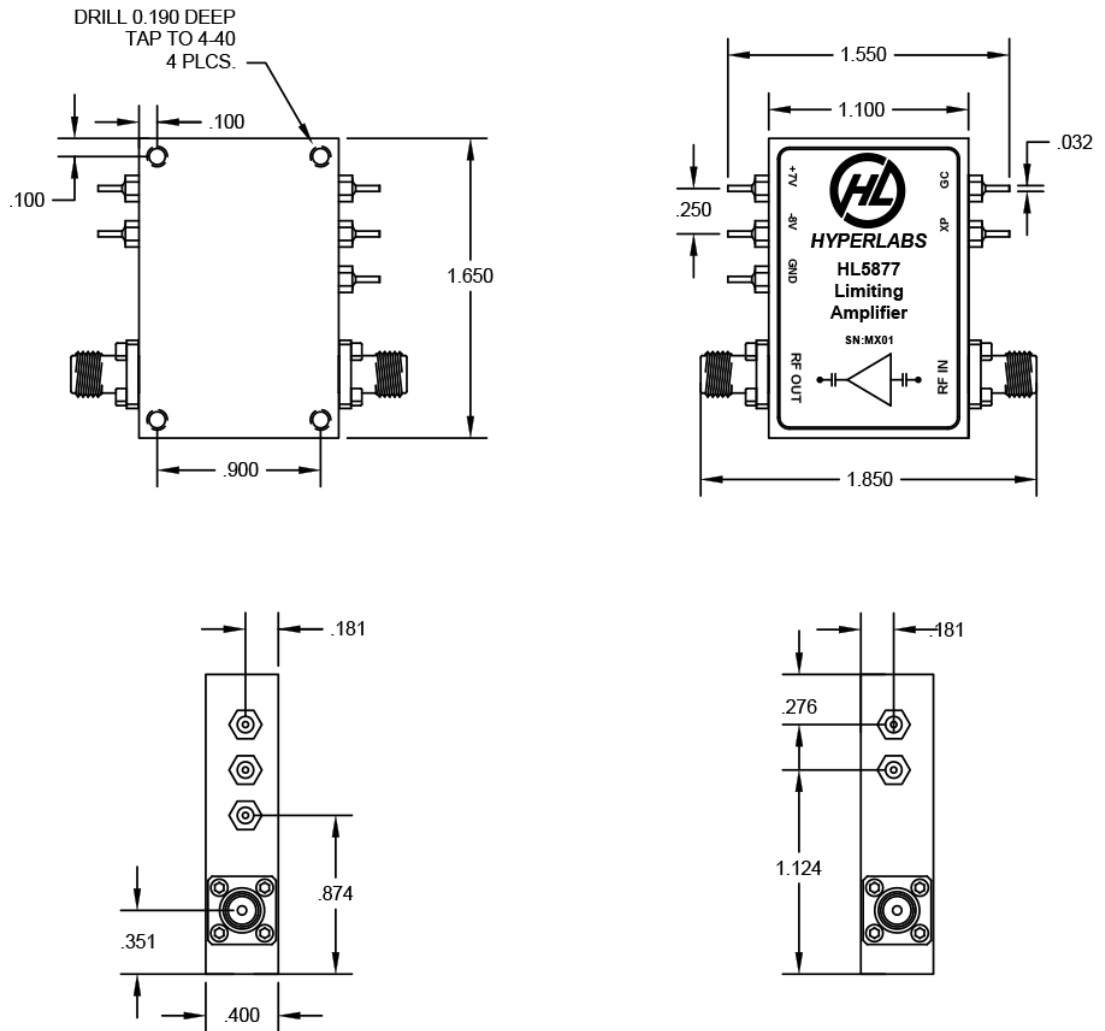


Figure 13: HL5877 mechanical drawing (opt. -29-JJ), inches