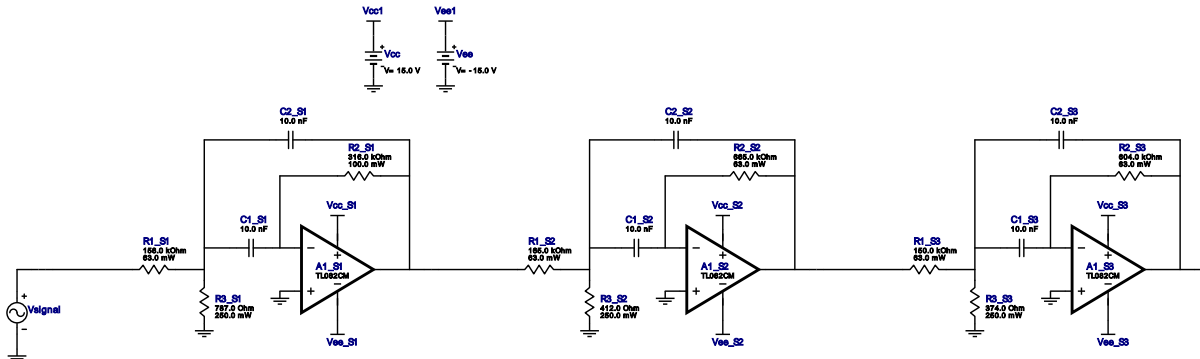


WEBENCH[®] Design Report

 Design : 3778301/1 TL082CM
 Bandpass, Multiple Feedback, Butterworth


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 mm ²
2.	A1_S2	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 mm ²
3.	A1_S3	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 mm ²
4.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
5.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
6.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
7.	C2_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
8.	C2_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
9.	C2_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
10.	R1_S1	Vishay-Dale	CRCW0402158KFKED Series= CRCW..e3	Res= 158.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	R1_S2	Vishay-Dale	CRCW0402165KFKED Series= CRCW..e3	Res= 165.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	R1_S3	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	R2_S1	Yageo America	RC0603FR-07316KL Series= ?	Res= 316.0 kOhm Power= 100.0 mW Tolerance= 0.01%	1	\$0.01	0603 5 mm ²
14.	R2_S2	Vishay-Dale	CRCW0402665KFKED Series= CRCW..e3	Res= 665.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
15.	R2_S3	Vishay-Dale	CRCW0402604KFKED Series= CRCW..e3	Res= 604.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
16.	R3_S1	Panasonic	ERJ-8ENF7870V Series= ERJ-8E	Res= 787.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²
17.	R3_S2	Panasonic	ERJ-8ENF4120V Series= ERJ-8E	Res= 412.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²
18.	R3_S3	Panasonic	ERJ-8ENF3740V Series= ERJ-8E	Res= 374.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²

Design Inputs

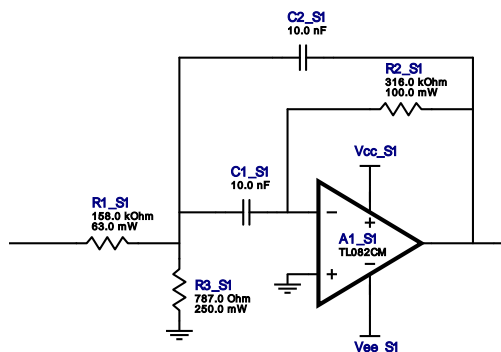
#	Name	Value	Description
1.	DualSupply	+/-15.0 V	DualSupply
2.	FilterType	Bandpass	
3.	FilterResponse	Butterworth	
4.	FilterOrder	6.0	
5.	FilterTopology	Multiple_Feedback	
6.	NumberOfStages	3.0	
7.	CenterFrequency	1,000.0	
8.	StopbandAttenuation	-45.0	
9.	PassbandBandwidth	100.0	
10.	StopbandBandwidth	1.05 k	
11.	Gain	1.0	
12.	ResistorTolerance	E96	Resistor series - 1% Passive resistor tolerance
13.	CapacitorTolerance	E24	Capacitor series - 5% Passive capacitance tolerance
14.	SeedCapacitance	10.0 n	Seed Capacitance to start design of filter

Design Assistance

1. TL082CM Product Folder : <http://www.ti.com//product/TL082-N> : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency 1,000.0 Hz
 Min GBW Req'd 1000.0 kHz
 Stage Gain 1.0 V/V
 Stage Q 10.0
 Stage Topology Multiple_Feedback

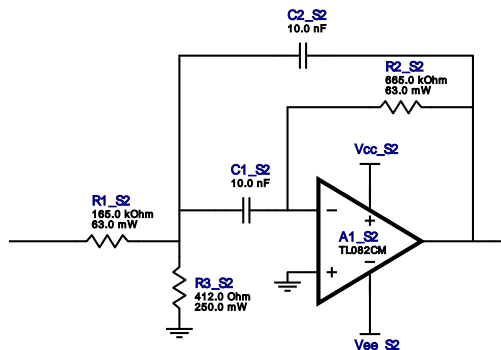


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
4.	R1_S1	Vishay-Dale	CRCW0402158KFKED Series= CRCW...e3	Res= 158.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
5.	R2_S1	Yageo America	RC0603FR-07316KL Series= ?	Res= 316.0 kOhm Power= 100.0 mW Tolerance= 0.01%	1	\$0.01	0603 5 mm ²
6.	R3_S1	Panasonic	ERJ-8ENF7870V Series= ERJ-8E	Res= 787.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²

Filter Stage :2

Cutoff Frequency 957.624 Hz
 Min GBW Req'd 1.917 MHz
 Stage Gain 1.0 V/V
 Stage Q 20.019
 Stage Topology Multiple_Feedback

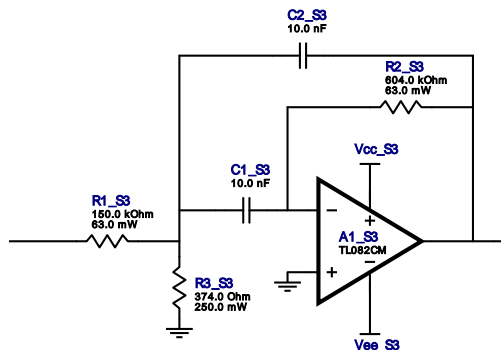


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 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	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
4.	R1_S2	Vishay-Dale	CRCW0402165KFKED Series= CRCW..e3	Res= 165.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
5.	R2_S2	Vishay-Dale	CRCW0402665KFKED Series= CRCW..e3	Res= 665.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
6.	R3_S2	Panasonic	ERJ-8ENF4120V Series= ERJ-8E	Res= 412.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²


Filter Stage :3

Cutoff Frequency 1.044 kHz
 Min GBW Req'd 2.09 MHz
 Stage Gain 1.0 V/V
 Stage Q 20.019
 Stage Topology Multiple_Feedback



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm ²
4.	R1_S3	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
5.	R2_S3	Vishay-Dale	CRCW0402604KFKED Series= CRCW..e3	Res= 604.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	R3_S3	Panasonic	ERJ-8ENF3740V Series= ERJ-8E	Res= 374.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).