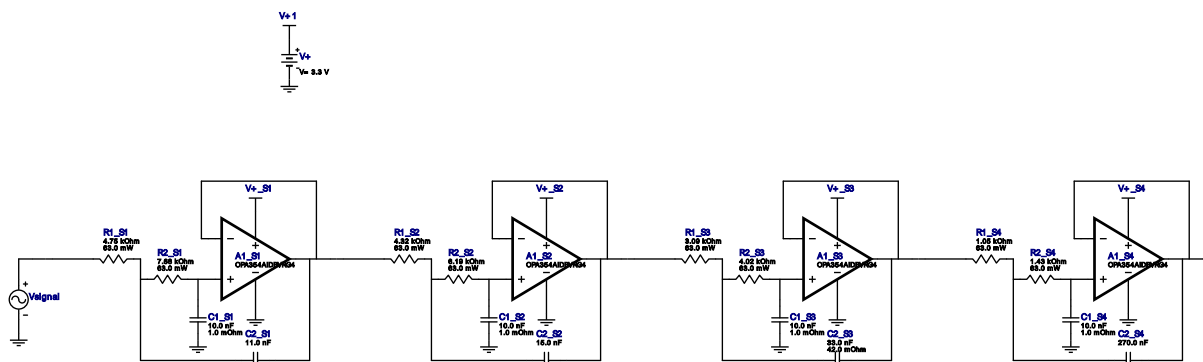


WEBENCH[®] Design Report










Design : 5322186/4 OPA354AIDBVRG4
Lowpass, Sallen_Key, Butterworth



My Comments

No comments

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
2.	A1_S2	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
3.	A1_S3	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
4.	A1_S4	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
5.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
6.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
7.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
8.	C1_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
9.	C2_S1	Samsung Electro-Mechanics	CL32C113JBHNNNE Series= C0G/NP0	Cap= 11.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.13	 1210 15 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	C2_S2	Kemet	C0603C153G4GAC7867 Series= C0G/NP0	Cap= 15.0 nF VDC= 16.0 V Tolerance= 2.0 %	1	\$0.26	 0603 5 mm ²
11.	C2_S3	AVX	08055C333JAT2A Series= X7R	Cap= 33.0 nF ESR= 42.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.07	 0805 7 mm ²
12.	C2_S4	Kemet	C2220C274J5GACTU Series= C0G/NP0	Cap= 270.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$1.85	 2220 54 mm ²
13.	R1_S1	Vishay-Dale	CRCW04024K75FKED Series= CRCW..e3	Res= 4.75 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	R1_S2	Vishay-Dale	CRCW04024K32FKED Series= CRCW..e3	Res= 4.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	R1_S3	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	R1_S4	Vishay-Dale	CRCW04021K05FKED Series= CRCW..e3	Res= 1.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	R2_S1	Vishay-Dale	CRCW04027K68FKED Series= CRCW..e3	Res= 7.68 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	R2_S2	Vishay-Dale	CRCW04026K19FKED Series= CRCW..e3	Res= 6.19 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	R2_S3	Vishay-Dale	CRCW04024K02FKED Series= CRCW..e3	Res= 4.02 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
20.	R2_S4	Vishay-Dale	CRCW04021K43FKED Series= CRCW..e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Design Inputs

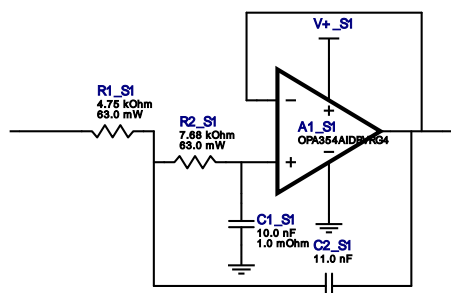
#	Name	Value	Description
1.	FilterType	Lowpass	
2.	FilterResponse	Butterworth	
3.	FilterOrder	8.0	
4.	FilterTopology	Sallen_Key	
5.	NumberOfStages	0.0	
6.	PassbandFrequency	2.5 k	
7.	StopbandAttenuation	-40.0	
8.	StopbandFrequency	4.5 k	
9.	Gain	1.0	
10.	SingleSupply	3.3	Power supply(s) to active chips
11.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
12.	CapacitorTolerance	E24	Capacitor series - 5% Passive capacitance tolerance
13.	SeedCapacitance	10.0 n	Seed Capacitance to start design of filter

Design Assistance






1. **OPA354AIDBVRG4** Product Folder : <http://www.ti.com/product/OPA354> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 2.5 kHz
 Min GBW Req'd 127.451 kHz
 Stage Gain 1.0 V/V
 Stage Q 509.796 m
 Stage Topology Sallen_Key

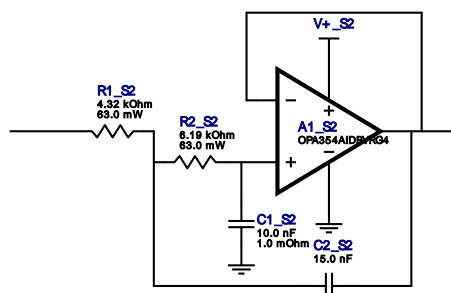


Electrical BOM






#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
2.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S1	Samsung Electro-Mechanics	CL32C113JBHNNNE Series= C0G/NP0	Cap= 11.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.13	 1210 15 mm ²
4.	R1_S1	Vishay-Dale	CRCW04024K75FKED Series= CRCW..e3	Res= 4.75 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S1	Vishay-Dale	CRCW04027K68FKED Series= CRCW..e3	Res= 7.68 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :2

Cutoff Frequency 2.5 kHz
 Min GBW Req'd 150.343 kHz
 Stage Gain 1.0 V/V
 Stage Q 601.348 m
 Stage Topology Sallen_Key

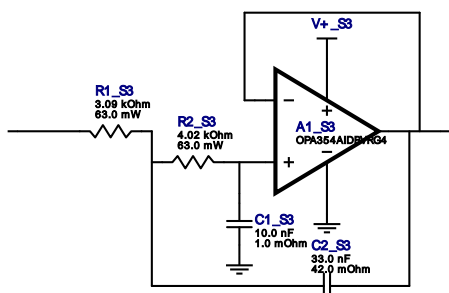


Electrical BOM






#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
2.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S2	Kemet	C0603C153G4GAC7867 Series= C0G/NP0	Cap= 15.0 nF VDC= 16.0 V Tolerance= 2.0 %	1	\$0.26	 0603 5 mm ²
4.	R1_S2	Vishay-Dale	CRCW04024K32FKED Series= CRCW...e3	Res= 4.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S2	Vishay-Dale	CRCW04026K19FKED Series= CRCW...e3	Res= 6.19 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :3

Cutoff Frequency 2.5 kHz
 Min GBW Req'd 225.001 kHz
 Stage Gain 1.0 V/V
 Stage Q 899.966 m
 Stage Topology Sallen_Key

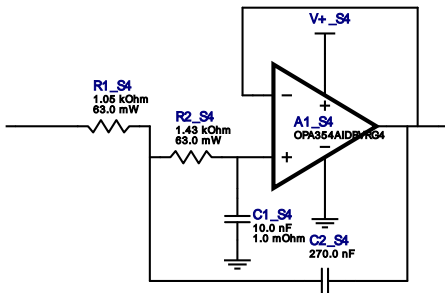


Electrical BOM






#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
2.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S3	AVX	08055C333JAT2A Series= X7R	Cap= 33.0 nF ESR= 42.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.07	 0805 7 mm ²
4.	R1_S3	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S3	Vishay-Dale	CRCW04024K02FKED Series= CRCW..e3	Res= 4.02 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :4

Cutoff Frequency 2.5 kHz
 Min GBW Req'd 640.718 kHz
 Stage Gain 1.0 V/V
 Stage Q 2.563
 Stage Topology Sallen_Key



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments, Inc.	OPA354AIDBVRG4	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.70	 0 mm ²
2.	C1_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S4	Kemet	C2220C274J5GACTU Series= C0G/NP0	Cap= 270.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$1.85	 2220 54 mm ²
4.	R1_S4	Vishay-Dale	CRCW04021K05FKED Series= CRCW...e3	Res= 1.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S4	Vishay-Dale	CRCW04021K43FKED Series= CRCW...e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

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