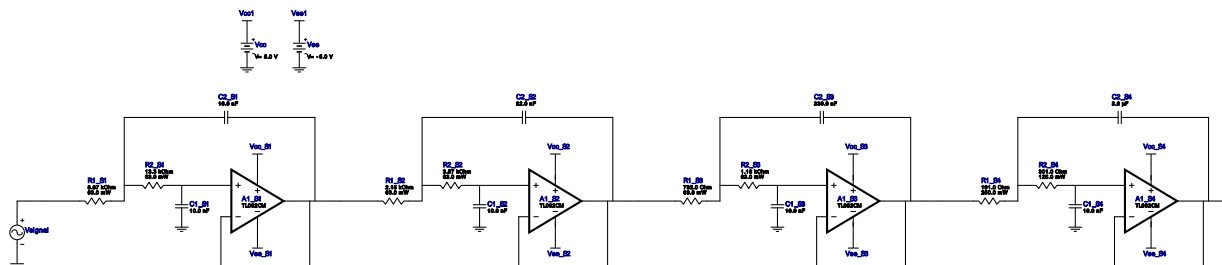





## WEBENCH® Design Report

Design : 4085740/3 TL082CM  
Lowpass, Sallen Key, Chebyshev 0.2 dB



#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
14.	R1_S2	Vishay-Dale	CRCW04022K15FKED Series= CRCW..e3	Res= 2.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
15.	R1_S3	Vishay-Dale	CRCW0402732RFKED Series= CRCW..e3	Res= 732.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
16.	R1_S4	Panasonic	ERJ-8ENF1910V Series= ERJ-8E	Res= 191.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm <sup>2</sup>
17.	R2_S1	Vishay-Dale	CRCW040213K3FKED Series= CRCW..e3	Res= 13.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
18.	R2_S2	Vishay-Dale	CRCW04023K57FKED Series= CRCW..e3	Res= 3.57 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
19.	R2_S3	Vishay-Dale	CRCW04021K18FKED Series= CRCW..e3	Res= 1.18 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
20.	R2_S4	Vishay-Dale	CRCW0805301RFKEA Series= CRCW..e3	Res= 301.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>

## Design Inputs

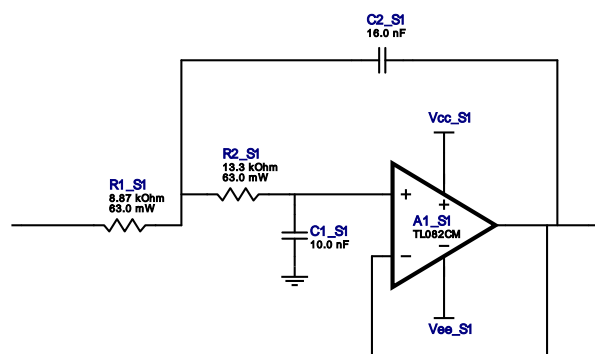
#	Name	Value	Description
1.	DualSupply	+/-5.0 V	DualSupply
2.	FilterType	Lowpass	
3.	FilterResponse	Chebyshev	
4.	FilterOrder	8.0	
5.	FilterTopology	Sallen_Key	
6.	NumberOfStages	4.0	
7.	PassbandFrequency	3.4 k	
8.	StopbandAttenuation	-45.0	
9.	StopbandFrequency	5.0 k	
10.	Gain	1.0	
11.	ResistorTolerance	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. **TL082CM** Product Folder : <http://www.ti.com/product/TL082-N> : contains the data sheet and other resources.

## Filter Stage :1

Cutoff Frequency 1.168 kHz  
 Min GBW Req'd 72.281 kHz  
 Stage Gain 1.0 V/V  
 Stage Q 619.0 m  
 Stage Topology Sallen\_Key

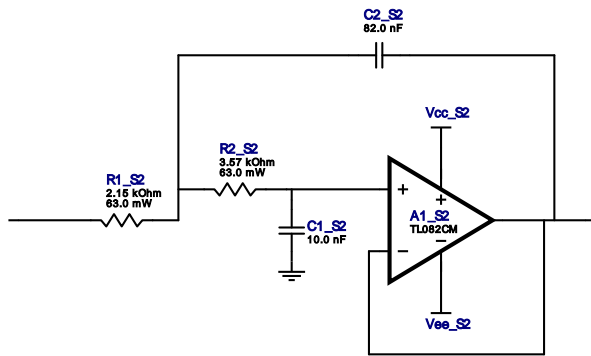


## Electrical BOM

#	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 <sup>2</sup>
2.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm <sup>2</sup>
3.	C2_S1	MuRata	GRM55N5C1H163JD01L Series= C0G/NP0	Cap= 16.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$1.26	2220 54 mm <sup>2</sup>
4.	R1_S1	Vishay-Dale	CRCW04028K87FKED Series= CRCW...e3	Res= 8.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
5.	R2_S1	Vishay-Dale	CRCW040213K3FKED Series= CRCW...e3	Res= 13.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

## Filter Stage :2

Cutoff Frequency 2.119 kHz  
 Min GBW Req'd 281.026 kHz  
 Stage Gain 1.0 V/V  
 Stage Q 1.326  
 Stage Topology Sallen\_Key

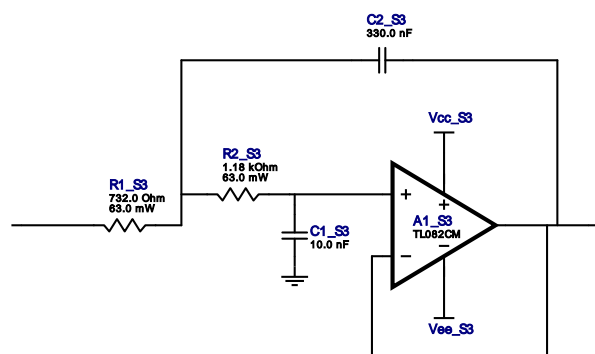


### Electrical BOM

#	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 <sup>2</sup>
2.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm <sup>2</sup>
3.	C2_S2	AVX	12063A822JAT2A Series= C0G/NP0	Cap= 82.0 nF VDC= 25.0 V Tolerance= 5.0 %	1	\$0.14	1206 11 mm <sup>2</sup>
4.	R1_S2	Vishay-Dale	CRCW04022K15FKED Series= CRCW...e3	Res= 2.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
5.	R2_S2	Vishay-Dale	CRCW04023K57FKED Series= CRCW...e3	Res= 3.57 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

## Filter Stage :3

Cutoff Frequency 2.986 kHz  
 Min GBW Req'd 834.852 kHz  
 Stage Gain 1.0 V/V  
 Stage Q 2.796  
 Stage Topology Sallen\_Key

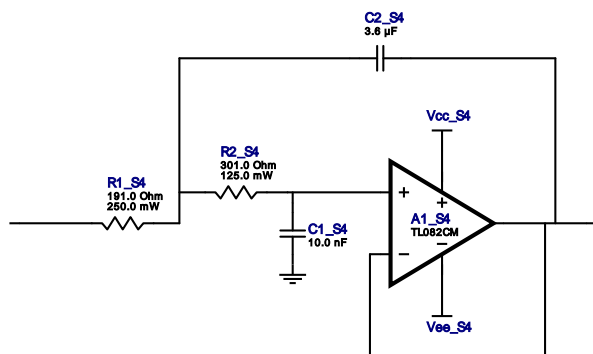


## Electrical BOM

#	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 <sup>2</sup>
2.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm <sup>2</sup>
3.	C2_S3	CUSTOM	CUSTOM Series= ?	Cap= 330.0 nF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm <sup>2</sup>
4.	R1_S3	Vishay-Dale	CRCW0402732RFBKED Series= CRCW...e3	Res= 732.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
5.	R2_S3	Vishay-Dale	CRCW04021K18FBKED Series= CRCW...e3	Res= 1.18 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

## Filter Stage :4

Cutoff Frequency	3.47 kHz
Min GBW Req'd	3.212 MHz
Stage Gain	1.0 V/V
Stage Q	9.255
Stage Topology	Sallen_Key



### Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments	TL082CM	GbwTyp= 4.0 MHz VccMin= 10.0 V VccMax= 36.0 V	1	\$0.21	SOIC 0 mm <sup>2</sup>
2.	C1_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	\$0.01	0603 5 mm <sup>2</sup>
3.	C2_S4	CUSTOM	CUSTOM Series= ?	Cap= 3.6 uF VDC= 0.0 V Tolerance= 0.0 %	1	NA	CUSTOM 0 mm <sup>2</sup>
4.	R1_S4	Panasonic	ERJ-8ENF1910V Series= ERJ-8E	Res= 191.0 Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm <sup>2</sup>
5.	R2_S4	Vishay-Dale	CRCW0805301RFKEA Series= CRCW..e3	Res= 301.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>

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