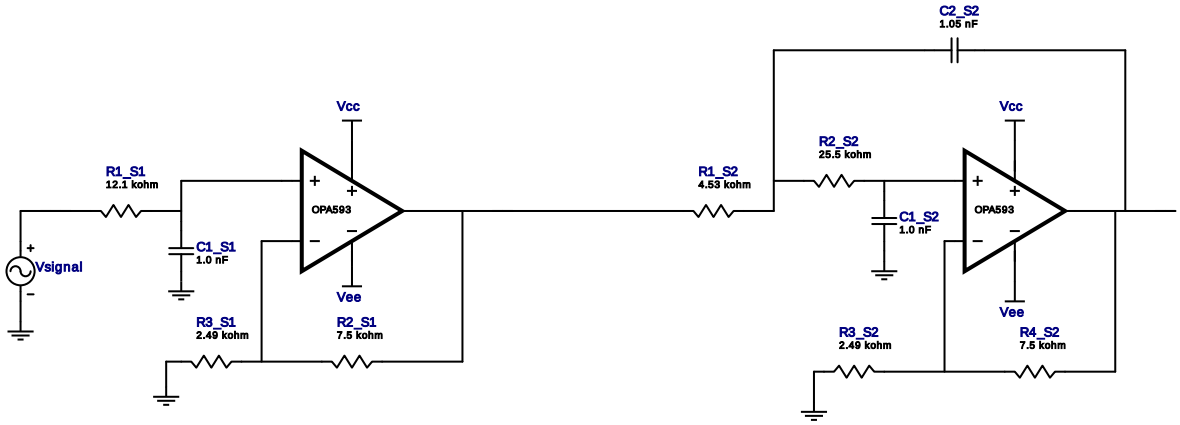
Type : Lowpass
Response : Bessel
Order : 3
Number of Stages : 2

Filter Design Report

Design : Lowpass Filter - 3rd order Bessel
Design ID: 8

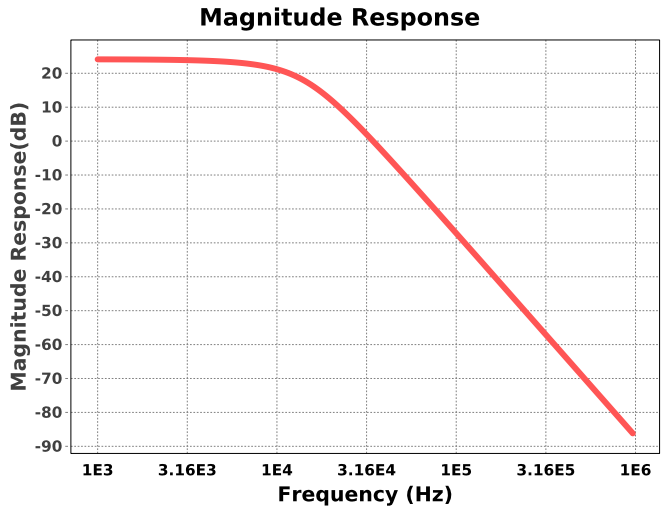


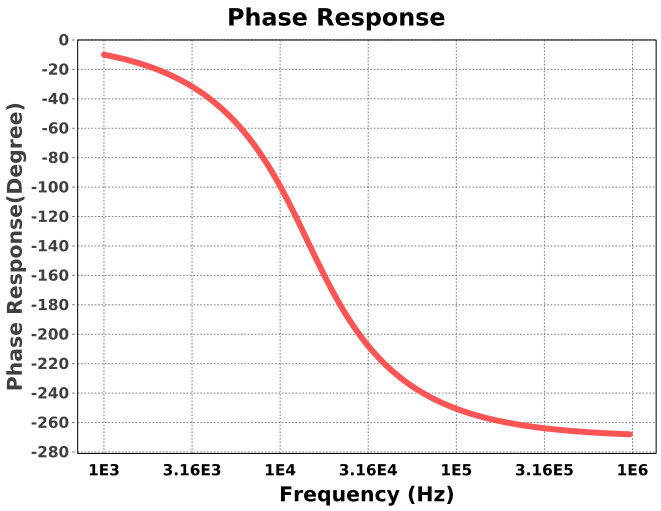
Electrical BOM

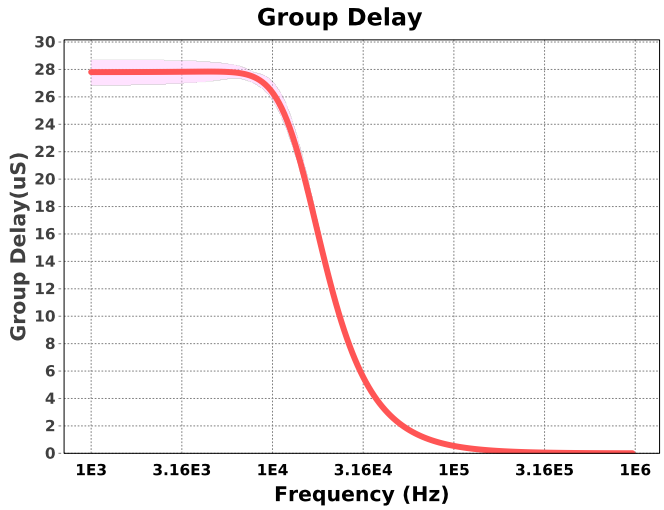
#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	OPA593	GbwTyp= 10MHz VccMax= 85V VccMin= 8V	1
2.	A1_S2	Texas Instruments Inc.	OPA593	GbwTyp= 10MHz VccMax= 85V VccMin= 8V	1
3.	C1_S1	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
4.	C1_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
5.	C2_S2	Generic	Ideal	Cap= 1.05 nF Tolerance= 2.0 %	1
6.	R1_S1	Generic	Ideal	Res= 12100.0ohm Tolerance= 1%	1
7.	R1_S2	Generic	Ideal	Res= 4530.0ohm Tolerance= 1%	1
8.	R2_S1	Generic	Ideal	Res= 7500.0ohm Tolerance= 1%	1
9.	R2_S2	Generic	Ideal	Res= 25500.0ohm Tolerance= 1%	1
10.	R3_S1	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1
11.	R3_S2	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1
12.	R4_S2	Generic	Ideal	Res= 7500.0ohm Tolerance= 1%	1

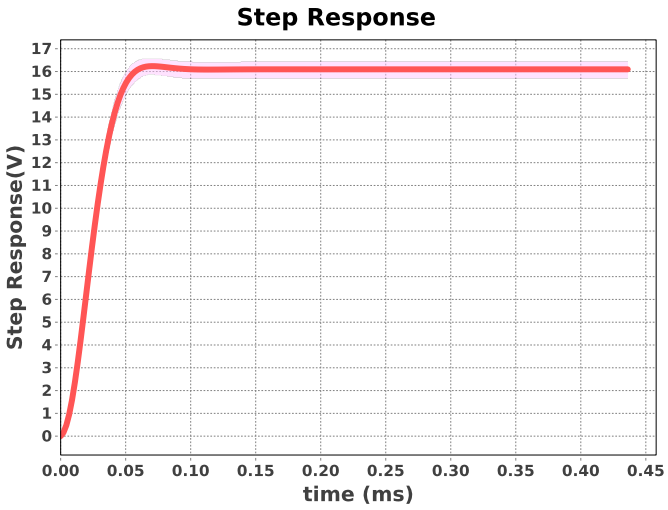
Sensitivity Analysis

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









Design Inputs

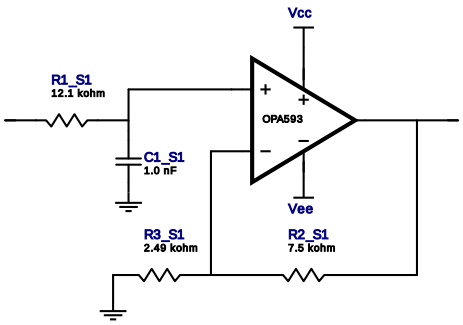
#	Name	Value	Description
1.	FilterType	lowpass	
2.	FilterResponse	Bessel	
3.	FilterOrder	3.0	
4.	FilterTopology	Single Pole	
5.	NumberOfStages	2.0	
6.	PassbandFrequency	10.0 k	
7.	StopbandAttenuation	-51.146	
8.	StopbandFrequency	100.0 k	
9.	Gain	16.0	
10.	SingleSupply	5.0	Power supply(s) to active chips
11.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
12.	CapacitorTolerance	E48	Capacitor series - 2% Passive capacitor tolerance

Design Assistance

1. **OPA593** Product Folder : http://www.ti.com/product/OPA593 : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency	13.153 kHz
Min GBW Reqd	2.654 MHz
Stage Gain	4.012 V/V
Stage Q	500.0 m
Stage Topology	Single Pole



Electrical BOM

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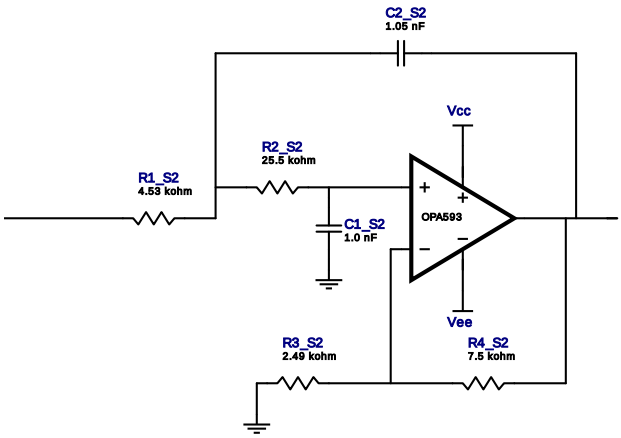
3.	R1_S1	Generic	Ideal	Res= 12100.0ohm Tolerance= 1%	1
4.	R2_S1	Generic	Ideal	Res= 7500.0ohm Tolerance= 1%	1
5.	R3_S1	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1

Filter Stage :2

Cutoff Frequency	14.451 kHz
Min GBW Reqd	4.014 MHz
Stage Gain	4.012 V/V
Stage Q	701.336 m
Stage Topology	Sallen-Key



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S2	Texas Instruments Inc.	OPA593	GbwTyp= 10MHz VccMax= 85V VccMin= 8V	1
2.	C1_S2	Generic	Ideal	Cap= 1.0 nF Tolerance= 2.0 %	1
3.	C2_S2	Generic	Ideal	Cap= 1.05 nF Tolerance= 2.0 %	1
4.	R1_S2	Generic	Ideal	Res= 4530.0ohm Tolerance= 1%	1
5.	R2_S2	Generic	Ideal	Res= 25500.0ohm Tolerance= 1%	1
6.	R3_S2	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1

#	Name	Manufacturer	Part Number	Properties	Qty
7.	R4_S2	Generic	Ideal	Res= 7500.0ohm Tolerance= 1%	1