



**power management
brochure**



State of the Art Solutions

Exar offers a broad array of power management integrated circuits (IC) that are used in a wide variety of end applications. Exar's state of the art solutions provide high efficiency, low quiescent current, small size, and the industry's best price/performance ratio.

Many of Exar's most advanced power management ICs are offered in thermally enhanced, leadless DFN or QFN packages for the best blend of low thermal impedance and minimal circuit board area. In an effort to respect the environment and reduce the use of hazardous substances, all Exar products have been qualified and released in lead-free versions.

Exar power management products can be used as stand alone solutions but are designed to be used together to create a complete power management system. A standard portable application would generally require buck regulators, supervisory ICs, charge pumps, boost regulators and several CMOS LDOs. High power applications like a telecommunications T1/E1 system board may pair several PWM controllers, supervisory ICs, voltage references, and several PNP LDOs for its power management needs.

Product	Description	Industry	Key Applications
Charge Pumps	Charge pump technology affords the benefits of a switching regulator without the need for an external inductor. Charge pumps can boost voltage or invert the input to a negative voltage.	Portables Peripherals	Mobile Phone LED Camera Flash Negative Display Bias
Low-Side Drivers	Low-side LED drivers provide a constant current sink to drive various LEDs. It is low noise with the most cost-effective and simple solution in the market today.	Consumer Portables Peripherals	Mobile Phone MP3 Player Torch Mode LED PmP LCD Backlighting AV Remote Control LED
Boost Regulators	Boost regulators are used to step up input voltage, typically supplied from a battery.	Portables Consumer	LED Accent Lighting LED Camera Flash Smart Phone/PDA Portable MP3 Player Computing Peripheral/Mouse
Buck Regulators	Buck regulators are used to step down input voltage to the desired level with higher efficiency than an LDO. A buck regulator integrates power FETs into the IC, providing a monolithic power converter.	Computing Portables	High End Mobile Phone Smart Phone/PDA Portable Gaming Personal Media Player Bluetooth Headset USB Stick/DVB-T Converter
PWM Controllers	PWM Controllers are the basic element used to build high efficiency switching regulators to deliver the precise voltage requirements at the point of load within a system's architecture.	Consumer Networking Industrial Automotive Medical	Set-top Box/Multimedia Industrial Control Distributed Power Systems Networking & Datacom Cable & DSL Modems
µP Supervisors	Microprocessor supervisors and reset circuits are used to reboot electronic equipment on a system crash or voltage perturbation.	Portables Automotive Consumer Computing	POS Terminal Electricity Meter Game Systems Motherboard White Goods (Washer, Dryer, etc.)
Voltage References	A voltage reference maintains a precise voltage at its output regardless of variations in the external environment, such as voltage fluctuations, temperature changes, etc.	Computing Consumer Industrial	Motherboard Power Supply VGA Card Power Meter Industrial Equipment
Low Dropout Regulators (LDO)	The simplest and lowest cost technique for stepping down DC voltage for high performance ASICs and microprocessors. An LDO provides a quiet, well-regulated DC voltage supply that has excellent transient response.	Portables Communications Automotive Consumer Industrial	Set Top Box Audio System Memory Supply Amplifier Power Power Meter White Goods (Washer, Dryer, etc.) Industrial Equipment

Technology Advantages

Point-of-Load (PoL) Power Solutions

Exar has a complete family of DC/DC conversion products for PoL power ranging from linear regulators to high-performance switching controllers and switching regulators covering applications with currents ranging from a few mA to 30A. Along with Exar's supervisory product line, these DC/DC products form a complete power management solution for PoL power suitable for a range of applications for industrial, embedded systems, telecom, set top boxes, graphics cards, motherboards, cell phones, PDAs, notebooks, etc.

Ultra-low quiescent current and shutdown capability for the buck regulator family increases battery life in portable applications while PowerBlox™ buck regulators make the design of high current PoL converters easy through the integration of a high performance controller and low RDS(ON) MOSFETs into a space saving thermally enhanced 7x4mm package. Exar latest PowerBlox™, the SP7662, has an output current of 12 Amps making it the highest power density

solution available with a wide 4.5V to 22V input voltage range.

Exar's high-efficiency synchronous DC/DC controllers (the SP613X family) are capable of a wide input voltage (up to 28V) and can drive multiple NFETs to achieve currents of up to 30A in a single phase. With switching frequencies ranging from 300kHz to 2.5MHz, this family offers the designers the flexibility to choose the optimum trade-off between efficiency and solution size. Protection features include integrated sequencing capability, thermal shutdown, short circuit protection, under voltage protection, and UVLO on both VIN and VCC supplies. Exar also offers high performance non-synchronous DC/DC controllers.

The non-synchronous SP6125/26/27 family in a TSOT-23-6 package is the worlds smallest buck controller having an input voltage range of 4.5V to 30V. This family is designed to drive an external PFET at switching speeds of 300kHz, 600kHz and 900kHz, respectively.

Highest Performance LED Driving Solutions

As LEDs gain in popularity due to their efficiency, power, durability, and reliability, Exar continues to develop expertise in the market with the highest performing, extremely compact solutions for driving the latest LEDs in a wide variety of applications. Knowing the importance of design flexibility, Exar offers four different categories of solutions for LED driver applications, Buck Regulators, Charge Pump Drivers, Boost Regulators, and Linear Drivers, each offering specific advantages.

Charge Pump Drivers: Exar's industry-leading charge pump drivers are suitable for backlighting displays and keypads as well as camera flash applications. The SP7680 buck-boost charge pump controls up to 7 individual LEDs through an I2C interface allowing one device to drive LEDs for the display, keypad, and indicators. Another I2C controlled LED driver is the SP7682 with a four channel backlight driver and 500mA flash driver.

Buck Regulators: The new SP7600 and SP7601 are Exar's first dedicated buck switching regulators for driving high Power LEDs. The SP7600 is a monolithic buck regulator operating at 1.3MHz which

results in a minimum size solution for driving LEDs up to 2Amps. Both devices are compatible with PWM dimming up to 1kHz and integrated compensation minimizes external component count.

Boost Regulators: Exar offers inductor based boost regulator solutions such as the SP6699 to drive up to 7 low current series connected LEDs. Driving LEDs in series ensures equal brightness and reduces connector count. Exar also offers high current boost regulators like the SP7648 for ultra-high efficiency high power LED applications up to 1Amp. The new XRP7410 boost controller LED driver is ideal for a wide variety of LED lighting applications from gaming machines to scanners and a 100mV current sense keeps power loss to a minimum.

Linear Drivers: A linear driver is a simple, cost-effective solution for display backlighting and camera flash LED applications. As forward voltages for LEDs drop, there is no need to boost the voltage from the battery. The SP7120, SP7121, and SP7122 high-side drivers offer a 2-3 channel solution for backlighting applications capable of sinking up to 25mA and offering dropout voltages as low as 150mV. The SP7618 can sink up to 1Amp and has a single wire interface controlling the LED current with 5 bit resolution.

Design Made Easy

Exar offers online design tools, a downloadable Power Simulator, and an extensive library of application notes, reference design, and FAQs. The online PowerLab™ and LEDLab™ allow one to enter their system requirements and instantly create a customized solution, including a schematic with calculated component values and a BOM.

PowerLab™ is an expert system that creates designs with Exar's high power density switching regulators and controllers. This system has been recently enhanced with the ability to download an offline version called Power Simulator which uses a SIMetrix/SIMPLIS based engine specifically designed for switching regulator simulation. LEDLab™ is an expert system that designs LED driver solutions.

Both tools make design quick and easy for the novice designer as well as the seasoned engineer, while providing the best solution for a given application. Application notes and reference designs provide more in depth information about the use and operation of Exar's power management products. Also available are Orcad models to facilitate easy schematic capture and board layout. These tools have direct links, as do our libraries of reference designs and application notes, at www.exar.com.

INPUT		OUTPUT	
Input Voltage		Output Voltage/Current	
Vin Min	10.0 Volts	Number Of Outputs	1
Vin Max	14.0 Volts	Vout 1	3.3 Volts
Regulated 5V Bias	<input type="radio"/> Available <input checked="" type="radio"/> N/A	Iout Max 1	8.0 Amps

Optimization

Small Foot Print High Efficiency

>100 LFM Airflow Yes No

Power Good Yes No

Integrated FETs? Yes No

When selecting a wide input voltage range below 5 V, please refer to user manual or contact Exar support for part selection.

SOLUTION

Design Rules HIDE

Max Input Ripple Voltage (limit to) 100.0 mV

Capacitor Type Ceramic Tantalum

OUTPUT 1

Output Inductor 1 Let Power Lab Choose User Defined

Max Output Ripple Voltage 1 (limit to) 50.0 mV

Transient Load Step 1 50.0 % of Iout Max

PowerLab™

Buck Regulators (I_{OUT} <2A)

Buck regulators are used to step down input voltage to the desired level with higher efficiency than an LDO. A buck regulator integrates power FET ICs, providing a monolithic power converter. Exar's buck regulators offer the industry's highest efficiency and are an excellent alternative to linear regulators when battery life is crucial.

Applications

- Mobile Phone
- Pager
- PDA/MP3
- VGA Card

Key Features

- Highest efficiency
- High frequency: up to 1.5MHz
- Low quiescent current: to 20μA
- PWM/PFM operation modes

Part Number	I _{OUT}	V _{IN}		I _Q	Fixed Outputs	Output Range	Freq.	Efficiency	Package	Special Features
		Min	Max							
SP34063A	Adj.	3V	36V	4mA	Adj.	Adj.	110kHz	80%	8-Pin NSOIC	Can be used to implement buck, boost or inverting topologies.
SP6655	400mA	2.6V	5.5V	20μA	Adj.	1V to 5V	PFM	98%	10-Pin DFN	Logic level shutdown, digitally programmable UVLO threshold, battery low indicator.
SP6656	400mA	2.7V	5.5V	20μA	Adj.	0.8V to 5V	PFM	98%	10-Pin DFN	Dynamically selectable output voltage.
SP6650	600mA	2.6V	5.5V	70μA	Adj.	1.5V to 6V	PFM	95%	10-Pin MSOP	Current limit, logic level shutdown, battery low indicator.
SP6651A	800mA	2.7V	5.5V	20μA	Adj.	0.8V to 5V	PFM	98%	10-Pin DFN 10-Pin MSOP	Logic level shutdown, digitally programmable UVLO threshold, battery low indicator.
SP6652	1A	2.7V	5.5V	1mA	Adj.	0.75V to 5V	1.2MHz	97%	10-Pin DFN 10-Pin MSOP	Logic level shutdown (0.5μA in shutdown), external clock synchronization.
SP6654	800mA	2.7V	5.5V	20μA	Adj.	0.8V to 5V	PFM	98%	10-Pin DFN 10-Pin MSOP	Logic level shutdown, digitally programmable UVLO threshold, power good indicator.
SP6659	600mA	2.5V	5.5V	300μA	Yes	0.6V to 5V	1.5MHz	98%	5-Pin TSOT	Pulse skipping at light load, low component count.
XRP6657	1.5A	2.5V	5.5V	240uA	Adj.	0.6V to 5V	1.3MHz	95%	6-Pin DFN	Adjustable output, pulse skipping at light load for improved efficiency.
SP6669	600mA	2.5V	5.5V	200uA	Yes	0.6V to 5V	1.5MHz	95%	5-Pin SOT-23	Adjustable 1.2V, 1.5V, and 1.8V outputs. Pulse skipping at light load for improved efficiency

PowerBlox™ Buck Regulators (I_{OUT} <2A)

The PowerBlox™ family of high current, high voltage, ultra-miniature buck regulators offer the world's best power density. Exar's PowerBlox™ are modular solutions that enable a designer to quickly and easily create a power system with the fewest number of external components.

Applications

- Servers
- Embedded Systems
- POL Modules
- Industrial Applications
- Plasma TVs, LCD Monitor
- Point of Sale Systems

Key Features

- Wide input voltage range: 2.5V-30V
- Built-in low RDS(ON) FETs
- Low output voltage: down to 0.6V
- Integrated sequencing control
- Pre-charged output tolerant
- Excellent thermal performance
- 7x4 mm DFN
- TSSOP-38

Part Number	I _{OUT}	MOSFET RDS(ON) mW		V _{IN}		Ref Voltage	Accuracy	Frequency	Efficiency	Fault Protection
		High Side	Low Side	Min	Max					
SP7656	3	60	n/a	4.5	29	0.6V	±1%	600kHz	89%	OCP
SP7650	3	40	40	2.5	28	0.8V	±1%	300kHz	95%	UVP
SP7661	3	75	75	3.0/5.5	22	0.8V	±1%	600kHz	92%	UVP, OCP
SP7651	3	40	40	2.5	20	0.8V	±1%	900kHz	92%	UVP
SP7653	3	40	40	2.5	20	0.8V	±1%	1.3MHz	91%	UVP
SP7652	6	15	15	2.5	28	0.8V	±1%	600kHz	92%	UVP
SP7663	6	17	17	3.0/5.5	22	0.8V	±1%	600kHz	91%	UVP, OCP
SP7655	8	15	15	2.5	28	0.8V	±1%	300kHz	95%	UVP
SP7662	12	17	7	3.0/5.5	22	0.8V	±1%	300kHz	93%	UVP, OCP

Controllers

The PWM controller is at the heart of high power DC/DC converters. The device is used to drive external FETs for delivering output current up to 30A. With up to 28V input, Exar's PWM controllers are well suited for all major market segments.

Applications

- VGA Card
- Printer/Copier/Fax Machine
- Set Top Boxes
- Data Communications

Key Features

- Low voltage output: down to 0.8V
- High frequency: up to 2500kHz
- High efficiency with external MOSFETs
- Easy to use, standard topology solutions

Part Number	I _Q	V _{IN}		Ref Voltage	Frequency (kHz)	Efficiency	Package	Features
		Min	Max					
SP6153 SP6154 SP6155 SP6156	2.6mA	4.5	30	0.6V	300 600 1000 2000	95%	16-Pin QFN	Internal compensation, Low Side FET RDS(ON) current limiting, internal Vcc supply, PGOOD, Enable, Sync-in, Sync-out, adjustable UVLO, Enable
SP6125 SP6126 SP6127	300µA	4.5	30	0.6V	300 600 900	95%	6-Pin TSOT	Programmable RDS(ON) sensing current limit, non-synchronous, PFET driver, low component count, % feedback accuracy.
SP6138 SP6136 SP6133	1.5mA	3	24	0.8V	2500 600 300	92%	16-Pin QFN	SP6133, SP6136 and SP6138 are single-supply devices that offer the same feature set as the SP6132 family with additional features of PWRGD, enable, and current limit.
SP6139	1.5mA	3	20	0.8V	1300	92%	10-Pin MSOP	Programmable soft start, UVLO on VCC and VIN, pre-bias, start up, thermal shutdown, output short-circuit protection with auto restart. This family can be used to implement power-up protocols by using the soft start and UVIN pins.
SP6137	1.5mA	3	20	0.8V	900	91%	10-Pin MSOP	
SP6134	1.5mA	3	15	0.8V	600	92%	10-Pin MSOP	
SP6134H	1.5mA	3	28	0.8V	600	91%	10-Pin MSOP	
SP6132	1.5mA	3	15	0.8V	300	95%	10-Pin MSOP	
SP6132H	1.5mA	3	28	0.8V	300	93%	10-Pin MSOP	
SP6128A	500µA	3	5.5	0.6V	300	89%	14-Pin TSSOP	Programmable overcurrent threshold, current limit using RDSON sensing.
SP6123 SP6123A	500µA	3	5.5	1.25V	300 500	95%	8-Pin NSOIC	30µA shutdown current, Pre-bias start up, Hiccup mode current limit, soft-start, high side feedback.
SP6122	300µA	3	5.5	1.25V	PWM/PFM	95%	8-Pin MSOP	5µA shutdown current, light-load efficiency, current limit using RDSON sensing, enable, fault.
SP6121	500µA	3	5.5	1.25V	500	90%	8-Pin NSOIC	Hiccup mode current limit, 5µA shutdown current.
SP6120B	950µA	3	5.5	1.25V	270-550	95%	16-Pin TSOP	10µA shutdown current, high-side FET can be either P-channel or N-channel, hiccup mode current limit, programmable switching frequency, selectable continuous mode or discontinuous mode operation, programmable soft start.
SP6120	950µA	3	5.5	1.25V	270-550	95%	16-Pin TSOP	

Boost Regulators and Controllers

Boost regulators are used to step up input voltage, typically supplied from a battery. Geared primarily for portable applications, Exar's SP664x boost regulators offer a small solution size with high efficiency. Exar's SP669x (and SP4446) are optimized for very high output voltage applications such as series LED driving or tuner bias voltages that range from 7V to 30V and require small load currents. The PFM action of Exar boost DC/DC provides an inherent soft-start function without extended circuitry. PFM operation at standard switching frequencies improve efficiency and extend the Vo/Vi ratio capability over high speed PWM boost DC/DC offered by other industry suppliers.

Furthermore, very low startup voltage capability and industry leading quiescent current greatly improve operating life of portable operating life of portable products that employ Exar boost DC/DC.

Applications

- Mobile Phone Camera Flash
- Flashlight
- Solar Landscape Lighting
- Wireless Mouse

Key Features

- High efficiency
- Low quiescent current: down to 10µA
- Simple, low-cost circuit

Part Number	I _{OUT}	V _{IN}		V _{OUT} Max.	I _Q	Fixed Outputs	Output Range	Efficiency	Package
		Min	Max						
SP4446	75mA	1V	8V	34V	20µA	n/a	2V to 30V	75%	5-Pin SOT-23
SP6641A	165mA	0.5V	4.5V	5V	10µA	3.3V, 5.0V	n/a	87%	5-Pin SOT-23
SP6645	175mA	0.82V	3.3V	5V	50µA	3.3V	2V to 5.5V	92%	8-Pin MSOP
SP6690	175mA	1V	13.5V	30V	20µA	n/a	2V to 30V	75%	5-Pin SOT-23 5-Pin TSOT 8-Pin DFN
SP6644	175mA	0.82V	3.3V	5V	50µA	3.3V	2V to 5.5V	92%	8-Pin MSOP
SP6691	225mA	1V	13.5V	30V	20µA	n/a	2V to 34V	75%	5-Pin SOT-23 5-Pin TSOT 8-Pin DFN
SP6641B	550mA	0.5V	4.5V	5V	10µA	3.3V to 5.0V	3.3V or 5V	87%	5-Pin SOT-23
SP7648	700mA	2.7V	4.5V	5.5V	12µA	n/a	2.7V to 5.5V	92%	10-Pin DFN 10-Pin MSOP
SP6648	400mA	0.5V	4.5V	5V	12µA	3.3V	2.3V to 5.5V	94%	10-Pin DFN 10-Pin MSOP
SP6699	150mA	2.5V	16V	27V	2mA	200mV	3.3V to 27V	80%	6-Pin SOT-23
XRP7410	Controller	7V	28V	>60V	2.2mA	800mV	7V to >60V	90%	10-Pin DFN 8-Pin MSOP

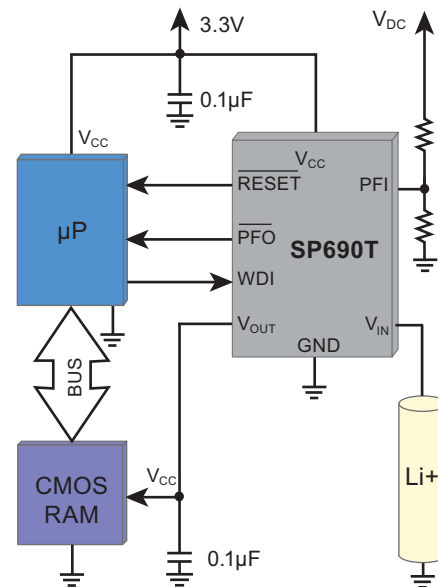
3V μ P Supervisors

Applications

- Applications
- Motherboard
- System Card
- Printers
- Servers
- Test Equipment

Key Features

- Low quiescent current: down to 10 μ A
- Detection rising and falling Vcc
- Accurate trip point
- Quad System Supervisors Available
- Communications/Datacom
- Metering Equipment
- Security/Monitoring



Microprocessor Error Detection Application

Part Number	I _Q	V _{IN}		Reset Threshold	Reset Active	Reset Accuracy	Package
		Min	Max				
SP706R	40 μ A	1V	5.5V	2.630V	Low	\pm 75mV	8-Pin NSOIC 8-Pin MSOP
SP708R	40 μ A	1V	5.5V	2.630V	Low/High	\pm 75mV	8-Pin NSOIC 8-Pin MSOP8
SP805S	40 μ A	1V	5.5V	2.925V	Low	\pm 75mV	8-Pin NSOIC
SP690S	40 μ A	1V	5.5V	2.925V	Low	\pm 75mV	8-Pin NSOIC
SP708S	40 μ A	1V	5.5V	2.930V	Low/High	\pm 75mV	8-Pin NSOIC 8-Pin MSOP
SP706S	40 μ A	1V	5.5V	2.930V	Low	\pm 75mV	8-Pin NSOIC 8-Pin MSOP
SP802T	40 μ A	1V	5.5V	3.075V	Low	\pm 60mV	8-Pin NSOIC
SP690T	40 μ A	1V	5.5V	3.075V	Low	\pm 75mV	8-Pin NSOIC
SP805T	40 μ A	1V	5.5V	3.075V	Low	\pm 75mV	8-Pin NSOIC
SP706T	40 μ A	1V	5.5V	3.080V	Low	\pm 75mV	8-Pin NSOIC 8-Pin MSOP
SP708T	40 μ A	1V	5.5V	3.080V	Low/High	\pm 75mV	8-Pin NSOIC 8-Pin MSOP
SP809	3 μ A	1V	6V	2.3V, 2.6V, 2.9V, 3.1V 4.0V, 4.1V, 4.6V	Low	\pm 1.5%	3-Pin SOT-23
SP809N	3 μ A	1V	6V	2.3V, 2.6V, 2.9V, 3.1V 4.0V, 4.1V, 4.6V	Low	\pm 1.5%	3-Pin SOT-23
SP810	3 μ A	1V	6V	2.3V, 2.6V, 2.9V, 3.1V 4.0V, 4.1V, 4.6V	High	\pm 1.5%	3-Pin SOT-23
SP6330	20 μ A	0.9V	5.5V	Quad	Low: OD	2%	8-Pin TSOT
SP6331	20 μ A	0.9V	5.5V	Quad	Low: OD	2%	6-Pin TSOT
SP6332	20 μ A	0.9V	5.5V	Quad	Low: CMOS	2%	8-Pin TSOT
SP6333	20 μ A	0.9V	5.5V	Quad	Low: CMOS	2%	6-Pin TSOT
SP6334	20 μ A	0.9V	5.5V	Quad	High: CMOS	2%	8-Pin TSOT
SP6335	20 μ A	0.9V	5.5V	Quad	High: CMOS	2%	6-Pin TSOT
SP6336	20 μ A	0.9V	5.5V	Triple	Low: OD	2%	8-Pin TSOT
SP6337	20 μ A	0.9V	5.5V	Triple	Low: CMOS	2%	8-Pin TSOT
SP6338	20 μ A	0.9V	5.5V	Triple	High: CMOS	2%	8-Pin TSOT
SP6339	20 μ A	0.9V	5.5V	Triple	Low: OD	2%	8-Pin TSOT
SP6340	20 μ A	0.9V	5.5V	Dual	Low: OD	2%	6-Pin TSOT
SP6341	20 μ A	0.9V	5.5V	Triple	Low: CMOS	2%	8-Pin TSOT
SP6342	20 μ A	0.9V	5.5V	Dual	Low: CMOS	2%	6-Pin TSOT

5V μ P Supervisors

Applications

- Automotive
- Datacom & Telecom Equipment
- Power Meter
- Industrial Equipment

Key Features

- Low quiescent current: down to 10 μ A
- Detection rising and falling Vcc
- Accurate trip point
- Quad System Supervisors Available
- Communications/Datacom
- Metering Equipment
- Security/Monitoring

Part Number	I _Q	V _{IN}		Reset Threshold	Reset Active	Reset Accuracy	Package
		Min	Max				
SP693A	60 μ A	1V	5.5V	4.40V	Low/High	125mV	16-Pin NSOIC
SP706	60 μ A	1V	5.5V	4.40V	Low	125mV	8-Pin NSOIC 8-Pin MSOP
SP708	60 μ A	1V	5.5V	4.40V	Low/High	125mV	8-Pin NSOIC 8-Pin MSOP
SP707	60 μ A	1V	5.5V	4.65V	Low/High	125mV	8-Pin NSOIC 8-Pin MSOP
SP690A	60 μ A	1V	5.5V	4.65V	Low	125mV	8-Pin NSOIC 8-Pin MSOP
SP705	60 μ A	1V	5.5V	4.65V	Low	125mV	8-Pin NSOIC 8-Pin MSOP
SP805L	60 μ A	1V	5.5V	4.65V	High	125mV	8-Pin NSOIC
SP791	75 μ A	1V	5.5V	4.65V	Low	125mV	16-Pin NSOIC
SP691A	60 μ A	1V	5.5V	4.65V	Low/High	125mV	16-Pin WSOIC 16-Pin NSOIC 16-Pin MSOP
SP809	3 μ A	0.9V	6V	4V, 4.1V, 4.6V	Low/Push Pull	\pm 1.5%	3-Pin SOT-23
SP809N	3 μ A	0.9V	6V	4V, 4.1V, 4.6V	Low/Open Drain	\pm 1.5%	3-Pin SOT-23
SP810	3 μ A	0.9V	6V	4V, 4.1V, 4.6V	High/Push Pull	\pm 1.5%	3-Pin SOT-23

USB Switching

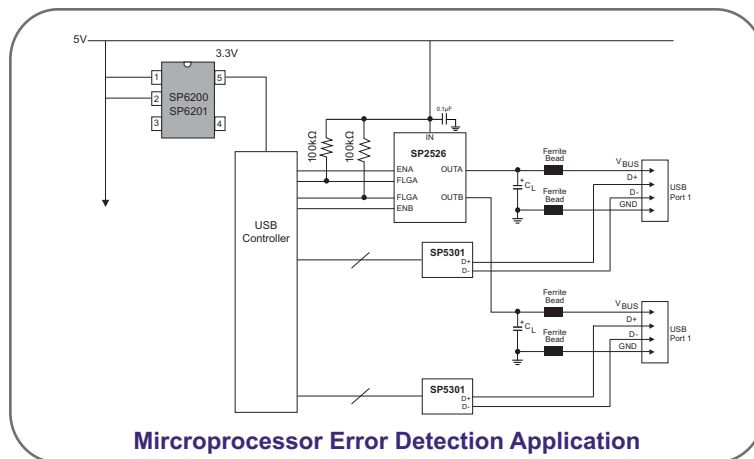
Applications

- USB Power Management
- Hot Plug-in Power Supplies
- Battery Charger Circuits
- Set Top Box Ports

Key Features

- +3.0V to +5.5V Input Voltage Range
- 500mA Continuous Load Current per Channel
- 2.6V Undervoltage Lockout
- 1.25A Short Circuit Current Limit

Part Number	I _Q Enable on I _{OUT} = 0	V _{IN}		Channels	I _{OUT}	Enable			Package
		Min	Max			V _{OH}	V _{OL}	Type	
SP2525A-1	75 μ A	3V	5.5V	1	500mA	2.4V	0.8V	Active High	16-Pin NSOIC
SP2525A-2	75 μ A	3V	5.5V	1	500mA	2.4V	0.8V	Active High	8-Pin NSOIC 8-Pin MSOP
SP2526A-1	110 μ A	3V	5.5V	2	500mA	2.4V	0.8V	Active Low	8-Pin NSOIC 8-Pin MSOP
SP2526A-2	110 μ A	3V	5.5V	2	500mA	2.4V	0.8V	Active Low	8-Pin NSOIC 8-Pin MSOP
SP619	350 μ A	2.5V	5.5V	1	725mA	1.4V	0.65V	n/a	8-Pin NSOIC 8-Pin MSOP



Low Dropout Regulators

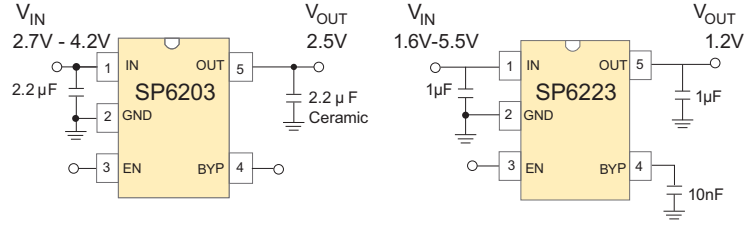
The simplest and lowest cost technique for stepping down DC voltage for high performance ASICs and microprocessors. A low dropout regulator (LDO) provides a quiet, well-regulated DC voltage supply that has excellent transient response. Exar offers an extensive line of LDOs in a wide range of voltages and currents.

Applications

- Mobile Phones
- PDAs
- MP3 Players
- Handheld Computers
- LCD Display Lighting

Key Features

- Extremely low dropout voltage
- Simple design
- Minimum external components needed
- Drive LEDs directly from li-ion battery
- Tiny package
- Low cost



Mobile Phone

Part Number	I _{OUT}	V _{IN}		I _Q	Accuracy	VDROP	Output Voltage*	Package
		Min	Max					
SP6222	50mA	1.6V	4.5V	10µA	2%	100mV	2.5V, 3.0V & Adjustable	5-Pin SC-70 5-Pin SOT-23
LP2950	100mA	2.4V	4.5V	150µA	0.5%, 1%	380mV	2.5V, 3.0V & Adjustable	3-Pin TO-92
LP2951	100mA	2.4V	30V	150µA	0.5%, 1%	380mV	2.5V, 5.0V & Adjustable	8-Pin NSOIC
SP6200†	100mA	2.5V	6V	28µA	2%	160mV	1.8V, 3.3V	5-Pin SOT-23 8-Pin DFN
SP6213/4	100mA	2.5V	6V	65µA	2.5%	250mV	1.8V, 2.5V, 2.85V, 3V, 3.3V, 5.0V	5-Pin SC-70
SPX2951	150mA	2.4V	30V	150µA	1%	300mV	3.3V, 5.0V & Adjustable	8-Pin NSOIC
SPX5205	150mA	2.5V	16V	70µA	1%	210mV	1.2V, 1.5V, 1.8V, 2.5V, 2.8V, 3V, 3.3V, 5.0V & Adjustable	5-Pin SOT-23
SP6260†	150mA	2.0V	6.0V	25µA	2%	225mV	1.5V, 1.8V, 2.5V, 2.8V, 3.0V, 3.2V, 3.3V	5-Pin SOT-23
SP6265	150mA/ 150mA	2.3V	5.5V	70µA	1.5%	300mV	1.8V/2.5V, 1.8/2.8V, 1.8/3.3V, 2.85/2.85V, 3.0/3.0V	6-Pin TSOT 8-Pin TDFN
SP6223	150mA	1.6V	4.5V	14µA	2%	300mV	Adjustable	5-Pin SC-70 5-Pin SOT-23
SP6201†	200mA	2.5V	6V	28µA	2%	320mV	1.5V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V, 5.0V & Adjustable	5-Pin SOT-23 8-Pin DFN
SPX2954	250mA	2.4V	30V	150µA	0.5%, 1%	310mV	3.3V, 5.0V	3-Pin SOT-223 8-Pin NSOIC
SP6203†	300mA	2.7V	6V	45µA	2%	180mV	2.5V, 2.8V, 2.85V, 3.0V, 3.3V, & Adjustable	5-Pin SOT-23 8-Pin DFN
SPX1521	300mA	4.1V	20V	150µA	1%	300mV	3.3V, 5.0V	3-Pin SOT-223
SPX2945	400mA	4.1V	30V	100µA	0.5%, 1%	420mV	n/a	3-Pin SOT-223 3-Pin TO-263
SP6205	500mA	2.7V	6V	45µA	3%	300mV	1.8V, 2.5V, 2.8V, 2.85V, 3.0V, 3.3V & Adjustable	5-Pin SOT-23 8-Pin DFN
SPX3819	500mA	2.5V	16V	90µA	1%	340mV	1.2V, 1.5V, 1.8V, 2.5V, 3V, 3.1V, 3.3V, 5.0V & Adjustable	5-Pin SOT-23 8-Pin NSOIC 8-Pin DFN
SPX1117	800mA	2.63V	12V	5mA	1%	1.1V	1.5V, 1.8V, 2.5V, 2.8V, 2.85V, 3V, 3.3V, 5.0V & Adjustable	3-Pin SOT-223 3-Pin TO-252 3-Pin TO-220 3-Pin TO-263
SPX2940	1A	3.2V	16V	12mA	3%	280mV	2.5V, 3.3V, 5.0V	3-Pin TO-220 3-Pin TO-263
SPX2941	1A	3V	16V	12mA	3%	280mV	Adjustable	5-Pin TO-263
SPX3940	1A	3.1	16V	12mA	1%, 2%	280mV	1.8V, 2.5V, 3.3V, 5.0V	3-Pin SOT-223 3-Pin TO-263

* Additional voltages may be available. Contact factory. † Low Noise optimized low dropout regulators

Part Number	I _{OUT}	V _{IN}		I _Q	Accuracy	VDROP	Output Voltage*	Package
		Min	Max					
SPX2815	1.5A	2.5V	10V	4mA	1%	400mV	2.5V, 3.3V, 5.0V & Adjustable	3-Pin TO-220 3-Pin TO-252 3-Pin TO-263
SPX29150	1.5A	2.5V	16V	12mA	1.5%	1.1mV	1.8V, 2.5V, 3.3V, 5.0V	3-Pin TO-220 3-Pin TO-263
SPX29151	1.5A	2.5V	16V	12mA	1.5%	390mV	1.8V, 2.5V, 3.3V, 5.0V	3-Pin TO-220 3-Pin TO-263
SPX29152	1.5A	2.5V	16V	12mA	1.5%	390mV	Adjustable	3-Pin TO-220 3-Pin TO-263
SPX29153	1.5A	2.5V	16V	12mA	1.5%	390mV	Adjustable	3-Pin TO-220 3-Pin TO-263
SP1086	1.5A	n/a	12V	10mA	2%	1.3V	1.5V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V, 5.0V & Adjustable	3-Pin TO-220 3-Pin TO-252 3-Pin TO-263
SPX1582†	3A	1.75V	5.5V	5mA	2%	400mV	1.5V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V, 5.0V & Adjustable	5-Pin TO-220 5-Pin TO-263
SPX1587†	3A	2.5V	10V	5mA	1%, 2%	1.1V	1.5V, 1.8V, 2.5V, 2.85V, 3.0V, 3.3V, 5.0V & Adjustable	3-Pin TO-220 3-Pin TO-252 3-Pin TO-263
SPX29300	3A	2.8V	16V	16mA	1%	550mV	1.8V, 2.5V, 3.3V, 5.0V	3-Pin TO-220 3-Pin TO-263
SPX29301	3A	2.8V	16V	16mA	1%	550mV	1.8V, 2.5V, 3.3V, 5.0V	5-Pin TO-220 5-Pin TO-263
SPX29302	3A	2.8V	16V	16mA	1%	550mV	Adjustable	5-Pin TO-220 5-Pin TO-263
SPX29302A	3A	2.8V	16V	16mA	1%	370mV	Adjustable	5-Pin TO-220 5-Pin TO-263
SPX1085	3A	2.8V	12V	10mA	2%	1.3V	1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V & Adjustable	3-Pin TO-220 3-Pin TO-252 3-Pin TO-263
SPX1084	5A	n/a	12V	10mA	2%	1.3V	1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V & Adjustable	3-Pin TO-220 3-Pin TO-252 3-Pin TO-263
SPX1581	5A	1.75V	5.5V	5mA	2%	400mV	2.85V, 3.3V	5-Pin TO-220
SPX1585	5A	2.77V	10V	5mA	1%, 2%	1.1V	1.5V, 2.5V, 3.3V & Adjustable	3-Pin TO-220 3-Pin TO-263
SPX29501	5A	2.8V	16V	20mA	1%	370mV	1.8V, 2.5V, 3.3V, 5.0V	5-Pin TO-263
SPX29502	5A	2.8V	16V	20mA	1%	370mV	Adjustable	5-Pin TO-220 5-Pin TO-263

Charge Pumps

Exar's charge pump technology provides the benefits of a switching regulator, such as improved efficiency, without the size and expense of an external inductor. Charge pumps can boost voltage to drive white LEDs for backlighting LCD displays, and invert voltages to serve as display bias supplies.

Applications

- Mobile Phone
- Voltage Inversion

Key Features

- No inductor required
- High efficiency
- Small size

Part Number	I _Q	V _{IN}		Current Output	Outout Range	Frequency	Efficiency	Package
		Min	Max					
SP6660	400μA	1.5V	4.25V	200mA	-1.5V to -4.25V or +3V to 8.5V	80kHz	93%	8-Pin MSOP 8-Pin NSOIC 8-Pin PDIP
SP6661	3mA	1.5V	5.3V	200mA	-1.2V to -5V	900kHz	92%	8-Pin MSOP 8-Pin NSOIC
SP6682	3mA	2.7V	5.5V	200mA	+0.3V to +5.5V	600kHz	75%	10-Pin MSOP 10-Pin DFN
SP6683	3mA	2.7V	5.5V	200mA	+0.3V to +5.5V	1200kHz	87%	10-Pin DFN

LED Drivers

Exar has an extensive selection of LED drivers from small low current linear drivers to high power buck regulators that can drive in excess of 3Amps. Whether driving a single high power LED for retail lighting or an array of 58 low current LEDs for a 14inch LCD panel, Exar has a solution. LEDLab™ is an online expert system that helps you quickly design an LED driver to meet your needs. Also, check out Design Solutions developed by Exar's Power applications group where they have solutions for LEDs up to 12Amps! All of these solutions are designed to keep power loss to a minimum and use as little board space as possible.

Applications

- Mobile Phones
- Wide range of portables
- LCD backlighting
- Architectural Lighting
- Operator panels
- Large LED Arrays
- Flashlights

Key Features

- Accurate current control
- I²C and single wire interfaces
- Extremely low dropout voltage
- Simple design
- Minimum external components needed
- Small Solutions
- Highly flexible

Part Number	Architecture	Application	Ch	V _{IN}		Max Series LEDs	Dropout Voltage	Max Current Per Channel (mA)	LED Matching Accuracy (%) (Typ.)	Control	Package
				Min	Max						
SP6415	Boost	Backlight	2	2.7	5.5	4		20	n/a	TTL	10-Pin DFN
SP6685	Charge Pump	Flash	1	2.7	5.5	1		700	n/a	TTL	10-Pin DFN
SP6686	Charge Pump	Flash	1	2.7	5.5	1		400	n/a	TTL	10-Pin DFN
SP6690	Boost	Backlight	1	1	13.5	7	n/a	25	n/a	TTL	5-Pin SOT-23 5-Pin TSOT 8-Pin DFN
SP6691	Boost	Backlight	1	1	13.5	7	n/a	40	n/a	TTL	5-Pin SOT-23 5-Pin TSOT 8-Pin DFN
SP6699	Boost	Backlight	1	2.5	16	6	n/a	40	n/a	TTL	6-Pin SOT-23
SP6887	Charge Pump	Backlight	4	2.7	5.5	1		30	3	TTL	16-Pin QFN
SP7600	Buck	High Power	1	4.5	29	6	0.2	2	n/a	TTL	8-Pin HSOICN
SP7601	Buck	High Power	1	4.5	29	6	0.2	3	n/a	TTL	6-Pin TSOT
XRP7602	Boost Controller	High Power	1	7	28	>8	n/a	n/a	n/a	TTL	10-Pin DFN 8-Pin MSOP
XRP7606	Boost Controller	SP7616	n/a	7	28	7	n/a	n/a	n/a	TTL	8-Pin DFN
XRP7607	Boost Controller	SP7617	n/a	7	28	7	n/a	n/a	n/a	ST	8-Pin DFN
SP7120	Linear	General	2	2.7	5.5	1	0.16	15/20/25	0.8	TTL	6-Pin SOT-23
SP7121	Linear	General	2	2.7	5.5	1	0.18	25	0.8	TTL	6-Pin SOT-23
SP7122	Linear	General	3	2.7	5.5	1	0.16	15/20/25	0.8	TTL	6-Pin SOT-23
SP7611A/C	Linear	General	4	2.7	5.5	1	0.3	40	0.8	TTL	6-Pin SC-70 6-Pin TDFN
SP7612/A/C	Linear	General	3	2.7	5.5	1	0.3	40	0.8	TTL	6-Pin SC-70 6-Pin TDFN
SP7614/A/C	Linear	General	2	2.7	5.5	1	0.15	80	0.8	TTL	6-Pin SC-70 6-Pin TDFN
SP7615	Linear	Backlight	4	4.5	16	4	1	126	0.6	TTL	8-Pin HSOICN 8-Pin DFN
SP7616	Linear	Backlight	4	4.5	30	7	0.45	60	1.5	TTL	8-Pin DFN
XRP7617	Linear	Backlight	8	4.5	30	7	0.5	30	2	ST	8-Pin DFN
SP7618	Linear	Flash	1	2.5	5.5	1	0.2	1000	n/a	SWI	8-Pin DFN
SP7619	Linear	Flash	1	2.5	5.5	1	0.12	500	n/a	TTL	8-Pin DFN
SP7619A	Linear	Flash	1	2.5	5.5	1	0.15	700	n/a	TTL	8-Pin DFN
SP7680	Charge Pump	LMU	7	2.7	5.5	1	0.2	31/62	0.8	I ² C	16-Pin QFN
SP7682	Charge Pump	BL+Flash	4+1	2.7	5.5	1	0.25	31/500	0.8	I ² C	16-Pin QFN
SP7682A	Charge Pump	BL+Flash	4+1	2.7	5.5	1	0.25	31/500	0.8	SWI	16-Pin QFN
SP7685	Charge Pump	Flash	1	2.7	5.5	1	0.15	1200	n/a	TTL	10-Pin DFN
SP7686	Charge Pump	Flash	1	2.7	5.5	1	0.2	500	n/a	SWI	8-Pin DFN
SP7686A	Charge Pump	Flash	1	2.7	5.5	1	0.2	500	n/a	TTL	8-Pin DFN
SP7686B	Charge Pump	Flash	1	2.7	5.5	1	0.2	500	n/a	TTL	10-Pin DFN

Voltage References

A voltage reference maintains a precise voltage at its output regardless of variations in the external environment, such as voltage fluctuations, temperature change, etc. Exar offers a full range of industry standard references.

Applications

- Motherboard
- Power Supply
- Power Meter
- VGA Card
- Industrial Equipment

Key Features

- High accuracy: 0.5%
- Industry standard
- Low cost alternative

Part Number	V _{REF}	V _{IN} Max.	Operating Current	Accuracy	Temp (ppm/°C)	I _{REF}	Package
SPX385-1.2	1.235	n/a	10µA - 20mA	1%, 2%	90	n/a	3-Pin TO-92 3-Pin SOT-23 8-Pin NSOIC
SPX1004-1.2	1.235	n/a	10µA - 20mA	0.3%	20	n/a	3-Pin SOT-89
SPX432	1.24	15V	1µA - 80mA	0.5%, 1%	92	6µA	3-Pin SOT-23 3-Pin TO-92
SPX432J	1.25	18V	0.1µA - 100mA	0.5%, 1%	28	0.4µA	3-Pin TO-92 3-Pin SOT-23
SPX1431	2.5	36V	1mA - 150mA	0.40%	28	1.9µA	3-Pin TO-92 3-Pin SOT-89 8-Pin NSOIC
SPX2431	2.5	20V	1mA - 100mA	0.5%, 1%	28	4µA	3-Pin SOT-23
SPX385-2.5	2.5	n/a	20µA - 20mA	1%, 2%	90	n/a	3-Pin TO-92 3-Pin SOT-23 8-Pin NSOIC
SPX431A	2.5	36V	1mA - 150mA	0.5%	28	4µA	3-Pin TO-92 3-Pin SOT-89 8-Pin NSOIC
SPX431B	2.5	36V	1mA - 150mA	1%	28	4µA	3-Pin TO-92 8-Pin NSOIC
SPX431C	2.5	36V	1mA - 150mA	2%	28	4µA	3-Pin SOT-89 3-Pin TO-92 8-Pin NSOIC
SPX431L	2.5	20V	1mA - 100mA	0.5%, 1%	28	4µA	3-Pin SOT-23 3-Pin SOT-89 3-Pin TO-92
SPX431LJ	1.24V	20V	0.1mA - 100mA	0.5%, 1%, 2%	28	4µA	3-Pin TO-92 3-Pin SOT-89
SPX385-5.0	5	n/a	20µA - 20mA	1%, 2%	90	n/a	3-Pin SOT-23 3-Pin TO-92 8-Pin NSOIC



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