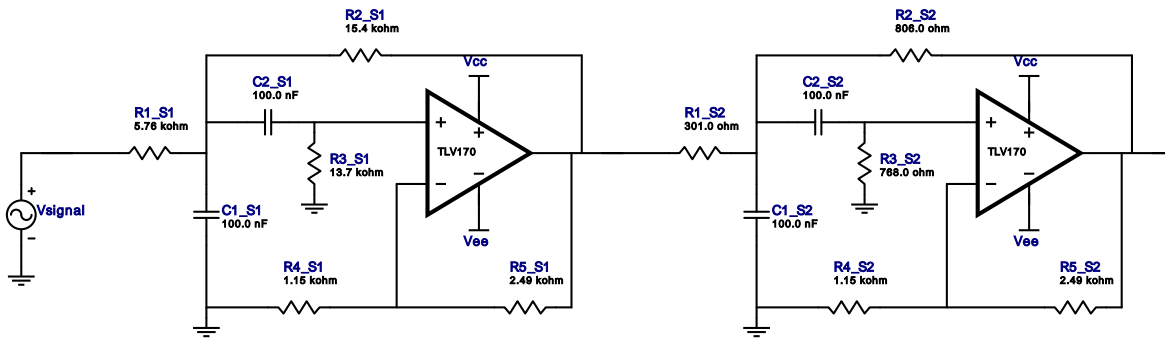


Type : Bandpass  
 Response : Butterworth  
 Order : 4  
 Number of Stages : 2

## Filter Design Report

Design : Bandpass Filter - 4th order Butterworth  
 Design ID: 20



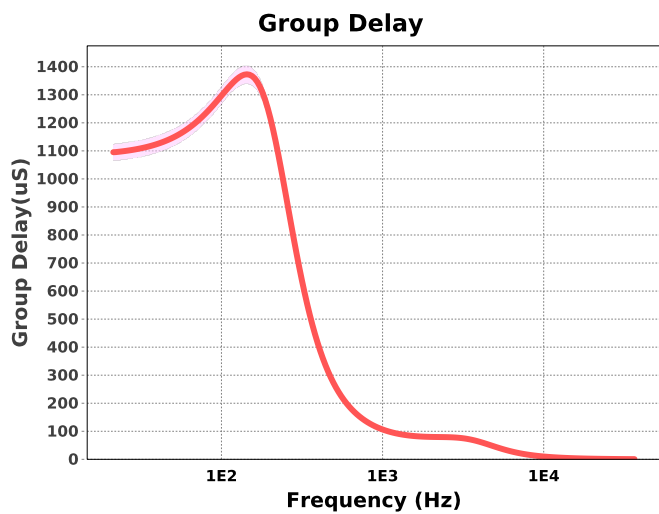
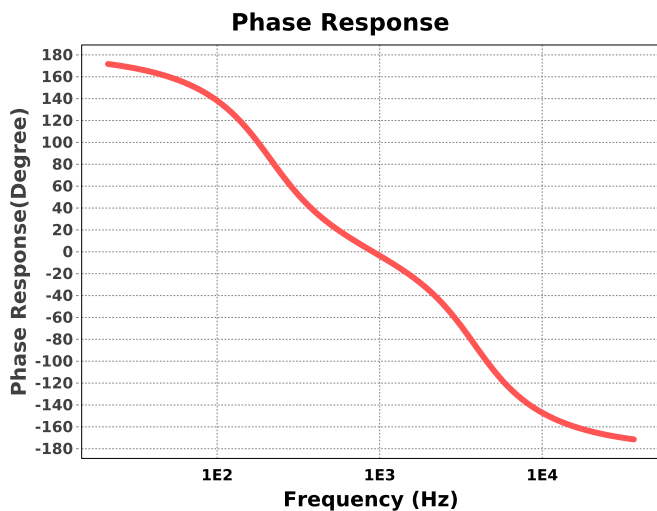
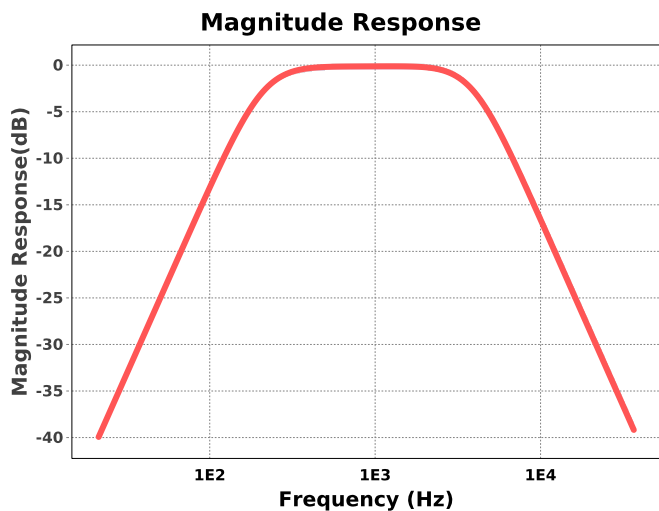
## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	TLV170	GbwTyp= 1.2MHz VccMax= 36V VccMin= 2.7V	1
2.	A1_S2	Texas Instruments Inc.	TLV170	GbwTyp= 1.2MHz VccMax= 36V VccMin= 2.7V	1
3.	C1_S1	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
4.	C1_S2	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
5.	C2_S1	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
6.	C2_S2	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
7.	R1_S1	Generic	Ideal	Res= 5760.0ohm Tolerance= 1%	1
8.	R1_S2	Generic	Ideal	Res= 301.0ohm Tolerance= 1%	1
9.	R2_S1	Generic	Ideal	Res= 15400.0ohm Tolerance= 1%	1
10.	R2_S2	Generic	Ideal	Res= 806.0ohm Tolerance= 1%	1
11.	R3_S1	Generic	Ideal	Res= 13700.0ohm Tolerance= 1%	1
12.	R3_S2	Generic	Ideal	Res= 768.0ohm Tolerance= 1%	1
13.	R4_S1	Generic	Ideal	Res= 1150.0ohm Tolerance= 1%	1

#	Name	Manufacturer	Part Number	Properties	Qty
14.	R4_S2	Generic	Ideal	Res= 1150.0ohm 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

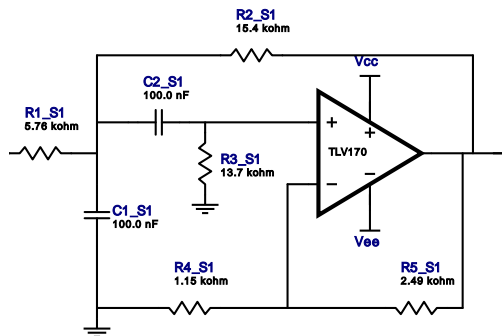
#	Name	Value	Description
1.	FilterType	bandpass	
2.	FilterResponse	Butterworth	
3.	FilterOrder	4.0	
4.	FilterTopology	Sallen-Key	
5.	NumberOfStages	2.0	
6.	CenterFrequency	900.0	
7.	StopbandAttenuation	-40.001	
8.	PassbandBandwidth	3.8 k	
9.	StopbandBandwidth	38.0 k	
10.	Gain	1.0	
11.	DualSupply	+/-5.00 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. **TLV170** Product Folder : <http://www.ti.com/product/TLV170> : contains the data sheet and other resources.

# Filter Stage :1

Cutoff Frequency 210.013 Hz  
 Min GBW Req'd 50.374 kHz  
 Stage Gain 3.165 V/V  
 Stage Q 737.187 m  
 Stage Topology Sallen-Key

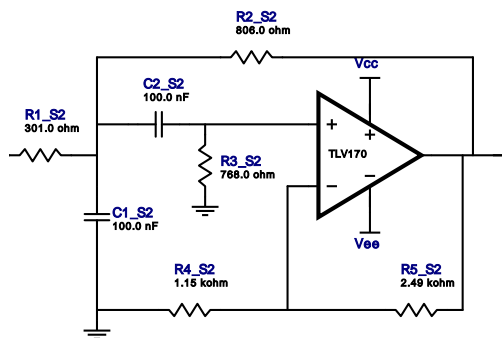


## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S1	Texas Instruments Inc.	TLV170	GbwTyp= 1.2MHz VccMax= 36V VccMin= 2.7V	1
2.	C1_S1	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
3.	C2_S1	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
4.	R1_S1	Generic	Ideal	Res= 5760.0ohm Tolerance= 1%	1
5.	R2_S1	Generic	Ideal	Res= 15400.0ohm Tolerance= 1%	1
6.	R3_S1	Generic	Ideal	Res= 13700.0ohm Tolerance= 1%	1
7.	R4_S1	Generic	Ideal	Res= 1150.0ohm Tolerance= 1%	1
8.	R5_S1	Generic	Ideal	Res= 2490.0ohm Tolerance= 1%	1

## Filter Stage :2

Cutoff Frequency 3.879 kHz  
 Min GBW Req'd 906.372 kHz  
 Stage Gain 3.165 V/V  
 Stage Q 752.299 m  
 Stage Topology Sallen-Key



### Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty
1.	A1_S2	Texas Instruments Inc.	TLV170	GbwTyp= 1.2MHz VccMax= 36V VccMin= 2.7V	1
2.	C1_S2	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
3.	C2_S2	Generic	Ideal	Cap= 100.0 nF Tolerance= 2.0 %	1
4.	R1_S2	Generic	Ideal	Res= 301.0ohm Tolerance= 1%	1
5.	R2_S2	Generic	Ideal	Res= 806.0ohm Tolerance= 1%	1
6.	R3_S2	Generic	Ideal	Res= 768.0ohm Tolerance= 1%	1
7.	R4_S2	Generic	Ideal	Res= 1150.0ohm Tolerance= 1%	1

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

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