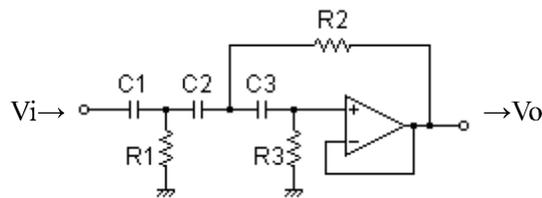


[Top](#) > [Tools](#) > [Filters](#) > [3rd order Sallen-Key High-pass Filter Design Tool](#) > Result

3rd order Sallen-Key High-pass Filter Design Tool - Result -

Calculated the Transfer Function for the 3rd order Sallen-Key High-pass filter, displayed on graphs, showing Bode diagram, Nyquist diagram, Impulse response and Step response

3rd order Sallen-Key filter



Transfer Function:

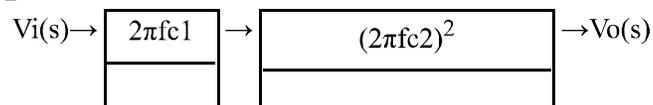
$$G(s) = \frac{s^3}{s^3 + 226.00509398072s^2 + 25488.357693278s + 1447379.766796}$$

\$49.54	\$92.70
\$185.64	\$37.83

DigiKey
DigiKey

R1 = 42.2kΩ
R2 = 16.5kΩ
R3 = 294kΩ
C1 = 0.15uF
C2 = 0.15uF
C3 = 0.15uF

Equivalent block diagram:



Select filter type

Set parameters of the equivalent block diagram

1st filter:

$f_c1 = 18$ Hz

2nd filter:

$f_c2 = 18$ Hz

Damping ratio $\zeta =$

0.5

Butterworth filter

Cut-off frequency $f_c =$ Hz

$$\frac{s+2\pi fc1}{s^2+2\zeta(2\pi fc2)s+(2\pi fc2)^2}$$

Cut-off frequency fc1, fc2 of equivalent block diagram:

$$fc1 = 18.110722132921[\text{Hz}]$$

$$fc2 = 17.949549885195[\text{Hz}]$$

Damping ratio ζ of equivalent block diagram:

$$\zeta = 0.49748060124867$$

Pole(s)

$$p = -8.9295528690297 + 15.570787605009i[\text{Hz}]$$

$$|p| = 17.949549885195[\text{Hz}]$$

$$p = -18.110722132921[\text{Hz}]$$

$$|p| = 18.110722132921[\text{Hz}]$$

$$p = -8.9295528690297 - 15.570787605009i[\text{Hz}]$$

$$|p| = 17.949549885195[\text{Hz}]$$

Zero(s)

$$z = 0[\text{Hz}]$$

$$|z| = 0[\text{Hz}]$$

$$z = -0[\text{Hz}]$$

$$|z| = 0[\text{Hz}]$$

$$z = -0[\text{Hz}]$$

$$|z| = 0[\text{Hz}]$$

Chebyshev filter

Characteristic frequency fc= Hz

Gain ripple gr= dB

$$C1 = 150n \text{ F} \quad C2 = 150n \text{ F}$$

C1, C2 is optional. But when setting these capacitances, C1 and C2 of both are needed.

Select Capacitor Sequence:

Select Resistor Sequence:

Frequency analysis

- Bode diagram
- Phase Group delay
- Nyquist diagram
- Pole, zero
- Phase margin
- Oscillation analysis

Analysis on frequency range:

f1= ~ f2= [Hz] (optional)

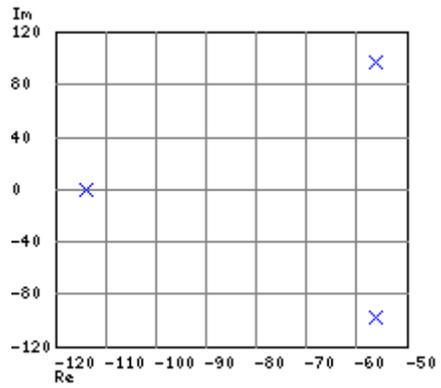
Transient analysis

- Step response
- Impulse response
- Overshoot
- Final value of the step response

Analysis on time range:

0~ [sec] (optional)

Poles



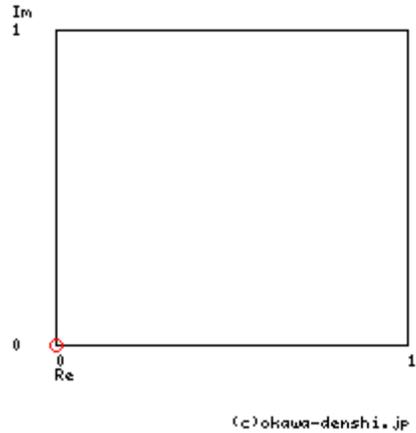
Calculate

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Complete your collection
eBay

Zeros



Phase margin

$$pm = \text{INF}[\text{deg}] (f=0[\text{Hz}])$$

Oscillation frequency

$$f = 15.570787605009[\text{Hz}]$$

Overshoot (in absolute value)

The 1st peak $g_{pk} = -0.31$ ($t = 0.015[\text{sec}]$)

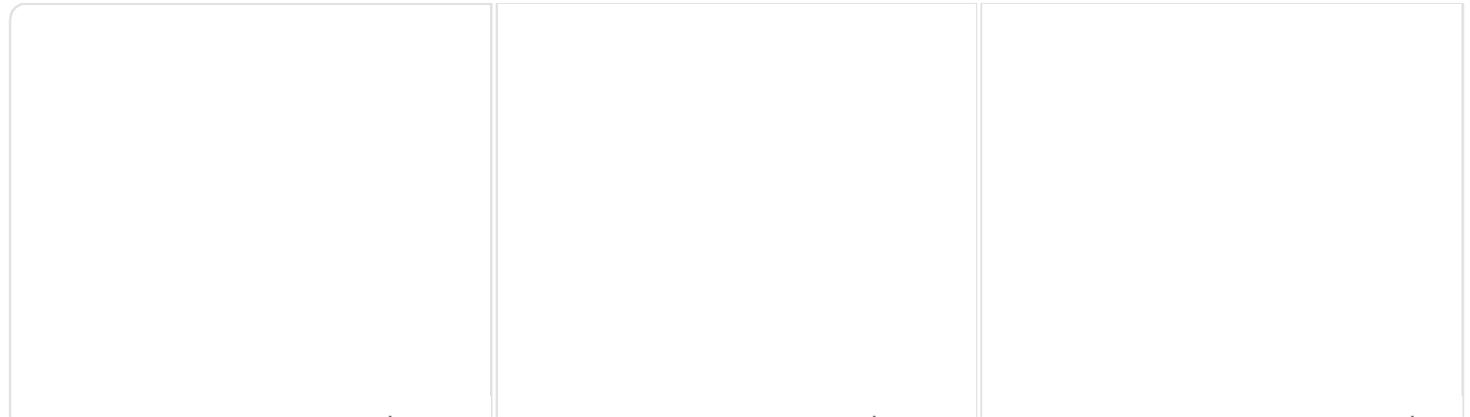
The 2nd peak $g_{pk} = 0.098$ ($t = 0.042[\text{sec}]$)

The 3rd peak $g_{pk} = -0.015$ ($t = 0.075[\text{sec}]$)

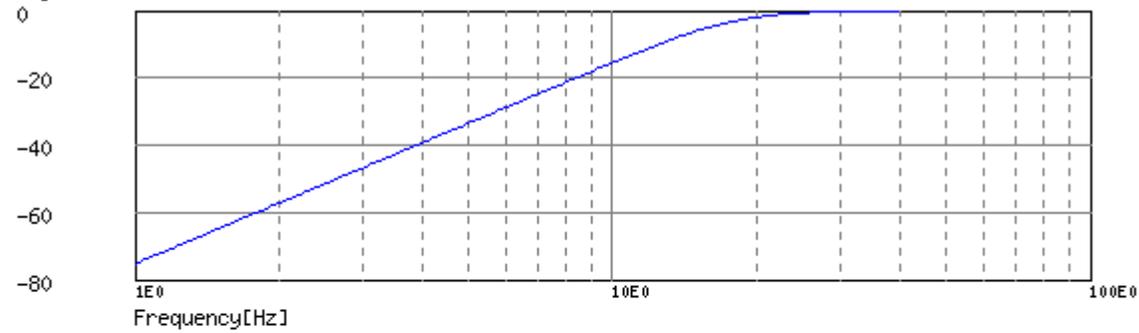
Final value of the step response (on the condition that the system converged when t goes to infinity)

$$g(\infty) = 0$$

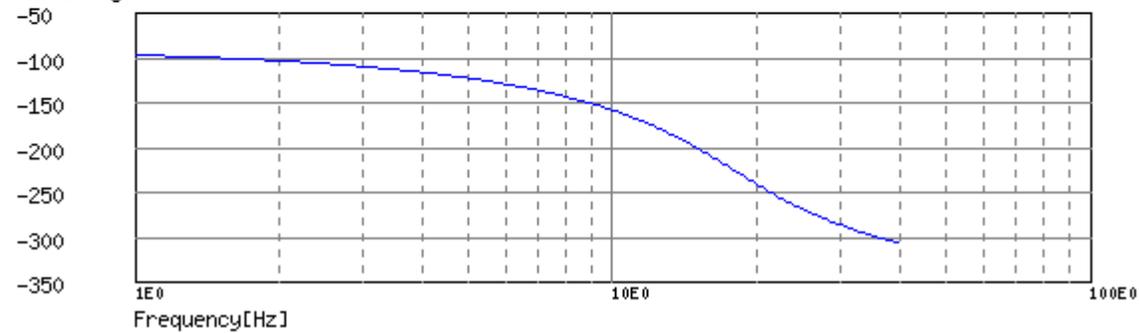
Frequency analysis

**BodeDiagram**

Magnitude[dB]



Phase[deg]



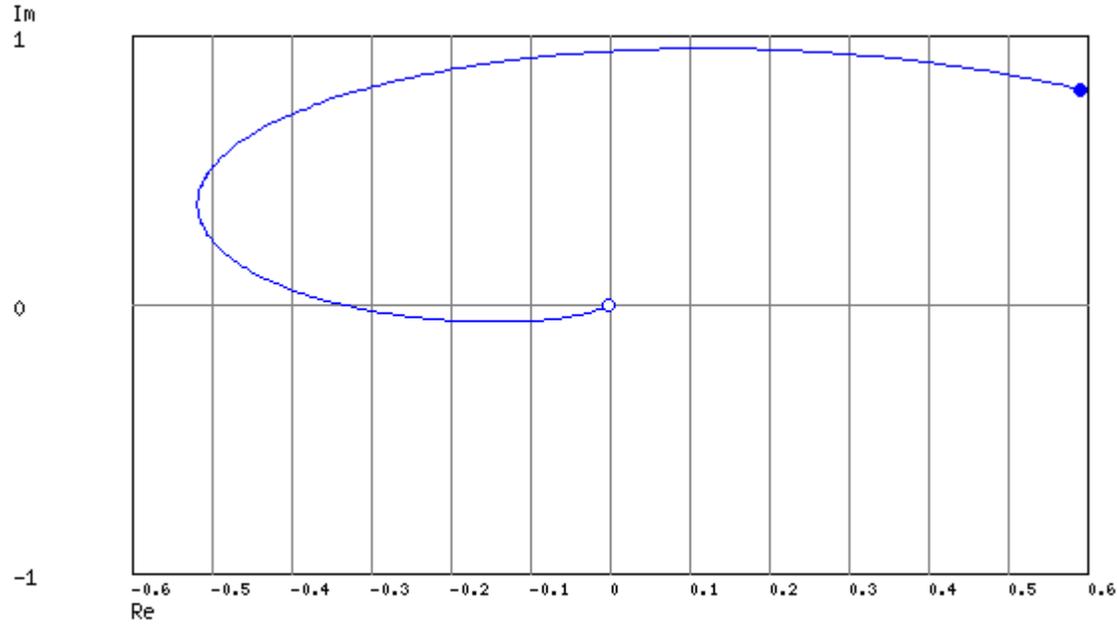
[Gain characteristics at the Bode Diagram](#) (provides up to 1 minute)

[Phase characteristics at the Bode Diagram](#) (provides up to 1 minute)

[Bode Diagram text data](#) (provides up to 1 minute)

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NyquistDiagram



[Nyquist Diagram text data](#) (provides up to 1 minute)

○ 1Hz ● 40Hz

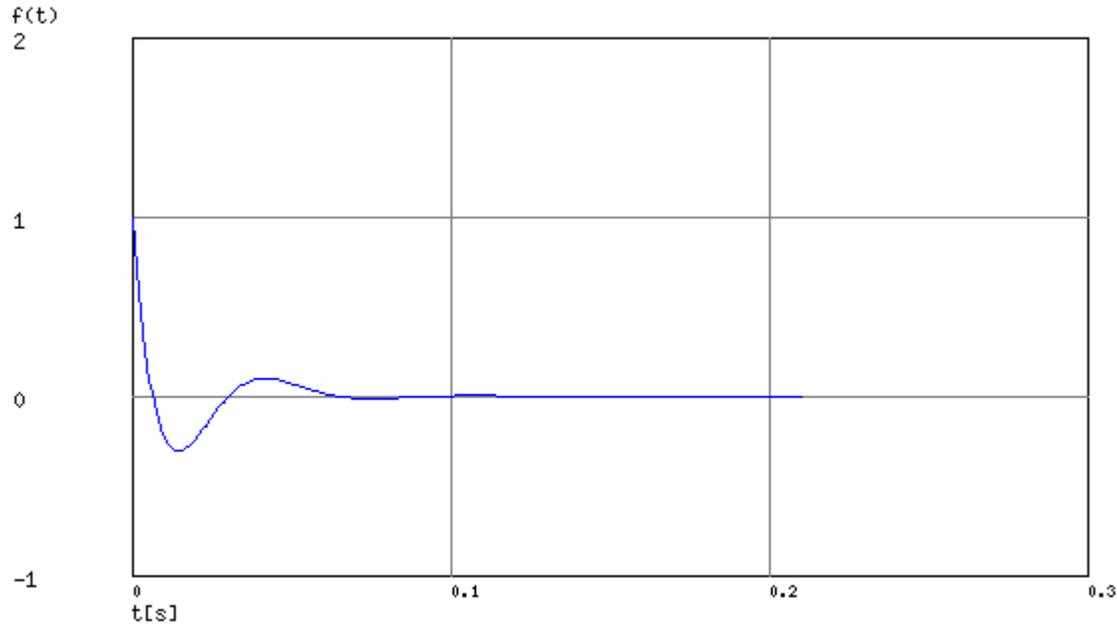
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Transient analysis

The Brightest

Maximize Your Visibility
Mechanic-Grade Heat

StepResponse



[Step Response text data](#) (provides up to 1 minute)

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Suggestion box

We'll use your suggestion to improve site quality in future.



Post Comment