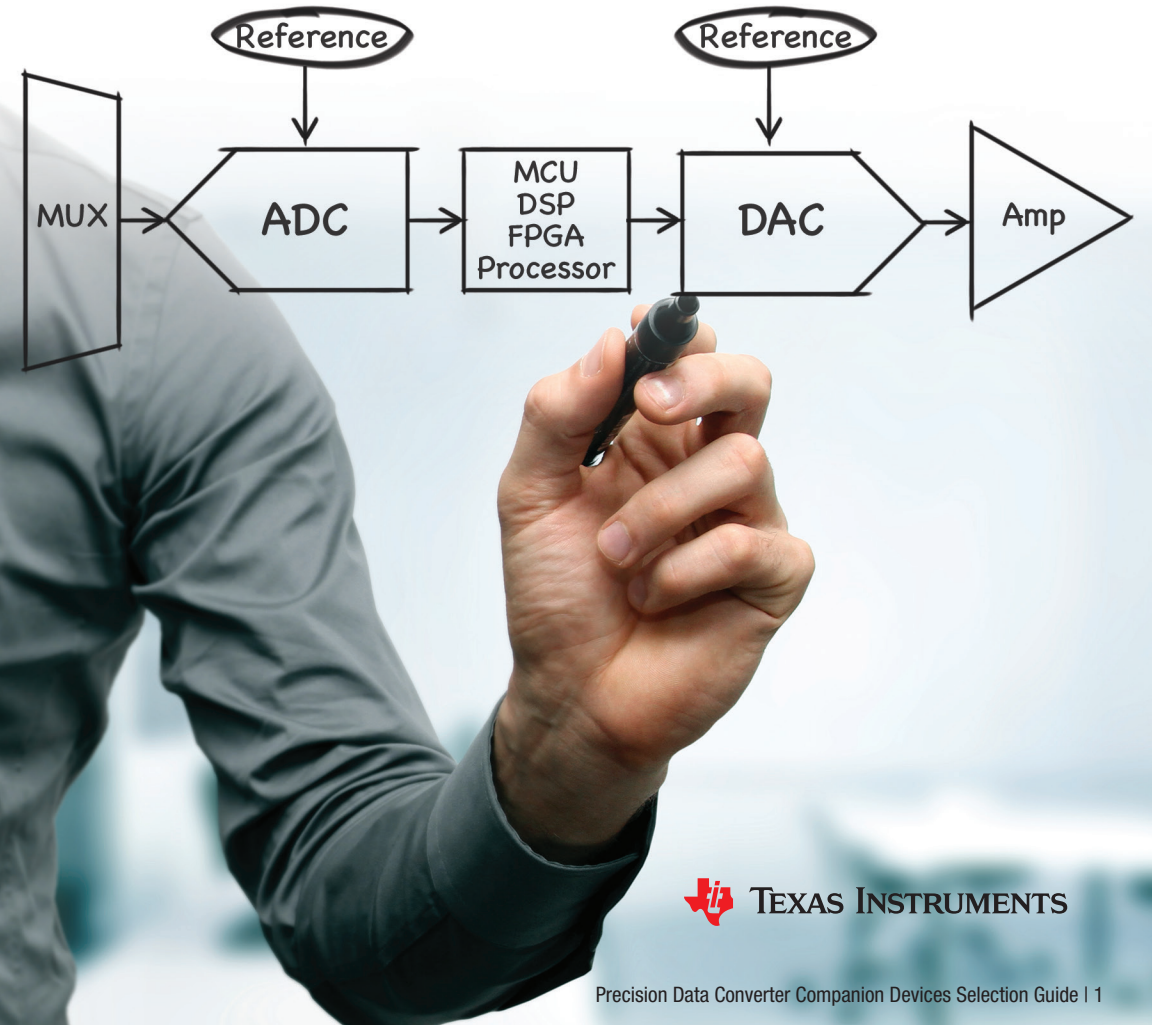
Precision Data Converter

Companion Devices Selection Guide



Texas Instruments

Precision Data Converter

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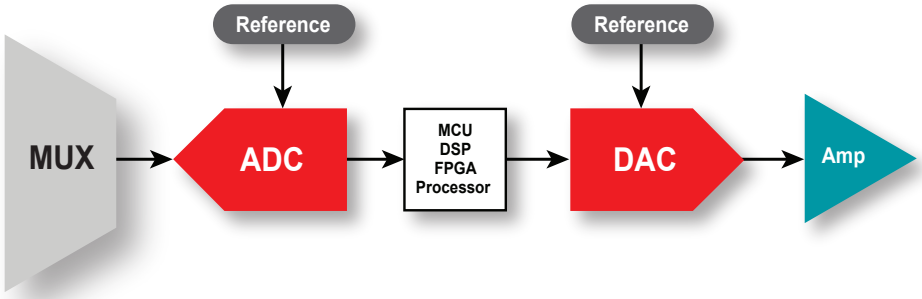

Revision: October 2018

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Precision DACs: www.ti.com/precisiondac

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Introduction

In this guide you will find tables organized by the data converter listed in the left most column. Each row contains a list of devices which when paired with the data converter can be used to achieve the signal chain performance and optimization specified.

Table Version 1: SAR ADCs

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS9110 **2 MSPS, 1 channel, fully differential**	OPA2625	1) 2-MSPS throughput 2) Fully differential input 3) 5-V single supply	**Optimized for linearity:** +/-0.5 LSB INL (TYP), +/-1.5 LSB INL (MAX)

ADC/DAC and its highlights

Recommended data converter input driver, selected to achieve optimum performance (e.g. linearity) and the tested system performance

Table Version 2: Delta-Sigma ADCs and DACs

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC9881	18-bit, 1-channel, low noise, buffered voltage output DAC	18	1	Buffered voltage	Op amp
					Signal switch

ADC/DAC and its highlights

In the right most column you will find a reference design developed and rigorously tested by signal chain experts. They include the following information, which can be used to decrease system development time and increase system performance:

- Circuit Topology
- PCB Layout
- Simulated Results
- Component Selection
- Calculated Results
- Measured Results

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA2625, OPA378	Composite zero-offset reference buffer	TI Design: TIPD115

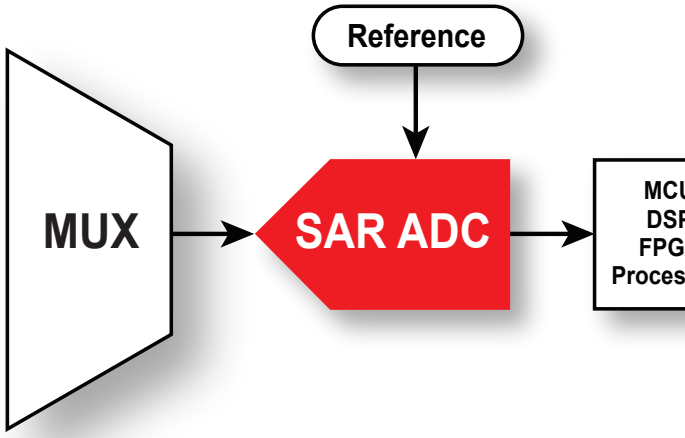
Recommended reference and reference driver for the ADC, chosen to achieve the previously specified system performance

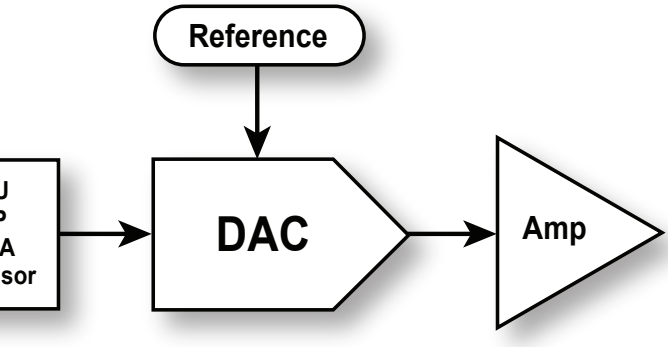
Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
OPA2192	36-V, precision, RRIO, low offset voltage, low input bias current op amp with e-trim	DAC sample and hold glitch reduction reference design	TIPD142
TS12A4515	Low-voltage, low on-state resistance SPST CMOS analog switches		

Companion products that pair well the ADC/DAC highlighted. These companion devices are also featured in the reference design to achieve an optimally performing system

Contents

SAR ADC




Reference
DAC
Amp

SAR ADC

Device	Resolution (bits)	Sample rate (kSPS)	No. of channels	Input range (V)	SNR (dB, typ)	THD (dB, typ)	INL (±LSB, Max)	Operating temperature range range (°C)
ADS9110	18	2000	1	±5.1	100	-118	1.5	-40 to 85
ADS8881	18	1000	1	±5	100	-115	2	-40 to 85, 0 to 70
ADS8887	18	100	1	±5	100	-115	3	1.5
ADS8885	18	400	1	0 to 5	100	-115	3	-40 to 85
ADS8883	18	680	1	±5	100	-115	3	-40 to 85
ADS8383	18	500	1	0 to 4.096	88	-112	4	-40 to 85
ADS8380	18	600	1	0 to 4.096	91	-112	4	-40 to 85
ADS8381	18	580	1	0 to 4.096	88	-112	4	-40 to 85
ADS8382	18	600	1	0 to 4.096	96	-116	3	-40 to 85
ADS8484	18	1250	1	0 to 4.096	98.5	-120	2.5	-40 to 85
ADS8482	18	1000	1	0 to 4.096	99	-121	2.5	-40 to 85
ADS8481	18	1000	1	0 to 4.096	94	-112	3.5	-40 to 85
ADS8866	16	100	1	0 to 5	93	-108	2	-40 to 85
ADS8867	16	100	1	±5	96.5	-112	1	-40 to 85
ADS8864	16	400	1	0 to 5	93	-108	2	-40 to 85

Device	Resolution (bits)	Sample rate (kSPS)	No. of channels	Input range (V)	SNR (dB, typ)	THD (dB, typ)	INL (±LSB, Max)	Operating temperature range range (°C)
ADS8865	16	400	1	±5	96.5	-112	1	-40 to 85
ADS8342	16	250	4	±2.5	84.6	-89	4	-40 to 85
ADS8344	16	100	8	0 to 5.25	86	-90	6	-40 to 85
ADS8345	16	100	8	0 to 5.25	85	-96	6	-40 to 85
ADS8863	16	680	1	±5	96.5	-112	1	-40 to 85
ADS8862	16	680	1	0 to 5	93	-108	2	-40 to 85
ADS8860	16	1000	1	0 to 5	93	-108	2	-40 to 85
ADS8861	16	1000	1	±5	96.5	-112	1	-40 to 85
ADS8317	16	250	1	0 to 5.5	90	-106	1.5	-40 to 85
ADS8339	16	250	1	0 to 5.5	93.9	-111	2	-40 to 85
ADS8332	16	500	8	0 to 5.5	91.5	-100	2	-40 to 85
ADS8331	16	500	4	0 to 5.5	91.5	-100	2	-40 to 85
ADS8350	16	750	2	0 to 5.5	85	-96	2.5	-40 to 125
ADS8353	16	600	2	0 to 5.5	89	-100	2.5	-40 to 125
ADS8354	16	700	2	0 to 5.5	93	-100	2.5	-40 to 125

SAR ADC

Device	Resolution (bits)	Sample rate (kSPS)	No. of channels	Input range (V)	SNR (dB, typ)	THD (dB, typ)	INL (±LSB, Max)	Operating temperature range range (°C)
ADS8688	16	500	8	±10.24	92	-102	2	-40 to 125
ADS8684A	16	500	4	±10.24	92	-102	2	-40 to 125
ADS8688A	16	500	8	±10.24	92	-102	2	-40 to 125
ADS8684	16	500	4	±10.24	92	-102	2	-40 to 125
ADS8422	16	400	1	0 to 4.096	93	-114	2	-40 to 85
ADS8505	16	250	1	±10	88	-105	1.5	-40 to 85
ADS7945	14	2000	2	0 to 5.25	84	-92	1.5	-40 to 125
ADS7946	14	2000	2	0 to 5.25	82	-85	2.5	-40 to 125
ADS7850	14	750	2	0 to 5.5	81.5	-90	1.5	-40 to 125
ADS7891	14	3000	1	0 to 2.5	78.5	-93	1.5	-40 to 85
ADS7853	14	1000	2	0 to 5.5	84	-100	2	-40 to 125
ADS7854	14	1000	2	0 to 5.5	85	-98	1.5	-40 to 125
ADS7851	14	1500	2	0 to 5.25	83.5	-90	2	-40 to 125
ADS8674	14	500	4	±10.24	85	-100	0.75	-40 to 125

Device	Resolution (bits)	Sample rate (kSPS)	No. of channels	Input range (V)	SNR (dB, typ)	THD (dB, typ)	INL (±LSB, Max)	Operating temperature range range (°C)
ADS8678	14	500	8	±10.24	85	-100	0.75	-40 to 125
ADS7042	12	1000	1	0 to 3.6	70	-80	1	-40 to 125
ADS7043	12	1000	1	0 to 3.6	70	-80	1	-40 to 125
ADS7044	12	1000	1	0 to 3.6	71	-85	1	-40 to 125
TLV2553	12	200	11	0 to 5.5	n/a	n/a	1	-40 to 85
ADS7952	12	1000	12	0 to 5.25	71.7	-82	1	-40 to 125
ADS7950	12	1000	4	0 to 5.25	71.7	-82	1	-40 to 125
ADS7951	12	1000	8	0 to 5.25	71.7	-82	1	-40 to 125
ADS7953	12	1000	16	0 to 5.25	71.7	-82	1	-40 to 125
ADS8638	12	1000	8	±10	71.8	-81	1.5	-40 to 125
ADS7250	12	750	2	0 to 5.5	73	-90	1	-40 to 125
ADS7254	12	1000	2	0 to 5.5	74	-92	1	-40 to 125
ADS7253	12	1000	2	0 to 5.5	73.5	-90	1	-40 to 125
ADS7251	12	2000	2	0 to 5.25	73	-90	1	-40 to 125

Resolution: 20 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8900B **1 MSPS, 1 channel, ±5 input range, int reference buffer**	OPA2625	1) 1-MSPS throughput 2) ±1 ppm INL 3) 102 db SNR 4) -125 db THD	**Optimized for AC and DC performance:** ±0.75 ppm INL, 102.5 dB SNR, -125 dB THD
	THS4551	1) 1-MSPS throughput 2) 5.7 kV_{RMS} Isolation 2) 101 dB SNR 3) -125 dB THD	**Jitter optimized with digital isolation:** 100.9 dB SNR, -127.7 dB THD
	THS4551	1) 1-MSPS throughput 2) 5.7 kV_{RMS} Isolation 2) 101 dB SNR 3) -125 dB THD	**Optimized for AC distortion with isolation:** 101.1 dB SNR, -122.6 dB THD

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5050	V_{REF}=5.0-V, 0.05% init. accuracy, low drift 3 ppm/°C	Internal reference buffer		TI Design: TIPD211
REF5050	V_{REF}=5.0-V, 0.05% init. accuracy, low drift 3 ppm/°C	Internal reference buffer		TI Design: TIDA-01035
REF5050	V_{REF}=5.0-V, 0.05% init. accuracy, low drift 3 ppm/°C	Internal reference buffer		TI Design: TIDA-01037

Resolution: 18 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8910B **1 MSPS, 1 channel, ±5 input range, int reference buffer**	OPA2625	1) 1-MSPS throughput 2) ±0.5 LSB INL 3) 101 db SNR 4) -125 db THD	**Optimized for AC and DC performance:** ±0.3 LSB INL, 101.2 dB SNR, -125 dB THD
ADS9110 **2 MSPS, 1 channel, fully differential**	OPA2625	1) 2-MSPS throughput 2) Fully differential input 3) 5-V single supply	**Optimized for linearity:** +/-0.5 LSB INL (TYP), +/-1.5 LSB INL (MAX)
ADS8881 **1 MSPS, 1 channel, ±5 input range, fully differential**	OPA350	1) 1-MSPS throughput 2) Transient step input 3) 5-V single supply	**18-bit, full-scale, step settling at 1-MSPS throughput:** Settling time <500 ns, INL ±1.5 LSB, power < 70 mW
	OPA320	1) 1-MSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR >98 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110dB, SNR >98 dB, P=<40 mW
	THS4521	1) 1-MSPS throughput 2) Fully differential input 3) Support for bipolar inputs	**Optimized for low total harmonic distortion:** THD <-110dB, SNR >98 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** Input noise=48 uVRMS, SNR >90 dB, P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** System noise=37.56 µVRMS, effective resolution >17.0-bit, P=<1 mW
ADS8883 **680 kSPS, 1 channel, ±5 input range, fully differential**	OPA350	1) 680-kSPS throughput 2) Transient step input 3) 5-V single supply	**18-bit full scale step settling at 680-kSPSthroughput:** Settling time <1500ns, INL ±1.5LSB, power < 70 mW
	OPA320	1) 680-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR >98 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >98dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** Input noise=48 uVRMS, SNR >90 dB, P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** System noise=37.56 uVRMS, effective resolution >17.0-bit, P=<1 mW

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5050	V_{REF}=5.0-V, 0.05% init. accuracy, low drift 3 ppm/°C	Internal reference buffer		TI Design: TIPD211
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA2625, OPA378	Composite zero-offset reference buffer	TI Design: TIPD115
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF6025	V_{REF}=2.5-V, 0.05% init. accuracy, low drift 5 ppm/°C integrated high-bandwidth buffer	Integrated into: REF6025 voltage reference	Accounted for in REF6025 voltage reference specifications	REF6025EVM-PDK
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2 µV/°C Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2 µV/°C Data rate=10-kSPS	TI Design: TIPD114
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	zV_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2 µV/°C . Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2 µV/°C Data rate=10-kSPS	TI Design: TIPD114

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 18 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8885 **1 channel, ±5 input range, fully differential**	OPA350	1) 400-kSPS throughput 2) Transient step input 3) 5-V single supply	**18-bit full scale step settling at 400-kSPS throughput:** Settling time <2500 ns, INL ±1.5 LSB, Power < 70 mW
	OPA320	1) 400-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR >98 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >98 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** Input noise=48 µVRMS, SNR >98 dB, P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** Syst noise=37.56 µVRMS, effective res >17.0-bit, P=<1 mW
ADS8887 **100 kSPS, 1 channel, ±5 input range, fully differential**	OPA363	1) 1-MSPS throughput 2) Transient step input 3) 5-V single supply	**18-bit full scale step settling at 100-kSPS throughput:** Settling time <10µs
	OPA313	1) 100-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35mW, SNR >98 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >98 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** Input noise=48 uVRMS, SNR >90 dB, P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** Syst noise=37.56 µVRMS, effective res >17.0-bit, P=<1 mW
ADS8380 **600 kSPS, 1 channel, 0 - 4.096 input range, single ended**	THS4031	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2µV/°C Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2µV/°C Data rate=10-kSPS	TI Design: TIPD114
REF5045	V_{REF}=4.5 V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5 V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5 V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset , low offset drift 0.05µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0 V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2µV/°C Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5 V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2µV/°C Data rate=10-kSPS	TI Design: TIPD114
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8380EVM

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 18 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8381 **580 kSPS, 1 channel, 0 - 4.096 input range, single ended**	THS4031	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec
ADS8382 **600 kSPS, 1 channel, ±4.096 input range, fully differential**	THS4131	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec
ADS8383 **500 kSPS, 1 channel, 0 - 4.096 input range, single ended**	THS4031	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec
ADS8481 **1 MSPS, 1 channel, 0 - 4.096 input range, single ended**	THS4031, THS4032	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec
ADS8482 **1 MSPS, 1 channel, ±4.096 input range, fully differential**	THS4031, THS4032	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec
ADS8484 **1.25 MSPS, 1 channel, ±4.096 input range, fully differential**	THS4031, THS4032	1) Max throughput 2) AC input specified on the datasheet 3) ±15V dual supply	**Optimized for dynamic performance:** refer to datasheet for performance spec

ADC Reference Driver				
Voltage reference	Reference specifications	Buffer amplifier	Reference driver performance	Reference designs & support
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8381EVM
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8382EVM
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8383EVM
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8481EVM
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8482EVM
1) Internal reference can be used 2) External reference mode		Internal reference buffer		ADS8484EVM

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8920B **1 MSPS, 1 channel, ±5 input range, int reference buffer**	OPA2625	1) 1-MSPS throughput 2) ±0.5 ppm INL 3) 95 db SNR 4) 125 db THD	**Optimized for AC and DC performance:** ±0.2 LSB INL, 96.5 dB SNR, -125 dB THD
ADS8681 **1 MSPS, 1 channel, ±12 input range, bipolar & unipolar**	Integrated Front End	1) Throughput of 1-MSPS 2) AC input specified on the datasheet 3) 5-V single supply	**16-bit 1-MSPS data acquisition reference design, isolated for high-voltage common-mode rejection**
ADS8861 **1 MSPS, 1 channel, ±5 input range, fully differential**	OPA350	1) 1-MSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 1-MSPS throughput:** Settling time <500ns, power < 70 mW
	OPA320	1) 1-MSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR> 96 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >96 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC Signals, ultra low power:** P=<1 mW
	THS4031	1) 1-MSPS throughput 2) 10-kHz AC input 3) ±15V dual supply	**Optimized for low distortion:** 100 kHz signal: THD <-110 dB
ADS8863 **680 kSPS, 1 channel, ±5 input range, fully differential**	OPA363	1) 680-kSPSthroughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 680-kSPS throughput:** Settling time <1500ns, power < 70 mW
	OPA313	1) 10-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR>96 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >96 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P=<1 mW

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5050	V_{REF}=5.0-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Internal reference buffer		TI Design: TIPD211
Internal reference		Internal reference buffer	Low output impedance, drift 4ppm/˚C	TI Design: TIDA106
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/˚C (0 to +70˚C)	OPA313	Micro power, low drift 2 µV/˚C Data rate=10-kSPS	TI Design: TIPD116
REF3425	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/˚C (-40 to +125˚C)	OPA313	Micro power, low drift 2 µV/˚C Data rate=10-kSPS	TI Design: TIPD114
REF5040	V_{REF}=4.0-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA188+THS4031	Low offset, low offset drift 0.03 µV/˚C, wide BW, low output impedance	Contact E2E
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/˚C (0 to +70˚C)	OPA313	Micro power, low drift 2 µV/˚C . Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/˚C (-40 to +125˚C)	OPA313	Micro power, low drift 2 µV/˚C . Data rate=10-kSPS	TI Design: TIPD114

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8865 **400 kSPS, 1 channel, ±5 input range, fully differential**	OPA350	1) 400-kSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 400-kSPS throughput:** Settling time <2500 ns, power < 70 mW
	OPA320	1) 400-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR>98 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >98 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** P=<1 mW
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC Signals, ultra low power:** P=<1 mW
ADS8867 **100 kSPS, 1 channel, ±5 input range, fully differential**	OPA363	1) 100-kSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 680-kSPS throughput:** Settling time <10 us
	OPA313	1) 100-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest power:** P<35 mW, SNR>96 dB, THD <-105 dB
	THS4521		**Optimized for lowest distortion and noise:** THD <-110 dB, SNR >96 dB, P=<40 mW
	OPA333	1) 10-kSPS throughput 2) 200-Hz input (ECG signals) 3) 3.3-V single supply	**ECG signals, ultra low power:** P=<1 mW
		1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P=<1 mW

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2 µV/°C Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2 µV/°C Data rate=10-kSPS	TI Design: TIPD114
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD112
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD113
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD115
REF3030	V_{REF}=3.0-V, 0.2% init. accuracy, 50 ppm/°C (0 to +70°C)	OPA313	Micro power, low drift 2 µV/°C . Data rate=10-kSPS	TI Design: TIPD116
REF3325	V_{REF}=2.5-V, 0.15% init. accuracy, 30 ppm/°C (-40 to +125°C)	OPA313	Micro power, low drift 2 µV/°C . Data rate=10-kSPS	TI Design: TIPD114

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8860 **1 MSPS, 1 channel, 0 - 5 input range, pseudo differential**	OPA836	1) 1-MSPS throughput 2) 10-kHz sine wave input 3) 5-V single supply	**Optimized for lowest distortion and noise:** SNR>91 dB, THD < -108 dB, P=30.75 mW
	OPA320	1) 1-MSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 1 MSPS throughput:** Settling time <900 ns, INL ±0.5 LSB, power < 25 mW
	OPA625	1) 1-MSPS throughput 2) DC input 3) 5-V single supply	**16-bit, muxed CH** Settling time <500 ns
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P<300 uW
ADS8862 **680 kSPS, 1 channel, 0 - 5 input range, pseudo differential**	OPA836	1) 680-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Optimized for lowest distortion and noise:** SNR>91 dB, THD=-110 dB, P=30.75 mW
	OPA320	1) 680-kSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 1-MSPS throughput:** Settling time <1500 ns, INL ±0.5LSB, power < 25 mW
	OPA625	1) 680-kSPS throughput 2) DC input 3) 5-V single supply	**16-bit, muxed CH** Settling time <1500 ns
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P<300 uW
ADS8864 **400 kSPS, 1 channel, 0 - 5 input range, pseudo differential**	OPA836	1) 400-kSPS throughput 2) 10-kHz sine wave input 3) 5-V single supply	**Optimized for lowest distortion and noise:** SNR>91 dB, THD=-110 dB, P=30.75 mW
	OPA320	1) 400-kSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 1-MSPS throughput:** Settling time <2500 ns, INL ±0.5LSB, power < 25 mW
	OPA625	1) 400-kSPS throughput 2) DC signals 3) 5-V single supply	**16-bit, muxed CH** Settling time <2500 ns
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P<300 uW
	OPA192, OPA140	1) 400-kSPS throughput 2) 10-kHz AC input 3) ±15V dual supply	**16-bit,4-CH muxed for high voltage diff inputs:** P=<1 mW

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TIDU014
REF6041	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD173
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD169
REF3330	Low power, 0.15% init. accuracy, 30 ppm/˚C @3.9µA (-40C to +125˚C)	OPA333	Micro power, low drift 2 µV/˚C Data rate=10-kSPS	ADS8860 data-sheet
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TIDU014
REF5040	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD173
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD169
REF3330	Low power, 0.15% init. accuracy, 30 ppm/˚C @3.9µA (-40C to +125˚C)	OPA333	Micro power, low drift 2 µV/˚C . Data rate=10-kSPS	ADS8860 data-sheet
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TIDU014
REF5040	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD173
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/˚C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/˚C, wide BW, low output impedance	TI Design: TIPD169
REF3330	Low power, 0.15% init. accuracy, 30 ppm/˚C @3.9µA (-40C to +125˚C)	OPA333	Micro power, low drift 2 µV/˚C Data rate=10-kSPS	ADS8860 data-sheet
REF3440	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/˚C	OPA350	Wide BW, low output impedance, drift 4uV/˚C	TI Design: TIPD151

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8866 **100 kSPS, 1 channel, 0 - 5 input range, pseudo differential**	OPA836	1) 100-kSPS throughput 2) 10-kHz sine wave input 3) 5-V single supply	**Optimized for lowest distortion and noise:** SNR>91 dB, THD=-110 dB, P=30.75 mW
	OPA364	1) 100-kSPS throughput 2) Transient step input 3) 5-V single supply	**16-bit full scale step settling at 100-kSPS throughput:** Settling time <10 us, INL ±0.5LSB, power < 25 mW
	OPA625	1) 100-kSPS throughput 2) DC signals 3) 5-V single supply	**16-bit, muxed CH** Settling time <10 us
	OPA333	1) 10-kSPS throughput 2) DC signals 3) 3.3-V single supply	**DC signals, ultra low power:** P<300 uW
ADS8350 **750 kSPS, 2 channels, 0 - 5 input range, pseudo differential**	OPA836	1) 750-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>85 dB@10kHz, THD<-94 dB@10 kHz
	THS4032	1) 750-kSPS throughput 2) 100-kHz AC input 3) ±15V dual supply	**Dual-channel, simultaneous sampling:** SNR>85 dB@100kHz, THD<-91 dB@100 kHz
ADS8353 **600 kSPS, 2 channels, 0 - 5 input range, single ended pseudo differential**	OPA836	1) 600-kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>83 dB@100 kHz, THD<-95 dB@100 kHz
	THS4032	1) 600-kSPS throughput 2) 100-kHz AC input 3) ±15V dual supply	**Dual-channel, simultaneous sampling:** SNR>83 dB@10 kHz, THD<-100 dB@10 kHz
ADS8354 **700 kSPS, 2 channels, ±5 input range, fully differential**	THS4521	1) 700-kSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>88 dB@10 kHz, THD<-100 dB@10 kHz
	THS4531A	1) 700-kSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Interface to sin/cos encoders with high-resolution position interpolation**
	THS4531A	1) 700-kSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Interface to sin/cos encoder with Sitara AM437x**

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333, THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TIDU014
REF3440	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD173
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Composite amplifier: OPA333+THS4281	Low offset, low offset drift 0.05 µV/°C, wide BW, low output impedance	TI Design: TIPD169
REF3330	Low power, 0.15% init. accuracy, 30 ppm/°C @3.9µA (-40C to +125°C)	OPA333	Micro power, low drift 2 µV/°C Data rate=10-kSPS	ADS8860 data-sheet
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350EVM -PDK
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350 data-sheet
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8353EVM -PDK
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8353 data-sheet
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	TI Design: TIDA-00499
Int ref / ext ref REF2033	REF2033: 2 Outputs, VREF and VREF / 2, 8 ppm/°C drift from–40°C to 125°C	OPA2365	Low-noise, single-supply, rail-to-rail op amp	TI Design: TIDA00176
Int ref / ext ref REF2025	REF2025 low-drift, low-power, dual-output VREF and VREF/2 voltage reference	Internal buffer	Internal buffer	TI Design: TIDA-00178

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8331 500 kSPS, 4 channels, 0 - 4.096 input range, single ended **ADS8332** 500 kSPS, 8 channels, 0 - 4.096 input range, single ended	OPA211	1) Max throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8339 250 kSPS, 1 channel, 0 - 5 input range, single ended	OPA836	1) Max throughput 2) AC input specified on datasheet 3) 5-V single supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8342 250 kSPS, 4 channels, ±2.5 input range, single ended bipolar	OPA725 OPA726	1) Max throughput 2) AC input specified on datasheet 3) ±5-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8344 100 kSPS, 8 channels, 0 - 5 input range, single ended **ADS8345** 100 kSPS, 8 channels, ±2.5 input range, fully differential	OPA132	1) Max throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8422 4 MSPS, 1 channel, ±4.096 input range, fully differential	THS4131 THS4031 THS4032	1) Max throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5040	V_{REF}=4.096-V, 0.05% init. accuracy, low drift 3 ppm/°C	OPA350	Wide BW, low output impedance, drift 4ppm/°C	ADS8331EVM ADS8332EVM
REF5045	V_{REF}=4.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	OPA333+THS4281	Low offset, low offset drift 4 µV/°C, wide BW, low output impedance	ADS8339EVM-PDK
REF5025	V_{REF}=2.5-V, 0.05% init. accuracy, low drift 3 ppm/°C	Internal reference buffer		ADS8342EVM
REF3440	V_{REF}=4.096-V, 0.2% init. accuracy, low drift 4 ppm/°C	OPA364	Wider BW, low offset, low drift 3 µV/°C	ADS8344EVM ADS8345EVM
Internal reference	Int Ref 4.096-V with low drift 6ppm/°C	Internal reference buffer		Contact E2E

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8684 **500 kSPS, 4 channels, single ended** **ADS8688** **500 kSPS, 8 channels, single ended** **input ranges:** **±10.24** **±5.12** **±2.56** **0 - 10.24** **0 - 5.12**	OPA2209	Amplifier only for driving aux channel integrated AFE for input channels 1) Max specified throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8684A **500 kSPS, 4 channels, single ended** **ADS8688A** **500 kSPS, 8 channels, single ended** **input ranges:** **±10.24** **±5.12** **±2.56** **0 - 10.24** **0 - 5.12** **0 - 2.56** **0 - 1.28**	OPA2209	Amplifier only for driving aux channel integrated AFE for input channels 1) Max specified throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8317 **250 kSPS, 1 channel, ±2.5 input range, fully differential**	OPA2376	1) Max throughput 2) 10-kHz sine wave input 3) 5-V single supply	**Optimized for dynamic performance:** ENOB=14.5

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5040	1) Internal reference: 4.096V, drift 10ppm/°C max. 2) External reference: REF5040 4.096-V, 0.05% init. accuracy, low drift 3ppm/°C	Internal reference buffer		ADS8688EVM-PDK
REF5040	1) Internal reference: 4.096V, drift 10ppm/°C max. 2) External reference: REF5040 4.096-V, 0.05% init. accuracy, low drift 3ppm/°C	Internal reference buffer		ADS8688AEVM-PDK
REF5025	V_{REF}=2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA376	Low power, low drift 0.26 µV/°C @750 µA	Contact E2E

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 16 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS8505 **250 kSPS, 1 channel, ±10 input range, single ended**	OPA140	1) Max throughput 2) 10-kHz sine wave input 3) ±15-V dual supply	**Optimized for dynamic performance:** ENOB=14.5

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5025	1) Internal reference: 2.5-V, drift 8ppm/°C typ 2) External reference: REF5025 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	Internal reference buffer		ADS8505EVM

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 14 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS7853 **1 MSPS, 2 channels, 0 - 5 input range, single ended/pseudo differential**	OPA836	1) 1-MSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>81 dB@10 kHz, THD<-95 dB@10 kHz
	THS4032	1) 1-MSPS throughput 2) 100-kHz AC input 3) ±15-V dual supply	**Dual-channel, simultaneous sampling:** SNR>78.5 dB@100 kHz, THD<-88 dB@100 kHz
ADS7854 **1 MSPS, 2 channels, ±5 input range, fully differential**	THS4521	1) 1-MSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>81.5 dB@10 kHz, THD<-90 dB@10 kHz
	THS4531	1) 1-MSPS throughput 2) 20-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling for optical encoders:** SNR>83.3 dB@2 kHz, THD<-88 dB@2 kHz
ADS7850 **750 kSPS, 2 channels, 0 - 5 input range, pseudo differential**	OPA836	1) 750 kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>81.5 dB@10 kHz, THD<-90 dB@10 kHz
	THS4032	1) 750 kSPS throughput 2) 100-kHz AC input 3) ±15-V dual supply	**Dual-channel, simultaneous sampling:** SNR>81.5 dB@100 kHz, THD<-90 dB@100 kHz
ADS7851 **1.5 MSPS, 2 channels, ±5 input range, fully differential**	THS4521	1) 1-MSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>82.3 dB@100 kHz, THD<-93 dB@100 kHz
			Dual-channel, simultaneous sampling for optical encoders
ADS7945 **2 MSPS, 2 channels, ±5 input range, fully differential**	OPA836	1) Max throughput 2) AC input specified on datasheet 3) 5-V single supply	**microPower, differential SAR ADC:** Refer to datasheet for performance spec
ADS7946 **2 MSPS, 2 channels, 0 - 5 input range, single ended**	OPA836	1) Max throughput 2) AC input specified on datasheet 3) 5-V single supply	**microPower, differential SAR ADC:** Refer to datasheet for performance spec

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	ADS7853EVM-PDK
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	TI Design: TIDA-00208
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	TI Design: TIDA-00201
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	N/A	N/A	TI Design: TIPD117
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350EVM-PDK
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350 data-sheet
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	Internal reference buffer		ADS7851EVM-PDK
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	Internal reference buffer		TI Design: TIPD117
REF5040	REF5040: 4.096-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA350	Wide BW, low output impedance, drift 4 µV/°C	ADS7945EVM-PDK
REF5040	REF5040: 4.0-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA350	Wide BW, low output impedance, drift 4 µV/°C	ADS7946EVM-PDK

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 14 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS7891 **3 MSPS,** **1 channel,** **0 - 2.5 input range,** **single ended**	THS4031	1) Max throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Single-ended SAR ADC:** Refer to datasheet for performance spec
ADS8674 **500 kSPS,** **4 channels,** **single ended**	OPA2209	Amplifier only for driving aux channel integrated AFE for input channels 1) Max specified throughput 2) AC input specified on datasheet 3) ±15-V dual supply	**Optimized for dynamic performance:** Refer to datasheet for performance spec
ADS8678 **500 kSPS,** **8 channels,** **single ended** **input ranges:** **±10.24** **±5.12** **±2.56** **0 - 10.24** **0 - 5.12** **0 - 2.56** **0 - 1.28**			

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF5025	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	Internal reference buffer		ADS7891EVM
REF5040	1) Internal reference: 4.096V, drift 10ppm/°C max. 2) External reference: REF5040 4.096-V, 0.05% init. accuracy, low drift 3ppm/°C	Internal reference buffer		ADS8678EVM-PDK

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 12 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS7042 **1 MSPS, 1 channel, 0 - 3.6 input range, single ended**	OPA314	1) 100 to 500 kSPS throughput 2) 10-kHz AC input 3) 3.3-V single supply	**Low power, ultra-small, optimized for 500 kSPS:** SNR>70 dB@10 kHz,THD <-75 dB@10kHz,P=1 mW
	OPA835	1) 500 to 1 MSPS throughput 2) 100-kHz AC input 3) -0.7/4.7-V dual supply	**Low power, ultra-small, optimized for 1 MSPS:** SNR>70 dB@100 kHz, THD<-80 dB@100kHz, P=2.5 mW
	No driver!	1) Throughput <10kSPS 2) 100-Hz AC input	**Ultra-Low power, ultra-small, optimized for <1kSPS:** SNR>70 dB@100 Hz, THD<-80 dB@100 kHz,P<1 uW
ADS7043 **1 MSPS, 1 channel, 0 - 3.6 input range, pseudo differential**	OPA316	1) 100 to 1 MSPS throughput 2) 2-kHz AC input 3) 3.3-V single supply	**Low power, ultra-small, optimized for 1 MSPS:** SNR>69 dB@2 kHz,THD <-80 dB@2 kHz
	OPA835	1) 500 to 1 MSPS throughput 2) 100-kHz AC input 3) -0.7/4.7-V dual supply	**Low power, ultra-small, optimized for 1 MSPS:** SNR>69 dB@100 kHz, THD<-80 dB@100 kHz, P=2.5 mW
	No driver!	1) Throughput <10kSPS 2) 100-Hz AC input	**Ultra-Low power, ultra-small, optimized for <1kSPS:** SNR>70 dB@100 Hz, THD<-80 dB@100 kHz,P<1 uW
ADS7044 **1 MSPS, 1 channel, ±3.6 input range, fully differential**	OPA316	1) 100 to 1 MSPS throughput 2) 5-kHz AC input 3) 3.3-V single supply	**Low power, ultra-small, optimized for 1 MSPS:** SNR>71 dB@5 kHz,THD <-85 dB@5 kHz
	THS4531	1) 500 to 1 MSPS throughput 2) 25-kHz AC input 3) 3.3-V single supply	**Low power, ultra-small, high CMRR:** SNR=71.6 dB@25 kHz, THD<-85 dB@25 kHz
	No driver!	1) Throughput <10kSPS 2) 100-Hz AC input	**Ultra-Low power, ultra-small, optimized for <1 kSPS**
ADS7250 **750 kSPS, 2 channels, 0 - 5 input range, pseudo differential**	OPA836	1) 750 kSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR=73 dB@10 kHz, THD<-90 dB@10 kHz
	THS4032	1) 750 kSPS throughput 2) 100-kHz AC input 3) ±15-V dual supply	**Dual-channel, simultaneous sampling:** SNR=73 dB@100 kHz, THD<-90 dB@100 kHz
ADS7251 **2 MSPS, 2 channels, ±5 input range, fully differential**	OPA836	1) 1.5 MSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>73 dB@100 kHz, THD<-90 dB@100 kHz **Dual-channel, simultaneous sampling for optical encoders**

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
AVDD supply	N/A	N/A	N/A	TI Design: TIPD168
AVDD supply	N/A	N/A	N/A	TI Design: TIPD168
AVDD supply	N/A	N/A	N/A	TI Design: TIPD168
AVDD supply	N/A	N/A	N/A	ADS7043 datasheet
AVDD supply	N/A	N/A	N/A	ADS7043 datasheet
AVDD supply	N/A	N/A	N/A	TI Design: TIPD168
AVDD supply	N/A	N/A	N/A	ADS7044 datasheet
AVDD supply	N/A	N/A	N/A	ADS7044 datasheet
AVDD supply	N/A	N/A	N/A	TI Design: TIPD168
REF3125	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350EVM-PDK
REF3125	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4ppm/°C	ADS8350 datasheet
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	Internal reference buffer		ADS7851EVM-PDK
				TI Design: TIPD117

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Resolution: 12 bit

	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS7253 **1 MSPS, 2 channels, 0 - 5 input range, single ended/ pseudo differential**	OPA836	1) 1 MSPS throughput 2) 10-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>71.5 dB@10 kHz, THD<-88 dB@10 kHz
	THS4032	1) 1 MSPS throughput 2) 100-kHz AC input 3) ±15-V dual supply	**Dual-channel, simultaneous sampling:** SNR>71.5 dB@100 kHz, THD<-84 dB@100 kHz
ADS7254 **1 MSPS, 2 channels, ±5 input range, fully differential**	THS4521	1) 1 MSPS throughput 2) 100-kHz AC input	**Dual-channel, simultaneous sampling:** SNR>72.5 dB@100 kHz, THD<-88 dB@100 kHz
	THS4531	1) 1 MSPS throughput 2) 20-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling for optical encoders:** SNR>73.7 dB@2 kHz, THD <-88.3 dB@2 kHz
	THS4531	1) 1 MSPS throughput 2) 20-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling for HIPERFACE position encoder**
ADS8638 **1 MSPS, 8 channels, ±10 input range, single ended bipolar**	OPA4140	1) <1 MSPS throughput 2) 2-kHz AC input 3) ±15-V dual supply	**4/8ch integrated analog inputs for PLC:** SNR>72 dB, THD<-76 dB
TLV2553 **200 kSPS, 11 channels, 0 - 5 input range, single ended**	OPA4140	1) Max throughput 2) 10-kHz sine wave input 3) 5-V single supply	**Optimized for dynamic performance:** THD = 82 dB, SNR = 72 dB, ENOB = 11.5
ADS7251 **2 MSPS, 2 channels, ±5 input range, fully differential**	OPA836	1) 1.5 MSPS throughput 2) 100-kHz AC input 3) 5-V single supply	**Dual-channel, simultaneous sampling:** SNR>73 dB@100 kHz, THD<-90 dB@100 kHz **Dual-channel, simultaneous sampling for optical encoders**

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF3425	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	ADS7853EVM-PDK
REF3425	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	ADS7253 data-sheet
REF3425	REF5025: 2.5-V, 0.05% init. accuracy, low drift 3ppm/°C	OPA2350	Dual channel, wide BW, low output impedance, drift 4 µV/°C	ADS7043 data-sheet
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	Internal reference buffer		TI Design: TIPD117
Internal reference	N/A	N/A		TI Design: TIDA-00202
REF3330	V_{REF}=3.3V, 0.15% init. accuracy, 30ppm/°C	N/A	N/A	TI Design: TIDA-00119
REF3440	(4.096V ± 0.2% (max) initial accuracy, low 20 ppm/°C (max) drift over -40°C to 125°C)	OPA320	Wideband 20MHz, low Vos drift @ 5 µV/°C (max), low b'band noise (4.5nV/rt_Hz), RRIO swing on 0-5Vsup	TLV2553EVM-PDK
Internal reference	Int V_{REF}=2.5-V, ± 10ppm/°C	Internal reference buffer		ADS7851EVM-PDK TI Design: TIPD117

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

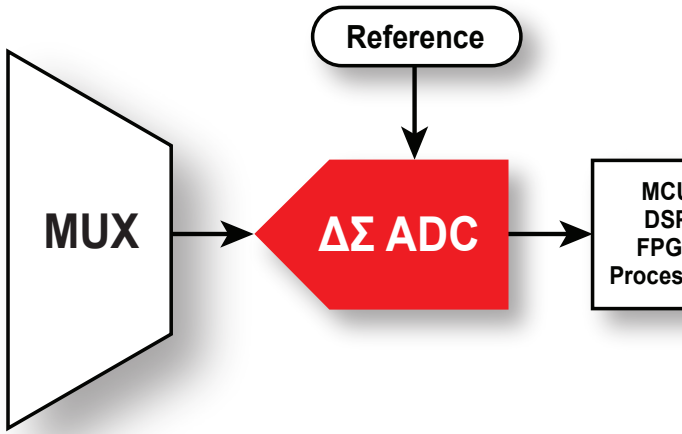
Resolution: 12 bit

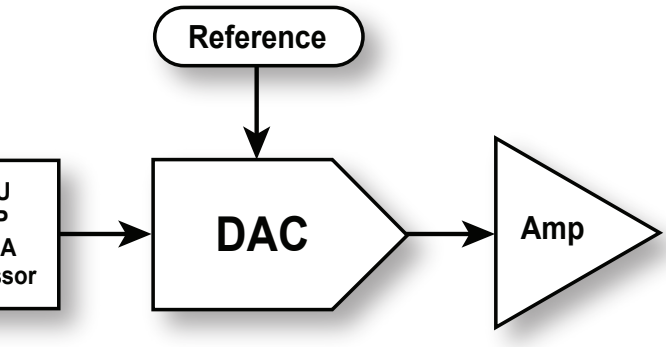
	ADC Input Driver		
SAR ADC	**Amplifier**	**Signal chain specifications**	**Signal chain performance**
ADS7953 **1 MSPS, 16 channels, 0 - 5 input range, single ended**	OPA314	ADS7953: 1) Low power consumption 2) <1-kHz AC or DC inputs when all 16 channels scanned sequentially 3) 5-V single supply	**Low power MUX application:** total power < 35 mW
ADS7952 **1 MSPS, 12 channels, 0 - 5 input range, single ended** **ADS7951** **1 MSPS, 8 channels, 0 - 5 input range, single ended**	OPA192	1) Buffered multiplexer output (MXO) 2) Max throughput 3) 5-V single supply	**Buffered multiplexer output (MXO):** 12-bit settling at 1 MSPS w 1x/2xREF range R(SOURCE) ≤ 10kΩ
ADS7950 **1 MSPS, 4 channels, 0 - 5 input range, single ended**	No Driver!	1) 1 MSPS throughput 2) Rsource≤100Ω for 1xREF Range, 12-bit settling 3) Rsource≤250Ω for 2xREF Range 12-bit settling	**Performance specified on datasheet**

ADC Reference Driver				
Voltage reference	**Reference specifications**	**Buffer amplifier**	**Reference driver performance**	**Reference designs & support**
REF3325	2.5V, 0.05% init. accuracy, low drift 3ppm/°C	N/A	N/A	N/A
REF3025				
REF3125				

NOTE: Specific voltage references listed in the table were selected to maximize the Signal-to-Noise Ratio (SNR) performance of the signal chain. Other output voltage variants are often available in the same voltage reference product families. Refer to the datasheet for details.

Delta-Sigma ADC




Reference
DAC
Amp

Delta-Sigma ADC

Device	Resolution (bits)	Sample rate (kSPS)	No. of channels	Interface	Input Range (V)	Vref
ADS1113	16	0.860	1	I2C	0 to 5.5	Int
ADS1115	16	0.860	4	I2C	0 to 5.5	Int
ADS1115-Q1	16	0.860	4	I2C	0 to 5.5	Int
ADS1118	16	0.860	4	SPI	0 to 5.5	Int
ADS1120	16	2	4	SPI	±2.85, 0 to 5.6	Int, Ext, Supply
ADS1194	16	8	4	SPI	0 to 5.5	Int, Ext
ADS1196	16	8	6	SPI	0 to 5.5	Int, Ext
ADS1198	16	8	8	SPI	0 to 5.5	Int, Ext
ADS1220	24	2	4	SPI	±2.85, 0 to 5.6	Int, Ext, Supply
ADS1247	24	2	4	SPI	±2.125, 0 to 4.25	Int, Ext
ADS1248	24	2	8	SPI	±2.125, 0 to 4.25	Int, Ext
ADS1255	24	30	2	SPI	0 to 5.25	Ext
ADS1262	32	38	10	SPI	±2.5, 0 to 5	Int, Ext
ADS127L01	24	512	1	SPI	0 to 3	Ext
ADS1292	24	8	3	SPI	0 to 5.25	Int, Ext
ADS1293	24	25.6	3	SPI	0 to 0.4	Int
ADS1294	24	32	4	SPI	0 to 5.25	Int, Ext
ADS1294R	24	32	4	SPI	0 to 5.25	Int, Ext
ADS1296	24	32	6	SPI	0 to 5.25	Int, Ext
ADS1296R	24	32	6	SPI	0 to 5.25	Int, Ext
ADS1298	24	32	8	SPI	0 to 5.25	Int, Ext
ADS1298R	24	32	8	SPI	0 to 5.25	Int, Ext
ADS131A04	24	128	4	SPI	-1.5 to 4.5	Int, Ext
ADS131E08	24	64	8	SPI	0 to 4	Int, Ext
ADS131E08S	24	64	8	SPI	0 to 4	Int

Isolated Amplifier

Device	Input Range (mV)	Isolation Rating (Vpeak)	Min Transient Immunity(kV/uS)	Package	Power (mW)	Operating temperature range Range (°C)
AMC1100	±250	4250	2.5	8SOIC, 8SOP	66	-40 to 105
AMC1200	±250	4250	10	8SOIC, 8SOP	66	-40 to 105
AMC1301	±250	7000	15	8SOIC	45	-40 to 125

Isolated Modulator

Device	Input Range (mV)	Isolation Rating (Vpeak)	Min Transient Immunity(kV/uS)	Package	Power (mW)	Operating temperature range Range (°C)
AMC1304	±50, ±250	7000	15	16SOIC	59	-40 to 125

Resolution: 32 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1262	High resolution, low noise, 32-bit, 38kSPS ADC with PGA and internal reference	32	11	38,400	MSP430 ultra-low-power MCUs
					Signal switches
					Isolation
					Amplifiers and linear
					Step-down (buck)
					Operating temperature range sensors
					Flip-flop/latch/register
					Logic
					Logic
					Logic
					Linear regulator (LDO)
					Step-up (boost)
					Linear regulator (LDO)
					Linear regulator (LDO)
					Linear regulator (LDO)

Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
MSP430F5529	16-Bit ultra-low-power microcontroller, 128KB flash, 8KB RAM, USB, 12Bit ADC, 2 USCIs, 32Bit HW MPY	High-resolution, low-drift, precision weigh-scale reference design with AC bridge excitation	TIPD188
TS5A21366	0.75-Ohm dual SPST analog switch with 1.8-V compatible input logic		
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter	Dual channel-to-channel isolated universal analog input module for PLC reference design	TIDA-00550
LM2903	Dual differential comparator		
LM5017	7.5-100V wide vin, 600mA constant on-time synchronous buck regulator		
LMT01	0.5°C accurate 2-pin operating temperature range sensor with a pulse train interface		
SN74AHC594	8-bit shift registers with output registers		
SN74LVC1G125	Single bus buffer gate with 3-state outputs		
SN74LVC1G332	Single 3-input positive-OR gate		
SN74LVC2G86	Dual 2-input exclusive-OR gate		
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
TPS61093	Low input, 20V/1.1A step-up DC/DC converter with integrated power diode and input/output isolation		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A4101	50V Input, 50mA, single output low-dropout linear regulator		
TPS7A49	Vin 3V to 36V, 150mA, ultra-low noise, high PSRR, low-dropout linear regulator		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	Product description	Resolution (bits)	No. of channels	Max sample rate (SPS)	Product type
ADS1194 ADS1196 ADS1198 ADS1294 ADS1294R ADS1296 ADS1296R ADS1298 ADS1298R	Multi-channel ADC with integrated ECG front end	16,24	4,6,8	32,000	Op amp Amplifier Logic Op amp

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
OPA320	Precision, 20MHz, 0.9pA Ib, RRIO, CMOS op amp	Reference design for software pacemaker detection in an ECG	TIPD197
TLV3401	Single nanopower open drain output comparator	Hardware pace detection for ECG reference design	TIPD111
SN74LVC2G00	Dual 2-input positive-NAND gate		
OPA348	1MHz, 45µA, RRIO, single op amp		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1220	Low-power, low-noise, 24-bit ADC for small signal sensors	24	4	2,000	Digital-to-analog converter
					MSP430 ultra-low-power MCUs
					Buffer/driver/transceiver
					Buck/boost, inverting or split-rail
					Linear regulator (LDO)
					Signal switches
					Power MOSFET
					Power MOSFET
					Operating temperature range sensors
					Linear regulator (LDO)
					MSP430 ultra-low-power MCUs
					ESD protection diodes
					Signal switches
					MSP430 ultra-low-power MCUs
					Other interface
					MSP430 ultra-low-power MCUs
					MSP430 ultra-low-power MCUs
					I2C
					MSP430 ultra-low-power MCUs
					Other interface

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
DAC161P997	Single-wire 16-bit DAC for 4-20mA loops	Isolated loop powered thermocouple transmitter reference design	TIDA-00189
MSP430F5172	MSP430F51x2 mixed signal microcontroller		
SN74LVC125A	Quadruple bus buffer gate with 3-state outputs		
TPS60402	60mA charge pump voltage inverter with fixed 50kHz operation		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TS5A3159	1-ohm SPDT analog switch	Wireless thermocouple sensor transmitter DevPack for SensorTag reference design	TIDA-00650
CSD13381F4	12V, n-channel FemtoFET™MOSFET	1g resolution over 15kg range sub-100nVpp noise front-end reference design	TIDA-00765
CSD23381F4	12V, p-channel FemtoFET™MOSFET		
LMT01	0.5°C accurate 2-pin operating temperature range sensor with a pulse train interface		
LP5907	250-mA ultra-low-noise LDO		
MSP430G2553	MSP430G2x53, MSP430G2x13 mixed signal microcontroller		
TPD4E1U06	Quad-channel high-speed ESD protection device		
TS5A21366	0.75-Ohm dual SPST analog switch with 1.8-V compatible input logic		
MSP430FR5738	MSP430FR5738 24 MHz ULP microcontroller with 16 KB FRAM, 1 KB SRAM, 21 IO, 10-bit ADC and comparator	IO-Link adapter reference design for sensors with analog 4-20mA output	TIDA-00457
SN65HVD101	IO-LINK PHY for device nodes		
MSP430FR5949	MSP430FR5949 16 MHz ultra-low-power microcontroller featuring 64 KB FRAM, 2 KB SRAM, 33 IO	Thermocouple AFE using RTD or integrated operating temperature range sensor for cold junction compensation (CJC)	TIDA-00168
REF5020	Low noise, very low drift, precision voltage reference		
TCA9535	Remote 16-Bit I2C and SMBus, low-power I/O expander with interrupt output and config registers		
MSP430FR5738	MSP430FR5738 24 MHz ULP microcontroller with 16 KB FRAM, 1 KB SRAM, 21 IO, 10-bit ADC and comparator	IO-Link sensor transmitter reference design	TIDA-00188
SN65HVD101	IO-Link PHY for device nodes		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1220 (cont.)	Low-power, low-noise, 24-bit ADC for small signal sensors	24	4	2,000	Digital-to-analog converter
					MSP430 ultra-low-power MCUs
					Linear regulator (LDO)
					n/a
					Digital-to-analog converter
					MSP430 ultra-low-power MCUs
					Linear regulator (LDO)
					MSP430 ultra-low-power MCUs
					Voltage reference
					I2C
					Isolation
					Isolation
					Step-down (buck)
					Protection, monitoring and hot swap
					Operating temperature range sensors
					I2C
					Operating temperature range sensors
					Linear regulator (LDO)
					Linear regulator (LDO)
					Signal switches

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
DAC161S997	SPI 16-bit precision DAC for 4-20mA loops	RTD operating temperature range transmitter for 2-wire, 4 to 20-mA current loop systems	TIDA-00095
MSP430G2513	MSP430G2x53, MSP430G2x13 mixed signal microcontroller		
TPS7A49	Vin 3V to 36V, 150mA, ultra-low noise, high PSRR, low-dropout linear regulator		
n/a	n/a	Fast prototyping 24bit sigma-delta ADC with energia ecosystem reference design	TIDA-00647
DAC161S997	SPI 16-bit precision DAC for 4-20mA loops	Small form factor, 2-wire 4 to 20mA current loop RTD operating temperature range transmitter reference design	TIDA-00165
MSP430FR5738	MSP430FR5738 24 MHz ULP microcontroller with 16 KB FRAM, 1 KB SRAM, 21 IO, 10-bit ADC and comparator		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
MSP430FR5949	MSP430FR5949 16 MHz ultra-low-power microcontroller featuring 64 KB FRAM, 2 KB SRAM, 33 IO	Optimized latency, power and memory footprint thermocouple sensing front-end reference design	TIDA-00468
REF5020	Low noise, very low drift, precision voltage reference		
TCA9535	Remote 16-Bit I2C and SMBus, low-power I/O expander with interrupt output and config registers		
ISO1540	2.5 kVrms isolated bidirectional clock, bidirectional I2C isolators	Operating temperature range sensor interface module for programmable logic controllers (PLC)	TIDA-00018
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
LM5017	7.5-100V wide vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot swap / inrush current controller with power limiting		
LM94022	±1.5°C operating temperature range sensor with multiple gain and class-AB analog output		
TCA6408A	Low-voltage 8-Bit I2C and SMBus I/O expander		
TMP275	±0.5°C operating temperature range sensor with I2C/SMBus interface in industry std LM75 form factor & pinout		
TPS715	50 mA, 24 V, 3.2-µA Iq, low-dropout linear regulator in SC70 package		
TPS7A49	Vin 3V to 36V, 150mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TS5A23159	1-ohm 5-V/3.3-V 2-channel SPDT switch		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1247	24-bit, 2kSPS, 4-ch ADC for precision sensor measurement	24	4	2,000	Linear regulator (LDO)
ADS1248	24-bit, 2kSPS, 8-ch ADC for precision sensor measurement	24	8	2,000	Magnetic current sensing
					Linear regulator (LDO)
					Power MOSFET
					I2C
					Linear regulator (LDO)
					Signal switches
					Amplifiers and linear
					Instrumentation amplifier
					Voltage reference
ADS1255	24-bit, 30kSPS very low noise delta-sigma ADC	24	1	30,000	ARM cortex-A8
					Advanced light control
					Advanced light control
					Amplifiers and linear
					Op amp
					Op amp
					Voltage reference
					Power management
					Power management
					Step-down (buck)
					Linear regulator (LDO)

Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
TPS7A49	Vin 3V to 36V, 150mA, ultra-low noise, high PSRR, low-dropout linear regulator	0°C – 100°C, hardware-compensated ratiometric 3-wire RTD system reference design	TIPD152
		3-wire RTD Acquisition System Accurately Measures operating temperature range From -200°C - 850°C	TIPD120
DRV425	Fully integrated precision fluxgate magnetic field sensor and readout	Fluxgate based displacement sensor reference design	TIDA-00463
TPS717	150mA, high PSRR, low quiescent current, low noise LDO		
CSD17571Q2	30V n-channel NexFET power MOSFETs, CSD17571Q2	Analog front end (AFE) for sensing operating temperature range in smart grid applications using RTD reference design	TIDA-00110
TCA6408A	Low-voltage 8-bit I2C and SMBus I/O expander		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TS3A5017	14-ohm dual SP4T analog switch 3.3-V/2.5-V analog multiplexer/demultiplexer		
INA159	High-speed, precision gain of 0.2 level translation difference amplifier	Analog input module for industrial outputs and operating temperature range sensors reference design	TIPD164
INA826	Precision, 200-µA supply current, 36-V supply instrumentation amplifier		
REF5025	3 µVpp/V noise, 3 ppm/°C drift precision voltage reference		
AM3358	Sitara processor	DLP near-infrared spectrometer for optical analysis of liquids & solids reference design	TIDA-00155
DLP4500NIR	DLP® 0.45 WXGA NIR DMD		
DLPC350	Digital controller for DLP4500 DMD and DLP4500NIR DMD		
INA330	Thermistor signal amplifier for operating temperature range control		
OPA2376	Precision, low noise, low quiescent current op amp		
OPA569	Power op amp, output signal swings within 200mV of rails at 2A output current		
REF5025	3 µVpp/V noise, 3 ppm/°C drift precision voltage reference		
TPS65145	4-CH LCD bias w/ fully int. pos. charge pump, 3.3V LDO contr., 0.96A min. boost ilim & fault detect		
TPS65217	Power management IC (PMIC) w/ 3 DC/DCs, 4 LDOs, linear battery charger & white LED driver		
TPS65251	4.5-V TO 18-V input, 3A/2A/2A output, synchronous triple buck converter		
TPS730	Low-noise, high PSRR, RF 200-mA low-dropout linear regulators		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1255 (cont.)	24-bit, 30kSPS very low noise delta-sigma ADC	24	1	30,000	Battery management products
					Wireless connectivity
					Wireless connectivity
					Advanced light control
					Video and data display
					Advanced light control
					Sensor products
					Current sense amplifiers
					Op amp
					Op amp
					Op amp
					Voltage reference
					Logic
					Logic
					Logic
					Logic
					Logic
					Logic
					Control + automation
					Control + automation
					Operating temperature range sensors
					ESD protection diodes
					Integrated load switches
					Power management
					Buck/boost, inverting or split-rail
					Non-isolated module
					Non-isolated module
					Voltage level translation

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
BQ24250	2A single input I2C/standalone switch-mode li-ion battery charger	DLP ultra-mobile NIR spectrometer for portable chemical analysis with bluetooth connectivity	TIDA-0054
CC2564MODA	Dual-mode Bluetooth® CC2564 module with integrated antenna		
CC2564MODN	Dual-mode Bluetooth® CC2564 module		
DLP2010NIR	DLP® 0.2 WVGA NIR DMD		
DLPA2005	PMIC/LED driver (high current) for DLP2010 DMD and DLP2010NIR DMD		
DLPC150	Digital controller for the DLP2010NIR DMD		
HDC1000	Low power, 3% accuracy digital humidity sensor with integrated operating temperature range sensor		
INA213	26-V, bi-directional, zero-drift, high accuracy, low-/high-side, voltage out current shunt monitor		
OPA2376	Precision, low noise, low quiescent current op amp		
OPA350	High-speed, single-supply, rail-to-rail op amps MicroAmplifier(TM) series		
OPA567	Rail-to-rail I/O, 2A power amplifier		
REF5025	3 µVpp/V noise, 3 ppm/°C drift precision voltage reference		
SN74LV1T04	Single power supply inverter gate logic level shifter		
SN74LV1T08	Single power supply 2-input positive and gate with logic level shifter		
SN74LV1T32	Single power supply 2-input positive or gate with logic level shifter		
SN74LVC1G125	Single bus buffer gate with 3-state outputs		
SN74LVC2G125	Dual bus buffer gate with 3-state outputs		
SN74LVC2G157	Single 2-line to 1-line data selector/multiplexer		
TM4C1290NCZAD	High performance 32-bit ARM® Cortex®-M4F based MCU		
TM4C129DNCPDT	IoT enabled high performance 32-bit ARM® Cortex®-M4F based MCU		
TMP006	Infrared thermopile contactless operating temperature range sensor in WCSP package		
TPD4S012	4-channel USB ESD solution with power clamp		
TPS22904	3.6V, 0.5A, 68mΩ load switch with quick output discharge		
TPS386596	Quad voltage supervisor with manual reset input		
TPS63036	High efficient single inductor buck-boost converter with 1-A switches		
TPS81256	Integrated power solution, 3W high-efficiency boost converter module in MicroSiP™ package		
TPS82671	600mA fully integrated, low noise step-down converter module in MicroSiP(TM) package		
TXB0106	6-Bit bidirectional voltage-level translator with auto direction sensing and +/-15-kV ESD protect		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS127L01	24-bit, high-speed, wide-bandwidth analog-to-digital converter	24	1	512,000	Level translation
					Logic
					Signal switches
					ESD protection diode
					Power management
					Step-up (boost)
					Control and automation
					Op amp
					Reference
ADS1292	24-bit ADC with integrated respiration impedance and ECG front end	24	3	32,000	LDO
					Step-up (boost)
					Operating temperature range sensor
					Op amp
					Microcontroller
					Microcontroller
					Voltage reference
ADS1293	Complete low power integrated AFE for ECG applications	24	3	25,600	Wireless connectivity
					Step-up (boost)

Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
TXS0108E	8-Bit bidirectional voltage-level shifter for open-drain and push-pull applications	ADS127L01 24-bit, delta-sigma analog-to-digital converter (ADC) evaluation module	ADS127L01EVM
SN74LVC2G06	Dual inverter buffer/driver with open-drain output		
SN74LVC1G07	Single buffer/driver with open-drain output		
SN74LVC1G06	Single inverter buffer/driver with open-drain output		
SN74AUP1G80	Low-power single positive edge triggered d-type flip-flop		
SN74CBT3244	Octal FET bus switch		
TPD4S012	4-channel USB ESD solution with power clamp		
TLV803M	3-pin voltage supervisor with active-low, open drain reset		
TPS61252	3.5MHz, 1.5A, 92% efficient boost converter with adjustable input current limit		
TM4C1294NCPDT	IoT enabled high performance 32-bit ARM cortex-M4F based MCU		
THS4551	Low noise, precision, 150MHz, fully differential amplifier		
REF6025	High-precision voltage reference with integrated high-bandwidth buffer		
TPS730	Low-noise, high PSRR, RF 200mA low-dropout linear regulators	Multi-parameter bio-signal monitor reference design for personal monitoring	TIDM-BIOSIGN-MONITOR
TPS61220	Low input voltage, 0.7V boost converter with 5.5µA quiescent current		
TMP112	1.4V-capable ±0.5ºC operating temperature range sensor with alert function and I2C/SMBus interface		
LMP2231	Single micropower, 1.6V, precision op amp with CMOS inputs		
RF430CL331H	Dynamic NFC interface transponder for large file transfer		
MSP430FRS989	16 MHz ultra-low-power microcontroller featuring 128KB FRAM, 2KB SRAM, 48 I/O, scan IF, AES		
LM4041-N	Precision micropower shunt voltage reference		
CC2541	Simplelink bluetooth low energy and proprietary wireless MCU	Wireless heart monitor with bluetooth low energy	TIDA-00096
TPS61220	Low input voltage, 0.7V boost converter with 5.5µA quiescent current		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS131A04	24-bit, simultaneous sampling AFE for power monitoring, control and protection	24	4	128,000	Isolator
					LDO
					Charge pump
					Clock buffer
					Reference
					Op amp
					Isolated amplifier
ADS131E08	24-bit, simultaneous sampling AFE for power monitoring, control and protection	24	8	64,000	Isolator
					LDO
					LDO
					LDO
					Microcontroller
					Transistor

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
SN6501	Low-noise, 350 mA, 410 kHz transformer driver	High accuracy ±0.5% current and isolated voltage measurement reference design	TIDA-00835
TLV704	24V, 150mA ultra-low IQ, low dropout regulator		
TPS717	150mA, high PSRR, low quiescent current, low noise LDO		
TPS723	200mA, negative output low-dropout linear regulator		
TPS60403	60mA charge pump voltage inverter with fixed 250kHz operation		
CDCLVC1102	Low jitter, 1:2 LVCMOS fan-out clock buffer		
LM4040-N	Precision micropower shunt voltage reference		
OPA4180	0.1 µV/C drift, quad, low noise, rail-to-rail, 36V zero drift op amp		
AMC1301	Precision ±250mV input, 3µS delay, reinforced isolated amplifier		
SN6501	Transformer driver	Isolated current and voltage measurement using fully differential isolation amplifier reference design	TIDA-00555
TLV704	24V, 150mA ultra-low IQ, low dropout regulator		
TPS7A30	-3V to -36V, -200mA, ultra-low noise, high PSRR, low dropout regulator		
TPS7A6533-Q1	Automotive 300-mA 40-V low-dropout regulator with ultra-low quiescent current		
MSP430FR5869	MSP430FR5869 mixed signal microcontroller		
CSD17571Q2	30V N-channel NexFET power MOSFET output driver		

Resolution: 24 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS131E08S	24-bit, simultaneous sampling AFE with fast power-up time for power monitoring, control and protection	24	8	64,000	Operating temperature range sensor
					LDO
					Reference
					Power management
					Microcontroller
					Amplifier

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
LMT87	2.7V-capable, 10 µA analog output operating temperature range sensor	High resolution, fast startup analog front end for air circuit breaker reference design	TIDA-00661
TPS723	200mA, negative output low-dropout linear regulator		
TPS732	Cap-free, NMOS, 250mA low dropout regulator with reverse current protection		
TPS7A6533-Q1	Automotive 300-mA 40-V low-dropout regulator with ultra-low quiescent current		
LM4041B	Adjustable precision micropower shunt voltage reference 0.2% accuracy		
LM8364	Active low voltage monitor with low quiescent current and 2.5% threshold accuracy		
MSP430FR5969	16 MHz ultra-low-power microcontroller featuring 64KB FRAM, 2KB SRAM, 40 I/O		
LMV614	Low-voltage, low-power, RRIO general purpose amplifier		
LM2903	Dual differential comparator		

Resolution: 16 bit

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Max sample rate (SPS)**	**Product type**
ADS1113	16-Bit ADC with Integrated MUX, oscillator, and reference	16	1	860	Operating temperature range sensors
					MSP430 ultra-low-power MCUs
					Wireless MCUs
ADS1115	16-Bit ADC with integrated MUX, PGA, comparator, oscillator, and reference	16	4	860	Operating temperature range sensors
					MSP430 ultra-low-power MCUs
					Linear regulator (LDO)
					Operating temperature range sensor
					Microcontroller
					ESD protection diode
ADS1115-Q1	Automotive, 16-bit ADC with Integrated MUX, PGA, comparator, oscillator, and reference	16	4	860,000	Op amp
					Current sense amplifiers
ADS1118	16-Bit ADC with integrated MUX, PGA, operating temperature range sensor, oscillator, and reference	16	4	860	n/a
ADS1120	Low-power, low-noise, 16-bit ADC for small signal sensors	16	4	2,000	Sensor products
					Voltage reference
					Signal switches

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
LMT70	±0.1°C precision analog operating temperature range sensor	Passive NFC operating temperature range patch reference design	TIDA-00721
MSP430G2403	MSP430G2x33, MSP430G2x03 mixed signal microcontroller		
RF430CL330H	Dynamic dual interface NFC transponder		
LMT70	±0.1°C precision analog operating temperature range sensor	Human skin operating temperature range sensing for wearable applications reference design	TIDA-00824
MSP430G2553	MSP430G2x53, MSP430G2x13 mixed signal microcontroller		
TPD1E10B06	Single-channel ESD in 0402 package With 10pF capacitance and 6V breakdown		
LMT70	±0.1ºC precision analog operating temperature range sensor		
MSP430G2553	Mixed signal microcontroller		
TPD1E10B06	Single-channel ESD in 0402 package with 10pF capacitance and 6V breakdown		
TLC2272A-Q1	Automotive advanced linCMOS rail-to-rail op amp	Voltage and current measurement reference design for automotive on-board charger system	TIDA-00456
INA138-Q1	Automotive grade, 36V, high-side, current output current shunt monitor		
n/a	n/a	Simple thermocouple measurement solution reference design, <1°C accurate	TIPD109
LMP91200	Integrated AFE for low-power pH sensing applications	Wireless pH sensor transmitter (DevPack for SensorTag) reference design	TIDA-00561
REF3120	2.048 4ppm/degrees C, 100uA SOT23-6 series (bandgap) voltage reference		
TS5A3159	1-Ohm SPDT analog switch		

Isolated Amplifier

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Gain Error (%)**	**No. of channels**	**Output type**	**Product type**
AMC1100	4.25kV peak isolated amplifier for current shunt measurements	±0.05	1	Voltage	Transformer driver
					LDO
					LDO
					LDO
					Microcontroller
					Transistor
					Analog-to-digital converter
AMC1200	4.25kV peak isolated amplifier for current shunt measurements	±0.05	1	Voltage	DC/DC switching regulator
					Transformer driver
					Op amp
					Voltage reference
					Voltage reference
					Transformer driver
					Isolated gate driver
					MOSFET gate driver
					N-channel MOSFET
					DC/DC switching regulator
					LDO
					Non-inverting driver
					Transformer driver

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Isolated current and voltage measurement using fully differential isolation amplifier reference design	TIDA-00555
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A6533-Q1	Automotive 300-mA 40-V low-dropout regulator with ultra-low quiescent current		
MSP430FR5869	MSP430FR5869 mixed signal microcontroller		
CSD17571Q2	30V N-channel NexFET power MOSFET output driver		
ADS131E08	Analog Front-End for power monitoring, control and protection		
LM5017MR	7.5-100V wide vin, 600mA constant on-time synchronous buck regulator	Isolated bias supplies and isolated amplifier combo for line voltage or current measurement	PMP9480
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Shunt-based 200A peak current measurement reference design using isolation amplifier	TIDA-00445
OPA2376,OPA376	Precision, low noise, low quiescent current op amp		
REF2033	Low-drift, low-power, dual-output VREF and VREF/2 voltage reference		
LM4040	Precision micropower shunt voltage reference		
SN6501	Low-voise 350 mA, 410 kHz transformer driver	Isolated IGBT gate driver evaluation platform for 3-phase inverter system reference design	TIDA-00195
ISO5852S	5.7 kVrms split O/P, reinforced isolated IGBT gate driver		
UCC27211	120V boot, 4A peak, high frequency high-side low-side driver		
CSD88537ND	60V dual n-channel NexFET power MOSFET		
TPS54286	4.5V to 28V input, dual 2A output, 600kHz step-down converter with internal compensation		
LP38691	500mA low dropout CMOS linear regulators stable with ceramic output capacitors		
SN74ALVC125	Quadruple bus buffer gates with 3-state outputs		
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Isolated current sensing reference design solution, 5A, 2kV	TIPD121

Isolated Amplifier

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Gain Error (%)**	**No. of channels**	**Output type**	**Product type**
AMC1301	Precision +/-250-mV input, 3-us delay, reinforced isolated amplifier	±0.05	1	Voltage	Isolated gate driver
					Op amp
					Comparator
					LDO
					LDO
					Voltage reference
					Voltage reference
					Logic gate
					Microcontroller

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
UCC21520	4A/6A, 5.7 kVrms isolated dual channel gate driver	Reference design for reinforced isolation 3-phase inverter with current, voltage and temp protection	TIDA-00366
OPA320	Precision, 20MHz, 0.9pA Ib, RRIO, CMOS op amp		
TLC372	Dual general purpose LinCMOS™ differential comparator		
TLCV1117-33	Single output LDO, 800mA, fixed(3.3), internal current limit, thermal overload protection		
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
REF2033	Low-drift, low-power, dual-output VREF and VREF/2 voltage reference		
TL431B	Adjustable precision shunt regulator		
SN74LVC1G10	Single 3-input positive-NAND gate		
TMS320F28027	Piccolo microcontroller		

Isolated Modulator

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Gain Error (%)**	**No. of channels**	**Output type**	**Product type**
AMC1304	Reinforced isolated modulator with LDO regulator	±0.02	1	Bit stream	Transformer driver
					LDO
					LDO
					Op amp
					Clock generator
					DC/DC switching regulator
					LDO
					DC/DC switching regulator
					Voltage reference
					Digital-to-analog converter
					Microcontroller
					Transformer driver
					LDO
					Microcontroller

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Shunt-based AC/DC current and voltage sensing for smart grid applications with reinforced isolation	TIPD165
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
OPA211	1.1nV/rtHz noise, low-power, precision op amp		
CDCE906	Programmable 3-PLL clock synthesizer / multiplier / divider		
TPS55340	Integrated, 5-A 40-V wide input range boost/SEPIC/ flyback DC-DC regulator		
LP38798	800-mA, high PSRR ultra-low-noise LDO for RF and analog circuits		
TPS54232	3.5V to 28V input, 2A, 1MHz step-down converter with eco-mode		
REF3012	1.25V 50ppm/degrees C, 50uA in SOT23-3 series (bandgap) voltage reference		
DAC8564	16-bit, quad channel, ultra-low glitch, voltage output DAC with 2.5V, 2ppm/°C internal reference		
TMS320F28377D	Dual-core delfino microcontroller		
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Isolated, shunt-based current sensing reference design	TIDA-00171
TPS795	Ultralow-noise, high-PSRR, fast, RF, 500-mA low-dropout linear regulators		
TMS320F28377D	Dual-core delfino microcontroller		

Isolated Modulator

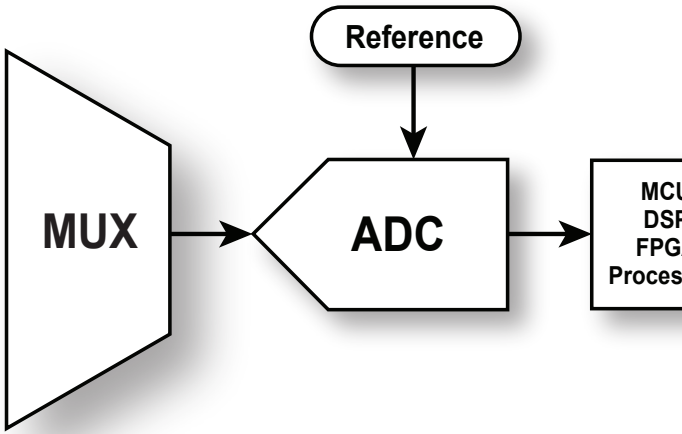
Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Gain Error (%)**	**No. of channels**	**Output type**	**Product type**
AMC1304 (cont.)	Reinforced isolated modulator with LDO regulator	±0.02	1	Bit stream	Transformer driver
					LDO
					LDO
					Op amp
					Instrumentation amplifier
					Clock generator
					DC/DC switching regulator
					LDO
					DC/DC switching regulator
					Voltage reference
					Digital-to-analog converter
					Microcontroller
					Non-inverting driver
					Transformer driver
					LDO
					LDO
					LDO
					Op amp
					Clock buffer
					Microcontroller

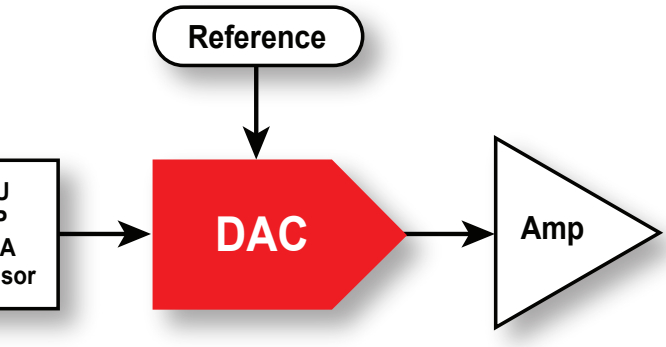
Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Isolated current shunt and voltage measurement reference design for motor drives	TIDA-00171
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
OPA211	1.1nV/rtHz noise, low-power, precision op amp		
INA826	Precision, 200-µA supply current, 36-V supply instrumentation amplifier		
CDCE906	Programmable 3-PLL clock synthesizer / multiplier / divider		
TPS55340	Integrated, 5-A 40-V wide input range boost/SEPIC/ flyback DC-DC regulator		
LP38798	800-mA, high PSRR ultra-low-noise LDO for RF and analog circuits		
TPS54232	3.5V to 28V input, 2A, 1MHz step-down converter with eco-mode		
REF3012	1.25V 50ppm/degrees C, 50uA in SOT23-3 series (bandgap) voltage reference		
DAC8564	16-bit, quad channel, ultra-low glitch, voltage output DAC with 2.5V, 2ppm/°C internal reference		
TMS320F28377D	Dual-core delfino microcontroller		
SN74ALVC125	Quadruple bus buffer gates with 3-state outputs		
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Extended current and voltage measurement using shunts for protection relays reference design	TIDA-00738
TLV704	24-V input voltage, 150-mA, ultralow IQ low-dropout regulators		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS709	150-mA, 30-V, ultra-low IQ, wide input low-dropout regulator with reverse current protection		
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp		
CDCLVC1104	Low jitter, 1:4 LVCMOS fan-out clock buffer		
AM4379	Sitara processor		

Isolated Modulator

Precision delta-sigma analog-to-digital converters					
Product number	**Product description**	**Gain Error (%)**	**No. of channels**	**Output type**	**Product type**
AMC1304 (cont.)	Reinforced isolated modulator with LDO regulator	±0.02	1	Bit stream	Transformer driver
					RS232 transceiver
					Digital isolator
					Digital isolator
					LDO
					Microcontroller

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
SN6501	Low-noise 350 mA, 410 kHz transformer driver	Multi-phase energy measurement with isolated shunt sensors reference design	TIDA-00601
TRS3232	3V to 5.5V multichannel RS-232 line driver/ receiver with +/-15kV ESD protection		
ISO7321	Low power, dual-channel 1/1 digital isolator		
ISO7320	Low power, dual-channel 2/0 digital isolator		
TPS793	High PSRR, low noise, 200mA single output LDO		
MSP430F67641	Low cost 3-phase metering SOC		


Reference
MUX
ADC
MCU
DSP
FPG
Proces


Reference
DAC
Amp

DAC

Device	Resolution (bits)	DAC Channels	Interface	INL (Max, ±LSB))	Output Type	Output Range (Min/Max, mV)
DAC7311	12	1	SPI	3	Buffered Voltage, Current	0 to 24
DAC7750	12	1	SPI	1	Buffered Voltage	0 to 5.5
DAC7760	12	1	SPI	2	Current	0 to 24
DAC7811	16	2	SPI	12	Buffered Voltage	0 to 5.5
DAC8560	16	1	SPI	8	Buffered Voltage	0 to 5.5
DAC8563	12	1	SPI	1	Current	0 to 1
DAC8750	16	1	SPI	52	Buffered Voltage, Current	0 to 24
DAC8760	16	1	SPI	26	Current	0 to 24
DAC8811	16	1	SPI	1	Current	0 to 2
DAC8812	18	1	SPI	2	Buffered Voltage	0 to 5.5
DAC8871	16	2	SPI	1	Current	0 to 2
DAC9881	16	1	SPI	1	Unbuffered Voltage	±18

Operating temperature range Range (°C)	Settling Time (µs)
-40 to 125	10
-40 to 125	6
-40 to 125	10
-40 to 125	7
-40 to 105	8
-40 to 125	0.2
-40 to 125	10
-40 to 125	10
-40 to 85	0.5
-40 to 105	5
-40 to 85	0.5
-40 to 105	1

Resolution: 18 bit

Precision digital-to-analog converters					
Product number	Product description	Resolution (bits)	No. of channels	Output type	Product type
DAC9881	18-bit, 1-channel, low noise, buffered voltage output DAC	18	1	Buffered voltage	Op amp
					Signal switch

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
OPA2192	36-V, precision, RRIO, low offset voltage, low input bias current op amp with e-trim	DAC sample and hold glitch reduction reference design	TIPD142
TS12A4515	Low-voltage, low on-state resistance SPST CMOS analog switches		

Resolution: 16 bit

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC8563	16-bit, 2-channel, low power, buffered voltage output DAC with 2.5V, 4ppm/°C reference	16	2	Buffered voltage	Op amp
					Isolator
					Interface
					LDO
					LDO
					Microcontroller
					Op amp
					Isolator
DAC8812	16-bit, 2-channel ultra high accuracy, multiplying DAC	16	2	Current	Op amp
DAC8811	16-bit, 1-channel ultra high accuracy, multiplying DAC	16	1	Current	Op amp
DAC8871	16-bit 1-channel, serial Interface, +/-18V (high voltage bipolar) unbuffered voltage output DAC	16	1	Unbuffered voltage	Op amp
					Op amp
					Op amp
					Voltage reference
					Current sense amplifier
					Op amp

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
XTR300	Industrial analog current/voltage output driver	Three phase AC voltage and current transducer with isolated DC analog outputs reference design	TIDA-00454
ISO7341FC	4kVpk low power quad channel, 25Mbps digital isolator		
TPL7407L	40V, 7-channel NMOS array, low side driver		
TPS7A4201	28V input, 50mA, single output low-dropout linear regulator		
TPS7A6533-Q1	Automotive 300-mA 40-V low-dropout regulator with ultra-low quiescent current		
MSP430F67661A	MSP430F67661A mixed signal microcontroller		
XTR300	Industrial analog current/voltage output driver	Two-channel source/sink combined voltage & current output, isolated, EMC/EMI tested reference design	TIPD155
ISO7641FM	6kVpk low power quad channel, 150Mbps digital isolator		
OPA277	High precision op amps	Digitally tunable MDAC based state variable filter reference design	TIPD160
OPA2277	Ultra low offset, high precision op amp	±10V four-quadrant multiplying DAC reference design	TIPD137
OPA140	11MHz, single supply, low noise, precision, rail-to-rail output, JFET amplifier	SPI programmable 16-bit, 36V, 1A power supply with integrated current shunt	TIPD138
OPA2277	High precision op amps		
OPA549	High-voltage, high-current op amp, excellent output swing		
REF102	Precision voltage reference		
INA146	High-voltage, programmable gain difference amplifier		
LF411	Precision JFET-input op amp		

Resolution: 16 bit

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC8560	16-bit, 1-channel, buffered voltage output DAC with 2.5V, 2ppm/°C internal reference	16	1	Buffered voltage	Op amp
					Op amp
					Op amp
					Voltage reference
					Signal switch
					Battery charger
DAC8760	16-bit, 1-channel, programmable current/ voltage output DAC for 4-20mA current loop applications	16	1	Buffered voltage and current	Op amp
					Isolator
					Op amp
					Isolator
					Switching regulator
					Hot-swap controller
					LDO
					LDO
					LDO
					Op amp
					Isolator

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
OPA180	0.1-µV/°C drift, low-noise, rail-to-rail output, 36-V, zero-drift op amp	Bipolar +/-10V output from a unipolar DAC for industrial voltage drivers	TIPD125
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp		
OPA334	0.05uV/C max, single-supply CMOS op amp	Charger booster pack reference design	TIDA-00587
REF3425	2.5V 4ppm/degrees C, 100uA SOT23-6 series (bandgap) voltage reference		
TS3A44159	0.45-Ohm quad SPDT analog switch quad-channel 2:1 multiplexer/demultiplexer with two controls		
BQ24250	2A single input I2C/standalone switch-mode Li-Ion battery charger		
OPA192	High voltage, rail-to-rail input/output, op amps, E-trim™ series	Combined voltage and current output terminal for analog outputs (AO) in industrial applications	TIPD119
ISO7641FC	4kVpk low power quad channel, 25Mbps digital isolator		
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	16-bit analog output module reference design for programmable logic controllers (PLC)	TIDA-00118
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A47	36-V, 1-A, 4.17-µVRMS, RF LDO voltage regulator		
OPA2171	36V, low power, RRO, general purpose op amp in micropackages	Adaptive power supply for PLC analog output module with output channel protection	TIDA-00231
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		

Resolution: 16 bit

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC8760 (cont.)	16-bit, 1-channel, programmable current/ voltage output DAC for 4-20mA current loop applications	16	1	Buffered voltage and current	Switching regulator
					Hot-swap controller
					Isolator
					Switching regulator
					Signal switch
					Op amp
					SAR ADC
					LDO
					Interface
					I/O expander
					Op amp
					SAR ADC
					Isolator
					Isolator
					Switching regulator
					Hot-swap controller
					Logic
					LDO
					LDO
					LDO
					Voltage Reference
					Isolator

Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator	Adaptive power supply for PLC analog output module with output channel protection	TIDA-00231
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
ISO7420	Low power dual channel isolators		
TPS61170	1.2A switch, high voltage boost converter in 2x2mm QFN package		
TS5A3159	1-Ohm SPDT analog switch		
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	Analog input, output and relay drive output module for smart grid IEDs reference design	TIDA-00310
ADS8684	SAR ADC with 16 bits, 4 channels, 500 kSPS, and bipolar inputs off +5V supply		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPL7407L	40V, 7-channel NMOS array, low side driver		
TCA6408A	Low-voltage 8-bit I2C and SMBus I/O expander		
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	16-bit analog mixed input and output module for programmable logic controller (PLC) reference design	TIDA-00170
ADS8688	SAR ADC with 16 bits, 8 channels, 500 kSPS, and bipolar inputs off +5V supply		
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
ISO7421	Dual channel, 1/1, 1Mbps digital isolator		
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
SN74HC595	8-bit shift registers with 3-state output registers		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A47	36-V, 1-A, 4.17-µVRMS, RF LDO voltage regulator		
REF3425	2.5V low-drift, low-power, small-footprint series voltage reference		
ISO7341FC	4kVpk low power quad channel, 25Mbps digital isolator	Single-channel industrial voltage & current output driver, isolated, EMC/EMI tested reference design	TIPD153

Resolution: 16 bit

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC8750	16-bit, 1-channel, programmable current output DAC for 4-20mA current loop applications	16	1	Buffered current	Op amp
					Isolator
					Switching regulator
					Hot-swap controller
					LDO
					LDO
					LDO
					Isolator

Companion products		Reference design	
Product number	Product description	System highlight (performance)	Document reference
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	16-bit analog output module reference design for programmable logic controllers (PLC)	TIDA-00118
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A47	36-V, 1-A, 4.17-µVRMS, RF LDO voltage regulator		
ISO7341FC	4kVpk low power quad channel, 25Mbps digital isolator	Single-channel industrial voltage & current output driver, isolated, EMC/EMI tested reference design	TIPD153

Resolution: 12 bit

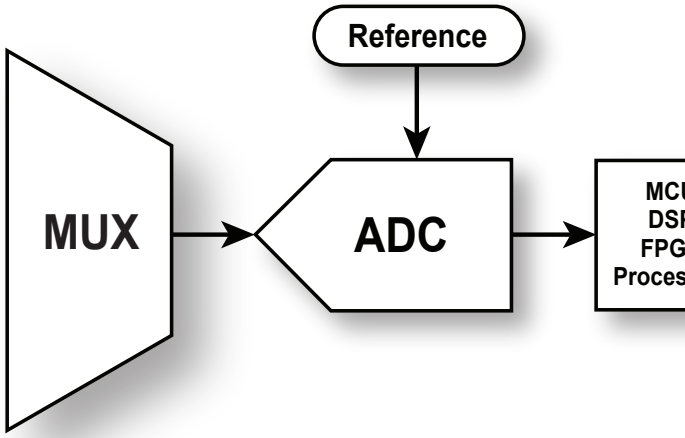
Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC7760	12-bit, 1-channel, programmable current/ voltage output DAC for 4-20mA current loop applications	12	1	Buffered voltage and current	Op amp
					Isolator
					Op amp
					Isolator
					Switching regulator
					Hot-swap controller
					LDO
					LDO
					LDO
					Isolator
					Isolator

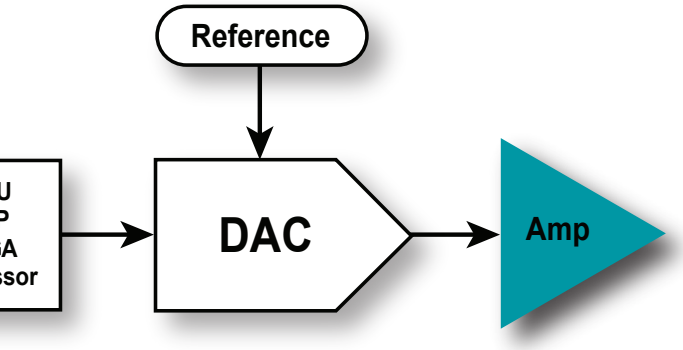
Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
OPA192	High voltage, rail-to-rail input/output, op amps, E-trim™ series	Combined voltage and current output terminal for analog outputs (AO) in industrial applications	TIPD119
ISO7641FC	4kVpk low power quad channel, 25Mbps digital isolator		
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	16-bit analog output module reference design for programmable logic controllers (PLC)	TIDA-00118
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A47	36-V, 1-A, 4.17-µVRMS, RF LDO voltage regulator		
ISO7341FC	4kVpk low power quad channel, 25Mbps digital isolator	Single-channel industrial voltage & current output driver, isolated, EMC/EMI tested reference design	TIPD153
ISO7341FC	4kVpk low power quad channel, 25Mbps digital isolator		

Resolution: 12 bit

Precision digital-to-analog converters					
Product number	**Product description**	**Resolution (bits)**	**No. of channels**	**Output type**	**Product type**
DAC7750	12-bit, 1-channel, programmable current output DAC for 4-20mA current loop applications	12	1	Buffered current	Op amp
					Isolator
					Switching regulator
					Hot-swap controller
					LDO
					LDO
					LDO
DAC7311	12-bit, 1-channel, ultra low power, 2.0V to 5.5V, buffered voltage output DAC	12	1	Buffered voltage	Op amp
					Shunt reference
DAC7811	12-bit, 1-channel, multiplying DAC	12	1	Current	Op amp
					Voltage reference
					Op amp
					Voltage reference

Companion products		Reference design	
Product number	**Product description**	**System highlight (performance)**	**Document reference**
OPA188	Precision, low noise, rail-to-rail output, 36V zero-drift op amp	16-bit analog output module reference design for programmable logic controllers (PLC)	TIDA-00118
ISO7141CC	4242-VPK small-footprint and low-power 3/1 quad channel digital isolator with noise filter		
LM5017	7.5-100V wide Vin, 600mA constant on-time synchronous buck regulator		
LM5069	Positive high voltage hot-swap / inrush current controller with power limiting		
TPS7A16	60V, 5-µA Iq, 100-mA, low-dropout voltage regulator with enable and power good		
TPS7A30	Vin -3V to -36V, -200mA, ultra-low noise, high PSRR, low-dropout linear regulator		
TPS7A47	36-V, 1-A, 4.17-µVRMS, RF LDO voltage regulator		
OPA317	Low offset, rail-to-rail I/O op amp	Low cost loop-powered 4-20mA transmitter EMC/EMI tested reference design	TIPD158
TL431B	Low cost, programmable shunt reference		
OPA192	High voltage, rail-to-rail input/output, op amps, E-trim™ series	Voltage-mode multiplying DAC reference design	TIPD159
REF5025	Low noise, very low drift, precision voltage reference		
OPA376	Precision, low noise, low Iq op amp	Single-supply, unipolar, multiplying DAC reference design	TIPD157
REF5050	Low noise, very low drift, precision voltage reference		


Reference
MUX
ADC
MCU
DSP
FPG
Proces


Reference
DAC
Amp

Part number	No. of channels	Power supply range (V)	GBW (typ) (MHz)	Vn at 1kHz (typ) (nV/rtHz)	Slew rate (typ) (V/us)	Rail-to-rail
OPA625	2	2.7-5.5	80	3.2	115	In to V-, out
OPA350	1	2.7-5.5	38	7	22	In, out
OPA320	1	1.8-5.5	20	8.5	10	In, out
THS4521	1	2.5-5.5	95	4.6	490	In to V-, out
OPA333	1	1.8-5.5	0.35	55	0.16	In, out
OPA363	1	1.8-5.5	7	17	5	In, out
OPA313	1	1.8-5.5	1	25	0.5	In, out
THS4031	1	10-30	200	1.6	100	No
THS4131	1	4-33	170	1.3	52	No
THS4032	2	10-30	200	1.6	100	No
OPA836	1	2.5-5.5	205	4.6	560	In to V-, out
OPA192	1	4.5-36	10	5.5	20	In, out
OPA140	1	4.5-36	11	5.1	20	In to V-, out
OPA364	1	1.8-5.5	7	17	5	In, out
THS4531A	1	2.5-5.5	27	10	220	In to V-, out
OPA211	1	4.5-36	45	1.1	27	Out
OPA725	1	4-12	20	10	30	In to V-, out
OPA726	1	4-12	20	10	30	In to V-, out
OPA132	1	5-36	8	8	20	In, out
OPA2209	2	4.5-36	18	2.2	6.4	Out
OPA314	1	1.8-5.5	3	14	1.5	In, out

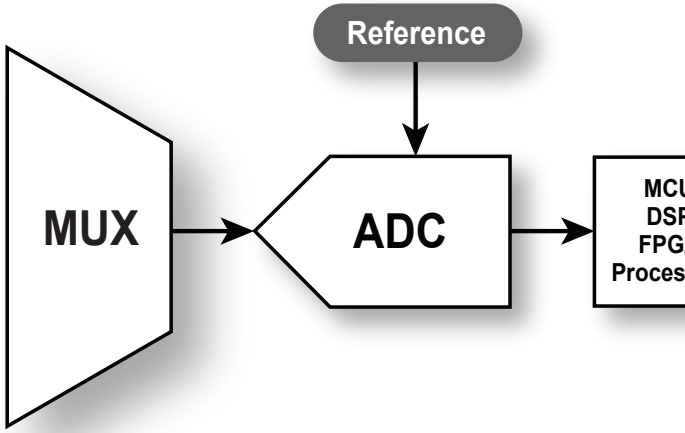
Vos (max) (mV)	Iq/ch (typ) (mA)	Operating temperature range range (C)	Package group
0.1	2	-40 to 125	SOT-23
0.5	5.2	-40 to 85	PDIP, SOIC, VSSOP
0.15	1.5	-40 to 125	SOT-23
2	1.14	-40 to 85	SOIC, VSSOP
0.01	0.017	-40 to 125	SOIC, SOT-23, SC70
2.5	0.65	-40 to 125	SOIC, SOT-23
2.5	0.05	-40 to 125	SC70, SOT-23
2	8.5	-40 to 85, 0 to 70	MSOP-PowerPAD, SOIC
2	12.3	-40 to 85, 0 to 70	MSOP-PowerPAD, SOIC, VSSOP
2	8.5	-40 to 85, 0 to 70	MSOP-PowerPAD, SOIC
0.4	1	-40 to 125	QFN, SOT-23
0.025	1	-40 to 125	SOIC, SOT-23, VSSOP
0.12	1.8	-40 to 125	SOIC, SOT-23, VSSOP
2.5	0.65	-40 to 125	SOIC, SOT-23
0.4	0.25	-40 to 125	QFN, SOIC, VSSOP
0.05	3.6	-40 to 125	SOIC, SON, VSSOP
3	4.3	-40 to 125	SOIC, SOT-23
3	4.3	-40 to 125	SOIC, VSSOP
0.5	4	-40 to 125	SOIC
0.15	2.2	-40 to 125	VSSOP, SOIC
2.5	0.15	-40 to 125	SC70, SOT-23

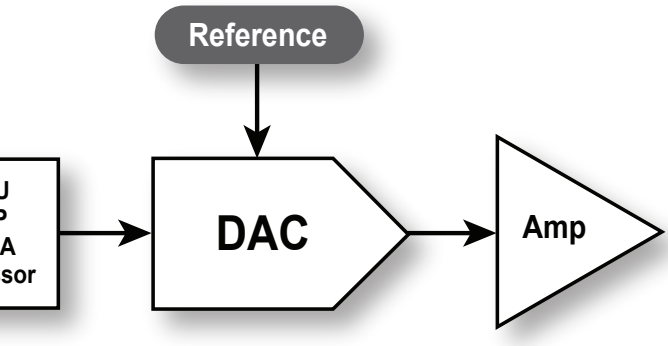
Part number	No. of channels	Power supply range (V)	GBW (typ) (MHz)	Vn at 1kHz (typ) (nV/rtHz)	Slew rate (typ) (V/us)	Rail-to-rail
OPA835	1	2.5-5.5	57	9.3	160	In to V-, Out
OPA316	1	1.8-5.5	10	11	6	In, Out
OPA4140	4	4.5-36	11	5.1	20	In to V-, Out
OPA378	1	2.2-5.5	0.9	20	0.4	In, Out
THS4281	1	2.7-16.5	95	12.5	35	In, Out
OPA188	1	4-36	2	8.8	0.8	In to V-, Out
OPA2350	2	2.7-5.5	38	7	22	In, Out
OPA2365	2	2.2-5.5	50	4.5	25	In, Out
OPA376	1	2.2-5.5	5.5	7.5	2	In, Out
OPA2192	2	4.5-36	10	5.5	20	In, Out
OPA277	1	4-36	1	8	0.8	In, Out
OPA2277	2	4-36	1	8	0.8	In, Out
OPA549	1	8-60	0.9	70	9	In to V-
LF411	1	7-36	3	18	15	No
OPA180	1	4-36	2	10	0.8	In to V-, Out
OPA334	1	2.7-5.5	2	60	1.6	In to V-, Out
OPA2171	2	2.7-36	3	14	1.5	In to V-, Out
OPA317	1	1.8-5.5	0.3	55	0.15	In, Out
OPA2376	2	2.2-5.5	5.5	7.5	2	In, Out
OPA350	1	2.7-5.5	38	7	22	In, Out

Vos (max) (mV)	Iq/ch (typ) (mA)	Operating temperature range range (C)	Package group
0.5	0.25	-40 to 125	QFN, SOT-23
2.5	0.4	-40 to 125	SC70, SOT-23
0.12	1.8	-40 to 125	SOIC, TSSOP
0.05	0.125	-40 to 125	SC70, SOT-23
2.5	0.8	-40 to 85	SOIC, SOT-23, VSSOP
0.025	0.425	-40 to 125	SOIC, SOT-23, VSSOP
0.5	5.2	-40 to 85	SOIC, VSSOP
0.2	4.6	-40 to 125	SOIC
0.025	0.76	-40 to 125	SC70, SOIC, SOT-23
0.025	1	-40 to 125	SOIC, VSSOP
0.02	0.79	-40 to 85	PDIP, SOIC, VSON
0.025	0.79	-40 to 85	PDIP, SOIC, VSON
5	26	-40 to 85	Power Package, TO-220
1	2	0 to 70	PDIP, SOIC
0.075	0.45	-40 to 105	SOIC, SOT-23, VSSOP
0.005	0.285	-40 to 125	SOT-23
1.8	0.475	-40 to 125	SOIC, VSSOP
0.09	0.021	-40 to 125	SC70, SOIC, SOT-23
0.025	0.76	-40 to 125	DSBGA, SOIC, VSSOP
0.5	5.2	-40 to 85	PDIP, SOIC, VSSOP

Part number	No. of channels	Power supply range (V)	GBW (typ) (MHz)	Vn at 1kHz (typ) (nV/rtHz)	Slew rate (typ) (V/us)	Rail-to-rail
OPA567	1	2.7-5.5	1.2	12	1.2	In, Out
OPA569	1	2.7-5.5	1.2	12	1.2	In to V-, Out
OPA4180	4	4-36	2	10	0.8	In to V-, Out
THS4551	1	2.7-5.4	135	3.3	220	In to V-, Out
TLC2272A-Q1	2	4.4-16	2.18	9	3.6	In to V-, Out
LMP2231	1	1.6-5.5	0.13	60	0.048	In to V-, Out
OPA348	1	1.6-5.5	1	35	0.5	In, Out

Vos (max) (mV)	Iq/ch (typ) (mA)	Operating temperature range range (C)	Package group
2	3.4	-55 to 125	VQFN
2	9	-55 to 125	SO PowerPAD
0.075	0.45	-40 to 105	SOIC, TSSOP
0.175	1.35	-40 to 125	QFN, VSSOP
0.95	1.1	-40 to 125	SOIC, TSSOP
0.15	0.01	-40 to 125	SOIC, SOT-23
5	0.045	-40 to 125	SC70, SOIC, SOT-23


Reference
MUX
ADC
MCU
DSP
FPG
Proces


Reference
DAC
Amp

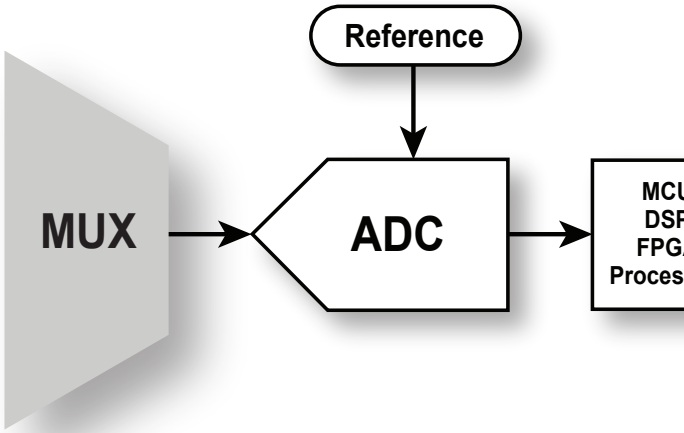
Precision voltage references

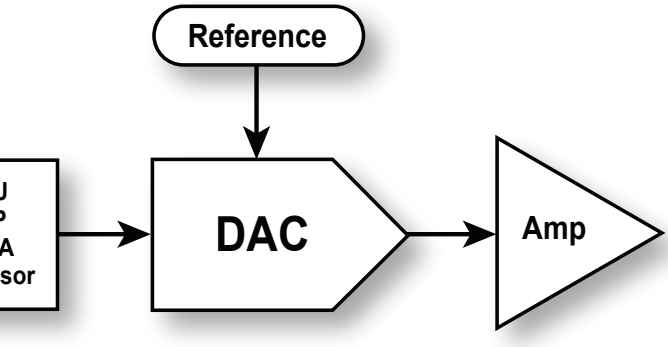
Part number	Voltage output V	Temp drift (max) ppm/°C	1/f Noise 0.1 to 10 Hz (typ) µVp-p	Initial accuracy (max) %	Quiescent current (typ) µA	Output current mA
REF1925	2.5, 1.25	25(4)	30	0.1	360	20
REF1930	3, 1.5		36			
REF1933	3.3, 1.65		39.6			
REF1941	4.096, 2.048		49.2			
REF2025	2.5, 1.25	8(4)	30	0.05	360	20
REF2030	3, 1.5		36			
REF2033	3.3, 1.65		39.6			
REF2041	4.096, 2.048		49.2			
REF3012	1.25	50(1), 60(2), 65(3), 75(4)	14	0.2	42	25
REF3020	2.048		23			
REF3025	2.5		28			
REF3030	3		33			
REF3033	3.3		36			
REF3040	4.096		45			
REF3112	1.25	15(1), 20(4)	17	0.2	100	10
REF3120	2.048		27			
REF3125	2.5		33			
REF3130	3		39			
REF3133	3.3		43			
REF3140	4.096		53			
REF3312	1.25	30(4)	35	0.15	3.9	5
REF3318	1.8		50			
REF3320	2.048		55			
REF3325	2.5		70			
REF3330	3		84			
REF3333	3.3		92			
REF3425	2.5	6(4)	12.5	0.05	72	10
REF3430	3		15			
REF3433	3.3		16.5			
REF3440	4.096		20.5			
REF3450	5		25			

(1) NOTE: This specification applies in the 0 to 70 °C Operating temperature range range.
(2) NOTE: This specification applies in the -30 to 85 °C Operating temperature range range.
(3) NOTE: This specification applies in the -40 to 85 °C Operating temperature range range.
(4) NOTE: This specification applies in the -40 to 125 °C Operating temperature range range.

Part number	Voltage output V	Temp drift (max) ppm/°C	1/f Noise 0.1 to 10 Hz (typ) µVp-p	Initial accuracy (max) %	Quiescent current (typ) µA	Output current mA
REF5010	10	3[4]	30	0.05	800	10
REF5020	2.048		6			
REF5025	2.5		7.5			
REF5030	3		9			
REF5040	4.096		12			
REF5045	4.5		13.5			
REF5050	5		15			
REF6025	2.5	5[4]	7.5	0.05	820	4
REF6030	3		9		820	
REF6033	3.3		9.9		820	
REF6041	4.096		12.3		820	
REF6045	4.5		13.5		830	
REF6050	5		15		830	
REF6125	2.5	8[4]	7.5	0.05	820	4
REF6130	3		9		820	
REF6133	3.3		9.9		820	
REF6141	4.096		12.3		820	
REF6145	4.5		13.5		830	
REF6150	5		15		830	
REF6225	2.5	3[1]	7.5	0.05	820	4
REF6230	3		9		820	
REF6233	3.3		9.9		820	
REF6241	4.096		12.3		820	
REF6245	4.5		13.5		830	
REF6250	5		15		830	

(1) NOTE: This specification applies in the 0 to 70 °C Operating temperature range range.
(2) NOTE: This specification applies in the -30 to 85 °C Operating temperature range range.
(3) NOTE: This specification applies in the -40 to 85 °C Operating temperature range range.
(4) NOTE: This specification applies in the -40 to 125 °C Operating temperature range range.


Reference
MUX
ADC
MCU
DSP
FPG
Proces


Reference
DAC
Amp

Supply voltage:

The supply voltage is the recommended voltage range that can be passed through the multiplexer (mux). This can range can by symmetric (e.g. -18V to 18V or 0V to 36V) or asymmetric (e.g. -6V to 30V), which simplifies the circuit design while providing flexibility for the signals that are being multiplexed.

On-resistance (R_{on}):

The on-resistance is the resistance between the drain and source terminal (input and output) of the mux. This resistance contributes to the signal distortion (gain error) of the data acquisition system, depending on the impedance at the output of the mux (with higher leakage resulting in a higher error). A buffer amplifier with high impedance can be added to the output of the mux to minimize the distortion created.

In addition, this resistance contributes to the cutoff frequency of low-pass filter which is created by the mux's internal resistance in combination with the on-capacitance. A lower resistance decreases the cutoff frequency of the filter.

Leakage current ($I_{s(off)}$, $I_{d(off)}$, $I_{d(on)}$):

Off-leakage current is composed of the source and drain off-leakage current, and is the current flowing through the source or drain pin when a channel is in the off state.

On-leakage current is the current that flows through the mux drain pin when a channel is in the on state.

Together on and off-leakage currents contribute to the DC errors of a data acquisition system, thus the lower the leakage current the more accurate the system will be.

On-capacitance (C_{on}):

On-capacitance is the combination of the source and drain capacitances. A low on-capacitance enables a fast settling time required for high precision systems. A low on-capacitance decreases the cutoff frequency of the low pass filter which is created by the mux's internal resistance in combination with the on-capacitance.

Charge injection:

Charge injection is a voltage change introduced at the output of a mux when it is turned on or off. A low charge injection reduces the distortion created when a channel is connected or disconnected, thus enabling faster switching between channels of a mux.

Operating temperature range:

The operating temperature range spec of a mux is the recommended operating temperature range range for the device.

Part number	Supply voltage (V)	On-resistance (Ω)	$I_{s(off)}$ (nA)	$I_{d(off)}$ (nA)	$I_{d(on)}$ (nA)	$C_{s(off)}$ (pF)	C_{on} (pF)	Charge injection (pC)(typ)	Operating temperature range (°C)
MUX36S08	36	170	0.04	0.1	0.1	2.9	10.6	0.15	-40 to 125
MUX36D04	36	170	0.04	0.1	0.1	2.9	7.7	0.15	-40 to 125
MUX508	36	170	1	1	1	2.9	10.6	0.15	-40 to 125
MUX509	36	170	1	1	1	2.9	7.7	0.15	-40 to 125

***All values are the maximum value at 25°C when using a dual supply, unless otherwise noted**
****Refer to product datasheet for full device specifications**

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