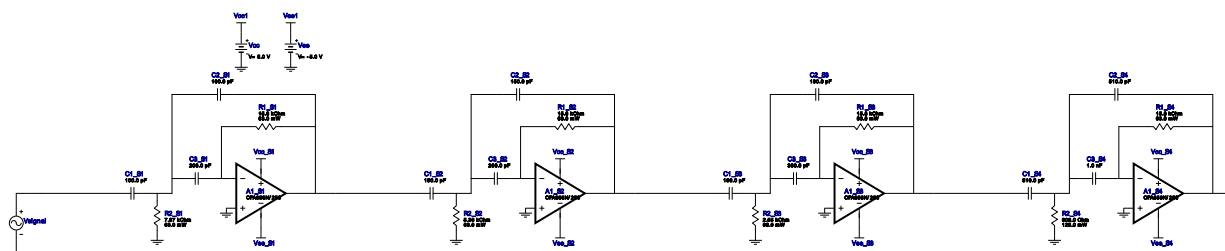


WEBENCH[®] Design Report

Design : 4445574/2 OPA656N/250
Highpass, Multiple Feedback, Butterworth



My Comments

No comments

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
2.	A1_S2	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
3.	A1_S3	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
4.	A1_S4	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
5.	C1_S1	Kemet	C0603C101J3GACTU Series= C0G/NP0	Cap= 100.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
6.	C1_S2	Johanson Technology	250R07N151JV4T Series= C0G/NP0	Cap= 150.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
7.	C1_S3	Samsung Electro-Mechanics	CL05C181JA5NNNC Series= C0G/NP0	Cap= 180.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
8.	C1_S4	MuRata	GRM1555C1E511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
9.	C2_S1	Kemet	C0603C101J3GACTU Series= C0G/NP0	Cap= 100.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
10.	C2_S2	Johanson Technology	250R07N151JV4T Series= C0G/NP0	Cap= 150.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
11.	C2_S3	Samsung Electro-Mechanics	CL05C181JA5NNNC Series= C0G/NP0	Cap= 180.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
12.	C2_S4	MuRata	GRM1555C1E511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
13.	C3_S1	Samsung Electro-Mechanics	CL05C201JB5NNNC Series= C0G/NP0	Cap= 200.0 pF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
14.	C3_S2	Samsung Electro-Mechanics	CL05C201JB5NNNC Series= C0G/NP0	Cap= 200.0 pF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
15.	C3_S3	MuRata	GRM1555C1E361JA01D Series= C0G/NP0	Cap= 360.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
16.	C3_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
17.	R1_S1	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	R1_S2	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	R1_S3	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
20.	R1_S4	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
21.	R2_S1	Vishay-Dale	CRCW04027K87FKED Series= CRCW..e3	Res= 7.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	R2_S2	Vishay-Dale	CRCW04025K36FKED Series= CRCW..e3	Res= 5.36 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
23.	R2_S3	Vishay-Dale	CRCW04022K55FKED Series= CRCW..e3	Res= 2.55 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
24.	R2_S4	Vishay-Dale	CRCW0805309RFKEA Series= CRCW..e3	Res= 309.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

Design Inputs

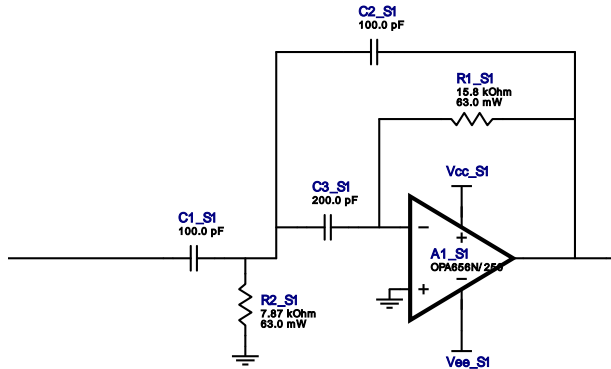
#	Name	Value	Description
1.	FilterType	Highpass	
2.	FilterResponse	Butterworth	
3.	FilterOrder	8.0	
4.	FilterTopology	Multiple_Feedback	
5.	NumberOfStages	4.0	
6.	PassbandFrequency	100.0 k	
7.	StopbandAttenuation	-45.0	
8.	StopbandFrequency	50.0 k	
9.	Gain	1.0	
10.	DualSupply	+/-5.0 V	Power supply(s) to active chips
11.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
12.	CapacitorTolerance	E24	Capacitor series - 5% Passive capacitance tolerance
13.	SeedCapacitance	100.0 p	Seed Capacitance to start design of filter

Design Assistance







1. **OPA656N/250** Product Folder : <http://www.ti.com//product/OPA656> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 100.0 kHz
 Min GBW Req'd 5.1 MHz
 Stage Gain 1.0 V/V
 Stage Q 510.0 m
 Stage Topology Multiple_Feedback

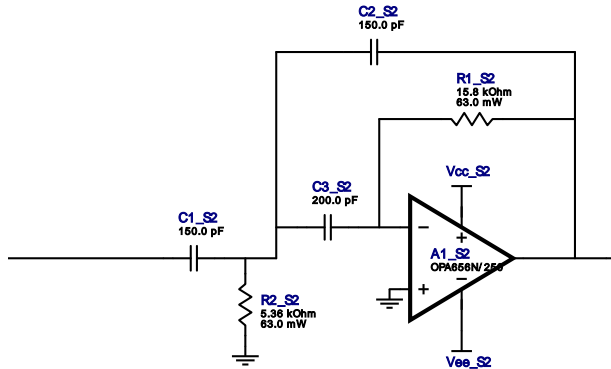


Electrical BOM







#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
2.	C1_S1	Kemet	C0603C101J3GACTU Series= C0G/NP0	Cap= 100.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
3.	C2_S1	Kemet	C0603C101J3GACTU Series= C0G/NP0	Cap= 100.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0603 5 mm ²
4.	C3_S1	Samsung Electro-Mechanics	CL05C201JB5NNNC Series= C0G/NP0	Cap= 200.0 pF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
5.	R1_S1	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
6.	R2_S1	Vishay-Dale	CRCW04027K87FKED Series= CRCW..e3	Res= 7.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :2

Cutoff Frequency 100.0 kHz
 Min GBW Req'd 6.0 MHz
 Stage Gain 1.0 V/V
 Stage Q 600.0 m
 Stage Topology Multiple_Feedback

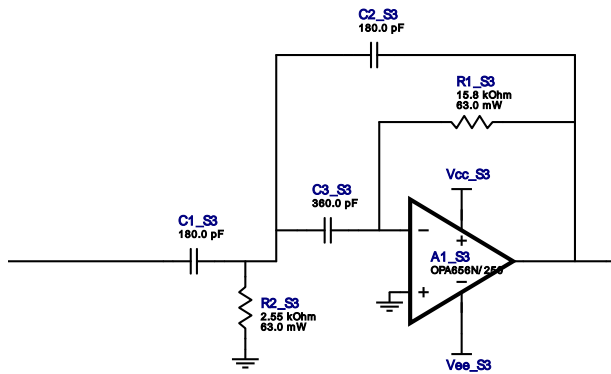


Electrical BOM






#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
2.	C1_S2	Johanson Technology	250R07N151JV4T Series= C0G/NP0	Cap= 150.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S2	Johanson Technology	250R07N151JV4T Series= C0G/NP0	Cap= 150.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
4.	C3_S2	Samsung Electro-Mechanics	CL05C201JB5NNNC Series= C0G/NP0	Cap= 200.0 pF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
5.	R1_S2	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
6.	R2_S2	Vishay-Dale	CRCW04025K36FKED Series= CRCW..e3	Res= 5.36 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

Filter Stage :3

Cutoff Frequency 100.0 kHz
 Min GBW Req'd 9.0 MHz
 Stage Gain 1.0 V/V
 Stage Q 900.0 m
 Stage Topology Multiple_Feedback

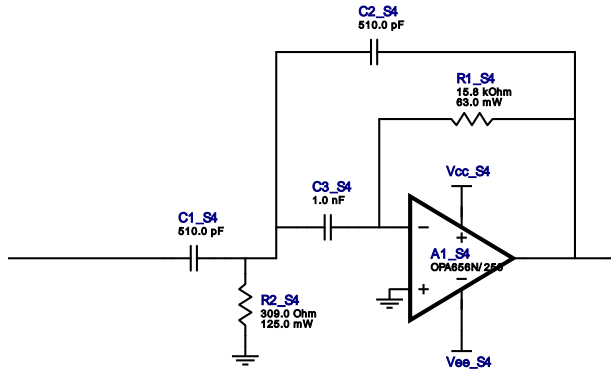


Electrical BOM






#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
2.	C1_S3	Samsung Electro-Mechanics	CL05C181JA5NNNC Series= C0G/NP0	Cap= 180.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S3	Samsung Electro-Mechanics	CL05C181JA5NNNC Series= C0G/NP0	Cap= 180.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
4.	C3_S3	MuRata	GRM1555C1E361JA01D Series= C0G/NP0	Cap= 360.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
5.	R1_S3	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
6.	R2_S3	Vishay-Dale	CRCW04022K55FKED Series= CRCW..e3	Res= 2.55 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²


Filter Stage :4

Cutoff Frequency 100.0 kHz
 Min GBW Req'd 25.6 MHz
 Stage Gain 1.0 V/V
 Stage Q 2.56
 Stage Topology Multiple_Feedback



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments	OPA656N/250	GbwTyp= 500.0MHz VccMin= 7.0 V VccMax= 13.0 V	1	\$5.75	 SOT-23 14 mm ²
2.	C1_S4	MuRata	GRM1555C1E511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
3.	C2_S4	MuRata	GRM1555C1E511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.01	 0402 3 mm ²
4.	C3_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
5.	R1_S4	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	R2_S4	Vishay-Dale	CRCW0805309RFKEA Series= CRCW..e3	Res= 309.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

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