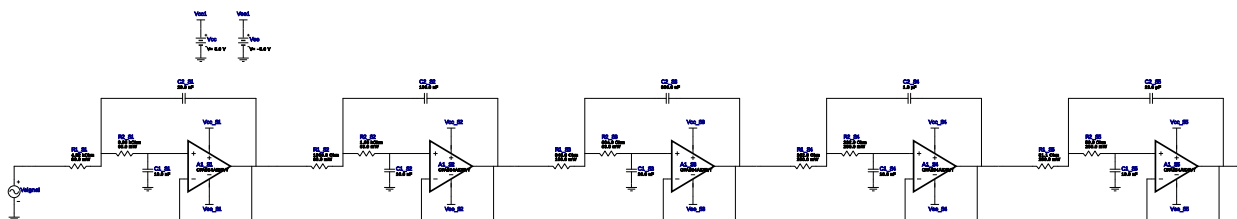


WEBENCH[®] Design Report

Design : 4738714/12 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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
7.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
8.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
9.	C1_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
10.	C1_S5	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
11.	C2_S1	MuRata	GRM3195C1H203JA01D Series= C0G/NP0	Cap= 20.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.07	 1206 11 mm ²
12.	C2_S2	Kemet	C0603C104J3RAC Series= X7R	Cap= 100.0 nF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
13.	C2_S3	CUSTOM	CUSTOM Series= ?	Cap= 360.0 nF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
14.	C2_S4	CUSTOM	CUSTOM Series= ?	Cap= 1.3 uF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
15.	C2_S5	CUSTOM	CUSTOM Series= ?	Cap= 13.0 uF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
16.	R1_S1	Vishay-Dale	CRCW04024K32FKED Series= CRCW..e3	Res= 4.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	R1_S2	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	R1_S3	Vishay-Dale	CRCW0603348RFKEA Series= CRCW..e3	Res= 348.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
19.	R1_S4	Panasonic	ERJ-8ENF1620V Series= ERJ-8E	Res= 162.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
20.	R1_S5	Panasonic	ERJ-8ENF51R1V Series= ERJ-8E	Res= 51.1 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
21.	R2_S1	Vishay-Dale	CRCW04028K06FKED Series= CRCW..e3	Res= 8.06 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	R2_S2	Vishay-Dale	CRCW04021K65FKED Series= CRCW..e3	Res= 1.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
23.	R2_S3	Vishay-Dale	CRCW0402604RFKED Series= CRCW..e3	Res= 604.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
24.	R2_S4	Panasonic	ERJ-8ENF2320V Series= ERJ-8E	Res= 232.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
25.	R2_S5	Panasonic	ERJ-8ENF59R0V Series= ERJ-8E	Res= 59.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

Design Inputs

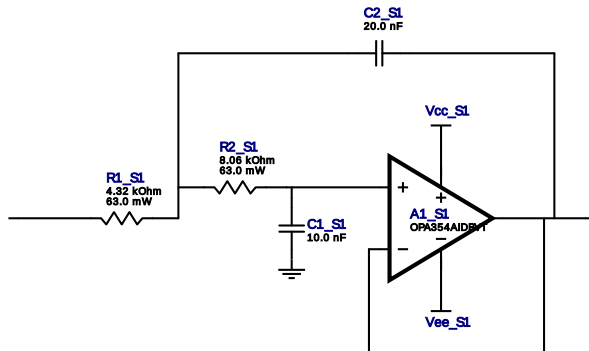
#	Name	Value	Description
1.	FilterType	Lowpass	
2.	FilterResponse	Chebyshev_05dB	
3.	FilterOrder	10.0	
4.	FilterTopology	Sallen_Key	
5.	NumberOfStages	5.0	
6.	PassbandFrequency	8.0 k	
7.	StopbandAttenuation	-45.0	
8.	StopbandFrequency	10.0 k	
9.	Gain	1.0	
10.	DualSupply	+/-5.0 V	Power supply(s) to active 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. **OPA354AIDBVT** Product Folder : <http://www.ti.com/product/OPA354> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 1.898 kHz
 Min GBW Req'd 127.726 kHz
 Stage Gain 1.0 V/V
 Stage Q 673.0 m
 Stage Topology Sallen_Key

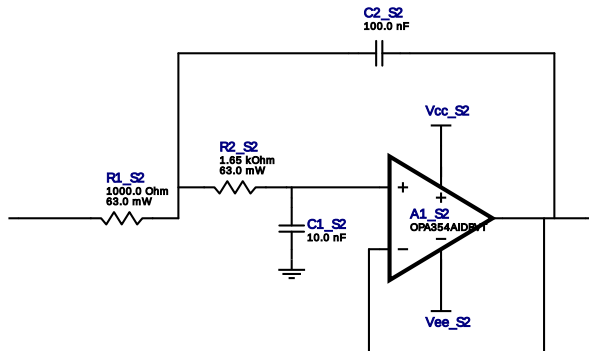


Electrical BOM

#	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.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S1	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_S1	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_S1	Vishay-Dale	CRCW04028K06FKED Series= CRCW..e3	Res= 8.06 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :2

Cutoff Frequency 3.902 kHz
 Min GBW Req'd 598.975 kHz
 Stage Gain 1.0 V/V
 Stage Q 1.535
 Stage Topology Sallen_Key

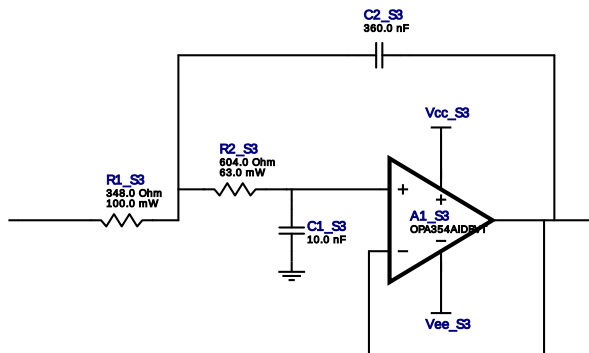


Electrical BOM

#	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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S2	Kemet	C0603C104J3RAC Series= X7R	Cap= 100.0 nF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
4.	R1_S2	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
5.	R2_S2	Vishay-Dale	CRCW04021K65FKED Series= CRCW..e3	Res= 1.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :3

Cutoff Frequency 5.834 kHz
 Min GBW Req'd 1.687 MHz
 Stage Gain 1.0 V/V
 Stage Q 2.891
 Stage Topology Sallen_Key

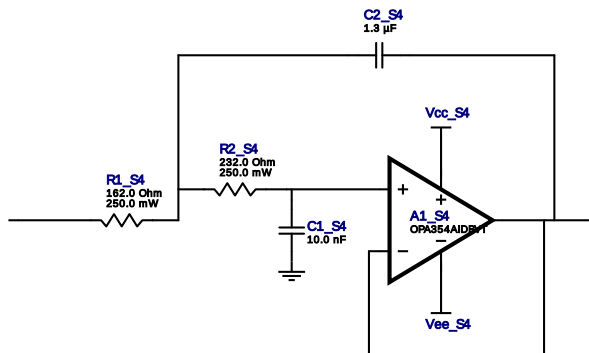


Electrical BOM

#	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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S3	CUSTOM	CUSTOM Series= ?	Cap= 360.0 nF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
4.	R1_S3	Vishay-Dale	CRCW0603348RFKEA Series= CRCW..e3	Res= 348.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
5.	R2_S3	Vishay-Dale	CRCW0402604RFKED Series= CRCW..e3	Res= 604.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :4

Cutoff Frequency 7.269 kHz
 Min GBW Req'd 4.079 MHz
 Stage Gain 1.0 V/V
 Stage Q 5.611
 Stage Topology Sallen_Key

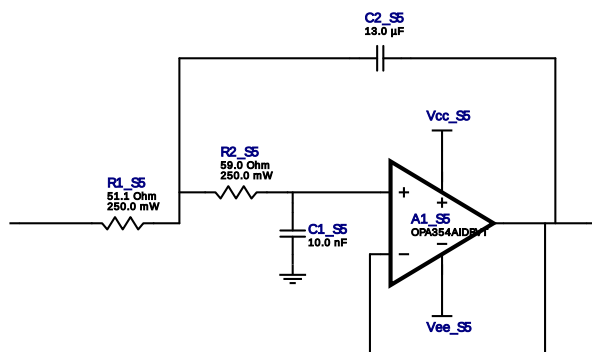


Electrical BOM

#	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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S4	CUSTOM	CUSTOM Series= ?	Cap= 1.3 uF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
4.	R1_S4	Panasonic	ERJ-8ENF1620V Series= ERJ-8E	Res= 162.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
5.	R2_S4	Panasonic	ERJ-8ENF2320V Series= ERJ-8E	Res= 232.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

Filter Stage :5

Cutoff Frequency 8.029 kHz
 Min GBW Req'd 14.442 MHz
 Stage Gain 1.0 V/V
 Stage Q 17.987
 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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S5	CUSTOM	CUSTOM Series= ?	Cap= 13.0 uF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm ²
4.	R1_S5	Panasonic	ERJ-8ENF51R1V Series= ERJ-8E	Res= 51.1 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
5.	R2_S5	Panasonic	ERJ-8ENF59R0V Series= ERJ-8E	Res= 59.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

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