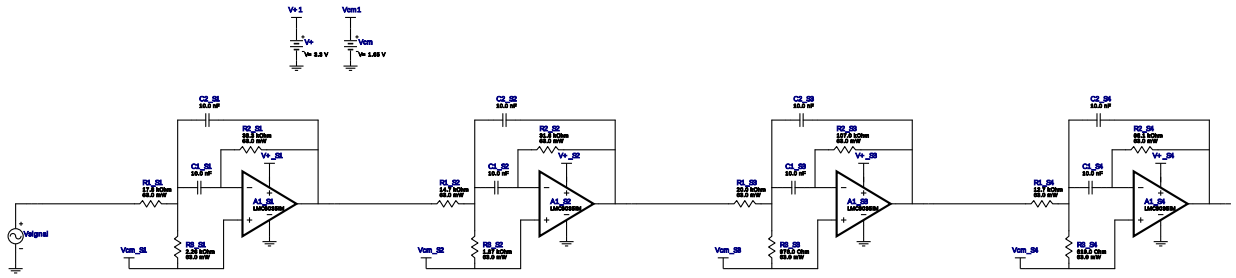
Type : Bandpass
Response : Butterworth
Order : 8
Number of Stages : 4

Device = LMC6035IM
Created = Jul 14 2015 6:14AM

WEBENCH® Design Report

Design : 4427102/5 LMC6035IM
Bandpass, Multiple Feedback, Butterworth



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	SOIC 0 mm^2
2.	A1_S2	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	SOIC 0 mm^2
3.	A1_S3	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	SOIC 0 mm^2
4.	A1_S4	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	SOIC 0 mm^2
5.	C1_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
6.	C1_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
7.	C1_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
8.	C1_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
9.	C2_S1	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
10.	C2_S2	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
11.	C2_S3	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
12.	C2_S4	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
13.	R1_S1	Vishay-Dale	CRCW040217K8FKED Series= CRCW..e3	Res= 17.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
14.	R1_S2	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
15.	R1_S3	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
16.	R1_S4	Vishay-Dale	CRCW040212K7FKED Series= CRCW..e3	Res= 12.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
17.	R2_S1	Vishay-Dale	CRCW040238K3FKED Series= CRCW..e3	Res= 38.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
18.	R2_S2	Vishay-Dale	CRCW040231K6FKED Series= CRCW..e3	Res= 31.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
19.	R2_S3	Vishay-Dale	CRCW0402107KFKED Series= CRCW..e3	Res= 107.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
20.	R2_S4	Vishay-Dale	CRCW040268K1FKED Series= CRCW..e3	Res= 68.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
21.	R3_S1	Vishay-Dale	CRCW04022K26FKED Series= CRCW..e3	Res= 2.26 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
22.	R3_S2	Vishay-Dale	CRCW04021K87FKED Series= CRCW..e3	Res= 1.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
23.	R3_S3	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
24.	R3_S4	Vishay-Dale	CRCW0402619RFKED Series= CRCW..e3	Res= 619.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

Design Inputs

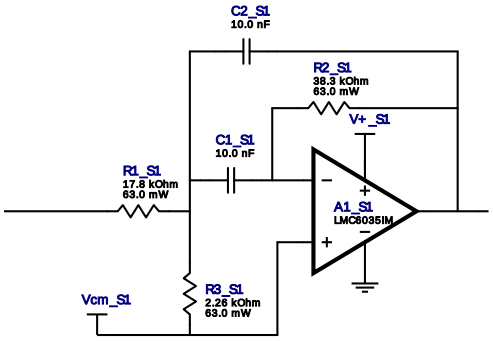
#	Name	Value	Description
1.	FilterType	Bandpass	
2.	FilterResponse	Butterworth	
3.	FilterOrder	8.0	
4.	FilterTopology	Multiple_Feedback	
5.	NumberOfStages	4.0	
6.	CenterFrequency	2.0 k	
7.	StopbandAttenuation	-20.0	
8.	PassbandBandwidth	1,000.0	
9.	StopbandBandwidth	1.9 k	
10.	Gain	1.0	
11.	SingleSupply	3.3	Power supply(s) to active chips
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. LMC6035IM Product Folder : http://www.ti.com//product/LMC6035 : contains the data sheet and other resources.

Filter Stage :1

Cutoff Frequency	1.813 kHz
Min GBW Reqd	394.333 kHz
Stage Gain	1.0 V/V
Stage Q	2.175
Stage Topology	Multiple_Feedback

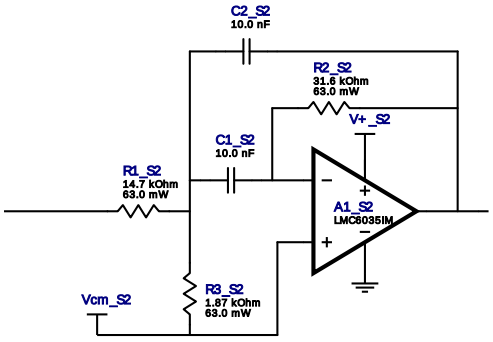


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S1	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	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	CRCW040217K8FKED Series= CRCW..e3	Res= 17.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
5.	R2_S1	Vishay-Dale	CRCW040238K3FKED Series= CRCW..e3	Res= 38.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
6.	R3_S1	Vishay-Dale	CRCW04022K26FKED Series= CRCW..e3	Res= 2.26 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

Filter Stage :2

Cutoff Frequency	2.206 kHz
Min GBW Reqd	479.861 kHz
Stage Gain	1.0 V/V
Stage Q	2.175
Stage Topology	Multiple_Feedback

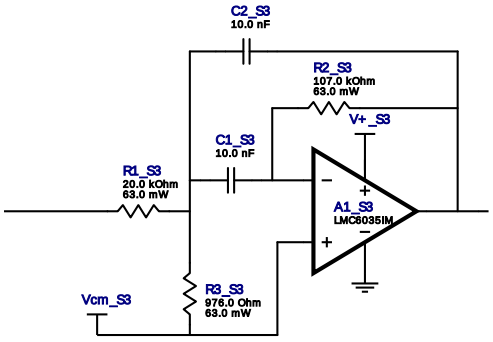


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S2	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	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	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
5.	R2_S2	Vishay-Dale	CRCW040231K6FKED Series= CRCW..e3	Res= 31.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
6.	R3_S2	Vishay-Dale	CRCW04021K87FKED Series= CRCW..e3	Res= 1.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

Filter Stage :3

Cutoff Frequency	1.589 kHz
Min GBW Reqd	852.575 kHz
Stage Gain	1.0 V/V
Stage Q	5.365
Stage Topology	Multiple_Feedback

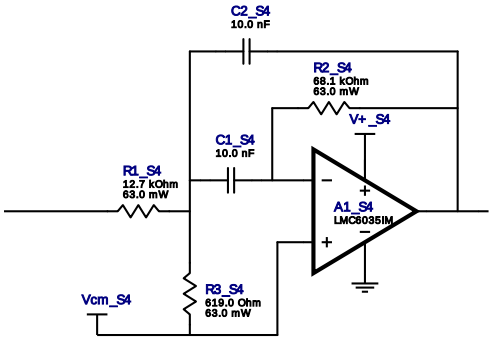


Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S3	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	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	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
5.	R2_S3	Vishay-Dale	CRCW0402107KFKED Series= CRCW..e3	Res= 107.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
6.	R3_S3	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

Filter Stage :4

Cutoff Frequency	2.517 kHz
Min GBW Reqd	1.35 MHz
Stage Gain	1.0 V/V
Stage Q	5.365
Stage Topology	Multiple_Feedback



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	A1_S4	Texas Instruments	LMC6035IM	GbwTyp= 1.4 MHz VccMin= 2.0 V VccMax= 15.5 V	1	$0.50	SOIC 0 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	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V Tolerance= 5.0 %	1	$0.01	0603 5 mm^2
4.	R1_S4	Vishay-Dale	CRCW040212K7FKED Series= CRCW..e3	Res= 12.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
5.	R2_S4	Vishay-Dale	CRCW040268K1FKED Series= CRCW..e3	Res= 68.1 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_S4	Vishay-Dale	CRCW0402619RFKED Series= CRCW..e3	Res= 619.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2