RoHS Compliant & Pb Free Product

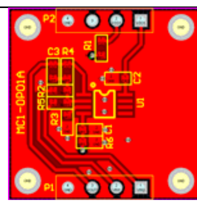
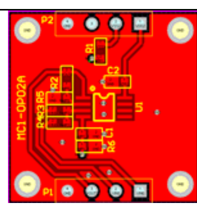
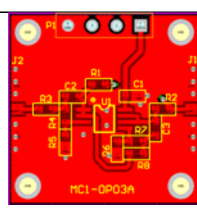
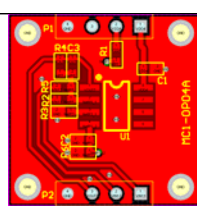
MC1-AN004

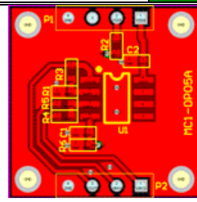
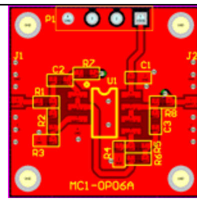
- Documents: Microwave Cell Application Note: Op-Amp Applications

Unlimited Possibilities!

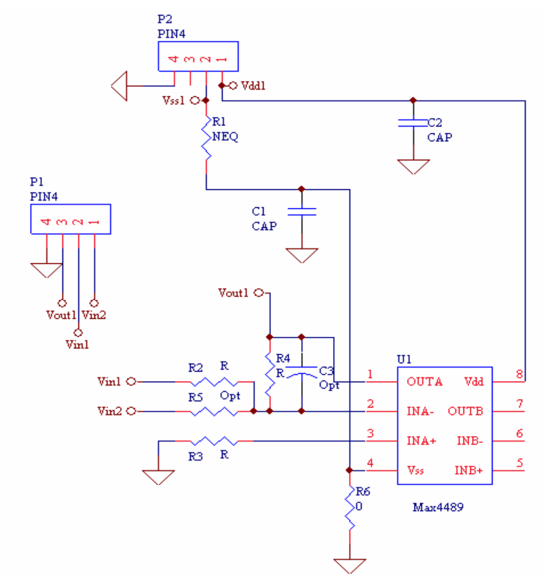
There are total 6 PCB cells offered for op-amp applications. MC1-OP01A, -OP02A, -OP03A are the same as MC1-OP04A, -OP05A and –OP06A except for different op-amp device packages. –OP01A to –OP03A supports MSOP-8 package and –OP04A to –OP06A supports SOIC-8 package. There are many basic applications designed for these three op-amp cells. The purpose of op-amp PCB cell is not intended for op-amp verification and is more designed for op-amp applications.

Table 1: Inventory Summary for Op-Amp PCB Cells

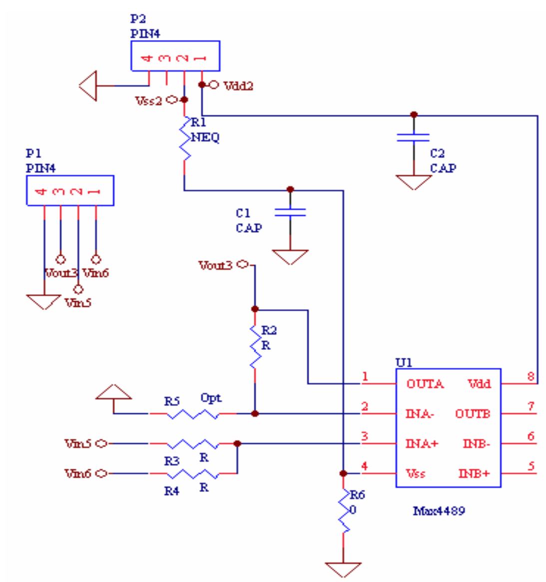
Cell Name	Supported Package	Cell Size	PCB Layout	Supported Device Vendor	Minimum Supported Device Part #	Typical Applications
MC1-OP01A	MSOP-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	-Inverting Amp. -Summing Amp. -Difference Amp. -Differentiator -Low Pass Filter -Integrator
MC1-OP02A	MSOP-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	-Non-Inverting Amp. -Unity Gain Buffer -Non-Inverting Summing Amp.
MC1-OP03A	MSOP-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	- 1, 2, 3 and 4th order Butterworth and Bessel Active Filters
MC1-OP04A	SOIC-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	-Inverting Amp. -Summing Amp. -Difference Amp. -Differentiator -Low Pass Filter -Integrator

MC1-OP05A	SOIC-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	-Non-Inverting Amp. -Unity Gain Buffer -Non-Inverting Summing Amp.
MC1-OP06A	SOIC-8	1x1		Maxim Etc. Other vendors	Max4489 www.maxim.com	- 1, 2, 3 and 4th order Butterworth and Bessel Active Filters

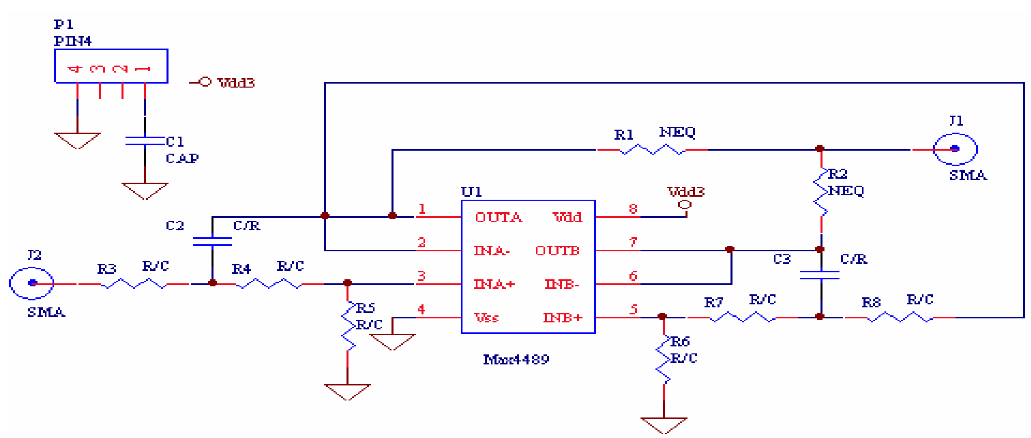
Offered schematics:



MC1-OP01A/MC1-OP04A

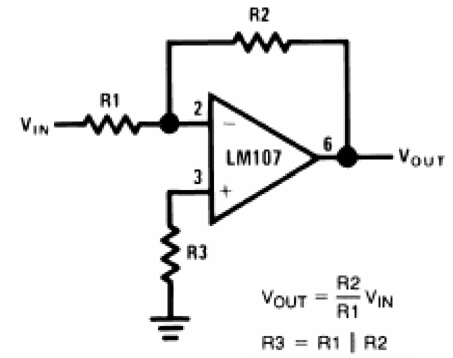


MC1-OP02A/MC1-OP05A

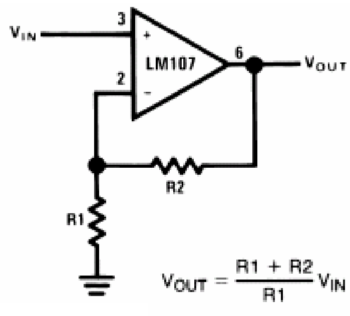


MC1-OP03A/MC1-OP06A

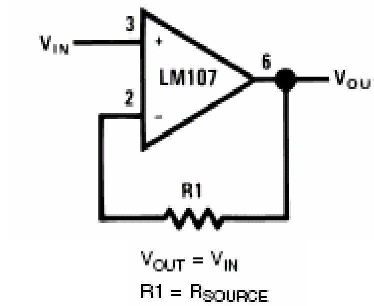
Typical Op-Amp Applications:



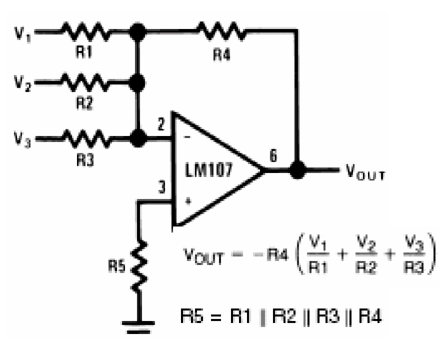
Inverting Amplifier



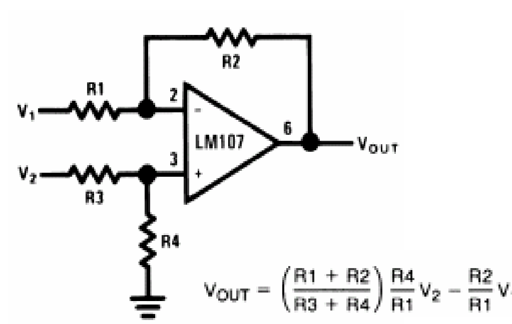
Non-Inverting Amplifier



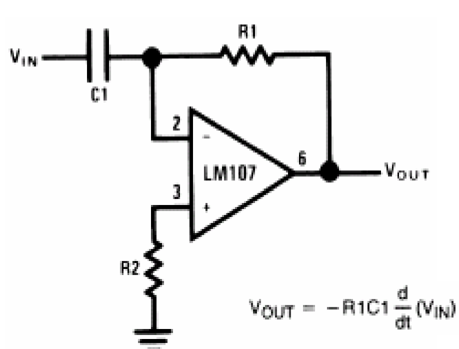
Unity Gain Amplifier

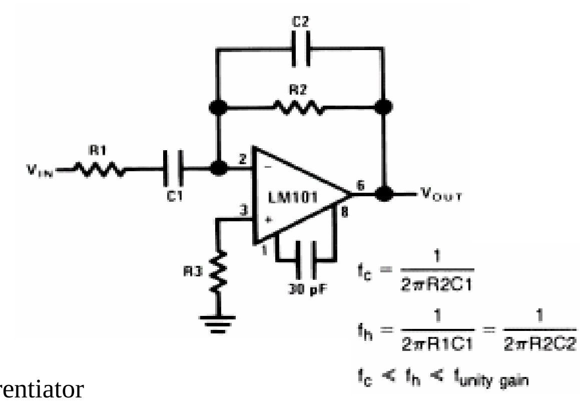


Summing Amplifier

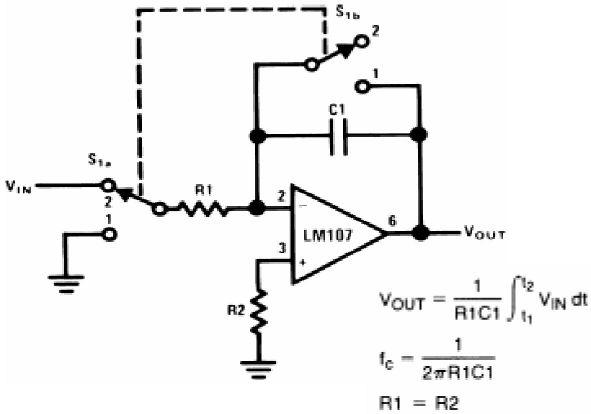


Difference Amplifier

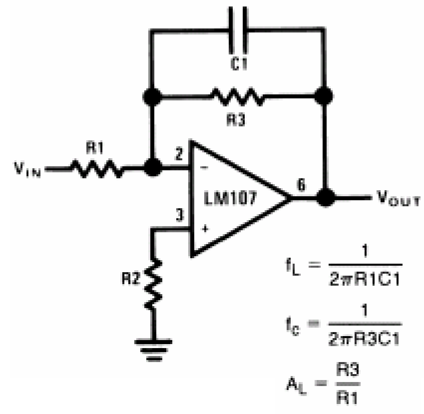




Differentiator

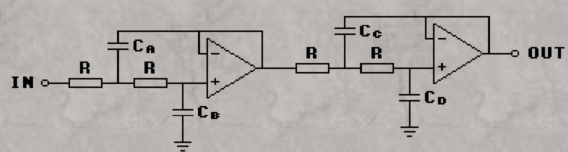


Integrator



Low Pass Filter

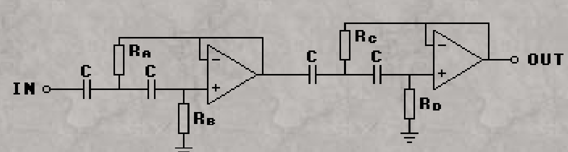
Active Filter: Butterworth (4th order, 24 dB/octave, Lowpass)



R=4.7k-10 kOhm
Ca=1.0824/(2*pi*Fc*R)
Cb=0.9239/(2*pi*Fc*R)
Cc=2.6130/(2*pi*Fc*R)
Cd=0.3827/(2*pi*Fc*R)

Units: R [Ohm], Cx [F], Fc [Hz]

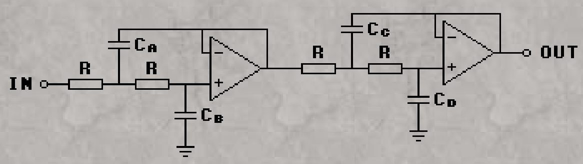
Active Filter: Butterworth (4th order, 24 dB/octave, Highpass)



C=4.7n-10nF
Ra=0.9239/(2*pi*Fc*C)
Rb=1.0824/(2*pi*Fc*C)
Rc=0.3827/(2*pi*Fc*C)
Rd=2.6130/(2*pi*Fc*C)

Units: Rx [Ohm], C [F], Fc [Hz]

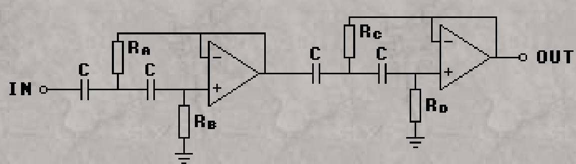
Active Filter: Bessel
(4th order, 24 dB/octave, Lowpass)



R=4.7k-10 kOhm
Ca=0.7298/(2*pi*Fc*R)
Cb=0.6699/(2*pi*Fc*R)
Cc=1.0046/(2*pi*Fc*R)
Cd=0.3872/(2*pi*Fc*R)

Units: R [Ohm], Cx [F], Fc [Hz]

Active Filter: Bessel
(4th order, 24 dB/octave, Highpass)



C=4.7n-10nF
Ra=1.3701/(2*pi*Fc*C)
Rb=1.4929/(2*pi*Fc*C)
Rc=0.9952/(2*pi*Fc*C)
Rd=2.5830/(2*pi*Fc*C)

Units: Rx [Ohm], C [F], Fc [Hz]

References:

1) D.Johnson and J.Hilburn, Rapid Practical Designs of Active Filters, John Wiley & Sons
2) H.Berlin, Design of Active Filters with Experiments, Howard W.Sams &Co., 1979
3) W.G.Jung, Op Amp Applications, Analog Devices

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