



# **Power Filters Formulas**

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# List of 15 Power Filters Formulas

### Power Filters

#### 1) Amplitude of Active Power Filter

fx 
$$\xi = rac{V_{dc}}{2 \cdot K_s}$$

ex 
$$1.109057 \mathrm{V} = rac{12 \mathrm{V}}{2 \cdot 5.41}$$

#### 2) Angular Resonant Frequency of Passive Filter 🕑

fx 
$$\omega_{\mathrm{n}} = rac{\mathrm{R} \cdot \mathrm{Q}}{\mathrm{L}}$$

$$= \frac{149.9\Omega \cdot 8.333}{50 \mathrm{H}}$$

### 3) Corner Frequency in Bandpass Filter for Series RLC Circuit 🕑

$$\begin{aligned} & \textbf{fx} \quad \textbf{f}_{c} = \left(\frac{R}{2 \cdot L}\right) + \left(\sqrt{\left(\frac{R}{2 \cdot L}\right)^{2} + \frac{1}{L \cdot C}}\right) \end{aligned} \qquad \textbf{Open Calculator } \textbf{F} \\ & \textbf{ex} \quad 2.998083 \text{Hz} = \left(\frac{149.9\Omega}{2 \cdot 50 \text{H}}\right) + \left(\sqrt{\left(\frac{149.9\Omega}{2 \cdot 50 \text{H}}\right)^{2} + \frac{1}{50 \text{H} \cdot 80 \text{F}}}\right) \end{aligned}$$



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#### 4) Cut-off Frequency in Bandpass Filter for Parallel RLC Circuit

#### 5) Gain of Active Power Filter



#### 6) Gain of Converter of Active Power Filter

fx 
$$\mathbf{K}_{\mathrm{s}} = rac{\mathrm{V}_{\mathrm{dc}}}{2\cdot\xi}$$
 Open Calculator  $lacksquare$ 

$$5.41028 = \frac{12V}{2 \cdot 1.109V}$$

#### 7) Keying Index of Parallel RLC Bandpass Filter 🕑

fx 
$$(k_i') = \omega_c \cdot (k_p')$$
  
ex  $0.00117 = 0.015 ext{Hz} \cdot 0.078$ 



Open Calculator 🛃





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#### 12) Resonant Frequency of Passive Filter 🕑







## Variables Used

- C Capacitance (Farad)
- **f** Frequency (Hertz)
- **f<sub>c</sub>** Corner Frequency (*Hertz*)
- **f**<sub>r</sub> Resonant Frequency (*Hertz*)
- **f**<sub>t</sub> Triangular Waveform Frequency (*Hertz*)
- **i<sub>sh</sub>** Harmonic Current Component
- K Active Power Filter Gain
- ki' Keying Index
- kp' Keying Parameter
- K<sub>s</sub> Gain of Converter
- L Inductance (Henry)
- Lo Leakage Inductance (Henry)
- **Q** Quality Factor
- R Resistance (Ohm)
- V<sub>c</sub> Voltage across Passive Filter Capacitor (Volt)
- Vch Voltage Harmonic Waveform
- Vdc DC Voltage (Volt)
- Vt Fundamental Frequency Component (Volt)
- β Filter Transfer Function
- δ Tuned Factor
- **θ** Phase Angle (Degree)
- $\lambda$  Triangular Waveform Slope
- **ξ** Triangular Waveform Amplitude (Volt)
- ω Angular Frequency (Radian per Second)
- ω<sub>c</sub> Cutoff Frequency (*Hertz*)

• ω<sub>n</sub> Angular Resonant Frequency (Radian per Second)

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### **Constants, Functions, Measurements used**

- Constant: pi, 3.14159265358979323846264338327950288 Archimedes' constant
- Function: arctan, arctan(Number) Inverse trigonometric tangent function
- Function: ctan, ctan(Angle) Trigonometric cotangent function
- Function: **sqrt**, sqrt(Number) Square root function
- Function: tan, tan(Angle) Trigonometric tangent function
- Measurement: Angle in Degree (°) Angle Unit Conversion
- Measurement: Frequency in Hertz (Hz) Frequency Unit Conversion
- Measurement: Capacitance in Farad (F) Capacitance Unit Conversion
- Measurement: Electric Resistance in Ohm (Ω) Electric Resistance Unit Conversion
- Measurement: Inductance in Henry (H) Inductance Unit Conversion
- Measurement: Electric Potential in Volt (V) Electric Potential Unit Conversion
- Measurement: Angular Frequency in Radian per Second (rad/s) Angular Frequency Unit Conversion



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### **Check other formula lists**

Power Filters Formulas

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