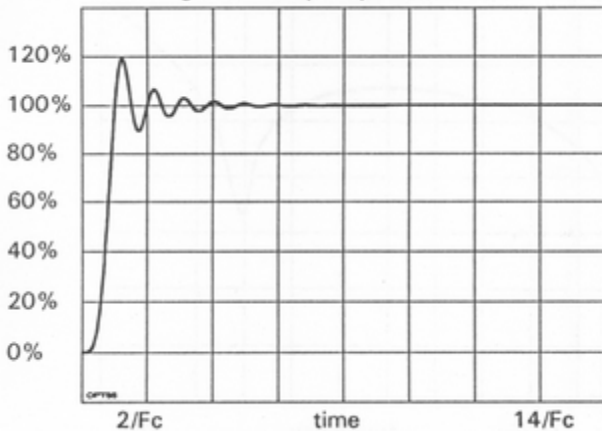
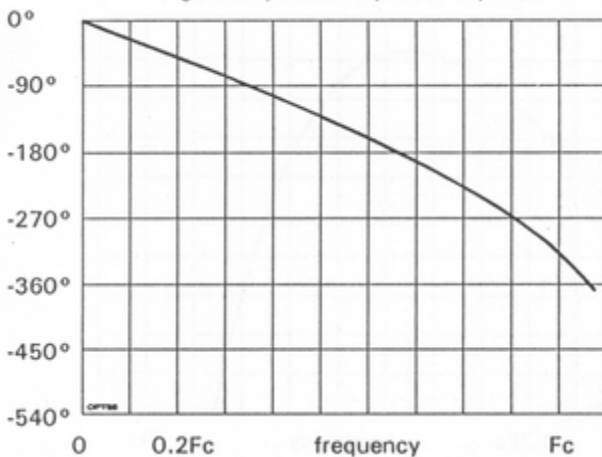


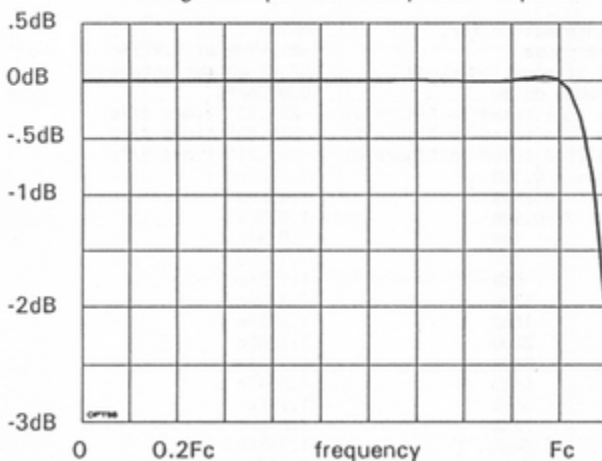
↓ Figure 1: step response vs. time



↓ Figure 2: passband phase response



↓ Figure 3: passband amplitude response



### Description

The Option 35 response is a computer-optimised flat passband filter; it is flat up to the cutoff frequency, and a stopband of 85dB starting at 2 times  $F_c$  (see figures 3 and 4). Although not strictly an elliptic filter, its response shape is very similar to such a filter.

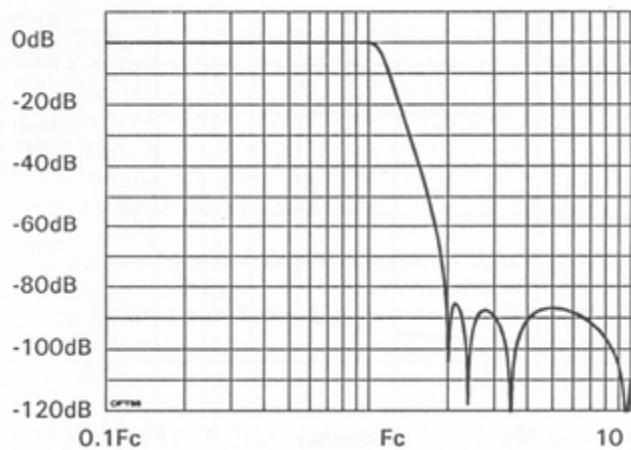
The Option 35 is a good choice for alias prevention work where sharper characteristics are not needed. The low passband ripple and fairly gentle transition to the stopband give it quite a moderate settling time and filters fitted with this response are often superior in signal handling characteristics such as noise and distortion to the sharper elliptics.

This response is possible in a highpass version, for which data is available. On some Kemo systems, Option 35 can be switched from lowpass to highpass, which further enhances its utility as a general purpose sharp filter.

### Note: Similarity to Upgrade 0535 response

Some Kemo systems supplied as standard with a simple  $n=4$  Butterworth filter can be augmented at a later date with an 0535 Upgrader. The resultant response is very similar to Option 35. The only significant difference is that the Option 35 uses two extra stopband zeroes to provide 5dB more rejection than Upgrade 0535. Data on this response can be supplied upon request.

↓ Figure 4: overall frequency response



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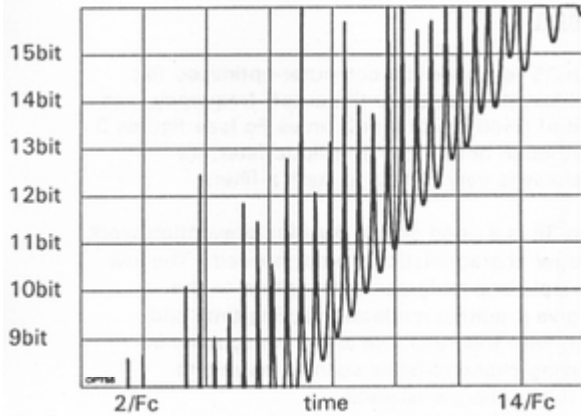
1 Dene Yard  
Green Street Green Road  
Dartford Kent DA2 8DH  
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uk@kemo.com  
Tel + 44 (0) 1474 705168  
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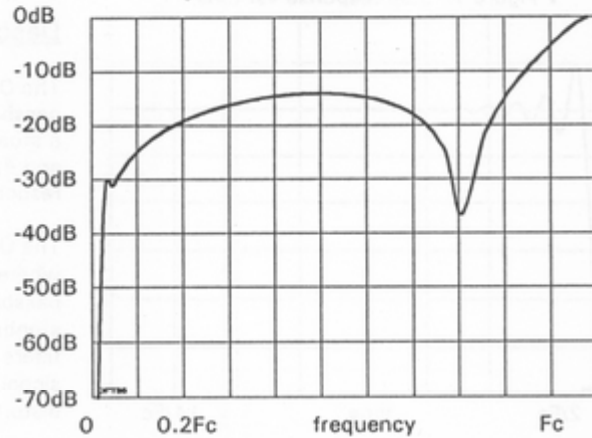
14 Rainstone Drive  
Greenville  
SC 29615

usa@kemo.com  
Tel (864) 297 2522

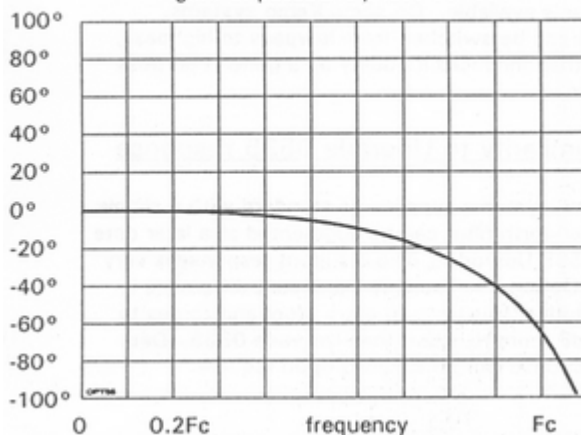
↓ Figure 5: accuracy vs. time



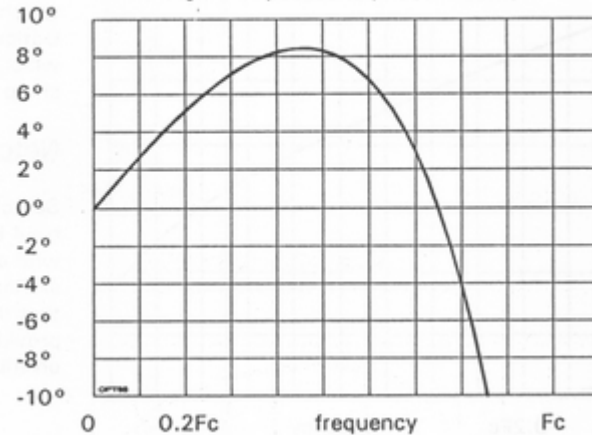
↓ Figure 8: vector error



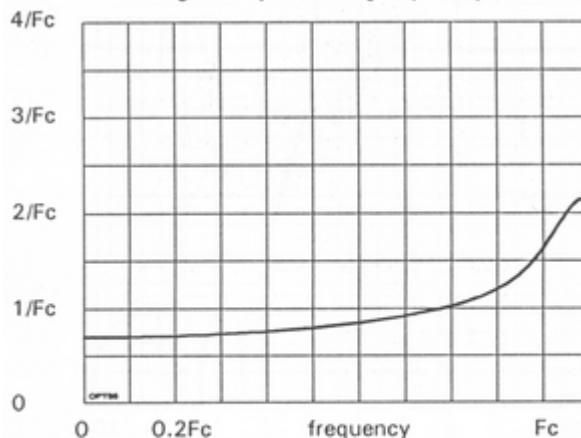
↓ Figure 6: passband phase deviation



↓ Figure 9: passband phase linearity



↓ Figure 7: passband group delay



Response information for:	OPT35
stopband response	-85.45dB at 1.975Fc
equivalent attenuation slope	87.02 dB per octave
zero frequency delay	0.6986/Fc
z.f. phase line (used in Figure 6)	-251.53° times f/Fc
mean phase line (used in Figure 9)	-278.84° times f/Fc
best phase line (used in Figure 8)	-285.01° times f/Fc
attenuation:	
0.1dB	1.022Fc
0.25dB	1.038Fc
0.5dB	1.053Fc
1dB	1.073Fc
3dB	1.115Fc
6dB	1.155Fc
12dB	1.222Fc
18dB	1.288Fc
24dB	1.358Fc
36dB	1.506Fc
48dB	1.654Fc
60dB	1.79Fc
72dB	1.896Fc
84dB	1.963Fc
96dB	[2.317Fc]
overshoot	19.32% at 1.225/Fc
risetime to 0.996Vin	1.014/Fc
approximate settling time to 8 bits	6.9/Fc
add on for each subsequent bit:	1.058/Fc

KT70092 8/8/94

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