HYPERLABS™
Innovation at Hyperspeed since 1992

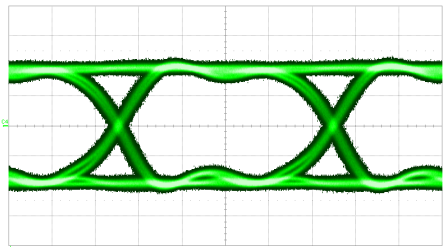
HL9452 Transition Time Converters (1-15 GHz)

Options and Technical Specifications

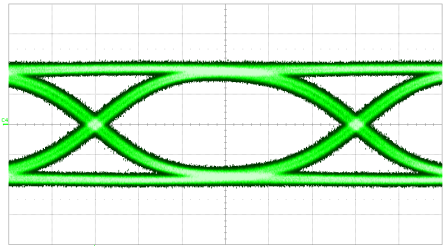
Option	Rise Time	Bandwidth (-3 dB fc)
-24	24 ps	14.5 GHz
-25	25 ps	14 GHz
-27	27 ps	13 GHz
-28	28 ps	12.5 GHz
-29	29 ps	12 GHz
-31	31 ps	11.3 GHz
-33	33 ps	10.6 GHz
-47	47 ps	7.46 GHz
-60	60 ps	5.83 GHz
-100	100 ps	3.5 GHz
-150	150 ps	2.33 GHz
-200	200 ps	1.75 GHz
-350	350 ps	1 GHz
-xxx	Custom	Custom

Common Specifications	
Insertion Loss	~0.07 to 0.24 dB (varies by option) *See full specifications on pg. 2*
Group Delay (100 MHz to fc)	Varies by rise time option *See full specifications on pg. 2*
Return Loss (DC to 3 fc)	~17 dB (varies by option) *See full specifications on pg. 2*
Max Input Power	1 W
Impedance	50 Ω
Connectors	SMA, -JP, Jack/Plug (standard) Other connector sizes (2.92 & 2.4 mm) available for additional charge
Dimensions	1.80” x 0.60” x 0.40” 45.72 x15.24 x 10.16 mm
Weight	14 g (0.49 oz.)
Temperature Limits	-40° to +40° C, operating
RoHS Compliance	RoHS compliant; made with lead-free solder
Warranty	1 year, see website

HL9452



16 Gbps PRBS31 pattern at RF Input of HL9452-28; see also Figs. 5-6 below



16 Gbps PRBS31 pattern at RF Output of HL9452-28

PRODUCT SUMMARY

The HL9452 family of Tranistion Time Converters is based on low-pass absorptive rise time filters to provide superior return loss and flat group delay at frequencies from 1 to beyond 15 GHz.

Designed using a proprietary absorptive filtering, these filters offer similar frequency response as 4th order Bessel-Thompson filters.

These filters are suitable for OEM use in high-speed telecom and digital networks, as anti-aliasing filters in digital oscilloscopes, and to limit the RF bandwidth to known values.

DEPLOYMENT NOTES

All specifications contained herein are typical unless otherwise noted.

S-parameter files and higher resolution versions of the plots on the following pages are available on our website.

These devices are bidirectional.

ORDERING DETAILS

Please specify rise time and connector options at time of order.

Eg., HL9452-60-JP

CUSTOM FILTERS

In addition to the options listed in this datasheet, HYPERLABS offers customers quick-turn custom filter designs up to 45 GHz.

Please contact us for more information about these custom designs.

HL9452 Full Specifications

Option	Rise Time	Bandwidth (-3 dB fc)	Insertion Loss (dB)	Return Loss (dB)	Group Delay (ps)
-24	24 ps	14.5 GHz	0.07	15	268
-25	25 ps	14 GHz	0.07	18	268
-27	27ps	13 GHz	0.08	16	269
-28	28 ps	12.5 GHz	0.08	17	271
-29	29 ps	12 GHz	0.07	19	269
-31	31 ps	11.3 GHz	0.1	18	270
-33	33 ps	10.6 GHz	0.1	17	273
-47	47 ps	7.46 GHz	0.1	15	262
-60	60 ps	5.83 GHz	0.11	20	267
-100	100 ps	3.5 GHz	0.15	20	286
-150	150 ps	2.33 GHz	0.2	19	283
-200	200 ps	1.75 GHz	0.24	20	329

Parameter	Common Specifications	Comments
Max Input Power	1 W (+30 dBm)	
Impedance	50 Ω	Input and Output
Connector Configuration (specify when ordering)	SMA, Jack/Plug (standard) Other connector sizes (2.92 and 2.4 mm) available for additional charge	-JP -PP -JJ
Dimensions (W x D x H)	1.80” x 0.60” x 0.40” 45.72 x15.24 x 10.16 mm	Package including connectors
Weight	14 g (0.49 oz.)	
Operating Temp.	-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. Specifications may vary slightly for other configurations.

HL9452 Plot and Eye Diagrams

Figures 1-4 show the typical characteristics for various HL9452 rise time options. Other options show similar performance within their respective specified rise times. Figures 5-6 show the eye diagrams for a 16 Gbps PRBS31 pattern passing through an HL9452-28.

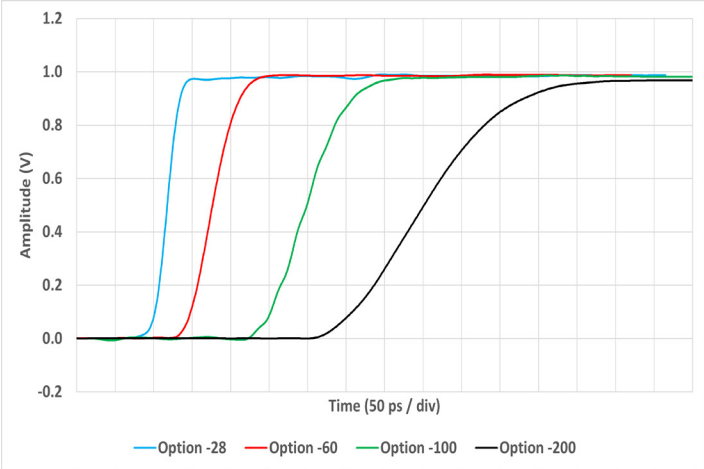


Figure 1: Typical HL9452 step response, various

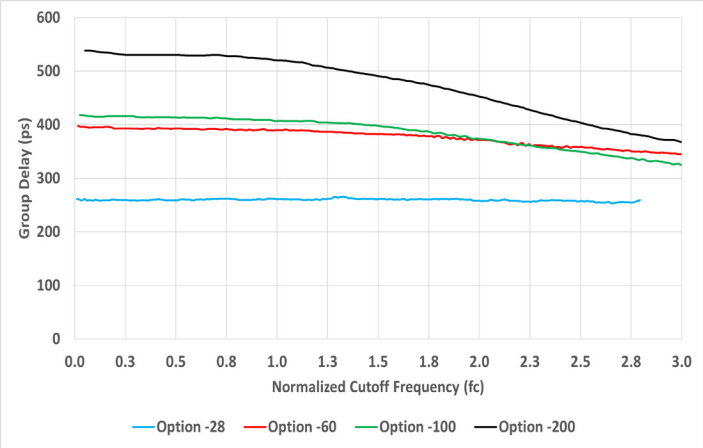


Figure 2: Typical HL9452 group delay, various options

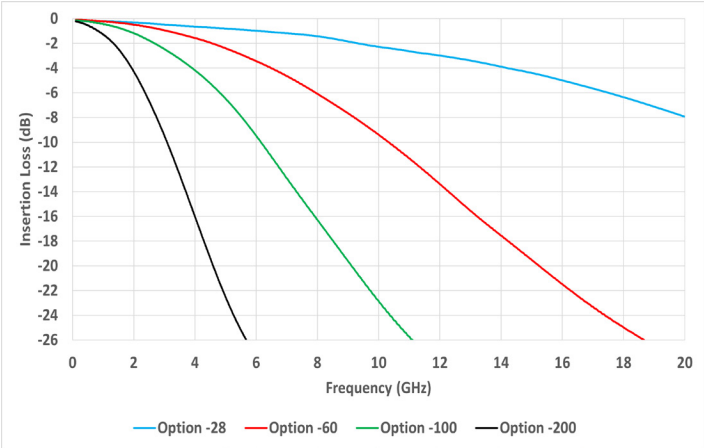


Figure 3: Typical HL9452 insertion loss, various

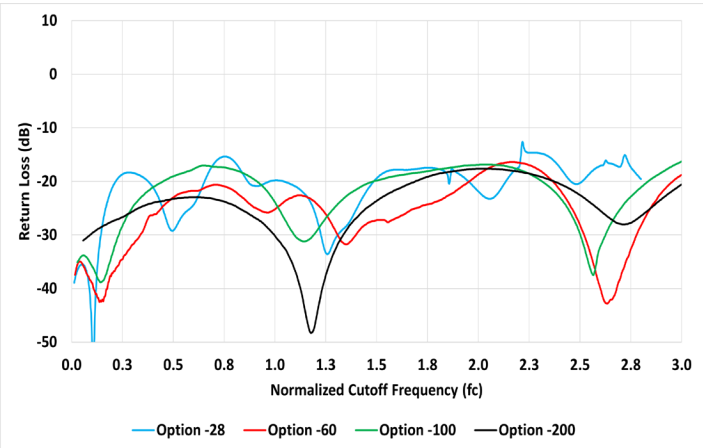


Figure 4: Typical HL9452 return loss, various options

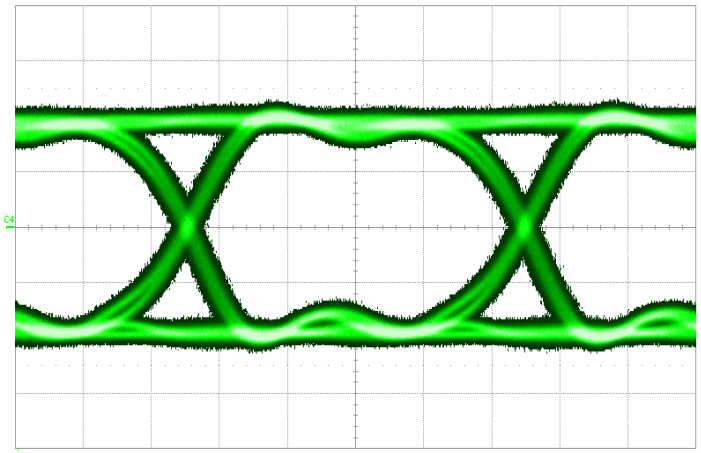


Figure 5: Eye diagram of a 16 Gbps PRBS31 pattern: HL9452-28, RF In

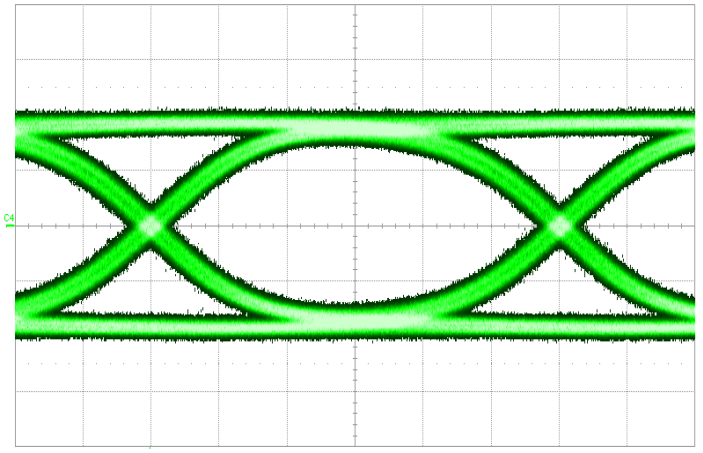


Figure 6: Eye diagram of a 16 Gbps PRBS31 pattern: HL9452-28, RF Out

HL9452 Dimensional Drawing

Figure 8 shows a mechanical drawing of an HL9452. Unless otherwise noted, all units are in inches. See page 2 for full dimensions.

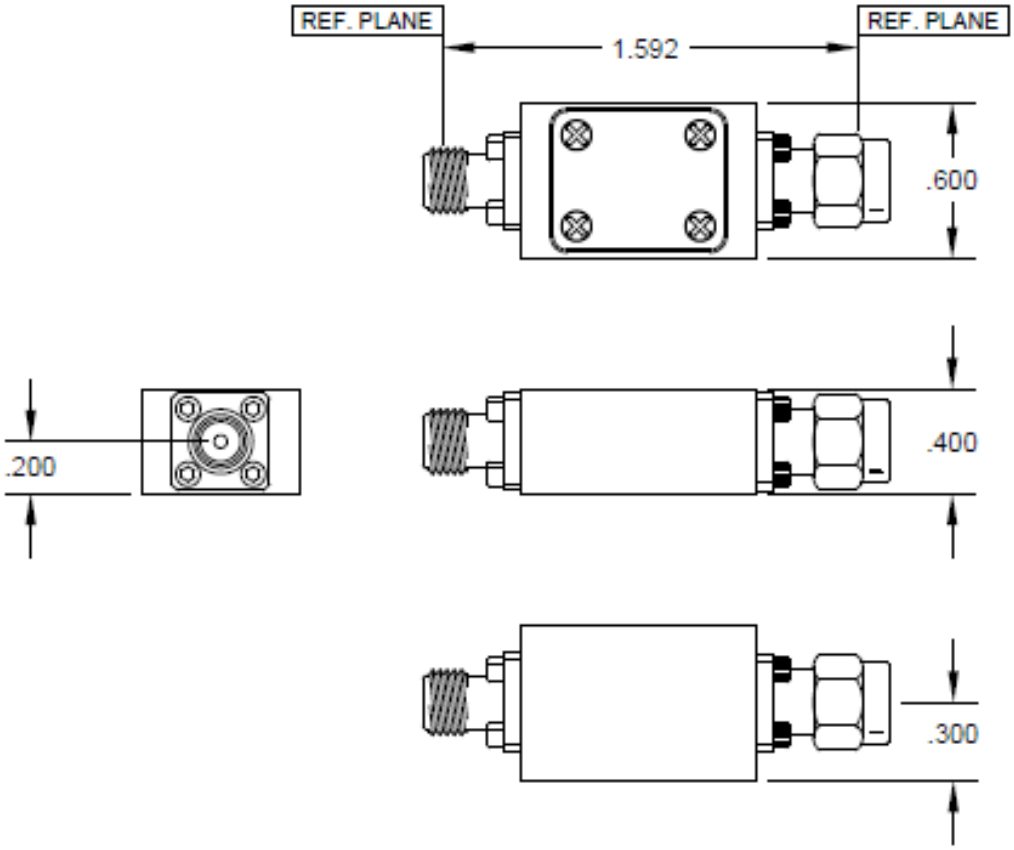


Fig 8: HL9452 Mechanical Drawing