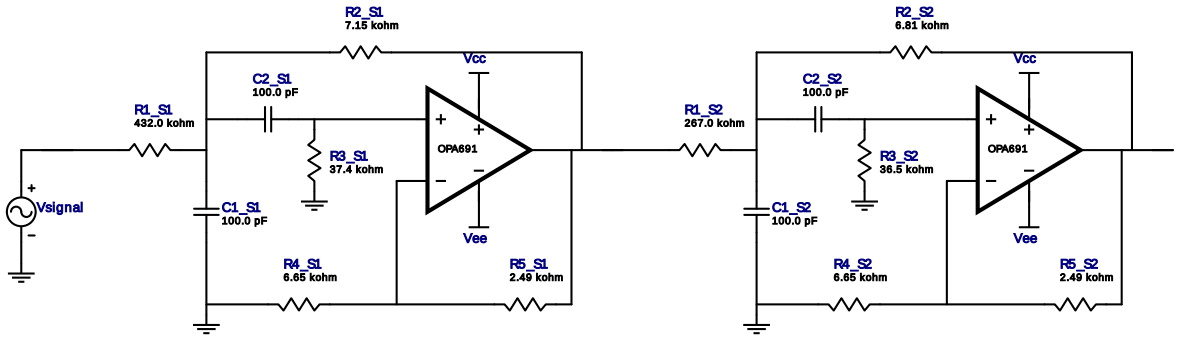
Type : Bandpass
Response : Bessel
Order : 4
Number of Stages : 2

Filter Design Report

Design : Bandpass Filter - 4th order Bessel
Design ID: 1



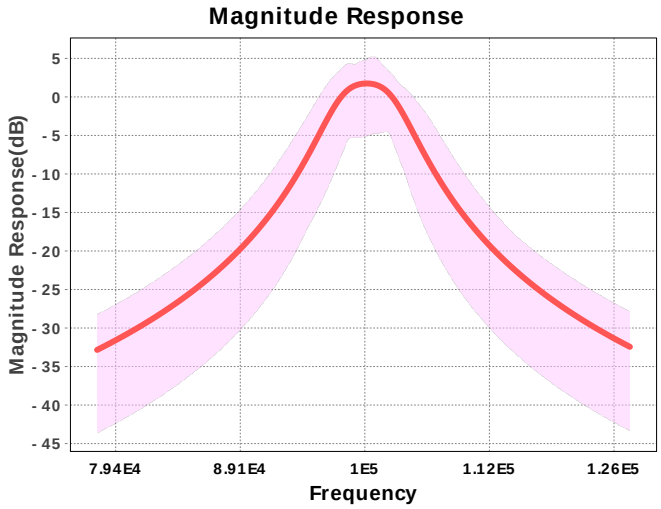
Electrical BOM

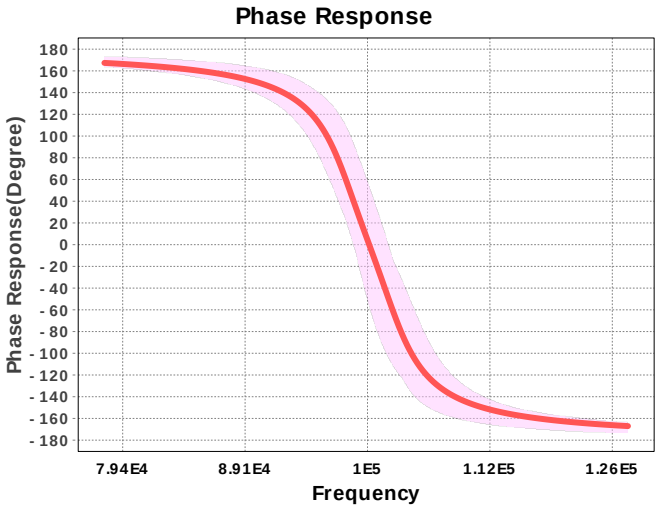
#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	OPA691	GbwTyp= 280MHz VccMax= 12V VccMin= 4V	1
2.	A1_S2	Texas Instruments Inc.	OPA691	GbwTyp= 280MHz VccMax= 12V VccMin= 4V	1
3.	C1_S1	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
4.	C1_S2	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
5.	C2_S1	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
6.	C2_S2	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
7.	R1_S1	Generic	Ideal	Res= 432000.0ohm Tolerance= 1%	1
8.	R1_S2	Generic	Ideal	Res= 267000.0ohm Tolerance= 1%	1
9.	R2_S1	Generic	Ideal	Res= 7150.0ohm Tolerance= 1%	1
10.	R2_S2	Generic	Ideal	Res= 6810.0ohm Tolerance= 1%	1
11.	R3_S1	Generic	Ideal	Res= 37400.0ohm Tolerance= 1%	1
12.	R3_S2	Generic	Ideal	Res= 36500.0ohm Tolerance= 1%	1
13.	R4_S1	Generic	Ideal	Res= 6650.0ohm Tolerance= 1%	1

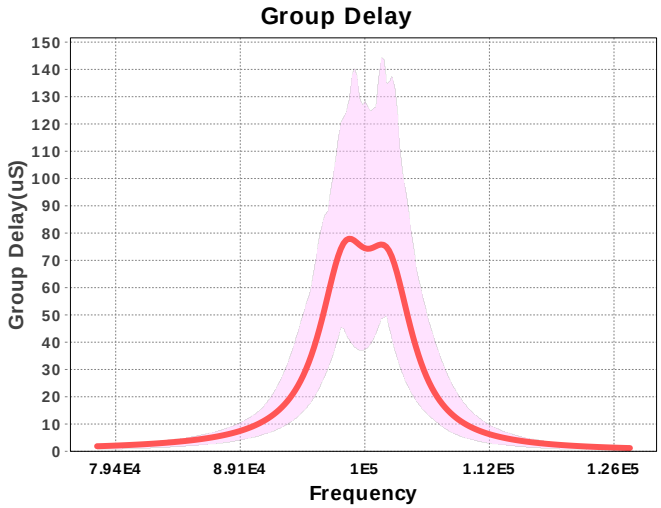
#	Name	Manufacturer	Part Number	Properties	Qty
14.	R4_S2	Generic	Ideal	Res= 6650.0ohm Tolerance= 1%	1
15.	R5_S1	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1
16.	R5_S2	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1

Sensitivity Analysis

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







Design Inputs

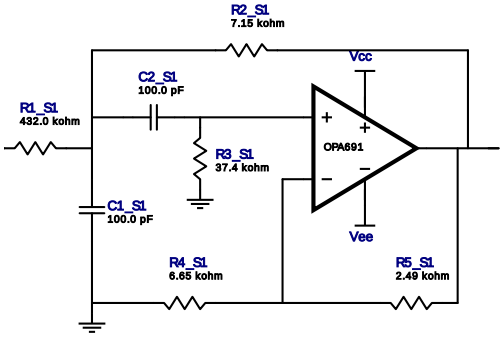
#	Name	Value	Description
1.	FilterType	bandpass	
2.	FilterResponse	Bessel	
3.	FilterOrder	4.0	
4.	FilterTopology	Sallen-Key	
5.	NumberOfStages	2.0	
6.	CenterFrequency	100.0 k	
7.	StopbandAttenuation	-35.869	
8.	PassbandBandwidth	5.0 k	
9.	StopbandBandwidth	50.0 k	
10.	Gain	1.413	
11.	DualSupply	+/-5.00 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. **OPA691** Product Folder : http://www.ti.com/product/OPA691 : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency	98.129 kHz
Min GBW Reqd	244.971 MHz
Stage Gain	1.374 V/V
Stage Q	18.017
Stage Topology	Sallen-Key

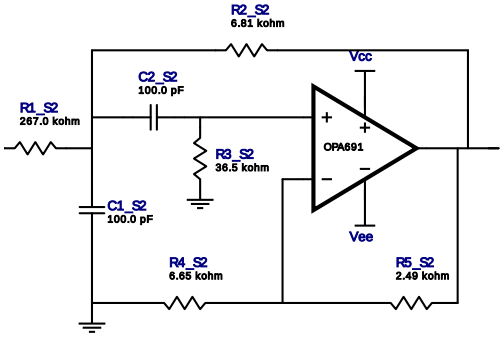


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	OPA691	GbwTyp= 280MHz VccMax= 12V VccMin= 4V	1
2.	C1_S1	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
3.	C2_S1	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
4.	R1_S1	Generic	Ideal	Res= 432000.0ohm Tolerance= 1%	1
5.	R2_S1	Generic	Ideal	Res= 7150.0ohm Tolerance= 1%	1
6.	R3_S1	Generic	Ideal	Res= 37400.0ohm Tolerance= 1%	1
7.	R4_S1	Generic	Ideal	Res= 6650.0ohm Tolerance= 1%	1
8.	R5_S1	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1

Filter Stage :2

Cutoff Frequency	102.228 kHz
Min GBW Reqd	252.899 MHz
Stage Gain	1.374 V/V
Stage Q	18.06
Stage Topology	Sallen-Key



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S2	Texas Instruments Inc.	OPA691	GbwTyp= 280MHz VccMax= 12V VccMin= 4V	1
2.	C1_S2	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
3.	C2_S2	Generic	Ideal	Cap= 100.0 pF Tolerance= 2.0 %	1
4.	R1_S2	Generic	Ideal	Res= 267000.0ohm Tolerance= 1%	1
5.	R2_S2	Generic	Ideal	Res= 6810.0ohm Tolerance= 1%	1
6.	R3_S2	Generic	Ideal	Res= 36500.0ohm Tolerance= 1%	1
7.	R4_S2	Generic	Ideal	Res= 6650.0ohm Tolerance= 1%	1

#	Name	Manufacturer	Part Number	Properties	Qty
8.	R5_S2	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1