



# solutions catalogue

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THE BROADLINE DISTRIBUTOR OF ELECTRONIC COMPONENTS

2013  
2014





LINEAR TECHNOLOGY Corporation designs, manufactures and markets a broad line of high performance integrated circuits, which excel in virtually all important values like low noise, low temperature drift, low power consumption and other. Applications for the Linear Technology's products include virtually all industrial segments.

**LINEAR TECHNOLOGY Corporation** navrhuje, vyrábí a dodává širokou linii špičkových integrovaných obvodů, které excelují ve všech důležitých vlastnostech jako nízký šum, malý tepelný drift, nízká spotřeba, vysoká rychlost a jiné. Aplikace pro produkty Linear Technology zahrnují prakticky všechny průmyslové segmenty.

**LINEAR TECHNOLOGY Corporation** entwirft, produziert und vermarktet eine breite Palette von spitzentmaßigen integrierten Schaltungen, welche in allen wichtigen Eigenschaften wie geringe Rauschwerte, kleiner Temperaturdrift, niedriger Stromverbrauch, hohe Geschwindigkeit und andere herausragen. Die Anwendungen für Linear Technology Produkte umfassen praktisch alle Industriebereiche.

A **LINEAR TECHNOLOGY Corporation** tervez, gyárt és szállít integrált áramköröket, melyek kitűnnek minden fontos tulajdonságban, mint pl. az alacsony zajszint, alacsony hő-eltolódás, alacsony fogyasztás, nagy sebesség, stb.. A Linear Technology termékeihez tartozó alkalmazások lefedik gyakorlatilag az összes ipari ágazatot.

**LINEAR TECHNOLOGY Corporation** rozwija i dostarcza szeroką gamę wyjątkowych układów scalonych, które wiodą prym we wszystkich ważnych parametrach jak niski szum, mały drift cieplny, niski pobór, wysoka prędkość i inne. Aplikacje dla produktów Linear Technology obejmują praktycznie wszystkie sektory przemysłowe.

**LINEAR TECHNOLOGY Corporation** proiectează, produce și comercializează o linie extinsă de circuite integrate de înaltă performanță care excelează în toate aspectele esențiale cum ar fi nivelul zgomotului, variația scăzută a temperaturii, consum scăzut de energie și altele. Aplicațiile pentru produsele Linear Technology includ realmente toate segmentele industriale.

**LINEAR TECHNOLOGY Corporation** navrhuje, vyrába a dodáva širokú líniu špičkových integrovaných obvodov, ktoré excelujú vo všetkých dôležitých vlastnostiach ako nízký šum, malý tepelný drift, nízka spotreba, vysoká rýchlosť a iné. Aplikácie pre produkty Linear Technology zahŕňajú prakticky všetky priemyselné segmenty.

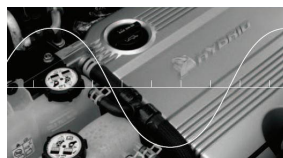
The Company's principal product categories include amplifiers, battery management, data converters, high frequency, interface, voltage regulators and voltage references. LT targets the most demanding market segments and deliver unparalleled quality and performance.

## Why LINEAR TECHNOLOGY?

- top quality high performance semiconductors
- very high reliability – functionality guaranteed in the whole temperature range and some types are 100% tested at temperature extremes
- for the development support, we can visit you with an LT technician

## Automotive Electronic Solutions

This selection guide features high performance, high reliability solutions for a wide range of functions commonly used in today's automobiles, including telematics, infotainment systems, body electronics, engine management, safety systems and GPS navigation systems.



## DC/DC uModule Power Products

uModule power products are complete power management solutions integrating the DC/DC controller, inductor, power transistors, input and output capacitors, and compensation components within a compact, IC-like form factor. Supported by Linear's rigorous testing and high reliability processes, the uModule power product family simplifies the design and layout of your next design.



- Point-of-Load Regulators
- Battery Chargers
- LED Drivers

## High Performance DC/DC Controllers

High performance DC/DC switching regulator controllers for applications including datacom, telecom, industrial, automotive, medical, avionics, control systems and consumer products. Linear makes power design easier by providing industry-leading field application engineering support; a broad selection of demonstration boards with schematics, layout files and parts lists SwitcherCAD software for simulation; application notes and comprehensive technical documentation.



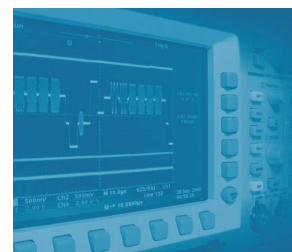
## Industrial Signal Chain

Analog-to-digital converters, digital-to-analog converters, amplifiers, comparators, filters, voltage references, RMS-to-DC converters and silicon oscillators designed for demanding industrial applications. These precise, flexible and rugged devices feature parameters fully guaranteed over the -40°C to 85°C temperature range.



## Linear Low Dropout (LDO) Regulator Solutions

Broad line of high performance low dropout (LDO) linear regulators with fast transient response, excellent line and load regulation, and very wide input voltage range from 0.9V to 100V. Output currents range from 20mA to 10A, with positive, negative and multiple output versions available. Many devices offer output voltage operation <0.8V and some feature operation as low as 0V, even with a single supply. Most are stable with ceramic output capacitors. LDO regulators can be applied in virtually any application



## Power Management for LEDs

A light-emitting diode (LED) is a semiconductor device that emits incoherent narrow-spectrum light when electrically forward biased, resulting in a form of electroluminescence. The color of the emitted light depends on the chemical composition of the semiconductor material used, and can be near-ultraviolet, visible or infrared. LEDs are more prevalent today than ever before, replacing traditional incandescent bulbs and fluorescent lights in many applications.



## Data Conversion

Data converters translate real world signals such as temperature, pressure, or voice into the digital realm and back again. Linear Technology's high performance analog to digital converters (ADCs) offer solutions for applications ranging from 24-bit precision measurements to 250MSPS communications systems. Our a to d topologies include delta sigma, SAR (successive approximation register) adc, and high speed pipeline analog to digital. Our digital to analog converters (DACs) offer a range of resolutions, output ranges and package densities. We offer voltage output d to a, current output d to a, and high speed digital to analog.

### Analog-to-Digital Converters (ADC)

Linear Technology offers a complete family of high performance analog to digital converter products (ADCs), including 16-bit to 24-bit delta sigma converters for precision measurements, up to 16-bit high-speed pipeline ADCs for communications and 8-bit to 18-bit low power successive approximation register (SAR) analog to digital converter for everything in between. Our analog to digital converter portfolio offers unmatched noise performance (SINAD, SNR and SFDR), low power consumption and small package size. – LTC2440, LTC2404, LTC2369, LTC2370

- **No Latency Delta Sigma ADCs:** LTC2473, LTC2496, LTC2453
- **General Purpose SAR ADCs:** LTC2376, LTC2370, LTC2367

### Digital-to-Analog Converters (DAC)

Linear Technology offers a complete family of digital to analog converters (DACs), offering both voltage output and current output, serial and parallel interfaces and a wide range of resolutions and package densities. Product lines include digital to analog converters consisting of precision DACs with up to 18-bit resolution for precision industrial applications, low power DACs in tiny packages for control-loop applications, and high-speed DACs with output frequencies of up to 50MSPS.

- **Voltage Output DACs:** LTC2656B, LTC2655B, LTC2605
- **Current Output DACs:** LTC2756, LTC2758, LTC2754B
- **High Speed DACs:** LTC1668, LTC1667, LTC1666
- **Special Function DACs:** LTC1426, LTC1428, LTC1840

### Switches and Multiplexers

SPI and I2C serially controlled multiplexers for data conversion applications and industry-standard analog switches. – LTC202, LTC1380, LTC201

### Signal Chain $\mu$ Module Receivers

The signal chain modules use a System-in-Package (SiP) technology similar to multi-chip modules (MCM) to integrate components with different technologies along with passive components to make an integrated subsystem. The micromodule ( $\mu$ Module) receivers consist of high-performance, high-speed ADCs with fixed-gain, high-speed amplifiers and anti-alias filters. The integrated ADC + driver products include integrated bypass capacitance and simplify the high frequency layout required to preserve the AC performance. The board space savings are significant for instrumentation applications such as spectrum analyzers, oscilloscopes (oscillographs) and communications test equipment or for communications applications such as high sensitivity receivers, software defined radio (SDR) or signal intelligence receivers. – LTM9010, LTM9004, LTM9005

## Signal Conditioning

Linear Technology's Signal Conditioning product category includes high performance analog IC's such as operational amplifiers (op amps), comparators, filters, voltage references, RMS-to-DC converters and oscillators.

### Operational Amplifiers (Op Amps)

Linear Technology manufactures a broad line of high performance operational amplifiers (op amps) each one designed for the unexpected. Fully specified over temperature, look to Linear for signal conditioning solutions when performance matters. Amplifier product families include high speed amplifiers, precision amplifiers, low noise amplifiers, and micropower amplifiers as well as special function amplifiers such as current sense, programmable gain and differential high speed analog to digital converter (ADC) drivers.

- **High Speed Amplifiers:** LTC6409, LTC6360, LTC6252
- **Precision Amplifiers:** LTC6362, LTC6253, LTC6257
- **Low Noise Amplifiers:** LT1028, LT6200, LTC6360
- **Low Power Amplifiers:** LT6004, LT1491A, LTC1077
- **Low Bias Current Amplifiers:** LTC6081, LTC6084, LTC2052
- **High Output Current Amplifiers:** LT1210, LT1970A, LT1813HV
- **Current Feedback Amplifiers:** LT1210, LT1396, LT1253
- **Current Sense Amplifiers:** LTC6109, LTC6109, LT1999
- **Programmable Gain Amplifiers:** LT1991, LTC6412, LTC6915
- **Instrumentation Amplifiers:** LTC2053, LT1167, LT1101
- **Difference Amplifiers:** LT1991, LT1995
- **Differential Amplifiers:** LTC6409, LTC6405, LT6350

### Comparators

Linear Technology specializes in high speed comparators and micropower comparators that offer simple, flexible features such as split input and output supplies, Over-the-Top inputs, integrated references and compact packages. Our high speed comparator

products offer propagation delays as fast as 7ns. Our micropower comparator product line offers supply currents as low as 300nA while still offering excellent precision and innovative features.

- **High Speed Comparators:** LT1715, LT1721, LTC6702
- **Micropower Comparators:** LTC1540, LTC6702, LT1716
- **High Speed DACs:** LTC1668, LTC1667, LTC1666
- **Application Specific Comparators:** LTC1540, LTC1440, LTC1042

### Filters

Linear Technology's line of continuous time and switched capacitor filters provide simple, flexible frequency discrimination solutions. Our specially designed filter products can accommodate any frequency response (lowpass, highpass or bandpass) and a wide range of frequencies.

- **Lowpass Filters:** LTC6605, LTC1569, LTC6603
- **Filter Building Blocks:** LT1568, LTC1562, LTC1164

### Voltage References

Linear Technology offers a broad line of series and shunt precision voltage references. Shunt voltage references operate in a manner that is functionally equivalent to a Zener diode. Series voltage references operate in a manner that is functionally equivalent to a 3 terminal regulator. Many of Linear Technology's voltage references are designed to operate in either series or shunt mode. All of our products offer excellent initial accuracy and low drift over time and temperature. Linear Technology's "Reference+" parts combine precision voltage references with comparators or amplifiers.

- **Shunt Voltage References:** LT1634, LT1004, LT1009
- **Series Voltage References:** LT6654, LT6656, LTC6654
- **Micropower Voltage References:** LT6656, LT1634, LT1790
- **Reference Plus Comparator or Amplifier:** LTC1540, LTC1843, LTC1440

### RMS-DC Conversion

RMS to DC conversion is the truest way to measure the energy contained in an AC waveform. Linear Technology's simple, true RMS-to-DC converters use an innovative delta-sigma computational technique that features high linearity and accuracy suitable for a wide variety of AC measurement applications. – LTC1966, LTC1967, LTC1968

### Precision Resistor Networks

Quad resistor networks with excellent matching specifications over the entire temperature range. All resistors can be accessed and biased independently, making them a convenient and versatile choice for any application that can benefit from matched resistors. These resistor networks provide precise ratiometric stability required in highly accurate difference amplifiers, voltage references and bridge circuits. – LT5400A, LT5400B

### Thermocouple Compensators

C/J devices use curvature correction circuitry to match the „bow“ found in all thermocouples, providing accurate cold junction compensation over a wide temperature range. – LT1025, LTK001

### Signal Chain $\mu$ Module Receivers

Signal Chain  $\mu$ Module Receivers: The signal chain modules use a System-in-Package (SiP) technology similar to multi-chip modules (MCM) to integrate components with different technologies along with passive components to make an integrated subsystem. The micromodule ( $\mu$ Module) receivers consist of high-performance, high-speed ADCs with fixed-gain, high-speed amplifiers and anti-alias filters. The integrated ADC + driver products include integrated bypass capacitance and simplify the high frequency layout required to preserve the AC performance. The board space savings are significant for instrumentation applications such as spectrum analyzers, oscilloscopes (oscillographs) and communications test equipment or for communications applications such as high sensitivity receivers, software defined radio (SDR) or signal intelligence receivers. – LTM9012, LTM9005, LTM9004

## Power Management

Linear Technology's high-performance analog ICs provide efficient solutions for power management and conversion applications in the automotive, telecommunications, industrial, medical, computing, military and high-end consumer markets. Our ICs provide unmatched power densities and software design simulation tools to provide fast and accurate power supply designs.

### Switching Regulator

Linear Technology manufactures a broad line of high performance switching regulator ICs with both synchronous and non-synchronous internal switches. These switching voltage regulators offer typical input voltage capability from 2.25V up to 60V, switching frequencies up to 4MHz and high efficiency operation up to 96%. Also with Burst Mode operation, quiescent currents in the tens of micro-amps level can be attained. This combination of features allows very small, low profile circuit implementations with minimum external components. Topologies include buck (step-down) switching regulators, boost (step-up) switching regulators, buck-boost switching regulator, inverting switching regulators, and flyback and isolated topology switching regulators. LTM8062, LTM8047, LTM8026, LTM8008, LTC3891, LTC3861, LTC3856

### LDO Linear Regulators

Linear Technology manufactures a broad line of high performance low dropout linear regulators (LDO). These LDOs offer very low dropout, fast transient response, excel-

lent line and load regulation, and have a very wide input voltage range, from 0.9V to 80V. Output currents range from 100mA to 10A, with positive, negative and multiple outputs. – LT3010, LT3060, LT3029

### µModule Regulators

Linear Technology's µModule power products are complete power management solutions integrating the DC/DC controller, power transistors, input and output capacitors, compensation components and inductor within a compact, IC-like form factor. Supported by Linear Technology's rigorous testing and high reliability processes, the µModule power product family simplifies the design and layout of your next point of load regulator, battery charger or LED driver solution. – LTM8047, LTM8062, LTM4627, LTM4628

### µModule LED Drivers

Linear Technology's µModule power products are complete power management solutions integrating the DC/DC controller, power transistors, input and output capacitors, compensation components and inductor within a compact, IC-like form factor. Supported by Linear Technology's rigorous testing and high reliability processes, the µModule power product family simplifies the design and layout of your next LED driver solution. – LTM8040, LTM8042

### µModule Battery Charger

Linear Technology's recent technical achievements in the performance of switching regulators and innovative packaging methods have finally allowed a new generation of battery chargers, including all the circuit components such as the inductor and power MOSFETs, to be shrunk and encapsulated in such a tiny size that they resemble a surface mount IC. These battery chargers are complete solutions containing the DC/DC controller, MOSFETs, inductor, input and output bypass capacitors and compensation circuitry in only 2.25cm. Supported by Linear Technology's rigorous testing and high reliability processes, the µModule family simplifies the design and layout of your next power supply. – LTM8061, LTM8062

### Isolated µModule Transceivers

Linear Technology's Isolator µModule Technology is a new development platform that allows Linear to reliably integrate inductive/magnetic isolation, discrete components, ICs and power onto a single substrate PCB. This high level of integration results in products that require no external components. All resistors, capacitors, inductors and ICs are onboard. – LTM2881, LTM2882

### Signal Chain µModule Receivers

The signal chain modules use a System-in-Package (SiP) technology similar to multi-chip modules (MCM) to integrate components with different technologies along with passive components to make an integrated subsystem. The micromodule (µModule) receivers consist of high-performance, high-speed ADCs with fixed-gain, high-speed amplifiers and anti-alias filters. The integrated ADC + driver products include integrated bypass capacitance and simplify the high frequency layout required to preserve the AC performance. The board space savings are significant for instrumentation applications such as spectrum analyzers, oscilloscopes (oscillographs) and communications test equipment or for communications applications such as high sensitivity receivers, software defined radio (SDR) or signal intelligence receivers. – LTM9012, LTM9005, LTM9004

### PMIC & Multifunction

Many of Linear Technology's battery management products combine the functionality of our standalone battery chargers with one or more other functions. Power management IC (PMIC) products combine battery charging, PowerPath control and one or more DC-DC regulators for a complete power solution for handheld products. Linear Technology's PowerPath products and architecture allow the load to be powered from both Vin and the battery, ensuring shorter charging times and more flexibility for the portable device designer. They also enable "instant on" in systems with a depleted battery. Other features combined with our battery chargers include dual inputs for USB and Wall Adapter, switching regulators, comparators, or LDOs. – LTC4156, LTC4155, LTC4085

### LED Driver ICs

Linear Technology has a very broad line of LED driver ICs for automotive, display backlighting, handheld and general lighting applications. They are configured as either Inductorless white LED drivers (for LEDs in parallel), or switching regulator based white LED drivers (for LEDs in series). Topologies include boost regulator LED drivers, buck regulator LED drivers, buck-boost LED drivers, SEPIC topology led drivers and more. Regardless of topology, these LED driver ICs offer the highest efficiency, lowest noise, and the smallest footprints. Other features of Linear Technology LED driver include integrated Schottky diodes, accurate LED current matching and multiple output capability. –LT3474, LT3597, LT3746

### Battery Management

Linear Technology manufactures a comprehensive line of high performance battery charger IC for any rechargeable battery chemistry, including Lithium-Ion, Lead Acid, and Nickel based. These battery charger IC are offered in linear or switching topologies and are completely autonomous in operation. Our battery charger IC offer many standard features for battery safety and management, including on-chip battery pre-conditioning, thermal regulation, NTC interface and dual Smart Battery systems management with SMBus or I2C interface. – LTC4150, LTC6803, LTC4071

### Power-Over-Ethernet (PoE) Interface Controllers

Power Over Ethernet (POE) Controller ICs for both the sourcing (PSE) and receiving (PD) sides of the IEEE 802.3af application. Industry-leading devices that meet the compliance requirements as well as the ruggedness requirements of the application.

– LTC4265, LTC4270, LTC4266

### System Supervisor, Monitor and Control

This extensive family of parts includes voltage supply monitors, trackers, margining controllers, sequencers, push button controllers and the new power monitors. All of these devices improve DC/DC converter functionality and feature a high degree of accuracy, integration and configurability, resulting in more cost efficient designs that would otherwise be burdened with multiple complicated components when designed the "traditional way". The System Monitor and Control family strives to provide convenient all-in-one solutions for many of today's growing number of digital power management applications. – LT2940, LT41800, LT4363

### Power Control

Power control products include ideal diodes, PowerPath controllers, MOSFET drivers, bridge drivers and other non-regulator power applications. – LTC5552, LTC4415, LTC4412

### Digital Power Management

Linear Technology manufactures a broad line of high performance DC/DC controllers featuring digitally controlled output voltages for CPU core power applications and other applications requiring dynamically adjustable outputs. These controllers support most CPU manufacturers product offerings including Intel, AMD and Transmeta. In addition, the key benefits of using these controllers include small solution footprint, reduced levels of capacitance, high conversion efficiencies, fast transient response and improved thermal management. – LTC2974, LTC2978, LTC3816

### Current Source

Constant current sources can be designed using a number of standard analog building blocks, including op amps, LED drivers and battery chargers. Linear Technology also offers a family of dedicated constant current sources that offer ease of use and design, voltage, current and thermal protection and built in current limiting. – LTM8042, LT3080, LTM8040

### Energy Harvesting

Linear Technology manufactures a wide range of ultra-low power ICs targeted for energy harvesting applications. Power management products that convert energy from Vibration (Piezo), PhotoVoltaic (Solar) and Thermal (TEC, TEG, Thermopiles, Thermocouples) sources provide high efficiency conversion to regulated voltages or to charge batteries and super capacitor storage elements. Boost converters that operate from as little as 20mV or battery chargers with Maximum Power Point capability expand the possibilities for a wide variety of industrial automation and control, wireless sensor, transportation, automotive and building management applications. Ultra-low quiescent current linear regulators, op amps, comparators, voltage supervisors, analog to digital converters, digital to analog converters and micropower voltage references provide additional fundamental building blocks required for autonomous systems. – LTC3105, LTC3388, LTC4071

### Supercapacitor Chargers

Supercapacitors, capacitors with up to 100F of charge storage, are emerging as an alternative to batteries in applications where the importance of power delivery trumps that of total energy storage. Supercapacitors have a number of advantages over batteries that make them a superior solution when short term, high power is needed, such as in power ride-through applications. These advantages include lower effective series resistance (ESR) and enhanced durability in the face of repeated charging. Linear Technology offers a portfolio of linear, switching and switched capacitor ICs designed to charge supercapacitors (also known as ultracapacitors). These parts offer input or output current limiting, automatic cell balancing and a range of protection features that make them uniquely suited to super cap charging. – LTC3226, LTC3625, LTC4425

Linear Technology's Interface products encompass a wide variety of industry-standard communication devices, including RS485 transceivers that enable long-range equipment communication, to I2C/SMBus digital interface devices that improve inter-chip communication. Our RS485, RS232, multiprotocol and CAN transceivers easily support today's fastest data rates, high node count, and low voltage supplies, while high ESD, failsafe, fault-protection and galvanic isolation all increase system reliability. Profibus (Process Field Bus) compatible devices easily meet the robust requirements of fieldbus solutions in factory and process automation environments. The I2C/SMBus bus buffers, multiplexers, rise time accelerators and isolators help digital systems meet specific I2C bus requirements, such as maximum bus capacitance and rise times, using unique features like selectable rise time acceleration strength and stuck bus recovery.

### RS232/RS562 Transceivers

The RS232 standard (formally TIA-232) specifies data transmission over a simple unshielded, multiconductor cable at rates up to 20kbps. The standard specifies the electrical characteristics and connector for an all-encompassing point-to-point modem interface. Although the original specification was intended for modems, subsequent versions of the standard shed unneeded signals to expand its scope and use as a general purpose serial interface at data rates up to 1Mbps. The RS562 standard is a similar low voltage version of the RS232 standard, with the primary difference being RS232 specifies a minimum driver output voltage of ±5V and RS562 specifies a minimum driver output voltage of ±3.7V, easing power supply requirements. Linear Technology offers single, dual, and combination transceivers of up to five RS232/RS562 drivers and receivers for 1.8V to 5.5V power supplies. Data terminal equipment (DTE) or data communications equipment (DCE) configurations are also available in 3.3V or 5V versions. Galvanically isolated modules, like the LTM2882, break ground loops and provide a convenient self-powered, isolated, low EMI solution that drastically reduces component count and design complexity. – LTC2801, LTC2804, LTM2882