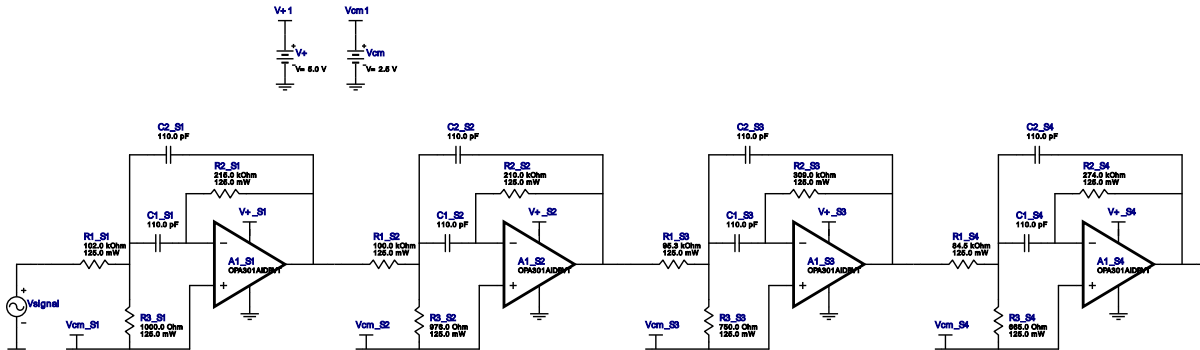


WEBENCH® Design Report

 Design : 1789249/1 OPA301AIDBVT
 Bandpass, Multiple Feedback, Bessel

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
2.	A1_S2	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
3.	A1_S3	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
4.	A1_S4	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
5.	C1_S1	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
6.	C1_S2	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
7.	C1_S3	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
8.	C1_S4	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
9.	C2_S1	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
10.	C2_S2	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
11.	C2_S3	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
12.	C2_S4	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	R1_S1	Panasonic	ERJ-6ENF1023V Series= 225	Res= 102.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
14.	R1_S2	Panasonic	ERJ-6ENF1003V Series= 225	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
15.	R1_S3	Panasonic	ERJ-6ENF9532V Series= 225	Res= 95.3 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
16.	R1_S4	Panasonic	ERJ-6ENF8452V Series= 225	Res= 84.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
17.	R2_S1	Panasonic	ERJ-6ENF2153V Series= 225	Res= 215.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
18.	R2_S2	Panasonic	ERJ-6ENF2103V Series= 225	Res= 210.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
19.	R2_S3	Panasonic	ERJ-6ENF3093V Series= 225	Res= 309.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
20.	R2_S4	Panasonic	ERJ-6ENF2743V Series= 225	Res= 274.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
21.	R3_S1	Panasonic	ERJ-6ENF1001V Series= 225	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
22.	R3_S2	Panasonic	ERJ-6ENF9760V Series= 225	Res= 976.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
23.	R3_S3	Vishay-Dale	CRCW0805750RFKEA Series= CRCW..e3	Res= 750.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
24.	R3_S4	Vishay-Dale	CRCW0805665RFKEA Series= CRCW..e3	Res= 665.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²

Design Inputs

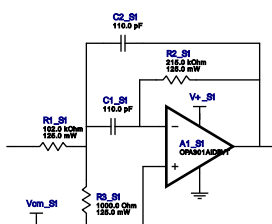
#	Name	Value	Description
1.	CapacitorTolerance	E24	Capacitor series - 5 Passive capacitance tolerance
2.	CenterFrequency	100.0 kHz	
3.	FilterOrder	8.0	
4.	FilterResponse	Bessel	
5.	FilterTopology	Multiple_Feedback	
6.	FilterType	Bandpass	
7.	Gain	1.0 V/V	
8.	NumberOfStages	4.0	
9.	PassbandBandwidth	10.0 kHz	
10.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
11.	SeedCapacitance	100.0 pF	Seed Capacitance to start design of filter
12.	SettlingTimeErrorBand	100.0 m%	Settling Time Error Band
13.	SettlingTimeSpecification	100.0 µsec	Settling Time Specification
14.	SingleSupply	5.0 V	SingleSupply
15.	StepResponseOvershootSpec	20.0 %	Step Response Overshoot
16.	StopbandAttenuation	-25.0 dB	
17.	StopbandBandwidth	30.0 kHz	

Design Assistance







1. **OPA301AIDBVT** Product Folder : <http://www.ti.com/product/OPA301> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 97.981 kHz
 Gain Bandwidth 72.084 MHz
 Stage Gain 1.0 V/V
 Stage Q 7.357
 Stage Topology Multiple_Feedback
 StageNo 1.0

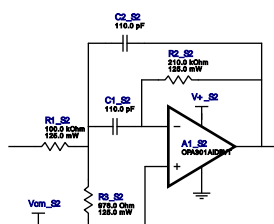


Electrical BOM







#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
2.	C1_S1	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	C2_S1	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
4.	R1_S1	Panasonic	ERJ-6ENF1023V Series= 225	Res= 102.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
5.	R2_S1	Panasonic	ERJ-6ENF2153V Series= 225	Res= 215.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
6.	R3_S1	Panasonic	ERJ-6ENF1001V Series= 225	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

Filter Stage :2

Cutoff Frequency 102.061 kHz
 Gain Bandwidth 75.086 MHz
 Stage Gain 1.0 V/V
 Stage Q 7.357
 Stage Topology Multiple_Feedback
 StageNo 2.0

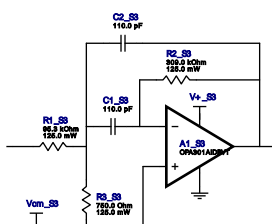


Electrical BOM







#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
2.	C1_S2	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	C2_S2	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
4.	R1_S2	Panasonic	ERJ-6ENF1003V Series= 225	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
5.	R2_S2	Panasonic	ERJ-6ENF2103V Series= 225	Res= 210.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
6.	R3_S2	Panasonic	ERJ-6ENF9760V Series= 225	Res= 976.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

Filter Stage :3

Cutoff Frequency 93.949 kHz
 Gain Bandwidth 95.302 MHz
 Stage Gain 1.0 V/V
 Stage Q 10.144
 Stage Topology Multiple_Feedback
 StageNo 3.0

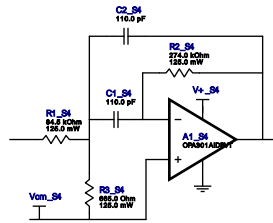


Electrical BOM


#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
2.	C1_S3	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	C2_S3	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
4.	R1_S3	Panasonic	ERJ-6ENF9532V Series= 225	Res= 95.3 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
5.	R2_S3	Panasonic	ERJ-6ENF3093V Series= 225	Res= 309.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
6.	R3_S3	Vishay-Dale	CRCW0805750RFKEA Series= CRCW..e3	Res= 750.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

Filter Stage :4

Cutoff Frequency	106.44 kHz
Gain Bandwidth	107.973 MHz
Stage Gain	1.0 V/V
Stage Q	10.144
Stage Topology	Multiple_Feedback
StageNo	4.0



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments	OPA301AIDBVT	GbwTyp= 150.0 MHz VccMin= 2.7 V VccMax= 5.5 V	1	\$0.90	 SOT-23 14 mm ²
2.	C1_S4	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	C2_S4	MuRata	GRM1555C1H111JA01D Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
4.	R1_S4	Panasonic	ERJ-6ENF8452V Series= 225	Res= 84.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
5.	R2_S4	Panasonic	ERJ-6ENF2743V Series= 225	Res= 274.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
6.	R3_S4	Vishay-Dale	CRCW0805665RFKEA Series= CRCW..e3	Res= 665.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

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