

The following tables form a shortform component selection guide for a collection of commonly used battery-powered DC/DC conversion applications. No design is required since inductor, capacitor and resistor values are completely specified. Choose the appropriate LTC® DC/DC converter for your application from the following tables.

The LT®1073, LT1107, LT1108, LT1110, LT1111, LT1173, LTC1174, and LT1303 all have low-battery detection capability. For higher current and multiple output devices see InfoCard 15: *Portable Computer Power Supply and Communications Solutions*.

Step-Up From One Cell (1V)

V _{OUT} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	R (Ω)	FIG	COMMENTS
3.3	80	LT1307	70	10	10	—	***	Smallest Solution
5	40	LT1073-5	95	82	100	0	1	Lowest I _Q
	40	LT1110-5	350	27	33	0	1	Best For Surface Mount
	40	LT1307	70	20	10	—	***	Smallest Solution
12	15	LT1073-12	95	82	100	0	1	Lowest I _Q
	15	LT1110-12	350	27	33	0	1	Best For Surface Mount

Adjustable versions also available for V_{OUT} up to 50V ***See data sheet

Step-Up From Two Cells (2V)

V _{OUT} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	R (Ω)	FIG	COMMENTS
3.3	400	LT1300**	120	10	100	—	2	Selectable 3.3V/5V Out
	200	LT1500/01	—	—	—	—	—	Low Noise: See Data Sheet for Circuits
5	90	LT1173-5	110	47	100	47	1	Lowest I _Q
		LT1111-5	300	18	33	47	1	Surface Mount
	150	LT1107-5	300	33	33	47	1	Surface Mount
		LT1108-5	110	100	100	47	1	Lowest I _Q
	200	LT1500/01	—	—	—	—	—	Low Noise: See Data Sheet for Circuits
	220	LT1300**	120	10	100	—	2	Selectable 3.3V/5V Out
12		LT1301**	120	10	100	—	2	Selectable 5V/12V Out
	600	LT1302	200	10	100	—	*	Highest Power Output
	20	LT1173-12	110	47	47	47	1	Lowest I _Q
		LT1111-12	300	18	22	47	1	Surface Mount
	40	LT1107-12	300	27	33	47	1	Surface Mount
		LT1108-12	110	82	100	47	1	Lowest I _Q
50		LT1301**	120	10	100	—	2	Selectable 5V/12V Out
	120	LT1302	200	3.3	66	—	*	Highest Power Output
		LT1305	120	10	100	—	2	High Power Output

*See LT1302 data sheet **For low-battery detection use LT1303 or LT1304

Step-Up From 5V To 12V

V _{OUT} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	R (Ω)	FIG	COMMENTS
12	90	LT1173-12	110	120	100	0	1	Lowest I _Q
		LT1111-12	300	47	33	0	1	Surface Mount
	175	LT1107-12	300	60	32	0	1	Surface Mount
		LT1108-12	110	180	100	0	1	Lowest I _Q
	200	LT1301**	120	33	47	—	2	True Shutdown
	250	LT1373	1000	22	47	—	***	Fixed Frequency

For low-battery detection use LT1303 or LT1304 * See data sheet

Flash Memory VPP (12V) Generation

V _{IN} (V)	V _{OUT} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	FIG	COMMENTS
5	12	60	LT1109-12	320	33	22	3	Small, SMT
		120	LT1109A-12	320	27	47	3	Small, SMT
		200	LT1301**	120	27	47	2	True Shutdown
		80	LT1309	650	10	1	***	For PCMCIA Type II
2 Cells	12	60	LT1109A-12	320	10	22	1	All Surface Mount
		80	LT1301**	120	10	47	2	True Shutdown

For low-battery detection use LT1303 or LT1304 *See LT1309 data sheet

Basic Step-Up Converters

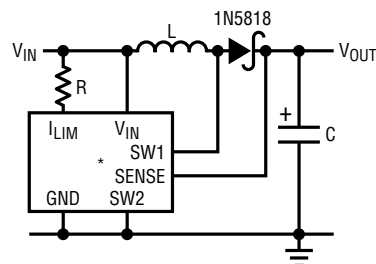
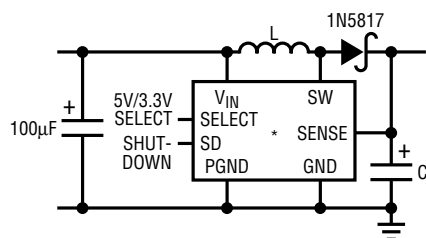


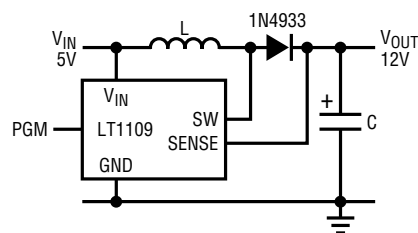
Figure 1



*SEE TABLES FOR RECOMMENDED PART, INDUCTOR, CAPACITOR AND RESISTOR VALUES

Figure 2

Flash Memory VPP Generator



*SEE TABLE FOR RECOMMENDED INDUCTOR AND CAPACITOR VALUES

Figure 3

Step-Down Conversion to 3.3V

V _{IN} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	I _{PGM}	Fig	COMMENTS
4.5 to 12.5	200 425	LTC1174-3.3	450 450	50 50	2 × 33 2 × 33	To GND To V _{IN}	5 5	Low Dropout, Surface Mount
4.5 to 12.5	200 425	LTC1574-3.3	450 450	50 50	2 × 33 2 × 33	To GND To V _{IN}	5 5	Low Dropout, SMT No External Diode
3.5 to 13.5	450	LTC1433/34	470	–	–	–	–	SSOP Packages, LTC1434 Has PLL for Synchronization
4.5 to 12.5	1A	LTC1265-3.3	160	–	–	–	–	Up to 1A with Internal Switch

Step-Down Conversion to 5V

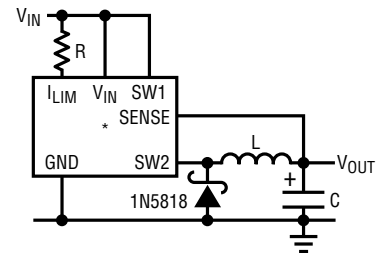
V _{IN} (Max)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	R/ I _{PGM}	Fig	COMMENTS
5.5 to 12	200 400	LTC1174-5	450 450	100 100	2 × 33 2 × 33	To GND To V _{IN}	5 5	Low Dropout, Surface Mount
5.5 to 16	200 400	LTC1574-5	450 450	100 100	2 × 33 2 × 33	To GND To V _{IN}	5 5	Low Dropout, SMT No External Diode
3.5 to 13.5	450	LTC1433/34	470	–	–	–	–	SSOP Packages, LTC1434 Has PLL for Synchronization
12 to 20	300 300	LT1107-5 LT1108-5	300 110	60 180	100 330	100 100	4 4	Surface Mount Lowest I _Q
20 to 30	300 300	LT1173-5 LT1111-5	110 300	470 180	470 220	100 100	4 4	Lowest I _Q Surface Mount
6 to 16	2A+	LTC1147	160	–	–	–	–	See Data Sheet

Adjustable output voltages up to 6.2V can be obtained with the adjustable versions of LT1173, LT1111, LT1107, LT1108, or LT1110.

Positive-to-Negative Voltage Conversion

V _{IN} (V)	V _{OUT} (V)	I _{OUT} (mA)	DEVICE	I _Q (μA)	L (μH)	C (μF)	R (Ω)	Fig	COMMENTS
5	–5	75	LT1108-5 LT1107-5	110 300	100 33	100 33	100 100	6 6	Lowest I _Q Surface Mount
		150	LTC1174-5	450	50	2 × 33	–	7	Surface Mount
12	–5	250	LT1173-5 LT1111-5	110 300	470 180	220 82	100 100	6 6	Lowest I _Q Surface Mount
4 8 12.5	–5	110 170 235	LTC1574-5	450	50	100	–	7	SMT, No Ext. Schottky Diode Required

Step-Down Converters



*SEE TABLES FOR RECOMMENDED PART, INDUCTOR, CAPACITOR AND RESISTOR VALUES

Figure 4

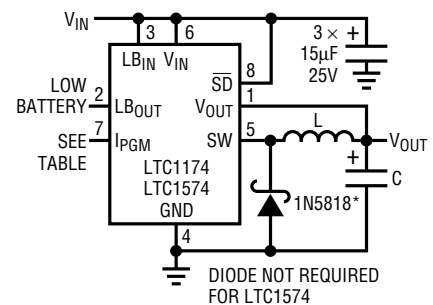
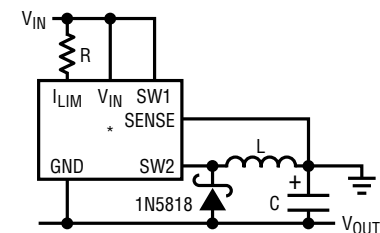


Figure 5

Positive-to-Negative Converters



*SEE TABLES FOR RECOMMENDED PART, INDUCTOR, CAPACITOR, AND RESISTOR VALUES

Figure 6

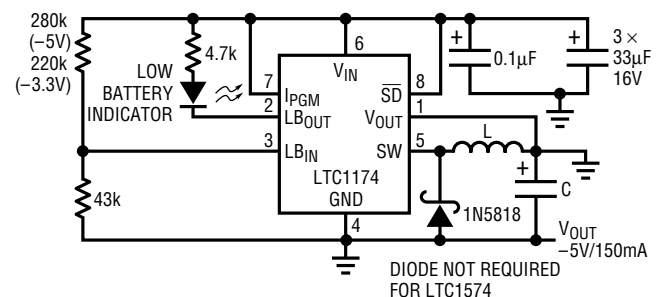


Figure 7

Inductor and Capacitor Part Numbers/Manufacturers

INDUCTOR VALUE (μ H)	COILTRONICS [†]	COILCRAFT [†]	SUMIDA [†]
15	–	DT3316-153	CD54-150LC
18	CTX20-1	–	CD54-180LC
20	CTX20-1	–	–
22	CTX20-1	DT3316-223	CD54-220LC
27	–	–	CD54-270LC
33	–	DT3316-473	CD54-330LC
47	CTX50-1	DT3316-683	CD74-470LC
68	–	DT3316-104	CD74-680LC
82	CTX82-1	DT3316-154	CD74-820LC
100	CTX100-1	–	CD105-101MC
120	CTX100-1	–	CD105-121MC
180	CTX250-4	–	CDR125-181MC
220	CTX250-4	–	CDR125-221MC
470	–	–	CDR125-471MC

[†]Surface mount inductors

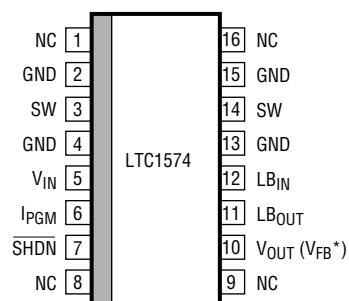
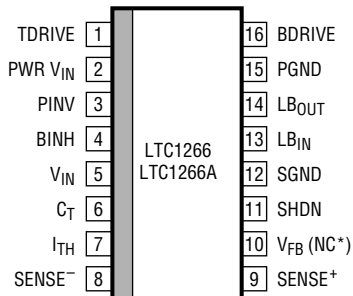
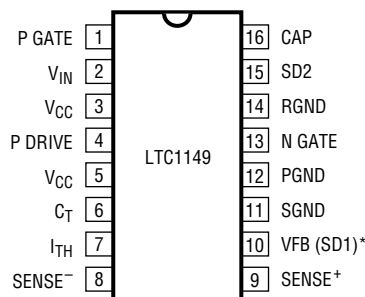
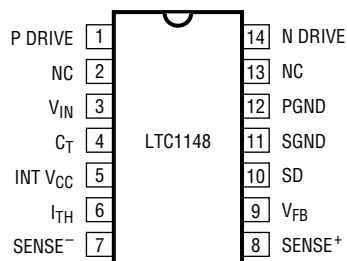
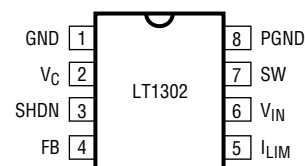
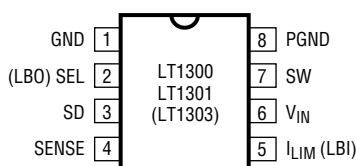
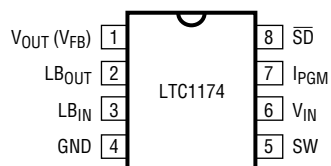
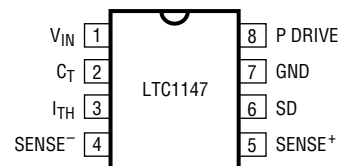
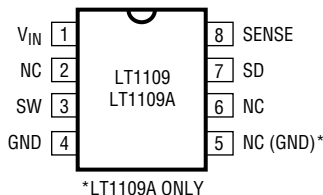
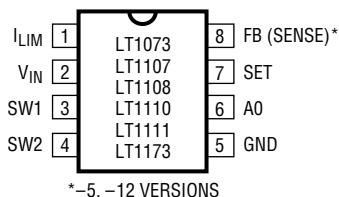
Inductor Manufacturers

Gowanda Elect.	Gowanda, NY, USA	716-532-2234	FAX: 716-532-2702
Coiltronics Intl.	Pompano Beach, FL, USA	407-241-7876	FAX: 305-782-4163
Sumida	Arlington Heights, IL, USA	708-956-0666	FAX: 708-956-0702
Coilcraft	Cary, IL, USA	800-322-2645	FAX: 708-639-1469

Capacitor Manufacturers

Best: TPS Series	AVX	Myrtle Beach, SC, USA	803-946-0690
Better: OS-CON Series	Sanyo Video	San Diego, CA, USA	619-661-6322
Good: PL Series	Nichicon America	Schaumburg, IL, USA	708-843-7500

Device Pinouts (DIP and SOIC Packages)



Linear Technology Micropower DC/DC Converter Family

DEVICE	V _{IN} (MIN)	V _{IN} (MAX)	I _{SW} (A) (MAX)	STEP-UP	STEP-DOWN	I _Q (μA)	SHDN	LOW BATT DETECT	DROPOUT VOLTAGE (V)	3.3V OUT	5V OUT	12V OUT	ADJ	# OF PINS	SO PACK	APPLICATION EXAMPLE
LT1073	1	15	1	X	X	95		X			X	X	X	8	X	1 Cell to 5V, 40mA
LT1107	2	30	1	X	X	300		X			X	X	X	8	X	2 Cells to 5V, 150mA
LT1108	2	30	1	X	X	110		X			X	X	X	8	X	2 Cells to 5V, 150mA
LT1109	2	30	0.5	X	X	320					X	X	X	3, 8	X	5V to 12V VPP, 60mA (Flash Memory)
LT1109A	2	20	1	X	X	320					X	X	X	8	X	5V to 12V VPP, 120mA (Flash Memory)
LT1110	1	15	1	X	X	350		X			X	X	X	8	X	1 Cell to 5V, 40mA
LT1111	2	30	1	X	X	300		X			X	X	X	8	X	2 Cells to 5V, 90mA
LTC1147	6	16	Ext.		X	160	X		0	X	X			8	X	6-8 Cell NiCd to 5V or 3.3V @ 1A+
LT1173	2	30	1	X	X	110		X			X	X	X	8	X	2 Cells to 5V, 90mA
LTC1174	4	13.5	0.6		X	450	X	X	0.5	X	X		X	8	X	9V to 5V @ up to 400mA
LTC1265	3.5	13.5	1		X	160	X	X	0.5	X	X		X	14	X	9V to 5V at 800mA
LT1300	2	6	1	X		120	X			X	X			8	X	2 Cells to 3.3V or 5V @ 250mA
LT1301	2	6	1	X	X	120	X				X	X		8	X	2 Cells to 5V or 12V @ 220mA or 50mA
LT1302	2	10	2	X		200	X						X	8	X	2 Cell to 5V at 600mA
LT1303	2	6	1	X		120	X	X			X		X	8	X	2 Cell to 5V @ 220mA
LT1304	2	6	1	X		120	X	X		X	X		X	8	X	2 Cells to 5V at 220mA, LBD Active in Shutdown
LT1305	2	6	2	X		120	X	X					X	8	X	Ideal for EL Panel Supply
LT1307	1.0	8	1	X		70	X	X					X	8	X	1Cell to 3.3V or 5V with Low-Battery Detect
LT1309	3.3	5	0.5	X		500	X					X		8	X	3.3V or 5V to 12V VPP (PCMCIA)
LTC1433	3.5	13.5	0.8		X	470	X	X	0.5	X	X		X	16	GN	3.5V to 12V _{IN} to 3.3V @ 400mA
LTC1444	3.5	13.5	0.8		X	470	X	X	0.5	X	X		X	20	GN	Same as LTC1444, Has PLL for Sync
LT1500	1.8	18	0.85	X		200	X	X		X	X		X	14	X	2 Cells to 3.3V or 5V, 200mA, Low Noise
LT1501	1.8	18	0.85	X		200	X	X		X	X		X	8	X	Same as LT1500, SO-8 Package
LTC1574	4	16	0.6		X	450	X	X	X	X	X		X	16	X	9V to 5V @ Up to 400mA. No External Schottky Diode Needed.