Automotive Solutions

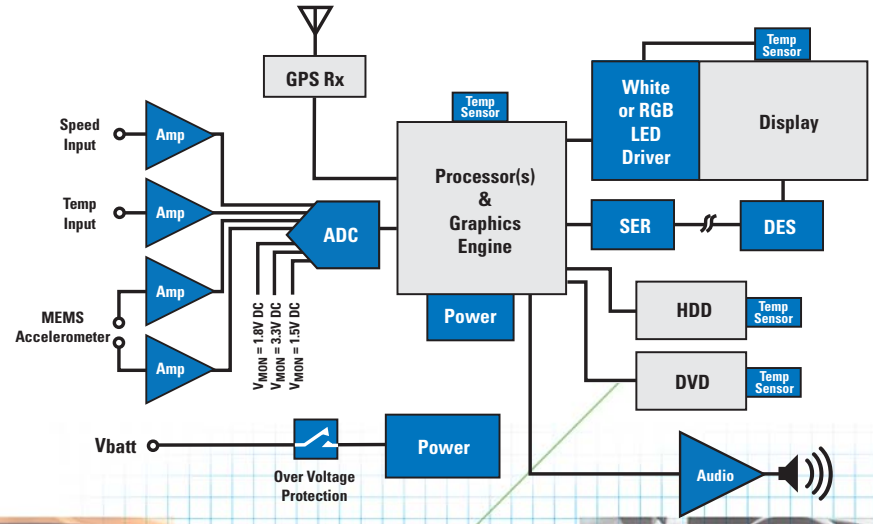
Solutions Guide

national.com/automotive

2010 Vol. 1

- Power Solutions
- Interface Solutions
- Data Conversion
- Temperature Solutions
- Audio Solutions
- Amplifiers
- Design Resources

PowerWise®



National Semiconductor

High-Quality Automotive Solutions for Robust Automotive Designs

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National Semiconductor—a leader in integrated circuits and a leading-edge silicon supplier in the automotive industry—offers a diverse product portfolio to address the many challenges and needs of the automotive market.

Today's automotive applications require reliability and precision in high-temperature environments and wide operating voltage ranges. At the same time, high efficiency solutions are critical to helping automotive electronic systems capitalize on space, lower operating temperatures, and minimize overall power consumption. National offers a diverse portfolio of data conversion, temperature sensor, amplifier, power management, audio, and interface products to address the everyday design challenges of the automotive industry.

Power Management Solutions

Efficiency in automotive solutions can not only save electrical power, but lower operating junction temperature and reduce solution size, as well. National offers best-in-class, low Iq products that preserve battery life for always-on electronics and a wide selection of LDOs, LED drivers, and PowerWise® regulators for systems with high-efficiency needs. Additional features such as wide input voltage ranges and adjustable frequencies make National's power management solutions ideal for automotive systems.

SerDes Solutions

Infotainment and driver assist technologies are proliferating throughout the vehicle driven by the need for increased safety, connectivity, and entertainment. National's FPD-Link family of serializers and deserializers enable the high-speed data transport of video signals between displays, cameras, graphics processors, and electronic control units (ECUs). These highly integrated chipsets embed data and clock over a single differential pair, incorporate advanced techniques for EMI mitigation, and are fully AEC-Q100 qualified to endure the harshest automotive operating environments.

Data Conversion Solutions

A wide portfolio of general purpose and high-speed analog-to-digital converters (ADCs) are ideal for applications like GPS and adaptive cruise control. National's ADCs maintain high dynamic performance over varying automotive temperature ranges while keeping system power dissipation low.

Audio Solutions

National's audio products enable high-performance listening experiences in vehicles with high-fidelity systems and minimize EMI with spread spectrum and edge rate control Class D products. Innovative solutions allow for multiple features in a single device, while reducing cable and heat sink requirements, for smaller, lighter automotive systems.

Temperature Sensor Solutions

Increased electronic content in critical automotive applications is driving the need for specialized high-temperature thermal management solutions. As a pioneer in this area, National's extensive line of thermal products include innovative technology building blocks that offer the highest accuracy, lowest power, and smallest packages with built-in safety mechanisms to promote the highest levels of reliability and best-in-class energy-efficient solutions over a wide temperature range.

Current Sensor Solutions

National's current sensors are optimized for automotive use and are 100 % tested at high and low operating temperatures to ensure consistent accuracy.

Amplifier Solutions

In many automotive analog applications and subsystems, EMI is a concern for the system designer. National offers EMI-hardened amplifiers which suppress the interference and enhanced connectivity caused by EMI sources. As a result, these amplifiers minimize the need for additional filters or costly shielding components.

PowerWise Solutions for Energy-Efficient Designs

PowerWise®

National's energy efficient PowerWise solutions for automotive products allow designers to reduce heat wear on electronics for longer service life while minimizing overall power consumption.

See all of National's automotive applications, products, and solutions at **national.com/automotive**

Contents

Automotive-Grade Products

National has developed Automotive-Grade products to help address and streamline design challenges with products that have passed rigorous testing and provide enhanced reliability specific to automotive requirements.

Automotive-Grade Products

National's Automotive-Grade products are:

- AEC-Q100-qualified with capabilities for each temperature grade
- TS-16949 certified
- Meeting customer-specific requirements
- Visible and traceable throughout the manufacturing, ordering, and supply chain processes

AECQ Temperature Grade	Min (°C)	Max (°C)
Grade 0	-40	+150
Grade 1	-40	+125
Grade 2	-40	+105
Grade 3	-40	+85
Grade 4	-0	+70

Product Qualification

Along with the AEC-Q100 reliability specification, a complete Production Part Approval Process (PPAP) package, compliant with the AIAG manual, is generated based on customer specifications.

Product Development

A comprehensive, phase review-based development process ensures quality from product inception through completion. This process includes complete design process documentation and AEC-Q003-compliant device characterization.

Manufacturing Quality

Beyond AEC-Q100 certification, National's manufacturing process distinguishes its Automotive-Grade products from others with:

- Special manufacturing flow with increased inspection and screening
- Enhanced defect detection through methods including PAT, delta current stress tests, statistical bin yield analysis, and reliability monitors
- Statistical process control
- Defect analysis using a closed loop, 8D-based corrective action and 5 Why root cause analysis

Change Management

To provide better visibility into product changes, National provides notifications with complete AEC-Q100-compliant documentation, including:

- Six months notification for change management
- Twelve month end-of-life notification with three-month shipping window

Identifying Automotive-Grade Product

All products featured in this guide are ideal for designing automotive applications. To find products that are fully Automotive-Grade compliant, look for the 🚗 symbol. Products with a ■ symbol are completing the requirements for Automotive-Grade status and will be fully qualified within the next 6 months. Each qualified part is identified with a special order code Q in the device part number to enable complete product visibility and traceability throughout the ordering, manufacturing, and supply chains.

Visit **national.com/automotive** for the most current list of AEC-Q100-qualified products or contact your local National Semiconductor sales office to request a product enter the qualification process.

Automotive Die Products

Die Products

As manufacturers continue to produce an increasing number of hybrid systems and subsystems, National has introduced a program aimed to provide products in die or wafer form to meet the special needs of automotive hybrids.

Die Products Value Advantage

The implementation rate of die products is rapidly increasing due to form factor and system performance improvement requirements. Factors influencing the migration from packaged semiconductor die to wire bond die include:

- Improved integration
- Smaller size and weight
- Reliability
- Improved electrical performance

Key Features of the Automotive Die Program

Focus on products with known pedigree and commonly used in automotive applications.
Temperature extensions:

- Tj up to +150°C
- Ta -40 to +125°C

Shipping methods to suit high volume production:

- Wafer
- Diced product on Tape and Reel — surftape® 7”up to 7000/reel

Automotive Die Portfolio

Part Type	Description
LM27	Factory Preset Thermostat
LM2594HV	Voltage Regulator
LM2901	Voltage Quad Comparator
LM2904	Dual Operational Amplifier
LM5575	Buck Switching Regulator
LM71	Temperature Sensor
LM74	Temperature Sensor
LMP7716	Amplifier
LP2951	Voltage Regulator
LM95172	Temperature Sensor

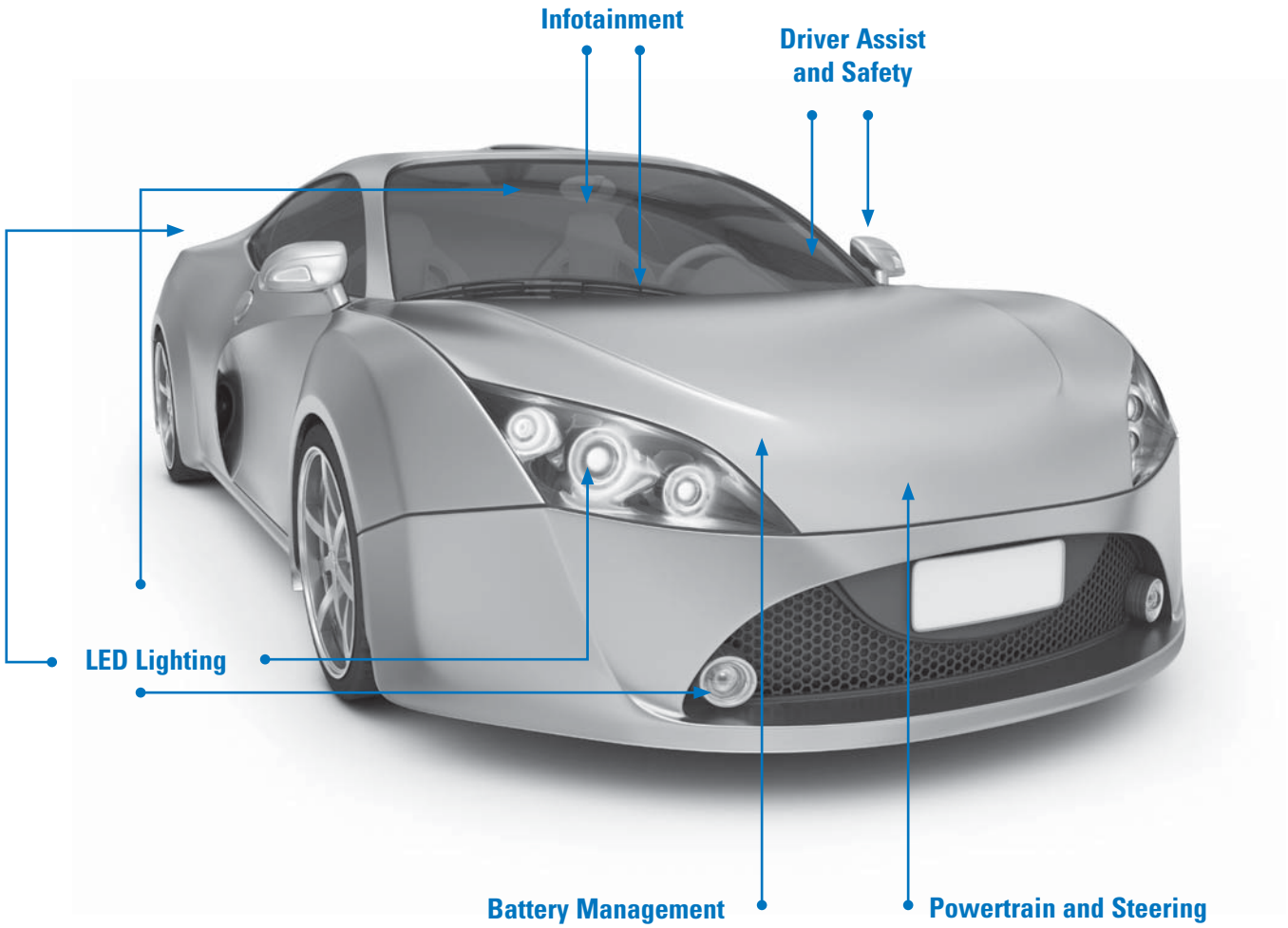
If you have questions or require a product not currently listed, please visit **national.com/automotive** to contact us.

Automotive Applications Overview

National's commitment to the automotive industry means providing more than just a collection of parts — it means delivering innovative, comprehensive automotive solutions that address system-level design requirements and enable comprehensive applications.

Following are a sampling of system-level solutions that address key automotive trends in infotainment, driver assist, safety, LED lighting, and powertrain systems.

When it comes to analog in automotive, National provides highly reliable solutions through a broad and growing array of products, regardless of the system. Look for growing innovation and updates at **national.com/automotive**.



Automotive Applications
Infotainment and GPS

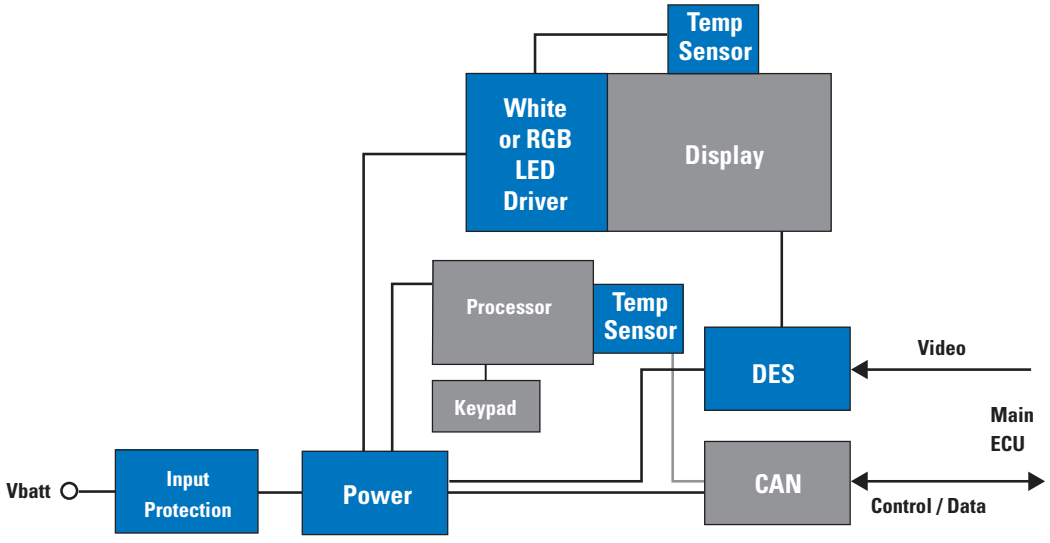
Infotainment — the fusion of driver information systems with in-car entertainment — continues to evolve as the automotive customer experience demands more advanced audio and video multimedia systems and integrated navigation.

To meet this demand, National features a diverse portfolio of products specifically targeted toward automotive infotainment systems that are small in size, feature EMI mitigating techniques, and incorporate power-saving technology.

Product	Features	Benefits
Power	High frequency	EMI mitigation, smaller inductor, power density, HV immunity
	External oscillator sync for spread-spectrum and/or avoiding specific radio tuner frequencies	
	Highly integrated Power Management Units (PMUs)	Small, cost-effective total footprint
FPD-Link SerDes	Serial link randomization and scrambling	EMI mitigation
	Spread-spectrum clock and leading EMI-mitigation techniques	
	Integrated signal conditioning features and termination resistors	Enhanced signal integrity
	Auto power up/down	Preserve battery life
	Small size	Reduce total board area
Temp Sensors	Best in class: high accuracy and resolution, fast conversion time, low quiescent current, and integrated reliability features	Protects electronics, maintains visual aesthetics, promote energy-efficient continuous operations
Amplifiers	Extremely low noise	High-fidelity audio
	Excellent Total Harmonic Distortion (THD)	
	Analog NTSC amplifiers available	Compatible with NTSC video signal standard

Automotive Infotainment System

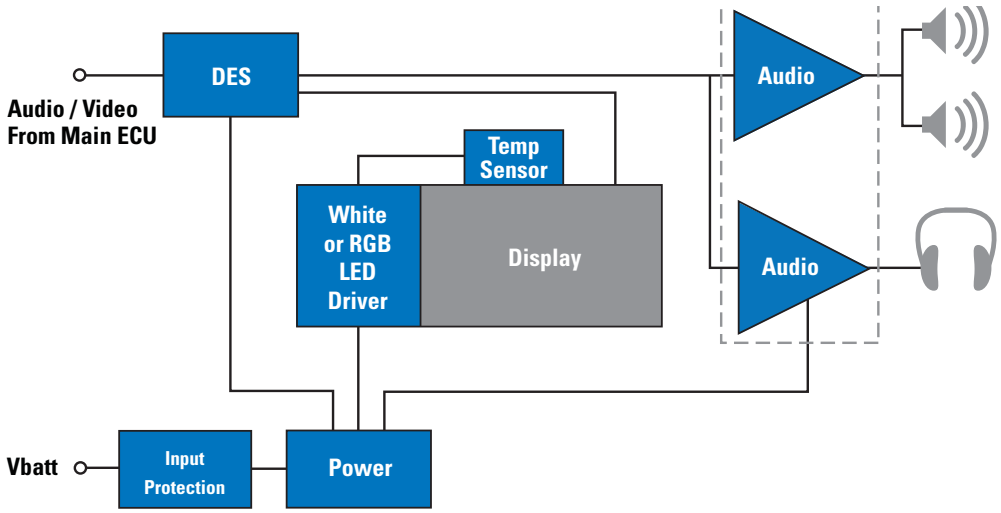
Central Information Display



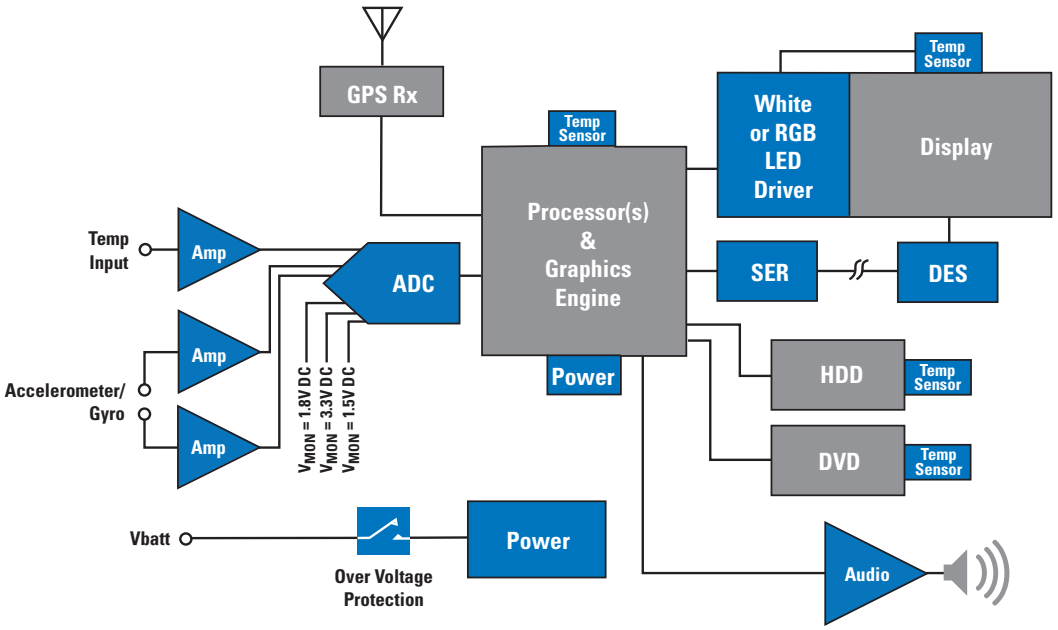
Automotive Applications
Infotainment and GPS

Automotive Infotainment System

Rear Seat Entertainment Unit

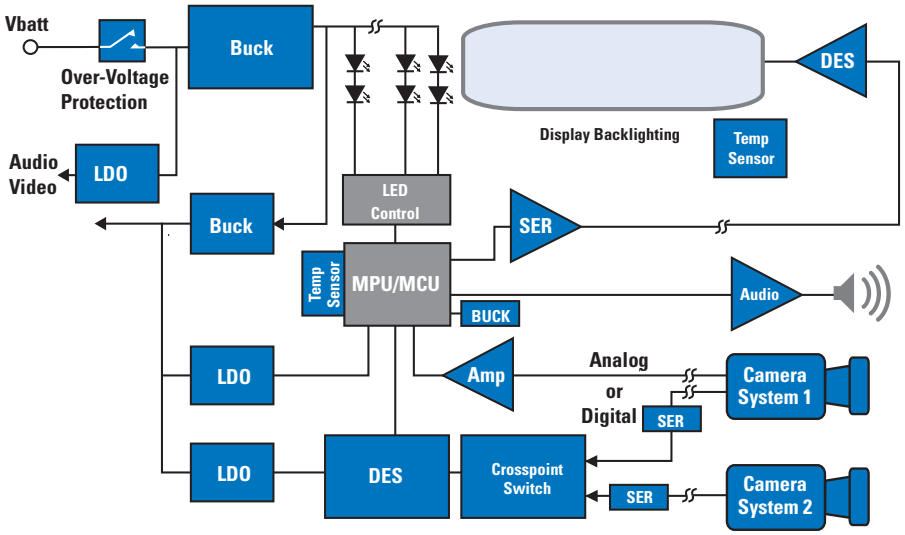


Automotive GPS Navigation System

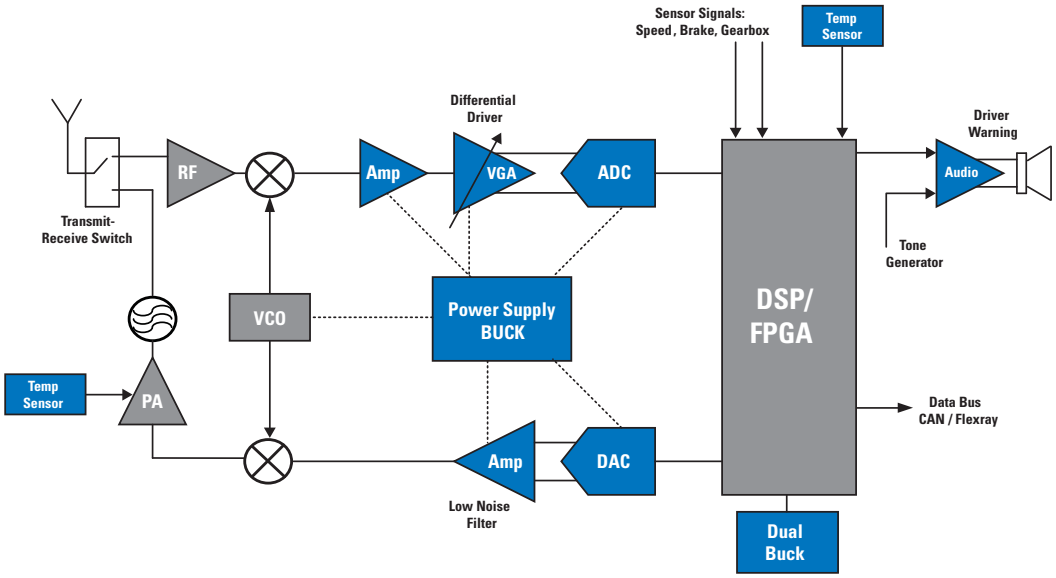


Safety combined with convenience is emerging as a top feature among automotive customers. Imaging solutions addresses this by extending visibility in end applications, such as parallel parking and backup vision. National creates innovative products for imaging applications that are qualified for automotive. These solutions utilize industry-leading EMI mitigating techniques, high efficiency at small solution sizes, and extensive power savings.

Automotive Park Assist



Car Radar for Active Cruise Control



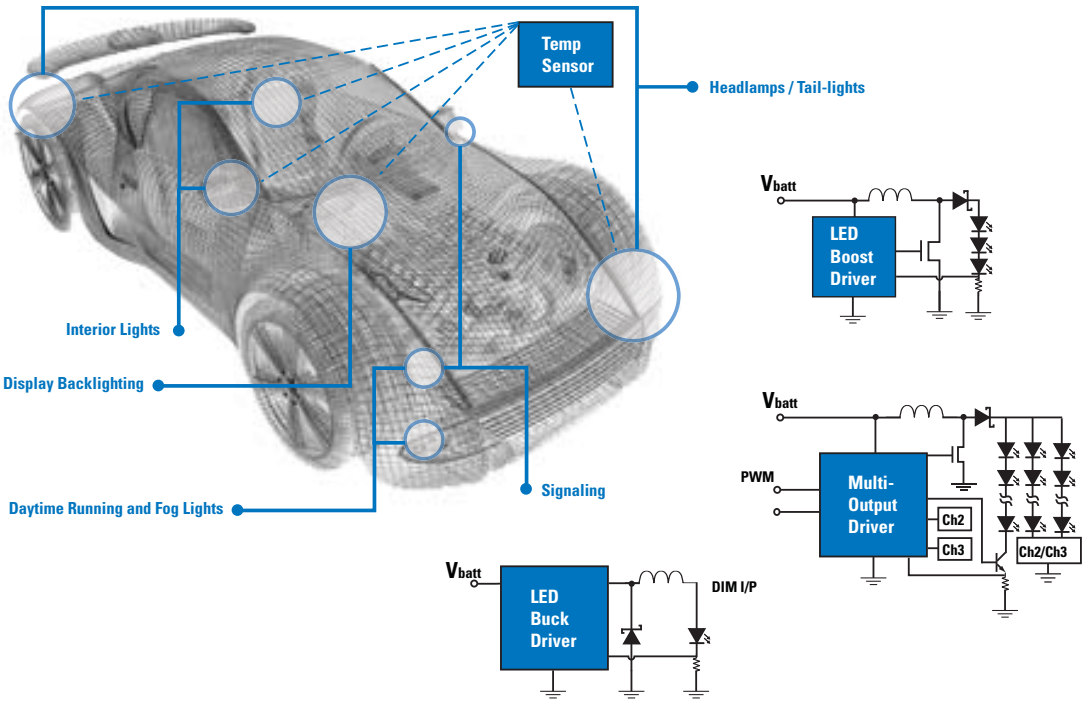
Automotive Applications
LED Lighting

From headlights to LCD backlighting in infotainment systems, LEDs are an integral part of the driving experience. National's portfolio of LED drivers offer key features like Pulse Width Modification (PWM) dimming, accurate Under Voltage Lock-out (UVLO), and high-side current sensing.

Additionally, low LED ripple current and external oscillator sync capabilities allow designers to reduce issues with EMI. These LED drivers provide maximum efficiency and effectiveness in any automotive lighting system.

Features	Benefits
High efficiency	Alleviates major heat problems
High-side current sensing	LEDs grounded to chassis
Accurate current control	Protect LEDs from over current
Flexible high dimming ratio	Easily reduces current when battery is low to avoid excessive battery drain
Wide-voltage range	Stable under instant on, low and high battery, high voltage transients
Accurate UVLO	Disable when battery is low
Low LED ripple current	Minimize EMI
External oscillator sync capability	External spread spectrum for low EMI

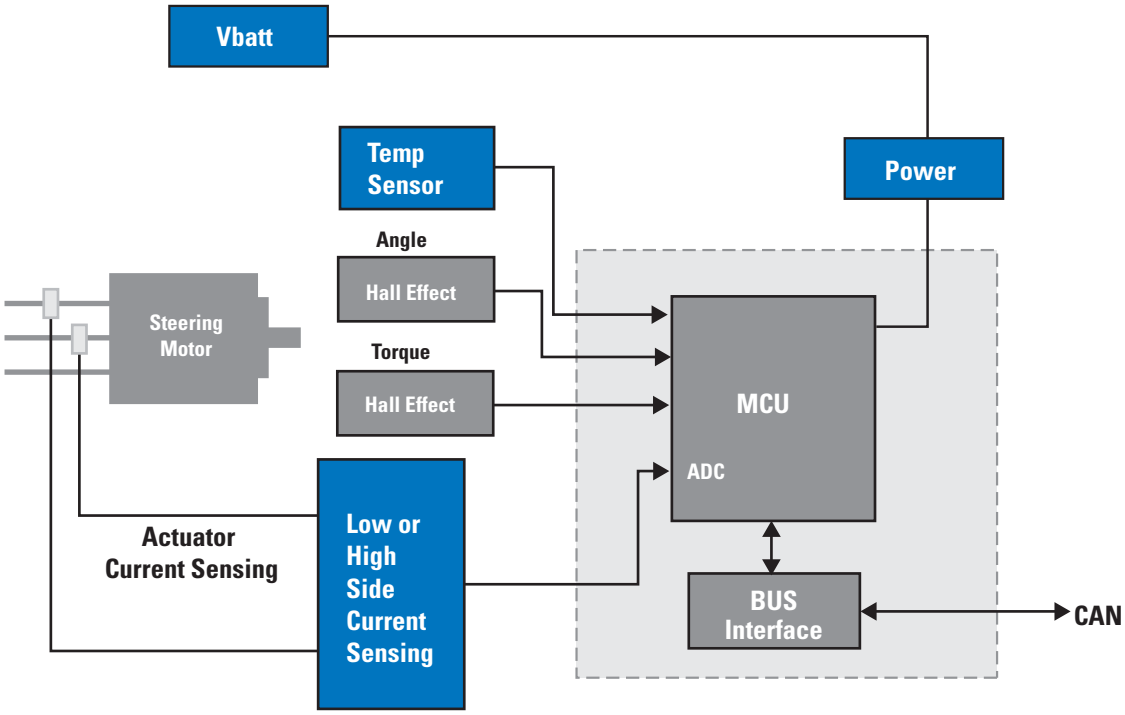
Automotive LED Lighting



Powertrain and under-the-hood systems, like electric power steering, gearbox, and injection systems demand the highest thermal performance from electronics at temperatures up to 150º C. National offers power management, thermal management, and bare die products with a range up to 175° C for state-of-the-art steering, gearbox, injection, and hybrid drive systems.

See why National is first in market position and has 85% brand recognition for its best-in-class temperature sensor solutions.

Automotive Electric Power Steering



Power Management Solutions

LM2600x – 1.5/3A Buck Regulators with High-Efficiency Sleep Mode

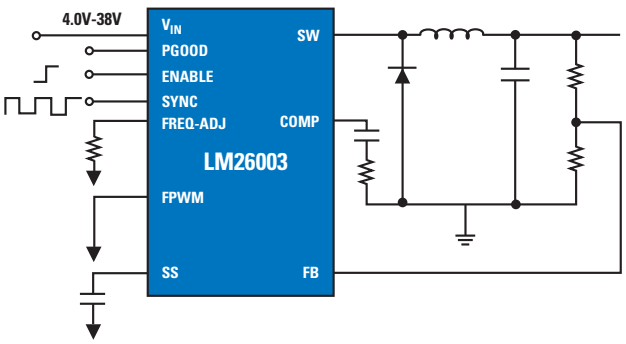
Features

- 10 µA in shutdown mode, 40 µA in sleep mode
- 3V cold-crank compatibility
- 4V to 38V continuous input range
- 1.5% reference accuracy
- Frequency synchronization
- Low input version LM26001B (3V to 18V)

Applications

Ideal for use in automotive telematics, navigation systems, and in-dash instrumentation

Basic Step-Down Regulator



LM34919B – Ultra-Small 40V, 600 mA Constant On-Time Buck Switching Regulator

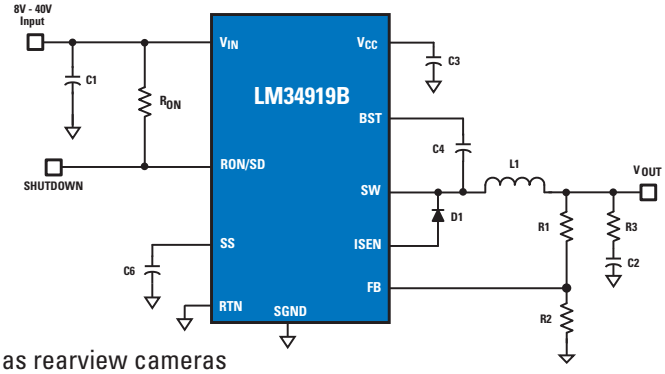
Features

- Integrated N-channel buck switch
- Integrated start-up regulator
- 6V to 40V nput voltage range
- No loop compensation required
- Ultra-fast transient response
- Operating frequency remains constant with load current and input voltage
- 2.6 MHz maximum switching frequency

Applications

Designed for use in extremely spaced-constrained applications, such as rearview cameras

Typical Application Circuit



LM5060 – Hot Swap/In-Rush Current Limit Controller with Current and Power Limiting

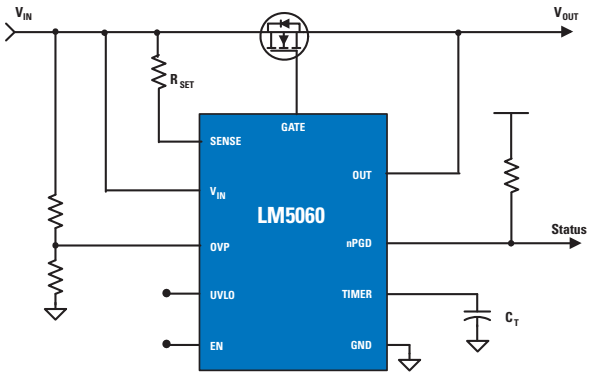
Features

- AEC Q-100 Grade 1 qualified
- Wide operating input voltage range +5.5V to +65V
- Less than 15 µA quiescent current in disabled mode
- Controlled output rise time for safe connection of capacitive loads
- Charge pump gate driver for external N-Channel MOSFET
- Programmable fault detection delay time

Applications

Ideal for use in electronic power steering and braking, electric motor control, and electronic circuit brakers

Typical Application Circuit



SIMPLE SWITCHER® Power Modules

Product ID	Output Current	Input Min (V)	Input Max (V)	Output Min (V)	Output Max (V)	Temp Range	Packaging	Auto Grade
NEW! LMZ10503/04/05 E, W	3/4/5	2.95	5.5	0.8	5	-40C to 125C	TO-PMOD-7	—
NEW! LMZ12001/02/03 E, W	1/2/3	4.5	20	0.8	6	-40C to 125C	TO-PMOD-7	—
NEW! LMZ14201/02/03 E, W	1/2/3	6	42	0.8	6	-40C to 125C	TO-PMOD-7	—

High-Voltage Switching Regulators

Product ID	SIMPLE SWITCHER	Synchronous Rectification	Load	V_{IN} (V)	V_{REF} (V)	Max Freq	Sync	Iq/Shutdown (µA)	Packaging	Auto Grade
LM(2)5574	✔		500 mA	6 to 75	1.225	1 MHz	✔	3.7 mA/48 µA	TSSOP-16	(1)
LM(2)5007			500 mA	9 to 75	2.5	800 kHz		0.6 mA70 µA	MSOP, LLP-8	—
NEW! LM5008/09A			350 mA	6 to 95	2.5	600 kHz		110 µA	MSOP, LLP-8	
NEW! LM25011			2A	6 to 42	2.51	2 MHz		1400 µA	MSOP-10	(1)
NEW! LM34919B			600 mA	6 to 40	2.5	2.6 MHz		0.6 mA/215 µA	micro SMD-10	(1)
LM3103	✔	✔	750 mA	4.5 to 42	0.6	1 MHz	✔	0.7 mA/20 µA	eTSSOP-16	—
LM(2)5010/A E			1A	8 to 42	2.5	1 MHz		0.6 mA/90 µA	LLP-10, eTSSOP-14	(1, 0)
LM34917A			1.2A	8 to 33	2.5	2 MHz		0.68 mA/95 µA	micro SMD-12	—
LM34910C			1.25A	8 to 50	2.5	1 MHz		0.6 mA/80 µA	LLP-10	—
LM25575 E	✔		1.5A	6 to 42	1.225	1 MHz	✔	3.7 mA/48 µA	eTSSOP-16	(1)
LM5575 E	✔		1.5A	6 to 75	1.225	500 kHz	✔	3.7 mA/57 µA	eTSSOP-16	(1)
LM3100	✔	✔	1.5A	4.5 to 42	0.8	1 MHz	✔	0.7 mA/20 µA	eTSSOP-20	—
LM26001/03 E			1.5/3.0A	3 to 38	1.25/1.24	500 kHz	✔	40 µA/10 µA	eTSSOP-16/20	(1)
LM3102	✔	✔	2.5A	4.5 to 42	0.8	1 MHz	✔	0.7 mA/25 µA	eTSSOP-20	—
LM25005			2.5A	7 to 42	1.225	500 kHz		3 mA/50 µA	eTSSOP-20	—
LM(2)5576 E	✔		3A	6 to 75	1.225	1 MHz	✔	3.7 mA/48 µA	eTSSOP-20	(1)
NEW! LM27341/42 E			1.5/2.0A	3 to 20	1.0	2350 kHz	✔	70 nA	LLP-10, eMSOP-10	(1)

High-Power Density Buck Switching Regulators

Product ID	V_{IN} (V)	Output Min (V)	Output Max (V)	Output Current (mA)	Frequency Range (kHz) & Sync	Synchronous Rectification	Packaging	Auto Grade
LM2734X/Y E	3 to 20	0.8	18	1000	500, 1600		SOT23-6	(1)
LM2734Z E	3 to 20	0.8	18	1000	3000		SOT23-6, LLP-6	(1)
LM2830	3 to 5.5	0.6	4.5	1000	1600		SOT23-5, LLP-6	(1)
LM2831/32	3 to 5.5	0.6	4.5	1500/2000	550, 1600, 3000		SOT23-5, LLP-6, eMSOP-8	—
LM20123/24	2.95 to 5.5	0.8	5	3000/4000	1000/1500	✔	eTSSOP-16	—
LM20125	2.95 to 5.5	0.8	5	5000	500	✔	eTSSOP-16	—
LM20133/34	2.95 to 5.5	0.8	5	3000	460 to 1.5 MHz, Sync	✔	eTSSOP-16	—
LM20143/44	2.95 to 5.5	0.8	5	3000/4000	500 to 1500	✔	eTSSOP-16	■
LM20154	2.95 to 5.5	0.8	5	4000	1000	✔	eTSSOP-16	—
LM20242	4.5 to 36	0.8	32	2000	1000	✔	eTSSOP-16	—
LM20333	4.5 to 36	0.8	32	3000	250 to 1.5MHz, Sync	✔	eTSSOP-20	—

Boost Switching Regulators

Product ID	V_{IN} (V)	Output Min (V)	Output Max (V)	Switch Current (A)	Frequency Range (kHz) & Sync	Packaging	Auto Grade
LM2735X E	2.7 to 5.5	3	24	2.25	1600	SOT23-5, LLP-6	(1)
LM2735Y	2.7 to 5.5	3	24	2.25	520	SOT23-5, LLP-6	(1)
LM5000 W	3.1 to 40	1.259	Set by external feedback network	2	300 to 600	LLP-16, TSSOP-16	—
LM5001 E	3.1 to 75	1.26	Set by external feedback network	1	50 to 1500, Sync	SO-8, LLP-8	—
LM5002	3.1 to 75	1.26	Set by external feedback network	0.5	50 to 1500, Sync	SO-8, LLP-8	—
LM27313	2.7 to 14	4	28	1	600 to 1600	SOT23-5	—

PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified ■ AEC-Q100 qualification in process
(0) AECQ Temperature Grade 0 (1) AECQ Temperature Grade 1

Power Management Solutions
Controllers and Gate Drivers

Advanced Topology Controllers

Product ID	Topologies	V_{IN} (V)	Gate Drive Current (A)	Frequency (kHz)	PWM Mode	Packaging	Other Features	Auto Grade
NEW! **LM25037**	Push-pull, half-bridge, full-bridge	5.5 to 75	1.2	2000	Voltage/ Current	TSSOP-16	Alternating outputs	(1)
LM5032	Dual independent/interleaved	13 to 105	2.5	1000	Current	TSSOP-16	Hiccup mode current limit	—
LM5034	Dual independent, forward active clamp	13 to 105	2.5/1.5	1000	Current	TSSOP-20	Reset transistor driver	—
NEW! **LM5035B**	Half-bridge	13 to 105	2	1000	Voltage/ Current	LLP-24, eTSSOP-20	Sync rectification for high efficiency	—
LM5037	Push-pull, half-bridge, full-bridge	13 to 105	1.2	2000	Voltage/ Current	TSSOP-16	Alternating outputs	■
NEW! **LM5039**	Half-bridge	13 to 105	2	1000	Voltage/ Current	LLP-24, eTSSOP-20	Average, cycle-by-cycle, hiccup mode current limit	—

Controllers

Product ID	V_{IN} (V)	Output Min (V)	Output Max (V)	Feedback Tolerance %	Frequency Range (kHz) and Sync	On/Off Pin	Topology, PWM Mode	Channels	Packaging	Auto Grade
LM2743 E, W	1 to 16	0.6	13.5	2.0	50 to 2000	✔	Voltage, Buck	1	TSSOP-14	■
LM3478 E, W	2.95 to 40	1.26	40	1.26	100 to 1000, Sync	✔	Boost, SEPIC, Flyback	1	MSOP-8	(1)
LM3488 W	2.95 to 40	1.26	40	1.26	100 to 1000, Sync	✔	Boost, SEPIC, Flyback	1	MSOP-8	(1)
LM3481 E	2.97 to 48	1.275	40.8	1.275	100 to 1000, Sync	✔	Boost, SEPIC, Flyback	1	MSOP-10	■
LM(2)5118 E, W	3 to 75	1.23	70	1.46	50 to 500, Sync	✔	Buck-Boost	1	eTSSOP-20	(1)
LM3485 E, W	4.5 to 35	1.242	VIN	2.0	0 to 1400	—	Hysteretic, Step down	1	MSOP-8	(1)
LM3489 E	4.5 to 35	1.239	VIN	2.0	0 to 1400	✔	Hysteretic, Step down	1	MSOP-8	(1)
LM(2)5085 E, W	4.5 to 42, 75	1.25	VIN	2.0	300 to 1000	✔	Buck, Constant on-time	1	MSOP-8	(1)
LM(2)5088 E, W	4.5 to 42	1.205	40, 70	1.5	50 to 1000	✔	Buck, Emulated current	1	eTSSOP-16	■
NEW! **LM5060** E	5.5 to 65	—	—	—	—	✔	Hot Swap	—	mini-SOIC-10	(1)

Gate Drivers

Product ID	Description	Sink/Source	V_{CC} Range	Supplies	Inputs	Package	Auto Grade
LM5110	Dual, low side	5A/3A	3.5V to 14V	Single or Split	Non-Inverting, Inverting, Mixed	SOIC-8, LLP-10	—
LM5111	Dual, low side	5A/3A	3.5V to 14V	Single or Split	Non-Inverting, Inverting, Mixed	SOIC-8, MSOP-EP	—
LM5112	Dual, low side	7A/3A	3.5V to 14V	Single or Split	Non-Inverting, Inverting, Mixed	LLP-6, MSOP-EP	(1)

PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

LM342x – N-Channel Controllers for Constant-Current LED Drivers

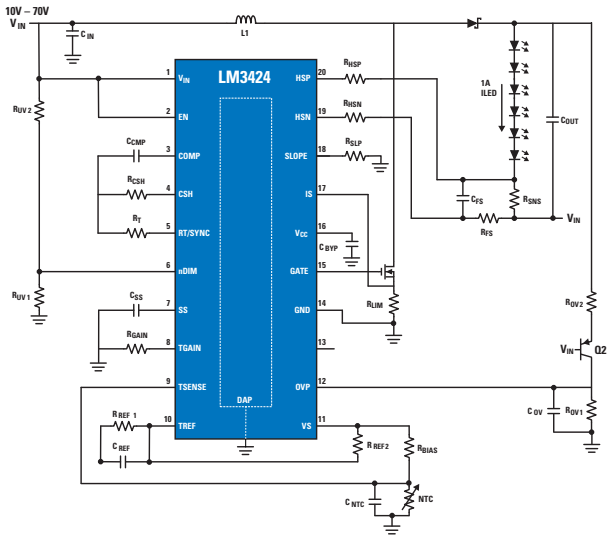
Features

- V_{IN} range from 4.5V to 75V
- High-side adjustable current sense
- 2Ω, 1A Peak MosFET gate driver
- Input under-voltage and output over-voltage protection
- PWM and analog dimming
- Cycle-by-cycle current limit

Applications

Ideal for illuminating LEDs in automotive lighting systems

Typical Application Circuit



LED Drivers

Product ID	Description	Input Range (V)	Max Out-put (V)	Max LED Current (mA)	Max # of LEDs in Series	Switching Freq (MHz)	Topology	Key Features	Packaging	Auto Grade
LM3401 E,W	Hysteretic PFET	4.5 to 30	35	3000	9	1.5	Buck	Adjustable hysteresis, 100% duty cycle, PWM dimming	MSOP-8	—
LM3402/04/ 06HV E,W	0.5A constant current	6 to 42/ 6 to 75	37/67	500/1000/ 1500	9/15	Adjustable up to 1 MHz	Buck	Fast PWM dimming, supports ceramic capacitor and capacitor-less outputs	MSOP-8, PSOP-8	—
LM3405A E,W	1A constant current	3 to 15/ 3 to 22	14/20	1000	4	1.6	Buck	205 mV feedback voltage, PWM dimming	TSOT-6	—
LM3407 E,W	0.35A constant current	4.5 to 30	27	350	7	Adjustable up to 1 MHz	Buck	Fast PWM dimming, low external component count, constant frequency	eMSOP-8	—
LM3409/HV E,W	PFET, constant current source	1.24 to V_{IN}	42/75	3000+	9/15	Adjustable	Buck	Differential high-side current sense, analog current adjust, 100% duty cycle	eMSOP-10	(1)
LM3410 E,W	Constant current boost and SEPIC, internal compensation	2.7 to 5.5	24	1000	6	525 kHz/ 1.6 MHz	Boost, SEPIC	PWM dimming, small footprint, low external component count	SOT23-5, LLP-6	(1)
LM3430/32 E	6-channel constant current boost controller and current regulator	6 to 40	80+	40 per string	100	Adjustable up to 2 MHz	Boost	Dynamic Headroom Control for balanced current through up to 6 strings of LEDs	TSSOP-28, LLP-28	—
LM3431 E,W	3-channel constant current, integrated boost controller	5 to 36	40+	200 per string	30	Adjustable up to 1 MHz	Boost	Balances current through 3 strings of LEDs for even brightness	LLP-12, LLP-24 eTSSOP-28	(1)
LM3421/23 E,W	N-channel controllers	4.5 to 75	75	>2000	20	Adjustable up to 2 MHz	Buck, Boost, Flyback, SEPIC	Fast PWM dimming, LED ready, broken open check, over voltage protection	eTSSOP-16/ 20	(1)
NEW! **LM3424/29** E,W	N-channel controllers	3.5 to 75	75	3000+	18/29	Adjustable	Buck, Boost, SEPIC	Programmable thermal foldback	eTSSOP-20	(1)

PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified (1) AECQ Temperature Grade 1

Power Management Solutions

Multi-Output Regulators and Sequencers

LM26480 – Externally Programmable Dual High-Current Buck DC/DC and Dual Linear Regulators

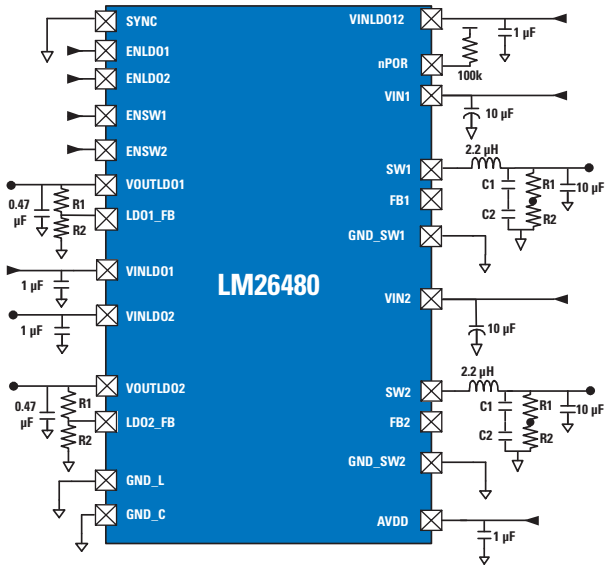
Features

- Compatible with advanced applications processors and FPGAs
- 2 LDOs for powering internal processor functions and I/Os
- Precision internal reference
- Thermal overload and current overload protection
- External power-on-reset function for Buck1 and Buck2
- Undervoltage lock-out detector to monitor input supply voltage

Applications

Ideal for use in automotive infotainment systems and camera modules

Typical Application Circuit



Multi-Output Regulators

Product ID	Description	I_{OUT}	Output Range (V)	Peak Efficiency	Input Range (V)	Features	Packaging	Auto Grade
LP3906 E	Multi-function, programmable power management unit with I²C-compatible interface	Up to 1.5A	0.8 to 3.3	96%	2.7 to 5.5	Dual 1.5A buck, dual 300 mA LDO, I²C	LLP-24	—
LM26480 E	Multi-function power management unit	Up to 1.5A	0.8 to 3.3	96%	2.7 to 5.5	Dual 1.5A buck, dual 300 mA LDO, external control	LLP-24	■
LP3907 E	Multi-function, programmable power management unit with I²C-compatible interface	Up to 1A	0.8 to 3.3	96%	2.7 to 5.5	Dual 1A/600mA buck, dual 300mA LDO, I²C	LLP-24, micro SMD-25	(1)

Cascading Sequencers

Product ID	V_{IN} (V)	Number of Regulators Able to Sequence	Power Down	Power Up	Ability to Cascade	On/Off Pin	Packaging	Auto Grade
LM3880 E	2.7 to 5.5	3	✔	✔	✔	✔	SOT-23 - 6	(1)
LM3881 E	2.7 to 5.5	3	✔	✔	✔	✔	Mini-SOIC - 8	—

PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

Low Dropout CMOS Linear Regulator Family

Product ID	V_{IN} (V)	Output Min (V)	Maximum Dropout (mV)	Load (mA)	Enable Pin	Packaging	Auto Grade
LP38690	2.7 to 10	ADJ (1.25 - 9) or 1.8, 2.5, 3.3, 5	1600	1000	—	T0252-3, SOT223-5, LLP-6	—
LP38691/93	2.7 to 10	ADJ (1.25 - 9) or 1.8, 2.5, 3.3, 5	725	500	—	T0252-3, LLP-6, SOT223-5	■
LP2960	-20 to 30	ADJ (1.24 - 29) or 3.3, 5	600	500	✔	SOIC-16	—
LM9070	5.3 to 26	5	800	250	—	TSOP-20, TO220-7	—
LM9071	5.3 to 26	5	800	250	✔	TO220-5, TO263-5	—
LP2950/51	0.3 to 30	1.24, 3.3	380	75	✔	SOIC-8	—
LP2952	-20 to 30	ADJ (1.24 - 29) or 3.3, 5	600	250	✔	TSOP-16, MDIP-14, D, W	—
LP2953	-20 to 30	ADJ (1.24 - 29) or 3.3, 5	600	250	✔	TSOP-16, MDIP-16, D, W	—
LP2954	-20 to 30	ADJ (1.24 - 29) or 5	600	250	✔	MSOP-8, TO220-3, TO263-3	—
LP2957	-20 to 30	5	600	250	✔	TO220-5	—
LM9076	3.65, 5.4 to 40	3.3, 5	450	150	✔	TO263-5	—
LM2936	3.3 to 60	3, 3.3, 3.5	400	50	✔	MSOP-8, SOT223-4, TO252-3, SOIC-8, T092-3, D, W	(1)
LM9036	3.7 to 40	3.3, 5	400	50	—	MSOP-8, TO252-3, SOIC-8	—

Voltage References

Product ID	Type	V_{IN} (V)	Reference (V)	Initial Accuracy (+/-) Max	Tempco, Max (ppm/C)	Output Current (mA)	Quiescent Current (mA)	Long Term Stability (ppm/1000hr)	Voltage Noise (µVp-p)	Packaging	Auto Grade
LM4120	Series	3.3 to 14	3, 3.3, 4.096, 2.048, 5, 1.8, 2.5	0.2, 0.5	50	5	0.16	100	20	SOT23-5	—
LM4128	Series	2.2 to 5.5	3, 3.3, 4.096, 2.048, 1.8, 2.5	0.1, 0.2, 0.5, 1	75, 100	20	0.06	50	170	SOT23-5	(1)
LM4132	Series	2.2 to 5.5	4.096, 2.048, 2.5	0.05, 0.1, 0.2, 0.4, 0.5	10, 20, 30	20	0.06	50	170	SOT23-5	—
LM4140	Series	1.8 to 5.5	1.25, 4.096, 2.048, 1.024, 2.5	0.1	3	8	0.23	60	2.2	SO-8	—
LM4030	Shunt	N/A	2.5, 4.096, 5.0	0.05, 0.10, 0.15	10	30	0.12	50	100	SOT23-5	■

PowerWise® product AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

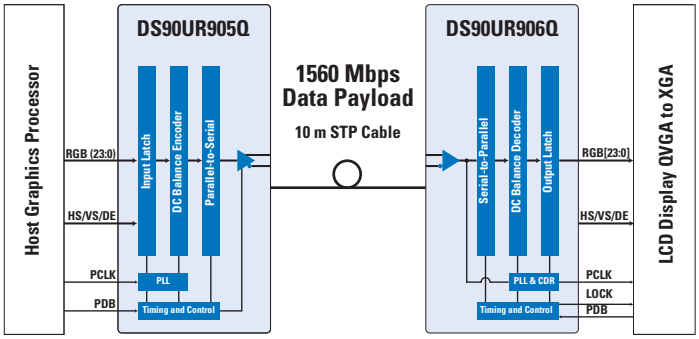
Interface Solutions

FPD-Link II Serializers and Deserializers

DS90UR90x – 5 MHz to 65 MHz 24-Bit True Color FPD-Link II SerDes

Features

- Transports video data and clock over a single pair
- RGB888 + VS, HS, DE
- 140 Mbps to 1.56 Gbps throughput
- Works with devices that support FPD-Link, LVCMOS, or LVDS
- EMI minimization on output parallel bus (Spread-Spectrum Clock Generation (SSCG), optional LVDS input/output
- Randomizer/scrambler for DC-balanced data stream



Applications

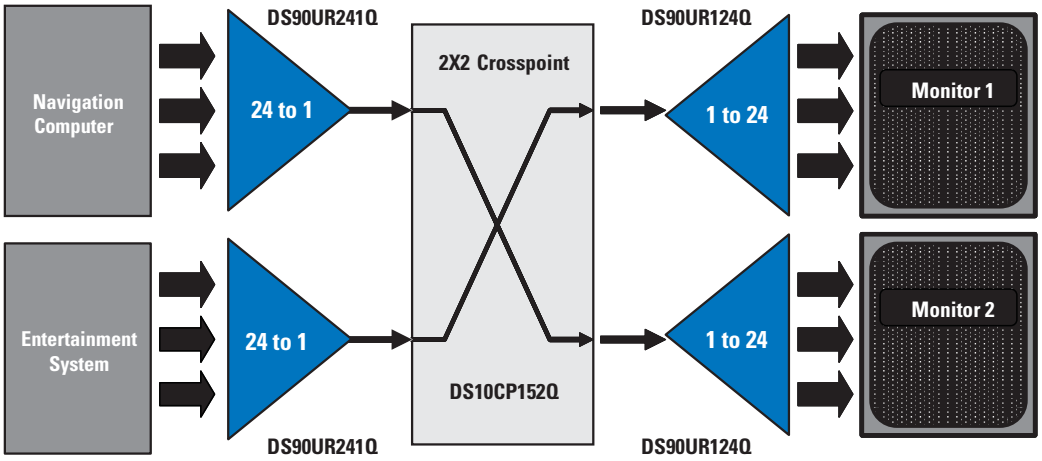
Designed for navigation and entertainment displays

FPD-Link II SerDes

Product ID	Description	Throughput (Mbps)	Pixel Clock Rate (MHz)	Graphics Bits	Function	ESD	Packaging	Auto Grade
Serializers								
NEW! **DS90UR905**	5 to 65 MHz, 24-bit FPD-Link II LVCMOS	1560	65	24	Embeds the clock and balances data payload	8 kV HBM, ISO 10605	LLP-48	(2)
NEW! **DS90UR907** E	5 to 65 MHz, 24-bit FPD-Link II converter	1560	65	24	Converts, balances, and level shifts 4 LVDS streams	8 kV HBM, ISO 10605	LLP-36	(2)
DS99R421 E	5 to 43 MHz, 24-bit FPD-Link II converter	774	43	18	AC-Coupled, DC Balance, BIST, enhanced serial link randomization	8 kV HBM, ISO 10605	LLP-36	(2)
DS90UR241 E	5 to 43 MHz, 24-bit FPD-Link II LVDS	774	43	18	AC-Coupled, DC Balance, Built-In Self Test (BIST), scrambling to lower EMI	8 kV HBM, ISO 10605	TQFP-64	(2)
DS90C241 E	5 to 35 MHz, 24-bit FPD-Link II LVDS	630	35	18	AC-Coupled, DC Balance	8 kV HBM, ISO 10605	TQFP-48	(2)
Deserializers								
NEW! **DS90UR906**	5 to 65 MHz, 24-bit color FPD-Link II	1560	65	24	Recovers data and control signals, level shifts signals	8 kV HBM, ISO 10605	LLP-60	(2)
NEW! **DS90UR908** E	5 to 65 MHz, 24-bit color FPD-Link II converter	1560	65	24	Recovers data and control signals, extracts clock	8 kV HBM, ISO 10605	LLP-48	(2)
DS99R124 E	5 to 43 MHz, 24-bit FPD-Link II converter	774	43	18	AC-Coupled, DC Balance, BIST, enhanced serial link randomization	8 kV HBM, ISO 10605	LLP-36	(2)
DS90UR124 E	5 to 43 MHz, 24-bit FPD-Link II LVDS	774	43	18	AC-Coupled, DC Balance, BIST, frequency spread PTO, slew rate control to lower EMI	8 kV HBM, ISO 10605	TQFP-64	(2)
DS90C124 E	5 to 35 MHz, 24-bit FPD-Link II LVDS	630	35	18	AC-Coupled, DC Balance, adjustable PTO to lower EMI	8 kV HBM, ISO 10605	TQFP-48	(2)

PowerWise® product E Evaluation board AEC-Q100 qualified (2) AECQ Temperature Grade 2

Crosspoint Switch with SerDes



Product ID	Description	Inputs	Outputs	Input Levels	Output Levels	Max Datarate (Mbps)	Temp Range (°C)	Packaging	Auto Grade
Crosspoint Switches									
DS25CP102	3.125 Gbps LVDS 2X2 crosspoint with pre-emphasis and equalization	2	2	LVDS	LVDS	3125	-40 to 85	LLP-16	(3)
DS10CP152Q	1.5 Gbps LVDS 2X2 crosspoint	2	2	LVDS	LVDS	1500	-40 to 85	SOIC-16	(3)
DS25CP152Q	3.125 Gbps LVDS 2X2 crosspoint	2	2	LVDS	LVDS	3125	-40 to 85	LLP-16	(3)
Drivers/Receivers									
DS90LV011AQ	LVDS driver	1	1	LVTTL	LVDS	400	-40 to 85	SOT-23-5	(1)
DS90LV027AQ	Dual LVDS driver	2	2	LVTTL	LVDS	400	-40 to 85	SOIC-8	(1)
DS90LT012AQ	LVDS receiver	1	1	LVDS	LVTTL	400	-40 to 85	SOT-23-5	(1)
DS90LV028AQ	Dual LVDS receiver	2	2	LVDS	LVTTL	400	-40 to 85	SOIC-8	(1)
DS90LV049Q	Dual, full duplex LVDS transceiver	4	4	LVTTL/LVDS	LVDS/LVTTL	400	-40 to 85	SOIC-16	(1)
M-LVDS									
DS91D176	M-LVDS transceiver	1	1	LVTTL/LVDS	LVDS/LVTTL	200	-40 to 85	SOIC-8	—
DS91C176	M-LVDS transceiver	1	1	LVTTL/LVDS	LVDS/LVTTL	200	-40 to 85	SOIC-8	—
DS91D180	M-LVDS full duplex	2	2	LVTTL/LVDS	LVDS/LVTTL	200	-40 to 85	SOIC-8	—
DS91C180	M-LVDS full duplex	2	2	LVTTL/LVDS	LVDS/LVTTL	200	-40 to 85	SOIC-8	—
DS91M040	Quad, full duplex M-LVDS transceiver	4	4	LVDS/LVTTL	LVDS/LVTTL	250	-40 to 85	LLP-32	—
DS91M047	Quad M-LVDS driver	4	4	LVTTL	LVDS	250	-40 to 85	SOIC-16	—
DS91M124	1 to 4 M-LVDS driver	1	4	LVTTL	LVDS	250	-40 to 85	SOIC-16	—
DS91M125	1 to 4 M-LVDS driver	1	4	LVDS	LVDS	250	-40 to 85	SOIC-16	—

PowerWise® product AEC-Q100 qualified (1) AECQ Temperature Grade 1 (3) AECQ Temperature Grade 3

Data Conversion Solutions
A/D Converters

Ultra-High-Speed A/D Converters

Product ID	Sampling Rate (MSPS)	Power (W)	NPR (dB)	IMD (dBFS)	Noise Floor (dBm/Hz)	ENOB (bits)	SNR (dB)	SFDR (dBc)	Packaging	Auto Grade
NEW! ADC12D1800 E	1800/3600	4.1	52	-61	-147	9.2	57.8	67	TEPBGA-292	—
NEW! ADC12D1600 E	1600/3200	3.8	52	-63	-147.5	9.3	58.6	68	TEPBGA-292	—
NEW! ADC12D1000 E	1000/2000	3.4	52	-66	-147.5	9.5	59.1	70.5	TEPBGA-292	—
ADC10D1500 E	1500/3000	3.59	48	-67.6	-144.7	8.9	57	66	TEPBGA-292	—
ADC10D1000 E	1000/2000	2.77	48	-67.6	-144.7	9.1	57	66	TEPBGA-292	—
ADC08B3000 E	3000	1.6	—	—	—	7.2	45.3	55.4	eLQFP-128	—
ADC08D1520 E	1500/3000	2	—	—	—	7.4	46.8	58	eLQFP-128	—
ADC081500	1500	1.2	—	—	—	7.4	47	56	eLQFP-128	—
ADC08D1020 E	1000/2000	1.6	—	—	—	7.4	46.8	58	eLQFP-128	—
ADC08D500 E	500	1.4	—	—	—	7.5	47	55	eLQFP-128	—
ADC08B200 E	200	0.306	—	—	—	7.2	46.3	56	TQFP-48	(2)

High-Speed A/D Converters

Product ID	Channels	Speed (MSPS)	Power (mW)	SNR (dB)	SFDR (dB)	Outputs	Packaging	Auto Grade
16-bit								
NEW! ADC16DV160 E	2	160	1300	78.5	95	LVDS	LLP-68	—
NEW! ADC16V130 E	1	130	755	78.5	95.5	LVDS	LLP-64	—
14-Bit								
ADC14155/V155 E	1	155	967/951	71.3/71.7	87/86.9	CMOS/LVDS	LLP-48	—
ADC14DS080/105 E	2	80/105	800/1000	74.2/73	90	Serial LVDS	LLP-60	—
ADC14DC080/105 E	2	80/105	600/800	73/74	90	CMOS	LLP-60	—
ADC14C080/105 E	1	80/105	300/400	74.2/74	90	CMOS	LLP-32	—
ADC14L020/40 E	1	20/40	150/235	74/73	93/90	CMOS	LQFP-32	—
12-Bit								
ADC12C170/V170 E	1	170	715/781	67.2	85.4/85.8	CMOS/LVDS	LLP-48	—
ADC12C080/105 E	1	80/105	300/400	71.2/71	90	CMOS	LLP-32	—
ADC12DS080/105 E	2	80/105	800/1000	71	88	Serial LVDS	LLP-60	—
ADC12DC080/105 E	2	80/105	600/800	71.5/71	90	CMOS	LLP-60	—
ADC12L066/80 E	1	66/80	357/425	66	80	CMOS	LQFP-32	—
11-Bit								
ADC11DV200 E	2	200	450	62.5	82	CMOS or LVDS	LLP-60	—
ADC11C125/70 E	1	125/170	608/715	65.5/65.1	88.2/85.4	CMOS	LLP-48	—
ADC11DL066	2	66	686	64	80	CMOS	TQFP-64	—
ADC11L066	1	66	357	65	78	CMOS	LQFP-32	—
10-Bit								
ADC10DV200 E	2	200	450	59.9	82	CMOS or LVDS	LLP-60	—
ADC10080 E	1	80	78.6	59.5	79	CMOS	TSSOP-28	—
ADC10040	1	40	55.5	59.6	80	CMOS	TSSOP-28	(3)
ADC10D020/40	2	20/40	150/257	59/60	75/72	CMOS	TQFP-48	—

PowerWise® product E Evaluation board AEC-Q100 qualified (2) AECQ Temperature Grade 2 (3) AECQ Temperature Grade 3

Low-Power Analog-to-Digital Converters

Product ID	Res (bits)	Inputs	Pin and Function Compatible	Speed Range (kSPS)	Supply Voltage Range (V)	Typ Power (mW)		Static Performance (Typ)		ENOB (bits) typ	Temp Range (°C)	Packaging	Auto Grade
						3V	5V	INL (LSB)	DNL (LSB)				
Single-Ended Input I²C A/D Converters													
ADC121C021 E, W	12	1		5.56 to 189	2.7 to 5.5	0.26	0.78	+12, -0.9	±0.5	11.5	-40 to 105	TSOT-6, MSOP-8	—
Single-Ended Input SPI A/D Converters													
ADC121S021 E, W	12	1		50 to 200	2.7 to 5.25	1.5	7.9	+0.45, -0.4	+0.45, -0.25	11.7	-40 to 85	SOT-23, LLP-6	—
ADC121S051 E, W	12	1		200 to 500	2.7 to 5.25	1.7	8.7	+0.45, -0.4	+0.5, -0.25	11.6	-40 to 85	SOT-23, LLP-6	—
ADC121S101 E, W	12	1		500 to 1000	2.7 to 5.25	2	10	±0.4	+0.5, -0.3	11.7	-40 to 125	SOT-23, LLP-6	—
ADC122S021 E, W	12	2		50 to 200	2.7 to 5.25	2.2	7.9	±0.35	+0.4, -0.2	11.7	-40 to 85	MSOP-8	—
ADC122S051 E, W	12	2		200 to 500	2.7 to 5.25	3	10	±0.5	+0.7, -0.4	11.7	-40 to 85	MSOP-8	—
ADC122S101 E, W	12	2		500 to 1000	2.7 to 5.25	4.3	13.1	±0.64	+0.9, -0.6	11.7	-40 to 85	MSOP-8	—
ADC124S021 E, W	12	4		50 to 200	2.7 to 5.25	2.2	7.9	±0.35	+0.4, -0.2	11.7	-40 to 85	MSOP-10	—
ADC124S051 E, W	12	4		200 to 500	2.7 to 5.25	3	10	±0.5	+0.7, -0.4	11.7	-40 to 85	MSOP-10	—
ADC124S101 E, W	12	4		500 to 1000	2.7 to 5.25	4.3	13.1	±0.64	+0.9, -0.6	11.7	-40 to 85	MSOP-10	—
ADC128S022 E, W	12	8		50 to 200	2.7 to 5.25	1.2	7.5	±0.4	-0.3, +0.5	11.8	-40 to 105	TSSOP-16	—
ADC128S052 E, W	12	8		200 to 500	2.7 to 5.25	1.6	8.7	±0.4	-0.4, +0.6	11.8	-40 to 105	TSSOP-16	■
ADC128S102 E, W	12	8		500 to 1000	2.7 to 5.25	2.3	10.7	±0.5	-0.4, +0.7	11.8	-40 to 105	TSSOP-16	—
Differential-Input SPI A/D Converters													
ADC121S625 E, W	12	1		50 to 200	4.5 to 5.5	—	2.25	+0.5/ -0.3	±0.4	11.8	-40 to 85	MSOP-8	—
ADC121S655 E, W	12	1		200 to 500	4.5 to 5.5	—	9	±0.6	±0.4	11.7	-40 to 105	MSOP-8	—
ADC121S705 E, W	12	1		500 to 1000	4.5 to 5.5	—	11.5	±0.6	±0.4	11.7	-40 to 105	MSOP-8	—
ADC141S626 E, W	14	1		50 to 250	2.7 to 5.5	2	4.8	±0.5	±0.5	13.7	-40 to 85	MSOP-10	—
ADC122S625 E, W	12	2		50 to 200	4.5 to 5.5	—	8.6	±1.0	±0.95	11.25	-40 to 105	MSOP-10	—
ADC122S655 E, W	12	2		200 to 500	4.5 to 5.5	—	11	±1.0	±0.95	11.25	-40 to 105	MSOP-10	—
ADC122S706 E, W	12	2		500 to 1050	2.7 to 5.5	20	25	±1.0	±0.95	11.25	-40 to 105	TSSOP-14	—

Low-Power Digital-to-Analog SPI Output Converters

Product ID	Res (bits)	# Mux Inputs	Pin and Function Comp. Family	Typ Settling Time (µsec)	Supply Voltage (V)	Typ Current Consumption (µA)		Static Performance (Typ)		Reference	Packaging	Auto Grade
						3V	5V	INL (LSB)	DNL (LSB)			
DAC081S101 E	8	1		3	2.7 to 5.5	175	260	±0.2	±0.04	Supply	TSOP-6, MSOP-8	—
DAC101S101 E	10	1		8	2.7 to 5.5	175	260	±0.6	±0.15	Supply	TSOP-6, MSOP-8	(1)
DAC121S101 E	12	1		8	2.7 to 5.5	175	260	±2.6	+0.2, -0.1	Supply	TSOP-6, MSOP-8	(1)
DAC082S085 E	8	2		3	2.7 to 5.5	210	320	±0.14	+0.04, -0.02	External	MSOP-10, LLP-10	—
DAC102S085 E	10	2		4.5	2.7 to 5.5	210	320	±0.7	+0.08. -0.03	External	MSOP-10, LLP-10	—
DAC122S085 E	12	2		6	2.7 to 5.5	210	320	±2.4	+0.2, -0.1	External	MSOP-10, LLP-10	—
DAC084S085 E	8	4		3	2.7 to 5.5	350	500	±0.14	+0.04, -0.02	External	MSOP-10, LLP-10	—
DAC104S085 E	10	4		4.5	2.7 to 5.5	350	500	±0.7	+0.08, -0.03	External	MSOP-10, LLP-10	—
DAC124S085 E	12	4		6	2.7 to 5.5	360	480	±2.4	+0.2, -0.1	External	MSOP-10, LLP-10	—
DAC088S085 E	8	8		3	2.7 to 5.5	650	970	±0.125	±0.03	Dual External	TSSOP-16, LLP-16	—
DAC108S085 E	10	8		4.5	2.7 to 5.5	650	970	±0.5	+0.08, -0.04	Dual External	TSSOP-16, LLP-16	—
DAC128S085 E	12	8		6	2.7 to 5.5	650	970	±2.0	+0.15, -0.09	Dual External	TSSOP-16, LLP-16	—

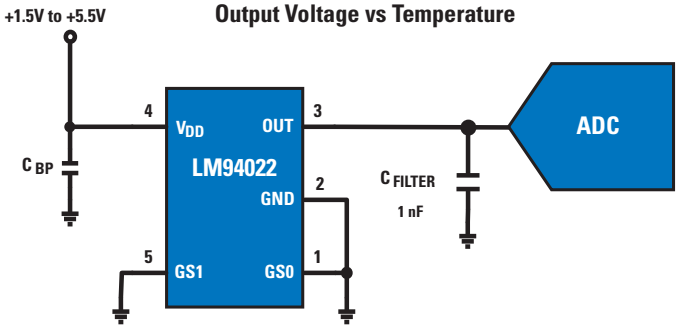
PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

Temperature Sensor Solutions

LM94022 – 1.5V, SC70, Multi Gain Analog Temperature Sensor with Class-AB Output

Features

- 1.5V to 5.5V Supply
- 5.4 µA typ quiescent current
- ±1.5°C accuracy
- -50°C to 150°C operating temperature
- Four selectable gains to optimize maximum gain for a given supply voltage
- Optimized to drive ADC inputs
  - ±50 µA output drive
  - Drives up to 1100 pF load capacitance without external resistor



Applications

Ideal for use in cabin/control electronics and driver assist systems

Analog Temperature Sensors

Product ID	Key Features	Temperature Range (°C)	Accuracy (°C)	Scale Factor / Resolution mV/°C	Power Supply (V)	Supply Current	Packaging	Auto Grade
NEW! **LM94021** [E]	4 selectable gains, Class A output	-50 to 150	± 1.5	-5.5 to -13.6	1.5 to 55	9.0 µA	SC-70	(0)
LM94022 [E]	4 selectable gains and class-AB output	-50 to 150	± 1.5	-5.5 to -13.6	1.5 to 5.5	5.4 µA	SC-70	(0)
LM19	Very low supply current, CMOS	-55 to 130	± 2.5	-11.7	2.4 to 5.5	4.5 µA	TO-92	—
LM20 [E]	Very low supply current, CMOS, tiny packages	-55 to 130	± 1.5	-11.7	2.4 to 5.5	4.5 µA	SC70, micro SMD	—
LM35	Bipolar, high accuracy	-55 to 150	± 0.5	10.0	4 to 30	56 µA	SOIC-8, TO-92, TO-220, TO-46	—

Analog Temperature Sensors with Temperature Switch

Product ID	Key Features	Temperature Range (°C)	Accuracy (°C)	Set Point Range (°C)	Power Supply (V)	Supply Current	Packaging	Auto Grade
LM26	Small, low-power	-55 to 120, 1°C increments	± 3	-55 to 120, 1°C increments	2.7 to 5.5	16 µA	SOT-23	—
LM26LV [E]	Small, low-voltage, low-power, extended temperature	0 to 150, 1°C increments	± 2.2	0 to 150, 1°C increments	1.6 to 5.5	8 µA	LLP-6	—
LM27	Small, low-power, high-temp	120 to 150, 1°C increments	± 3	120 to 150, 1°C increments	2.7 to 5.5	15 µA	Die, SOT-23	—
LM56	User-programmable, dual setpoint/output	-40 to 125, ext resistor set	± 2.0	-40 to 125, ext resistor set	2.7 to 10	110 µA	SOIC-8, MSOP-8	—
LM57 [E]	User-programmable, setpoint/output	-40 to 150 ext resistor set	±1.5	-40 to 150, ext resistor set	2.4 to 5.5	24 µA	LLP-8	—

PowerWise® product [E] Evaluation board AEC-Q100 qualified (0) AECQ Temperature Grade 0

Temperature Sensor Solutions

Digital Temperature Sensors

Product ID	Key Features	Accuracy (°C)	Power Supply (V)	Supply I (mA)	Temperature Range (°C)	Interface Type	Resolution (bits)	Packaging	Auto Grade
LM73 [E]	11- to 14-bit, 2-wire local	± 1	2.7 to 5.5	0.320	-40 to 150	2-wire	11-14	SOT23-6	—
LM75 [E]	9-bit, thermal watchdog	± 2.0	3 to 5.5	0.250	-55 to 125	2-wire	9	MSOP-8, SOIC-8	—
LM92	Highly accurate, thermal window comparator	± 0.33 and ± 0.5	2.7 to 5.5	0.350	-55 to 150	2-wire	13	SOIC-8	—
LM71	High-accuracy and resolution, SPI/ Microwire™ interface	± 1.5	2.65 to 5.5	0.300	-40 to 150	3-wire	14	SOT23-5, LLP-6	(0)
LM71A	High-accuracy and resolution, SPI/ Microwire interface	± 1.5	2.65 to 5.5	0.300	-40 to 150	3-wire	14	Die	—
LM74	12 bit, SPI/Microwire interface	±1.25	3.0 to 5.5	0.265	-55 to 150	3-wire	13	Die, SOIC-8	—
LM95071 [E]	High-accuracy and resolution, SPI interface	± 1.0	2.4 to 5.5	0.28	-40 to 150	3-wire	14	SOT23-5	—
LM95172 [E]	200°C, high-temp, accuracy, and resolution, SPI interface	±1.0	3 to 5.5	0.28	-40 to 200	3-wire	16	Cerpack-10	—
LM95172AQ	175°C, high-temperature, accuracy, and resolution, SPI interface	±1.0	3 to 5.5	0.400	-40 to 175	3-wire	16	Die	(0)

Remote Diode Temperature Sensors

Product ID	Key Features	Temperature Range (°C)	Accuracy (°C)	Scale Factor/ Resolution	Power Supply (V)	Supply Current	Packaging	Auto Grade
LM95235 [E]	11-bit remote, SMBus interface, and TruTherm® technology	-40 to 85°, 140° remote range	±0.75	0.03125°C/ LSB	3.0 to 3.6	350 µA	MSOP-8	(3)
LM95213 [E]	11-bit dual remote, SMBus interface, 3 Tcrit	-40 to 140°, 140° remote range	±1.1	0.03125°C/ LSB	3.0 to 3.6	570 µA	LLP-14	—
LM95214 [E]	11-bit quad remote, SMBus interface, 3 Tcrit	-40 to 140°, 140° remote range	±1.1	0.03125°C/ LSB	3.0 to 3.6	570 µA	LLP-14	—

Hardware Monitors with Temperature Sensors

Product ID	Key Features	Temperature Range (°C)	Accuracy (°C)	Scale Factor / Resolution	Vmon Accuracy	Power Supply (V)	Supply Current	Packaging	Auto Grade
LM87 [E]	Dual remote diodes, DAC output, TACH Inputs	-40 to 125°	± 3.0	1°C/LSB	2%	2.8 to 3.8	0.7 mA	TSSOP-24	—
LM63 [E]	Remote diode, digital, PWM output, LUT fan control	0 to 85° (local) 25 to 125° (remote)	± 1.0	0.125°C/LSB	—	3.0 to 3.6	1.3 mA	SOIC-8	—
LM96194	4 TruTherm remote diodes, 4 fan monitors, 2 PWM fan controls, 8 voltage monitors, PI LUT closed loop fan control	-40 to 85° (local) -40 to 100° (remote)	± 3.0	0.5°C/LSB	2%	3.0 to 3.6	1.6 mA	LLP-48	—
LM96163 [E]	TruTherm support, LUT fan control	-40 to 125°	± 0.75	0.03125°C/LSB	—	3.0 to 3.6	456 µA	LLP-10	—
NEW! LM96080 [E]	Voltage monitoring, DAC output, TACH inputs	-40 to 125°	±3.0	0.0625°C/LSB	—	3.0 to 5.5	0.3 mA	TSSOP-24	—

PowerWise® product [E] Evaluation board AEC-Q100 qualified (0) AECQ Temperature Grade 0 (3) AECQ Temperature Grade 3

Audio Solutions
Amplifiers and Subsystems

Class AB Mono

Product ID	Key Features	THD (%)	Output Power at 1% THD+N V_{DD} = 5V		Packaging	Auto Grade
			4Ω (W)	8Ω (W)		
LM48100Q	Mono, 1.25W, output fault detection, volume control	0.02	—	1.25	Exposed Pad TSSOP-14	(2)
LM4941 E	1.25W Boomer®, RF suppression, high PSRR and CMRR	0.04	—	1.25	micro SMD-9, LLP-8	—
LM4990	2W (into 4Ω) Boomer, selectable shutdown	0.02	2.03	1.25	LLP-10, micro SMD-9, MSOP-8, TSSOP-10	—
LM4995 E	1.3W Boomer	0.08	—	1.3	micro SMD-9, LLP-8	—

Class D Mono

Product ID	Key Features	THD (%)	Output Power THD ≤ 1% V_{DD} = 5V		Packaging	Auto Grade
			4Ω (W)	8Ω (W)		
LM4673 E	Mono, filterless	0.02	2.15	1.24	micro SMD-9, LLP-8	—
LM4675 E	Mono, ultra-low EMI	0.02	2.2	1.3	micro SMD-9, LLP-8	—
LM48310 E	Mono filterless, Enhanced Emission Suppression (E^2S)	0.03	2.1	1.3	LLP-10	—

Class AB Stereo

Product ID	Key Features	THD (%)	Output Power at THD ≤ 1%		Packaging	Auto Grade
			4Ω (W)	8Ω (W)		
LM48510 E	1.2W, Boosted Class D Boomer	0.07	1.7 at 3.3V	1.2 at 3.3V	LLP-16	—
LM48511 E	3W, Boosted Class D Boomer, ultra-low EMI, spread spectrum	0.03	5.4 at 5V	3 at 5V	LLP-24	—
LM4928 E	RF suppression	0.04	1.8W	1.2W	LLP-14, micro SMD-16	—

Class D Stereo

Product ID	Key Features	THD (%)	Output Power THD ≤ 1% V_{DD} = 5V		Packaging	Auto Grade
			4Ω (W)	8Ω (W)		
LM4674A E	Stereo, class D, filterless	0.07	1.02	0.63	micro SMD-16	—
LM48411 E	Enhanced Emission Suppression (E^2S)	0.05	2W	1.25	micro SMD-16	—

Audio Subsystems

Product ID	Key Features	Mono Input Ch.	Stereo Input Ch.	Class D Speaker Driver	Packaging	Auto Grade
LM49450 E	2.5W, low-EMI stereo class D, 24-bit DAC, ground referenced headphones, volume control, 3D enhancement	—	I^2S	✔	LLP-32	—
LM4934	3D, stereo speaker, OCL/SE stereo headphone, earpiece, monoline level outputs	1	2, I^2S	—	micro SMD-42	—
LM4935 E	Dual-mode, stereo headphone, mono high-efficiency loudspeaker amplifiers, multi-purpose ADC	1 analog, I^2S	1 analog, I^2S	✔	micro SMD-49	—
LM49250	Enhanced Emissions Suppression (E^2S), stereo class D, ground referenced headphone amplifier	Differential	2	✔	micro SMD-36	—
LM49370 E	Boomer, dedicated interface for Bluetooth® transceivers	PCM	I^2S	✔	micro SMD-49	—

PowerWise® product E Evaluation board AEC-Q100 qualified (2) AECQ Temperature Grade 2

High-Performance Audio Operational Amplifiers

Product ID	Description	Input Voltage Noise Density (nV/√Hz)	THD (%)	Slew Rate (V/µs)	GBWP (MHz)	PSRR (dB)	Supply Voltage (V)	Packaging	Auto Grade
LME49710 [E]	High-fidelity	2.7	0.00003	20	56	125	±2.5 to ±17	DIP-8, MSOP-8, TO99-8	—
LME49870	44V High-fidelity	2.7	0.00003	20	55	125	±2.5 to ±22	SOIC-8	—
LM4562 [E]	Dual, high-fidelity	2.7	0.00003	20	56	110	±2.5 to ±17	DIP-8, MSOP-8, TO99-8	—
LME49720 [E]	Dual, high-fidelity	2.7	0.00003	20	56	110	±2.5 to ±17	DIP-8, MSOP-8, TO99-8	—
LME49860	44V dual, high-fidelity	2.7	0.00003	20	55	120	±2.5 to ±22	SOIC-8	—
LME49740 [E]	Quad high-performance, high-fidelity	2.7	0.00003	20	56	125	±2.5 to ±17	DIP-8, MSOP-8	—
LME49713 [E]	High-fidelity, current feedback	1.9	0.00008	1900	30	102	±5 to ±18	SOIC-8	—
LME49721 [E]	High-performance, high-fidelity, rail-to-rail input/output	4	0.0002	8.5	20	103	2.2 to 5.5	MSOP-8	—
LME49723 [E]	Dual, high-fidelity	3.6	0.0002	8	17	100	±2.5 to ±17	MSOP-8	—
LM49743	Quad, high-fidelity	3.5	0.0001	12	30	98	±4 to ±17	TSSOP-14	—

Headphone Buffer

Product ID	Description	THD (%)	Output Current (mA)	Slew Rate (V/µs)	GBWP (MHz)	Supply Voltage (V)	Packaging	Auto Grade
LME49600 [E]	High-performance, high-fidelity, high-current audio buffer	0.00015	250	2000	20/180	±2.25 to ±18	TO263-5	—

High-Performance Audio Power Amplifier Drivers

Product ID	Description	Supply Voltage Max (V)	Typical THD Ratings (%)	THD Measurement Conditions	PSRR (dB)	Supply Voltage Range (V)	Mute/ Shutdown	Packaging	Auto Grade
LM4702B	Stereo high-fidelity	±100	0.003	A_V = 30 dB, V_{OUT} = 20 V_{RMS} at 1 kHz	110	±20 to ±100	Mute	TO220-15	—
LM4702C	Stereo high-fidelity	±75	0.005	A_V = 30 dB, V_{OUT} = 14 V_{RMS} at 1 kHz	110	±20 to ±75	Mute	TO220-15	—
LME49810	Mono high-fidelity, Baker Clamp	±100	0.0007	No Load, BW = 30 kHz, V_{OUT} = 20 V_{RMS} at 1 kHz	110	±20 to ±100	Mute	TO247-15	—
LME49811	Mono high-fidelity	±100	0.005	No load, AV = 30 dB V_{OUT} = 10 V_{RMS} at 1 kHz	110	±20 to ± 100	Mute	TO247-15	—

Stereo Headphone Amplifiers

Product ID	Description	THD (%)	PSRR (dB)	Output Power THD ≤ 1%, V_{CC} = 3V		Auto Grade
				16Ω (mW)	32Ω (mW)	
LM4980	42 mW high-fidelity, click/pop suppression	0.02	90	42	28	—
LM4985 [E]	135 mW Boomer, OCL or cap-coupled output, 32-step I²C volume control	0.08	77	45	23	—

PowerWise® product [E] Evaluation board

Amplifier Solutions
High-Speed Amplifiers

High-Speed Amplifiers

Product ID	Channels	-3 dB BW (MHz)	Slew Rate (V/µs)	Supply Voltage (V)	Supply Current/ Channel (mA)	Input Offset Voltage Max 25C (mV)	Packaging	Auto Grade
Video								
LM6171 E	1	160 at +1	3600	5.5 to 34	2.5	3	MDIP-8,SOIC-8	—
LM6172 E	2	160 at +1	3000	5.5 to 36	2.2	3	MDIP-8, CDIP8, CSOIC-16, SOIC-8	—
LM7171 E, W	1	220 at +2,-1	4100	5.5 to 36	6.5	1	MDIP-8, SOIC-8, CDIP-8, CPACK-10	—
LM7372 E, W	2	220 at +2,-1	3000	9 to 36	6.5	8	SOIC, PSOP, LLP-8	—
LMH6722 E	4	420 at+1	1800	10 to 12	5.6	5	SOIC-14, TSSOP-14, LLP-14	(1)
LMH6715 E, W	2	480 at +1	1300	10 to 12	5.8	6	SOIC-8, CDIP-8	—
LMH6723/24 E	1, 2, 4	370 at +1	600	4.5 to 12	1	3	SOT23-5, SOIC-8, SOIC-14, TSSOP-14	—
LMH6733 E, W	3	1000 at +1	3750	3 to 12	6.5	2.2	SSOP-16	—
Single Supply Optimized for Video								
LMH6601 E	1	125 at +1	250	2.4 to 5.5	9.6	2.4	SC70-6,	(3)
LMH6611/12 E	1,2	345 at+1	460	2.7 to 11	3.25	0.75	SOT23-6	—
LMH6618/19 E, W	1, 2	140 at+1	57	2.7 to 11	1.35	0.6	TSOT-6	—
LMH6639 E, W	1	228 at +1	172	3 to 12	4.18	5	SOT23-6, SOIC-8	—
LMH6642/43/44 E, W	1, 2, 4	130 at +1	135	2.7 to 12.8	2.7	5	SOT23-5, SOIC-8, SOIC-14, TSSOP-14	—
LMH6645/46/47 E, W	1, 2,1	55 at +1	22	2.5 to 12	0.725	3	SOT23-5, SOT23-6, SOIC-8, MSOP-8	—
Low Noise								
NEW! **LMH6629** E	1	900	1600	2.7 to 5.5	15.5	0.78	LLP-8	—
LMH6609 E	1	900 at +1	1400	6 to 12	7	2.5	SOT23, SOIC-8	—
LMH6624/26 E	1, 2	190/170 at 10	400/360	5 to 12	12	0.5	SOT23-5, SOIC-8,C DIP-8, CPACK-10	—
LMH6628	2	300 at +1	550	5 to 12	9	2	SOIC-8	—
LMH6702 E, W	1	1700 at +1	3100	10 to 12	12.5	4.5	SOT23-5, SOIC-8, CDIP-8, CPACK-10	—
LMH6703 E	1	1800 at +1	4200	8 to 12	11	7	SOT23-6,SOIC-8	—
Differential								
LMH6550 E	1	400 at +1	3000	5 to 12	20	5	SOIC-8, MSOP-8	—
LMH6551 E	1	370 at +1	2400	3 to 12	12.5	4	SOIC-8, MSOP-8	—
LMH6552 E	1	1500 at +1	3800	4.5 to 12	19	16.5	SOIC-8, LLP-8	—
NEW! **LMH6554** E	1	2500 at +1	6200	4.7 to 5.3	52	3	LLP-14	—
LMH6555 E	1	1200 at +1	1300	3 to 3.6	120	50	LLP-16	—

Variable Gain Amplifiers

Product ID	Input	-3db Bandwidth Unity Gain (MHz)	Gain Adjust Range (dB)	Icc (mA)	Slew rate (V/µs)	Linear in	Packaging	Auto Grade
LMH6502	Differential	130	70	27	1800	dB	SOIC-14, TSSOP-14	—
LMH6503	Differential	135	70	37	1800	V/V	SOIC-14, TSSOP-14	—
LMH6505 E	Single-Ended	150	80	11	1500	dB	SOIC-8, MSOP-8	—
LMH6514 E	Differential	600	42	107	—	dB	LLP-16	—
LMH6515 E	Differential	600	31	107	—	dB	LLP-16	—
NEW! **LMH6517** E	Differential	1200	31.5	80	—	dB	LLP-32	—

PowerWise® product E Evaluation board W WEBENCH® enabled AEC-Q100 qualified (1) AECQ Temperature Grade 1 (3) Temperature Grade 3

LMH6629 – 8 GHz Gain Bandwidth Ultra-Low-Noise Amplifier

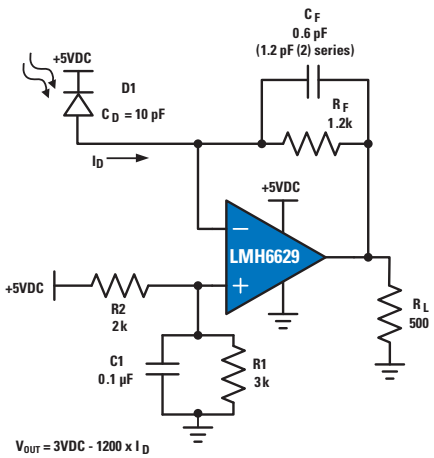
Features

- 8 GHz gain bandwidth
- 0.69 nV√Hz input noise voltage
- 25˚C 780 uV input offset voltage max
- 1600 V/µs slew rate
- -90/-94 dBc HD2/HD3 at 0.5 Mhz
- 2.7 to 5V supply voltage range
- ≥4/≥10 selectable min gain

Applications

Ideal for use in automotive LIDAR systems

Typical Application Circuit



Clock Buffers with Independent Shutdown

Product ID	Features	Channels	Frequency (MHz)	Phase Noise (dBc/Hz)	Slew Rate V/us)	Supply Voltage Range (V)	Supply Current (mA)	Packaging	Auto Grade
LMH2180 E	75 MHz, dual	2	78	-123	106	2.4 to 5	2.3	LLP-8	—
LMV112 E	49 MHz, dual	2	40	—	110	2.4 to 5	1.6	LLP-8	—

RF Detectors with Shutdown

Product ID	Features	RF frequency (MHz)	Dynamic Range (dB)	Power Range (dBm)	Accuracy (dB)	Supply Voltage (V)	Supply Current (mA)	Packaging	Auto Grade
NEW! LMH2110 E	Multi-mode, multi-band RF power control	50 to 6000	45	-40 to 5	0.5	2.7 to 5	4.8	microSMD-6	—
LMH2100 E	Log power, CDMA, WCDMA	50 to 4000	40	-45 to -5	0.5	2.7 to 3.3	7.1	SMD-6	—
LMV221 E	Log power, CDMA, WCDMA	50 to 3500	40	-45 to -5	0.5	2.7 to 3.3	7.2	LLP-6	—
LMV225 E	CDMA, WCDMA	450 to 2000	30	-30 to 0	1	2.7 to 5.5	4.8	SMD-4, LLP-6	—
LMV228 E	CDMA, WCDMA	450 to 2000	30	-15 to 15	1	2.7 to 5.5	4.9	SMD-4, LLP-6	—

Special Video Functions

Product ID	Description	Vcc (V)	Supported Standards	Outputs	Packaging	Auto Grade
LMH1980	Auto detecting SD/HD/PC video sync separator	3.3 to 5	NTSC, PAL, 480i/p, 576i/P, 720p, 1080i/p/, PC RGB	H/V/C sync, burst/back porch, odd/even, HD detect	MSOP-10	—
LMH1981 E	Auto-format video SD/HD sync separator, low H jitter	3.3 to 5	NTSC, PAL, SECAM, 480i/p, 576i/p, 720p, 1080i/p	H/V/C sync, odd/even, burst/back porch, video	TSSOP-14	—
LMH1982 E	Multi-rate video clock generator with Genlock	2.5	NTSC, 48-kHz audio clock input, 720p , 576i/p , 480i/p , 1080i/p, PAL	2	LLP-32	—
LMH1251	YPBPR to RGBHV converter, 2:1 video switch	4.75 to 5.25	1: YPBPR 480i/p, 576i/p, 720p, 1080i/p 2: PC RGBHV up to UXGA	RGBHV up to UXGA	TSSOP-24	—

PowerWise® product E Evaluation board

Amplifier Solutions
Precision Amplifiers

LMP8645/HV – Precision High-Voltage Variable Gain Current Sense Amplifier

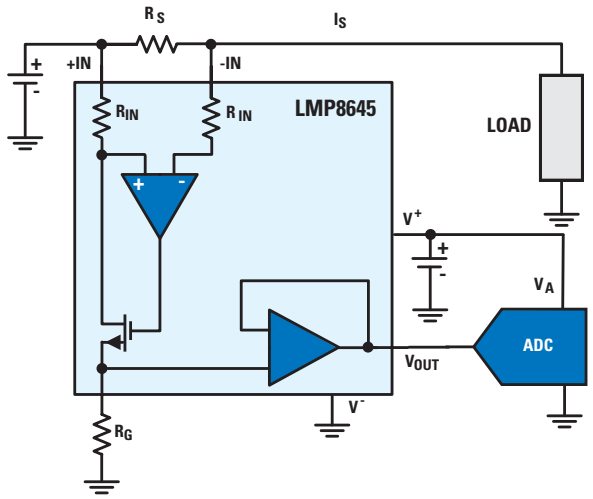
Features

- –2 to 42V CMVR (standard grade)
- –2 to 76V CMVR (HV grade)
- 1 mV max input offset voltage
- Buffered output
- Variable gain (1 to 100V/V) set by external resistor
- 2% max gain Accuracy
- –40°C to 125°C operating temperature range

Applications

Ideal for use in high side current sense, vehicle current measurement, motor controls, battery monitoring, remote sensing, and power management

Typical Application Circuit



Current Sense Amplifiers

Product ID	Description	Vcm Range (V)	Vos (mV) (max)	Max TC-VOS (µV/°C)	Gain Output (V/V)	Supply Voltage Range (V)	Supply Current (mA)	PSRR (dB)	Packaging	Auto Grade
LMP8601	Precision, Wide Common Mode Range	-22 to 60	1	10	20	3.0 to 5.5	1.1	90	SOIC-8	(1)
LMP8602	Precision, Wide Common Mode Range	-22 to 60	1	10	50	3.0 to 5.5	1.1	90	SOIC-8, MSOP-8	(1)
LMP8603	Precision, Wide Common Mode Range	-22 to 60	1	10	100	3.0 to 5.5	1.1	90	SOIC-8, MSOP-8	(1)
LMP8645	Variable gain, high voltage current sense	-2 to 42	1	7	ExtR (1 to 100)	2.7 to 12	0.61	90	TSOT-6	—
LMP8645HV	Variable gain, high voltage current sense	-2 to 76	1	7	ExtR (1 to 100)	2.7 to 12	0.61	90	TSOT-6	—

High-Voltage Operational Amplifiers

Product ID	Channels	Supply Voltage Range (V)	Supply Current/ Channel (mA)	Gain Band-width (MHz)	Slew Rate (V/µs)	Offset Volt-age max, 25C (mV)	Voltage Noise (nV/√Hz)	Output Current (mA)	Temp Range (°C)	CMOS Inputs	Rail- to-Rail inputs	Packaging	Auto Grade
LM6211	1	5 to 24	0.96	17	5.5	2.5	6	16	-40 to 125	✔		SOT23-5	—
LM8261/62	1/2	2.5 to 30	1.05	21	12	7	15	60	-40 to 85	Bipolar	✔	MSOP-8, SOT23-5	—
LM7341	1	2.5 to 32	0.6	4.5	1.2	4	36	8	-40 to 125	Bipolar	✔	SOT23-5	—
LM7321/22	1/2	2.5 to 32	0.48	16	8.5	5	11.9	48	-40 to 125	—	✔	SOT23-5, SOIC-8, MSOP-8	—
LM7332	2	2.5 to 32	1.5	19.3	12	4	14.8	55	-40 to 125	—	✔	SOIC-8, MSOP-8	■

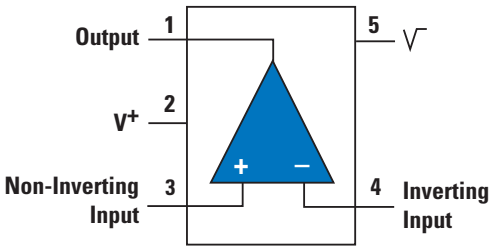
AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

LMC7101 – Tiny, Low-Power Operational Amplifier with Rail-to-Rail Input and Output

Features

- AEC-Q100 Grade 1 qualified
- Tiny space-saving package
- Guaranteed specs at 2.7V, 3V, 5V, 15V supplies
- Typical supply current 0.5 mA at 5V
- Typical total harmonic distortion of 0.01% at 5V
- 1.0 MHz gain-bandwidth

Typical Application Circuit



Applications

Designed for space constrained and weight critical automotive designs

Low-Power Operational Amplifiers

Product ID	Channels	Supply Current/ Channel (mA)	Gain Band-width (MHz)	Offset Voltage Max, 25C (mV)	Max Input Bias Current (nA)	Voltage Noise (nV/√Hz)	Supply Voltage Range (V)	Temperature Range (°C)	CMOS Inputs	Rail to Rail inputs	Packaging	Auto Grade
LMV641	1	0.158	10	0.5	105	14	2.7 to 12	-40 to 125	Bipolar		SOIC-8, SC70-5	—
LM6132/34	2/4	0.36	10	6	350	27	2.7 to 24	-40 to 85	Bipolar	✔	SOIC-8, MDIP-8, SOIC-14	—
LMV422	2	0.4	8	4	0.1	25	2.7 to 5.5	-40 to 85	✔		MSOP-10	—
LMV851/52/54 [E]	1/2/4	0.41	8	1	0.5	11	2.7 to 5	-40 to 125	✔		SC70-5, MSOP, TSSOP-14	—
LMV951	1	0.57	2.8	2.8	85	25	0.9 to 3	-40 to 125	Bipolar	✔	TSOT-6	—
LM7301	1	0.6	4	6	250	36	2.2 to 30	-40 to 85	Bipolar	✔	SOIC-8, SOT23-5	—
LM6142/42	2/4	0.65	17	1	526	16	1.8 to 24	-55 to 125	Bipolar	✔	SOIC-8, MDIP-8, SOIC-14	—
LM7341	1	.65	4	4	-95	33	2.7 to 32	-40 to 125	bipolar	✔	SOT23-5	—
LMP7701/02/04	1/2/4	0.725	2.5	0.22	0.4	9	2.7 to 12	-40 to 125	✔	✔	SOIC-8, SOT23-5, MSOP, TSSOP-14	(1)
LM6211	1	0.96	17	2.5	0.01	6	5 to 24	-40 to 125	✔		SOT23-5	—
LM8261/62	1/2	0.97	21	5	2700	15	2.5 to 30	-40 to 85	Bipolar	✔	SOT23-5, MSOP-8	—
LMV841/42/44	1/2/4	1	4.5	5	0.3	20	2.7 to 12	-40 to 125	✔	✔	SC70-5, SOIC, MSOP, TSSOP-14	(1)
NEW! LMC7101	1	0.5	1.1	3 to 7	0.064	37	2.7 to 15.5	-40 to 125		✔	SOT-23	(1)

PowerWise® product [E] Evaluation board AEC-Q100 qualified (1) AECQ Temperature Grade 1

Amplifier Solutions

Precision Amplifiers and Comparators

Precision Operational Amplifiers

Product ID	Offset Voltage Max, 25C (mV)	Supply Voltage Max	TcVos (µV/°C)	CMRR (dB)	PSRR (dB)	Avol (dB)	Voltage Noise (nV/√Hz)	Channel	Supply Current / Channel (mA)	Supply Voltage Range (V)	CMOS Inputs	Rail-to-Rail inputs	Packaging	Auto Grade
LMP2015/16	0.005	5	0.015	130	120	130	35	1/2	0.93	2.7 to 5	✔		SOT23-5, SOIC-8, MSOP-8	—
LMP2014MT	0.025	5	0.01	130	120	130	35	2	0.93	2.7 to 5	✔		TSSOP-14	—
LMP7731/32	0.04	5.5	1	120	129	130	2.9	1/2	2.2	1.8 to 5.5	Bipolar	✔	SOT-23, SOIC-8	—
LMP2021/22	0.005	5.5	0.02	139	130	160	11	1/2	1.1	2.2 to 5.5	✔		SOT-23, SOIC-8, MSOP-8	—
LMP2232/34	0.15	5	1	97	120	120	60	1/2/4	0.009	1.8 to 5	✔		MSOP-8, SOIC-8, TSSOP-14	—
LMP7711/12	0.15	5.5	1	100	100	110	5.8	1/2	1.15	1.8 to 5.5	✔		TSOT-6, MSOP-10	—
LMP7716	0.15	5	1	100	98	110	5.8	1/2	1.15	1.8 to 5	✔		SOT23-5	(1)
LMP7717/18	0.15	5	1	100	98	110	5.8	1/2	1.15	1.8 to 5	✔		SOIC-8, SOT23-5, MSOP-8	—

High-Speed Comparators

Product ID	Features	Vcc (V)	Icc (mA/ ch)	tpd (ns)	Toggle Rate (Mbps)	Packaging	Auto Grade
LMH7322 E	Dual, LVDS/ RSPECL outputs	2.7 to 12	22.6	0.7	4000	LLP-24	—
LMH7324 E	Quad, LVDS/ RSPECL outputs	5 to 12	22.6	0.7	4000	LLP-32	—
LMH7220 E	LVDS outputs	2.7 to 12	6.8	2.9	1080	TSOT-23	—
LMV7219 E	TTL outputs	2.7 to 5	1.1	7	—	SC70-5, SOT-23	—

Low-Power Comparators

Product ID	Channels	Response Time (µs)	Offset Voltage Max, 25C (mV)	Supply Voltage Max	Supply Voltage Range (V)	Supply Current Per Channel (mA)	Output	Temperature Range (°C)	Packaging	Auto Grade
LMV7219	1	0.009	6	5	2.7 to 5	1.1	Push Pull	-40 to 85	SC70, SOT23-5	—
LMV761/762	1/2	0.12	0.3	5	2.7 to 5	0.275	Push Pull	-40 to 125	SOIC-8, SOT23-6, MSOP-8	■
LM6511	1	0.18	5	36	2.7 to 36	2.7	Open Drain	-40 to 85	SOIC-8	—
LMV331/393/339	1/2/4	0.2	7	5.5	2.7 to 5.5	0.06	Open Drain	-40 to 85	SC70-5, SOT23-5, MSOP, TSSOP	—
LMV7271	1	0.88	4	5	1.8 to 5	0.009	Push Pull	-40 to 85	SC70-5, SOT23-5	—
LMV7291	1	0.88	4	5	1.8 to 5	0.009	Push Pull	-40 to 85	SC70-5	—
LMC6762	2	4	15	15	2.7 to 15	0.006	Push Pull	-40 to 85	SOIC-8	—
LMC6772	2	4	5	15	2.7 to 15	0.006	Open Drain	-40 to 85	SOIC-8	(1)
LMC7211	1	4	5	15	2.7 to 15	0.007	Push Pull	-40 to 85	SOIC-8, SOT23-5	—
LMP7300	1	4	0.3	12	2.7 to 12	0.012	Open Drain	-40 to 125	SOIC-8	—
LPV7215	1	4.5	3	5	1.8 to 5	0.001	Push Pull	-40 to 85	SC70-5, SOT23-5	—
LMC7215	1	24	6	8	2 to 8	0.001	Push Pull	-40 to 85	SOIC-8, SOT23-5	—

PowerWise® product AEC-Q100 qualified ■ AEC-Q100 qualification in process (1) AECQ Temperature Grade 1

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