

# LP8F & LP8P

8-POLE, 8-ZERO FLAT/PULSE LOW-PASS FILTER



## DESCRIPTION

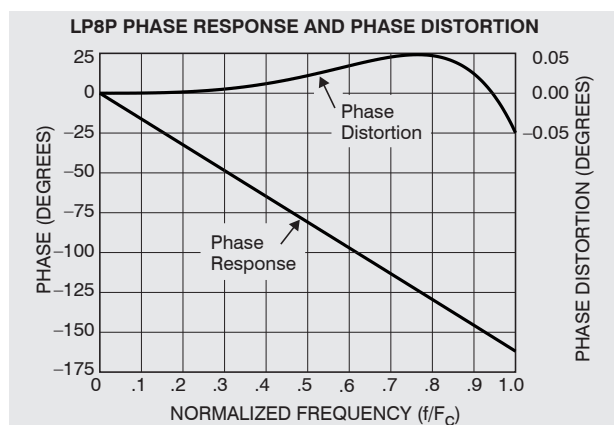
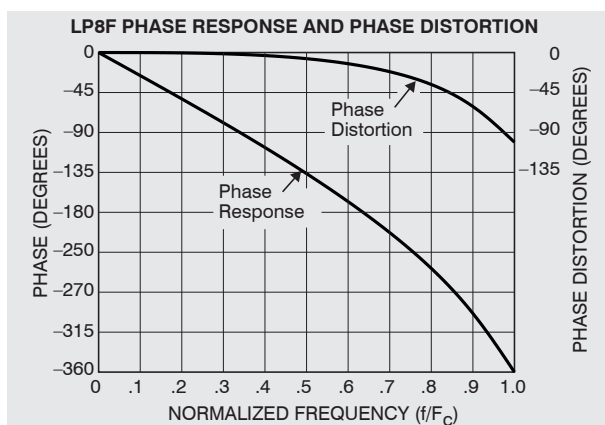
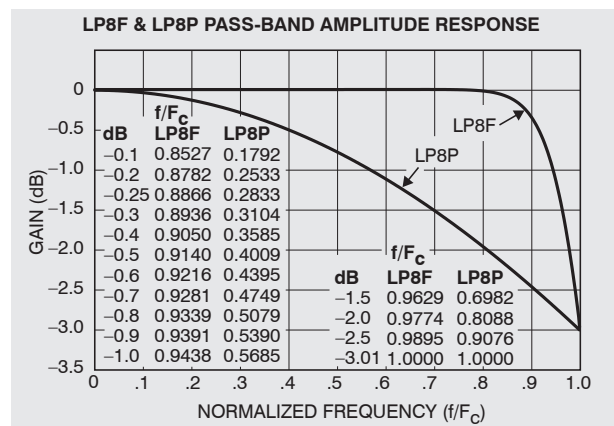
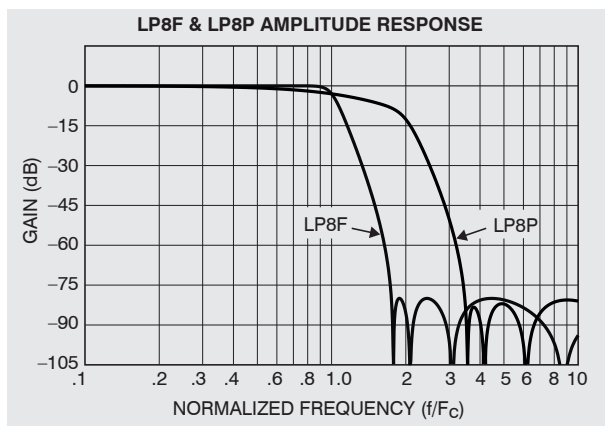
The LP8F and LP8P 8-pole, 8-zero Low-Pass filters together provide the user with the versatility to address applications in either the time or frequency domain. The choice of LP8F or LP8P is programmable in most Precision Filters products that offer this filter characteristic.

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.

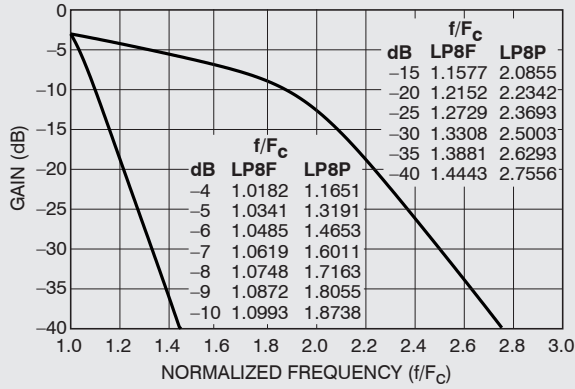
Cascade an HP8F with an LP8F to form a band-pass filter. If the filters are set with the  $-0.1$  dB frequencies overlapping, the resulting band-pass filter will have 0.2 dB of insertion loss and will provide more than 80 dB of attenuation below  $0.487 F_c$  and above  $2.05 F_c$ .

## SPECIFICATIONS

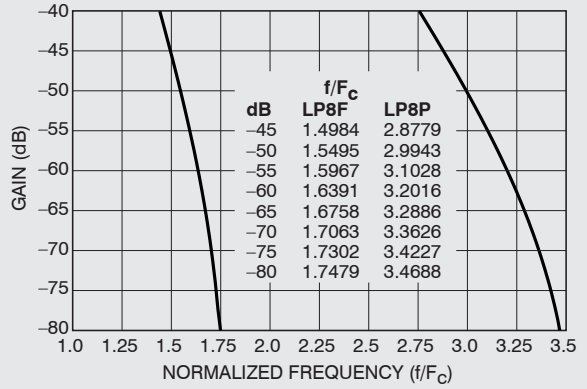
	LP8F Maximally Flat Low- Pass Filter	LP8P Constant Time Delay Low-Pass Filter
Cutoff Frequency Amplitude	-3.01 dB	-3.01 dB
DC Gain	0.00 dB	0.00 dB
Pass-Band Ripple	0.00 dB	0.00 dB
Stop-Band Frequency:	1.7479 $F_c$	3.4688 $F_c$
Cutoff Frequency Phase	-360.0°	-161.9°
Phase Distortion (DC to $F_c$ )	<102.0°	<0.05°
Zero Frequency Group Delay	0.7197/ $F_c$	0.4496/ $F_c$
Percent Overshoot	18.9%	1.1%
1% Settling Time	4.03/ $F_c$	1.25/ $F_c$
0.1 % Settling Time	7.02/ $F_c$	2.25/ $F_c$
-0.1 dB Frequency	0.8527 $F_c$	0.1792 $F_c$
-1 dB Frequency	0.9438 $F_c$	0.5685 $F_c$
-2 dB Frequency	0.9774 $F_c$	0.8088 $F_c$
-3.01 dB Frequency	1.0000 $F_c$	1.0000 $F_c$
-20 dB Frequency	1.2152 $F_c$	2.2342 $F_c$
-40 dB Frequency	1.4443 $F_c$	2.7556 $F_c$
-60 dB Frequency	1.6391 $F_c$	3.2016 $F_c$
-80 dB Frequency	1.7479 $F_c$	3.4688 $F_c$



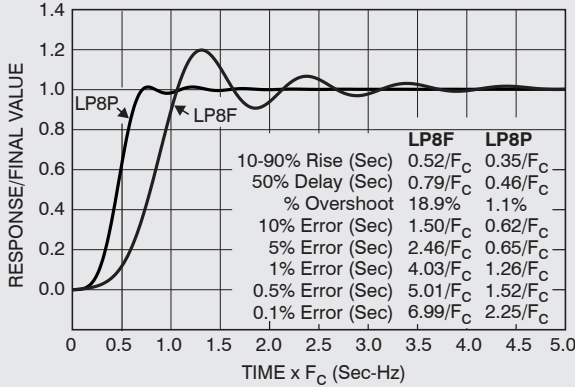
**LP8F & LP8P TRANSITION REGION AMPLITUDE RESPONSE**



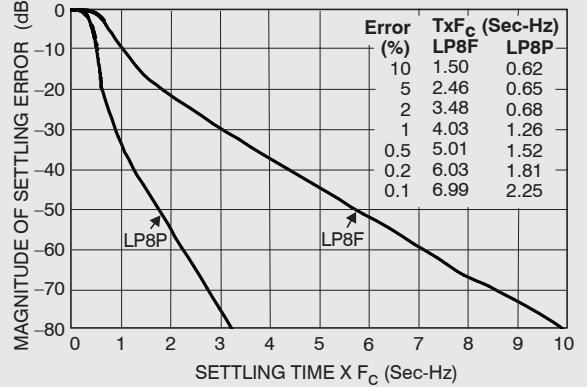
**LP8F & LP8P TRANSITION REGION AMPLITUDE RESPONSE**



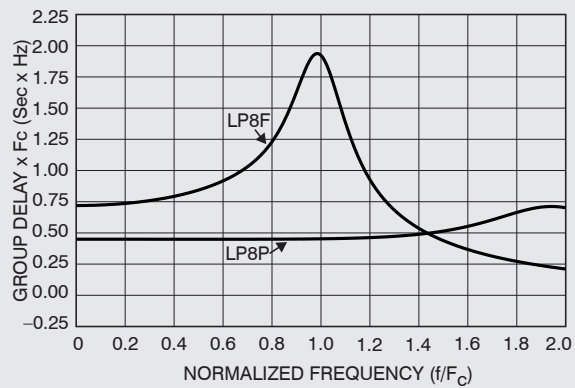
**LP8F & LP8P STEP RESPONSE**



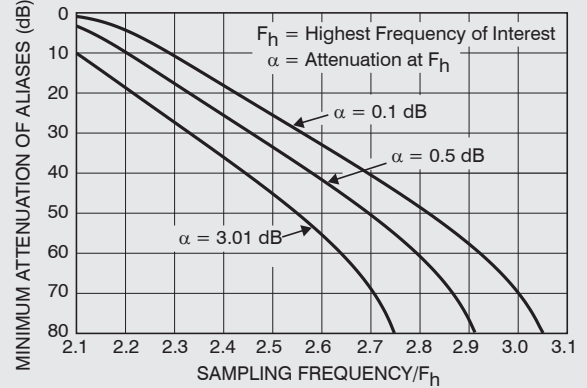
**LP8F & LP8P SETTLING TIME**



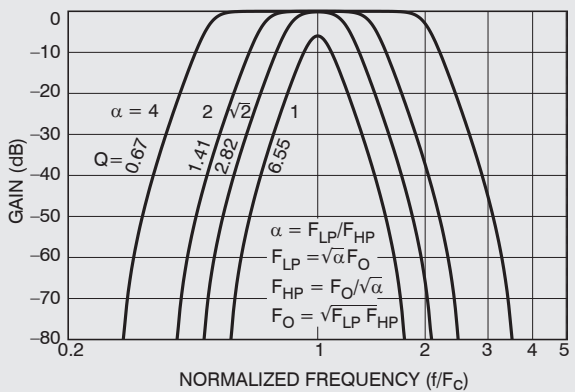
**LP8F & LP8P GROUP DELAY**



**LP8F ATTENUATION OF ALIASES VS SAMPLING FREQUENCY**



**BANDPASS AMPLITUDE RESPONSE HP8F & LP8F CASCADED**



**LP8P ATTENUATION OF ALIASES VS SAMPLING RATE**

