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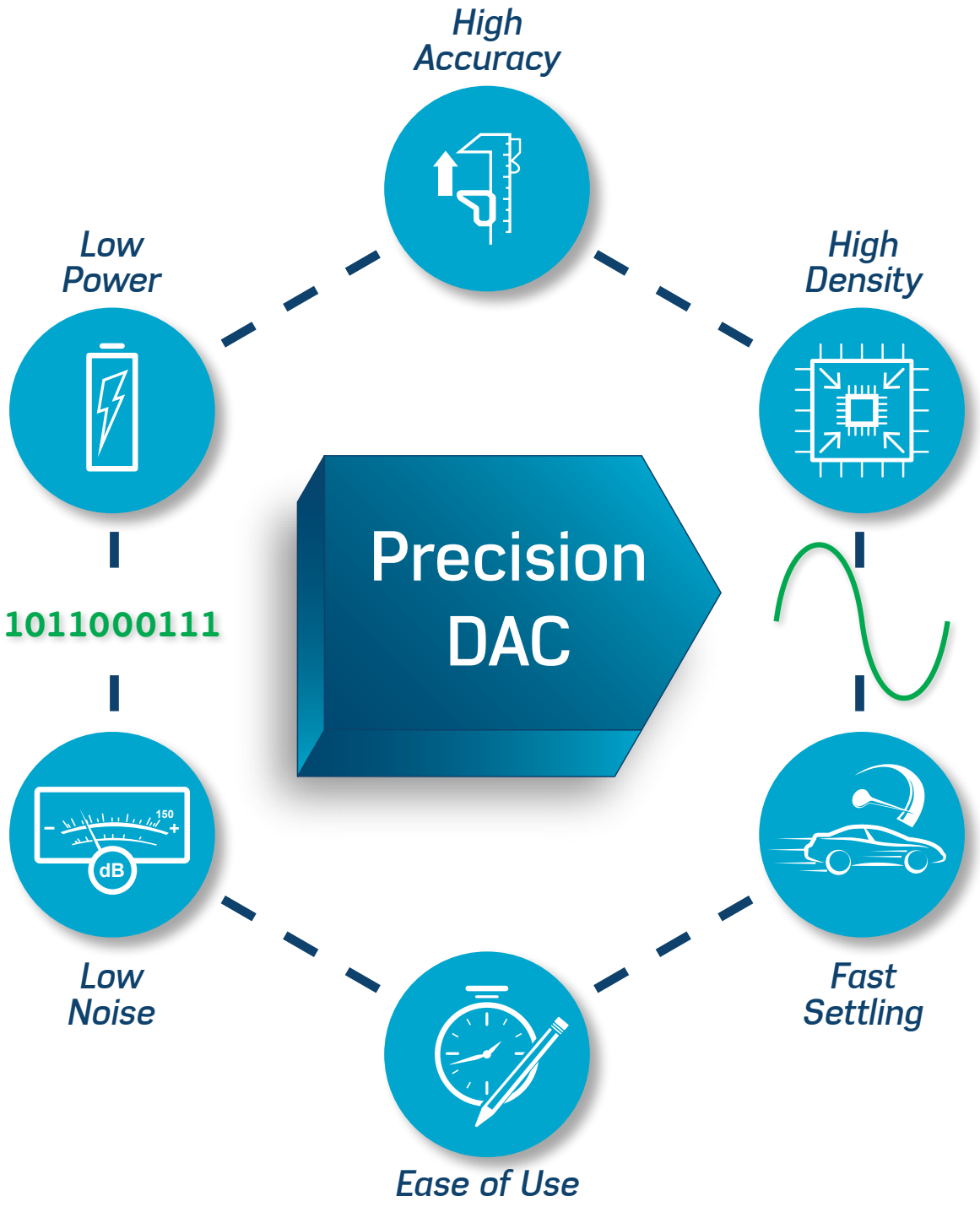
PRECISION DAC SELECTOR GUIDE



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Introduction

Welcome to the Analog Devices Digital-to-Analog Converter (DAC) Selection Guide. This guide is designed to help facilitate product selection based on your application needs. We've organized the guide to distinguish the strengths of each product relative to alternatives. For further details, including temperature operating range or suitability for applications such as aerospace or automotive, please visit the website parametric tables. A detailed data sheet review and product evaluation should be performed before selecting the right product for your application. Each DAC is supported with a demo system associated with the free, easy-to-use, software tools and example code that enables users to evaluate the performance of these digital to analog converters, quickly and easily.

Voltage Output (V_{OUT}) DACs

Analog Devices offers a comprehensive family of resistor string and R-2R voltage output (V_{OUT}) digital to analog converters (DACs). From 8 bits up to industry leading 20 bits of resolution, single channel to as many as 40 channels in high density packages, flexible I/O, high DC precision and lowest glitch, we have a DAC to suit your application. Our DACs work well in a wide variety of open-loop or closed-loop systems, adjusting gain, offset, and many other signals, as well as fast settling DACs suitable for AC applications such as waveform generation.

Multiplying (I_{OUT}) DACs 8

Analog Devices' family of high precision, multiplying current output (I_{OUT}) R-2R digital to analog converters (DACs) feature guaranteed ±1 LSB INL and DNL specifications, from 8 bits up to 18 bits of resolution, and include single and multichannel DAC options with parallel, serial SPI or I^2C interfaces. Current output R-2R DACs allow the choice of an external amplifier optimized for specific applications.

Special Function DACs

COLOR KEY	
Higher Accuracy	Indicates that the DAC is higher precision (better INL, noise, glitch) versus a similar product in same cell.
Lower Power	Indicates that the DAC enables lower power operation versus a similar product in same cell.
Smaller Solution	Indicates that the DAC enables a smaller solution size versus a similar product in same cell. The DAC may have a smaller package footprint or integrate additional functionality such as output amplifiers or monitoring multiplexer.
≥9 I^2C Addresses	Indicates that the DAC may be configured for 9 or more I^2C user-selectable slave addresses, allowing many DACs on the same bus and minimizing address conflicts with other components.
Lower Glitch	Indicates lower mid-scale glitch impulse versus a similar product in same cell, making it possible to produce higher frequency, lower noise output waveforms
ADC/DAC Combo	These devices offer ADCs, DACs, GPIO and temp sensor functionality in a single IC.
>5 MHz Bandwidth	Indicates a higher bandwidth multiplying DAC, which is more suitable for signal generation. The multiplying bandwidth is specified as the reference-input frequency at which the gain is compressed by –3 dB.

Voltage Output (V_{OUT}) DACs

Single Channel to 8-Channel Low Voltage Single Supply Voltage Output DACs

Analog Devices offers the broadest portfolio of low voltage single-supply DACs in the industry, serving a wide class of applications due to the low power, smallest solution footprint and robust range of features, with flexible SPI or I²C interfaces. ADI's *nano*DAC+® products offer enhanced features such as higher accuracy, improved DC performance, increased robustness, and lower glitch energy, among other advantages.

Featured Product:

AD5676R: Octal, 16-Bit, *nano*DAC+ with 2 ppm/°C Reference

- High Relative Accuracy (INL): ±3 LSB Maximum at 16 Bits
- Total Unadjusted Error (TUE): ±0.14 % of FSR Maximum
- Low Drift 2.5 V Reference: 2 ppm/°C typical, 5 ppm/°C Maximum
- –40 °C to +125 °C Operation
- 2.7 V to 5.5 V Power Supply Range
- 20-Lead, TSSOP and 4 mm x 4 mm LFCSP

Resolution	Output Type	Interface	1-Channel Unbuffered	1-Channel		2-Channel		4-Channel		8-Channel	
			Ext. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref
18-Bit	Unipolar Single Supply	SPI		AD5680M							
16-Bit	Unipolar Single Supply	SPI	LTC2641-16, AD5541A, AD5062M	AD5683, AD5662M, AD5060M	AD5683R, AD5660M	AD5689M, AD5663M, AD5065M	AD5689RM, AD5663RM	AD5686M, AD5664, AD5064M, LTC2604M, AD5066M	AD5686RM, AD5664R, LTC2654-16M	AD5676M, LTC2600	AD5676RM, AD5668M, LTC2656-16M, AD5678
		I²C		AD5693, LTC2606M	AD5693R	AD5667, LTC2607M	AD5667R	AD5696M, AD5665M, LTC2609M	AD5696RM, AD5665RM, LTC2655-16M	AD5675M, LTC2605M	AD5675RM, AD5669RM, LTC2657-16M
14-Bit	Unipolar Single Supply	SPI	LTC2641-14, AD5551	AD5040M, AD5641, LTC2611M	AD5682R, AD5640M	AD5045M, LTC2612	AD5643R	AD5044M, LTC2614M	AD5685RM, AD5644R	LTC2610	AD5392, AD5648M
		I²C		LTC2616M	AD5692R	LTC2617M	AD5647R	LTC2619M	AD5695RM, AD5645RM	LTC2615M	AD5392

M Reset to Mid-Scale or Zero-Scale Options

Z Reset to Hi-Z, Mid-Scale or Zero-Scale Options

Higher Accuracy

Lower Power

Smaller Solution

≥9 I²C Addresses

Lower Glitch

ADC/DAC Combo

Single Channel to 8-Channel Low Voltage Single Supply Voltage Output DACs (Continued)

Resolution	Output Type	Interface	1-Channel Unbuffered	1-Channel		2-Channel		4-Channel		8-Channel	
			Ext. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref
12-Bit	Unipolar Single Supply	PWM					LTC 2644-12Z		LTC 2645-12Z		
		SPI	LTC 2641-12 AD 5512AM	AD 5621 AD 5320	AD 5681R LTC 2630-12M LTC 2640-12M AD 5620M	AD 5687M AD 5322 AD 5323 LTC 2622	AD 5687RM LTC 2632-12M AD 5623R	AD 5684M AD 5624 AD 5024M LTC 2624M	AD 5684RM AD 5624R LTC 2654-12M LTC 2634-12M	LTC 2620 AD 5328	AD 5672M AD 5628M LTC 2656-12M LTC 2636-12M AD 5592R
		I2C		AD 5622 AD 5321	AD 5691R LTC 2631-12M	AD 5339 AD 5627 LTC 2627M	LTC 2633-12Z AD 5627R AD 5697RM	AD 5694M AD 5326 AD 5325 AD 5625M LTC 2629M	AD 5694RM AD 5625RM LTC 2655-12M LTC 2635-12Z	LTC 2625M	AD 5671RM AD 5629RM LTC 2657-12M LTC 2637-12M AD 5593R
	Unipolar Single Supply	PWM					LTC 2644-10Z		LTC 2645-10Z		
		SPI		AD 5611 AD 5310	AD 5310R LTC 2630-10M LTC 2640-10M	LTC 1662 AD 5313 AD 5312	AD 5313RM LTC 2632-10M	AD 5314 LTC 1664 AD 5317	AD 5317RM LTC 2634-10M	AD 5318 LTC 1660	LTC 2636-10M
		I2C		AD 5612 AD 5311	AD 5311R LTC 2631-10M LTC 1669	AD 5338	AD 5338R LTC 2633-10Z	AD 5316 AD 5315	AD 5316RM LTC 2635-10Z		LTC 2637-10M
		SMBus			LTC 1663						
	Unipolar Single Supply	PWM					LTC 2644-8Z		LTC 2645-8Z		
		SPI		AD 5601 AD 5300	LTC 2630-8M LTC 2640-8M	AD 5302 AD 7303	LTC 2632-8M	AD 5307 AD 5304	LTC 2634-8M	AD 5308 LTC 1665	LTC 2636-8M
		I2C		AD 5602 AD 5301	LTC 2631-8M	AD 5337	LTC 2633-8M	AD 5306 AD 5305	LTC 2635-8M		LTC 2637-8M

M Reset to Mid-Scale or Zero-Scale Options

Z Reset to Hi-Z, Mid-Scale or Zero-Scale Options

Higher Accuracy

Lower Power

Smaller Solution

≥9 I2C Addresses

Lower Glitch

ADC/DAC Combo

Single Channel to 8-Channel Bipolar Voltage Output DACs

Analog Devices' family of bipolar voltage output DACs offers exceptional 1 ppm level accuracy at up to 20-bit resolutions and robust output drive, capable of driving a variety of demanding loads. SoftSpan™ versions enable each output range to be individually configured via software or pin-strapping. This provides flexibility in reuse across multiple product platforms, reduces the complexity of board design and layout, in addition to providing a more accurate signal chain resulting in higher system performance and faster design times.

Featured Product:

AD5761R: Multiple Range, 16-Bit, Bipolar Voltage Output DACs with 2 ppm/°C Reference

- 8 Software-Programmable Output Ranges: 0V to 5V, 0V to 10V, 0V to 16V, 0V to 20V, ±3V, ±5V, ±10V, and –2.5V to +7.5V; 5% Overrange
- Low Drift 2.5V Reference: ±2 ppm/°C Typical
- Total Unadjusted Error (TUE): 0.1% FSR Maximum
- 16-Bit Resolution: ±2 LSB Maximum INL
- AD5761R-EP Supports Defense and Aerospace Applications

Resolution	Output Type	Interface	1-Channel Unbuffered	1-Channel		2-Channel		4-Channel		8-Channel	
			Ext. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref
20-Bit	Bipolar	SPI	AD5790, AD5791								
18-Bit	Bipolar	SPI	AD5780, AD5781								
16-Bit	SoftSpan Bipolar	SPI		AD5761M	AD5761RM	AD5752M	AD5752RM	LTC2704-16, AD5754M	LTC2664-16M, AD5754RM		LTC2666-16M
16-Bit	Bipolar	SPI	AD5760, AD5570, LTC2642-16, AD5542A	AD5570, AD7849		AD5763	AD5762R	AD5764, AD5765	AD5764R	AD5362	
14-Bit	SoftSpan Bipolar	SPI				AD5732M	AD5732RM	AD5734M, LTC2704-14	AD5734RM		
14-Bit	Bipolar	SPI	LTC2642-14, AD5552	AD5531				AD7834	AD5744R	AD5363	
12-Bit	SoftSpan Bipolar	SPI		AD5721M	AD5721RM	AD5722M	AD5722RM	LTC2704-12, AD5724M	LTC2664-12M, AD5724RM		LTC2666-12M
12-Bit	Bipolar	SPI	LTC2642-12, AD5512A	AD5530			AD7249	AD5726, AD7398			
10-Bit	Bipolar ±5V	SPI						AD7399			
8-Bit	Bipolar ±5V	SPI						AD7304			

M Reset to Mid-Scale or Zero-Scale Options

Z Reset to Hi-Z, Mid-Scale or Zero-Scale Options

Higher Accuracy

Lower Glitch

16-Channel to 40-Channel Voltage Output DACs

Targeted at optical communications including Mach-Zehnder modulator bias control, as well as LED displays, analog output modules, antenna arrays, and system biasing, these high density, high channel count DACs offer high output current capability, output monitoring multiplexers, and output span flexibility for ease of reuse, in the industry's smallest footprints.

Featured Products:

LTC2668: 16-Channel, 16-/12-Bit Voltage Output DACs with 10 ppm/°C Max Reference

- 16 DACs in Small 6 mm × 6 mm QFN Package
- Internal Precision Reference: 10 ppm/°C (Max)
- Independently Programmable Output Ranges: 0V to 5V, 0V to 10V, ±2.5V, ±5V, ±10V
- Maximum INL Error: ±4 LSB (16 Bits), ±1 LSB (12 Bits)
- Output Buffers Drive ±10 mA and 1000 pF Loads
- Channel Monitoring Multiplexer
- 1.8V to 5V SPI Serial Interface
- -40 °C to 125 °C Operation

AD5766/AD5767: 16-Channel, 16-/12-Bit Voltage Output DACs

- 16 DACs in Small 4 mm x 4 mm WLCSP or 6 mm x 6 mm LFCSP Packages
- Integrated DAC Output Buffers with ±20 mA Output Current Capability
- Independently Programmable Output Ranges: –20V to 0V, –16V to 0V, –10V to 0V, –10V to +6V, –12V to +14V, –16V to +10V, ±5V, and ±10V
- Maximum INL Error: ±16 LSB (16 Bits), ±1 LSB (12 Bits)
- Integrated Reference Buffers
- Channel Monitoring Multiplexer
- 1.8V to 5V SPI Serial Interface
- –40 °C to +105 °C Operation

Resolution	Output Type	Interface	16-Channel		32-Channel		40-Channel	
			Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref
16-Bit	SoftSpan Bipolar	SPI		LTC 2668-16M				
	Bipolar	SPI	AD 5766, AD 5360		AD 5372		AD 5370	
	Unipolar Single Supply	SPI		LTC 2668-16M, AD 5679R		AD 5382		AD 5384
14-Bit	Bipolar	SPI	AD 5361		AD 5373, AD 5378	AD 5532B/HS	AD 5371, AD 5379	
	Unipolar Single Supply	SPI		AD 5390		AD 5382		AD 5380
		I²C		AD 5390		AD 5382		AD 5380
12-Bit	SoftSpan Bipolar	SPI		LTC 2668-12M				
	Bipolar	SPI	AD 5767, AD 5516					
	Unipolar Single Supply	SPI		LTC 2668-12M, AD 5674R, AD 5391, AD 5590		AD 5383		AD 5381
		I²C		AD 5391		AD 5383		AD 5381

M Reset to Mid-Scale or Zero-Scale Options

Z Reset to Hi-Z, Mid-Scale or Zero-Scale Options

Lower Power

Smaller Solution

Parallel Interface Voltage Output DACs

Resolution	Output Type	Interface	1-Channel		2-Channel		4-Channel		8-Channel	32-Channel	40-Channel
			Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Ext. Ref	Int. Ref	Int. Ref
16-Bit	Bipolar	Parallel	AD 7846, LTC 1821								
	Unipolar Single Supply	Parallel		LTC 1657							
14-Bit	Bipolar	Parallel					AD 7835, AD 7836		AD 7841	AD 5378	
	Unipolar Single Supply	Parallel								AD 5382	AD 5380
12-Bit	Bipolar	Parallel			AD 7847, AD 7837	AD 7247, AD 7237	DAC 8412, DAC 8413[M], AD 5725[M]				
	Unipolar Single Supply	Parallel	AD 5340, AD 5341	LTC 1450	AD 5342, AD 5343		AD 5344, AD 5725[M]			AD 5383	AD 5381
10-Bit	Bipolar	Parallel					AD 5583				
	Unipolar Single Supply	Parallel	AD 5331		AD 5333		AD 5335, AD 5336		AD 5347		
8-Bit	Bipolar	Parallel	AD 7224				AD 7225, AD 7226, AD 7305		AD 7228		
	Unipolar Single Supply	Parallel	AD 5330, AD 7801		AD 5332, AD 7302		AD 5334, AD 7305	AD 7339	AD 5346		

[M] Reset to Mid-Scale or Zero-Scale Options

[Z] Reset to Hi-Z, Mid-Scale or Zero-Scale Options

Multiplying (I_{OUT}) DACs

A *multiplying* R-2R current output (I_{OUT}) DAC differs from a *fixed-reference* DAC in that it can apply a high-resolution digitally set gain to a varying wideband analog signal at the reference input, making them inherently suitable for AC signal-processing applications. The SoftSpan feature allows software selectable output spans that reduce the solution size by eliminating the need to add precision gain stages and the associated external jumpers, costly precision resistors, and amplifier circuitry. Integrated precision resistors allow reference inversion, bipolar offset, offset, and gain adjustment.

Featured Products

LTC2756/LTC2758: 18-Bit, Single and Dual Current Output (I_{OUT}) DACs with SoftSpan Outputs

- Maximum 18-Bit INL Error: ±1 LSB Over Temperature
- Program or Pin-Strap Six Output Ranges: 0V to 5V, 0V to 10V, –2.5V to 7.5V, ±2.5V, ±5V, ±10V
- Glitch Impulse 0.4 nV•s (3V), 2 nV•s (5V)
- 18-Bit Settling Time: 2.1 µs
- 2.7V to 5.5V Single Supply Operation
- 1 µA Maximum Supply Current
- Voltage-Controlled Offset and Gain Trims
- Serial Interface with Readback of All Registers

Resolution	Output Type	Interface	1-Channel	2-Channel	4-Channel	8-Channel
18-Bit	SoftSpan Bipolar	SPI	LTC 2756	LTC 2758		
		Parallel	LTC 2757			
16-Bit	SoftSpan Bipolar	SPI	LTC 1592	LTC 2752	LTC 2754-16	
		Parallel	LTC 2751-16	LTC 2753-16	LTC 2755-16	
	Bipolar	SPI	AD 5543, LTC 1596M, LTC 1595	AD 5545M	AD 5544M	
		Parallel	AD 5546M, LTC 1597M	AD 5547M		
14-Bit	SoftSpan Bipolar	SPI	LTC 1589			
		Parallel	LTC 2751-14	LTC 2753-14	LTC 2755-14	
	Bipolar	SPI	AD 5453, AD 5553, AD 5446	AD 5555M	AD 5554M	
		Parallel	LTC 1591M, AD 5556M	AD 5557M		

M Reset to Mid-Scale or Zero-Scale Options

>5 MHz Bandwidth

Multiplying (I_{OUT}) DACs (Continued)

Resolution	Output Type	Interface	1-Channel	2-Channel	4-Channel	8-Channel
12-Bit	SoftSpan Bipolar	SPI	LTC 1588		LTC 2754-12	
		Parallel	LTC 2751-12	LTC 2753-12	LTC 2755-12	
	Bipolar	SPI	AD 5441, AD 5443, AD 5444, AD 5452	LTC 1590, AD 5415, AD 5449		
		Parallel	AD 5445	AD 5405, AD 5447		
10-Bit	Bipolar	SPI	AD 5451, AD 5432	AD 5439	AD 7564	AD 7568
		Parallel	AD 5433	AD 5440		
8-Bit	Bipolar	SPI	AD 5450, AD 5425, AD 5426	AD 5429		
		Parallel	AD 5424	AD 5428		

[M] Reset to Mid-Scale or Zero-Scale Options

>5 MHz Bandwidth

Special Function DACs

PWM to Voltage Output DACs

Analog Devices' LTC2645 and LTC2644 PWM to V_{OUT} DACs convert a PWM (pulse width modulation) input to an accurate, stable, buffered voltage without the ripple, slow settling, and external passive components of discrete filter implementations. This family of products provides a simple bolt-on solution to accurately set and adjust up to four voltages without a single line of code required. Applications include isolated motor control, automotive headlights, industrial lighting, flight telemetry, medical monitors, and many other applications that benefit from the simple control interface.

Resolution	Voltage Output Range	Interface	2-Channel	4-Channel
12-Bit	0V to 5V	PWM	LTC 2644-12	LTC 2645-12
10-Bit	0V to 5V	PWM	LTC 2644-10	LTC 2645-10
8-Bit	0V to 5V	PWM	LTC 2644-8	LTC 2645-8

Key Features:

- No Latency PWM-to-Voltage Conversion
- Voltage Output Updates and Settles within 8 µs
- 100 kHz to 30 Hz PWM Input Frequency
- ±2.5 LSB Max INL; ±1 LSB Max DNL (12-Bit)
- Pin-Selectable Internal or External Reference
- 2.7 V to 5.5 V Supply Range
- 1.71 V to 5.5 V Input Voltage Range
- Low Power: 4 mA at 3V, <1 µA Power-Down
- –40 °C to 125 °C Operation

Micropower Voltage Output DACs

Micropower DACs are ideal for portable battery-operated equipment, and for generating bias or control voltages in a variety of space-constrained and power-sensitive applications.

Featured Product:

AD5641: 2.7 V to 5.5 V, <100 µA, 14-Bit *nano*DAC in LFCSP and SC70

- Single 14-Bit Voltage Output DAC
- Micropower Operation: 100 µA Maximum at 5V
- Power-Down to Typically 0.2 µA at 3V
- ±4 LSB INL (B Version)
- 2.7V to 5.5V Power Supply
- 6-Lead LFCSP and SC70 Packages

Resolution	Interface	1-Channel	2-Channel				4-Channel		8-Channel	
		I_Q (3 V)	Ext. Ref	I_Q (3 V)	Int. Ref	I_Q (3 V)	Ext. Ref	I_Q (3 V)	Ext. Ref	I_Q (3 V)
14-Bit	SPI	AD 5641 60 µA								
12-Bit	Parallel	AD 5340, AD 5341 115 µA								
10-Bit	SPI		LTC 1662	3 µA			LTC 1664	186 µA	LTC 1660	340 µA
			LTC 1661	95 µA						
	I^2C				LTC 1669	60 µA				
	SMBus				LTC 1663	60 µA				
	Parallel	AD 5331 115 µA								
8-Bit	SPI								LTC 1665	340 µA
	Parallel	AD 5330 115 µA								

Current Source-Sink DACs

Analog Devices' current source DAC portfolio is ideal for photonics control applications where low current noise density, low dropout voltage, and high power efficiency, in addition to high channel density, is critical to system performance. The flexibility of the configurable current source DAC outputs, and 300 mA current delivery, make them suitable for resistive heaters and proportional solenoid drive.

The current sinking AD5398A and AD5821A are designed for autofocus, image stabilization, and optical zoom applications in camera phones, digital still cameras, and camcorders. They are also suitable for many industrial applications, such as controlling temperature, light, and movement without derating over temperatures ranging from –30 °C to +85 °C.

Featured Product

LTC2662: Five-Channel, 300 mA Current-Source-Output 16-/12-Bit SoftSpan DACs

- Eight Per-Channel Programmable Output Ranges:
  - 300 mA, 200 mA, 100 mA, 50 mA, 25 mA,12.5 mA,6.25 mA and 3.125 mA
  - Can Be Paralleled for Up to 1.5 A
- Flexible 2.85 V to 33 V Supply Voltage
- 1 V Dropout Guaranteed
- Separate Voltage Supply per Output Channel
- Internal Switches to Optional Negative Supply
- –40 °C to 125 °C Operation

Resolution	Interface	Channels	Current Sink		Current Source	
			Part Number	Output Range	Part Number	Output Ranges
16-Bit	SPI	5			LTC 2662-16	Software Selectable All Channels: 3.125 mA, 6.25 mA, 12.5 mA, 25 mA, 50 mA, 100 mA, 200 mA, 300 mA
12-Bit	SPI	5			LTC 2662-12	Software Selectable All Channels: 3.125 mA, 6.25 mA, 12.5 mA, 25 mA, 50 mA, 100 mA, 200 mA, 300 mA
10-Bit	I^2C	1	AD 5398A, AD 5821A	3 mA to 120 mA		

High Voltage DACs

High voltage DACs are targeted at optical MEMS (microelectromechanical systems), micropositioning applications for piezo actuators, and level setting for automotive test and measurement.

Resolution	Voltage Output Range	Interface	1-Channel	4-Channel	32-Channel
14-Bit	50 V to 200 V	SPI			AD 5535B
12-Bit	30 V or 60 V	SPI	AD 5501	AD 5504	

Featured Product

AD5535B: 32-Channel, 14-Bit V_{OUT} DAC with Full-Scale Programmable Output from 50 V to 200 V

- 32-Channel, 14-Bit denseDAC® with Integrated High Voltage Output Amplifier
- 15 mm × 15 mm CSP_BGA Package
- Full-Scale Output Voltage Programmable from 50 V to 200 V via Reference Input
- 550 µA Drive Capability
- Integrated Silicon Diode for Temperature Monitoring
- 1.2 MHz Channel Update Rate
- –10 °C to +85 °C Operation

Fast Precision DACs (>30 Msps)

For test and measurement applications demanding both DC and AC performance, our fast precision DACs enable higher speed waveform generation of up to 12.5 Msps with 4x oversampling with clean signal spectrums.

Resolution	Output Type	Interface	1-Channel	
			Part Number	Speed
16-Bit	Current Steering	Parallel	LTC 1668	50 Msps
14-Bit	Current Steering	Parallel	LTC 1667	50 Msps
12-Bit	Current Steering	Parallel	LTC 1666	50 Msps

4 mA to 20 mA Loop DACs

4 mA to 20 mA Loop DACs are employed in process control and factory automation applications. Combined with ADI's family of HART modems like the AD5700, the 4 mA to 20 mA converters can be used together to realize a robust, accurate, and HART Foundation registered solution.

Analog Devices' portfolio extends from the highly integrated AD5421, a loop powered device that offers an internal regulator and output driver, to devices such as the AD5422/AD5412, offering voltage outputs with force/sense capability to ensure that the correct voltage is applied across the load, along with a compensation pin for driving large capacitive loads. The quad channel AD5755-1 offers a unique dynamic power control mode to minimize power dissipation and improve thermal management in current mode.

Resolution	Current Output Range	Interface	Voltage Output Range	1-Channel	4-Channel
16-Bit	4 mA to 20 mA, 0 mA to 20 mA, 0 mA to 24 mA	SPI	None	AD5420, AD5421	
16-Bit	4 mA to 20 mA	SPI	0 V to 5 V, 0 V to 10 V, ±5 V, ±10 V	AD5422	AD5755-1
12-Bit	4 mA to 20 mA, 0 mA to 20 mA, 0 mA to 24 mA	SPI	None	AD5410	
12-Bit	4 mA to 20 mA	SPI	0 V to 5 V, 0 V to 10 V, ±5 V, ±10 V	AD5412	

Loop Powered

Dynamic Power Control

ADC/DAC Combos

Analog Devices' comprehensive portfolio of integrated monitoring and control components combine ADCs, DACs, temperature sensors, GPIOs, and current sensing technologies in a wide range of configurations. These integrated solutions save space over discrete implementations and provide greater versatility and configurability for applications requiring general system monitoring and control.

Resolution	Output Type	Interface	4-Channel Part Number	4-Channel # of ADC Channels	8-Channel Part Number	8-Channel # of ADC Channels	16-Channel Part Number	16-Channel # of ADC Channels
12-Bit	Bipolar	SPI			AD7293	4		
12-Bit	Unipolar Single Supply	SPI			AD5592R	8	AD5590	16
12-Bit	Unipolar Single Supply	I^2C	AD7294-2	2	AD5593R	8		
12-Bit	Unipolar Single Supply	I^2C	AD7294	4				
12-Bit	Unipolar Single Supply	SPI/I^2C	AD7517	4				
10-Bit	Unipolar Single Supply	SPI	AD7292	8				
10-Bit	Unipolar Single Supply	SPI/I^2C	AD7516	4				

Featured Products:

AD5592R/AD5593R: 8-Channel, 12-Bit, Configurable ADC/DAC with On-Chip Reference

- 8-Channel, Configurable ADC/DAC/GPIO
- Configurable as any Combination of
  - 8 × 12-Bit DAC Channels
  - 8 × 12-Bit ADC Channels
  - 8 × General-Purpose Digital Input/Output Pins
- Integrated Temperature Sensor
- SPI (AD5592R) or I^2C (AD5593R) Interface
- Available in
  - 16-Ball, 2 mm × 2 mm WLCSP
  - 16-Lead, 3 mm × 3 mm LFCSP and TSSOP

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