Suitable low-power multi- channel ADC for bridge sensors (strain gauges).

Maximilià Serra

Prodigy 215 points
Community Member

Other Parts Discussed in Thread: ADS124S08, ADS1261, ADS1262, ADS114S08, ADS1120

Hello,

We are working with CC2650F128 to read strain gauges.

So far we have been using the ADS1231 to read a differential input and it worked just fine. Now we want to increase the system's capability to incorporate multiple bridge sensors.

To reduce chip count and pin usage from the MCU we have decided to use a multi-channel ADC instead of adding ADCs to the SPI bus.

The main requirments are:

1. Low-power mode.
2. High precision.
3. SPI compatible.
4. At least 3 bridge sensors (8-channels).
5. Sample rate < 1 kSPS.
6. Supply voltage of 3.3V. COuld go up to 5V if necessary.

We are considering the ADS1148 or it's "next generation" the ADS114s08. (We think that 16-bit is enough for our aplication).

An alternative would be to have multiple ADS1120 (from which we like the power performance) in the SPI bus. This would only be worth doing if the precision and power performance compensate.

But we are still deciding, any suggestion on alternative ADCs would be much appreciated.

Are there any ADC preferred for bridge sensor with multichannel and low-power?

If only there was a low-power equivalent for ADS1262...

Best regards,

Max

over 6 years ago

Bob Benjamin over 6 years ago

TI__Guru** 113645 points

Hi Max,

Welcome to the E2E forum! The faster the device and more integrated options the higher the operating current and increase in power.

You did not state what features you like about the ADS1262. We also have the ADS1261 which is similar. However given the requirements I would suggest using the ADS114S08 (16-bit output) or ADS124S08 (24-bit output). These 2 devices are identical except for output data size. These devices can also be fine tuned for power savings by using only the features needed.

Best regards,
Bob B

Maximilià Serra *over 6 years ago in reply to Bob Benjamin*

Prodigy 215 points

Hi Bob,

Thanks for your answer.

I agree that the ADS114S08 is the best match. And compared to the ADS1148 it includes a low-side switch which we probably will use a lot.

If we want to have a flexible number of bridge sensors (from 1 up to +10) we have considered to connect each sensor to ADC and have them in the SPI bus.

Since the count would be application specific this would allow us to optimise the resources, not unused channels. (Worst case, if we run short on SPI chip select pins we would have an address decoder).

In such scenario and since we are required to decide on a single component. (We can not take the ADS114S08 or the ADS114S06 depending on the application). We think that the may ADS1120 take the lead. What do you think?

Or maybe another ADC do you think would fit better?

On previous posts I have read that the power performance of the ADS1120 is far better than the ADS114S08. And power is an issue.

Best regards,

Max

Bob Benjamin *over 6 years ago in reply to Maximilià Serra*

TI__Guru** 113645 points

Hi Max,

I really don't know anything about your system. Having a scalable system is a nice idea, but the cost can be quite a bit more in terms of part count. You have to determine if increasing board size to accommodate the extra devices is worth the scalability.

Power for both devices will actually be quite comparable if using the excitation supply for the reference as the ADS114S08 can turn off unnecessary analog power devices not used. Both devices have a low-side switch and power down options. Either method should work well.

Best regards,

Bob B