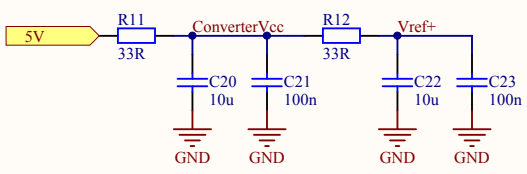
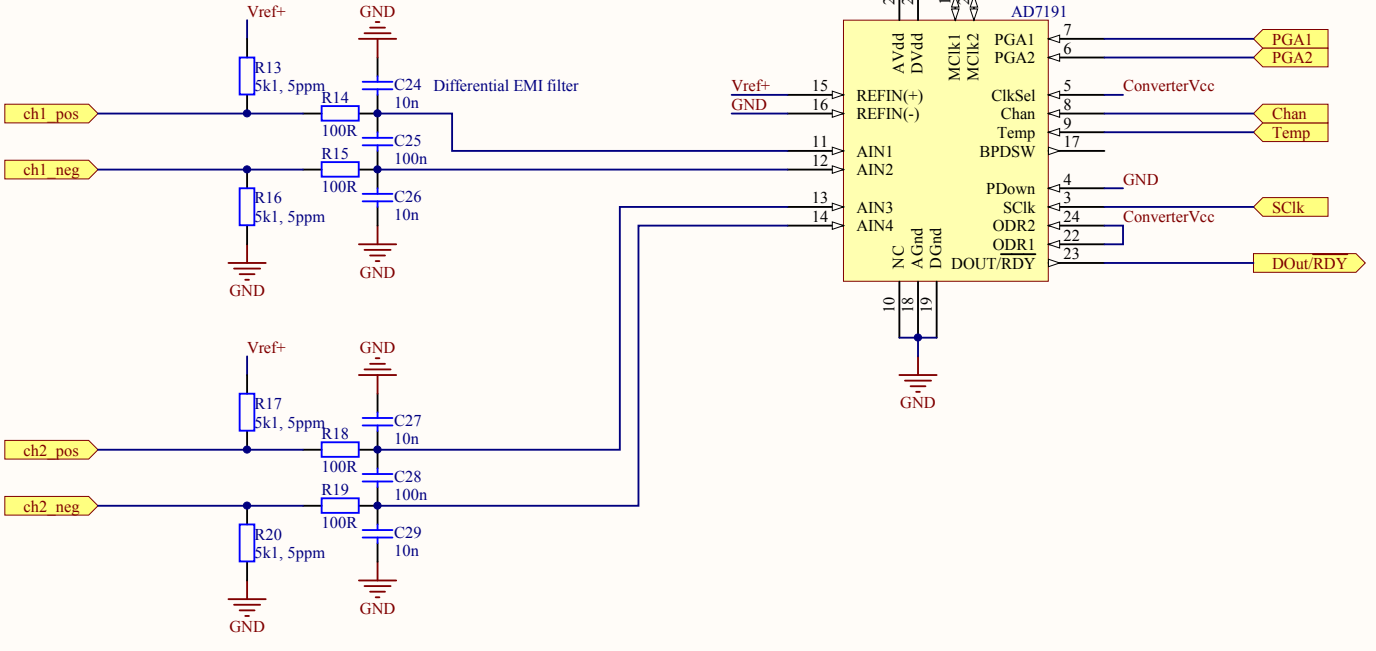
Power supply filtering:

33R + 10uF -> 500 Hz pole

Converter draws 5 mA
Reference arm draws 0.25 mA





Performance with a typical thermistor (R25 = 10K) :

Resolution at the gain=1, rate=10 Hz, RMS noise floor of 500 nV:
-50 degC to +120 degC : < 0.1 mK
0 degC to 35 degC : < 10 uK

Error in measured T from tempCo (5ppm) of bridge resistors:
0.07 mK / K @ -50 degC (thermistor)
0.1 mK / K @ 20 degC (thermistor)
0.2 mK / K @ 120 degC (thermistor)

Error from converter offset drift (150 nV / K @ gain=1):
< 35 uK / K (-50 degC to +120 degC thermistor)
2 uK / K @ 20 degC (thermistor)

Error from converter gain drift (1ppm / K):
1 mK / K @ -50 degC (very fast drop off to this value below -20 degC)
< 0.1 mK / K @ Troom > 0 degC

Total error from ambient drifts @ thermistor = 20 degC: 0.2 mK / K
(note that a large part of this could be removed by applying a correction calculated from the internal temperature sensor of the AD7191)

Gain drift over time: 10 ppm / 1000 hours gives < 1 mK @ Troom > 0 degC over 1000 hours

Errors from power supply noise and drift:

Supply rejection:
90 dB -> 30 uV / V
Thus 10 mV noise gives 300 nV shift -> 4 uK (nothing)

Common mode input rejection (rate=10Hz):
120 dB -> 1 uV / V
So 100 mV of 50 Hz / 60 Hz noise -> 1 uK

Title: Digital temperature controller		
Size: A4	Number:	Revision: 1
Date: 09/08/2013		Sheet2 of 3
File: Z:\Users\..\tempSensor.SchDoc		Drawn By: CJB