

New Products and Solutions

Fall 2020 Edition

Overview

Analog Devices is a leading global, high performance analog technology company dedicated to solving the toughest engineering challenges. We enable our customers to interpret the world around us by intelligently bridging the physical and digital with unmatched technologies that sense, measure, power, connect, and interpret. Our powerful suite of products and solutions adds value across the entire signal chain. In this Fall 2020 edition of the New Products and Solutions guide, you will find select new product innovations including ADCs, amplifiers, DACs, isolation, power management, RF and microwave, and switches for use across a wide range of markets and applications. You can also stay up-to-date on the latest news from ADI by subscribing to one of our email newsletters.

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Products by Market

Large blue circles indicate the primary markets and the small blue circles indicate the secondary markets.

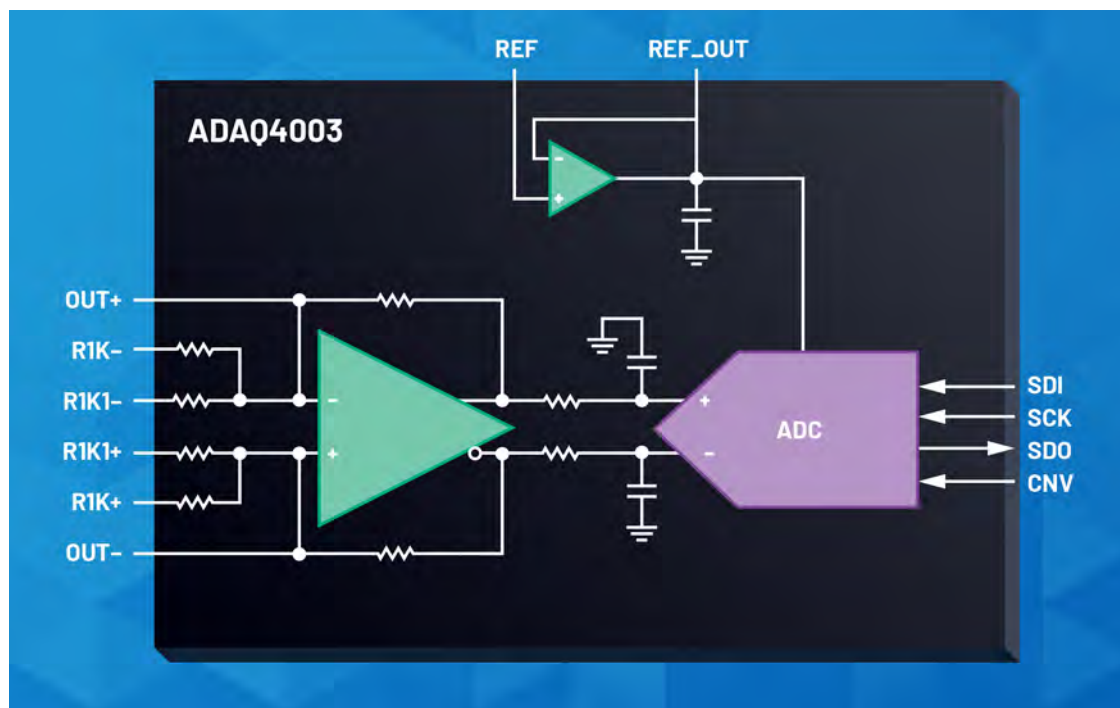
Product Category	Part Number	General-Purpose	Aerospace and Defense	Automotive	Building and Infrastructure	Communications	Consumer	Energy	Healthcare	Industrial Automation	Instrumentation and Measurement
Analog-to-Digital Converter	ADAQ4003	•	•						•	•	•
	ADuM7702	•						•		•	
Digital-to-Analog Converter	ADFS5758			•						•	
Amplifier	ADA4355	•	•			•			•		•
	LTC6373	•	•					•		•	•
Interface and Isolation	ADuM4221			•				•		•	•
	ADM3058E/ADM2761E/ADM2763E				•			•		•	
Power Management	LT8336	•		•					•	•	
	LTC2971	•		•	•	•					
	LTC4238					•				•	•
RF and Microwave	ADAR2001		•			•			•		•
	ADRF5042/ADRF5043	•	•			•					•
	ADRF5740	•	•			•					•
	ADRV9002*	•	•		•	•	•			•	•
	HMC8364, HMC8362, HMC8074		•			•					•
Switch and Mux	ADG5401F	•	•							•	•
Reference Design	CN-0503										•

*ADRV9002 is a pre-release product.

Analog-to-Digital Converter

ADAQ4003: 18-Bit, 2 MSPS, μ Module Data Acquisition Solution

The ADAQ4003 is a μ Module[®] precision data acquisition (DAQ), signal chain solution that reduces the development cycle of a precision measurement system by transferring the signal chain design challenge of component selection, optimization, and layout from the designer to the device. Using system-in-package (SiP) technology, the part reduces end system component count by combining multiple common signal processing and conditioning blocks into a single device. These blocks include a high resolution 18-bit, 2 MSPS successive approximation register (SAR); an analog-to-digital converter (ADC); a low noise, fully differential ADC driver amplifier (FDA); and a stable reference buffer.



Features and Benefits

- ▶ SiP technology enables 75% space savings
- ▶ On-board resistors minimize temperature dependent errors
- ▶ Fast settling, wide common-mode input range, high accuracy for precision measurement systems

Applications

- ▶ Automatic test equipment
- ▶ Machine automation, process control
- ▶ Medical instrumentation



7 mm $\times$ 7 mm, 49-ball CSP_BGA



ADAQ4003 evaluation board

Analog-to-Digital Converter

ADuM7702: 16-Bit, Isolated Sigma-Delta Modulator

With the industry's highest ac and lowest offset drift performance, our isolated sigma-delta ADC enables the use of smaller shunt resistors to improve system efficiency, accuracy, and reliability. The [ADuM7702](#) and [ADuM7704](#) enable system miniaturization and the reduction of the torque ripple specification to improve the performance and robustness of a motor control system. Proven *iCoupler*® isolation technology offers safety and system reliability, as well as allows for higher bus voltages in the inverter design to further improve drive efficiency.

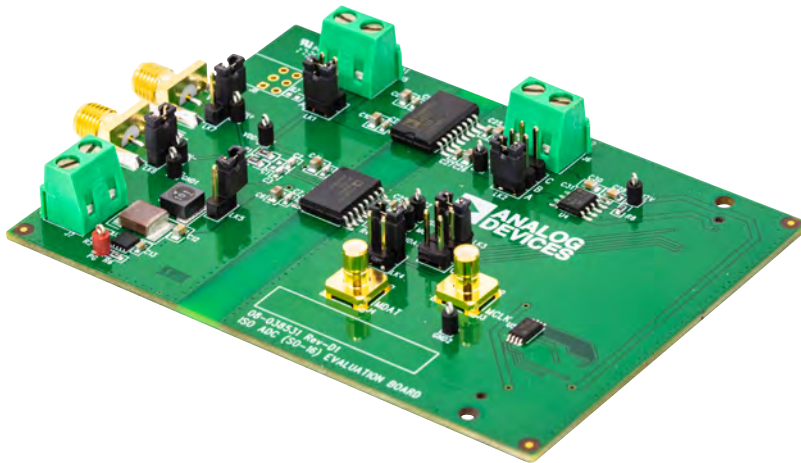
- ▶ [ADuM7702/ADuM7702-8](#): CMOS interface is non-LDO. ADuM7702 is 16-lead; ADuM7702-8 is 8-lead.
- ▶ [ADuM7704/ADuM7704-8](#): CMOS interface is integrated LDO; ADuM7704 is 16-lead. ADuM7704-8 is 8-lead.

Features and Benefits

- ▶ Improves system efficiency and reduces torque ripple
- ▶ Proven *iCoupler* technology allows for higher bus voltages
- ▶ Highest CMTI enables faster switching times

Applications

- ▶ Industrial automation: motor control, shunts, current sense, isolated ADC, sigma-delta
- ▶ Energy: shunts, current sense, protective relays, metering
- ▶ General-purpose: isolated DAQ, isolation, ADC



ADuM7702 evaluation board



16-lead SOIC-W



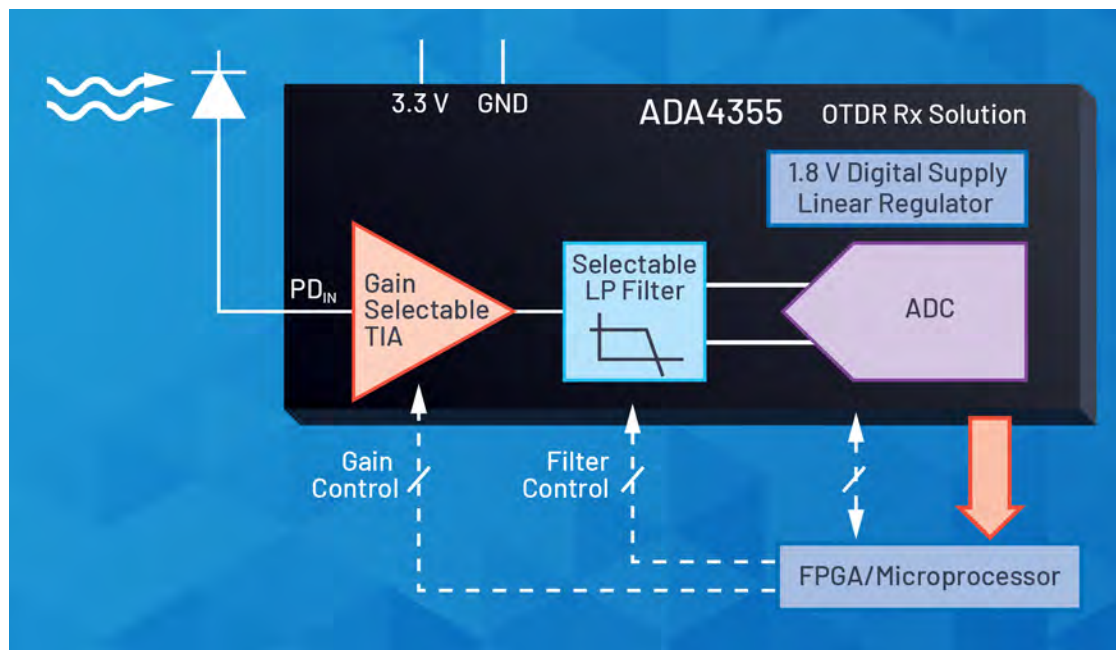
8-lead SOIC-W IC with increased creepage

Amplifier

ADA4355: Programmable Transimpedance, Current-to-Bits μ Module Receiver

The ADA4355 is a complete, high performance, current input μ Module device. For space savings, the ADA4355 includes all the required active and passive components to realize a complete current-to-bits data acquisition solution, supporting a small form factor, optical modules, and multichannel systems.

The high speed transimpedance amplifier (TIA) of the device supports 10 ns pulse widths, allowing high spatial resolution for time of flight (ToF) measurements. Additionally, the ADA4355 includes three TIA gain (TZ) settings to maximize dynamic range.



Features and Benefits

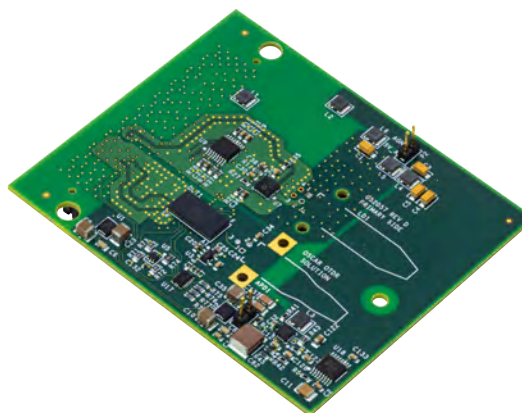
- ▶ 75% space savings for applications such as optical networking
- ▶ Measurement of currents from microamps to picoamps
- ▶ Includes a 14-bit, 125 MSPS ADC for a current-to-bits solution

Applications

- ▶ Photodetector amplification and signal acquisition
- ▶ Optical time domain reflectometry (OTDR)
- ▶ Chemical analyzers, mass spectroscopy
- ▶ Time of flight, current-to-voltage conversion



84-ball CSP_BGA

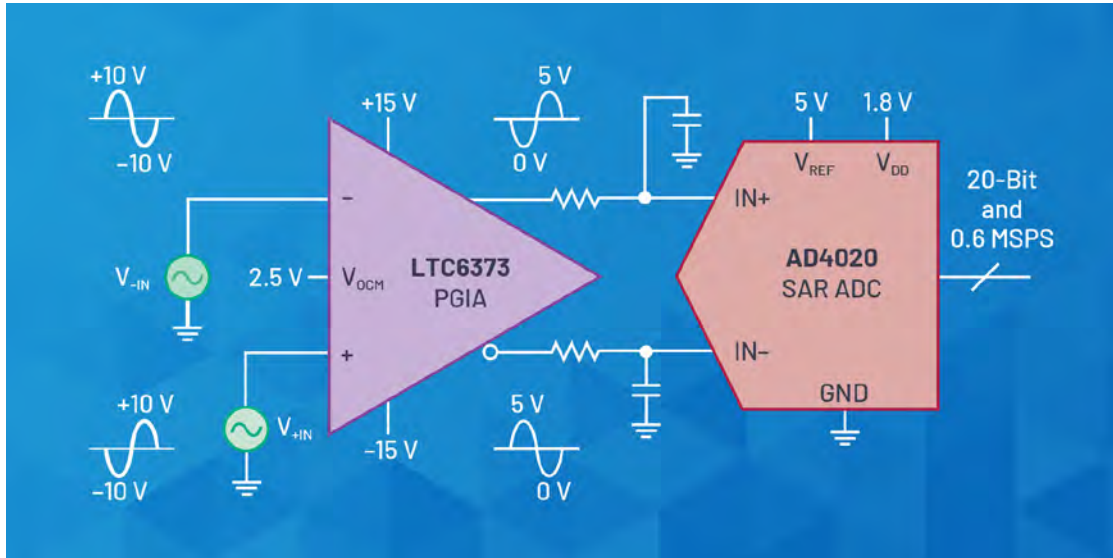


ADA4355 evaluation board

Amplifier

LTC6373: 36 V, Fully Differential, Programmable Gain Instrumentation Amplifier with 25 pA Input Bias Current

The **LTC6373** is a precision instrumentation amplifier with fully differential outputs that includes a highly matched internal resistor network to achieve excellent CMRR and extremely low gain error, gain drift, and gain nonlinearity. The user can easily program the gain to one of seven available settings through a 3-bit parallel interface (A2 to A0). The eighth state puts the part in shutdown, which reduces the current consumption to 250 μ A.



Features and Benefits

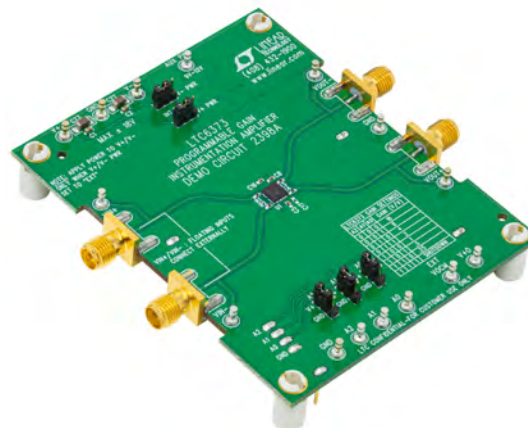
- ▶ Ultrahigh input impedance enables sensor agnostic interface
- ▶ Programmable gains, including attenuation options
- ▶ Drives ADCs directly, reducing components, power, and design time

Applications

- ▶ Instrumentation: electrical test and measurement, ATE
- ▶ Industrial automation: process control
- ▶ Aerospace and defense: DAQ
- ▶ Energy: DAQ



4 mm $\times$ 4 mm, 12-lead DFN (LFCSP)

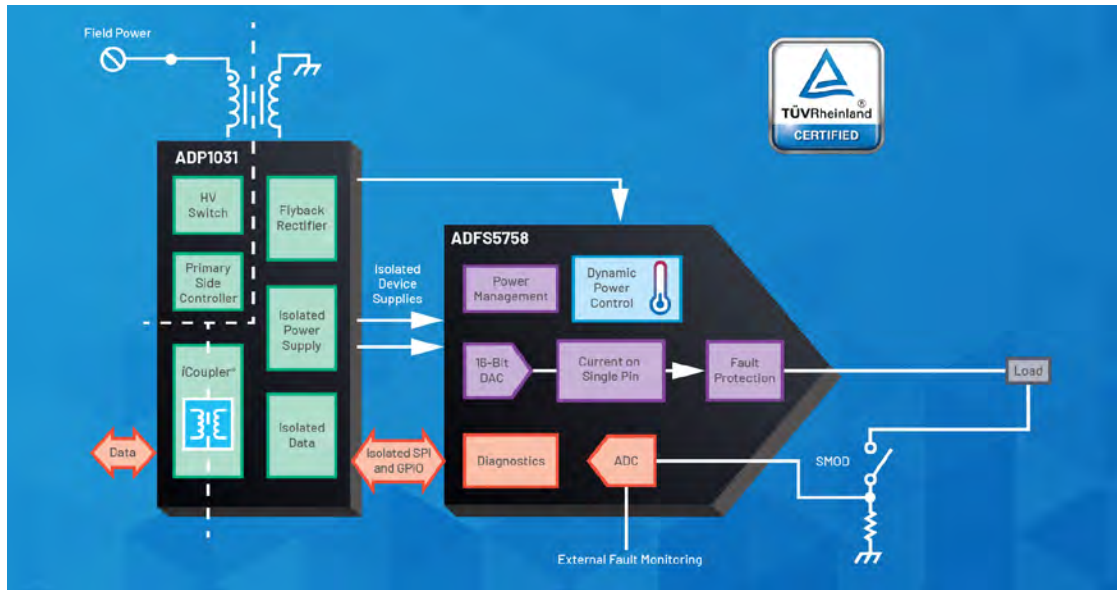


LTC6373 evaluation board

Digital-to-Analog Converter

ADFS5758: Single-Channel, 16-Bit, Current/Voltage Output DAC, Functional Safety Approved

The ADFS5758 is a single-channel, 16-bit, current/voltage output DAC. The device is functional safety approved for unipolar current output and is a fully compliant item with a systematic capability of SC3, which can be used in safety-related applications up to SIL 2, according to IEC 61508. This arrangement allows a single ADFS5758 to be used to achieve SIL 2 for a nonredundant configuration. The safe state for the ADFS5758 is open circuit/high impedance.



Features and Benefits

- ▶ Certified by TÜV for SIL 2 unipolar current output to simplify customer development
- ▶ Wide range of certified advanced diagnostic features
- ▶ Highly robust with minimal external protection components required to save cost and area

Applications

- ▶ Industrial automation: functional safety output modules and instruments
- ▶ PLC/DCS applications
- ▶ Automotive
- ▶ HART® network connectivity



5 mm × 5 mm, 32-lead LFCSP



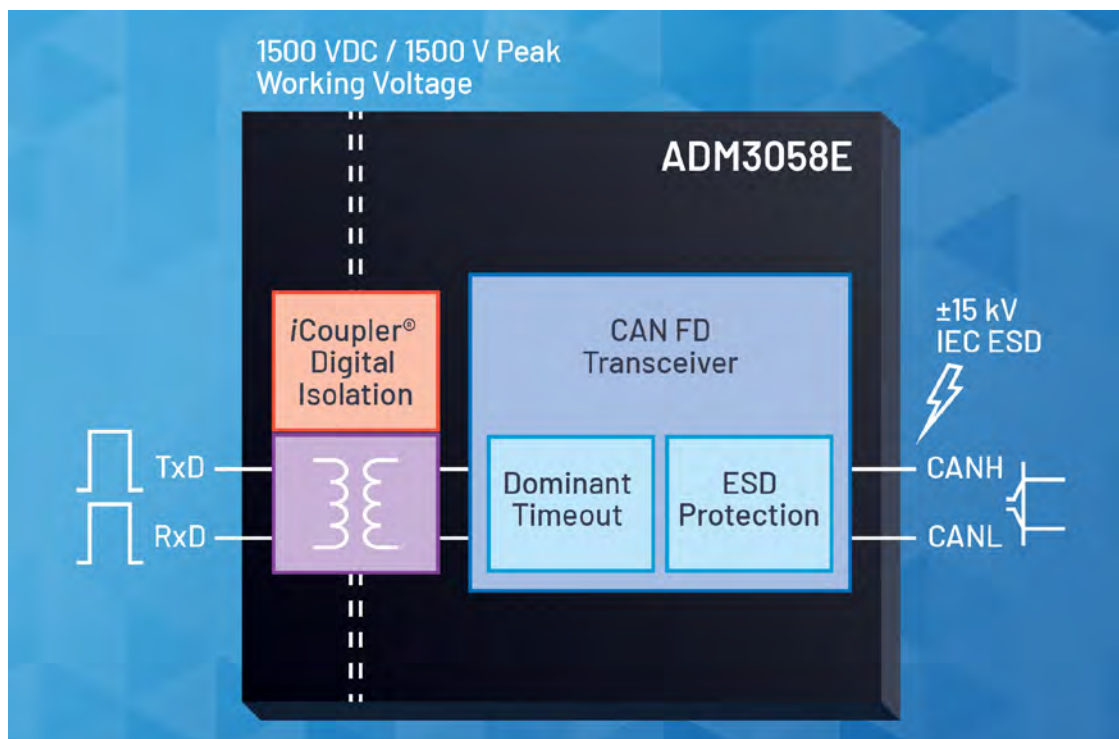
ADFS5758 evaluation board

Interface and Isolation

ADM3058E/ADM2761E/ADM2763E: 5.7 kV RMS Isolated, Basic CAN FD and RS-485 Transceivers

The ADM3058E and ADM2761E/ADM2763E family enables demanding solar energy applications with 1500 VDC working voltage and 5.7 kV reinforced isolation. These parts reduce design time and material costs. The ADM2761E/ADM2763E isolated RS-485 transceiver includes smart features to reduce end system install and debug time. Future-proofs your network bandwidth. ADM3058E enables backward compatibility and can fully isolate higher bandwidth CAN FD networks over longer distances and improved timing margins.

- ▶ **ADM3058E:** isoCAN
- ▶ **ADM2761E:** half-duplex, isolated RS-485
- ▶ **ADM2763E:** full-duplex, isolated RS-485



Features and Benefits

- ▶ Protocol options for CAN FD or RS-485
- ▶ 5.7 kV reinforced iCoupler digital isolation and IEC ESD for signal integrity in harsh environments
- ▶ CISPR 32 Class B emissions on a 2-layer PCB reduce design complexity and time to market

Applications

- ▶ Energy: solar
- ▶ Industrial automation
- ▶ Building infrastructure: building control and automation



8-lead SOIC IC with increased creepage



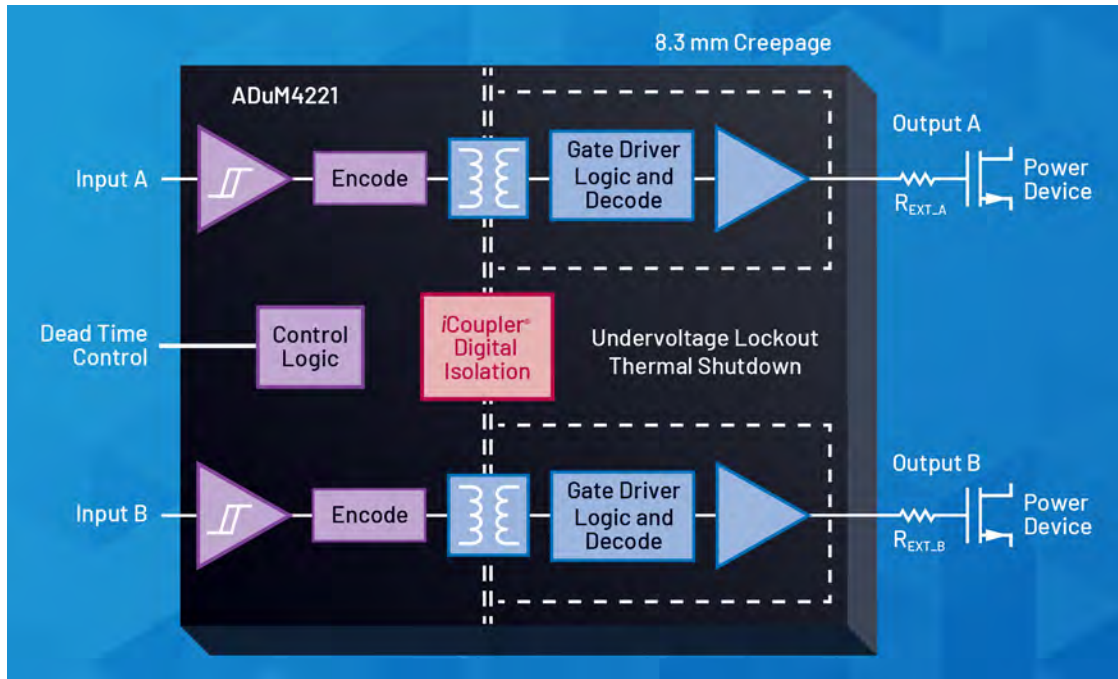
ADM3058E evaluation board

Interface and Isolation

ADuM4221: Isolated, Half-Bridge Gate Driver with Adjustable Dead Time, Dual Input, 4 A Output

The ADuM4221 uses iCoupler technology to provide independent and isolated high-side and low-side outputs. The isolator operates with a logic input voltage ranging from 2.5 V to 6.5 V, providing compatibility with lower voltage systems. In comparison to gate drivers employing high voltage level translation, this part offers the benefit of true, galvanic isolation between the input and each output.

- ▶ ADuM4221: adjustable dead time and dual input
- ▶ ADuM4221-1: adjustable dead time and single input
- ▶ ADuM4221-2: no adjustable dead time and dual input



Features and Benefits

- ▶ Dual-channel gate driver with high gate drive strength
- ▶ Ideal for high performance applications such as GaN and SiC switch technologies

Applications

- ▶ Switching power supplies, industrial inverters
- ▶ Isolated IGBT/MOSFET gate drives
- ▶ GaN and SiC compatible



Increased creepage, 16-lead SOIC-16

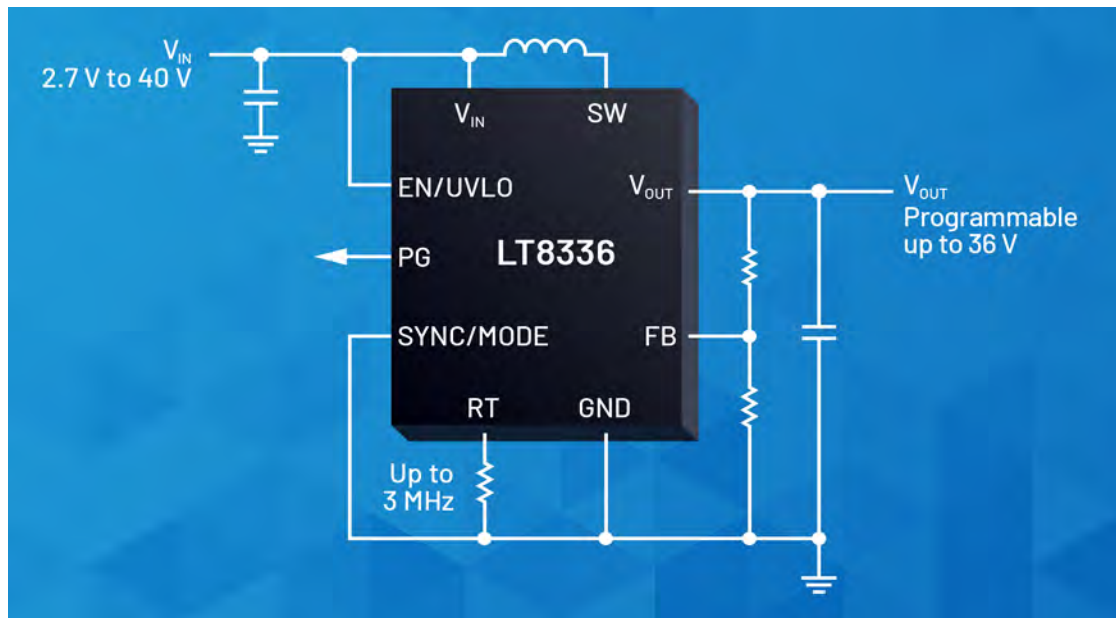


ADuM4221 evaluation board

Power Management

LT8336: 40 V, 2.5 A, Low I_Q Synchronous Step-Up Silent Switcher Device

The LT8336 features Silent Switcher® architecture and optional spread spectrum frequency modulation to minimize EMI emissions while delivering high efficiencies at high switching frequencies. It has a wide input/output voltage range, low V_{IN} pin quiescent current in Burst Mode® operation, and is 100% duty cycle capable for the synchronous MOSFET in pass-through operation ($V_{IN} \geq V_{OUT}$).



Features and Benefits

- ▶ PassThru™ mode minimizes V_{IN} -to- V_{OUT} voltage drop to improve efficiency
- ▶ Meets CISPR 25 radiated emissions standards
- ▶ 3 MHz switching frequency reduces component size

Applications

- ▶ Automotive power supplies
- ▶ Industrial power supplies
- ▶ General-purpose step-up



3 mm × 3 mm, 16-lead LQFN

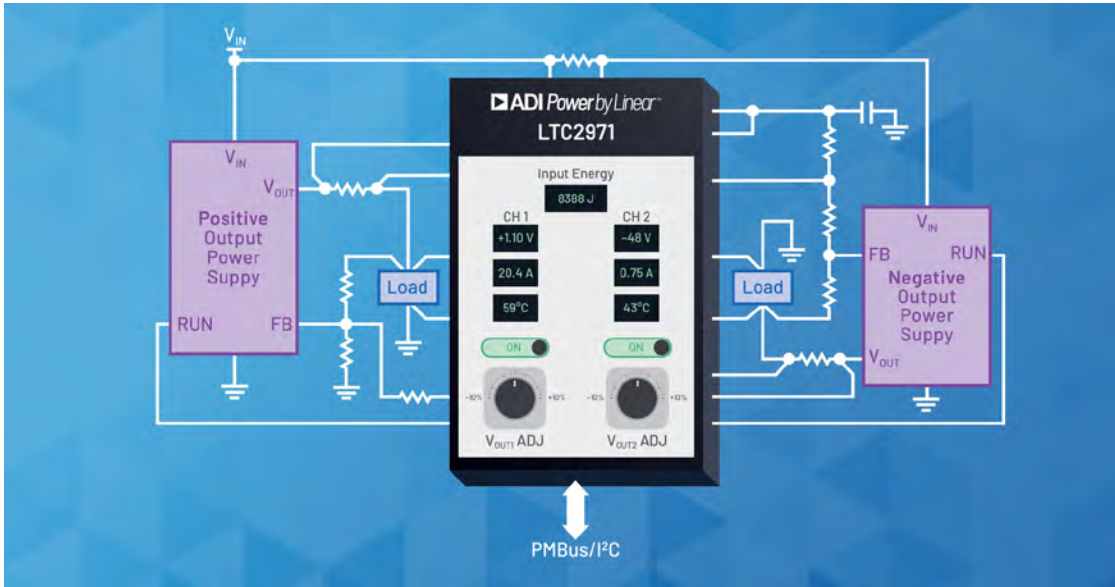


LT8336 evaluation board

Power Management

LTC2971: 2-Channel ± 60 V Power System Manager

The **LTC2971** is a 2-channel, high voltage power system manager used to sequence, trim (servo), margin, supervise, manage faults, provide telemetry, and log faults. Our DACs use a proprietary soft-connect algorithm to minimize supply disturbances. Supervisory functions include overvoltage and undervoltage and temperature threshold limits for two power supply output channels and one input channel.



Features and Benefits

- Maintains point of load accuracy to 0.25% precision
- Real-time telemetry and fault logging
- Simplifies system debug and analysis

Applications

- Computers and network servers
- Industrial test and measurement
- High reliability systems
- Video and medical imaging



7 mm × 7 mm, 49-ball BGA

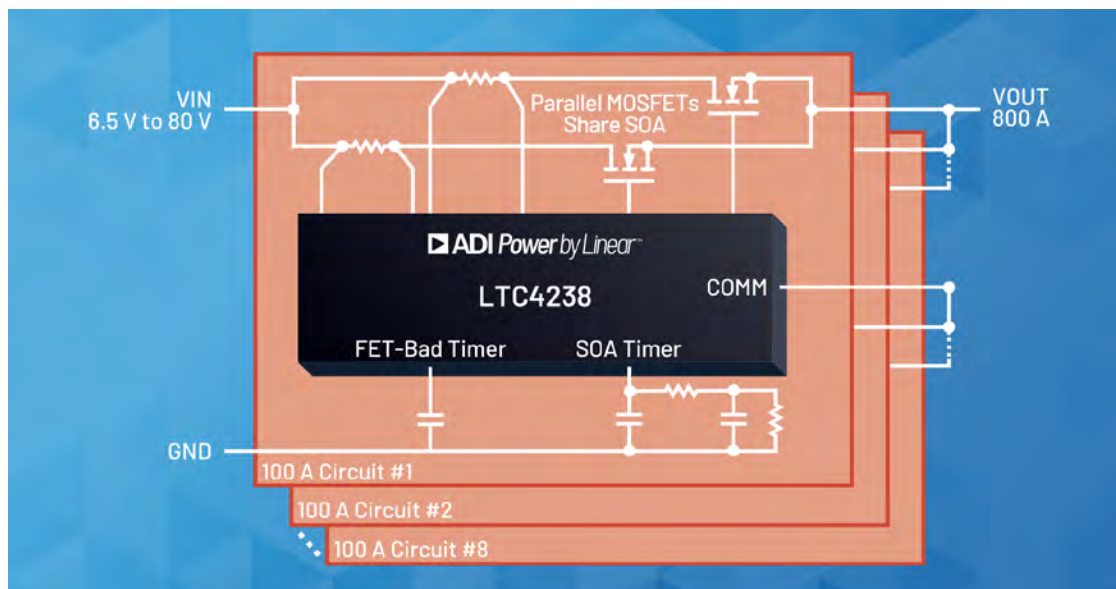


LTC2971 evaluation board

Power Management

LTC4238: High Voltage, High Current Hot Swap Controller

The LTC4238 is a high voltage, high current hot swap controller that allows a board to be safely inserted and removed from a live backplane. Dual 12 V gate drive is well suited for high power applications to either share safe operating area across parallel MOSFETs or support a 2-stage startup that first charges the load capacitance, and then enables a low on-resistance path to the load.



Features and Benefits

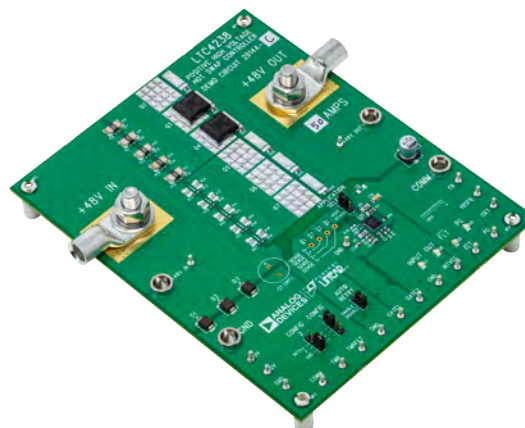
- ▶ Relaxes FET requirements to reduce costs and board space
- ▶ Increases total system reliability by minimizing FET failure rates
- ▶ Scale designs by paralleling multiple controllers

Applications

- ▶ Live board insertion in 12 V, 24 V, and 48 V systems
- ▶ Industrial high-side switch/circuit breaker
- ▶ Computers, servers
- ▶ Vehicle electrical systems



LTC4238 24-lead narrow SSOP

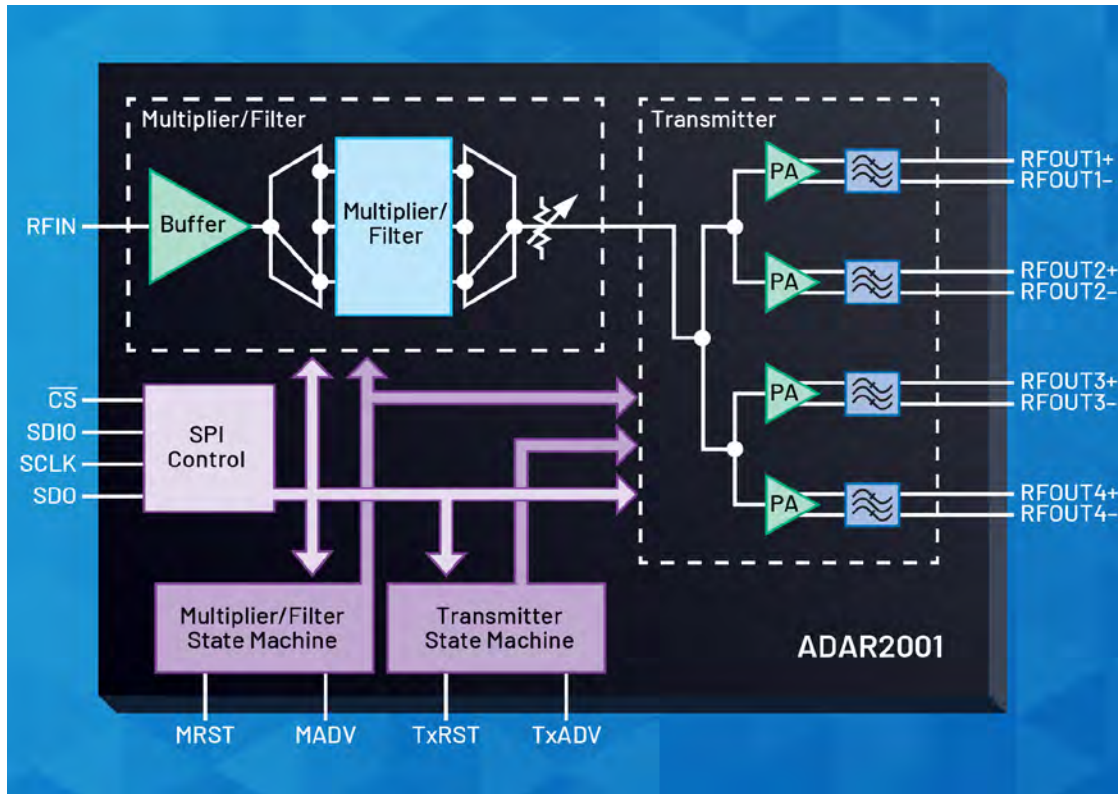


LTC4238 evaluation board

RF and Microwave

ADAR2001: 10 GHz to 40 GHz, 1:4 Channel, 4× Frequency Multiplier/Filter

The **ADAR2001** is a transmitter IC optimized for millimeter wave body scanning applications. Accepting a single-ended continuous wave (CW) input signal between 2.5 GHz and 10 GHz, the device provides gain, 4× frequency multiplication, harmonic filtering, 1:4 signal splitting, and four independently controllable power amplifiers (PAs).



Features and Benefits

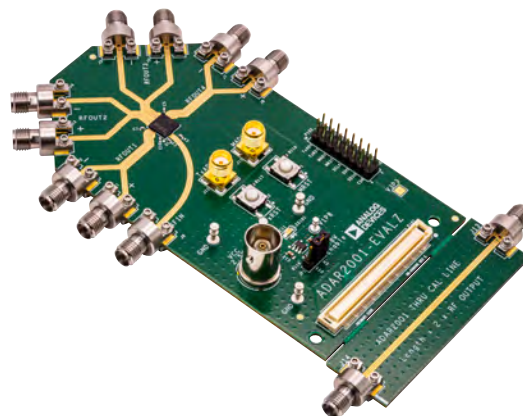
- Provides sufficient resolution to detect and identify small objects
- Integrated two state machines for easy configuration and fast switching
- 1:4 channel device simplifies design of large scanning arrays

Applications

- Millimeter wave imaging (industrial, medical, and security)
- Wideband local oscillator (LO) multiplier/distributor



6 mm × 6 mm, 40-terminal LGA



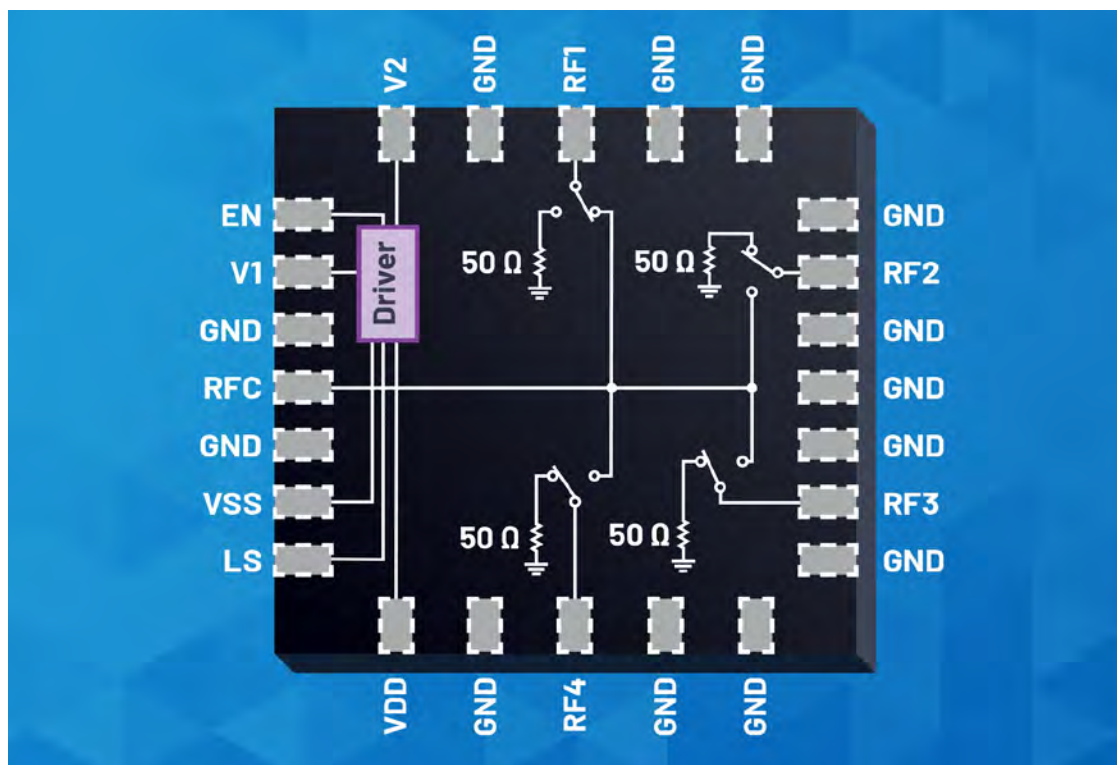
ADAR2001 evaluation board

RF and Microwave

ADRF5042: Nonreflective, 100 MHz to 44 GHz Silicon SP4T Switch

The [ADRF5042](#) operates with an insertion loss of lower than 3.2 dB and an isolation of higher than 35 dB. The device has an RF input power handling capability of 24 dBm for both through and terminated paths. The ADRF5042 requires a dual-supply voltage of +3.3 V and -3.3 V. It employs CMOS—and low voltage transistor to transistor logic (LVTTTL)—compatible controls.

- ▶ [ADRF5042](#): 100 MHz to 44 GHz
- ▶ [ADRF5043](#): 9 kHz to 44 GHz



Features and Benefits

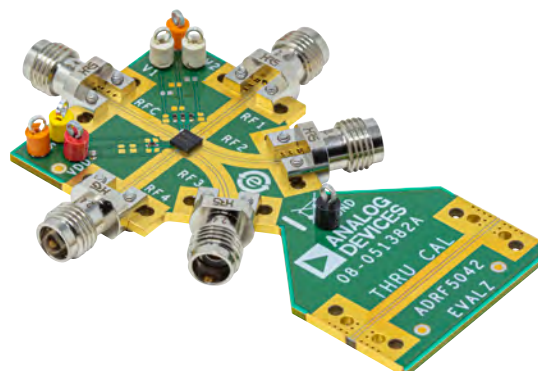
- ▶ Insertion loss of lower than 3.2 dB
- ▶ Isolation of higher than 35 dB
- ▶ Pin compatible with the [ADRF5043](#) low frequency cutoff version

Applications

- ▶ Industrial scanners, test instrumentation
- ▶ Cellular infrastructure—millimeter wave 5G
- ▶ Military radios, radars, electronic counter measures (ECMs)



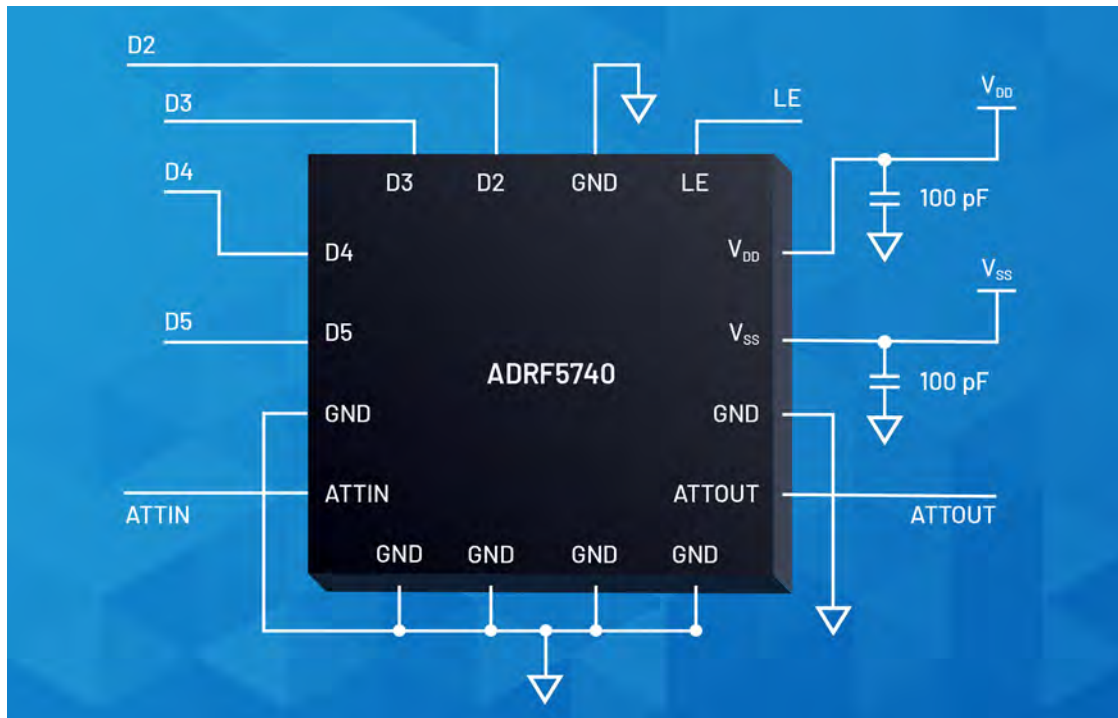
3 mm × 3 mm, 24-terminal LGA



ADRF5042 evaluation board

ADRF5740: 2 dB LSB, 4-Bit, Silicon Digital Attenuator, 10 MHz to 60 GHz

The ADRF5740 is a silicon, 4-bit digital attenuator with a 22 dB attenuation control range in 2 dB steps. It operates from 10 MHz to 60 GHz with less than 3.3 dB of insertion loss and with $\pm(0.2 + 7.0\%$ of attenuation state) of attenuation accuracy at 55 GHz. The ATTIN port of the ADRF5740 has an RF input power handling capability of 24 dBm average and 24 dBm peak for all states.



Features and Benefits

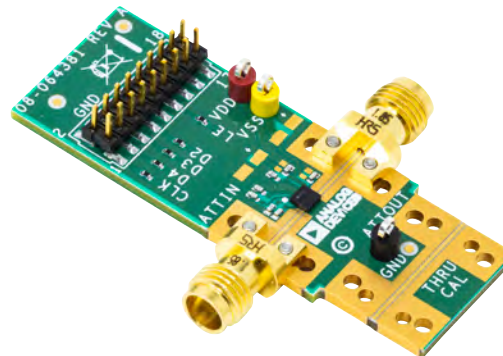
- ▶ Low insertion loss of 3 dB at 50 GHz is best in market
- ▶ SOI process technology offers fast switching and settling times
- ▶ Compact LGA package and CMOS control interface simplify hardware design

Applications

- ▶ Instrumentation and measurement: wideband network analyzers, signal generators
- ▶ Aerospace and defense: radars, wideband receivers
- ▶ Communications: millimeter wave 5G
- ▶ General-purpose: wideband signal chains



2.5 mm × 2.5 mm, 16-lead LGA

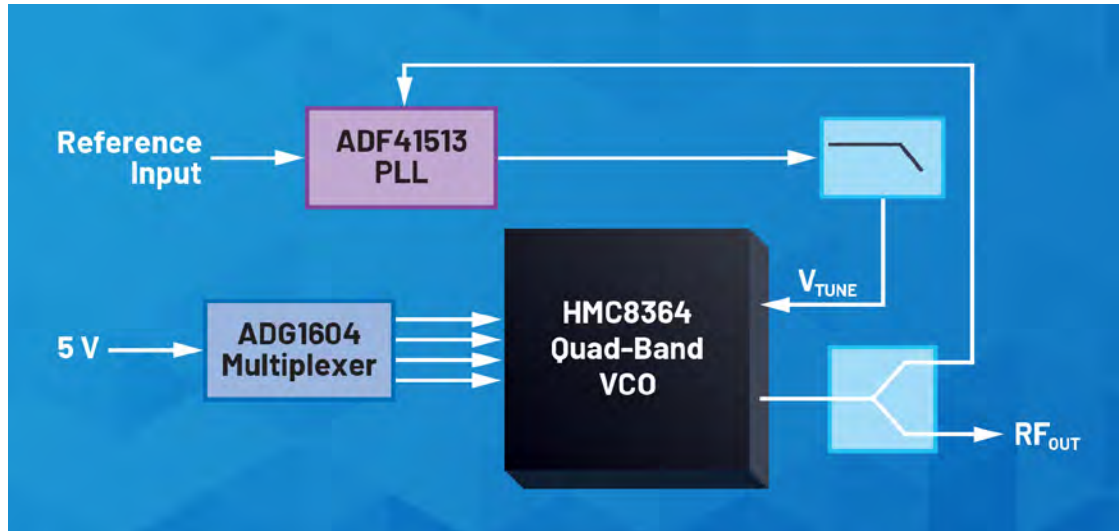


ADRF5740 evaluation board

HMC8364: 18.10 GHz to 26.60 GHz Quad-Band VCO

The **HMC8364** is a GaAs, quad-band, MMIC, VCO designed to offer wideband frequency capabilities without compromising phase noise performance. The device integrates four independent, narrow-band VCOs with overlapping frequency bands, operating at a fundamental frequency range of 18.10 GHz to 26.60 GHz.

- ▶ **HMC8074**: 8.3 GHz to 15.2 GHz
- ▶ **HMC8362**: 11.90 GHz to 18.30 GHz
- ▶ **HMC8364**: 18.10 GHz to 26.60 GHz



Features and Benefits

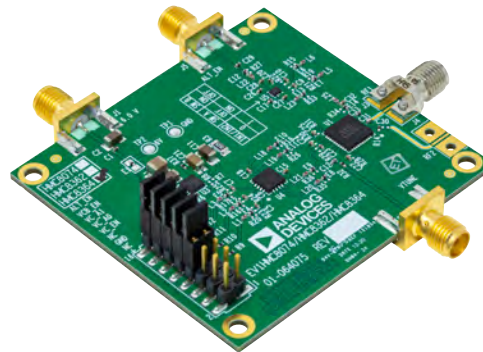
- ▶ Wideband frequency: 8.3 GHz to 26.6 GHz
- ▶ Low phase noise similar to narrow-band VCOs
- ▶ Simpler loop filter design with lower tuning voltage than traditional wideband VCOs

Applications

- ▶ Electronic test and measurement
- ▶ Industrial and medical instrumentation
- ▶ Point-to-point and multipoint radios



6 mm × 6 mm, 40-lead LFCSP



HMC8364 evaluation board

RF and Microwave

ADRV9002: Dual Narrow-/Wideband RF Transceiver

The [ADRV9002](#) is first in a new family of integrated RF transceivers (RF-to-digital) and features two independent transmit paths, two independent receive paths, and two independent RF synthesizers on chip. The ADRV9002 operates from 30 MHz to 6 GHz, and is designed to provide the highest dynamic range (150 dB/Hz) and best-in-class blocker tolerance for narrow- and wideband signals from 12 kHz to 40 MHz. The [ADRV9002](#) is a highly versatile transceiver that enables users to determine performance vs. power consumption and provides many system power saving modes. The new ADRV9002 is ideally suited for use in challenging portable and networking applications, and is capable of either TDD or FDD operation across a broad number of markets in VHF, UHF, and cellular bands up to 6 GHz.

► Industrial



► Satellite Communications

► First Responders



► UAVs

Features

Hardware

- 2 × 2 highly integrated (RF-to-digital) transceiver
 - Two independent high performance on-chip RF LOs
- Operation from 30 MHz to 6 GHz
- Scalable bandwidths from 12 kHz to 40 MHz per channel
- One independent user selectable data interface per channel
 - User configurable serial LVDS or CMOS modes
- Separate flexible clocking PLL
 - User selectable sample rate and clocking independent of the RF LOs and reference clock

Software

- A full hardware and software development solution is available, enabling evaluation and code generation for end systems
 - Windows®, Linux®/no-OS development environment
 - System-level reference designs and FPGA support
 - Integration options MATLAB®, Python, C/C++



12 mm × 12 mm, 196-ball CSP_BGA

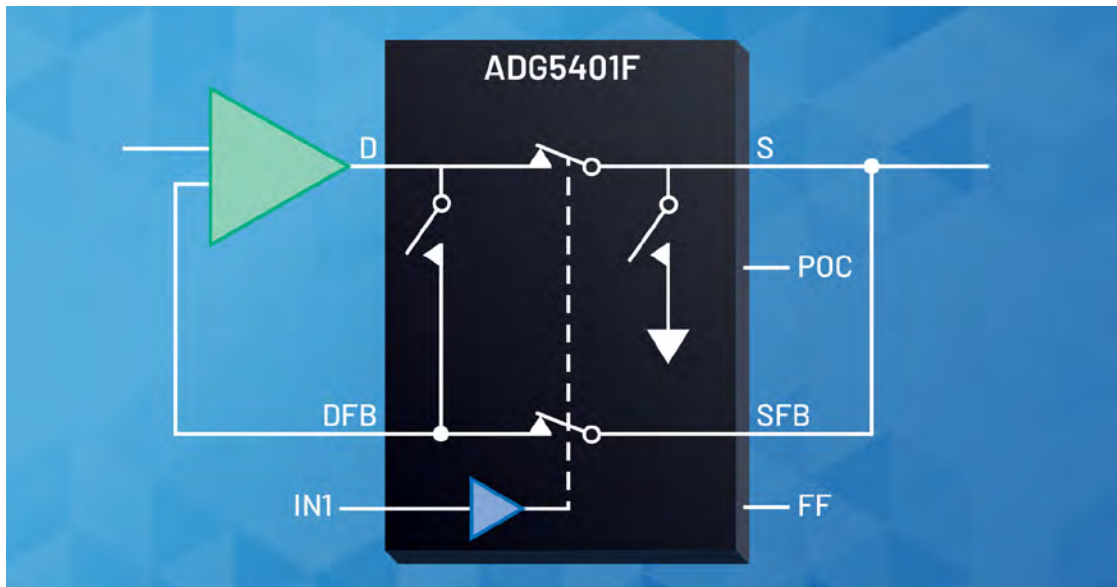


ADRV9002 evaluation board

Switch and Mux

ADG5401F: Fault Protection, 6 Ω R_{ON} , SPST Switch with 0.6 k Ω Feedback Channel

The [ADG5401F](#) main channel switch is an SPST, low on-resistance switch that features overvoltage protection, power-off protection, and overvoltage detection on the source pins (S and SFB). It features a protected secondary feedback channel for use with DAC or amplifier outputs. When no power supplies are present, the switch remains in the off condition, and the switch inputs are high impedance.



Features and Benefits

- ▶ Small size enables higher channel density
- ▶ Low 6 Ω R_{ON} and secondary feedback channel

Applications

- ▶ DAC and amplifier output protection
- ▶ Process control/distributed control systems
- ▶ Data acquisition and instrumentation



3 mm x 2 mm, 10-lead LFCSP



ADG5401F evaluation board

Reference Design

CN-0503: Multiple Parameter Optical Liquid Measurement Platform

Optical techniques are used in a broad class of liquid analysis techniques. Phenomena such as absorbance, fluorescence, scattering, and backscatter are used to detect chemical composition, pH, turbidity, and other chemical and physical properties. Optical techniques have several advantages—namely, they are contact free, not destructive, high precision, and high sensitivity; however, they often require complicated electronics to compensate for electrical and physical errors. The [CN-0503](#) is a reconfigurable multiparameter optical liquid measurement platform capable of performing colorimetry, turbidity, and fluorometry.



Liquid analysis



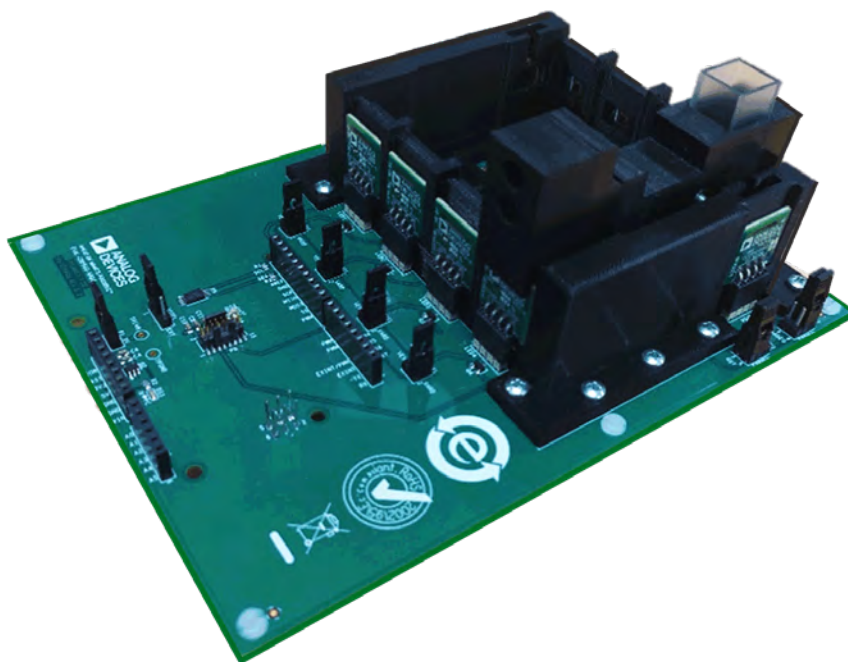
Chemical analysis and analytical instruments

Features and Benefits

- ▶ On-chip digital filters allow the platform to operate at full performance regardless of lighting conditions
- ▶ Benchtop instrument performance for handheld and portable applications
- ▶ Up to four independent light paths can be measured simultaneously

Applications

- ▶ Liquid/chemical analysis
- ▶ Analytical instruments



EVAL-CN0503-ARDZ evaluation board

Additional New Products

Product Category	Part Number	Description
Amplifiers	ADL8104	Wideband, high linearity, low noise amplifier
	ADL9006	2 GHz to 28 GHz, GaAs, pHEMT, MMIC low noise amplifier
	ADPA1105	46 dBm (40 W), 0.9 GHz to 1.6 GHz, GaN power amplifier
	ADPA7007	GaAs, pHEMT, MMIC, 1 W power amplifier, 18 GHz to 44 GHz
Analog-to-Digital Converters	AD4115	Single-supply, multichannel, 125 kSPS, 24-bit, sigma-delta ADC
	AD7383 (16-bit)/AD7384 (14-bit)	Dual, simultaneous sampling, 4 MSPS, SAR ADC
	ADuM7704	16-bit, isolated, sigma-delta modulator
	EVAL-AD7124-8-PMOZ	8-channel, low noise, low power, 24-bit, sigma-delta ADC
Digital-to-Analog Converters	AD9166	DC to 9 GHz, vector signal generator
Industrial Automation	CN-0540	24-bit data acquisition system for IEPE sensors
Industrial Ethernet	CN-0506	10 Mbps/100 Mbps/1000 Mbps Industrial Ethernet PHY
Interface and Isolation	ADM2461E (half-duplex)/ADM2463E (full)	500 kbps, 5.7 kV rms, signal isolated RS-485 transceiver
	ADM2565E (half-duplex)/ADM2567E (full)	3 kV rms signal and power isolated RS-485 transceiver
	ADM2865E	5.7 kV rms signal and power isolated RS-485 transceiver
Power Management	ADP5600	Interleaved inverting charge pump with negative LDO regulator
Power Monitor and Control	ADuM4221-1 (single)/ADuM4221-2 (dual)	Isolated, half-bridge gate driver, 4 A output
RF and Microwave	ADAR2004	10 GHz to 40 GHz, 4-channel Rx mixer
	ADL8150 (ACPZN)	GaAs, HBT, MMIC, low phase noise amplifier
	ADRF5300	Silicon SPDT switch, reflective, 24 GHz to 32 GHz
Switches and Multiplexers	ADG5421F	±60 V fault protection and detection, dual SPST switch

Design Resources

EngineerZone® Online Support Community

Engage with the Analog Devices technology experts in our online support community. Ask your toughest design questions, browse our rich knowledge base, or read about new technologies in one of our blogs.

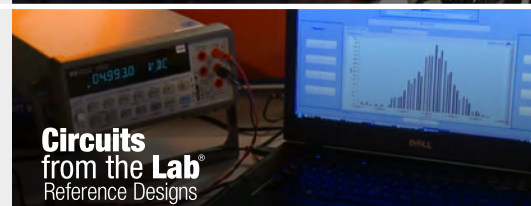
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