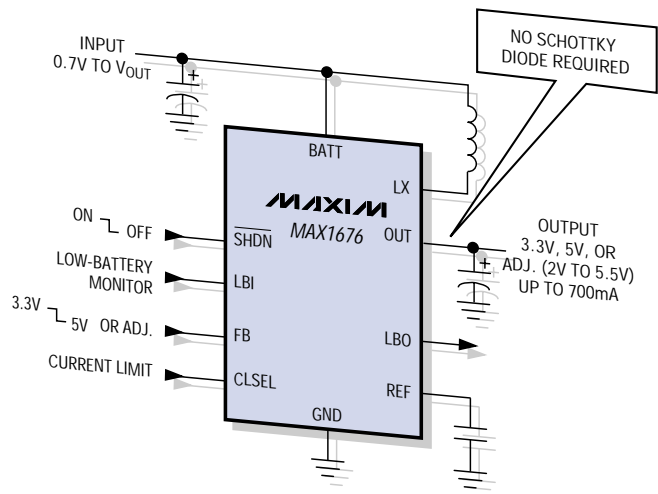


## NEW Low-Cost, Low-Noise Step-Up Converters Reduce EMI in Noise-Sensitive Applications


### 95% Efficient Regulators Consume Just 16µA and Fit in µMAX Packages

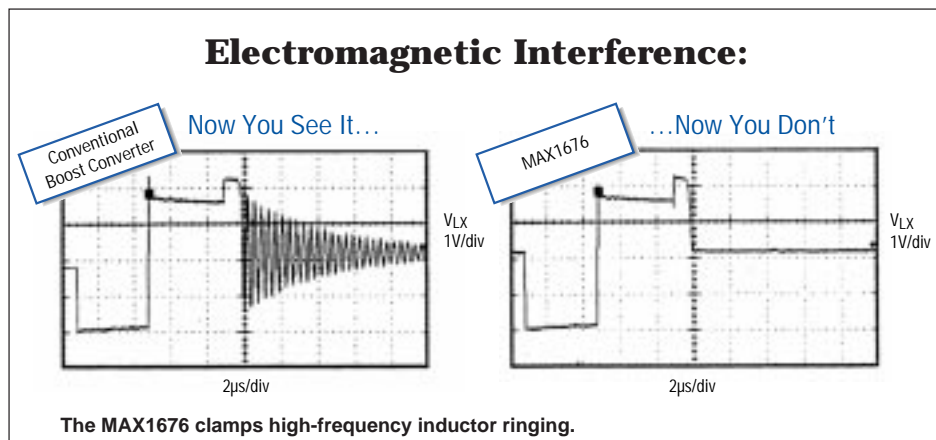
The new MAX1674/MAX1675/MAX1676 are ideal for 1-cell and 2-cell step-up applications. Their internal switches and synchronous rectifier eliminate the need for an external MOSFET switch and Schottky diode, improving efficiency and reducing solution size and cost.

These step-up converters have preset (pin-selectable) outputs of 3.3V or 5V, or are adjustable from 2V to 5.5V using a resistor-divider. The MAX1674 and MAX1675 feature 1A and 500mA switches, respectively, allowing optimization of external component size. The MAX1676 features a pin-selectable current limit (1A or 500mA), as well as circuitry to damp inductor ringing, eliminating a source of EMI in noise-sensitive applications. All three parts are packaged in an ultra-small, 1.1mm-high µMAX.



Part	Current Limit (A)	EMI-Damping Circuitry	Pin-Package
MAX1674	1	No	8-pin µMAX
MAX1675	0.5	No	8-pin µMAX
MAX1676	1 or 0.5	Yes	10-pin µMAX

 8-µMAX AREA: 0.024in <sup>2</sup> 15.5mm <sup>2</sup> MAX HEIGHT: 1.11mm
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------



## ANALOG DESIGN GUIDE

1	Multiplexers, Switches, Military
2	Interface Products
3	Op Amps, Comparators
4	DC-DC Converters, Power Supplies
5	µP Supervisory
6	Analog Filters
7	A/D Converters
8	High Speed: Video, Comparators
9	D/A Converters
10	Display Drivers
11	Voltage References
12	3V Analog

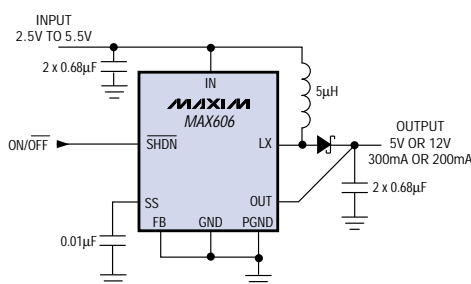
# Featured Products

## 300mA, Low-Profile Boost Converters

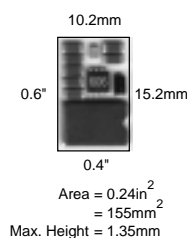
The MAX606/MAX607 are the smallest CMOS boost converters available for low-profile applications, such as PCMCIA cards. Switching at up to 1MHz, an entire MAX606 circuit is less than 1.35mm high yet fits into 0.24in<sup>2</sup>. The MAX607 switches at up to 500kHz, reducing supply current and permitting the use of space-saving inductors. An entire MAX607 circuit fits into just 0.16in<sup>2</sup>. Both parts are available in 8-pin  $\mu$ MAX and SO packages.

Another space-saving feature is a unique control scheme that minimizes output voltage ripple over the entire input/output voltage range of these devices, allowing stable operation with only small, ceramic input and output capacitors. In addition, programmable soft-start reduces inrush currents during start-up.

- Optimized for PCMCIA Applications
- Small, 2 x 0.68 $\mu$ F Input/Output Capacitors
- 1MHz Switching Frequency Permits Small, Low-Profile Inductors (MAX606)
- $\mu$ MAX Package: 1/2 Size of SO-8 and Only 1.1mm High
- 3.3V to 5V Input Range (at 300mA)
- Programmable Soft-Start
- 1 $\mu$ A Shutdown Mode
- Evaluation Kit Available



TOTAL HEIGHT < 1.35mm!

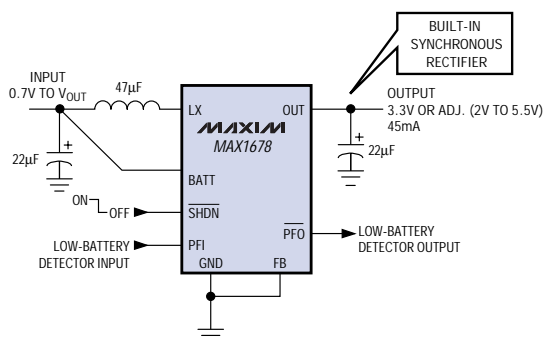
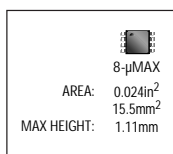


## Efficient 1-Cell Boost Converter for Pagers

The MAX1678 is a high-efficiency step-up regulator optimized for low-power 1-cell and 2-cell applications, such as pagers and remote controls. Packaged in an ultra-small 8-pin  $\mu$ MAX package, the MAX1678 requires no external MOSFET switch or Schottky diodes, reducing solution size and cost. Also included is an uncommitted comparator for low-battery detection, and circuitry to eliminate EMI in noise-sensitive applications.

The MAX1678 employs a proprietary constant-peak-current control scheme, which combines the ultra-low quiescent current of traditional PFM converters with high full-load efficiency and low output voltage ripple. Operating from inputs as low as 0.7V, the output voltage may be preset to 3.3V or adjusted between 2V and 5.5V.

- 0.85V Guaranteed Start-Up
- >90% Efficient
- Low-Noise Anti-Ringing Feature
- Built-In Synchronous Rectifier (No External Diode Needed)
- 45mA Output Current (at 3.3V from 1.2V Input)
- 37 $\mu$ A Quiescent Current
- $\mu$ MAX Package: 1/2 Size of SO-8
- Uncommitted LBI/LBO Comparator
- 2 $\mu$ A Shutdown Mode
- Evaluation Kit Available



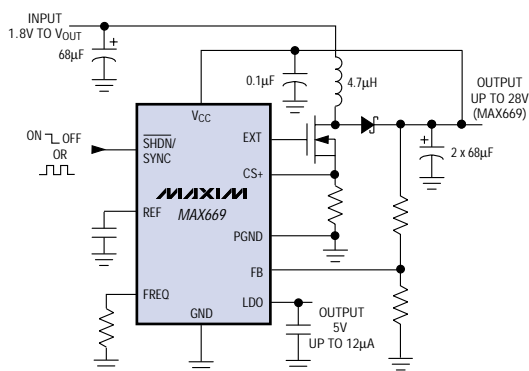
# Featured Products



## High-Voltage, High-Power $\mu$ MAX PWM Controllers

The MAX668/MAX669 are constant-frequency PWM controllers, configurable in step-up, SEPIC, flyback, and isolated topologies at power levels exceeding 20W. Their wide input voltage range permits a variety of input sources, and their adjustable (100kHz to 500kHz) or synchronizable operating frequency allows optimization of external component size and cost, and isolates switching harmonics from critical frequencies in noise-sensitive applications.

The MAX668 operates with inputs as low as 3V and puts no restriction on the output voltage generated. The MAX669 is identical to the MAX668, except its internal “bootstrap” connection allows operation at voltages down to 1.8V while restricting the output voltage to a maximum of 28V. Both parts offer a digital soft-start function, a logic-controlled shutdown mode, a user-programmable current limit, and a 5V linear-regulator output capable of sourcing up to 12mA—all in an extremely compact 10-pin  $\mu$ MAX package. A preassembled evaluation kit is available.



- Up to 28V Input Voltage
- Bootstrapped Operation for Inputs Down to 1.8V (MAX669)
- Current-Mode PWM Architecture with Idle Mode™ Operation
- Fixed-Frequency (100kHz to 500kHz) or Synchronizable Operation
- 220µA Quiescent Current
- 4µA Shutdown Mode
- Digital Soft-Start Function
- 10-Pin  $\mu$ MAX Package: 1/2 Size of SO-8
- Evaluation Kit Available

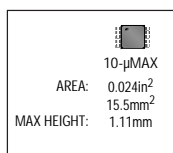
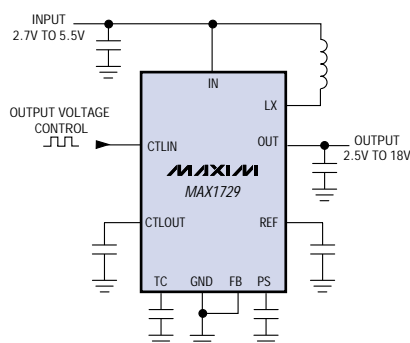
Idle Mode is a trademark of Maxim Integrated Products.



## Temperature-Compensated ECB Color LCD Bias Supply

The MAX1729\* is a step-up/step-down DC-DC converter, ideally suited for generating the bias supply in Electrically Controlled Birefringence (ECB) color LCD displays. Step-up/step-down operation is performed by internally following a step-up converter with a linear regulator, generating the precise, low-ripple output voltage necessary for these displays.

The MAX1729 features a PWM input for dynamic adjustment of the display color or contrast. Internal feedback generates a temperature-compensated 2.5V to 16V output voltage, while external feedback extends the output range to 18V. Temperature compensation counteracts temperature-dependent color variations in the display. The MAX1729 is available in a space-saving 10-pin  $\mu$ MAX package.



- 2.7V to 5.5V Input Range
- 2.5V to 18V Output Range (External Feedback Mode)
- PWM-Adjustable Output Voltage
- On-Chip Temperature Sensor
- 60µA Quiescent Supply Current
- 0.1µA Shutdown Mode
- 10-Pin  $\mu$ MAX Package
- Evaluation Kit Available

\*Future product—contact factory for availability.



# Complete Power-Management Solutions for Wireless Handsets

Maxim's extensive line of power-management ICs provides the industry's best combination of high efficiency, low noise, and small size for your wireless applications. Whether you use 1 Li+ cell or 2 to 3 NiCd cells, our products extend battery life and provide the flexibility and performance you demand.

Maxim's state-of-the-art 1.2 $\mu$ m BiCMOS process is the industry's best process for power management. With our high gate density and a wide range of high-voltage/high-current devices, we continue to lead the industry in the low-power/high-integration devices required for tomorrow's wireless applications. When your application requires a higher integration level, many of our products double as

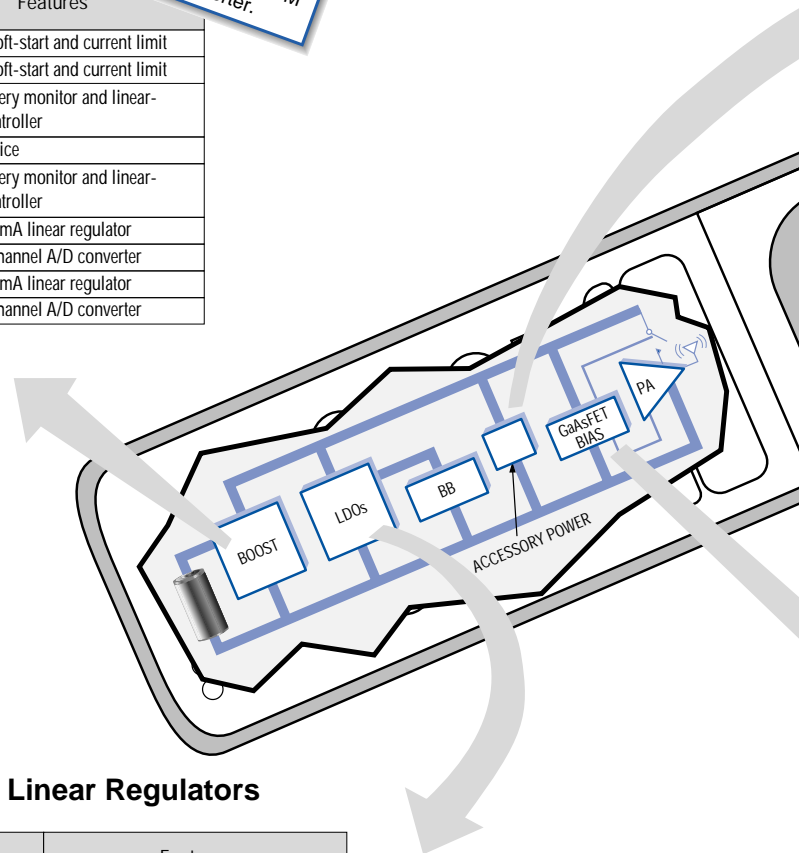
(continued on next page)

## High-Efficiency, Low-Noise Boost Converters

For 2 Li-Cell applications, see the MAX887H PWM buck converter.

Part	3.6VIN, 5VOUT Output Current (mA)	1.2VIN, 3.3VOUT Output Current (mA)	Features
MAX1709*	2000	750	Adjustable soft-start and current limit
MAX1708*	1500	500	Adjustable soft-start and current limit
MAX1703	1500	500	Includes battery monitor and linear-regulator controller
MAX1700	1000	300	Simplest device
MAX1701	1000	300	Includes battery monitor and linear-regulator controller
MAX1705	1000	300	Includes 200mA linear regulator
MAX849	1000	300	Includes 2-channel A/D converter
MAX1706	500	200	Includes 200mA linear regulator
MAX848	500	200	Includes 2-channel A/D converter

\* Future product—contact factory for availability.



## Low-Noise, Low-Dropout Linear Regulators

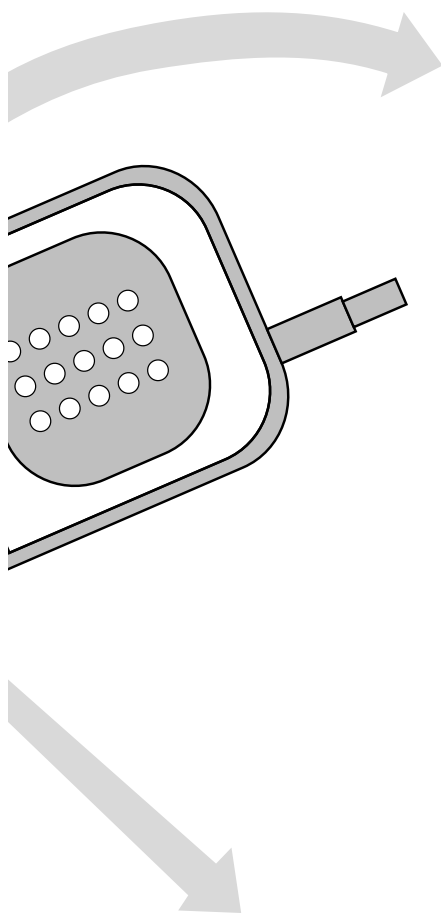
Part	Output Current (mA)	RDS(ON) ( $\Omega$ )	Features
MAX8863/4	100	1.1	Low cost, low dropout
MAX8873/4	120	1.1	MAX8863/4 in '2982 pinout
MAX8865/6	2x100	1.1	Dual MAX8863/4 in $\mu$ MAX package
MAX8867/8	150	1.1	30 $\mu$ V <sub>RMS</sub> output noise
MAX8877/8	150	1.1	MAX8867/8 in '2982 pinout
MAX8862	250/100	0.8/1.6	Dual output, wide input range
MAX882	200	1.1	Reference remains on in shutdown, high-power package
MAX883/4	200	1.1	11 $\mu$ A quiescent supply current, high-power package
MAX603/4	500	0.65	15 $\mu$ A quiescent supply current, high-power package

# Complete Power-Management Solutions for Wireless Handsets

proven building blocks for custom and semi-custom designs. For more information on Maxim's custom IC capabilities, contact your local Maxim sales office.

In addition to power management, Maxim offers an extensive portfolio of wireless communications products. For more information regarding our line of wireless communications products, phone Maxim at 1-800-998-8800, ask for the Literature Department, and request the latest edition of the Wireless Analog Design Guide.

(continued from previous page)



## Miscellaneous/Accessory Power

Application	Part	Function	Features
Card Slots	MAX619	5V Regulated Charge Pump	500kHz operation
	MAX679	3.3V Regulated Charge Pump	μMAX package
	MAX682/3/4**	250/100/50mA, 5V Regulated Charge Pump	Low-noise, fixed-frequency operation
	MAX1686**	3V/5V Regulated Charge Pump	Ideal for dual-voltage SIM card slots
VCOs	MAX768	Dual, Low-Noise Regulated Charge Pump	Dual, low-noise outputs up to $\pm 2xV_{IN}$
LCDs	MAX865	Dual-Output Charge Pump	Dual outputs ( $\pm 2xV_{IN}$ ), μMAX package
	MAX868	Inverting Voltage Doubler	30mA at up to $-2xV_{IN}$ , μMAX package
	MAX1682/3	30mA Doubling Charge Pump	SOT23-5 package
	MAX1729*	ECB Color LCD Bias	Temperature compensated output

\* Future products—contact factory for availability.

\*\* New product.

## Low-Noise GaAsFET Bias

Part	Function	Features
MAX768	Low-Noise Doubler/Inverter	Dual, low-noise outputs up to $\pm 2xV_{IN}$
MAX828/9	Inverter	SOT23-5 package
MAX840/3/4	Low-Noise Inverter	Wide input voltage range
MAX850/1/2/3	Low-Noise Inverter	Wide input voltage range
MAX870/1	Inverter	SOT23-5 package
MAX881R**	Low-Noise Inverter	Power-OK signal, small μMAX package

\*\* New product.

# Flexible, Efficient Power for Your PDA and Subnotebook Designs

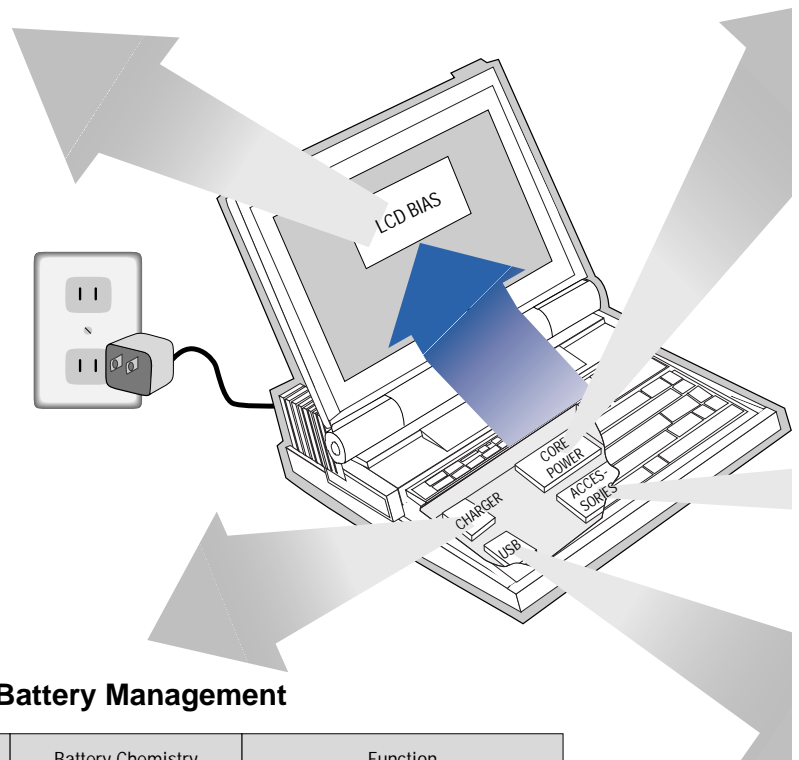
Maxim's broad range of power-management products contains all of the components you need to provide flexible, efficient power to your PDA and subnotebook design. Featured components include battery chargers for all chemistries, card-slot protection, core and accessory power, and LCD-panel bias supplies.

(continued on next page)

## LCD Bias

Part	Function	Features
MAX629	LCD Bias Supply	$\pm 28V$ with internal switch
MAX686	LCD Bias Supply	MAX629 functions + digital output control
MAX868	Regulated Charge Pump	Output up to $-2V_{IN}$
MAX1610	CCFL Supply	Digital output control
MAX1611	CCFL Supply	SMBus <sup>®</sup> -controlled output
MAX1664	AMLCD Supply	Internal boost + LCD bias

SMBus is a registered trademark of Intel Corp.



## Battery Management

Application	Part	Battery Chemistry	Function
Battery Charger	MAX712/13	NiMH, NiCd	High-Efficiency Stand-Alone Battery Charger
	MAX745	Li+	High-Efficiency Stand-Alone Battery Charger
	MAX846	Li+, NiMH, NiCd, Lead Acid	Compact, Low-Cost, Multichemistry Battery Charger
	MAX1640/1	NiMH, NiCd, Lead Acid	High-Efficiency Battery Charger
	MAX1647/8	Li+, NiMH, NiCd, Lead Acid	SMBus Smart Battery Charger
Fuel Gauge	MAX1660	Any	High-Accuracy Fuel Gauge
Pack Protector	MAX1665*	Li+	2, 3, and 4-Cell Li+ Pack Protector

\* Future product—contact factory for availability.

# Flexible, Efficient Power for Your PDA and Subnotebook Designs

(continued from previous page)

In addition to the products shown in the following tables, Maxim offers a complete portfolio of notebook computer power products. For more information regarding our line of notebook power products, phone Maxim at 1-800-998-8800, ask for the Literature Department, and request the latest edition of the Low-Power Notebook ICs Analog Design Guide.

## CPU Core Power

Part	Function	Features
MAX887H	High-Efficiency, PWM Step-Down Converter	Internal synchronous switch
MAX1626	High-Efficiency Step-Down Controller	3.3V/5V fixed output
MAX1627	High-Efficiency Step-Down Controller	Adjustable output
MAX1652**	High-Efficiency, PWM Step-Down Controller	Regulates secondary positive output
MAX1653**	High-Efficiency, PWM Step-Down Controller	MAX797 in small QSOP-16
MAX1654**	High-Efficiency, PWM Step-Down Controller	Regulates secondary negative output
MAX1655**	High-Efficiency, PWM Step-Down Controller	Output as low as 1V
MAX1700 Family	High-Efficiency Step-Up Converters	Various

\*\* New product.

## Accessory Power

Part	Function	Output Current (mA)
MAX603/4	Low-Dropout Linear Regulator	500
MAX682/3/4**	5V Regulated Charge Pump	250/100/50
MAX882/3/4	Low-Dropout Linear Regulator	200
MAX8867/8	Low-Dropout Linear Regulator	150
MAX8877/8	Low-Dropout Linear Regulator	150

\*\* New product.

## Card-Slot/Load-Switch Control

Part	Function	Features
MAX869	2A (Adj.) High-Accuracy Current-Limited Switch	USB compatible
MAX890	1A (Adj.), High-Accuracy Current-Limited Switch	USB compatible
MAX891/2	500mA/250mA (Adj.), High-Accuracy Current-Limited Switch	USB compatible, $\mu$ MAX package
MAX894/5	Dual, 500mA/250mA (Adj.), High-Accuracy Current-Limited Switch	Dual switches in SO-8
MAX1661/2/3**	SMBus Serial Bus Expansion and Load-Switch Control	Three SMBus GPIOs in $\mu$ MAX-10

\*\* New product.

# Maxim's Compact, Low-Iq Supplies are Ideal for Pagers and Digital Cameras

Maxim's step-up converters offer unique capabilities that are ideal for pager applications. Featuring low quiescent currents, operation from input voltages as low as 700mV, and ultra-small  $\mu$ MAX packaging, these devices provide your pager designs with smaller size and longer standby times.

## Main Power

(continued on next page)

Part	Function
MAX769**	Complete Power Management (Step-Up/Down)
MAX847**	Complete Power Management (Step-Up)
MAX1674/5/6**	Low-Iq, High-Efficiency Step-Up Converter
MAX1678**	Low-Noise, High-Efficiency Step-Up Converter
MAX1700 Family	Low-Noise, High-Efficiency Step-Up Converter

\*\* New product.



Pager



## Complete Power Management for Two-Way Pagers

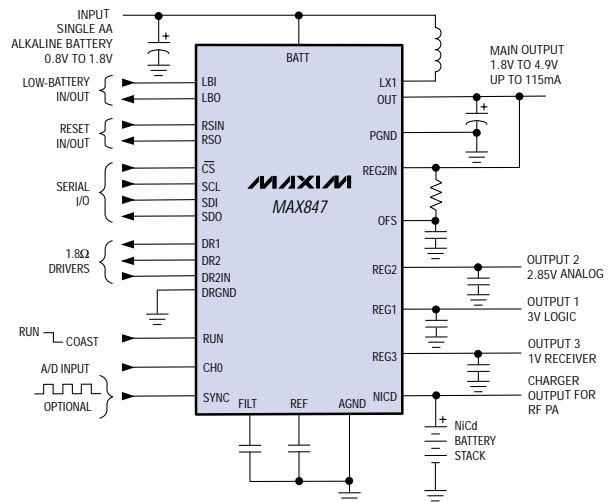
The MAX847 and MAX769 are the most recent additions to Maxim's highly integrated line of low-noise and low-power-consumption power-management ICs that save space and extend battery life. Packaged in a small 28-pin QSOP (just 0.096in<sup>2</sup>), the MAX847 and MAX769 provide complete power management for low-power digital wireless communications applications, such as two-way pagers.

### On-Chip Functions

- Synchronous-Rectified DC-DC Step-Up (MAX847) Step-Up/Down (MAX769)
- Three Low-Noise Linear-Regulator Outputs
- 3-Channel, 7-Bit A/D Converter
- Integrated PLL for Clock Synchronization
- Serial Interface
- Power-On Reset Output
- Low-Battery Comparator
- Charger Output
- Two 120mA Open-Drain Drivers
- Automatic Battery-Backup Switchover

### Features

- 115mA Output Current from 1-Cell Input
- 13 $\mu$ A Quiescent Supply Current
- Low-Noise, Synchronizable, Fixed-Frequency PWM Operation
- Digitally Controlled Output Voltage from 1.8V to 4.9V
- Evaluation Kit Available for Easy Prototyping





# Maxim's Compact, Low-Iq Supplies are Ideal for Pagers and Digital Cameras

Maxim's extensive line of power-management products even accommodates the special power requirements of digital cameras. For USB-ready cameras, you can also look at the MAX890 family of USB-compliant current-limited switches to ensure fast, accurate protection of your USB port.

## LCD Bias

(continued from previous page)

Part	Function
MAX629	High-Efficiency $\pm 28V$ Step-Up Converter
MAX686	Digitally Adjustable $\pm 28V$ Step-Up Converter
MAX863	High-Efficiency, Dual Step-Up Controller
MAX868	Compact, Regulated Inverting Voltage Doubler
MAX1771	High-Efficiency Step-Up Controller

## CCD Bias

Part	Function
MAX685**	Dual-Output CCD Bias

\*\* New product.



Digital Camera

## Main Power

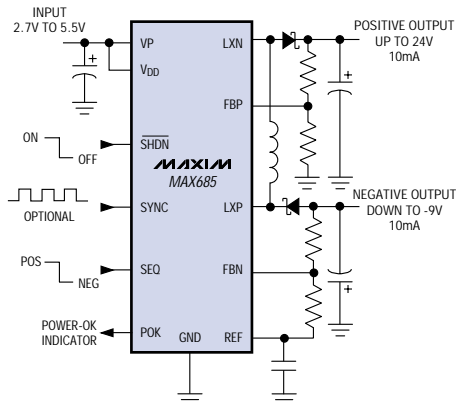
Part	Function
MAX682**	Low-Noise, Regulated Charge Pump
MAX887H	High-Efficiency, PWM Step-Down Converter
MAX1626/7	High-Efficiency Step-Down Controller
MAX1674/5/6**	Low-Iq, High-Efficiency Step-Up Converter
MAX1700 Family	Low-Noise, High-Efficiency Step-Up Converters

\*\* New product.

## **NEW** Low-Noise, Dual-Output Supply for CCD and LCD Bias

The MAX685 features dual low-noise outputs for powering CCD imaging devices and LCDs. Powered from a 2.7V to 5.5V source, this device uses a single inductor to provide independently regulated positive and negative 10mA outputs, saving space and cost by eliminating bulky, expensive custom transformers. Other features include a power-OK indicator that signals when the outputs are in regulation, selectable power-on sequencing, and a synchronizable switching frequency. With its integrated power switches, the MAX685 is packaged in a space-saving 16-pin QSOP (which is the same size as an 8-pin SO).

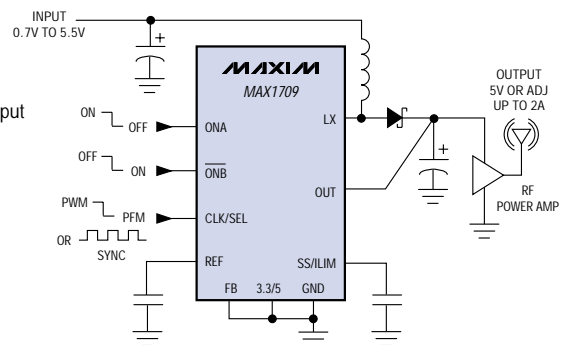
- Dual Independent Outputs with a Single Inductor
- No Transformer Required
- Low-Noise, Low-Ripple Outputs
- Power-OK Indicator
- Selectable Power-On Sequencing
- 0.1 $\mu$ A Shutdown Mode
- Small 16-Pin QSOP Package (same size as SO-8)



# High-Efficiency, Low-Noise Step-Up Converters Power Wireless Handsets and PDAs

Devices in Maxim's MAX1700 family of PWM boost converters offer the best combination of small size, low noise, and high efficiency for wireless handsets and PDAs. Their wide input voltage range, extending as low as 0.7V, is ideal for a range of battery sources from 1 to 3 NiCd/NiMH cells or 1 Li+ cell. Efficiency for each member of this device family exceeds 95%, with pin-selectable low-power and micropower shutdown modes to ensure the longest standby times. Their fixed-frequency, synchronizable PWM operation ensures that the switching frequency (and its harmonics) does not interfere with noise-sensitive circuitry within your system.

- >95% Efficiency
- Low-Noise, Synchronizable PWM Operation
- 0.7V to 5.5V Input Range
- 3.3V/5V/Adj. (2.5V to 5V) Output Range
- Up to 2A Output Current
- Small QSOP Package (same size as SO-8)
- 1µA Shutdown Mode



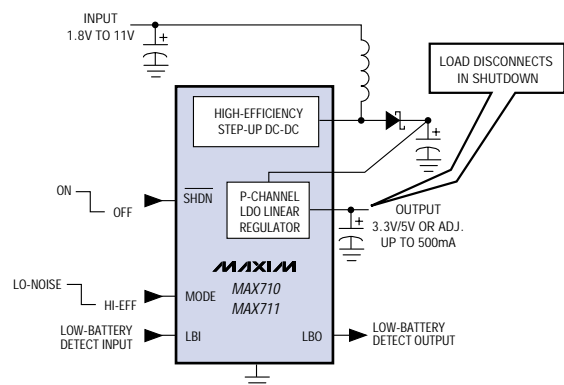
Part	Output Current (mA)		Pin-Package	Features
	3.6VIN, 5VOUT	1.2VIN, 3.3VOUT		
MAX1709*	2000	750	16-Pin Narrow SO	Adjustable soft-start and current limit
MAX1708*	1500	500	16-Pin QSOP	Adjustable soft-start and current limit
MAX1703	1500	500	16-Pin Narrow SO	With battery monitor and linear-regulator controller
MAX1700	1000	300	16-Pin QSOP	Simplest device
MAX1701	1000	300	16-Pin QSOP	With battery monitor and linear-regulator controller
MAX1705	1000	300	16-Pin QSOP	Includes 200mA linear regulator
MAX849	1000	300	16-Pin Narrow SO	Includes A/D converter
MAX1706	500	200	16-Pin QSOP	Includes 200mA linear regulator
MAX848	500	200	16-Pin Narrow SO	Includes A/D converter

\*Future product—available after December 1998.

# Low-Noise, Efficient Step-Up/Down Converters Require No Transformer

The MAX710/MAX711 and MAX1672 integrate a step-up DC-DC converter with a linear regulator to provide compact, low-noise step-up/step-down conversion. Optimized for applications where the regulated output voltage (1.8V to 11V) varies above and below the input voltage (1.8V to 11V), these devices use an inductor, which is cheaper and physically smaller than the transformers required for competing SEPIC and flyback configurations. As with SEPIC and flyback configurations, the MAX710/MAX711/MAX1672 each disconnect the load from the source when in shutdown mode.

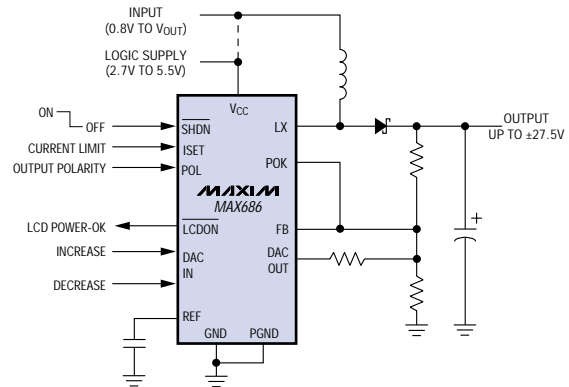
The 300mA MAX1672 is packaged in a small 16-pin QSOP, which is the same size as an 8-pin SO package. The MAX710/MAX711, offering a 500mA output, are available in 16-pin SO packages.



# ±28V Step-Up Converters Have Digitally Adjustable Outputs

The MAX686 and MAX629 feature internal 500mA power switches, capable of generating up to ±28V outputs. They are designed to generate either a fixed (MAX629) or digitally adjustable (MAX686) positive or negative output from a positive input as low as 0.8V. Configurable in boost, SEPIC, and flyback topologies, these flexible boost converters have selectable current limits to aid optimization of efficiency and external component size and cost.

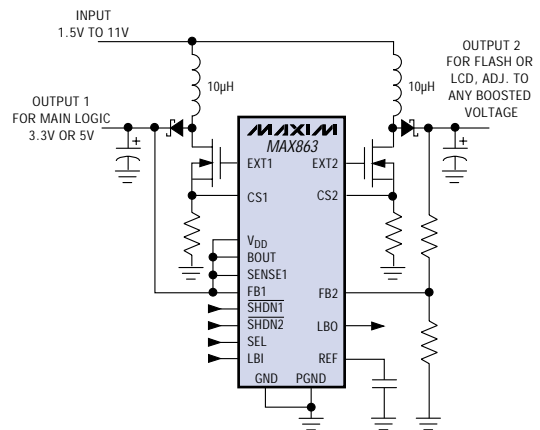
- Internal 500mA DMOS Switch
- 6-Bit DAC-Controlled Output Voltage
- Power-OK Indicator Protects LCD
- 2.7V to 5.5V Input Voltage Range (Controller)
- Operation with Inputs as Low as 0.8V
- Output Voltages up to ±28V
- 65µA Supply Current
- 1.5µA Shutdown Mode
- Adjustable Current Limit
- 16-QSOP Package (same size as SO-8)
- For Simple LCD Bias Generator See Also: MAX629



# Flexible, Low-Cost Boost Controllers: Ideal for Single-/Dual-Rail Systems

The MAX863 dual-output DC-DC converter contains two independent step-up controllers in a single compact QSOP package. Drawing only 85µA when both controllers are on, the MAX863's operation down to 1.5V makes it the perfect choice for hand-held systems such as PDAs and digital cameras. The MAX1771 is a single low-cost step-up controller, offering functionally similar performance to the MAX863. Both parts are configurable in step-up, SEPIC, and flyback configurations.

- >90% Efficiency from 20mA to 2A
- 85µA Quiescent Supply Current
- Operation from as Low as 1.5V
- Independent Shutdown Inputs
- 3.3V/5V/Adjustable Output Voltages
- Uncommitted Low-Battery Comparator
- Small 16-QSOP Package (same size as SO-8)
- Evaluation Kit Available



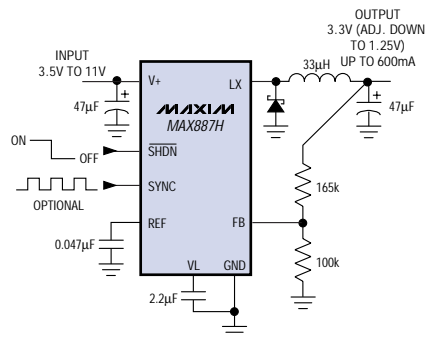
**NEW**

## See Also:

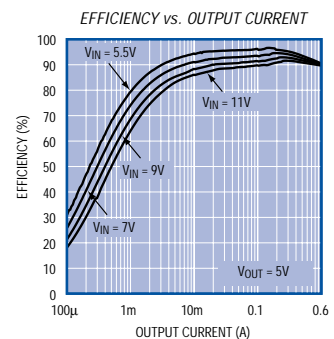
MAX668/MAX669:	µMAX PWM Controllers Offer Wide Input Range
MAX606/MAX607:	300mA Low-Profile Boost Converters
MAX1674/5/6:	Compact, Efficient Step-Up Converters (front cover)
MAX847/MAX769:	Complete Power Management for Two-Way Pagers
MAX685:	Low-Noise, Dual-Output Supply for CCD and LCD Bias
MAX682/3/4:	250mA/100mA/50mA Low-Noise, Regulated Charge Pumps
MAX1678:	Efficient 1-Cell Boost Converter for Pagers

# Low-Noise, High-Efficiency, Fixed-Frequency PWM Step-Down Converter

The MAX887H is a high-efficiency, low-noise PWM step-down converter delivering 600mA at voltages as low as 1.25V. Operating from a wide input voltage range, 100% duty-cycle operation permits low-dropout operation. The device's internal 0.6Ω power switch and synchronous rectifier greatly reduce power losses, resulting in efficiency exceeding 95%. The MAX887H consumes just 200μA quiescent supply current, ensuring long standby times in hand-held devices such as wireless handsets, PDAs, and notebook computers. Its high 300kHz (or synchronizable) fixed operating frequency permits small, low-cost components while preventing interference in noise-sensitive applications.



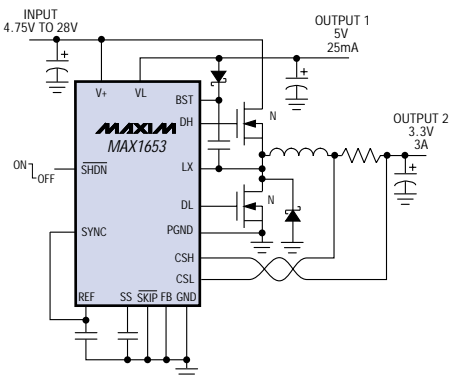
- 600mA Output Current
- 3.5V to 11V Input Voltage Range
- 1.25V to 10.25V Output Voltage Range
- Low-Dropout, 100% Duty-Cycle Operation
- Low-Noise (300kHz or Synchronous) PWM Operation
- 2.5μA Shutdown Mode



## **NEW** Upgrades to MAX797 Family Provide Lower Output Voltages, Smaller Packages

The MAX1652-MAX1655 are high-efficiency, PWM step-down controllers packaged in a space-saving QSOP. These devices combine the excellent performance of the popular MAX797 family of devices with higher (99%) duty-cycle operation for lower dropout, output voltages as low as 1V, and lower quiescent supply current to ensure the longest standby times in hand-held applications such as PDAs and notebooks.

The MAX1652/MAX1654 have an additional feedback pin that permits regulation of a low-cost second output tapped from a transformer winding, while the MAX1653/MAX1655 feature logic-controlled forced-PWM operation for noise-sensitive applications. The MAX1653/MAX1655 are also available in 16-pin SO packages that are pin-compatible with the MAX797, providing a simple drop-in upgrade for existing circuits.

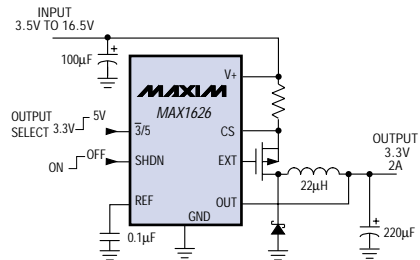


- Pin-Compatible Upgrade to the MAX797 Family
- Output Voltages as Low as 1V (MAX1655)
- 4.5V to 30V Input Voltage Range
- 170μA Quiescent Supply Current
- 3μA Shutdown Mode
- Low Noise (150kHz or 300kHz) or Synchronous Operation
- Programmable Soft-Start
- Low-Cost Secondary Output Regulation
- 16-Pin QSOP Package
- For 40V Input Range, see MAX797H
- Evaluation Kit Available

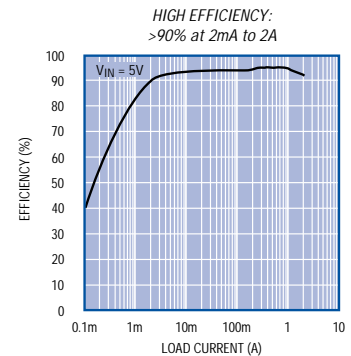
PART	MINIMUM V <sub>OUT</sub> (V)	SPECIAL FEATURE	PIN-COMPATIBLE WITH:
MAX1652	2.5	Regulates positive secondary voltage (such as +12V)	MAX796
MAX1653	2.5	Logic-controlled low-noise mode	MAX797
MAX1654	2.5	Regulates negative secondary voltage (such as -5V)	MAX799
MAX1655	1	Low output voltages (1V to 5.5V); Logic-controlled low-noise mode	MAX797 (except for reference and FB set voltages)

# High-Efficiency, Low-Cost Step-Down Controllers

The MAX1626/MAX1627 are step-down controllers that use a unique current-limited control scheme to provide excellent efficiency over loads spanning up to three decades. This wide dynamic range optimizes the MAX1626/MAX1627 for battery-powered applications such as PDAs, where load currents can vary considerably as power to individual circuit blocks is cycled to conserve energy. Operation at up to 100% duty cycle ensures the lowest possible dropout voltage, extending the useful life of battery supplies.



- >90% Efficiency over 2mA to 2A
- 70µA Quiescent Supply Current
- Fixed or Adjustable Output Voltage
  - 3.3V/5V Fixed (MAX1626)
  - Adjustable (MAX1627)
- Low-Dropout, 100% Duty-Cycle Operation
- 3V to 16.5V Input Supply Voltage
- 1µA Max Shutdown Mode



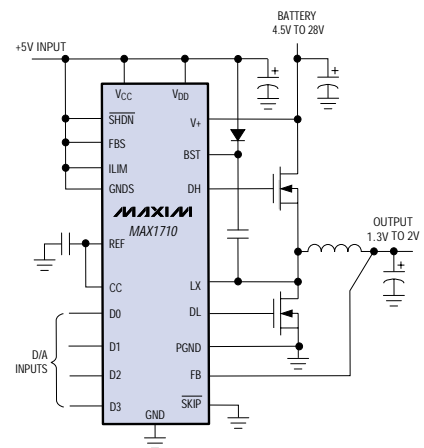
## NEW High-Speed, Digitally Adjusted Step-Down Controller for Notebook CPUs

The MAX1710 is a step-down (buck-topology), pulse-width-modulation (PWM) controller intended for core CPU DC-DC converters in notebook computers. It features a triple-threat combination of ultra-fast transient response, high DC accuracy, and high efficiency needed for leading-edge CPU core power supplies. Maxim's proprietary Quick-PWM™ quick-response, constant-on-time PWM control scheme handles wide input/output voltage ratios with ease and provides 100ns "Instant-On" response to load transients while maintaining a constant switching frequency.

The MAX1710 achieves high efficiency at a reduced cost by eliminating the current-sense resistor found in traditional current-mode PWMs. An on-board 4-bit digital-to-analog converter (DAC) sets the output voltage in compliance with Intel's Mobile Pentium II® CPU specifications. The part comes in a small 24-pin QSOP package.

For a fixed overvoltage protection threshold ( $V_{OUT} = 2V$ ), use the MAX1711\*.

- Ultra-High Efficiency
- No Current-Sense Resistor (lossless  $I_{LIMIT}$ )
- Internal Digital Soft-Start (1.7ms)
- Quick-PWM with 100ns Load-Step Response
- $\pm 1\%$   $V_{OUT}$  Accuracy over Line and Load
- 4-Bit On-Board DAC
- 1.25V to 2V Output Adjust Range
- 200/300/450/600kHz Switching Frequency
- Over/Undervoltage Protection
- Drives Large Synchronous-Rectifier FETs
- 500µA Typical  $I_{CC}$  Supply Current
- PGOOD Power-Good Indicator Output
- Small 24-Pin QSOP Package

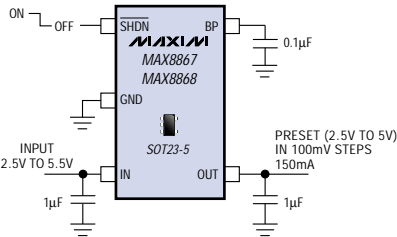


Quick-PWM is a trademark of Maxim Integrated Products.  
Pentium II is a registered trademark of Intel Corp.  
\*Future product—contact factory for availability.



# Maxim's Low-Dropout Linears Provide Low Supply Current, Small Packaging

## 150mA, SOT23-5, Low-Noise Linear Regulators Have Lowest Dropout



Parameter	Typical	Units
Input Voltage Range	2.5 to 6.5	V
Supply Current (Shutdown)	85 (0.01)	µA
Output Voltage	2.5 to 5.0	V
Output Current	150	mA

MAX8867/MAX8868

- Low 30µVRMS Output Noise
- Low 55mV Dropout at 50mA
- Output Voltages Preset in 100mV Increments
- Fault Protection
  - Thermal Overload Protection
  - Output Current-Limit/Short-Circuit Protection
  - Reverse Battery Protection
- 5-Pin SOT23 Package

**SEE ALSO:  
MAX8863/64**

## Also Available in Second-Source† Pinouts!

Maxim's SOT23 linear regulators are available with the same pinouts as the '2980/'2981 and '2982, so you can replace your SOT23 linears with lower dropout equivalents and get longer battery life.

† Maxim's maximum input voltage range is 6.5V operating, 7.0V absolute max. (MAX8863/64/73/74); and 5.5V operating, 6.0V absolute max (MAX8867/68/77/78).

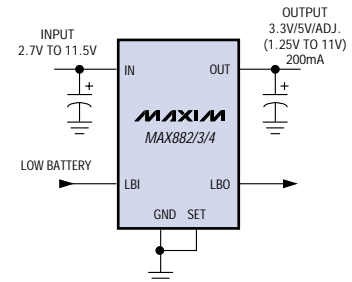
Maxim Second Source	Same Specs As:	Competitor's Equivalent
MAX8873/MAX8874	MAX8863/MAX8864	'2980 '2981
MAX8877/MAX8878	MAX8867/MAX8868	'2982

## 250mA LDOs Consume Just 11µA at Any Load and in Dropout

MAX882/MAX883/MAX884

- Low 220mV Dropout Voltage at 200mA
- 7µA Standby Mode (MAX882)
- Uncommitted Low-Battery Comparator
- Fault Protection
  - Thermal Overload Protection
  - Output Current-Limit/Short-Circuit Protection
  - Reverse Battery Protection
- High-Power (1.8W) 8-Pin SO Package

Parameter	Typical	Units
Input Voltage Range	2.7 to 11.5	V
Supply Current (Shutdown)	11 (0.01)	µA
Output Voltage	3.3/5, 1.25 to 11	V
Output Current	200	mA

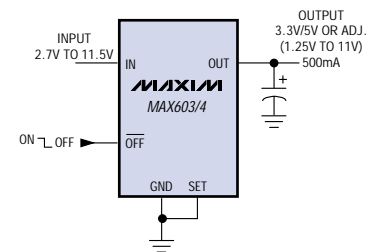


## World's Smallest 500mA LDO Linear Regulator Fits in SO-8

MAX603/MAX604

- Excellent Dropout Voltage: As Low as 0.4Ω RDS(ON)
- Fault Protection
  - Foldback Current Limiting
  - Reverse Current Protection
  - Thermal Overload Protection
- High-Power (1.8W) 8-Pin SO Package

Parameter	Typical	Units
Input Voltage Range	2.7 to 11.5	V
Supply Current (Shutdown)	15 (0.01)	µA
Output Voltage	3.3/5, 1.25 to 11	V
Output Current	500	mA



## Other Linear Regulators

Part Number	Input Voltage Range (V)	Output Voltage (V)	Dropout Voltage (V)	I <sub>Q</sub> (µA) max(typ)	Shutdown	Pin-Package
ICL7663/A	1.5 to 16	Adj. (1.3 to 15)	0.9 at 40mA	10(3.5)	Yes	8-DIP, 8-SO, 8-T099
ICL7664/A	-2 to -16	Adj. (-1.3 to -16)	0.3 at 30mA	10(3.5)	Yes	8-DIP, 8-SO, 8-T099
MAX663/6	2 to 16.5	Fixed 5 or adj. (1.3 to 15)	0.9 at 40mA	12(6)	Yes	8-DIP, 8-SO
MAX664	-2 to -16.5	Fixed -5 or adj. (-1.3 to -16)	0.3 at 30mA	12(6)	Yes	8-DIP, 8-SO, 8-T099
MAX667	3.5 to 16.5	Fixed 5 or adj. (1.3 to 15)	0.15 at 200mA	25(20)	Yes	8-DIP, 8-SO
MAX687/688/689	2.7 to 11	Fixed 3.3/3.3/3.0	0.073 at 500mA	250(150)	Yes	8-DIP, 8-SO, 8-µMAX
MAX1615/16	4 to 28	3.3/5 or adj.	0.35 at 30mA	6(8)	Yes	5-SOT23
MAX1658/1659	2.7 to 16.5	3.3/5 or adj. (1.25 to 16)	0.49 at 350mA	60(30)	Yes	8-SO (PBISS = 1.8W)
MAX8862	2.5 to 11.5	2.85/3.18/4.9 or adj. (2 to 11)	0.20 at 250mA (dual)	330(200)	Yes	16-NSO
MAX8865/8866	2.5 to 6.5	2.8/2.84/3.15 or adj. (1.3 to 5.5)	0.11 at 100mA (dual)	270(105)	Yes	8-µMAX



# Inductorless DC-DC Conversion: Charge Pumps Save Space and Cost



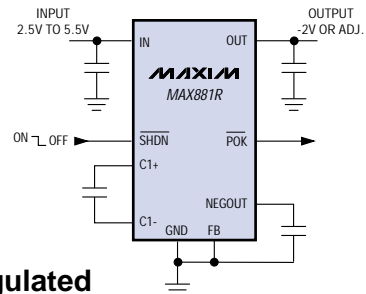
## Smallest Complete GaAsFET Bias Supply Fits in $\mu$ MAX Package

MAX881R

- 1mVp-p Output Voltage Ripple
- Preset -2V or Adjustable -0.5V to -4.9V Output
- 1ms Guaranteed Start-Up
- Power-OK Signal Controls GaAsFET Drain Switch
- 0.05 $\mu$ A Shutdown Mode
- Small Package and Capacitors: Ideal for Height-Restricted Apps

Part	Input Voltage Range (V)	Supply Current	Power-OK	Pin-Package
MAX881R**	2.5 to 5.5	500 $\mu$ A	Yes	10-pin $\mu$ MAX
MAX840/3/4	2.5 to 10	750 $\mu$ A	No	8-pin SO
MAX850/1/2/3	4.5 to 10	2mA	No	8-pin SO

\*\* New product.

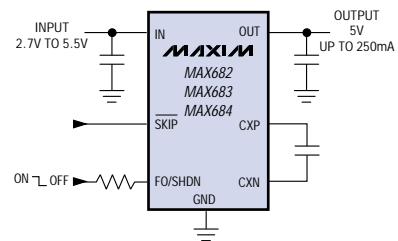


## 1 Li+ or 3 NiCd to 5V at up to 250mA: Fixed-Frequency Regulated Voltage Conversion Without Inductors

Designed as high-efficiency auxiliary supplies for compact applications, these complete 5V charge-pump regulators operate from 2.7V to 5.5V while requiring only one resistor and three capacitors. High switching frequencies (up to 2MHz) and a unique regulation scheme allow use of capacitors as small as 1 $\mu$ F per 100mA of output current.

MAX682/MAX683/MAX684

- Regulated 5V Output
  - 50mA Output Current (MAX684)
  - 100mA Output Current (MAX683)
  - 250mA Output Current (MAX682)
- 100 $\mu$ A Quiescent Current (Skip Mode)
- Programmable (50kHz to 2MHz) Switching Frequency
- Ultra-Small  $\mu$ MAX Package (MAX683/MAX684)
- 0.1 $\mu$ A Shutdown Current



Part	Input Voltage Range (V)	Output Voltage (V)	Output Current (mA)	Supply Current ( $\mu$ A)	Pin-Package	Features
MAX619	2 to 3.6	5	50	75	8-pin SO	500kHz Operation for Small Capacitors
MAX662A	4.5 to 5.5	12	30	185	8-pin SO	500kHz Operation for Small Capacitors
MAX679	1.8 to 2.6	3.3	20	50	8-pin $\mu$ MAX	1MHz Operation for Small Capacitors
MAX682/3/4**	2.7 to 5.5	5	250/100/50	100	8-pin SO	Adjustable, Constant-Frequency Operation
MAX868	2.7 to 5.5	Up to $-2V_{IN}$	30	30	10-pin $\mu$ MAX	Regulated Inverting Voltage Doubler
MAX1673	2 to 5.5	Up to $-V_{IN}$	125	35	8-pin SO	Regulated Inverter, Constant-Frequency Operation
MAX1686**	2.7 to 4.2	3/5	12	45	8-pin $\mu$ MAX	Ideal for Dual-Voltage SIM Card Ports

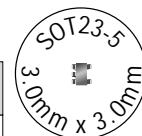
\*\* New product.

## Replace Your '7660 Circuits with Maxim's Pin-Compatible Upgrades...

Parameter	'7660	MAX660	MAX860	MAX861	MAX1680	MAX1681
Pin-Package	8-SO/ $\mu$ MAX	8-SO	8-SO/ $\mu$ MAX	8-SO/ $\mu$ MAX	8-SO	8-SO
Output Impedance ( $\Omega$ )	55	6.5	12	12	3.5	3.5
Output Current (mA)	10	100	50	50	125	125
Oscillator Frequency (kHz)	10	10/80	6/50/130	13/100/250	125/250	500/1000
Capacitors ( $\mu$ F)	10	150	10	4.7	10	2.2
Configuration	Both	Both	Both	Both	Both	Both

## ...or with Maxim's SOT23 Alternatives

Parameter	'7660	MAX828	MAX829	MAX870	MAX871	MAX1682	MAX1683
Pin-Package	8-SO/ $\mu$ MAX	SOT23-5	SOT23-5	SOT23-5	SOT23-5	SOT23-5	SOT23-5
Output Impedance ( $\Omega$ )	55	20	20	20	20	20	20
Output Current (mA)	10	25	25	25	25	30	30
Oscillator Frequency (kHz)	10	12	35	125	500	12	35
Capacitors ( $\mu$ F)	10	10	3.3	1	0.33	10	3.3
Configuration	Both	Inverting	Inverting	Inverting	Inverting	Doubling	Doubling



# DC-DC Switching Converters

Part Number	Input Voltage Range (V)	Output Voltage (V)	Quiescent Supply Current (mA), max(typ)	Output (mA)	Control Scheme	Pins-Package	Temp. Ranges*	EV Kit	Features	Price <sup>†</sup> 1000-up (\$)
<b>STEP-UP SWITCHING REGULATORS</b>										
MAX606/607	3 to 5.5	5 or 12 or adj.	0.5(0.25)/0.3(0.15)	200	PFM	8-μMAX	E	Yes	1MHz switching frequency fits Type 1 PCMCIA cards	3.25
MAX608	1.8 to 16.5	5 or adj.	0.11(0.085)	1A	PFM	8-DIP, 8-SO	E	Yes	Same as MAX1771, but accepts low input voltages	1.89
MAX629	2.7 to 28	V <sub>IN</sub> to 28 or 0 to -28	0.100(0.08)	40 at 28V	PFM	8-SO	E	Yes	30V/0.5A internal switch, configure as +28V or -28V	2.85
MAX630	2 to 16.5	Adj.	0.125(0.07)	30mW	PFM	8-DIP, 8-SO	C,E,M	-	Improved RC4123 second source	2.88
MAX631/632/633	1.5 to 5.6/ 12.6/15.6	5/12/15 or adj.	0.4(0.135)/ 2(0.5)/2.5(0.75)	40/25/20	PFM	8-DIP, 8-SO	C,E,M	-	Only two external components	2.56
MAX641/642/643	1.5 to 5.6/ 12.6/15.6	5/12/15 or adj.	0.4(0.135)/ 2(0.5)/2.5(0.75)	300/550/ 325	PFM	8-DIP, 8-SO	C,E,M	-	PFM controller	2.87
MAX668/669	3 to 28	Adj.	0.35(0.22)	1A	PWM	10-μMAX	E	Yes	Adjustable (or sync.) frequency, 28V controller in μMAX	2.10
MAX686	2.7 to 27.5	Up to 28	0.125(0.08)	40 at 28V	PFM	16-QSOP	E	Yes	30V/0.5A internal switch, DAC-controlled output, configure as +28V or -28V	2.95
MAX731	1.8 to 5.25	5	4(2)	200	PWM	8-DIP, 16-WSO	C,E,M	Yes		2.60
MAX732	4 to 9.3	12	3(1.7)	200	PWM	8-DIP, 16-WSO	C,E,M	Yes		2.76
MAX733	4 to 11	15	3(1.7)	125	PWM	8-DIP, 16-WSO	C,E,M	Yes		2.60
MAX734	1.9 to 12	12	2.5(1.2)	120	PWM	8-DIP, 8-SO	C,E,M	Yes	12V flash memory, hot insert	2.23
MAX752	1.8 to 16	Adj.	3(1.7)	2.4W	PWM	8-DIP, 8-SO	C,E,M	Yes		2.94
MAX756/757	1.1 to 5.5	(3.3 or 5)/adj.	0.060(0.045)	250	PFM	8-DIP, 8-SO	C,E	Yes	Best combination of low I <sub>Q</sub> and high 86% efficiency	1.95
MAX761/762	2 to 16.5	12/15 or adj. to 16.5	0.1(0.080)	120	PFM	8-DIP, 8-SO	C,E,M	Yes	12V flash memory, lowest I <sub>Q</sub> , 1.8V/3V/5V inputs	2.23
MAX770/771/772	2 to 16.5	5/12/15 or adj.	0.1(0.085)	1A	PFM	8-DIP, 8-SO	C,E,M	Yes	Controllers, high efficiency over wide I <sub>OUT</sub> range	1.80
MAX773	3 to 16.5	5/12/15/adj.	0.1(0.085)	1A	PFM	14-DIP, 14-NSO	C,E,M	-	Controller, high-voltage applications	1.80
MAX848/849	0.7 to 5.5	3.3 or 2.7 to 5	0.06	1A	PWM	16-NSO	E	Yes	1 to 3 cell step-up, low-noise, fixed-frequency PWM	2.38/2.50
MAX856/857	0.5 to 6	(3.3 or 5)/adj.	0.060(0.025)	100	PFM	8-SO, 8-μMAX	C,E	Yes	Smallest, best combination of low I <sub>Q</sub> and high 85% efficiency	1.72
MAX858/859	0.5 to 6	(3.3 or 5)/adj.	0.060(0.025)	25	PFM	8-SO, 8-μMAX	C,E	Yes	Smallest, best combination of low I <sub>Q</sub> and high efficiency	1.72
MAX863	1.5 to 11	2 pos. adj.	65(40)	1A	PFM	16-QSOP	E	Yes	Dual output, lowest I <sub>Q</sub> , high efficiency	2.80
MAX866/867	0.5 to 6	(3.3 or 5)/adj.	0.06(0.027)	90	PFM	8-SO	E	Yes	Guaranteed 0.9V start-up, low I <sub>Q</sub>	1.76
MAX1642/1643	0.7 to 5.5	3.3 or adj.	16(10)	90	PFM	8-μMAX	E	Yes	High efficiency, synchronous rectifier, dual LBI/LBO	1.76
MAX1674/5/6	0.7 to 5.5	Adj. (2 to 5)	0.040(0.03)	500	PFM	10-μMAX	E	Yes	Low I <sub>Q</sub> , internal synchronous rectifier	1.85/1.85/ 1.99
MAX1677	0.7 to 5.5	3.3/adj. & adj.	0.06(0.05)	300	PWM	16-QSOP	E	Yes	Main logic plus ± LCD outputs, no external transistors	††
MAX1678	0.7 to 5.5	3.3 or adj. (2 to 5.5)	37μA	45	PFM	8-μMAX	E	Yes	1-cell to 2-cell, low-noise, high-efficiency step-up converter	1.65
MAX1700/1701	0.7 to 5.5	2.5 to 5.5	0.100(0.06)	1A	PWM/PFM	8-SO, 16-QSOP	E	Yes	1V guaranteed start-up, MAX1701 includes 2 battery monitors and op-amp block	3.25/3.60
MAX1703	0.8 to 5.5	3.3 or adj. (2.7 to 5.5)	0.140(0.1)	1.5A	PWM/PFM	16-NSO	E	Yes	1.1V guaranteed start-up, 92% efficiency	3.95
MAX1705/1706	0.7 to 5.5	2.5 to 5.5 (dual)	0.190(0.1)	1A/0.5A	PWM/PFM	16-QSOP	E	Yes	Dual output: step-up and 200mA linear regulator, 1V guaranteed start-up	3.15/2.96
MAX1708	0.7 to 5.5	3.3/5 or adj. (2.5 to 5)	0.140(0.1)	1A	PWM/PFM	16-QSOP	E	Yes		††
MAX1709	0.7 to 5.5	3.3/5 or adj. (2.5 to 5)	0.140(0.1)	2A	PWM/PFM	16-NSO	E	Yes		††
MAX1771	2 to 16.5	12 or adj.	0.1(0.085)	1A	PFM	8-DIP, 8-SO	C,E,M	Yes	MAX771 upgrade	1.80
<b>STEP-UP/DOWN SWITCHING REGULATORS</b>										
MAX710/711	1.8 to 11	(3.3 or 5)/adj. (2.7 to 5)	0.1(0.08)	500	PFM	16-NSO	E	Yes	No transformer, step-up and linear	2.95
MAX761	2.7 to 12	Adj. (1.5 to 6)	0.1(0.08)	200	PFM	8-DIP, 8-SO	C,E,M	-	No transformer, SEPIC	2.23
MAX1672	1.8 to 11	5 or 3.3 or adj. (2.7 to 5)	0.125(0.1)	300	PFM	16-QSOP	E	Yes	Step-up followed by linear regulator, in/out disconnect in shutdown	2.65

\* Temperature Ranges: C = 0°C to +70°C, I = -25°C to +85°C, E = -40°C to +85°C, M = -55°C to +125°C

†† Future product—contact factory for pricing and availability. Specifications are preliminary.

† Prices provided are for design guidance and are FOB USA. International prices will differ due to local duties, taxes, and exchanges rates. Not all packages are offered in 1k increments, and some may require minimum order quantities.



## DC-DC Switching Converters (continued)

Part Number	Input Voltage Range (V)	Output Voltage (V)	Quiescent Supply Current (mA), max(typ)	Output (mA)	Control Scheme	Pins-Package	Temp. Ranges*	EV Kit	Features	Price† 1000-up (\$)
<b>STEP-DOWN SWITCHING REGULATORS</b>										
MAX638	2.6 to 16.5	5, adj.	0.6(0.135)	75	PFM	8-DIP, 8-SO	C,E,M	–		2.56
MAX639/640/653	4 to 11.5	5/3.3/3 or adj.	0.02(0.01)	225	PFM	8-DIP, 8-SO	C,E,M	Yes	Ultra-low I <sub>Q</sub>	2.96
MAX724	8 to 40	Adj.	11(8.5)	5A	PWM	7-TO220	C, E	–		4.52
MAX726	8 to 40	Adj.	11(8.5)	2A	PWM	7-TO220	C, E	–		3.00
MAX727/728/729	8 to 40	5/3.3/3	11(8.5)	2A	PWM	7-TO220	C, E	–		3.00
MAX730A/50A/63A	Up to 11	5/adj./3.3	3(1.7)	500	PWM	8-DIP, 8-SO	C,E,M	Yes	No subharmonic switching noise	2.15
MAX738A/48A/58A	Up to 16	5/3.3/adj.	3(1.7)	750	PWM	8-DIP, 16-WSO	C,E,M	Yes	No subharmonic switching noise	2.60
MAX744A	4.75 to 16	5	2.5(1.2)	750	PWM	8-DIP, 16-WSO	C,E,M	Yes	Optimized for cellular communications, no subharmonic switching noise	2.90
MAX767	4.5 to 5.5	3.3, 3.45 (R), or 3.6 (S)	0.75	1.5A to 10A	PWM	20-SSOP	C,E	Yes	Dedicated 5V-to-3.3V, high efficiency, small size	3.40
MAX787/788/789	8 to 40	5/3.3/3	11(8.5)	5A	PWM	7-TO220	C, E	–		4.52
MAX796/797/799	4.5 to 30	5.05/3.3/2.9/adj.	1(0.7)	50W	PWM	16-DIP, 16-NSO	C,E,M	Yes	Synchronous rectifier, secondary output regulation, high efficiency over full I <sub>OUT</sub> range	3.65
MAX798	4.5 to 30	1.6/adj.	1(0.7)	50W	PWM	16-NSO	E	–	Synchronous rectifier, secondary output regulation, high efficiency over full I <sub>OUT</sub> range	4.93
MAX830/831	8 to 30	Adj./5	–	1A	PWM	16-SO	C	Yes	Small package	3.99
MAX832/833	8 to 30	3.3/3	–	3A	PWM	20-SSOP	E	Yes	Small package	3.99
MAX887	3.5 to 11	Adj. (1.27 to 9)	0.5(0.2)	600	PFM/PWM	8-SO	E	Yes	Internal synchronous rectifier, high efficiency, synchronizable	2.44
MAX1623	4.5 to 5.5	Adj. (1.1 to 4) or 3.3/2.5 selectable	(<1µA)	–	PWM	20-SSOP	E	Yes	Internal 3A PMOS power switch and 3A NMOS synchronous-rectifier switch	††
MAX1624	4.5 to 5.5	1.1 to 3.5	0.3	to 20A	PWM	24-SSOP	E	Yes	High accuracy Pentium Pro® V <sub>JD</sub> programming, synchronous rectifier, power-good output	3.85
MAX1625	4.5 to 5.5	1.1 to 3.5	0.3	to 20A	PWM	16-SO	E	Yes	High accuracy, synchronous rectifier, power-good output	3.39
MAX1626/1627	3 to 16.5	(3.3 or 5)/adj.	0.080(0.06)	3A	PFM	8-SO	E	Yes	MAX1649/MAX1651 upgrade, 100% duty cycle, high efficiency	1.88
MAX1636	4.5 to 30	Adj. (1.1 to 5.5)	0.3	50W	PWM	20-SSOP	E	Yes	Synchronous rectifier, high efficiency over I <sub>OUT</sub> range, 1% V <sub>OUT</sub> accuracy, OVP, power-good output	3.95
MAX1637	4.5 to 30	Adj. (1.1 to 5.5)	0.3	50W	PWM	16-SO	E	–	High efficiency over I <sub>OUT</sub> range, 1% V <sub>OUT</sub> accuracy	3.70
MAX1638	4.5 to 5.5	Adj. (1.3 to 3.5)	0.3	to 20A	PWM	24-SSOP	E	Yes	Pentium II® VID, high accuracy, adjustable synchronous rectifier	3.85
MAX1639	4.5 to 5.5	Adj. (1.3 to 3.5)	0.3	to 20A	PWM	16-SO	E	–	High accuracy, adjustable synchronous rectifier	3.39
MAX1640/1641	5.5 to 30	6 to 30	4(2)	50W	PWM	16-QSOP	E	Yes	High-efficiency current source, synchronous rectifier	2.75
MAX1652/53/54	4.5 to 28	5/3.3/adj.	0.17	50W	PWM/PFM	16-QSOP, 16-NSO	E	Yes	High-efficiency over full I <sub>OUT</sub> range, synchronous rectified, all N-channel design, secondary output regulation	3.50
MAX1655	4.5 to 30	1 to 5.5	0.440(0.320)	50W	PWM/PFM	16-QSOP	E	Yes	Same as MAX1653 with low-voltage output range	3.50
MAX1710	2 to 28	1.25 to 2/adj.	950µA(600µA)	–	PWM	24-QSOP	E	Yes	100ns load-step response eliminates current-sense resistor	††
<b>INVERTING SWITCHING REGULATORS</b>										
MAX735/755	4 to 6.2	-5/adj.	3(1.6)	275	PWM	8-DIP, 8-SO	C,E,M	–	>80% efficiencies	2.15
MAX736/37/39/59	4 to 8.6	-12/-15/-5/adj.	3(1.6)	500	PWM	14-DIP, 16-WSO	C,E,M	Yes	>80% efficiencies	2.75
MAX749	2 to 6	Digital adj.	0.06	5W	PFM	8-DIP, 8-SO	C,E,M	Yes	Digital adjust for negative LCD	2.49
MAX764/765/766	3 to 16.5	-5/-12/-15 or adj. to 21ΔV	0.1	200	PFM	8-DIP, 8-SO	C,E,M	Yes	Lowest I <sub>Q</sub>	2.38
MAX774/775/776	3 to 16.5	-5/-12/-15 or adj.	0.1	1A	PFM	8-DIP, 8-SO	C,E,M	Yes	Controllers, high efficiency over wide I <sub>OUT</sub> range	2.20

\* Temperature Ranges: C = 0°C to +70°C, I = -25°C to +85°C, E = -40°C to +85°C, M = -55°C to +125°C

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†† Future product—contact factory for pricing and availability. Specifications are preliminary. Pentium II and Pentium Pro are registered trademarks of Intel Corp.

## Battery Chargers/Fuel Gauges

Part Number	No. of Cells Charged	Cell Chemistry	Charge Rate	Charge Termination Method	Pins-Package	Temp. Ranges*	EV Kit	Features	Price <sup>†</sup> 1000-up (\$)
MAX712/713	1 to 16	NiMH/NiCd	Fast, trickle	0ΔV, max V, max temp., max time (neg ΔV, MAX713)	16-DIP, 16-NSO	C,E,M	Yes	Linear or switcher, supplies load while charging, built-in termination algorithms	3.09
MAX745	1 to 4	Li+	Digital prog.	Voltage and current limit	20-SSOP	E	Yes	High-efficiency switch mode, 0.75% precision	4.50
MAX846A	1 to 10	Li+/NiCd/NiMH	Fast, trickle, top-off	Universal charger, user set	16-QSOP	E	Yes	Complete system, 1%-accurate V <sub>OUT</sub> for Li+, built-in 1% LDO, drives PNP, cost-saving independent voltage and current regulation loops	3.25
MAX1640/1641	1 to 16	Universal	Fast, trickle, top-off	Voltage and current limit	16-QSOP	E	Yes	High-efficiency PWM current-source, synchronous rectifier	2.75
MAX1647/1648	1 to 8	Universal	Digitally programmable	Voltage and current limit, thermistor	20-SSOP, 16-NSO	E	-	SBS Level 2 smart-battery charger with SMBus <sup>®</sup> interface (MAX1647)	4.79/4.25
MAX1660	4 to 28	Universal	-	-	16-QSOP	E	Yes	Digitally controlled fuel-gauge interface with ±1% absolute accuracy	2.95
MAX1665	2 to 4	Li+	-	-	8-SO	E	-	Li+ battery supervisor monitors charge and discharge cycles	††
MAX2003/A	1 to 16	NiCd and/or NiMH	Fast, trickle, top-off	Temp. slope, neg. ΔV, max temp., max time	16-DIP, 16-WSO, 16-NSO	C	Yes	Linear, built-in termination algorithms, discharge-before-charge, pulse trickle (A)	3.25/3.80
MAX1612/1613	2 to 3	NiCd/NiMH	Selectable	-	16-NSO	E	Yes	Highly accurate bridge-battery backup controller	††

## LCD & CCFL Display Power Supplies

Part Number	Input Voltage Range (V)	DC-DC Output Voltages (V)	Quiescent Supply Current (μA)	Pins-Package	EV Kit	Features	Price <sup>†</sup> 1000-up (\$)
ICL7660	1.5 to 10	-V <sub>IN</sub> or 2 x V <sub>IN</sub>	110	8-DIP, 8-SO, 8-μMAX	-	No inductors, low-cost pager LCD supply, μMAX package	1.09
MAX629	0.8 to 28	V <sub>IN</sub> to 28 or 0 to -28	80	8-SO	Yes	Internal 30V/0.5A switch	2.85
MAX686	0.8 to 27.5	V <sub>IN</sub> to 27.5 or 0 to -27.5	68	16-QSOP	Yes	DAC-controlled output, internal 28V/500mA switch	2.95
MAX749	2 to 6	Negative LCD	60	8-DIP, 8-SO	Yes	Digital LCD adjustment	2.49
MAX753	6 to 24	CCFL drive, configurable; negative LCD, configurable	100	16-DIP, 16-NSO	-	Digital CCFT and LCD adjustment	4.45
MAX754	6 to 24	CCFL drive, configurable; positive LCD, configurable	100	16-DIP, 16-NSO	-	Digital CCFT and LCD adjustment	4.45
MAX759	4 to 15	Negative LCD, adjustable	1.2mA	14-DIP, 16-WSO	Yes	Internal MOSFET	2.75

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## Multiple-Output, System-Integrated Power Management Supplies

Part Number	Input Voltage Range (V)	Linear Output Voltage (V)	DC-DC Output Voltages (V)	Auxiliary Outputs (V)	Quiescent Supply Current, Over Temp. ( $\mu$ A)	Pins-Package	Temp. Ranges*	EV Kit	Features	Price† 1000-up (\$)
MAX685	2.7 to 5.5	–	Pos: 2.7 to 24 Neg: -1.3 to -9	Power-OK	800	16-QSOP	E	Yes	CCD power supply, single inductor, internal switches	3.26
MAX769	1.5 to 5.5	3.0 at 65mA, 2.85 at 25mA, 1.0 at 2mA	1.8 to 4.9 at 80mA	Battery charger, 2 x 1.8 $\Omega$ drivers	875 full-on, 15 coasting	28-QSOP	E	–	Step-up/down DC-DC intended for 3-cell, 2-way pagers; serial interface	5.11
MAX847	0.8 to 1.8	3.0 at 65mA, 2.85 at 25 $\mu$ A 1.0 at 2mA	1.8 to 4.9 at 80mA	Battery charger, 2 x 1.8 $\Omega$ drivers	875 full-on, 15 coasting	28-QSOP	E	–	Step-up DC-DC intended for 1-cell, 2-way pagers; serial interface	4.34
MAX863	1.5 to 11	–	Main = 3.3 to 5 or adj./1A, aux. = adj./1A	LBI/LBO low- battery detector	45 w/main on, 65 w/both on 1 in shutdown	16-QSOP	E	Yes	Two high-efficiency boost controllers on one IC, for PDAs and organizers	2.80
MAX1705/6	0.7 to 5.5	Down to 2.5	2.5 to 5.5	LBI/LBO	100	16-QSOP	E	Yes	Step-up, LDO, 1V guaranteed start-up	3.15/2.96

## Miscellaneous Power Supplies

Part Number	Description	Pins-Package	Temp. Ranges*	EV Kit	Features	Price† 1000-up (\$)
MAX845	Isolated transformer driver	8-SO, 8- $\mu$ MAX	E	Yes	750mW output, thin transformer, fits PCMCIA cards	1.55
MAX869L	Current-limit power switch	16-QSOP	E	–	45m $\Omega$ /2A switch	2.15
MAX890L	Current-limited power switch	8-SO	E	–	90m $\Omega$ , 1A switch	1.25
MAX891L/892L	Current-limited power switches	8- $\mu$ MAX	E	–	150m $\Omega$ /0.5A (MAX891L), 300m $\Omega$ /0.25A (MAX892L)	1.32
MAX894L/895L	Dual current-limited power switches	8-SO	E	–	Dual, 150m $\Omega$ /0.5A (MAX894L), 300m $\Omega$ /0.25A (MAX895L)	1.99

## Load-Switch Controllers

Part Number	Input Voltage Range (V)	Supply Current ( $\mu$ A)	Power-On Reset	Applications	Pins-Package	Temp. Ranges*	EV Kit	Features	Price† 1000-up (\$)
MAX1661	2.7 to 5.5	3	Outputs low	N-channel MOSFETs	10- $\mu$ MAX	E	Yes	Serial-to-parallel/parallel-to-serial, SMBus® interface	1.29
MAX1662	2.7 to 5.5	3	Outputs high	P-channel MOSFETs	10- $\mu$ MAX	E	Yes	Serial-to-parallel/parallel-to-serial, SMBus® interface	1.29
MAX1663	2.7 to 5.5	3	Outputs high	P-channel MOSFETs	10- $\mu$ MAX	E	Yes	Serial-to-parallel/parallel-to-serial, SMBus® interface	1.29

## Temperature Sensors

Part Number	Description	Pins-Package	Temp. Ranges*	Features	Price† 1000-up (\$)
MAX1617	Remote temperature sensor with SMBus®	16-QSOP	M	Measures CPU temperature directly with no calibration and $\pm 3^{\circ}$ C accuracy	4.13
MAX6501–6504	2.7V to 5.5V temperature switches	5-SOT23	M	Ambient temperature monitor with factory-set thresholds (in $10^{\circ}$ C increments), push/pull or open-drain outputs, $\pm 5^{\circ}$ C accuracy	0.67**

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\*\* 2500 pc. factory-direct price, FOB USA.

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