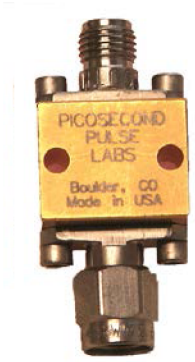
Low-Pass Filter

PSPL5935 Datasheet

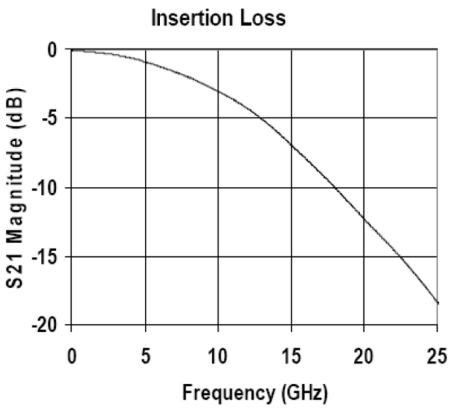


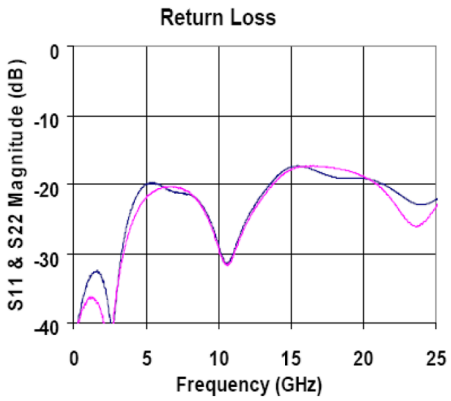
The PSPL5935 Low-Pass Filters are designed for OEM use in high speed digital networks and telecom systems. The devices use a proprietary, absorptive filter design that has attenuation and group delay frequency responses similar to those of the 4th order Bessel-Thomson filter. Traditional Bessel-Thomson designs filter by reflecting stop-band frequency signals and thus can cause increased bit error rates and eye diagram closure due to multiple reflections. By contrast, the PSPL5935 filters by absorption. They have excellent impedance matches and very good return losses, both within and above the filter pass band. This filter is bi-directional, so either port may be used as the input.

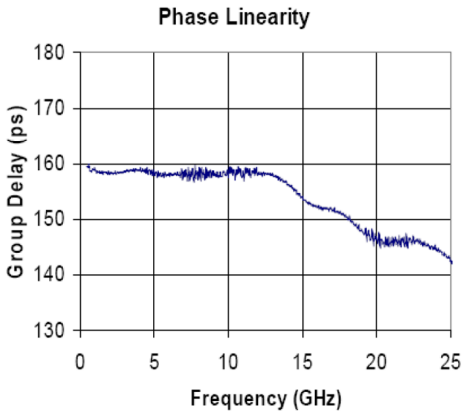
Key performance specifications

- Gaussian insertion loss profile
- Flat group delay
- Z-matched
- No reflection
- Rise time values of 12.6 to 33 ps
- -3 dB frequencies from 10 to 28 GHz
- 25 dBm RF power

Typical performance, option 10GHZ





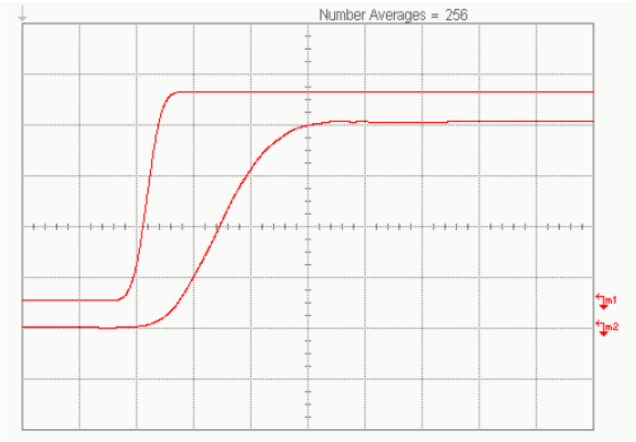


Step Response

The upper trace in the graph at the right shows the input normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 34.9 ps. The risetime (Tr) of the filter can be calculated using the following formula.

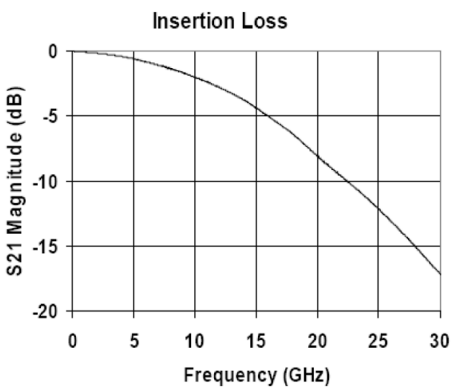
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

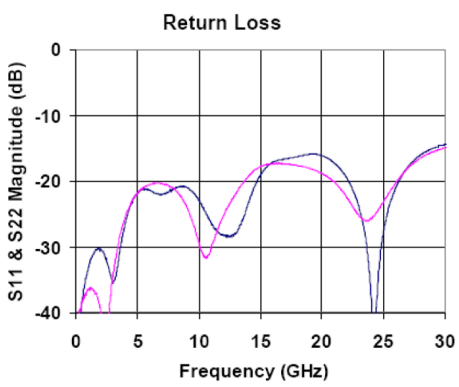
$$Tr(filter) = 33.4\,ps$$

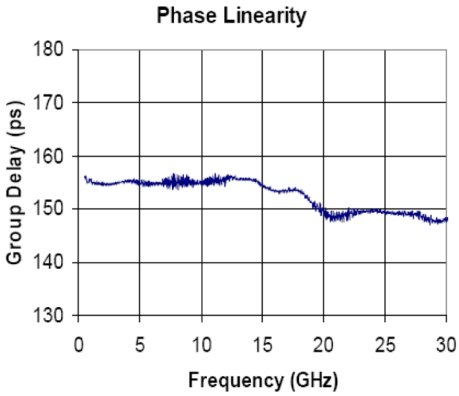


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 12P5GHZ





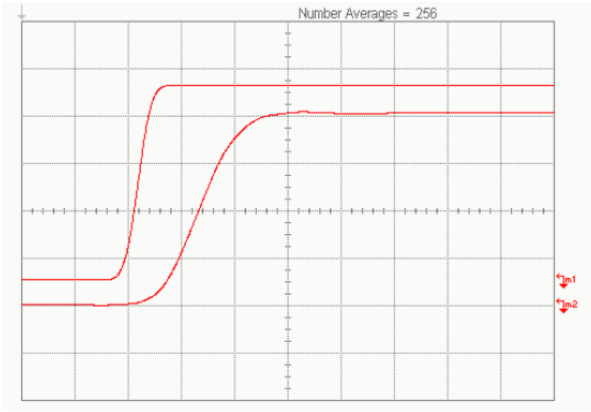


Step Response

The upper trace in the graph at the right shows the input signal normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 28.9 ps. The risetime (Tr) of the filter can be calculated using the following formula.

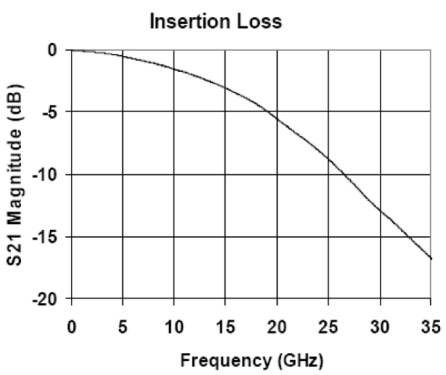
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

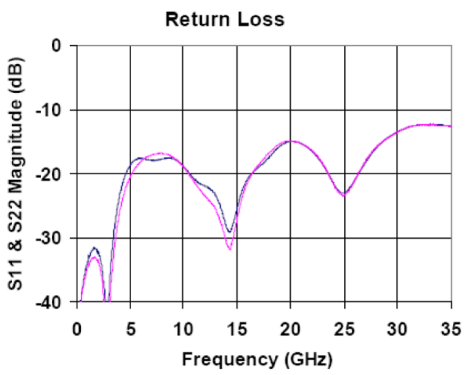
$$Tr(filter) = 27.1ps$$

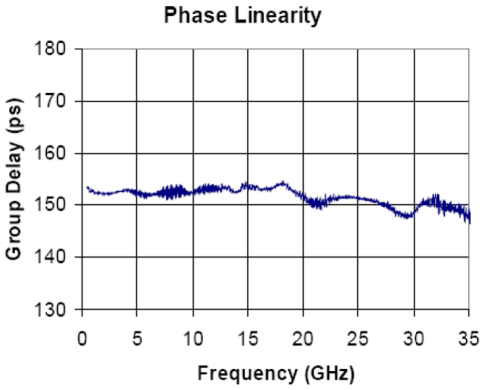


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 15GHZ





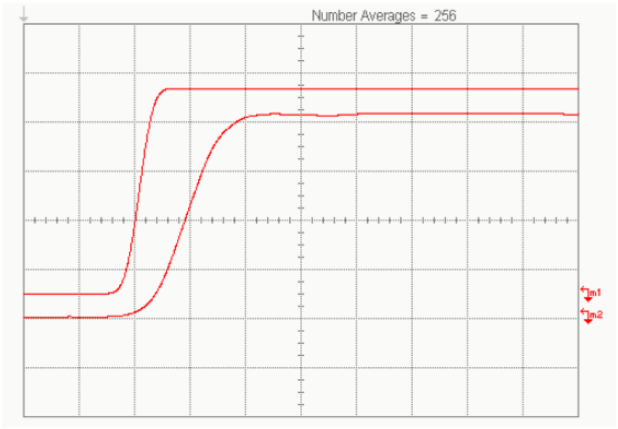


Step Response

The upper trace in the graph at the right shows the input signal normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 24.7 ps. The risetime (Tr) of the filter can be calculated using the following formula.

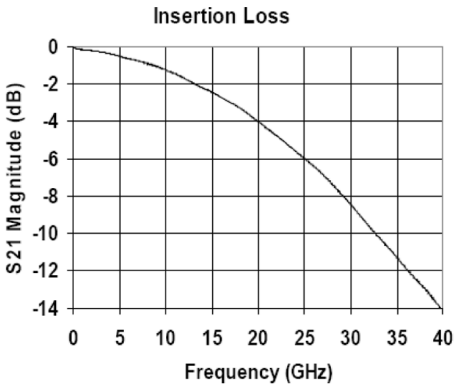
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

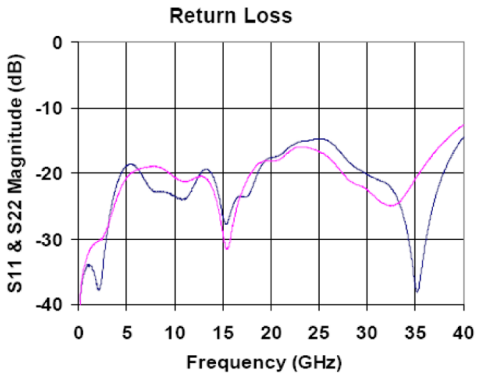
$$Tr(filter) = 22.5\,ps$$

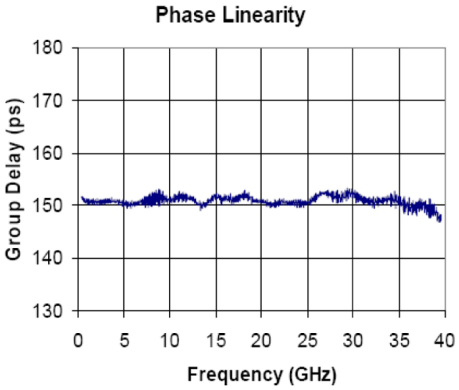


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 17P5GHZ





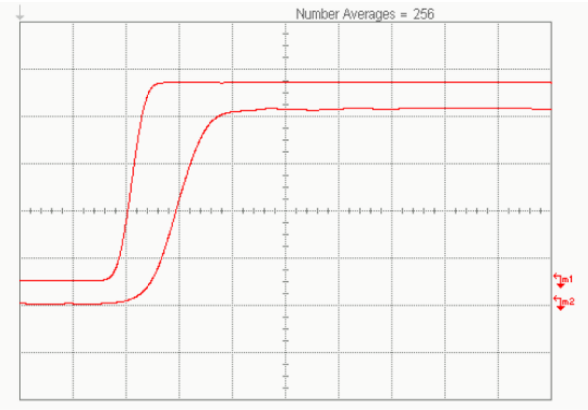


Step Response

The upper trace in the graph at the right shows the input normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 21.5 ps. The risetime (Tr) of the filter can be calculated using the following formula.

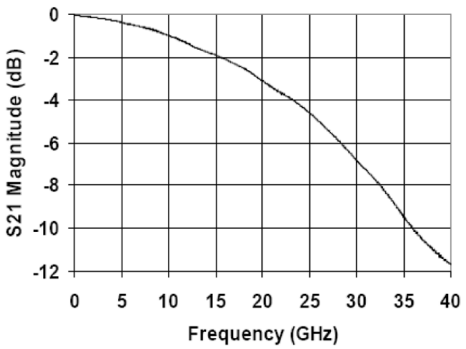
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

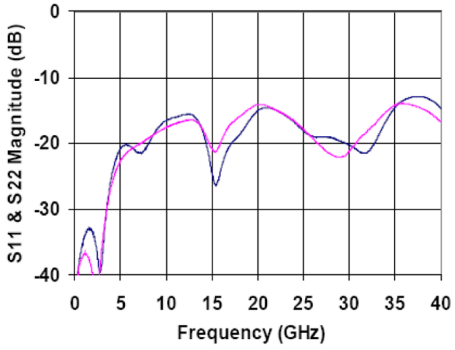
$$Tr(filter) = 18.9\,ps$$

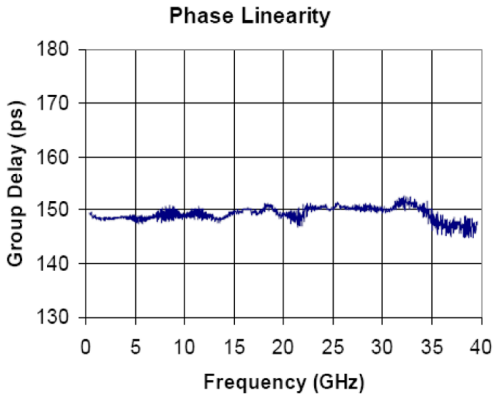


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 20GHZ





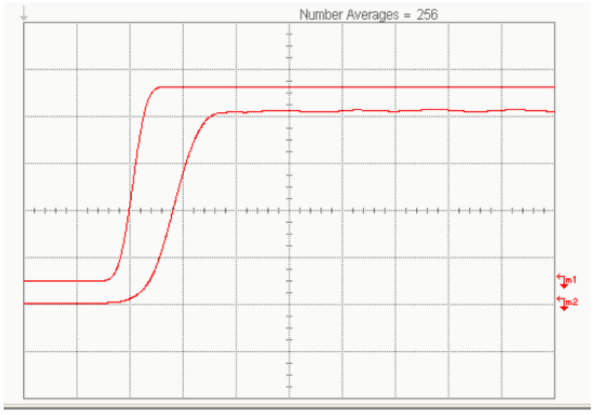


Step Response

The upper trace in the graph at the right shows the input signal normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 19.7 ps. The risetime (Tr) of the filter can be calculated using the following formula.

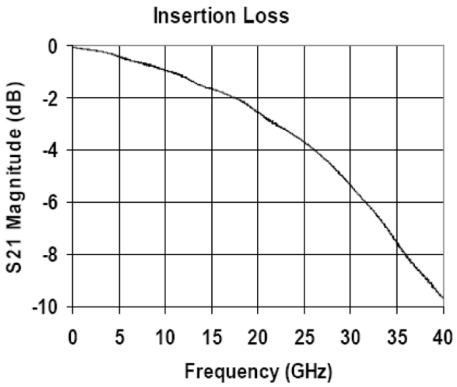
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

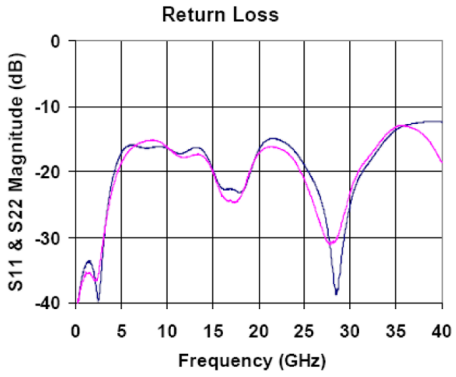
$$Tr(filter) = 16.8\,ps$$

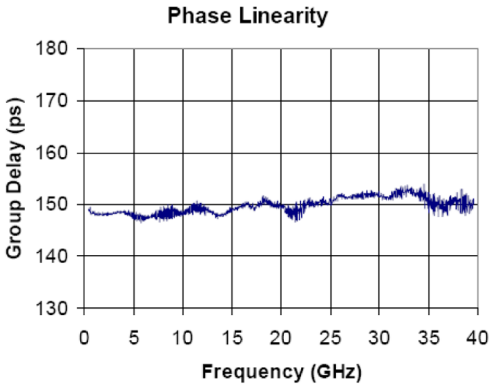


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 22P5GHZ





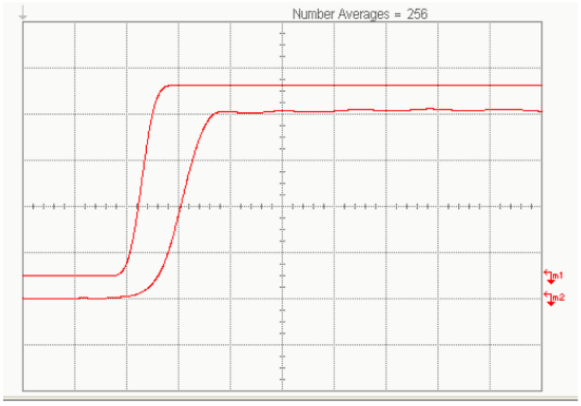


Step Response

The upper trace in the graph at the right shows the input normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 17.3 ps. The risetime (Tr) of the filter can be calculated using the following formula.

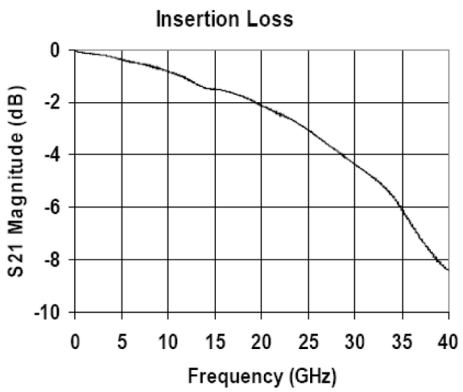
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

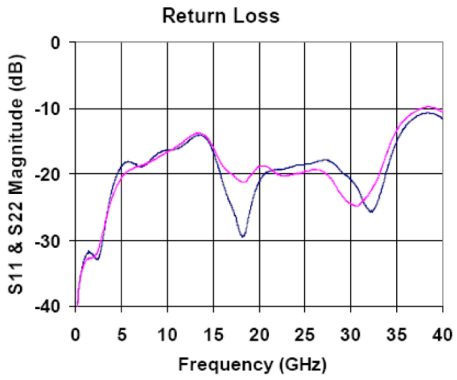
$$Tr(filter) = 15.7\,ps$$

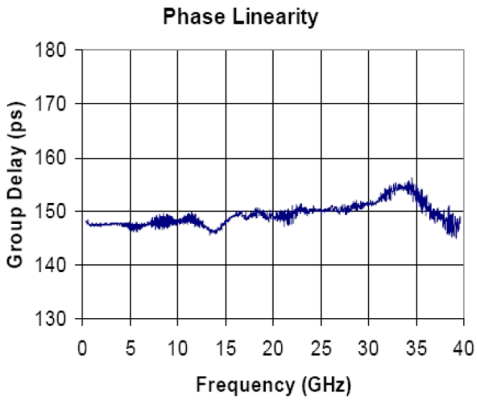


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

Typical performance, option 25GHZ





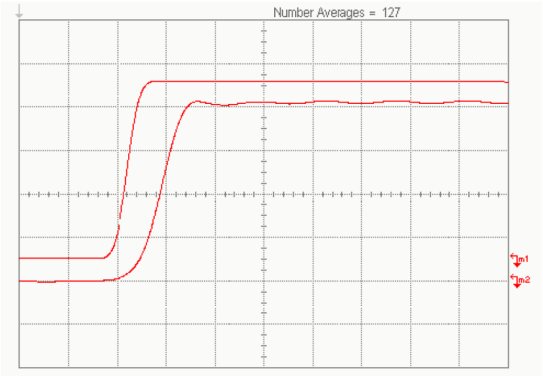


Step Response

The upper trace in the graph at the right shows the input signal normalized to 10 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 17.3 ps. The risetime (Tr) of the filter can be calculated using the following formula.

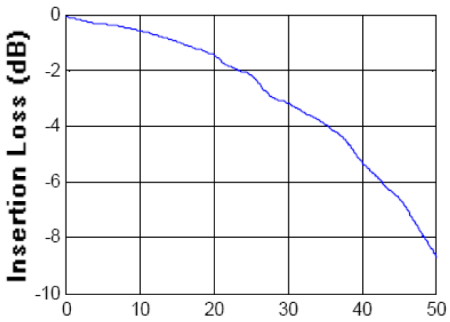
$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

$$Tr(filter) = 14.2\,ps$$

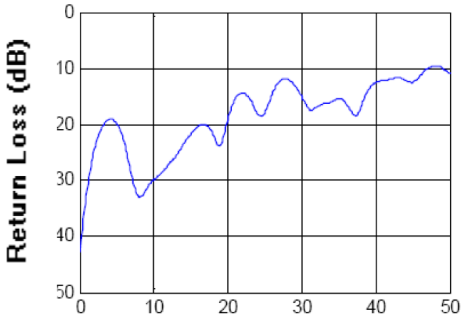


Amplitude scale = 75 mV/div, Time scale = 20 ps/div

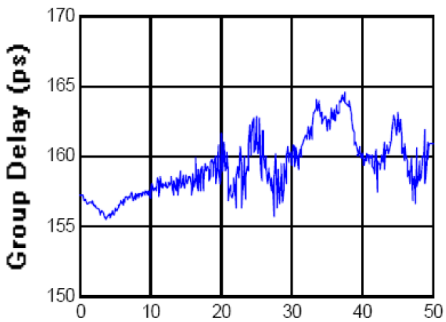
Typical performance, option 28GHZ



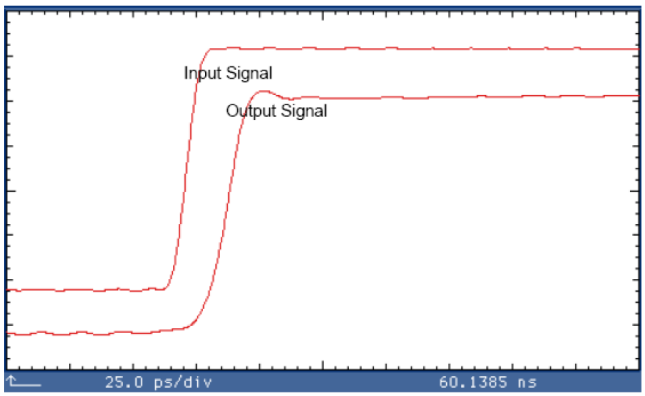
Insertion Loss, 0-50 GHz



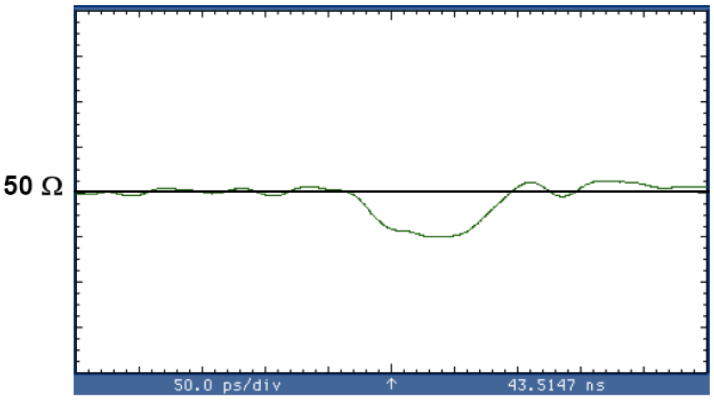
Return Loss, 0-50 GHz



Group Delay (2% Aperture), 0-50 GHz

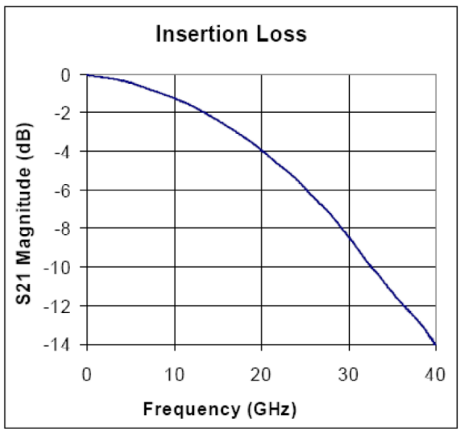


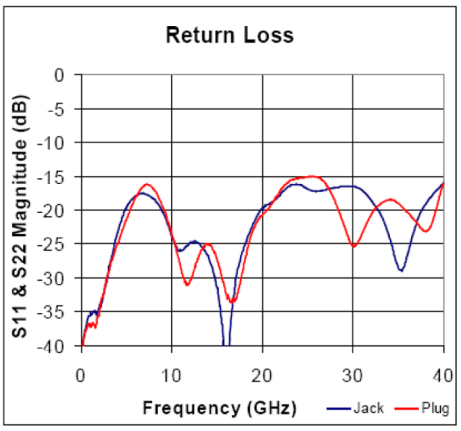
TDT Response to 10 ps step.
Timebase 25 ps/div.

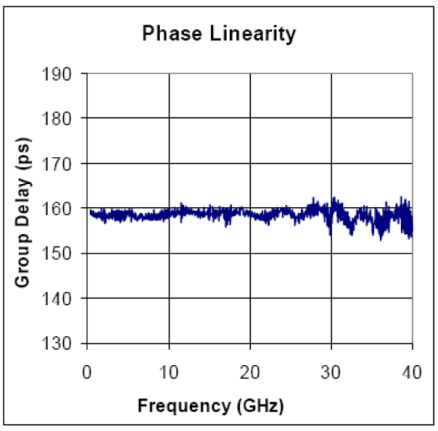


TDR of 5935 Filter using 25 ps step.
Scale 5% ρ/div, 50 ps/div.

Typical performance, option 20PS





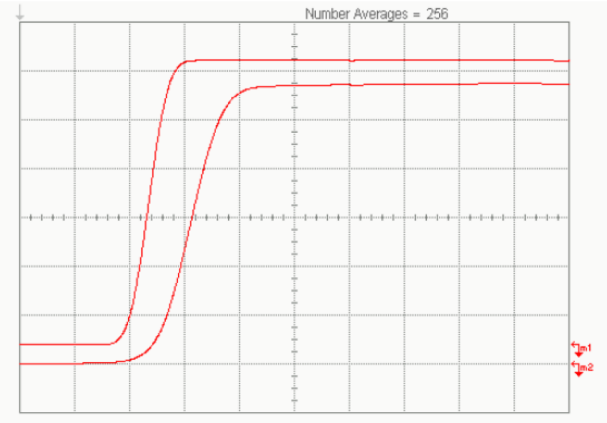


Step Response

The upper trace in the graph at the right shows the input signal normalized to 14 ps (10% - 90%). The lower trace shows the risetime of the filter output to be 23.8 ps. The risetime (Tr) of the filter can be calculated using the following formula.

$$Tr(filter) = \sqrt{Tr(Total)^2 - Tr(Source)^2}$$

$$Tr(filter) = \sqrt{23.8^2 - 14^2}\ ,\ Tr(filter) = 19.2\,ps$$



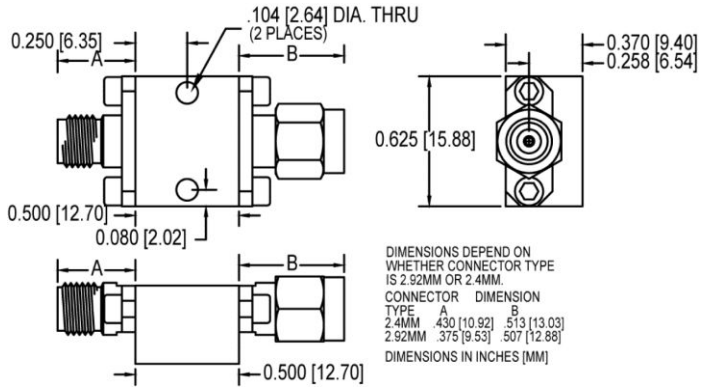
Amplitude scale = 100 mV/div, Time scale = 20 ps/div

Specifications

All specifications apply to all models unless noted otherwise.

Parameter [1]			Opt. 10GHZ	Opt. 12P5GHZ	Opt. 15GHZ	Opt. 17P5GHZ	Opt. 20GHZ	Opt. 22P5GHZ	Opt. 25GHZ	Opt. 28GHZ	Opt. 20PS
Bandwidth	-3 dB with respect to S21 at 100 MHz	Minimum	9.7 GHz	12.1 GHz	14.5 GHz	16.9 GHz	19.4 GHz	21.5 GHz	24.2 GHz	27.2 GHz	16.8 GHz
		Typical	10.0 GHz	12.5 GHz	15.0 GHz	17.5 GHz	20.0 GHz	22.5 GHz	25.0 GHz	28.0 GHz	17.2 GHz
		Maximum	10.3 GHz	12.9 GHz	15.5 GHz	18.0 GHz	20.6 GHz	23.2 GHz	25.8 GHz	28.8 GHz	17.6 GHz
Rise time		10% to 90%	33 ps	27 ps	23 ps	19 ps	17 ps	16 ps	14 ps	12.6 ps	20 ps
Group Delay		100 MHz to 40 GHz	158 ps	155 ps	153 ps	151 ps	149 ps	149 ps	148 ps	160 ps	159 ps
Return Loss		see plots	-12 dB 0 – 25 GHz	-12 dB 0 – 30 GHz	-12 dB 0 - 30 GHz	-12 dB 0 – 30 GHz	-10 dB 0 – 40 GHz	-12 dB 0 – 30 GHz	-10 dB 0 – 30 GHz	-15 dB 0 - 15 GHz	-17 dB 0 – 20 GHz
					-10 dB 30 – 35 GHz	-10 dB 30 – 40 GHz		-10 dB 30 – 40 GHz	-8 dB 30 – 40 GHz	-9 dB 15 - 40 GHz	-15 dB 20 – 40 GHz
Max Power, CW			25 dBm								
Storage Temperature		Case	-25 °C, minimum +90 °C, maximum								
Impedance			50 Ω								
Warranty			One year								

Mechanical dimensions



1 All parameters listed are typical unless max/min guaranteed limits are provided.

Ordering information

Models

PSPL5935	Low-Pass Filter

Options

PSPL5935 240JP	2.4 mm connectors, jack (f) & plug (m)
PSPL5935 292JP	2.92 mm connectors, jack (f) & plug (m)
PSPL5935 10GHZ	10 GHz 3 dB frequency
PSPL5935 12P5GHZ	12.5 GHz 3 dB frequency
PSPL5935 15GHZ	15 GHz 3 dB frequency
PSPL5935 17P5GHZ	17.5 GHz 3 dB frequency
PSPL5935 20GHZ	20 GHz 3 dB frequency
PSPL5935 22P5GHZ	22.5 GHz 3 dB frequency
PSPL5935 25GHZ	25 GHz 3 dB frequency
PSPL5935 28GHZ	28 GHz 3 dB frequency
PSPL5935 20PS	20 ps Rise time

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* European toll-free number. If not accessible, call: +41 52 675 3777

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