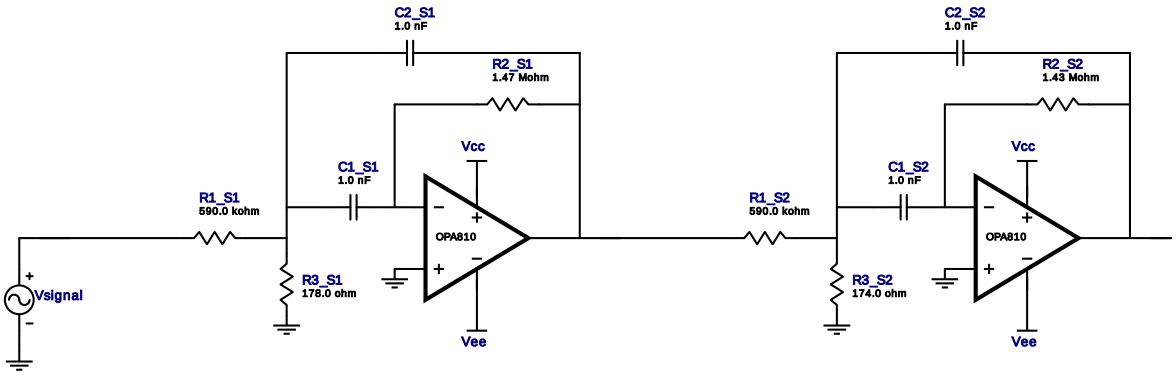
Type : Bandpass
Response : Bessel
Order : 4
Number of Stages : 2

Filter Design Report

Design : Bandpass Filter - 4th order Bessel
Design ID: 7

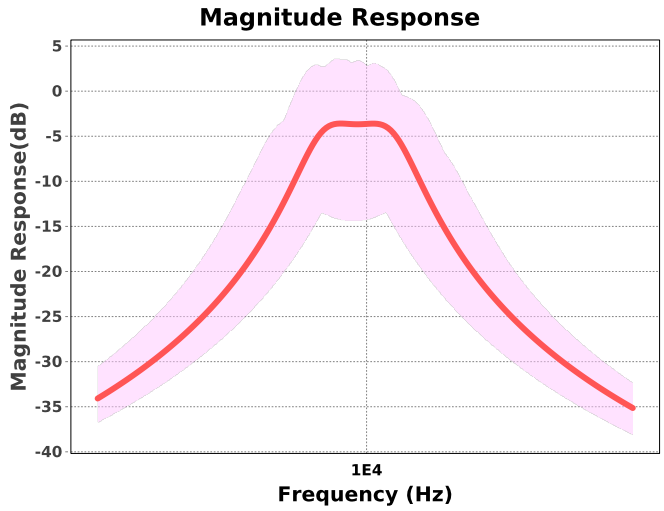


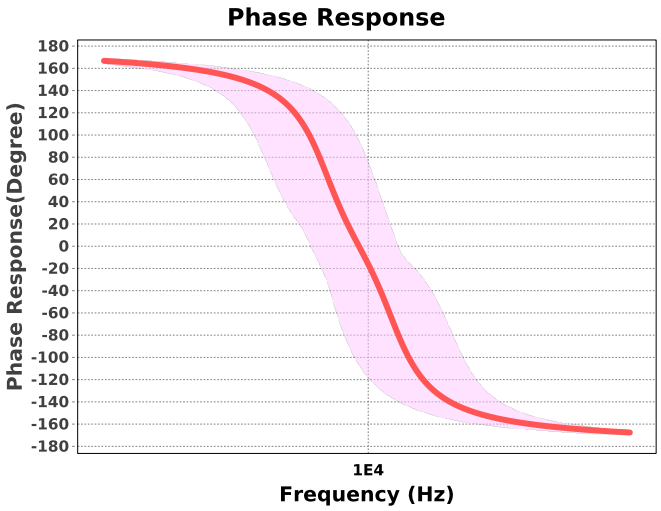
Electrical BOM

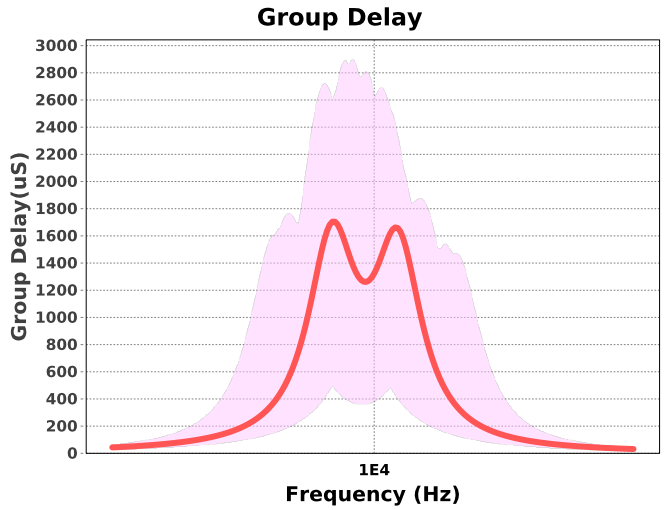
#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	OPA810	GbwTyp= 70MHz VccMax= 27V VccMin= 4.75V	1
2.	A1_S2	Texas Instruments Inc.	OPA810	GbwTyp= 70MHz VccMax= 27V VccMin= 4.75V	1
3.	C1_S1	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
4.	C1_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
5.	C2_S1	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
6.	C2_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
7.	R1_S1	Generic	Ideal	Res= 590000.0ohm Tolerance= 1%	1
8.	R1_S2	Generic	Ideal	Res= 590000.0ohm Tolerance= 1%	1
9.	R2_S1	Generic	Ideal	Res= 1470000.0ohm Tolerance= 1%	1
10.	R2_S2	Generic	Ideal	Res= 1430000.0ohm Tolerance= 1%	1
11.	R3_S1	Generic	Ideal	Res= 178.0ohm Tolerance= 1%	1
12.	R3_S2	Generic	Ideal	Res= 174.0ohm Tolerance= 1%	1

Sensitivity Analysis

#	Name	Series	Tolerance
1.	Cap	E48	2%
2.	Res	E96	1%







Design Inputs

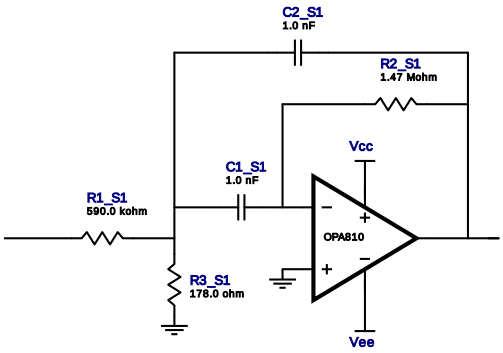
#	Name	Value	Description
1.	FilterType	bandpass	
2.	FilterResponse	Bessel	
3.	FilterOrder	4.0	
4.	FilterTopology	Multiple Feedback	
5.	NumberOfStages	2.0	
6.	CenterFrequency	10.0 k	
7.	StopbandAttenuation	-711.003 m	
8.	PassbandBandwidth	200.0	
9.	StopbandBandwidth	100.0	
10.	Gain	1.122	
11.	DualSupply	+/-5.00 V	Power supply(s) to active chips
12.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
13.	CapacitorTolerance	E48	Capacitor series - 2% Passive capacitor tolerance

Design Assistance

1. **OPA810** Product Folder : http://www.ti.com/product/OPA810 : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency	9.84 kHz
Min GBW Reqd	55.095 MHz
Stage Gain	1.246 V/V
Stage Q	45.445
Stage Topology	Multiple Feedback



Electrical BOM

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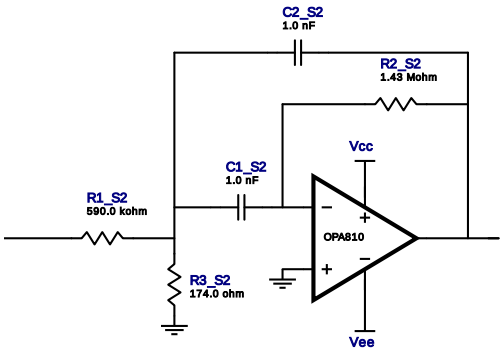
3.	C2_S1	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
4.	R1_S1	Generic	Ideal	Res= 590000.0ohm Tolerance= 1%	1
5.	R2_S1	Generic	Ideal	Res= 1470000.0ohm Tolerance= 1%	1
6.	R3_S1	Generic	Ideal	Res= 178.0ohm Tolerance= 1%	1

Filter Stage :2

Cutoff Frequency	10.091 kHz
Min GBW Reqd	55.801 MHz
Stage Gain	1.212 V/V
Stage Q	45.334
Stage Topology	Multiple Feedback



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S2	Texas Instruments Inc.	OPA810	GbwTyp= 70MHz VccMax= 27V VccMin= 4.75V	1
2.	C1_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
3.	C2_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
4.	R1_S2	Generic	Ideal	Res= 590000.0ohm Tolerance= 1%	1
5.	R2_S2	Generic	Ideal	Res= 1430000.0ohm Tolerance= 1%	1
6.	R3_S2	Generic	Ideal	Res= 174.0ohm Tolerance= 1%	1