PowerBlox™

Synchronous Step-Down Regulators
Non Synchronous Step-Down Regulators

EXAR
Powering Connectivity™

2009
EXAR CORPORATION

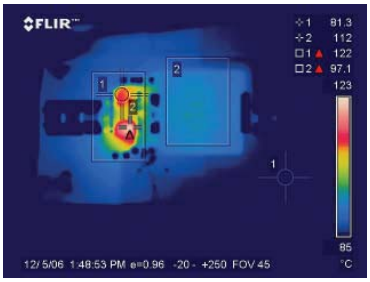
Exar PowerBlox™ family of synchronous and non synchronous step-down regulators provides a fully integrated single chip solution for point-of-load applications with high current output requirements. The high input voltage range and operating switching frequency options allow the PowerBlox™ family to fit in a wide range of applications and power architectures by enabling step-down DC to DC conversions from various intermediate power bus levels while providing a highly efficient and performing solution in the most compact footprint.

Exar's PowerBlox™ Family		
Feature	Advantage	Benefit
High current density	Reduced solution footprint for high current load	Allows positioning of the power solution close to the load
High efficiency	Minimizes power overhead and power losses	Reduces heat dissipation requirements
Wide conversion range at high frequency	Single stage smallest solution possible at any input voltage	Reduces cost and complexity
Scalability	Common platform for wide range of applications	Short design time

Ultra Small Solution – Highest Current Density

Packing up to 12 Amps in 28mm², Exar's unique package technology produces the industry's smallest 12A regulator.

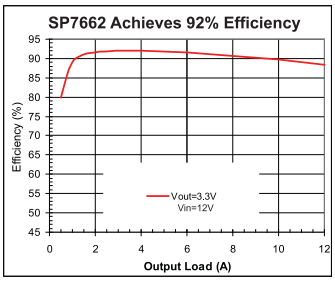
The part is packaged in a custom DFN package with three integrated heat sinks for outstanding thermal management.



High Efficiency and Performance

With integrated high performance, low resistance FETs, the PowerBlox™ family achieves up to 95% efficiency.

Even at full load, the family is able to maintain an impressive level of efficiency, thus minimizing heat dissipation and energy usage.



Ease of Use

PowerBlox™ enables and simplifies the creation of a power system or point of load. This device family is scalable to easily reuse the same design as the power and output current requirements increase. It is easily configurable for various power up sequencing requirements.

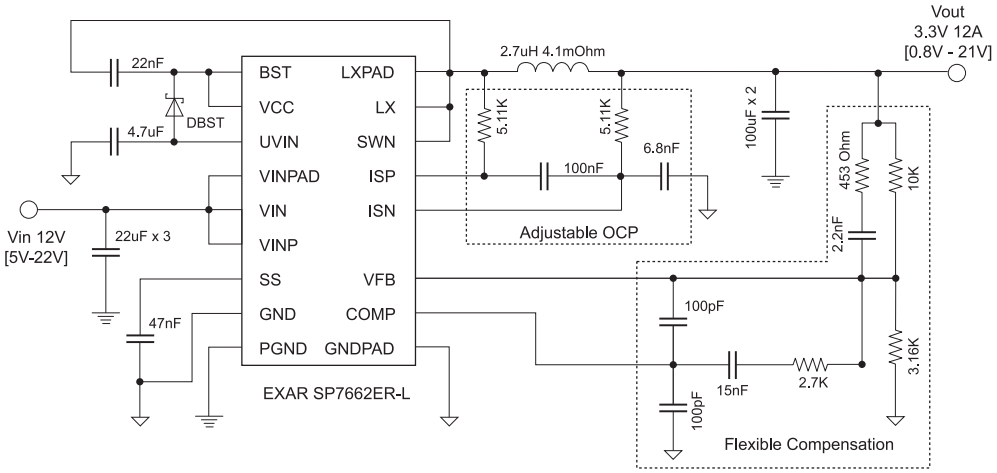
Low Duty Cycle - Wide Input Voltage Range

PowerBlox™ family supports input voltage from 2.5V up to 28V. A wide duty cycle range capability allows for output voltages from near the Vin rail down to 0.8V. Exar's technology supports minimum on-time down to 40ns.

Part Number	Output Current	Frequency	Operating Voltage		Output Voltage	Output Voltage Range		Accuracy	Efficiency	Package	Features
			Min.	Max.		Min.	Max.				
SP7650	3A	300KHz	2.5V	28V	Adj.	0.8V	27V	1.0%	95%	26-pin DFN	Synchronous UVLO, OTP, Soft Start Short Circuit Protection /Auto Restart
SP7656	3A	600KHz	4.5V	29V	Adj.	0.6V	28V	1.0%	89%	8-pin SO8	Non synchronous UVLO, Current Limiting, Softstart Intenal Compensation
SP7661	3A	600KHz	3.0V	22V	Adj.	0.8V	20.2V	1.0%	92%	26-pin DFN	Synchronous UVLO, OTP, Soft Start, Current Limiting Short Circuit Protection /Auto Restart
SP7651	3A	900KHz	2.5V	20V	Adj.	0.8V	19V	1.0%	92%	26-pin DFN	Synchronous UVLO, OTP, Soft Start Short Circuit Protection /Auto Restart
SP7653	3A	1300KHz	2.5V	20V	Adj.	0.8V	19V	1.0%	91%	26-pin DFN	Synchronous UVLO, OTP, Soft Start Short Circuit Protection /Auto Restart
SP7652	6A	600KHz	2.5V	28V	Adj.	0.8V	27V	1.0%	92%	26-pin DFN	Synchronous UVLO, OTP, Soft Start Short Circuit Protection /Auto Restart
SP7663	6A	600KHz	3.0V	22V	Adj.	0.8V	20.2V	1.0%	91%	26-pin DFN	Synchronous UVLO, OTP, Soft Start, Current Limiting Short Circuit Protection /Auto Restart
SP7655	8A	300KHz	2.5V	28V	Adj.	0.8V	27V	1.0%	95%	26-pin DFN	Synchronous UVLO, OTP, Soft Start Short Circuit Protection /Auto Restart
SP7662	12A	300KHz	3.0V	22V	Adj.	0.8V	20.2V	1.0%	93%	26-pin DFN	Synchronous UVLO, OTP, Soft Start, Current Limiting Short Circuit Protection /Auto Restart

Typical Application

12 Amperes – 3.3V output voltage using Exar's SP7662ER-L



Input Voltage Rail (V) \ Output Voltage (V)	0.9	1.0	1.1	1.5	1.8	2.5	2.8	3.3	5.0	9.6	12	18
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PowerBlox™

Power Lab™
power design made easy

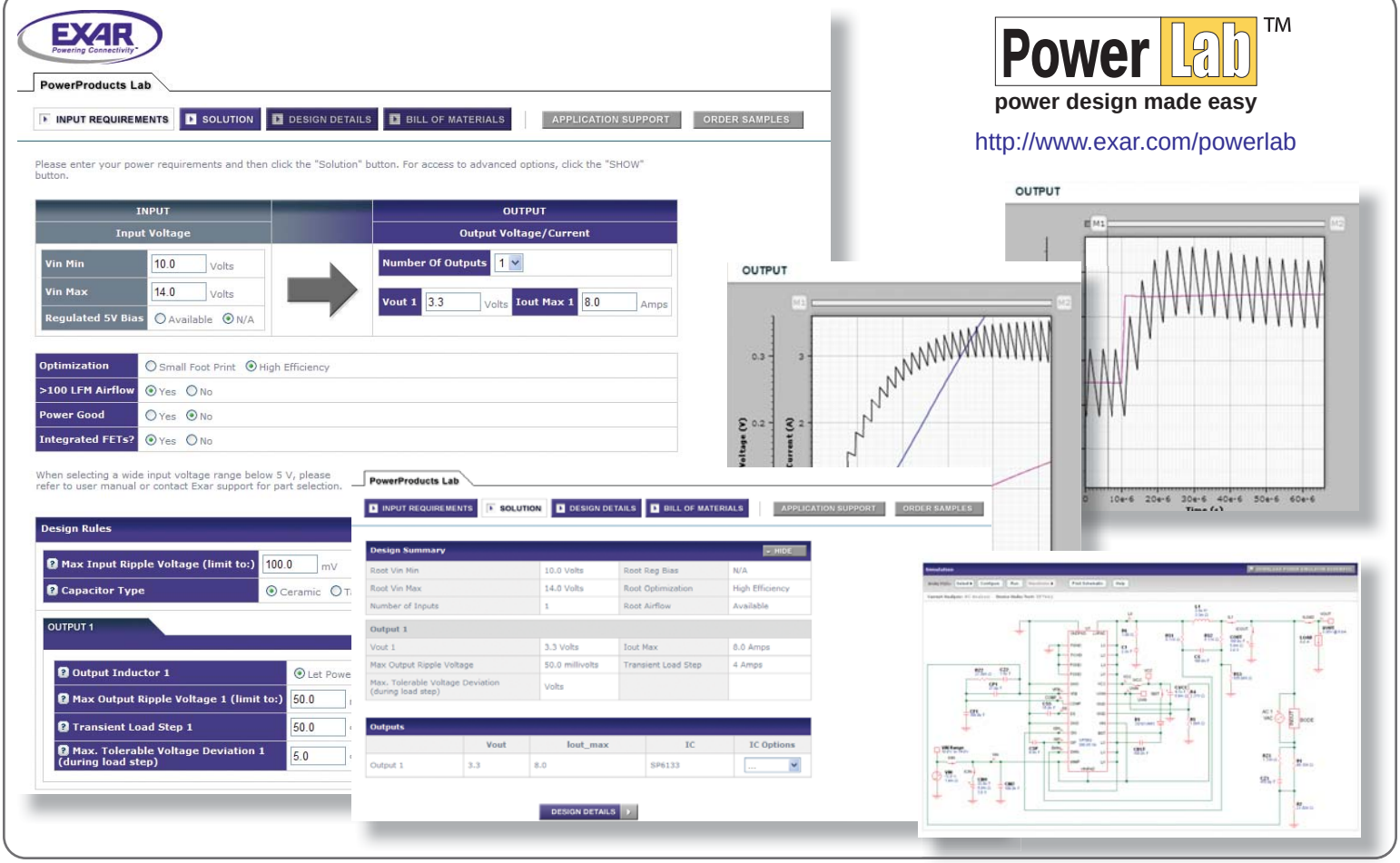
SP765x and SP766x requires 5V bias supply

SP765x requires 5V bias supply

3A Solution | 6A Solution | 8A Solution | 12A Solution

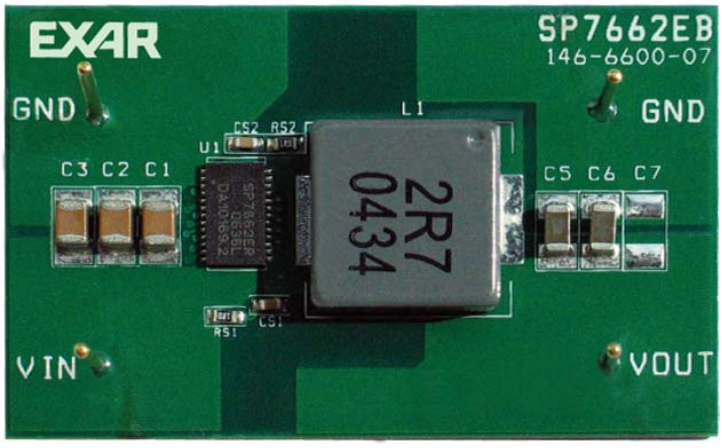
PowerLab - Online Design Tool

Exar's PowerLab interactive online design tool helps create an optimized design solution complete with schematics, component values and simulation curves from a set of custom specifications. Click the PowerLab icon on the Exar website to start and finish your design today!



Evaluation Boards

Evaluation boards for all PowerBlox™ family of devices are available along with their user manual.



Design Solutions and Application Notes are available for download at http://www.exar.com/

Design Solutions

DS05 SP7653 converts 5V input to 1.2V output at 2.5A
DS06 SP7655 converts 24V input to 12V output at 8A
DS33 Solution converts up to 28V input to drive LEDs to 6A
DS39 Providing 48W (6A at 8V) from 12V input using PowerBlox™
DS40 Converting 12V input to 1.2V output processor core voltage at up to 8A using PowerBlox™
DS44 Converting up to 16V input to 2.5V output with PowerBlox™
DS46 Improve efficiency and extend input voltage range of PowerBlox™ with application of external Vcc bias voltage
DS47 High performance 3A output PowerBlox™ provides high performance over wide input voltage range
DS52 Application of charge pump to utilize PowerBlox™ at only 3V input
DS57 Using PowerBlox™ with up to 16V input for providing 3A LED drive current using only 0.5 inch²
DS58 PowerBlox™ handles very low duty cycle: 22V input with 1.2V output to 8A
DS61 SP7662 PowerBlox™ provides 12A LED drive current from a 15V nominal DC input
DS63 SP7663 PowerBlox™ creates 5V at 4A supply off adapter 12V secondary
DS65 SP7651 PowerBlox™ creates 2A peak current off adapter 12V secondary

Application Notes

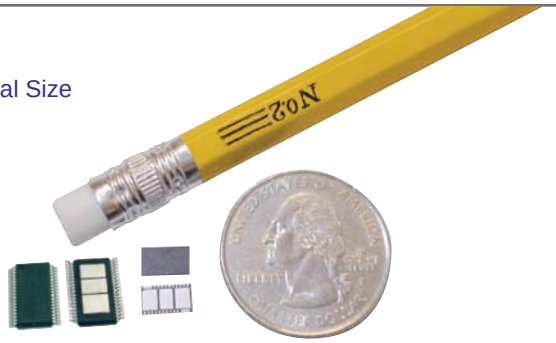
ANP04 CAD layout recommendations for the PowerBlox™ family
ANP05 Thermal resistance on SP765x devices
ANP06 PowerBlox™ in distributed power architectures
ANP15 Voltage mode control: the modulator in continuous current mode (CCM) of operations
ANP25 PowerBlox™ thermal analysis
ANP27 An alternative to POLA modules: PowerBlox™

Applications

- Distributed Power Architectures
- Point of Load Converters
- Point of Load Modules
- FPGA, DSPs and Processors Power Supplies

Markets

- Telecom and Networking Equipment
- Set-Top Boxes
- Cable Modems
- Medical Equipment
- Video Processing and Interface Products



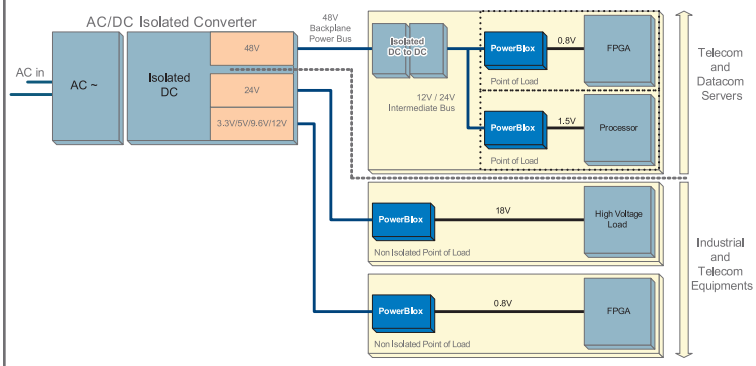
PowerBlox™ Family Features

- 3A, 6A, 8A and 12A Synchronous Buck Regulators
- Integrated High and Low Side FETs
- 2.5V up to 28V Wide Input Voltage Conversions
- As Low as 0.8V Output Voltage
- 300Khz to 1.3MHz Operating Frequency
- Up to 95% Efficiency
- Type II & III Compensation
- Multiple Sequencing Options
- Short Circuit, Programmable UVLO and Thermal Protection
- PowerLab Online Design Creation Tool
- 7mm X 4mm DFN-26

Feature Options

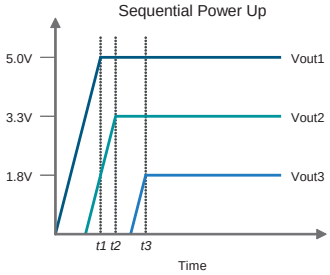
- Programmable Current Limiting
- Single Input Voltage Rail Operations

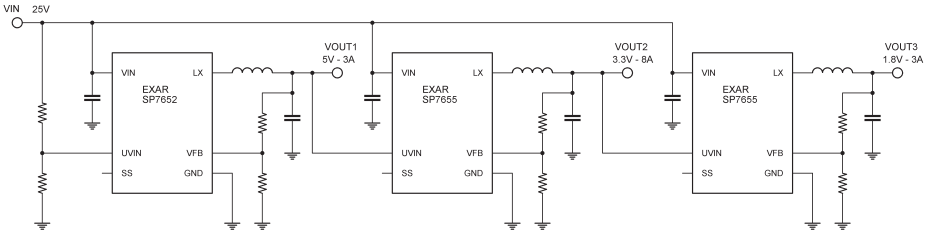
Distributed Power Architecture



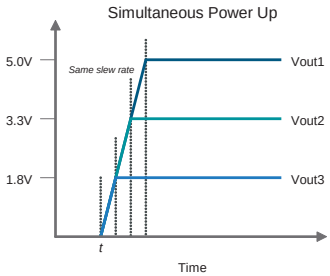
Powering Up Sequence

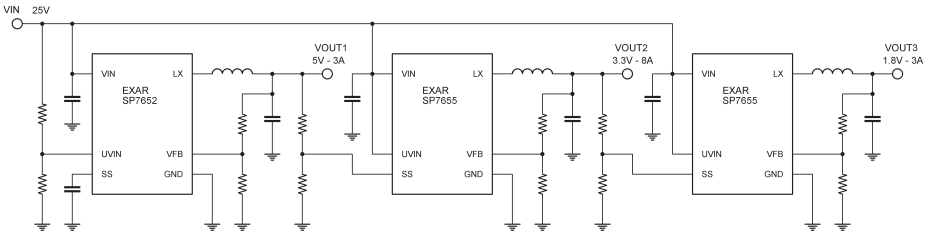
Complex power-up sequencing and protocols eliminates the need for sequencing ICs and simplifies the system design while reducing the overall solution costs.



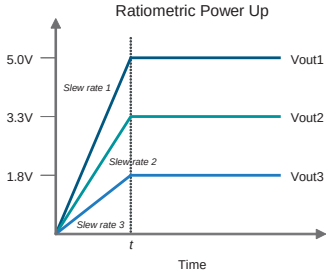


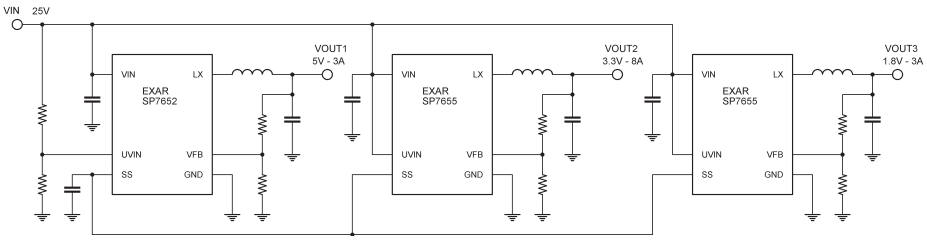
Vout1 powers up first then triggers Vout2 which powers up and triggers Vout3





All converters begin their soft start cycle simultaneously with the same slew rate





All supplies are turned on simultaneously and reach their respective output voltages at the same time

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