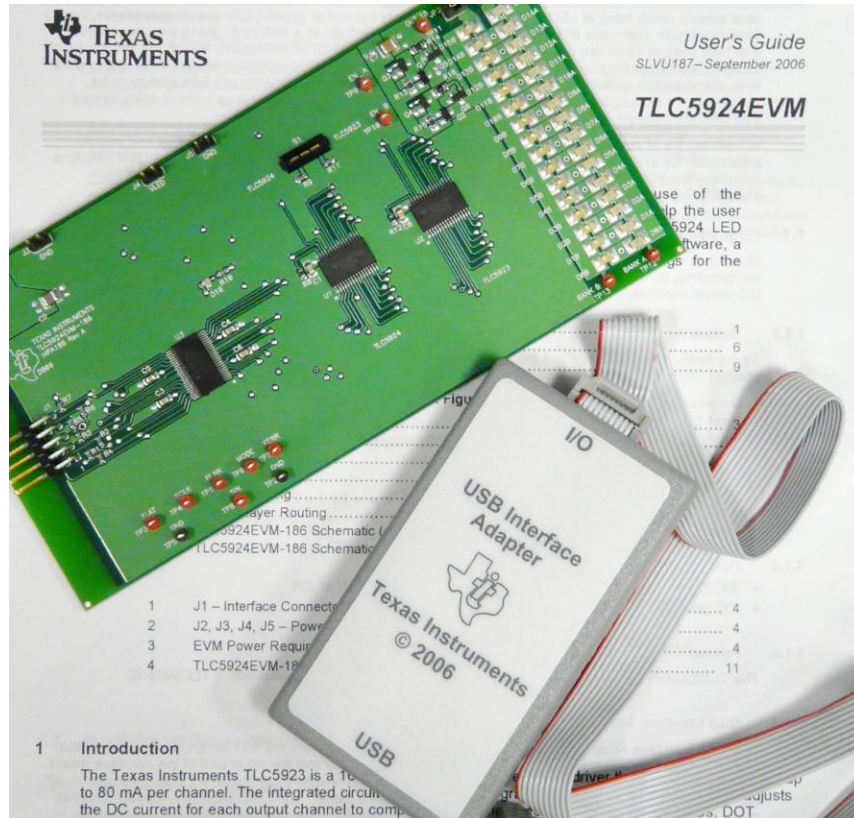


# Power Management

## Analog tools for university laboratories and projects



Above: The LED Driver -  
**TLC5924EVM-186**  
TLC5924 Evaluation Module  
**\$99**

Power Management is now a major subject in its own right. No longer is the power supply an afterthought, sometimes it is the very heart of the system, such as in solar powered or energy harvesting applications. The push towards low-power systems combined with the complexity of multiple power rails for leading edge processors make this a true systems engineering topic.

**TI is the industry leader in power management devices and our range of design tools and EVMs are second to none.**

Whether you are running a Lab to enable students to grasp the principles of DC-DC conversion, or designing specific projects, TI has excellent tools to make this easy. In addition, we have first class simulation software such as SwitcherPro™ which enable you to verify your choices before you commit to hardware.

## Power Management

### “Gas” Gauge

- Min battery capacity 800mAh
- Max battery capacity 15000mAh
- SM Bus communication interface

**Part#: BQ20Z90EVM-001**

<http://focus.ti.com/docs/toolsw/folders/print/bq20z90evm-001.html>

**\$99**

**For: Notebook PCs, Medical, Test Equipment and Portable Instrumentation**

The BQ20Z90EVM monitors capacity change, battery impedance, open-circuit voltage, and other critical parameters of the battery pack, sending the information to the host controller by serial communication. The gauge gives instant accuracy, continuously analyzing the battery impedance. This enables the device to automatically adjust for battery aging, battery self discharge and temperature inefficiencies. PC software and an interface board are included for easy evaluation.



### Multi-cell Li-ion Charger

- Input voltage 17-24V AC
- Current Limit 4.7A
- LEDs for control and status signals

**Part#: BQ24730EVM**

<http://focus.ti.com/docs/toolsw/folders/print/bq24730evm.html>

**\$149**

**For: Notebook PCs, Portable DVD Players, Webpads and Tablet PCs.**

The BQ24730 input current sense amplifier can be used to sense battery discharge current. Integrated features such as charger soft start, charge over-current protection, and IC temperature monitoring provide a second level of protection, in addition to pack and system protection functions. The EVM includes test points at key signals for testing, allowing easy probe hook-up. Jumpers are available for easy-to-change connections. The EVM can charge 3 or 4 Li-ion cells.

### Power Sequencer

- 8 Voltage rails
- 4 Four Configurable Digital Outputs
- Independent rail control

**Part#: UCD9081EVM**

<http://focus.ti.com/docs/toolsw/folders/print/ucd9081evm.html>

**\$149**

**For: Telecommunications Switches, Servers, Networking Equipment and Test Equipment.**

The UCD9081 power-supply sequencer controls the enable sequence of up to eight independent voltage rails and provides four general-purpose digital outputs (GPO). In addition, each rail is monitored for undervoltage and overvoltage glitches and thresholds. Each rail the UCD9081 monitors can be configured to shut down a user-defined set of other rails and GPOs, and alarm conditions are monitored on a per-rail basis.

### LED Driver

- 16 Channels
- Drive Capability 0 to 80mA
- Output current 90mA

**Part#: TLC5924EVM-186**

<http://focus.ti.com/docs/toolsw/folders/print/tlc5924evm-186.html>

**\$99**

**For: Mono-color, Multi-color, Full-color LED Displays, LED Signboards and Display Backlighting**

The TLC5924EVM is designed to help the user evaluate and test the various operating modes of the TLC5923 and TLC5924 LED drivers. The EVM contains a TLC5923 IC connected in parallel with a TLC5924IC. The two ICs drive 16 red and 16 green light-emitting diodes (LED).



### AC/DC Controller

- Input voltage 80 to 265 VRMS
- Output voltage 19.4V
- Output current 6.2A

**Part#: UCC28600EVM**

<http://focus.ti.com/docs/toolsw/folders/print/ucc28600evm.html>

**\$49**

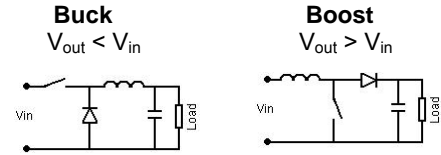
**For: Supplies for LCD-Monitors, LCD-TV, PDP-TV and Set Top Boxes, AC/DC Adapters and Offline Battery Chargers**

The UCC28600 EVM provides a 19.4 V regulated output at 6.2 A of load current, from an AC input range of 85 VRMS to 265 VRMS. This EVM gives a one-stop solution for powering many projects

## DC/DC Converters

### Switched mode DC/DC converters:

Switched mode DC/DC converters are more efficient than discrete converters, because they minimize the wasted energy.



Simplified circuits shown

#### Buck Boost for Portable

- Input voltage 1.8 to 5.5V
- Output voltage 1.2 to 5.5V
- Output current 1200mA max

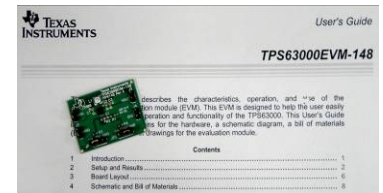
Part#: TPS63000EVM-148

<http://focus.ti.com/docs/toolsw/folders/print/tps63000evm-148.html>

\$49

#### For: Portable Audio Players, PDAs, Cellular Phones and Personal Medical Projects

The TPS63000 family is well suited to portable power applications. It is capable of delivering up to 1200 mA of output current at 3.3 V in step-down mode or up to 800 mA of output current at 3.3 V in step-up mode, from a single-cell Li-Ion battery. Total solution size is small, featuring a compact 3x3 mm<sup>2</sup> QFN package and small 2.2 uH inductor.



#### Buck or Boost for Portable

- In 62400/61200: 2.5-6V / 0.3-5.5V
- Out 62400/61200: 0.6V-Vin/1.8-5.5V
- Output current 600mA max

Part#: TPS62400EVM-167 (buck)

<http://focus.ti.com/docs/toolsw/folders/print/tps62400evm-167.html>

\$49

Part#: TPS61200EVM-179 (boost)

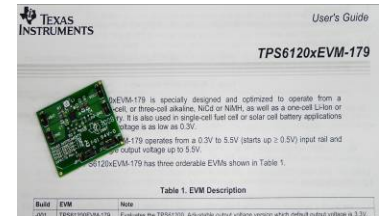
<http://focus.ti.com/docs/toolsw/folders/print/tps61200evm-179.html>

\$49

#### For: Portable Media Players, Digital Radio and Digital Cameras / Fuel Cell and Solar Cell Powered Projects

The TPS62400 EVM has a serial interface, so the output voltages can be modified during operation. The EVM comes with a USB to EasyScale converter and software so that a personal computer can be used to communicate with the EVM.

The TPS61200 provides a power supply solution for products powered by either a single-cell, two-cell, or three-cell alkaline, NiCd or NiMH, or one-cell Li-Ion or Li-polymer battery.



#### Wide Input Buck

- In 5430/40200: 9-36V / 8-16V
- Out 5430/40200: 5V / 3.3V
- Out 5430/40200: 3A / 2.5A max

Part#: TPS5430EVM-173 (integrated FET)

<http://focus.ti.com/docs/toolsw/folders/print/tps5430evm-173.html>

\$10

Part#: TPS40200EVM-001 (external FET)

<http://focus.ti.com/docs/toolsw/folders/print/tps40200evm-001.html>

\$49

#### For: Set-top Box, DVD, Industrial and Car Audio Power Supplies, Distributed Power Systems and DSL/Cable Modems

The TPS5430EVM-173 evaluation module output voltage can be easily adjusted by changing a resistor divider. The TPS40200EVM-001 demonstrates the use of the TPS40200 in a typical buck converter application. The board provides ample test points for module evaluation. This EVM can be modified to support output voltages from 0.7 V to 5 V by changing a single feedback resistor.

#### High Current Buck

- In 54010/40055: 3-3.6V / 10-14V
- Out 54010/40055: 0.9-2.5V / 1.8V
- Out 54010/40055: 14A / 15A max

Part#: TPS54010EVM-067 (integrated FET)

<http://focus.ti.com/docs/toolsw/folders/print/tps54010evm-067.html>

\$49

Part#: TPS40055EVM-001 (external FET)

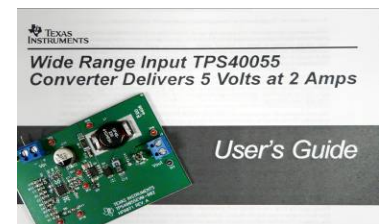
<http://focus.ti.com/docs/toolsw/folders/print/tps40055evm-001.html>

\$49

#### For: Broadband, Networking, Optical Communications Infrastructure and Industrial Servers

The TPS54010EVM-067 input voltage range is 3.0 V to 3.6 V and the power stage input is 2.2 V to 4.0 V. The output voltage is adjustable down to 0.9 V (module preset to 1.5 V). Other voltages are possible by changing a resistor divider. The TPS54010 is ideal for regulating the voltage for high current DSPs, FPGAs, ASICs, and microcontrollers.

The TPS40055EVM-001 operates at 300 kHz and delivers 1.8 V at 15 A with efficiency over 90% for much of the load range, and a full load efficiency of 88%. The TPS40055 synchronous buck controller offers a variety of user programmable functions such as operating frequency, soft-start time, voltage feed-forward, high-side current limit, and external loop compensation.





For more information about the University Program  
<http://www.ti.com/europe/university>

<b>Wide Vin Converter</b>	<b>Part#: TPS54160EVM</b>	<b>\$25</b>
▪ In 54160/54331: 3.5-60V / 3.5-28V	<a href="http://focus.ti.com/docs/toolsw/folders/print/tps54160evm-230.html">http://focus.ti.com/docs/toolsw/folders/print/tps54160evm-230.html</a>	
▪ Out 54160/54331: 5V / 3.3V	<b>Part#: TPS54331EVM-232</b>	<b>\$10</b>
▪ Out 54160/54331: 1.5A / 3A max	<a href="http://focus.ti.com/docs/toolsw/folders/print/tps54331evm-232.html">http://focus.ti.com/docs/toolsw/folders/print/tps54331evm-232.html</a>	

**For: Low Power Systems, Industrial and Car Audio Power Supplies, Aftermarket Auto Accessories: Video, GPS**  
The TPS54160 is ideal for 12-V, 24-V and 48-V Industrial and Commercial Low Power Systems, Aftermarket Auto Accessories: Video, GPS, and Entertainment.  
The TPS54331 suits in Consumer Applications such as Set-Top Boxes, CPE Equipment, LCD Displays, Peripherals, and Battery Chargers, Industrial and Car Audio Power Supplies, 5V, 12V and 24V Distributed Power Systems.

## Software:

<b>SwitcherPro™</b>	<b>Part#: SWITCHERPRO</b>	<b>FREE</b>
	<a href="http://focus.ti.com/docs/toolsw/folders/print/switcherpro.html">http://focus.ti.com/docs/toolsw/folders/print/switcherpro.html</a>	

SwitcherPro Online or Desktop Design Software allows you to design power supplies with Texas Instruments TPS40K™ controllers, TPS60xxx low-power DC/DC converters and SWIFT™ (TPS54xxx) point-of-load step-down DC/DC products. Use this tool to create, manage and share custom designs. The desktop application now allows more flexibility in creating designs since there is no need to be connected to the internet.

<b>bqEASY™</b>	<b>Part#: BQEASY-SW</b>	<b>FREE</b>
	<a href="http://focus.ti.com/docs/toolsw/folders/print/bqeasy-sw.html">http://focus.ti.com/docs/toolsw/folders/print/bqeasy-sw.html</a>	

Evaluating the complex configuration options of the Texas Instruments advanced fuel gauges can be simplified by using the bqEASY software. The bqEASY software procedure provides detailed configuring, calibrating, and chemistry selection instructions, and works within the Evaluation Software (EVSU).

<b>Low Power DC/DC Designer Software</b>	<b>Part#: TPS62K-SW</b>	<b>FREE</b>
	<a href="http://focus.ti.com/docs/toolsw/folders/print/tps62k-sw.html">http://focus.ti.com/docs/toolsw/folders/print/tps62k-sw.html</a>	

The TPS62K-SW low power DC/DC design software tool is a Windows based application that can assist in the design of power supply circuits using the TPS62xxx family of DC to DC conversion devices. The software allows the user to optimize the design for space or efficiency and provides basic circuit performance analysis.

<b>Analog eLAB™</b>		<b>FREE</b>
	<a href="http://www.ti.com/analogdesigncenter">http://www.ti.com/analogdesigncenter</a>	

The Analog E-Lab has everything you need to get started using TI's analog products. Learn with our training and webcast sessions. Select products through parametric analysis. Design with our "Pro" series, reference designs, etc. Simulate with different model resources and obtain free Samples of our products within 24 hours.



## Product Support:

Europe, Middle East and Africa

[www.ti.com/europe/csc](http://www.ti.com/europe/csc)



Prices Valid as of 1<sup>st</sup> August 2009

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