The LP8F and LP8P 8-pole, 8-zero Low-Pass filters together provide the user with the versatility to address applications in either the time or frequency domain. The choice of LP8F or LP8P is programmable in most Precision Filters products that offer this filter characteristic.

The LP8F is specified to have outstanding pass-band flatness and very sharp roll-off characteristics. The pass-band characteristic is nearly identical to an 8-pole Butterworth yet the LP8F has a much sharper roll-off. The LP8F is a good choice as an anti-aliasing filter and for applications such as spectral analysis. The LP8P has excellent transient response and phase linearity making it an ideal filter for time domain applications including transient (shock) measurements and time domain waveform analysis. The LP8P has frequency domain characteristics superior to the 8-pole Bessel filter. Like the Bessel, the LP8P has a broadly rounded amplitude response that is a consequence of the LP8P's linear phase property.

Cascade an HP8F with an LP8F to form a band-pass filter. If the filters are set with the –0.1 dB frequencies overlapping, the resulting band-pass filter will have 0.2 dB of insertion loss and will provide more than 80 dB of attenuation below 0.487 F_c and above 2.05 F_c.

\[
\begin{align*}
\text{LP8F & LP8P AMPLITUDE RESPONSE} & \quad \text{LP8F & LP8P PASS-BAND AMPLITUDE RESPONSE} \\
\text{LP8F PHASE RESPONSE AND PHASE DISTORTION} & \quad \text{LP8F PHASE RESPONSE AND PHASE DISTORTION}
\end{align*}
\]

\[
\begin{align*}
\text{SPECIFICATIONS} & \quad \text{LP8F} \quad \text{LP8P} \\
\text{Maximally Flat Low-Pass Filter} & \quad \text{Constant Time Delay} \\
\text{Cutoff Frequency Amplitude} & \quad \text{Cutoff Frequency Phase} \\
-3.01 \text{ dB} & \quad -161.9^\circ \\
\text{DC Gain} & \quad \text{Phase Distortion (DC to } F_c) \\
0.00 \text{ dB} & \quad <0.05^\circ \\
\text{Pass-Band Ripple} & \quad \text{Zero Frequency Group Delay} \\
0.00 \text{ dB} & \quad 0.1792/F_c \\
\text{Stop-Band Frequency:} & \quad 0.4496/F_c \\
1.7479 F_c & \quad 1.0000 \frac{F_c}{F_c} \\
-0.1 \text{ dB Frequency} & \quad -1 \text{ dB Frequency} \\
0.8527 F_c & \quad 0.9436 F_c \\
-1 \text{ dB Frequency} & \quad -2 \text{ dB Frequency} \\
0.8527 F_c & \quad 0.9774 F_c \\
-2 \text{ dB Frequency} & \quad -3.01 \text{ dB Frequency} \\
0.8782 F_c & \quad 1.0000 F_c \\
-3.01 \text{ dB Frequency} & \quad -10 \text{ dB Frequency} \\
0.9050 F_c & \quad 1.2152 F_c \\
-10 \text{ dB Frequency} & \quad -20 \text{ dB Frequency} \\
0.9140 F_c & \quad 1.4433 F_c \\
-20 \text{ dB Frequency} & \quad -40 \text{ dB Frequency} \\
0.9216 F_c & \quad 1.6391 F_c \\
-40 \text{ dB Frequency} & \quad -60 \text{ dB Frequency} \\
0.9281 F_c & \quad 1.7479 F_c \\
-60 \text{ dB Frequency} & \quad -80 \text{ dB Frequency} \\
0.9339 F_c & \quad 3.4688 F_c \\
-80 \text{ dB Frequency} & \quad \end{align*}
\]