

Figure 3. Simultaneous Sampling

### Multiplexed Inputs with Integrated MUX

The remaining two Multi-Channel AIN modules use multiplexed-inputs. An integrated MUX and ADC solution is shown below in Figure 4. This type of solution is suitable for lower power and smaller footprint requirements. With any level of integration comes performance trade-offs based on process constraints to get the best of the analog and the best of the mixed signal.

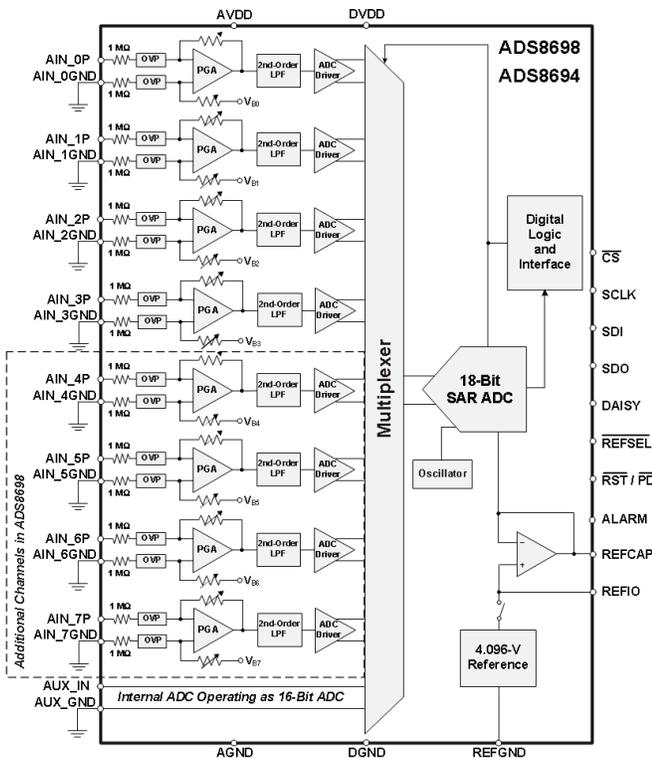


Figure 4. Multiplexed Inputs with Integrated MUX

### Multiplexed Inputs with External MUX

One of the most common approaches when designing for maximum flexibility of performance and cost uses discrete Op Amps, an ADC and MUX as shown in Figure 5 below. This is a common approach when flexibility for performance and cost is preferred. Each analog input signal scaling can be custom tailored for a specific type and range of signal as well as desired noise and frequency filtering. This signal chain uses a drive op amp circuit after the MUX into the ADC, and possibly an ADC reference buffer. A **MUX-Friendly** amplifier such as the **OPAx189** or **OPAx192** can be used after the MUX, such as **MUX36S08** or **MUX36D04**, to switch between channels to accomplish fast settling time. If a reference buffer is needed, see TI's 20MHz, high-precision **OPA320**.

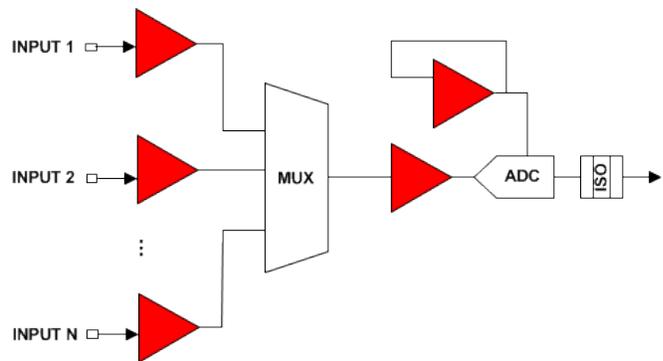


Figure 5. Multiplexed Inputs with External MUX

Table 1. Referenced Devices

Device	Feature
<a href="#">OPA189</a>	<b>MUX-Friendly, Zero-Drift</b> , 36V, 14MHz, 3μV offset, 5.2nV/√Hz noise
<a href="#">OPA192</a>	<b>MUX-Friendly, E-Trim</b> , 36V, 10MHz, 25μV offset, 5.5nV/√Hz noise
<a href="#">OPA388</a>	<b>MUX-Friendly, Zero-Drift, Zero-Crossover</b> , 5V, 10MHz, 5μV offset, 7nV/√Hz noise
<a href="#">OPA320</a>	<b>Zero-Crossover</b> , 5V, 20MHz, 0.9pA bias current, 150μV offset, 8.5nV/√Hz noise
<a href="#">ADS5888S</a>	16-Bit High-Speed 8-Channel Simultaneous-Sampling ADC
<a href="#">MUX36S08</a>	36-V, Low-Capacitance, Low-Leakage-Current, Precision, Analog Multiplexers
<a href="#">MUX36D04</a>	

Table 2. Related Documentation

Literature number:	Description
<a href="#">SBOT040</a>	MUX-Friendly Precision Op Amps
<a href="#">SBOA182B</a>	Zero-Drift Amps: Features and Benefits
<a href="#">SBOA181A</a>	Zero-Crossover Amps: Features and Benefits
<a href="#">SBOT037A</a>	Offset Correction: Laser Trim, e-Trim, and Chopper

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