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High Performance DC/DC Controllers

LINEAR TECHNOLOGY

High Performance DC/DC Controllers

Introduction

Linear Technology offers complete power solutions with a full lineup of power management products. This brochure provides an overview of our high performance DC/DC switching regulator controllers for applications including datacom, telecom, industrial, automotive, medical, avionics, control systems and consumer products. Linear makes power design easier by providing industry-leading field application engineering support; a broad selection of demonstration boards with schematics, layout files and parts lists; SwitcherCAD™ software for simulation; application notes and comprehensive technical documentation.

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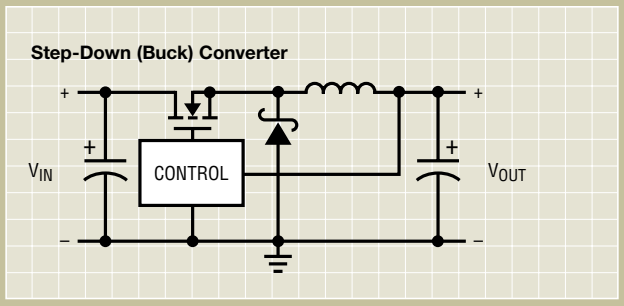
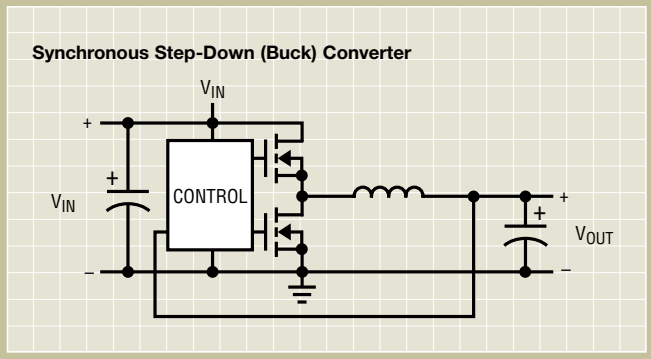


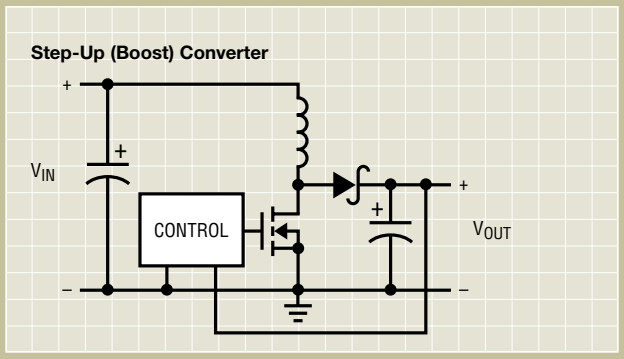
- $V_{OUT} < V_{IN}$

Synchronous Step-Down (Buck) Converter



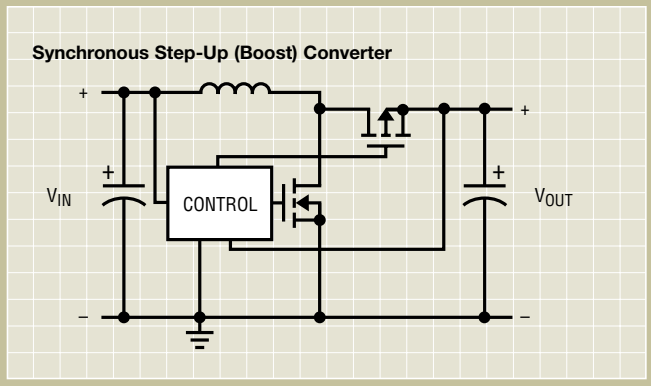
- More Efficient than a Standard Buck

Step-Up (Boost) Converter



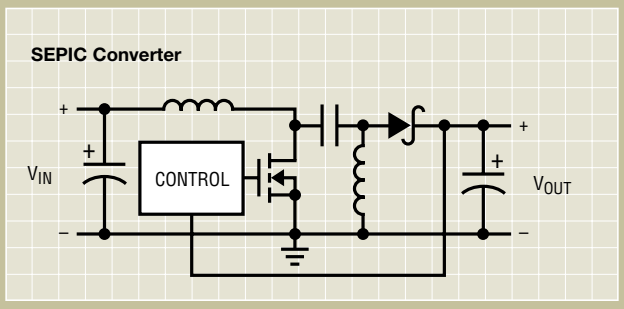
- $V_{OUT} > V_{IN}$

Synchronous Step-Up (Boost) Converter



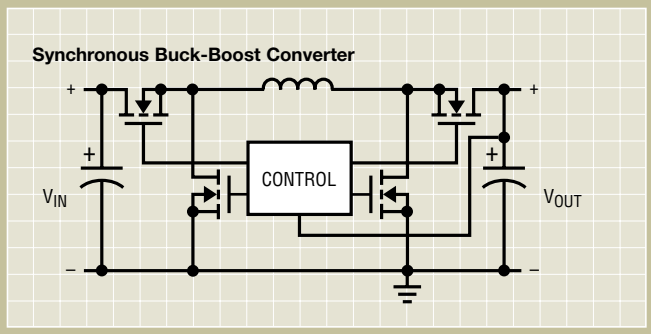
- More Efficient than a Standard Boost

SEPIC Converter



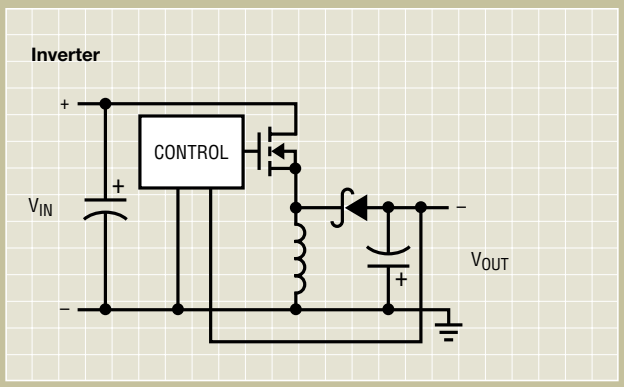
- V_{IN} Above, Below or Equal to V_{OUT}

Synchronous Buck-Boost Converter



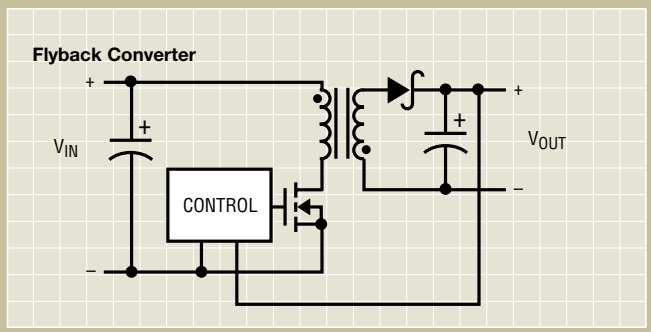
- V_{IN} Above, Below or Equal to V_{OUT}
- More Efficient than a SEPIC

Inverter



- Changes Input Voltage from Positive to Negative Voltage

Flyback Converter

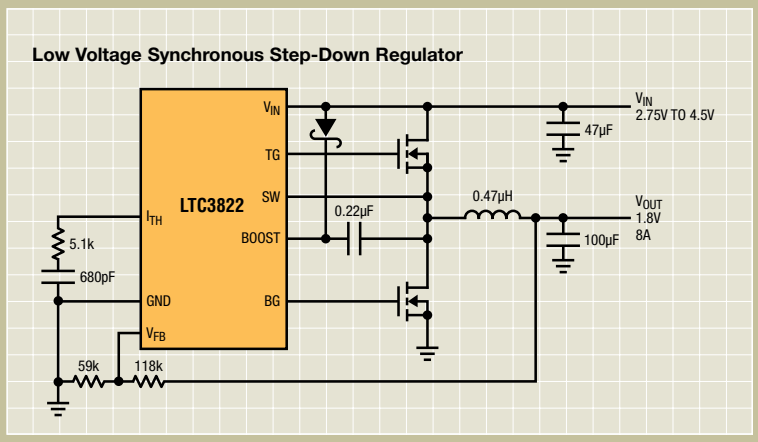


- Isolated and Non-Isolated
- High V_{OUT}/V_{IN} Ratios
- Simple

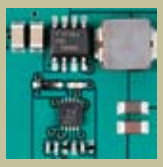
Single Output Step-Down (Buck) DC/DC Controllers

Linear Technology's single output step-down DC/DC controllers provide up to 96% efficient step-down conversion. Output voltages as low as 0.6V are accommodated with currents up to 60 amps. Features include synchronous or non-synchronous operation, on-board MOSFET drivers, low quiescent current, tracking, tight reference voltage accuracy, optional sense resistor, current mode or voltage mode control and selectable or synchronizable operating frequency. Linear offers several hundred step-down controllers. Only a select few are listed below. For a complete list, visit www.linear.com or contact your local sales office.

V_{IN} up to 10V



LTC3822
Demonstration Board



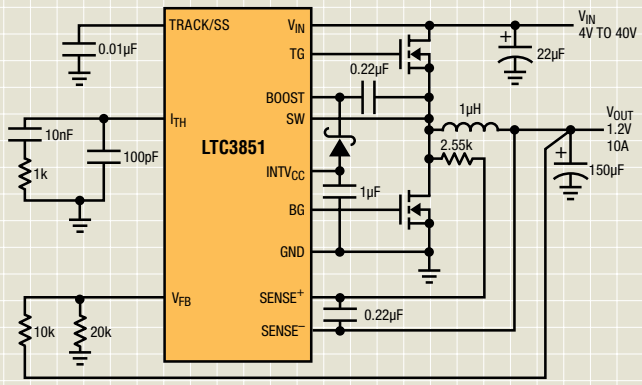
Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	Operating Frequency (2)	I_Q	Package	Synchronous Rectification	No R_{SENSE}	Tracking	Synchronizable	Shut-down	Power Good Signal	Programmable Soft-Start	Current (I) or Voltage (V) Mode Control
LTC3772/B	2.75 to 9.8	0.8 to V_{IN}	5	550kHz	40µA	DFN-8, ThinSOT™		√			√			I
LTC3801/B	2.4 to 9.8	0.8 to V_{IN}	5	550kHz	16µA	ThinSOT					√			I
LTC3808	2.75 to 9.8	0.6 to V_{IN}	5	250kHz to 750kHz	105µA	DFN-14, SSOP-16	√	√	√	PLL	√	√		I
LTC3809/-1	2.75 to 9.8	0.6 to V_{IN}	5	250kHz to 750kHz	105µA	DFN-10, MSOP-10E	√	√	√	PLL	√			I
LTC1622	2 to 9.8	0.8 to V_{IN}	5	550kHz	350µA	MSOP-8, S8				√	√		√	I
LTC1772/B	2.5 to 9.8	0.8 to V_{IN}	5	550kHz	230µA	ThinSOT					√			I
LTC1773	2.65 to 8.5	0.8 to V_{IN}	10	550kHz to 750kHz	80µA	MSOP-10	√			√	√		√	I
LTC3822	2.75 to 4.5	0.6 to 0.99V_{IN}	20	300kHz/550kHz/ 750kHz	360µA	DFN-10, MSOP-10	√	√			√			I
LTC3822-1	2.75 to 4.5	0.6 to 0.99V_{IN}	20	300kHz/550kHz/ 750kHz	105µA	DFN-12, SSOP-16	√	√	√	√	√	√	√	I
LTC3830/-1	3 to 8	1.26 to 0.91V_{IN}	20	100kHz to 500kHz	700µA	S8, SO-16, SSOP-16	√	√		√	√		√	V
LTC3832/-1	3 to 8	0.6 to 0.91V_{IN}	20	100kHz to 500kHz	700µA	SO-8, SSOP-16	√	√		√	√		√	V

Note (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated

Single Output Step-Down (Buck) DC/DC Controllers

V_{IN} up to 40V

Synchronous Step-Down Regulator



LTC3851
Demonstration Board

Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	Operating Frequency (2)	I_Q	Package	Synchronous Rectification	Differential V_O Sensing	No R_{SENSE}	Tracking	Synchronizable	Power Good Signal	Number of Phases
LTC1771	2.8 to 20	1.23 to 18	5	Constant Off-Time	10µA	MSOP-8, SO-8							1
LTC1624	3.5 to 36	1.19 to 0.95V_{IN}	5	200kHz	550µA	SO-8							1
LTC1625	3.7 to 36	1.19 to 0.99V_{IN}	10	150kHz	500µA	SSOP-16	√		√				1
LT3740	2.2 to 22	0.8 to 0.77V_{IN}	20	300kHz	2.5mA	DFN-16	√		√	√		√	1
LTC3823	4.5 to 30	0.6 to 0.9V_{IN}	20	Constant On-Time	1.4mA	QFN-32, SSOP-28	√	√	√	√	PLL	√	1
LTC3770	4.5 to 32	0.6 to 0.9V_{IN}	20	Constant On-Time	1.3mA	QFN-32, SSOP-28	√		√	√	PLL	√	1
LTC1735/-1	3.5 to 36	0.8 to 7	20	200kHz to 600kHz	450µA	SSOP-16, TSSOP-20	√				√	√	1
LTC1775	3.7 to 36	1.19 to 0.99V_{IN}	20	150kHz	500µA	SSOP-16	√		√			√	1
LTC1778/-1	4 to 36	0.8 to 0.9V_{IN}	20	Constant On-Time	900µA	SSOP-16	√		√			√	1
LTC3713	1.5 to 36	0.8 to 0.9V_{IN}	20	200kHz to 1.5MHz	900µA	SSOP-24	√		√			√	1
LTC3778	4 to 36	0.6 to 0.9V_{IN}	20	Constant On-Time	900µA	SSOP-20	√		√			√	1
LTC3835 LTC3834	4 to 36	0.8 to 10	20	140kHz to 650kHz	80µA 30µA	DFN-20, SSOP-20	√			√	PLL	√	1
LTC3835-1 LTC3834-1	4 to 36	0.8 to 10	20	140kHz to 650kHz	80µA 30µA	DFN-16, SSOP-16	√			√	PLL		1
LTC3851/-1	4 to 40	0.8 to 5.5	25	250kHz to 750kHz	1mA	QFN-16, SSOP-16	√		√	√	PLL	√	1
LTC1929/PG	4.5 to 36	0.8 to 7	40	150kHz to 300kHz	470µA	SSOP-28	√	√			PLL	√	2
LTC3729L-6	4 to 30	0.6 to 7	40	250kHz to 500kHz	450µA	QFN-32	√	√			PLL	√	2
LTC3729	4 to 36	0.8 to 7	40	250kHz to 500kHz	450µA	QFN-32, SSOP-28	√	√			PLL	√	2
LTC3731	4.5 to 36	0.6 to 7	60	250kHz to 600kHz	2.3mA	SSOP-28	√	√			PLL	√	3

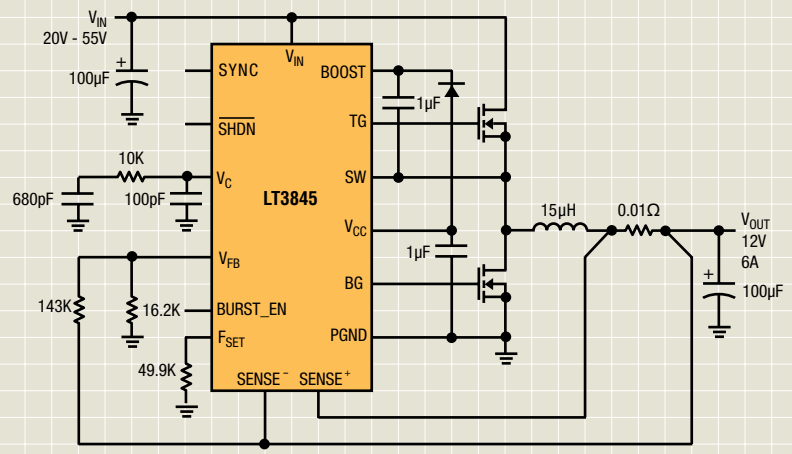
Note (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated

Additional Features: All parts have peak or valley current mode control and a shut-down (run) pin

Single Output Step-Down (Buck) DC/DC Controllers

V_{IN} up to 100V

High Voltage Step-Down Regulator



LT3845
Demonstration Board

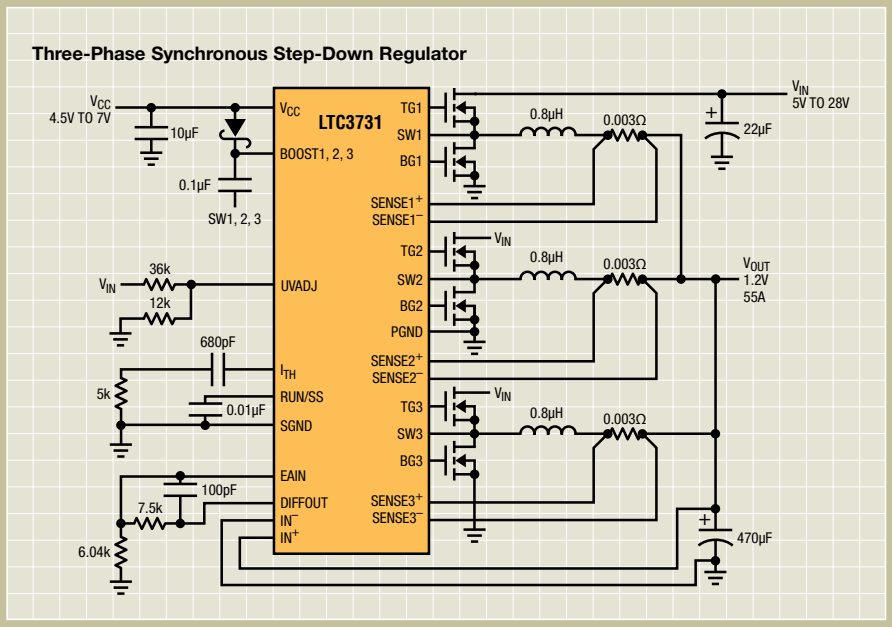
Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	Operating Frequency (2)	I_Q	Package	Synchronous Rectification	No R_{SENSE}	Tracking	Synchronizable	Shut-down	Power Good Signal	Adjustable Turn-on Voltage	Current (I) or Voltage (V) Mode Control
LT3724	4 to 60	1.23 to 36	5	200kHz	100µA	TSSOP-16					√		√	I
LTC3824	4 to 60	0.8 to V_{IN}	5	200kHz to 600kHz	40µA	MSOP-10E				√				I
LTC3703-5	4.1 to 60	0.8 to $0.93V_{IN}$	10	100kHz to 600kHz	1.7mA	SSOP-16, TSSOP-28	√	√		√	√			V
LT3844	4 to 60	1.23 to 36	10	100kHz to 500kHz	120µA	TSSOP-16E				√	√		√	I
LTC3703	9.3 to 100	0.8 to $0.93V_{IN}$	10	100kHz to 600kHz	1.7mA	SSOP-16, TSSOP-28	√	√		√	√			V
LT3845	4 to 60	1.23 to 36	20	100kHz to 500kHz	120µA	TSSOP-16E	√			√	√		√	I
LTC3812-5	4.2 to 60	0.8 to $0.93V_{IN}$	20	100kHz to 1MHz	3mA	TSSOP-16E	√	√			√	√		I
LT3800	4 to 60	1.23 to 36	20	200kHz	100µA	TSSOP-16E	√				√		√	I
LTC3810-5	4.2 to 60	0.8 to $0.93V_{IN}$	20	100kHz to 1MHz	3mA	QFN-32	√	√	√	√	√	√	√	I
LTC3810	6.2 to 100	0.8 to $0.93V_{IN}$	20	100kHz to 1MHz	3mA	SSOP-28	√	√	√	√	√	√	√	I

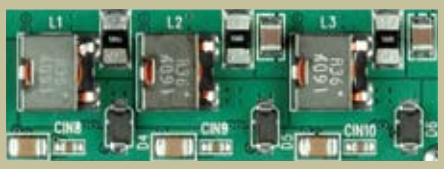
Note (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated

Additional Features: All parts have programmable soft-start

Single Output PolyPhase Step-Down (Buck) DC/DC Controllers

PolyPhase operation clocks multiple DC/DC converter sections out-of-phase. This significantly reduces input and output ripple currents, resulting in higher efficiency, lower EMI and smaller input and output filtering components.





LTC3731 Demonstration Board

Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	# of Phases	I_Q	Operating Frequency (2)	VID Code	Package	Phase Modulation/ Clock Out	EXTV_{CC}	No R_{SENSE}	Stage Shedding (3)
LTC3734	4 to 36	0.7 to 1.71	20	1	2mA	210kHz to 550kHz	IMVP-4	QFN-32				√
LTC3835 LTC3834	4 to 36	0.8 to 10	20	1	80µA 30µA	140kHz to 650kHz	None	QFN-20, TSSOP-20	√	√		
LTC3735	4 to 36	0.7 to 1.71	40	2	2mA	210kHz to 530kHz	IMVP-4	QFN-38, SSOP-36				√
LTC1929/PG	4 to 36	0.8 to 7	40	2	470µA	150kHz to 300kHz	None	SSOP-28		√		
LTC3719	4 to 36	0.8 to 1.55	40	2	1.2mA	150kHz to 300kHz	AMD	SSOP-36		√		
LTC3732	4.5 to 32	1.1 to 1.85	55	3	2.2mA	250kHz to 600kHz	VRM9.0/9.1	QFN-38, SSOP-36				√
LTC3733/-1	4 to 36	0.8 to 1.55	60	3	2.5mA	210kHz to 530kHz	AMD	QFN-38, SSOP-36				√
LTC3738	4 to 28	0.84 to 1.6	60	3	2.5mA	210kHz to 530kHz	VRM9/10	QFN-38				√
LTC3729L-6	4 to 30	0.6 to 7	40 to 240	2 to 12	470µA	250kHz to 550kHz	None	QFN-32	√	√		
LTC3811	4.5 to 30	0.6 to 3.3	25 to 240	2 to 12	10.5mA	250kHz to 750kHz	None	QFN-38, SSOP-36	√	√	√	
LTC3729	4 to 36	0.8 to 7	40 to 240	2 to 12	450µA	250kHz to 550kHz	None	QFN-32, SSOP-28	√	√		
LTC3731	4 to 36	0.6 to 7	40 to 240	3 to 12	2.3mA	250kHz to 600kHz	None	QFN-32, SSOP-36	√			√

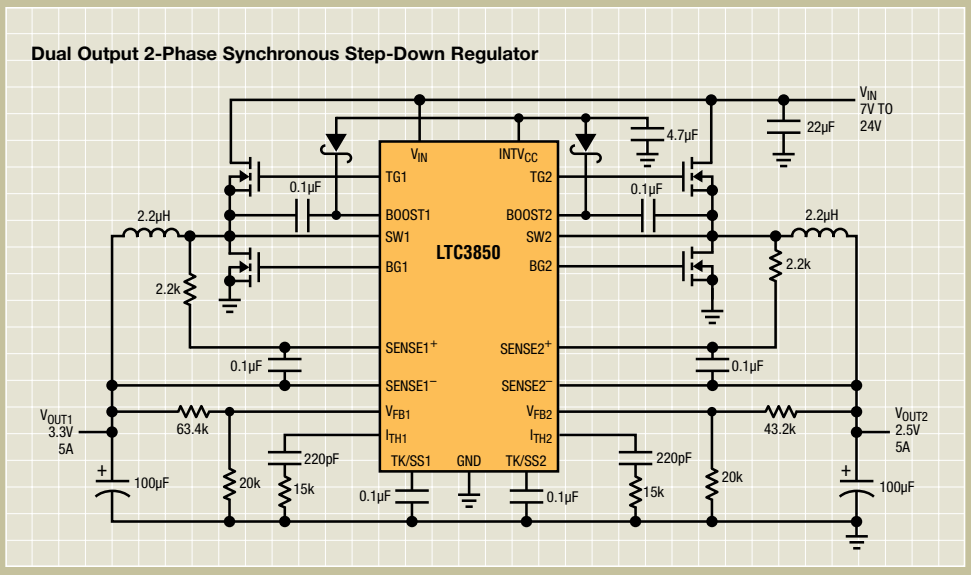
Note (1) The maximum output current depends on the choice of external components and number of phases
(2) The operating frequency can be selected within the range indicated
(3) Stage Shedding maximizes light load efficiency

Additional Features: (A) All parts have differential V_O sensing, shut-down (run) pin, clock input, programmable soft-start and a power good signal
(B) All parts are peak current mode controllers
(C) Multiple parts can be paralleled for higher current applications

Multiple Output PolyPhase Step-Down (Buck) DC/DC Controllers

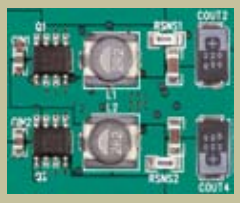
Linear's PolyPhase multiple output DC/DC controllers provide up to three high current outputs with up to 95% efficiency. Features include out-of-phase operation, on-board MOSFET drivers, synchronous or non-synchronous rectification, low quiescent current, tracking, tight V_{REF} accuracy and optional current sense resistors. Other options include selectable, synchronizable switching frequency or constant-on-time, spread spectrum and an extra LDO output voltage.

Dual Output 2-Phase Synchronous Step-Down Regulator

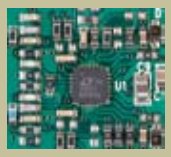


LTC3850 Demonstration Board

Top View



Bottom View



Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	I_Q	Operating Frequency (2)	Package	Number of Outputs	Maximum # of Phases	No R_{SENSE}	Tracking	Synchronizable	$EXTV_{CC}$	Current Sense Method	Current (I) or Voltage (V) Mode Control
LTC3736/-1/-2 LTC3737	2.75 to 9.8	0.6 to V_{IN}	8/8	475µA/ 220µA	300kHz to 750kHz	QFN-24, SSOP-24	2	2	√	√	PLL		$R_{DS(ON)}$	I
LT3742	3.5 to 30	0.8 to V_{IN}	5/5	5mA	500kHz	QFN-24	2	2					R_{SEN}	I
LTC3836	2.75 to 4.5	0.6 to 0.97V_{IN}	10/10	450µA	250kHz to 850kHz	SSOP-28, QFN-28	2	2	√	√	√		$R_{DS(ON)}$	I
LTC3802	3 to 30	0.6 to 0.90V_{IN}	20/20	6.5mA	330kHz to 750kHz	QFN-32. SSOP-28	2	2	√	√	PLL		$R_{DS(ON)}$	V
LTC1876	3.5 to 36	0.8 to 7	20/20/1	350µA	150kHz to 300kHz	SSOP-36	3	2				√	R_{SEN}	I
LTC3773	3.3 to 36	0.6 to 5	20/20/20	2.3mA	160kHz to 700kHz	QFN-38, SSOP-36	3	3		√	PLL		R_{SEN}	I
LTC3850	4 to 30	0.8 to 5.5	25/25	850µA	250kHz to 780kHz	QFN-28, SSOP-28	2	2	√	√	PLL	√	R_{SEN} or DCR	I
LTC3828	4.5 to 28	0.8 to 7	20/20	2mA	260kHz to 550kHz	QFN-32, SSOP-28	2	6		√	PLL		R_{SEN}	I
LTC3728/L/ LX/L-1	3.5 to 28/36	0.8 to 6	20/20	450µA	250kHz to 550kHz	QFN-32, SSOP-28	2	2			PLL	√	R_{SEN}	I
LTC3707	4.5 to 30	0.8 to 6	20/20	350µA	150kHz to 300kHz	SSOP-28	2	2				√	R_{SEN}	I
LTC3727/ -1/A-1/LX-1	4 to 36	0.8 to 14	20/20	670µA	250kHz to 550kHz	QFN-32, SSOP-28	2	2			PLL	√	R_{SEN}	I
LTC3827/-1 LTC3826/-1	4 to 36	0.8 to 10	20/20	80µA/ 50µA	140kHz to 650kHz	QFN-32, SSOP-28	2	2		√	PLL	√	R_{SEN}	I
LTC3811	4.5 to 30	0.6 to 3.3	25/25	10.5mA	250kHz to 750kHz	QFN-38, SSOP-36	2	12	√	√	PLL	√	R_{SEN} or DCR	I

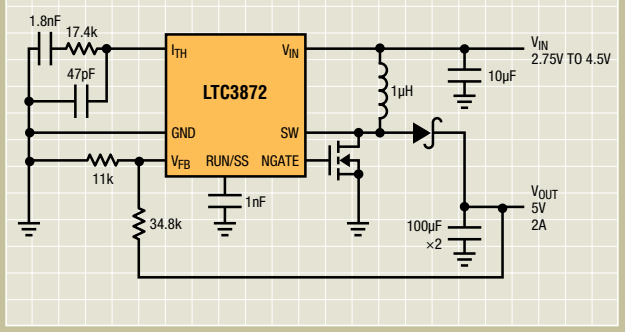
Notes: (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated

Additional Features: (A) All parts have a shut-down (run) pin and a power good signal
(B) All parts are synchronous controllers, except the LT3742
(C) All parts have programmable Soft-Start except the LTC3736

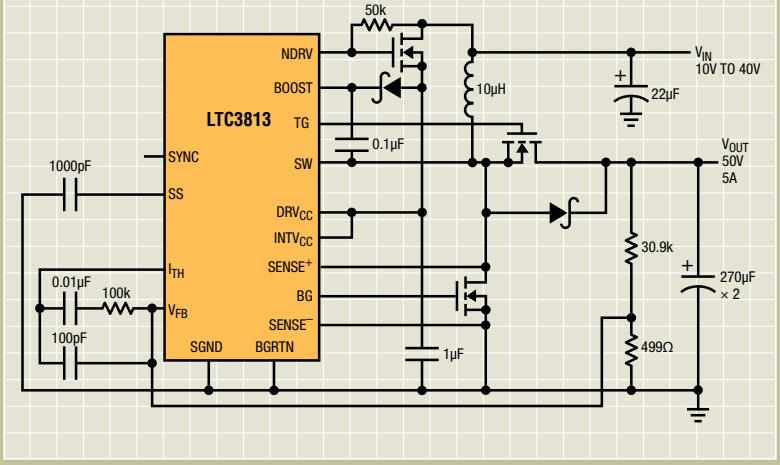
Step-Up (Boost) DC/DC Controllers

Linear Technology offers both synchronous and non-synchronous step-up controllers. Features include optional sense resistor, on-board LDO, 2-phase operation, high power gate driver, programmable fixed switching frequency and low quiescent current. Efficiencies up to 97% can be achieved with synchronous operation.

Low-Power Step-Up Converter



High-Power Synchronous Step-Up Converter



LTC3872 Demonstration Board

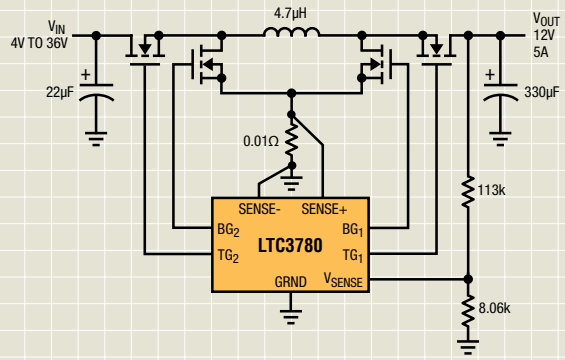
Part Number	V_{IN} Range (V)	V_{OUT} (1) Range (V)	I_{OUT} (1) Max (A)	Operating Frequency (2)	Package	Description
LTC3872	2.75 to 9.8	Up to 60V w/o R_{SENSE} and Higher	5	550kHz	ThinSOT or DFN-8	No R_{SENSE}, Pulse Skipping at Light Load
LTC1871/-1/-7	2.5 to 36	3.3 and Higher	5	50kHz to 1MHz	MSOP-10	No R_{SENSE}, Burst Mode® Operation
LTC1872	2.5 to 9.8	3.3 and Higher	5	550kHz	SOT-23	Burst Mode Operation
LTC1700	0.9 to 5	1.5 to 6	5	400kHz to 750kHz	MSOP-10	No R_{SENSE} Synchronous Rectification
LT3724	4 to 60	9 and Higher	5	200kHz	TSSOP-16	High Voltage with Burst Mode Operation
LTC3803/ -3/-5	4.8/8.7 to 75(1)	10 and Higher	5	200kHz or 300kHz	ThinSOT	Small Package, Constant Frequency
LTC3805/-5	4.7/8.4 to 75(1)	10 and Higher	5	70kHz to 700kHz	MSOP-10, DFN-10	Programmable Soft-Start
LTC3873/-5	4.1/8.4 to 75(1)	Up to 60V w/o R_{SENSE} and Higher	5	200kHz	ThinSOT, DFN-8	No R_{SENSE}
LT3750	3 to 24	5 and Higher	5	100kHz to 300kHz	MSOP-10	Very High Output Voltages
LT1619	1.9 to 18	3.3 and Higher	10	300kHz to 550kHz	MSOP-8, SO-8	Synchronizable
LTC1624	3.5 to 36	5 and Higher	10	200kHz	SO-8	Wide Input Voltage Range
LTC3703/-5	4.1 to 60/100	5 to 100/60	10	100kHz to 600kHz	SSOP-16, SSOP-28	No R_{SENSE}, Synchronous Rectification
LT3844	4 to 60	5 and Higher	10	100kHz to 600kHz	TSSOP-16E	Programmable and Synchronizable Frequency
LTC3814-5	4.5 to 0.9V_{OUT}	8 to 60	10	100kHz to 1MHz	TSSOP-16	No R_{SENSE}, Synchronous Rectification, 1 ohm Gate Drive
LTC3813	7 to 0.9V_{OUT}	8 to 100	10	100kHz to 1MHz	SSOP-28	No R_{SENSE}, Synchronous Rectification, 1 ohm Gate Drive
LT3782	6 to 40	7 and Higher	30	150kHz to 500kHz	SSOP-28	High Power, 2-Phase Operation

Note (1) The maximum voltage and current depend on the choice of external components
(2) The frequency can be selected within the range indicated

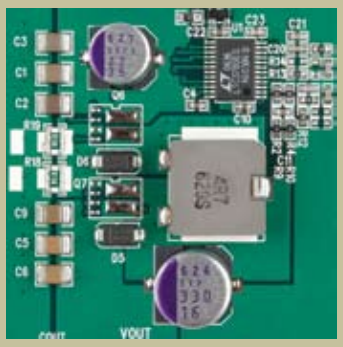
Synchronous Buck-Boost DC/DC Controllers

High performance 4-switch synchronous buck-boost controllers operate from an input voltage that is above, below or equal to the output voltage. These controllers utilize a single inductor and can deliver efficiencies up to 98%.

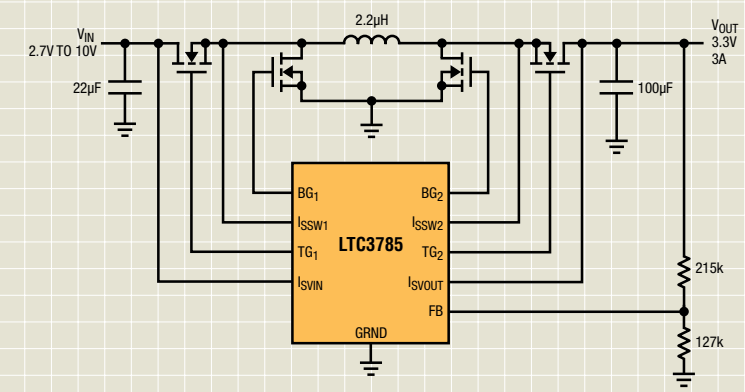
Simplified Synchronous Buck-Boost Schematic

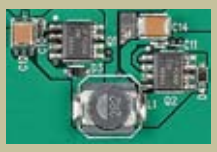


LTC3780
Demonstration Board



Simplified Low Voltage Synchronous Buck-Boost Schematic





LTC3785
Demonstration Board

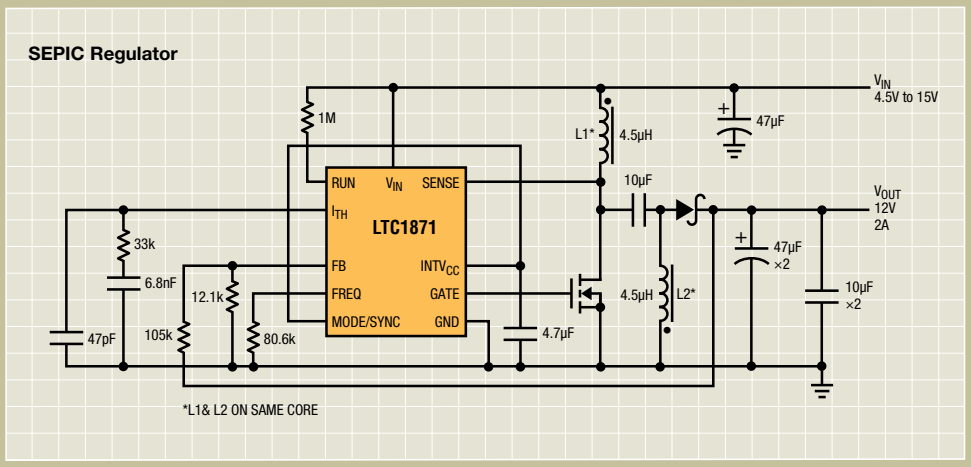
Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) Max (A)	Operating Frequency (2)	Package	No R_{SENSE}	Synchronizable	Current (I) or Voltage (V) Mode Control
LTC3780	4 to 36	0.8 to 30 (3)	20	200kHz to 400kHz	QFN-32, SSOP-24		PLL	I
LTC3785	2.7 to 10	2.7 to 10	10	100kHz to 1MHz	QFN-24	√		V

Note (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated
(3) For higher output voltages, contact Linear Technology

SEPIC DC/DC Controllers

SEPIC converters operate from an input voltage that is above, below or equal to the output voltage and provide output short circuit protection. The SEPIC provides a simpler solution compared to synchronous buck-boost controllers, but has lower efficiency, power density and maximum output current. All of Linear's boost controllers can be designed into a SEPIC converter. A select list of parts is shown below.

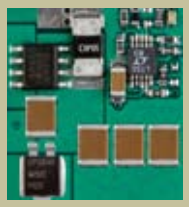
SEPIC Regulator



LTC1871
Demonstration Board

Top View

Bottom View

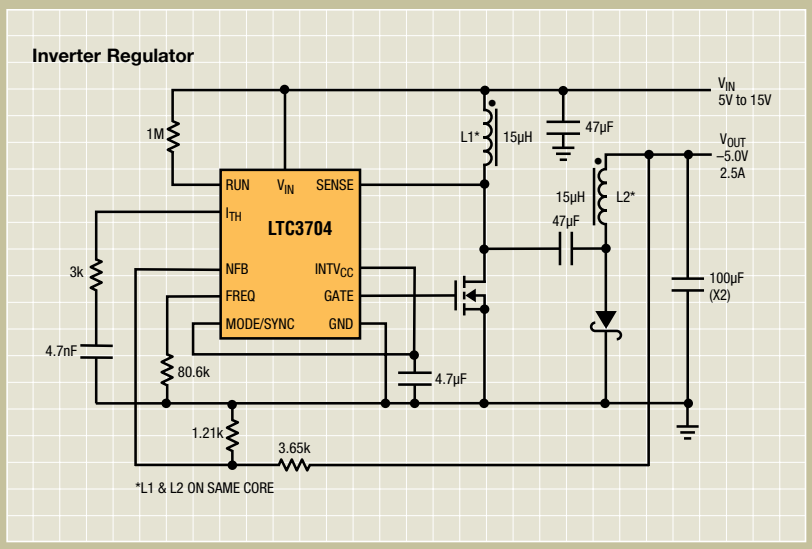


Part Number	V_{IN} Range (V)	V_{OUT} [1] Range (V)	Output Current[1] (A)	Operating Frequency[2]	No R_{SENSE}	I_Q	Shut-Down Current	Package
LTC1871/-1	2.5 to 36	1.23 to 52	3	50kHz to 1MHz	√	550µA	<20µA	MSOP-10
LTC1871-7	6 to 36	1.23 to 52	3	50kHz to 1MHz	√	550µA	<20µA	MSOP-10
LTC3872	2.75 to 9.8	1.20 to 52	3	550kHz	√	250µA	<20µA	ThinSOT, DFN-8
LT1619	1.9 to 18	1.24 to 52	3	300kHz to 550kHz		9mA	<40µA	MSOP-8, SO-8
LTC1624	3.5 to 36	1.19 to 52	3	200kHz		550µA	<30µA	SO-8
LT3844	4 to 60	1.23 to 52	3	100kHz to 600kHz		120µA	<15µA	TSSOP-16
LT3724	4 to 60	1.23 to 52	3	200kHz		80µA	<15µA	TSSOP-16
LTC3803/-3	8.7 to 75[1]	0.8 to 52	3	200kHz or 300kHz		240µA	<10µA	ThinSOT
LTC3803-5	4.8 to 75[1]	0.8 to 52	3	200kHz		240µA	<10µA	ThinSOT
LTC3805	8.4 to 75[1]	0.8 to 52	3	70kHz to 700kHz		360µA	<40µA	DFN-10, MSOP-10
LTC3805-5	4.5 to 75[1]	0.8 to 52	3	70kHz to 700kHz		360µA	<40µA	DFN-10, MSOP-10
LTC3873	8.4 to 75[1]	1.20 to 52	3	200kHz		300µA	<100µA	ThinSOT, DFN-8
LTC3873-5	4.1 to 75[1]	1.20 to 52	3	200kHz		300µA	<80µA	ThinSOT, DFN-8
LT1950	3 to 75[1]	1.23 to 52	3	100kHz to 500kHz		2.3mA	<20µA	SSOP-16
LT1952/-1	8 to 75[1]	1.23 to 52	3	100kHz to 500kHz		5.2mA	<240µA	SSOP-16

Note (1) The maximum voltage and current depend on the choice of external components. For higher output voltages contact Linear Technology.
(2) The frequency can be selected within the range indicated

Inverter DC/DC Controllers

Inverting DC/DC controllers convert a positive input voltage to a negative output. Features include optional sense resistor, current mode control, integrated MOSFET driver, undervoltage lockout, selectable operating frequency, low quiescent current and wide input voltage range.



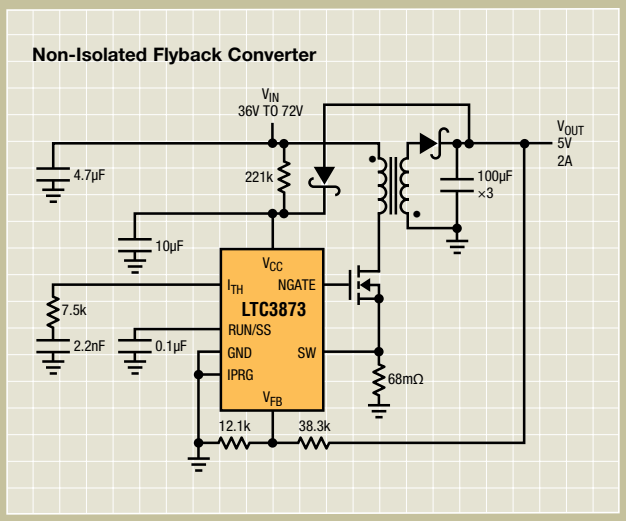
LTC3704
Demonstration Board

Part Number	V_{IN} Range (V)	V_{OUT}[1] Range (V)	I_{OUT}[1] MAX (A)	Operating Frequency[2]	I_Q	Package
LTC3704	2.5 to 36	-1.23 to -52	5	50kHz to 1MHz	550µA	MSOP-10
LT1619	1.9 to 18	-1.24 to -52	5	300kHz to 550kHz	140µA	MSOP-8, SO-8
LTC1624	3.5 to 36	-1.19 to -52	5	200kHz	550µA	SO-8
LTC1625	3.7 to 36	-1.19 to -52	5	150kHz	500µA	SSOP-16
LTC3803/-3	8.7 to 75[1]	-0.8 to -52	5	200kHz or 300kHz	240µA	ThinSOT
LTC3803-5	4.8 to 75[1]	-0.8 to -52	5	200kHz	240µA	ThinSOT
LTC3805	8.4 to 75[1]	-0.8 to -52	5	70kHz to 700kHz	360µA	DFN-10, MSOP-10
LTC3805-5	4.5 to 75[1]	-0.8 to -52	5	70kHz to 700kHz	360µA	DFN-10, MSOP-10
LTC1871/-1	2.5 to 36	-1.23 to -52	5	50kHz to 1MHz	550µA	MSOP-10
LT3724	4 to 60	-1.23 to -52	10	200kHz	100µA	TSSOP-16E
LT3800	4 to 60	-1.23 to -52	10	200kHz	80µA	TSSOP-16E
LT3844	4 to 60	-1.23 to -52	10	100kHz to 600kHz	120µA	TSSOP-16E
LTC1778	4 to 36	-0.8 to -52	10	Constant On-Time	900µA	SSOP-16
LT1952/-1	8 to 75[1]	-2.5 to -52	10	100kHz to 500kHz	5.2mA	SSOP-16
LT3845	4 to 60	-1.23 to -52	10	100kHz to 600kHz	120µA	TSSOP-16

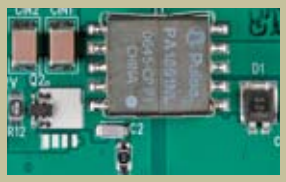
Note (1) The maximum voltage and current depend on the choice of external components. For higher output voltages contact Linear Technology.
(2) The frequency can be selected within the range indicated

Flyback DC/DC Controllers

Synchronous and non-synchronous flyback controllers are shown for isolated and non-isolated DC/DC converters. This family of current mode controllers can regulate the output voltage directly, through an opto-coupler or an integrated primary-side transformer winding.



LTC3873
Demonstration Board



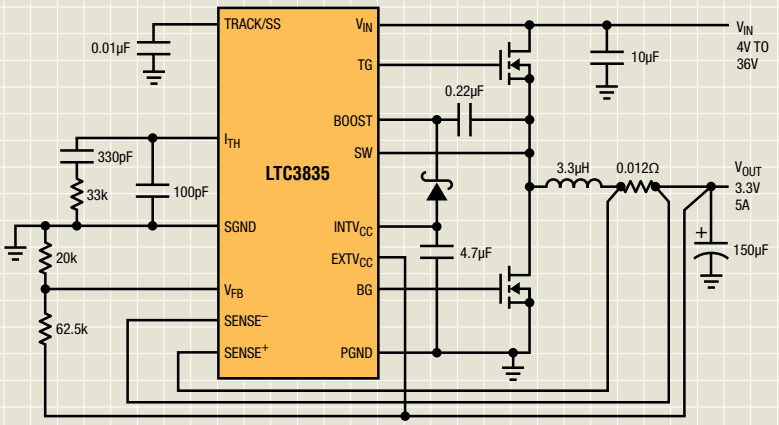
Part Number	V_{IN} Range (V)	V_{OUT} (1) Min (V)	Output Current(1) (A)	Synchronous Operation	Operating Frequency(2)	I_Q	Package
LT1619	1.9 to 18	1.24	3		300kHz to 550kHz	9mA	MSOP-8, SO-8
LTC3803/-3	8.7 to 75(1)	0.8	3		200kHz or 300kHz	240µA	ThinSOT
LTC3803-5	4.8 to 75(1)	0.8	3		200kHz	240µA	ThinSOT
LTC3805	8.4 to 75(1)	0.8	3		70kHz to 700kHz	360µA	DFN-10, MSOP-10
LTC3805-5	4.5 to 75(1)	0.8	3		70kHz to 700kHz	360µA	DFN-10, MSOP-10
LTC3873	8.4 to 75(1)	1.2	3		200kHz	360µA	ThinSOT, DFN-8
LTC3873-5	4.1 to 75(1)	1.2	3		200kHz	360µA	ThinSOT, DFN-8
LTC1871	2.5 to 75(1)	1.23	5		50kHz to 1MHz	250µA	MSOP-10
LT1725	16 to 75(1)	1.25	5		50kHz to 250kHz	10mA	SO-16, SSOP-16
LT1737	4.5 to 75(1)	1.23	5		50kHz to 250kHz	10mA	SO-16, SSOP-16
LTC3806	10 to 75(1)	1.23	5	√	250kHz	1mA	DFN-12
LT3837	4.5 to 75(1)	1.23	12	√	50kHz to 250kHz	6.4mA	TSSOP-16
LT3825	16 to 75(1)	1.23	12	√	50kHz to 250kHz	6.4mA	TSSOP-16

Note (1) The maximum voltage and current depend on the choice of external components
(2) The frequency can be selected within the range indicated

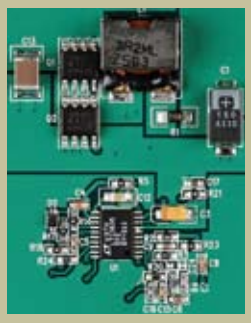
MicroPower DC/DC Controllers

MicroPower controllers have a very low quiescent current which creates an extremely efficient DC/DC converter at no load or light load conditions. The parts listed below utilize Burst Mode® operation and/or pulse skipping to reduce light load power consumption and significantly help preserve battery life during standby or idle mode.

Low Quiescent Current Synchronous Step-Down Regulator



LTC3835
Demonstration Board



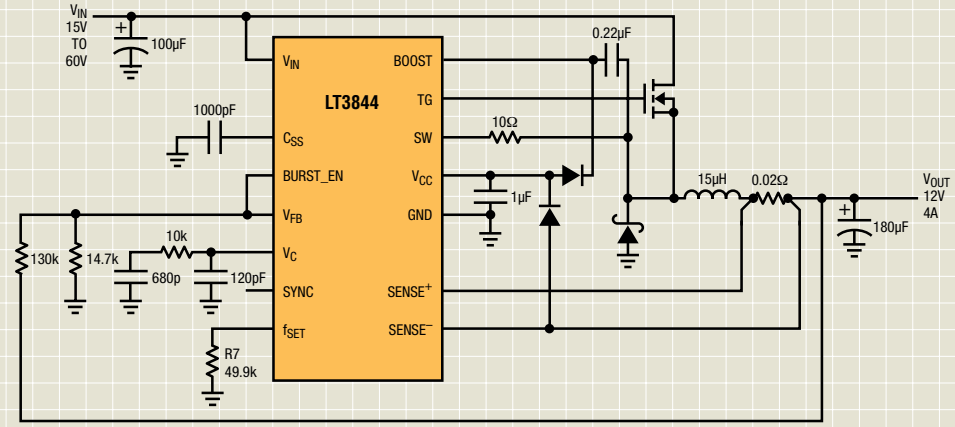
Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} Max(1) (A)	Synchronous Operation	Dual Output	Operating Frequency(2)	No R_{SENSE}	I_Q	Package	Topology
LTC1771	2.8 to 20	1.23 to 18	5			Constant Off-Time		10µA	MSOP-8, SO-8	Step-Down
LTC3801	2.5 to 9.8	0.8 to V_{IN}	5			550kHz		16µA	ThinSOT	Step-Down
LTC3834	4 to 36	0.8 to 10	20	√		140kHz to 650kHz		30µA	QFN-20, TSSOP-20	Step-Down
LTC3834-1	4 to 36	0.8 to 10	20	√		140kHz to 650kHz		30µA	DFN-16, SSOP-16	Step-Down
LTC3826/-1	4 to 36	0.8 to 10	20/20	√	√	140kHz to 650kHz		30µA	QFN-32/SSOP-28	Step-Down
LTC3772	2.75 to 9.8	0.8 to V_{IN}	5			550kHz	√	40µA	DFN-8, ThinSOT	Step-Down
LTC3824	4 to 60	0.8 to V_{IN}	5			200kHz to 600kHz		40µA	MSOP-10E	Step-Down
LTC1773	2.65 to 8.5	0.8 to V_{IN}	6	√		500kHz to 750kHz		80µA	MSOP-10	Step-Down
LTC3835	4 to 36	0.8 to 10	20	√		140kHz to 650kHz		80µA	QFN-20, TSSOP-20	Step-Down
LTC3835-1	4 to 36	0.8 to 10	20	√		140kHz to 650kHz		80µA	DFN-16, SSOP-16	Step-Down
LTC3827/-1	4 to 36	0.8 to 10	20/20	√	√	140kHz to 650kHz		80µA	QFN-32/SSOP-28	Step-Down
LTC3785	2.7 to 10	2.7 to 10	10	√		100kHz to 1MHz	√	86µA	QFN-24	Buck-Boost
LT3724	4 to 60	1.23 to 36	5			200kHz		100µA	TSSOP-16	Step-Down, Step-Up, SEPIC, Inverter
LT3800	4 to 60	1.23 to 36	20	√		200kHz		100µA	TSSOP-16	Buck, Inverter
LTC3808	2.75 to 9.8	0.6 to V_{IN}	5	√		250kHz to 750kHz	√	105µA	DFN-14, SSOP-16	Step-Down
LTC3809	2.75 to 9.8	0.6 to V_{IN}	5	√		250kHz to 750kHz	√	105µA	DFN-10, MSOP-10E	Step-Down
LTC3809-1	2.75 to 9.8	0.6 to V_{IN}	5	√		550kHz		105µA	DFN-10, MSOP-10E	Step-Down
LT3844	4 to 60	1.23 to 36	5			100kHz to 600kHz		120µA	TSSOP-16	Step-Down, Step-Up, SEPIC, Inverter
LT3845	4 to 60	1.23 to 36	20	√		100kHz to 600kHz		120µA	TSSOP-16	Step-Down

Note (1) The maximum output current depends on the choice of external components
(2) The frequency can be selected within the range indicated

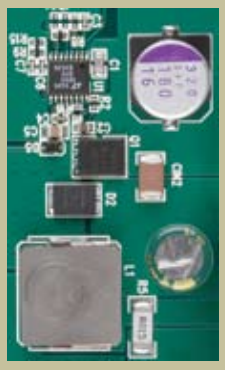
Multiple Topology DC/DC Controllers

Linear Technology offers DC/DC controllers that can be used in multiple converter topologies including buck, boost, flyback, forward, inverter and SEPIC. Features include a wide input voltage range, low quiescent current, selectable operating frequency, optional sense resistor and on-board MOSFET gate driver.

High Voltage Synchronous Step-Down Regulator



LT3844
Demonstration Board



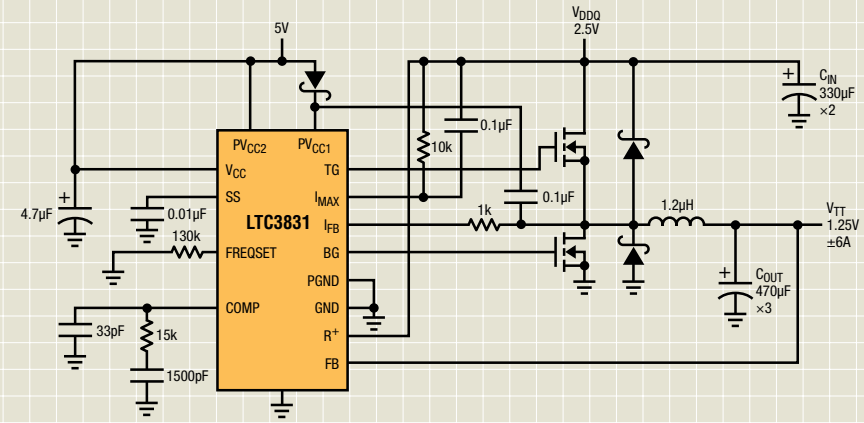
Part Number	V_{IN} Range (V)	V_{REF} (V)	I_Q	Operating Frequency[2]	Package	No R_{SENSE}	Buck	Boost	Flyback	Forward	Inverter	SEPIC
LT1619	1.9 to 18	1.24	140µA	300kHz to 550kHz	MSOP-8, SO-8			√	√		√	√
LT1950	3 to 25	1.23	2.3mA	100kHz to 500kHz	SSOP-16			√	√	√		√
LTC1871-7	6 to 36	1.23	250µA	50kHz to 1MHz	MSOP-10	√		√	√			√
LTC1871/-1	2.5 to 36	1.23	250µA	50kHz to 1MHz	MSOP-10	√		√	√			√
LTC1624	3.5 to 36	1.19	550µA	200kHz	SO-8		√	√			√	√
LTC1625	3.7 to 36	1.19	500µA	150kHz	SSOP-16	√	√				√	√
LTC3851	4 to 40	0.8	1mA	250kHz to 750kHz	QFN-16/SSOP-16	√	√		√			
LT3724	4 to 60	1.23	80µA	200kHz	TSSOP-16		√	√			√	√
LTC3703/-5	4.1 to 60/100	0.8	1.7mA	100kHz to 600kHz	SSOP-16, SSOP-28		√	√				
LT3844	4 to 60	1.23	120µA	100kHz to 600kHz	TSSOP-16E		√	√			√	√
LTC3803/-3	8.7 to 75[1]	0.8	240µA	200kHz	ThinSOT			√	√		√	√
LTC3803-5	4.8 to 75[1]	0.8	240µA	200kHz	ThinSOT			√	√		√	√
LTC3805	8.4 to 75[1]	0.8	360µA	70kHz to 700kHz	DFN-10, MSOP-10			√	√		√	√
LTC3805-5	4.5 to 75[1]	0.8	360µA	70kHz to 700kHz	DFN-10, MSOP-10			√	√		√	√
LTC3873	8.4 to 75[1]	1.2	360µA	200kHz	ThinSOT, DFN-8			√	√		√	√
LTC3873-5	4.1 to 75[1]	1.2	360µA	200kHz	ThinSOT, DFN-8			√	√		√	√
LT1952/-1	8 to 75[1]	1.23	5.2mA	100kHz to 500kHz	SSOP-16			√		√	√	√

Note (1) The maximum voltage depends on the choice of external components
(2) The frequency can be selected within the range indicated

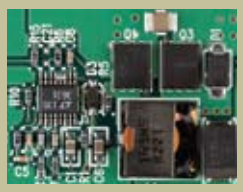
DDR/QDR Memory Termination DC/DC Controllers

DDR (Double Data Rate)/QDR (Quad Data Rate) termination applications require that V_{OUT2} (V_{TT}) is always 1/2 of V_{REF} (which is usually V_{OUT1} or V_{DDQ}). Features include dual or single outputs, on-board MOSFET drivers, synchronous rectification, low quiescent current, tracking, tight V_{REF} accuracy, current mode or voltage mode control, spread spectrum and optional current sense resistors.

DDR Synchronous Step-Down Regulator



LTC3831
Demonstration Board



Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	I_{OUT} (1) MAX (A)	I_Q	Operating Frequency (2)	Package	Dual Output	Spread Spectrum	No R_{SENSE}	Tracking	Synchronizable	$EXTV_{CC}$	Current (I) or Voltage (V) Mode
LTC3776	2.75 to 9.8	0.6 to V_{IN}	6/6	575µA	300kHz to 750kHz	QFN-24, SSOP-24	√	√	√	√	PLL		I
LTC3831	3 to 8	1.25 to 0.91V_{IN}	15	14.7mA	100kHz to 500kHz	SSOP-16			√		√		V
LTC3831-1	3 to 8	0.4 to 0.91V_{IN}	15	20.7mA	100kHz to 500kHz	SSOP-16			√		√		V
LTC3718	1.5 to 36	0.7 to V_{IN}/2	20	1mA	200kHz to 1.5MHz	SSOP-24			√				I
LTC3717	4 to 36	0.7 to V_{IN}/2	20	1mA	200kHz to 1.5MHz	SSOP-16			√			√	I
LTC3717-1	4 to 36	0.7 to V_{IN}/2	20	1mA	200kHz to 1.5MHz	QFN-32			√			√	I

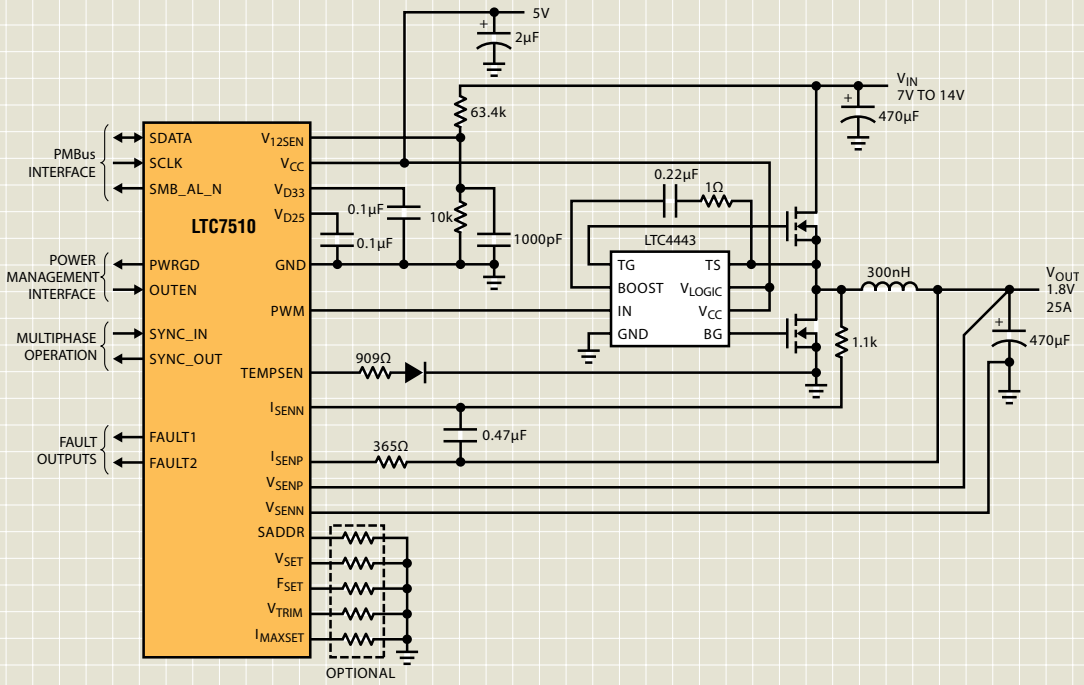
Notes: (1) The maximum output current depends on the choice of external components
(2) The operating frequency can be selected within the range indicated

Additional Features: (1) All parts have synchronous rectification & use the MOSFET $R_{DS(ON)}$ for current sense

Digital Step-Down Buck Controller with PMBus Monitoring and Control

The LTC7510 is a digital DC/DC controller with on-board non-volatile memory and PMBus interface for real time reporting and controll of point-of-load (POL) regulators. Power management monitoring and control parameters include current, voltage, operating frequency and temperature. Power supply sequencing, margining, turn-on/-off are easily programmed via the PMBus interface and provide POL fault detection reporting.

Digital Power Monitoring and Control Synchronous Step-Down Regulator

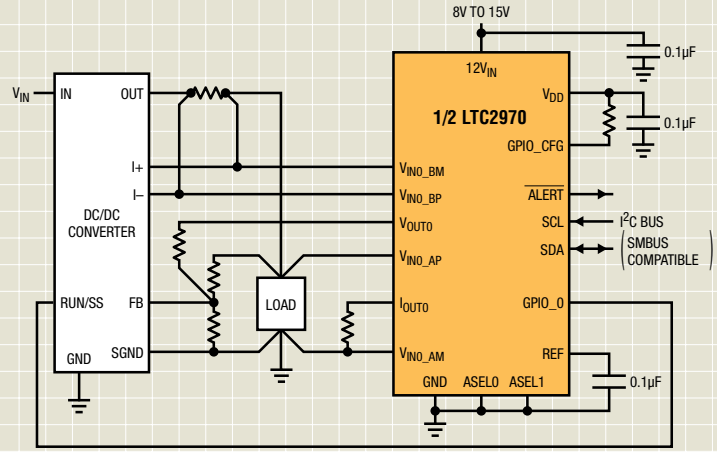


Part Number	V_{IN} Range (V)	V_{OUT} Range (V)	Output Current (A)	Tracking Margining	Architecture	Operating Frequency	Package	Features
LTC7510	5 to 16	0.7 to 3.6	30	Yes	Sync PWM Controller	150kHz to 1.5MHz	QFN-32	Digital Control Loop, Integrated Non-Volatile Memory, Monitors V, I, Frequency, Temp and Faults, PolyPhase Operation Using Multiple LTC7510s

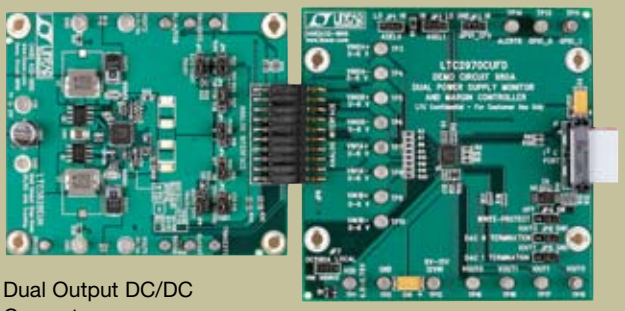
Power Supply Monitor, Margining and Hot Swap

The LTC2970 is a dual power supply monitor and margining controller with an SMBus compatible I²C interface. A low drift, on-chip reference and 14-bit A/D converter allow precise measurements of supply voltages, load currents and internal die temperature. Also included are Hot Swap controllers with I²C bus reporting capability.

Power Supply Monitor and Margining Schematic



LTC2970
Demonstration Board



Dual Output DC/DC Converter

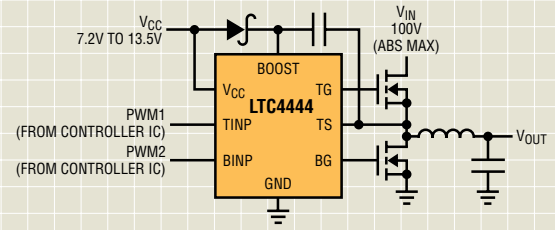
Monitoring and Margining Circuit

Part Number	V_{IN} Range (V)	Monitored Supply Range	Number of Monitored Supplies	Function	ADC Resolution	Number of ADC Channels	DAC Resolution	Number of DAC Channels	Package	Features
LTC2970	5 to 12	up to 5V	2	V/I & Temp	14-bit	4 differential	8-bit	2	QFN-24	I²C, Automatic Servo Logic, Temp Sensor
LTC4215	2.9 to 16.5	up to 16.5V	1	Hot Swap Controller	8-bit	3	n/a	n/a	QFN-24, TSSOP-16	I²C, Current and Voltage Monitor
LTC4260	8.5 to 80	up to 80V	1	Hot Swap Controller	8-bit	3	n/a	n/a	QFN-32, SSOP-24, SO-24	I²C, Current and Voltage Monitor
LTC4261	-100 to -12	down to -100V	1	Hot Swap Controller	10-bit	3	n/a	n/a	QFN-24, SSOP-28	I²C, Current and Voltage Monitor

High Speed MOSFET Drivers

Linear Technology offers several types of high speed MOSFET drivers with features that include synchronous rectification, low-side and high-side driving, single or dual outputs, inverting or non-inverting and high voltage applications.

Synchronous Step-Down MOSFET Driver



Part Number	V_{CC} Input Voltage Range (V)	Maximum V_{IN} Supply Voltage (V)	Maximum Output Current/ Impedance Source/Sink	I_Q	Package	Description
LTC1693-1	4.5 to 13.2	14	1.4A/1.7A	730µA	SO-8	Dual N-Channel Both Non-Inverting
LTC1693-2	4.5 to 13.2	14	1.4A/1.7A	730µA	SO-8	Dual N-Channel 1 Non-Inverting, 1 Inverting
LTC1693-3	4.5 to 13.2	14	1.4A/1.7A	730µA	MSOP-8	Single with Output Polarity Select
LTC1693-5	4.5 to 13.2	14	1.4A/1.7A	360µA	MSOP-8	Single P-Channel Driver
LTC4441/-1	5 to 8	28	6A/6A	250µA	MSOP-10, SO-8	Low Side Driver
LTC4440	7.3 to 15	80, 100pk	2.4A/1.5	250µA	MSOP-10, SO-8	High Side, High Voltage
LTC4440-5	3.65 to 15	60, 80pk	1.1A/1.85	200µA	MSOP-8E, ThinSOT	High Side, High Voltage
LTC3900	4.5 to 11	12	2A/2A	500µA	SO-8	Synchronous Driver for Foward Converters
LTC3901	4.5 to 11	12	2A/2A	500µA	SSOP-16	Synchronous Driver for Push-Pull and Full-Bridge Converters
LTC4442/-1	6.2 to 9.5	38	2.4A/5A	730µA	MSOP-8	Synchronous Driver
LTC4443/-1	6.2 to 9.5	38	2.4A/5A	730µA	DFN-12	Synchronous Driver, with Integrated Schottky Diode
LTC4445/-1	4 to 6.5	38	2.4A/5A	730µA	DFN-16	Dual Synchronous Driver, with Integrated Schottky Diodes
LTC4447	4 to 6.5	38	3.2A/5A	730µA	DFN-12	Synchronous Driver, with Integrated Schottky Diode
LTC4444	7.2 to 13.5	100	2.5A/2.5A	350µA	MSOP-8	Synchronous High Voltage Driver

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