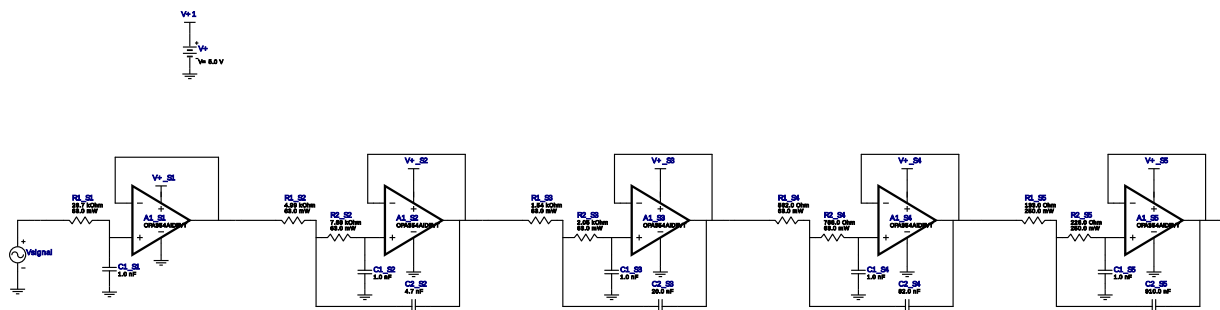


WEBENCH[®] Design Report

Design : 4386859/14 OPA354AIDBVT
Lowpass, Sallen Key, Chebyshev 0.5 dB



My Comments

No comments

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
2.	A1_S2	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
3.	A1_S3	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
4.	A1_S4	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
5.	A1_S5	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
6.	C1_S1	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
7.	C1_S2	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
8.	C1_S3	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
9.	C1_S4	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
10.	C1_S5	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
11.	C2_S2	Kemet	C0603C472J5RACTU Series= X7R	Cap= 4.7 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
12.	C2_S3	MuRata	GRM3195C1H203JA01D Series= C0G/NP0	Cap= 20.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.07	 1206 11 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	C2_S4	AVX	12063A822JAT2A Series= C0G/NP0	Cap= 82.0 nF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.14	 1206 11 mm ²
14.	C2_S5	CUSTOM	CUSTOM Series= ?	Cap= 910.0 nF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
15.	R1_S1	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	R1_S2	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	R1_S3	Vishay-Dale	CRCW04021K54FKED Series= CRCW..e3	Res= 1.54 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	R1_S4	Vishay-Dale	CRCW0402562RFKED Series= CRCW..e3	Res= 562.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	R1_S5	Panasonic	ERJ-8ENF1330V Series= ERJ-8E	Res= 133.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
20.	R2_S2	Vishay-Dale	CRCW04027K68FKED Series= CRCW..e3	Res= 7.68 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
21.	R2_S3	Vishay-Dale	CRCW04022K05FKED Series= CRCW..e3	Res= 2.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	R2_S4	Vishay-Dale	CRCW0402768RFKED Series= CRCW..e3	Res= 768.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
23.	R2_S5	Panasonic	ERJ-8ENF2260V Series= ERJ-8E	Res= 226.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

Design Inputs

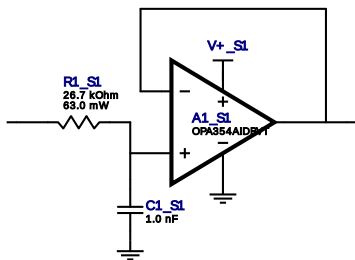
#	Name	Value	Description
1.	FilterType	Lowpass	
2.	FilterResponse	Chebyshev_05dB	
3.	FilterOrder	9.0	
4.	FilterTopology	Sallen_Key	
5.	NumberOfStages	5.0	
6.	PassbandFrequency	30.0 k	
7.	StopbandAttenuation	-45.0	
8.	StopbandFrequency	40.0 k	
9.	Gain	1.0	
10.	SingleSupply	5.0	Power supply(s) to active chips
11.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
12.	CapacitorTolerance	E24	Capacitor series - 5% Passive capacitance tolerance
13.	SeedCapacitance	1.0 n	Seed Capacitance to start design of filter

Design Assistance

1. **OPA354AIDBVT** Product Folder : <http://www.ti.com//product/OPA354> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 5.952 kHz
Min GBW Req'd 297.608 kHz
Stage Gain 1.0 V/V
Stage Q 500.0 m
Stage Topology Real_Pole

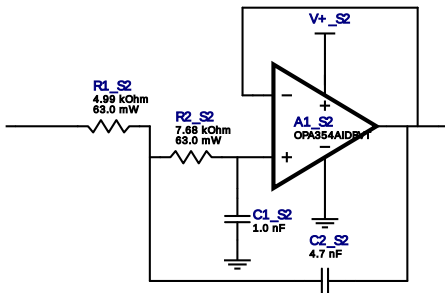


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm²
2.	C1_S1	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm²
3.	R1_S1	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²

Filter Stage :2

Cutoff Frequency 11.862 kHz
 Min GBW Req'd 1.257 MHz
 Stage Gain 1.0 V/V
 Stage Q 1.06
 Stage Topology Sallen_Key

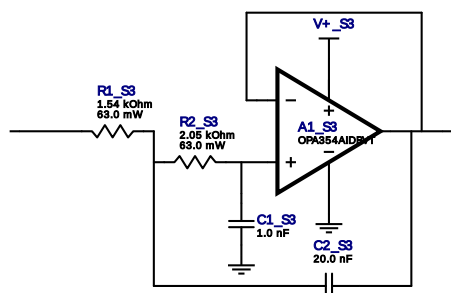


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
2.	C1_S2	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S2	Kemet	C0603C472J5RACTU Series= X7R	Cap= 4.7 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
4.	R1_S2	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S2	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 :3

Cutoff Frequency 20.181 kHz
 Min GBW Req'd 4.466 MHz
 Stage Gain 1.0 V/V
 Stage Q 2.213
 Stage Topology Sallen_Key

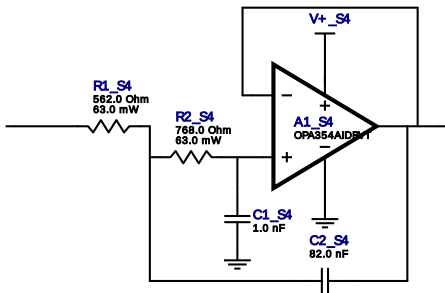


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
2.	C1_S3	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S3	MuRata	GRM3195C1H203JA01D Series= C0G/NP0	Cap= 20.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.07	 1206 11 mm ²
4.	R1_S3	Vishay-Dale	CRCW04021K54FKED Series= CRCW..e3	Res= 1.54 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S3	Vishay-Dale	CRCW04022K05FKED Series= CRCW..e3	Res= 2.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :4

Cutoff Frequency 26.654 kHz
 Min GBW Req'd 11.936 MHz
 Stage Gain 1.0 V/V
 Stage Q 4.478
 Stage Topology Sallen_Key

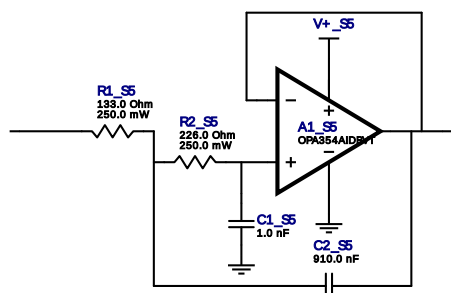


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
2.	C1_S4	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S4	AVX	12063A822JAT2A Series= C0G/NP0	Cap= 82.0 nF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.14	 1206 11 mm ²
4.	R1_S4	Vishay-Dale	CRCW0402562RFKED Series= CRCW..e3	Res= 562.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S4	Vishay-Dale	CRCW0402768RFKED Series= CRCW..e3	Res= 768.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :5

Cutoff Frequency 30.138 kHz
 Min GBW Req'd 43.938 MHz
 Stage Gain 1.0 V/V
 Stage Q 14.579
 Stage Topology Sallen_Key



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S5	Texas Instruments, Inc.	OPA354AIDBVT	GbwTyp= 250.0MHz VccMin= 2.5 V VccMax= 5.5 V	1	\$0.80	 DBV0005A 15 mm ²
2.	C1_S5	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S5	CUSTOM	CUSTOM Series= ?	Cap= 910.0 nF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
4.	R1_S5	Panasonic	ERJ-8ENF1330V Series= ERJ-8E	Res= 133.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
5.	R2_S5	Panasonic	ERJ-8ENF2260V Series= ERJ-8E	Res= 226.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

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