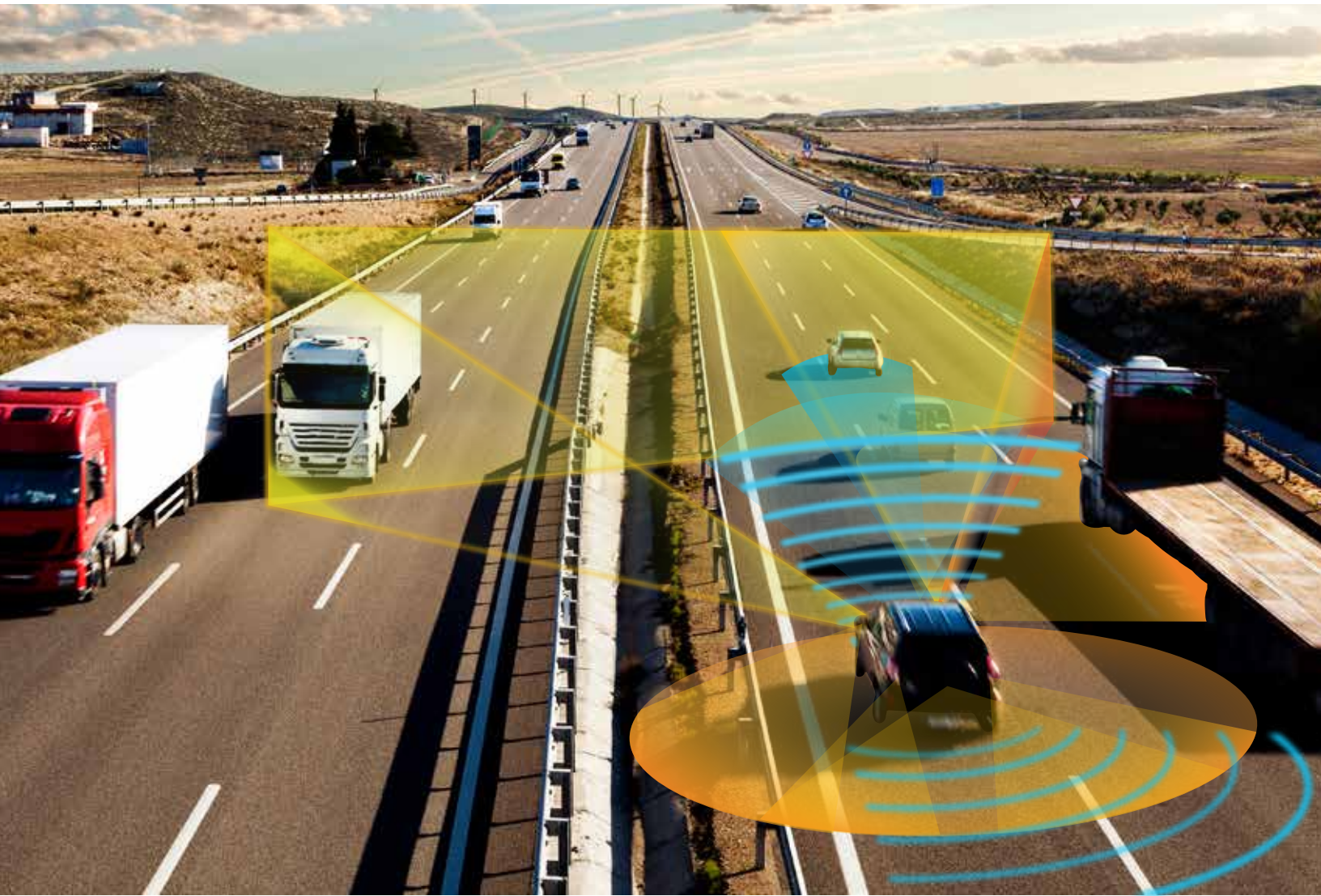
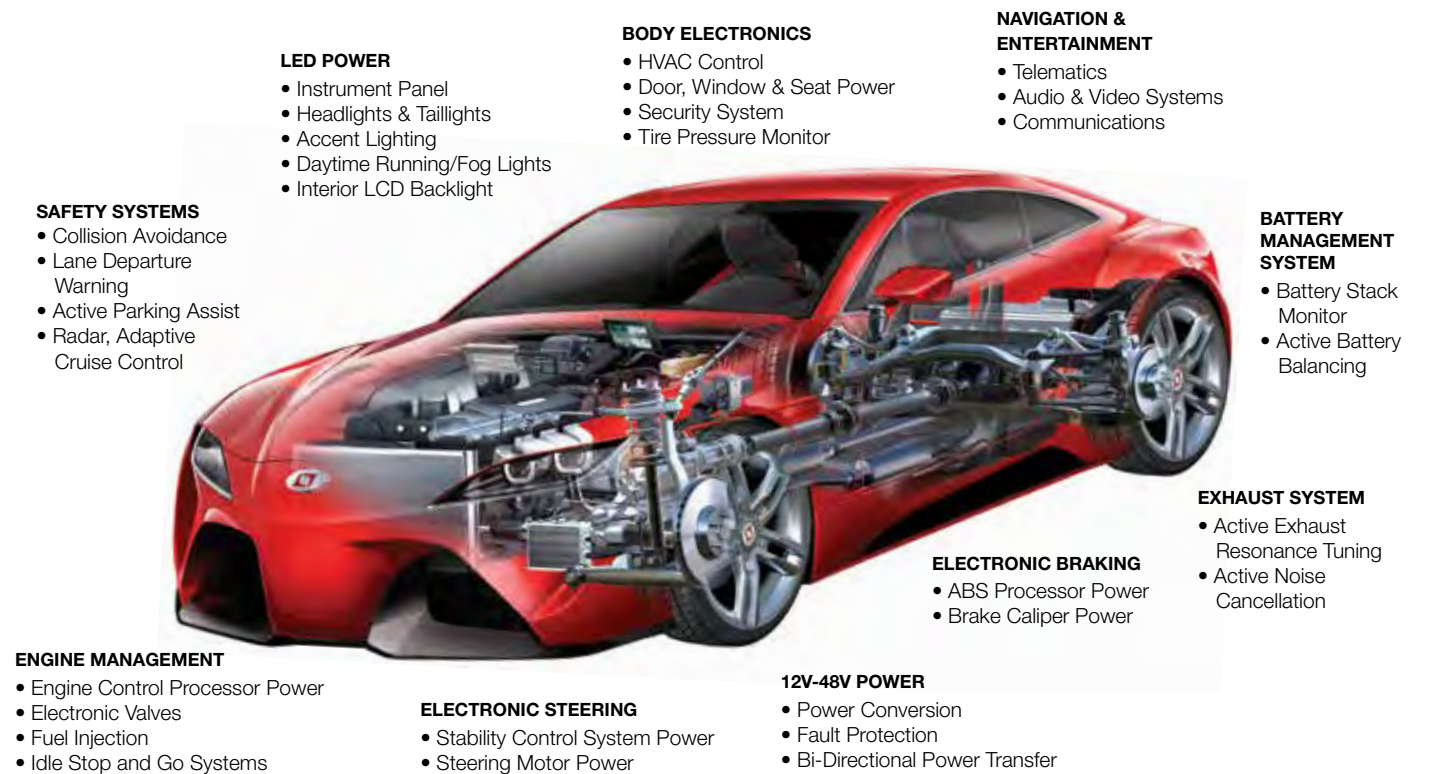


Automotive & Transportation Solutions

High Performance Analog ICs



Automotive Electronics Systems



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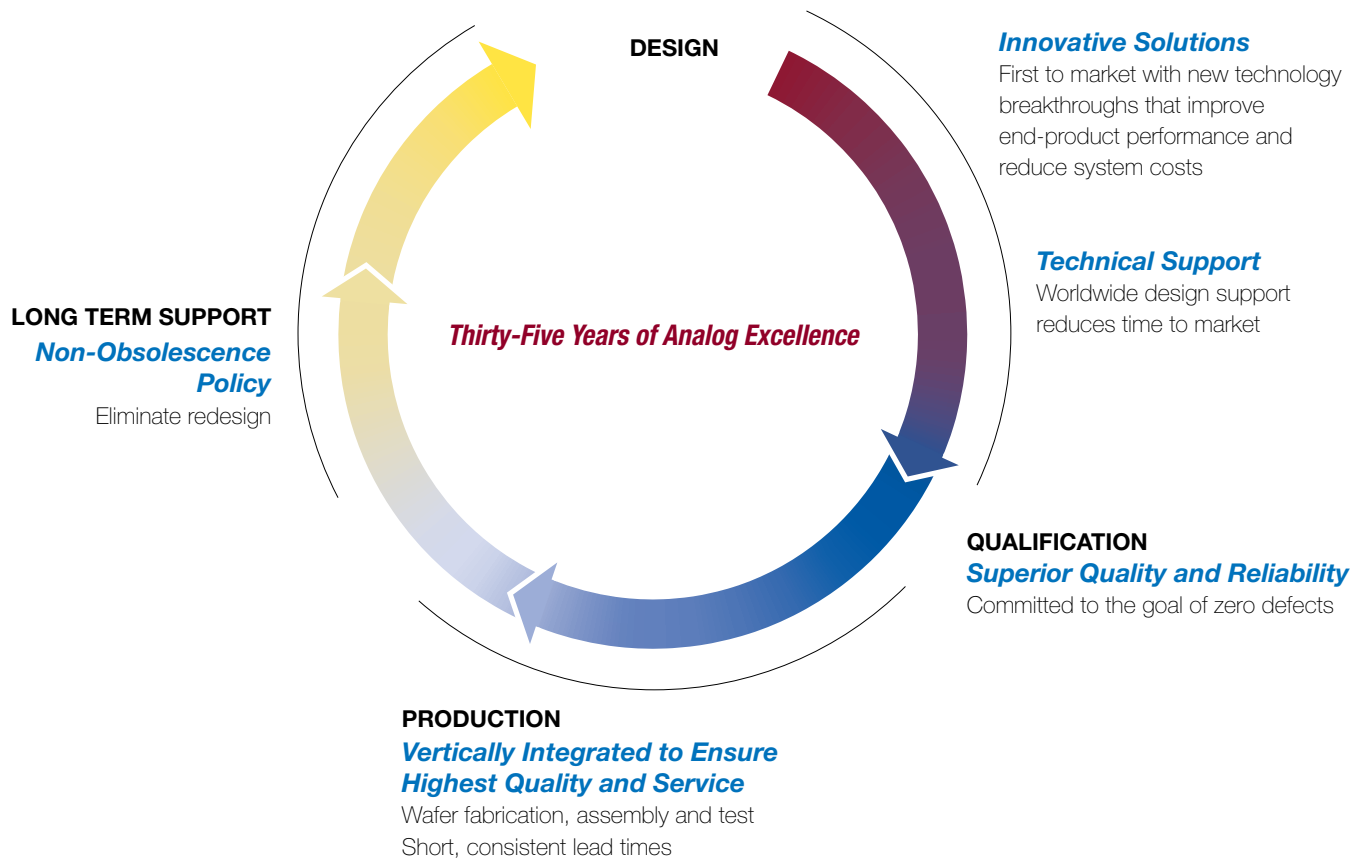
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Focused on the Automotive & Transportation Market

- Linear Technology is a major supplier to OEM and Tier 1, 2, and 3 automotive and transportation companies worldwide, accounting for 23% of our sales last year
- Our innovative solutions improve performance, and reduce system costs and design time
- Superior Quality and Reliability—Committed to the Goal of Zero Defects
 - TS16949 Automotive Quality Standard Certification since 2003
 - Utilize the Automotive Electronics Council's AEC-Q100 guidelines to define qualification plans for designated products
 - ISO 26262 International Safety Standard Implementation
 - Industry-Leading Quality Indices
 - Infant Mortality Field Failure Rate < 0.1ppm
 - Long Term Field Failure Rate 0.01ppm
 - Quick Turnaround of Failure Analysis 8D Correction Reports

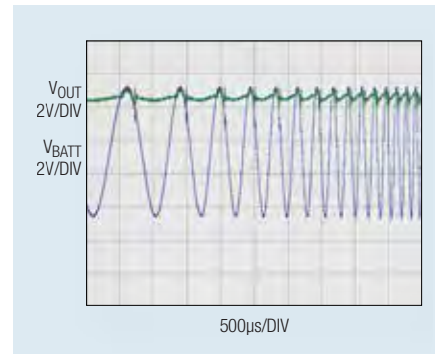


LT8672: Active Rectifier Controller

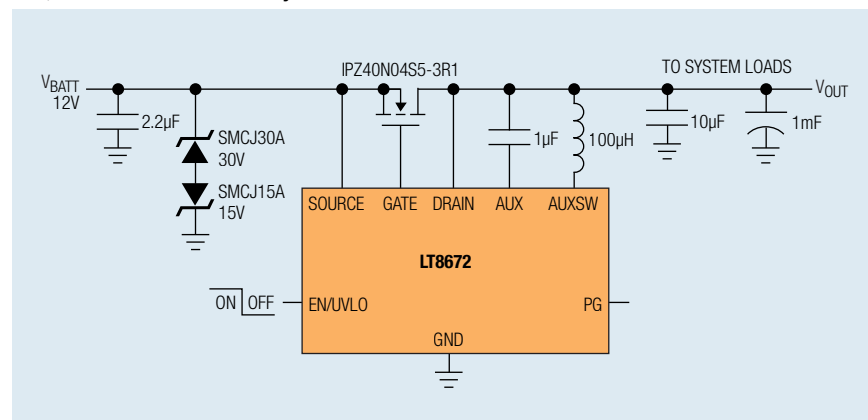
Features:

- Reverse Input Protection to -40V
- Improved Performance Compared to a Schottky Diode:
 - Reduce Power Dissipation by $>90\%$
 - Reduce Drop to 30mV
- Ultrafast Transient Response
 - Rectifies $6\text{V}_{\text{P-P}}$ Up to 50kHz
 - Rectifies $2\text{V}_{\text{P-P}}$ Up to 100kHz
- Up to 100A
- Wide Operating Voltage Range: 3V to 42V
- Low $18\mu\text{A}$ Quiescent Current in Operation
- Low $3\mu\text{A}$ Shutdown Current
- Accurate 1.2V Enable Pin Threshold
- Available in Small 10-Lead MSOP

Rectification of Input Ripple



12V, 10A Automotive Battery Protection



Surge Stoppers

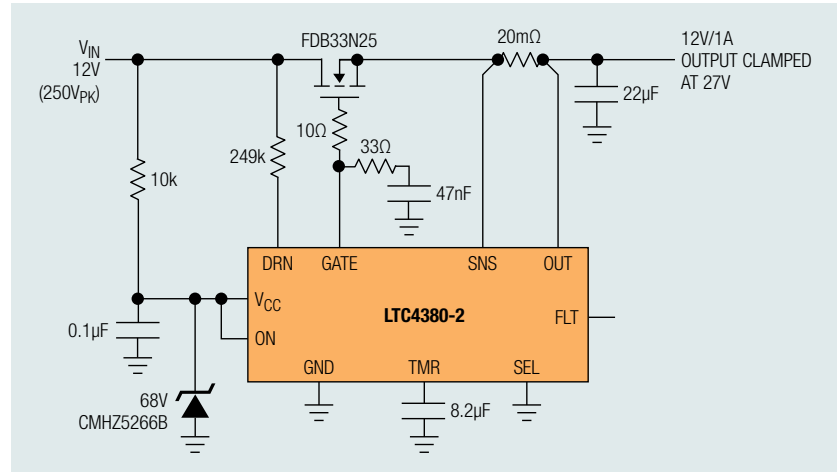
Features:

- Stops High Voltage Surges (>100V)
- Replaces Bulky TVS, LC Filter and Fuses
- Adjustable Output Clamp Voltage
- Overcurrent and Reverse-Battery Protection
- Adjustable Ride-Through Fault Timer
- Undervoltage and Overvoltage Monitoring
- Latchoff and Auto-Retry Options

Applications:

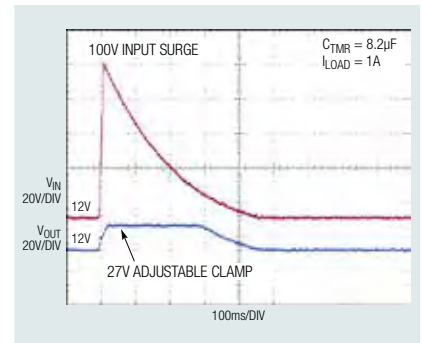
- Automotive Surge Protection
- Engine Control Unit
- Car Infotainment System
- GPS

12V, 1A with 250V Overvoltage Protection



Part Number	V _{IN} Range (V)	Surge Max (V)	I _Q (μA)	I _{SD} (μA)	Reverse Battery	Current Limit	Fault Timer	Ideal Diode	Reverse Output	Maximum Ambient Temperature	Package
LTC4380	4 to 72	100+	8	6	-60V	•	•			125°C	3x3 DFN-0, MSOP-10
LT4363	4 to 80	100+	970	7	-60V	•	•			125°C	4x3 DFN-12, MSOP-12, SO-16
LTC4364	4 to 80	100+	483	10	-40V	•	•	•	-20V	125°C	4x3 DFN-14, MSOP-16, SO-16
LTC4367	2.5 to 60	100+	70	5	-40V					125°C	3x3 DFN-8, MSOP-8
LTC4366	9 to 500+	500+	160+	5	External		•			125°C	3x2 DFN-8, TSOT-8
LTC7860	3.5 to 60	100+	770	7	External	•	•			150°C	MSOP-12
LTC4361	2.5 to 5.5	80	230	1.5	External	ECB				125°C	2x2 DFN-8, TSOT-8

Surge Stopper Limits Output to 27V During Input Surge



Ideal Diode Controllers

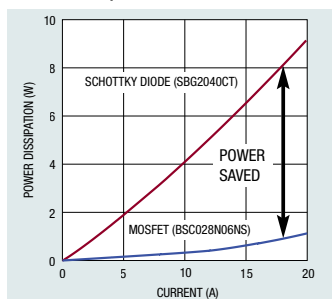
Features:

- Replaces Power Schottky Diode
- Saves Power, Voltage and Board Area
- Smooth Switchover without Oscillation
- No Reverse DC Current

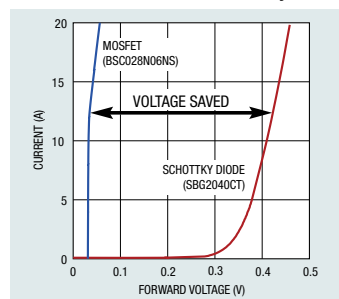
Applications:

- Reverse Battery Protection
- Supply Holdup
- Diode-OR for Redundancy
- Engine Stop-Start
- Body Electronics

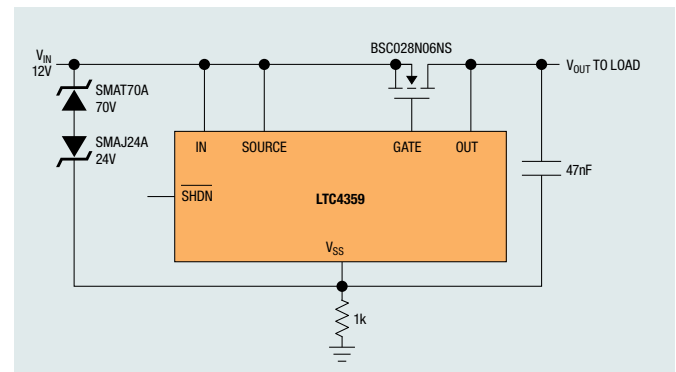
Power Dissipation vs Load Current



Forward Voltage Drop Comparison Between MOSFET and Schottky Diode



12V, 20A Automotive Reverse Battery Protection



Part Number	V _{IN} Range (V)	Supplies	Internal FET	I _Q (mA)	I _{SD} (μA)	Reverse Battery	Diode On/Off Control	Monitors	Maximum Ambient Temperature	Package
LTC4359	4 to 80	1		0.15	9	-40V	•		150°C	2x3 DFN-6, MSOP-8
LTC4352	0 to 18	1		1.47			•	V _{IN} , FET On/Drop	150°C	3x3 DFN-12, MSOP-12
LTC4353	0 to 18	2		1.6	75			FET On	85°C	4x3 DFN-16, MSOP-16
LTC4371	-4.5 to >-100V	2 (OR)		0.3				FET Drop	85°C	3x3 DFN-10, MSOP-10
LTC4355	9 to 80	2 (OR)		2.6				V _{IN} , Fuse, FET Drop	125°C	4x3 DFN-14, MSOP-16, SO-16
LTC4357	9 to 80	1		0.93					125°C	2x3 DFN-6, MSOP-8
LTC4358	9 to 26.5	1	5A	0.78					85°C	4x3 DFN-14, TSSOP-16

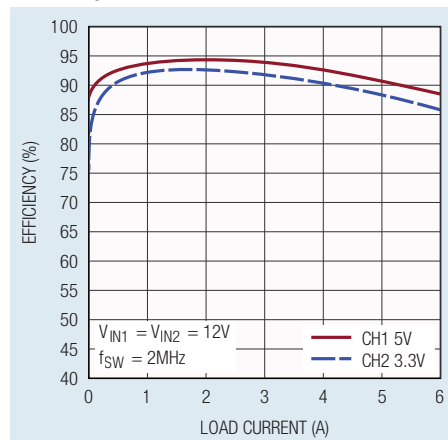
Silent Switcher—Ultralow EMI Synchronous Switching Regulators

LT8650S: 42V, Dual 4A/6A Peak Synchronous Step-Down Silent Switcher 2

Silent Switcher® 2 Architecture:

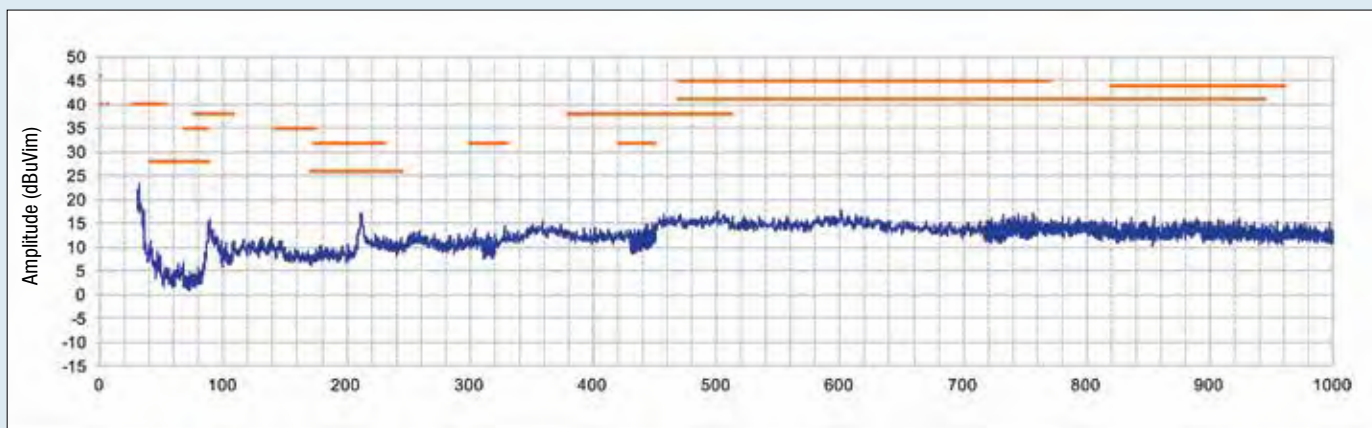
- Ultralow EMI/EMC Emissions—Meets CISPR 25, Class 5 Limits
 - Internal Capacitors for V_{IN} , BST, $INTV_{CC}$
 - Spread Spectrum Frequency Modulation
- Up to 95% Efficiency at 2MHz
- Wide Input Voltage Range: 3.0V to 42V
- $I_Q < 6.5\mu A$
- Small 32-Lead 4mm × 6mm LGA Package

Efficiency



LT8650S
Actual Size
Demo Board

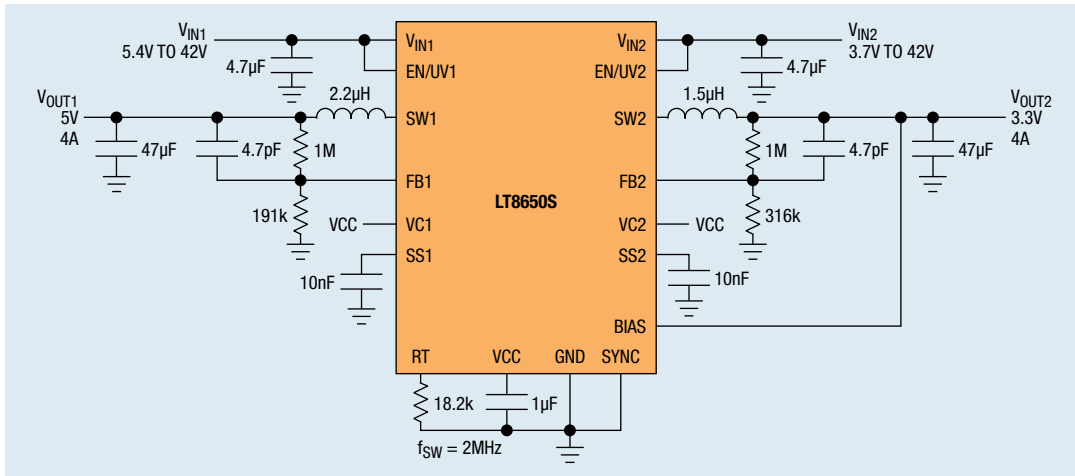
Silent Switcher EMI Performance—LT8650S Below



LT8650S EMI/EMC Curve 5V@3.8A, 3.3V@4.2V, $f_{SW} = 2\text{MHz}$ with Spread Spectrum

— LT8650S
— CISPR 25, CLASS5 Limit

5V/4A, 3.3V/4A 2MHz Step-Down Converter



Silent Switcher Synchronous Step-Down Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (µA)	I _{SD} (µA)	Max Junc Temp (°C)	Package
LT8608S*	Silent Switcher 2 Synchronous Step-Down	3.0 to 42	1.5A	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	125	2x3 LGA-12
LT8609S*	Silent Switcher 2 Synchronous Step-Down	3.0 to 42	2A/3A Peak	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	125	3x3 LGA-16
LT8641	Silent Switcher Synchronous Step-Down	3.0 to 65	3.5	0.8	200kHz to 3MHz	200kHz to 3MHz	2.5	1	150	3x4 QFN-18
LT8614	Silent Switcher Synchronous Step-Down	3.4 to 42	4	0.97	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x4 QFN-18
LT8640/-1	Silent Switcher Synchronous Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	2.5	1	150	3x4 QFN-18
LT8640S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	2.5	1	125	4x4 LGA-24
LT8643S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	50	1	125	4x4 LGA-24
LT8653S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	2A/3A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6	1	125	3x4 LGA-20
LT8650S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	4A/6A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6.2	1	125	4x6 LGA-32
LT8645S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 65	7	0.8	200kHz to 3MHz	200kHz to 3MHz	2.5	1	125	4x6 LGA-32
LT8642S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 18	10	0.6	200kHz to 3MHz	200kHz to 3MHz	155	1	125	4x4 LGA-24
LT8652S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 18	8.5A/12A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6.2	1	125	4x7 LGA-36

*Silent Switcher 2: Internal Capacitors for V_{IN}, BST, INTV_{CC}

Silent Switcher µModule Regulator

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (µA)	I _{SD} (µA)	Max Junc Temp (°C)	Package
LTM8003	Silent Switcher µModule Regulator	3.4 to 40	3.5A/6A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	25	3	150	6.25x9 BGA

60V+, High Efficiency Monolithic Step-Down DC/DC Converters

LT8645S: A Synchronous Step-Down Silent Switcher 2

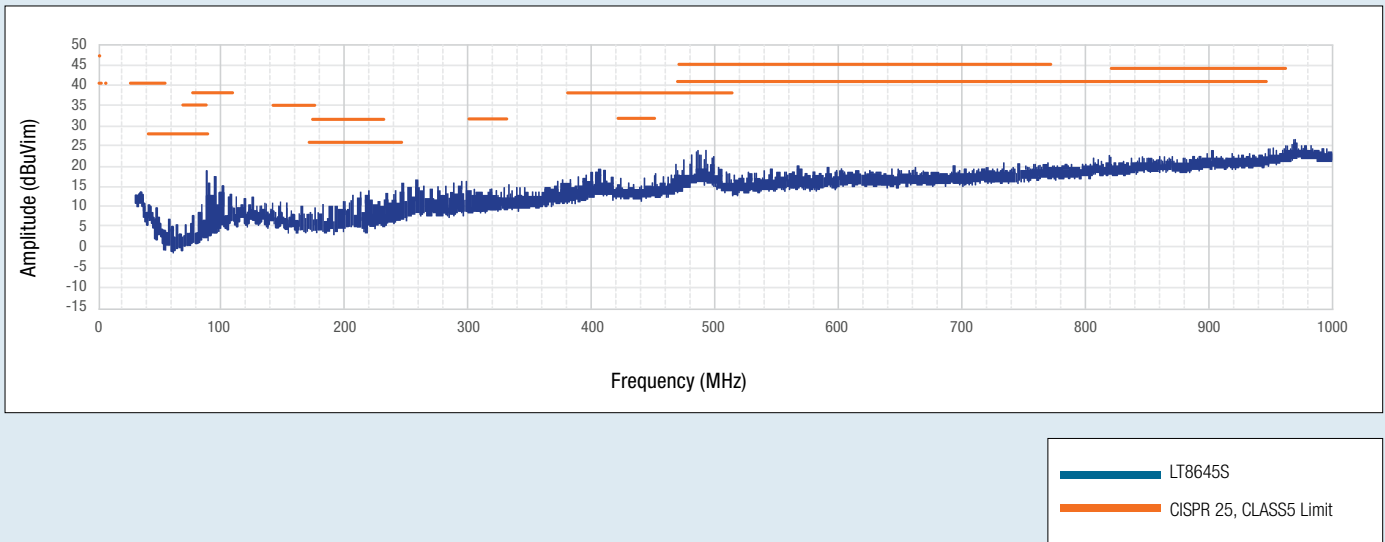
Silent Switcher 2 Architecture:

- Ultralow EMI/EMC Emissions—Meets CISPR 25, Class 5 Limits
 - Internal Capacitors for V_{IN} , BST, $INTV_{CC}$
 - Spread Spectrum Frequency Modulation
- Up to 94% Efficiency at 2MHz
- Wide Input Voltage Range: 3.4V to 65V
- $I_Q < 2.5\mu A$
- Small 32-Lead 4mm × 6mm LGA Package

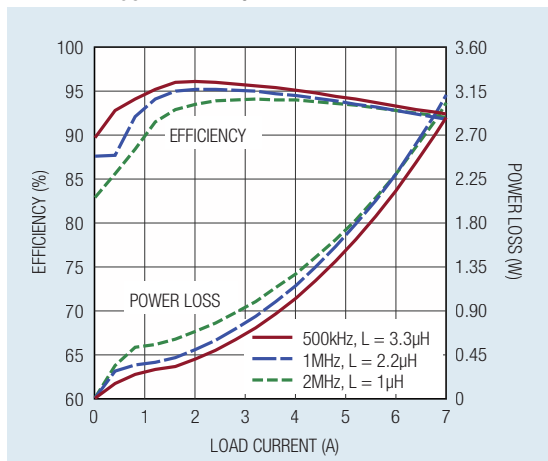


LT8645S
Actual Size
Demo Board

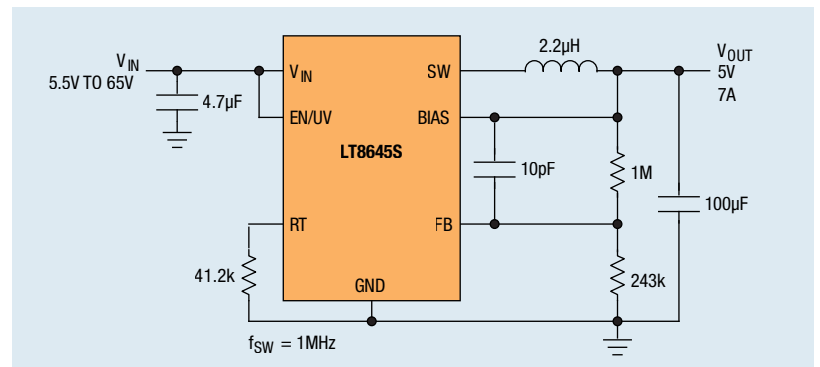
Silent Switcher EMI Performance—LT8645S Below



12V_{IN} to 5V_{OUT} Efficiency



5V, 7A Step-Down Converter



60V, Ultralow Quiescent Current Synchronous Monolithic Step-Down DC/DC Converters

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3630A	Synchronous Step-Down	4 to 65	0.5	0.8	Hysteretic	n/a	12	1	150	3x5 DFN-16, MSOP-16E
LT8619	Synchronous Step-Down	3.4 to 65	1	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x3 DFN-10, MSOP-10E
LT8620	Synchronous Step-Down	3.4 to 65	2	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	MSOP-16E
LT8626	Dual Output Synchronous Step-Down	3.4 to 65	1.5A + 1A	0.97	200kHz to 3MHz	200kHz to 3MHz	5	1	150	3x6 QFN, TSSOP-28E
LT8641	Silent Switcher Synchronous Step-Down	3.0 to 65	4	0.8	200kHz to 3MHz	200kHz to 3MHz	2.5	1	150	3x4 QFN-18
LT8645S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 65	7	0.8	200kHz to 3MHz	200kHz to 3MHz	2.5	1	150	3x4 QFN-18

*Silent Switcher 2: Internal Capacitors for V_{IN}, BST, INN_{CC}

60V, Ultralow Quiescent Current Monolithic Step-Down DC/DC Converters

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LT3990	Step-Down Regulator	4.2 to 62	0.35	1.21	200kHz to 2MHz	250kHz to 2MHz	2.5	1	150	3x3 DFN-10, MSOP-16E
LT3991	Step-Down Regulator	4.3 to 55	1.20	1.19	200kHz to 2MHz	250kHz to 2MHz	2.8	1	125	3x3 DFN-10, MSOP-10E
LT3995	Step-Down Regulator	4.3 to 60	2.50	1.2	200kHz to 2MHz	200kHz to 2MHz	2.7	1	150	MSOP-16E

76V to 150V, Low Quiescent Current Synchronous Monolithic Step-Down DC/DC Converters

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3639	Synchronous Step-Down	4.0 to 150	0.10	0.6	Hysteretic	n/a	12	1	150	HV MSOP-16E
LTC3638	Synchronous Step-Down	4.0 to 140	0.20	0.6	Hysteretic	n/a	12	1	150	HV MSOP-16E
LTC3637	Synchronous Step-Down	4.0 to 76	0.50	0.6	Hysteretic	n/a	12	1	150	HV MSOP-16E, 3x5 DFN-16
LT8630	Synchronous Step-Down	3.0 to 100	0.60	0.8	100kHz to 1MHz	100kHz to 1MHz	7	1	150	TSSOP-20E
LT8631	Synchronous Step-Down	3.0 to 100	1.00	0.8	100kHz to 1MHz	100kHz to 1MHz	7	1	150	TSSOP-20E

40V, Ultralow Quiescent Current Monolithic Switching Regulators

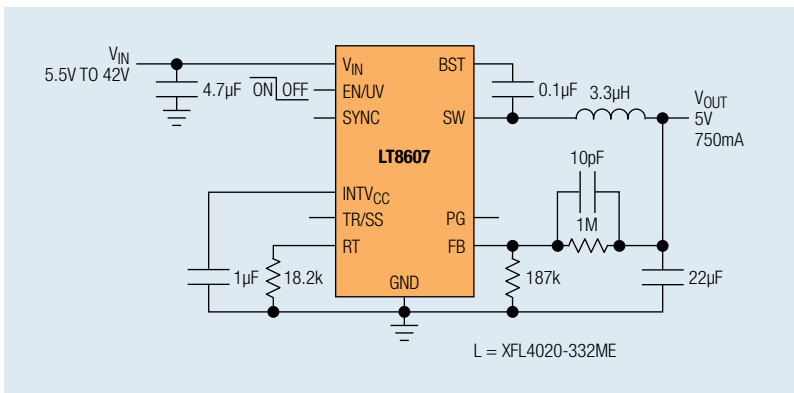
LT8607: 42V, 750mA, Synchronous Step-Down with Ultralow I_Q

- Wide Input Voltage Range: 3.0V to 42V
- $I_Q < 2.5\mu\text{A}$
- 93% Efficiency at 2MHz
- Spread Spectrum Frequency Modulation for Low EMI
- 200kHz to 2.2MHz Switching Frequency
- Small 10-Lead MSOP Package or 8-Lead 2mm × 2mm DFN Package

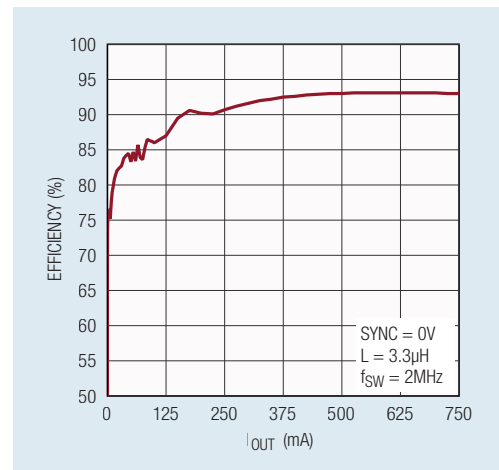


LT8607
Actual Size
Demo Board

5V, 2MHz Step-Down



12VIN to 5VOUT Efficiency



42V, Ultralow Quiescent Current Synchronous Monolithic Switching Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LT8606	Synchronous Step-Down	3.0 to 42	0.35	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	2x2 DFN-8, MSOP-10E
LT8607	Synchronous Step-Down	3.0 to 42	0.75	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	2x2 DFN-8, MSOP-10E
LT8608	Synchronous Step-Down	3.0 to 42	1.5	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	2x2 DFN-8, MSOP-10E
LT8608S*	Silent Switcher 2 Synchronous Step-Down	3.0 to 42	1.5	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	2x3 LGA-12
LT8609/A/B	Synchronous Step-Down	3.0 to 42	2A/3A Peak	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	MSOP-10E
LT8609S*	Silent Switcher 2 Synchronous Step-Down	3.0 to 42	2A/3A Peak	0.8	200kHz to 2.2MHz	200kHz to 3MHz	2.5	1	150	3x3 LGA-16
LT8610	Synchronous Step-Down	3.4 to 42	2.5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	MSOP-16E
LT8610A	Synchronous Step-Down	3.4 to 42	3.5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	MSOP-16E
LT8610AB	Synchronous Step-Down	3.4 to 42	3.5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	MSOP-16E
LT8610AC	Synchronous Step-Down	3.0 to 42	3.5	0.8	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	MSOP-16E
LT8610AX	Synchronous Step-Down	3.4 to 42	3.5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	175	MSOP-16E
LT8611	Synchronous Step-Down with Current Sense	3.4 to 42	2.5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x5 QFN-24
LT8697	Synchronous Step-Down with Cable Comp	3.4 to 42	2.5	5V	300kHz to 2.2MHz	300kHz to 2.2MHz	3.6	1	150	3x5 QFN-24
LT3690	Synchronous Step-Down	3.9 to 36, 60MAX	4	0.8	170kHz to 1.5MHz	170kHz to 1.5MHz	70	1	150	4x6 QFN-26
LT8616	Dual Output Synchronous Step-Down	3.4 to 42	2.5A + 1.5A	0.97	200kHz to 3MHz	200kHz to 3MHz	5	1	150	3x6 QFN-28, TSSOP-28E
LT8614	Synchronous Silent Switcher Step-Down	3.4 to 42	4	0.97	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x4 QFN-18
LT8612	Synchronous Step-Down	3.4 to 42	5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x6 QFN-28
LT8613	Synchronous Step-Down with Current Sense	3.4 to 42	5	0.985	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	3x6 QFN-28
LT8640/-1	Silent Switcher Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	2.5	1	150	3x4 QFN-18
LT8640S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	2.5	1	125	4x4 LGA-24
LT8643S*	Silent Switcher 2 Synchronous Step-Down	3.4 to 42	5A/7A Peak	0.97	200kHz to 3MHz	200kHz to 3MHz	50?	1	125	4x4 LGA-24
LT8601	Triple Output Synchronous Step-Down	3.0 to 42	2.5A + 1.5A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	30	1	150	6x6 QFN-40
LT8602	Quad Output Synchronous Step-Down	3.0 to 42	2.5A + 1.5A + 1.8A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	25	1	150	6x6 QFN-40
LT8603	Triple Output Synchronous Step-Down with Boost Controller	3.0 to 42	2.5A + 1.5A + 1.8A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	30	1	150	6x6 QFN-40
LT8653S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	2A/3A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6	1	125	3x4 LGA-20
LT8650S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	4A/6A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6.2	1	125	4x6 LGA-32

*Silent Switcher 2: Internal Capacitors for V_{IN}, BST, INN_{CC}

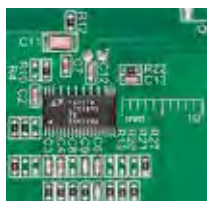
40V, Ultralow Quiescent Current Monolithic Switching Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LT3970	Step-Down	4.2 to 42	0.35	1.25	200kHz to 2.2MHz	200kHz to 2.2MHz	2.5	1	150	2x3 DFN-10, MSOP-10
LT3973	Step-Down	4.3 to 42	0.75	1.21	200kHz to 2.2MHz	250kHz to 2.2MHz	2.5	1	150	3x3 DFN-10, MSOP-10E
LT3971	Step-Down	4.3 to 38	1.2	1.19	200kHz to 2.2MHz	200kHz to 2.2MHz	2.8	1	125	3x3 DFN-10, MSOP-10E/16E
LT3975	Step-Down	4.3 to 42	2.50	1.2	200kHz to 2MHz	200kHz to 2MHz	2.7	1	150	MSOP-16E
LT3976	Step-Down	4.3 to 40	5.00	1.2	200kHz to 2MHz	200kHz to 2MHz	3.3	1	150	MSOP-16E

60V_{IN} to 150V_{IN} Max Input DC/DC Controllers

LTC3895: 150V Low I_Q, Synchronous Step-Down DC/DC Controller

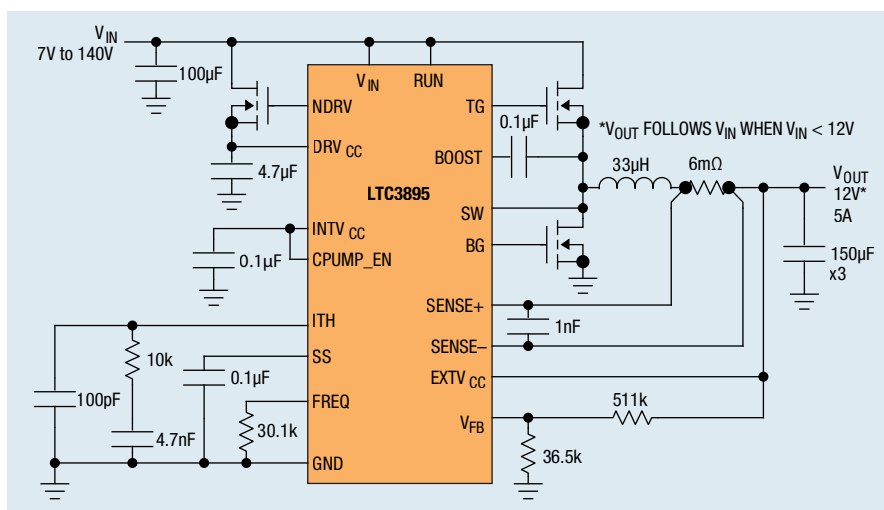
- Wide V_{IN} Range: 4V to 140V (150V Abs Max)
- Wide Output Voltage Range: 0.8V to 60V
- Adjustable Gate Drive Level: 5V to 10V
- Low Operating I_Q: 40μA (Shutdown = 10μA)
- 100% Duty Cycle Operation
- No External Bootstrap Diode Required



LTC3895
Actual Size
Demo Board



LTC3895
Back side of
Demo Board



60V_{IN} to 150V_{IN} Max Input, Low Quiescent Current DC/DC Controllers

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency (kHz)	Ext Sync Range (kHz)	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3895	Synchronous Step-Down	4 to 150	20	0.8	50 to 900	75 to 850	40	10	150	TSSOP-38 (31)
LTC3892	Synchronous Step-Down	4 to 60	2 X 20	0.8	50 to 900	75 to 850	28	14	150	QFN-32/TSSOP-28
LTC3891	Synchronous Step-Down	4 to 60	20	0.8	50 to 900	75 to 750	50	14	150	QFN-20, TSSOP-20E
LT3840	Synchronous Step-Down	2.5 to 60	20	1.23	50 to 1MHz	50 to 1MHz	75	10	150	QFN-38/TSSOP-28
LT3845A	Synchronous Step-Down	4 to 60	20	1.23	100 to 600	100 to 600	120	10	125	TSSOP-16E
LTC7813	Synchronous Buck + Boost	4.5 to 60	2 X 10	0.8	75 to 850	75 to 850	29	10	150	QFN-32
LTC3864	Step-Down	3.5 to 60	5	0.8	50 to 850	75 to 750	40	7	150	DFN-12
LTC3863	Inverter	3.5 to 60	5	-0.4	50 to 850	75 to 750	70	7	150	DFN-12, MSOP-12
LTC3897	Synchronous Step-Up with Protection	4.5 to 75	20	Up to 60	50 to 900	75 to 850	55	15	150	QFN-38, TSSOP-38
LTC3784	Synchronous Step-Up	4.5 to 60	20	Up to 60	50 to 900	75 to 850	28	8	150	QFN-28, SSOP-28
LTC3769	Synchronous Step-Up	4.5 to 60	10	Up to 60	50 to 900	75 to 850	28	4	150	QFN-24, SSOP-20

80V_{IN} to 100V_{IN} Max Input DC/DC Controllers

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency (kHz)	Ext Sync Range (kHz)	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3871	Bidirectional Synchronous Buck or Boost	Up to 100	20	1.2	60 to 460	60 to 460	8mA	140	150	LPFQ-48
LT3748	Flyback	5 to 100	5	1.22	Variable	n/a	1.3mA	1	150	MSOP-16 (12)
LT3758A	Boost, Flyback, SEPIC and Inverting	5.5 to 100	5	1.6/-0.8	100 to 1MHz	100 to 1MHz	1.75mA	0.1	150	DFN-10, MSOP-10
LTC3810	Synchronous Buck	6.2 to 100	20	6.2	100 to 1MHz	100 to 1MHz	3mA	240	125	TSSOP-16E
LT8710	Synchronous SEPIC	4.5 to 80	10	0	70 to 700	70 to 700	4mA	1	125	TSSOP-20

LT8697: 42V, 2.5A Synchronous Buck Regulator with Cable Drop Compensation for USB Applications

36V_{IN} to 65V_{IN} Max Multi-Output Step-Down DC/DC Converters

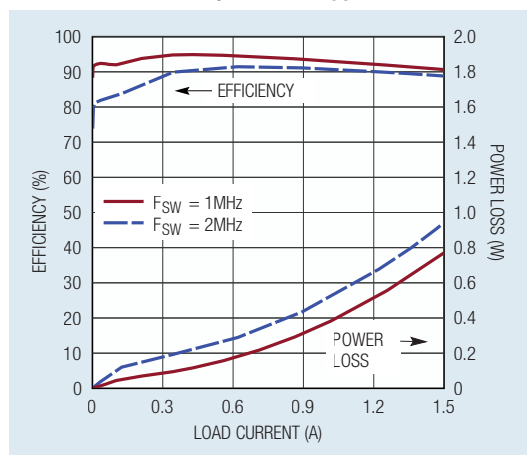
LT8602: 42V Quad Monolithic Synchronous Step-Down Regulator

- Two High Voltage Synchronous Buck Regulators:
 - 3V to 42V Input Voltage Range; Output Currents Up to 2.5A and 1.5A
- Two Low Voltage Synchronous Buck Regulators:
 - 2.5V to 5.5V Input Voltage Range; Output Currents Up to 1.8A
- 250kHz to 2.2MHz Switching Frequency
- Low Ripple Burst Mode Operation: $I_Q = 25\mu A$
- 6mm x 6mm QFN-40 Package

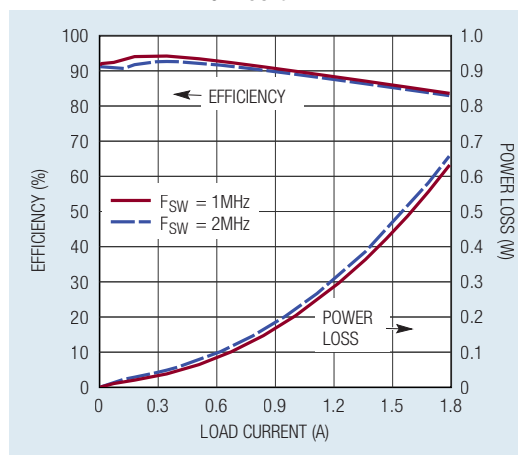


LT8602
Actual Size
Demo Board

HV Channel Efficiency, $V_{IN} = 12V_{OUT1} = 5V$



LV Channel Efficiency, $V_{OUT3} = 1.8V$



36V_{IN} to 65V_{IN} Max Multi-Output Step-Down DC/DC Converters

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency	Ext Sync Range	I _Q	I _{SD} (μA)	Max Junc Temp (°C)	Package
LT3667	Step-Down with Dual LDOs	4.3 to 40	0.4	0.8	250kHz to 2.2MHz	300kHz to 2.2MHz	45	1	150	3x5 QFN-24, MSOP-16E
LT3668	Step-Down with Dual Tracking LDOs	4.3 to 40	0.4	0.8	250kHz to 2.2MHz	300kHz to 2.2MHz	50	1	150	MSOP-16E
LT3645	Step-Down + LDO Controller	3.6 to 36, 55MAX	0.5	0.8	750kHz	n/a	1.7	1	150	MSOP-12E
LT3509	Dual Step-Down	3.6 to 36, 60MAX	2 x 0.70	0.80	300kHz to 2.2MHz	300kHz to 2.2MHz	1.9	1	150	3x4 DFN-14, MSOP-16E
LT3688	Dual Step-Down/POR, Watchdog Timer	3.6 to 36	2 x 0.80	0.80	350kHz to 2.5MHz	350kHz to 2.5MHz	115uA	1	150	4x4 QFN-24, TSSOP-24E
LT3988	Dual Step-Down	4 to 60, 80MAX	2x1.0	0.75	250kHz to 2.5MHz	250kHz to 2.5MHz	2	1	150	MSOP-16E
LT3508	Dual Step-Down	3.7 to 36	2x1.40	0.80	250kHz to 2.5MHz	250kHz to 2.5MHz	4.6mA	1	150	4x4 QFN-24 TSSOP-16E
LT3640	Dual Step-Down	4 to 35, 55MAX	1.3 + 1.1	0.60	350kHz to 2.5MHz	350kHz to 2.5MHz	290uA	1	125	4x5 QFN-28, TSSOP-28E
LT3641	Dual Step-Down	4 to 42, 55MAX	1.3 + 1.1	0.60	350kHz to 2.5MHz	350kHz to 2.5MHz	290uA	1	150	4x5 QFN-28, TSSOP-28E
LT3500	Step-Down + LDO Controller	3.6 to 40	2.00	0.80	250kHz to 2.2MHz	250kHz to 2.2MHz	2.5mA	12	150	3x3 DFN-12
LT8626	Dual Output Synchronous Step-Down	3.4 to 65	1.5A + 1A	0.97	200kHz to 3MHz	200kHz to 3MHz	5	1	150	3x6 QFN, TSSOP-28E
LT3694/-1	Step-Down + Dual LDO Controller	4 to 37, 70MAX	2.60	0.75	250kHz to 2.5MHz	250kHz to 2.5MHz	1	1	125	4x5 QFN-28, TSSOP-20E
LT3514	Triple Step-Down + LDO Controller	3.2 to 40	2A+1A+1A+10mA	0.80	250kHz to 2.2MHz	250kHz to 2.2MHz	TBD	1	TBD	4x5 QFN-28
LT8616	Dual Output Synchronous Step-Down	3.4 to 42	2.5A + 1.5A	0.97	200kHz to 3MHz	200kHz to 3MHz	5	1	150	3x6 QFN-28, TSSOP-28E
LT8626	Dual Output Synchronous Step-Down	3.4 to 65	1.5A + 1A	0.97	200kHz to 3MHz	200kHz to 3MHz	5	1	150	3x6 QFN, TSSOP-28E
LT3504	Quad Step-Down	3.2 to 40	4 x 1.0	0.80	250kHz to 2.2MHz	250kHz to 2.2MHz	7mA	1	125	4x5 QFN-28
LT3507/A	Triple Step-Down + LDO Controller	4 to 36	2.7, 2x1.8	0.80	250kHz to 2.5MHz	250kHz to 2.5MHz	7mA	1	150	5x7 QFN-38, TSSOP-38E
LT3692/A	Dual Step-Down	3 to 36, 60MAX	2x3.5	0.8	250kHz to 2.25MHz	250kHz to 2MHz	4	10	150	5x5 QFN-32, TSSOP-38E
LT8601	Triple Output Synchronous Step-Down	3.0 to 42	2.5A + 1.5A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	30	1	150	6x6 QFN-40
LT8602	Quad Output Synchronous Step-Down	3.0 to 42	2.5A + 1.5A + 1.8A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	30	1	150	6x6 QFN-40
LT8603	Quad Output Synchronous Step-Down with Pre-Boost Controller	2.0 to 42	2.5A + 1.5A + 1.8A + 1.8A	0.8	250kHz to 2.2MHz	250kHz to 2.2MHz	35	1	150	6x6 QFN-40
LT3992	Dual Step-Down	3 to 60	0.8	3 x 2	250kHz to 2MHz	250kHz to 2MHz	4.7	6	150	5x5 QFN-32, TSSOP-38E
LT8653S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	2A/3A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6	1	125	4x5 LGA-20
LT8650S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 42	4A/6A Peak x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	6.2	1	125	4x6 LGA-32
LT8652S*	Dual Silent Switcher 2 Synchronous Step-Down	3.0 to 18	8.5A x 2	0.8	200kHz to 3MHz	200kHz to 3MHz	40	1	125	4x7 LGA-36

*Silent Switcher 2: Internal Capacitors for V_{IN}, BST, INTV_{CC}

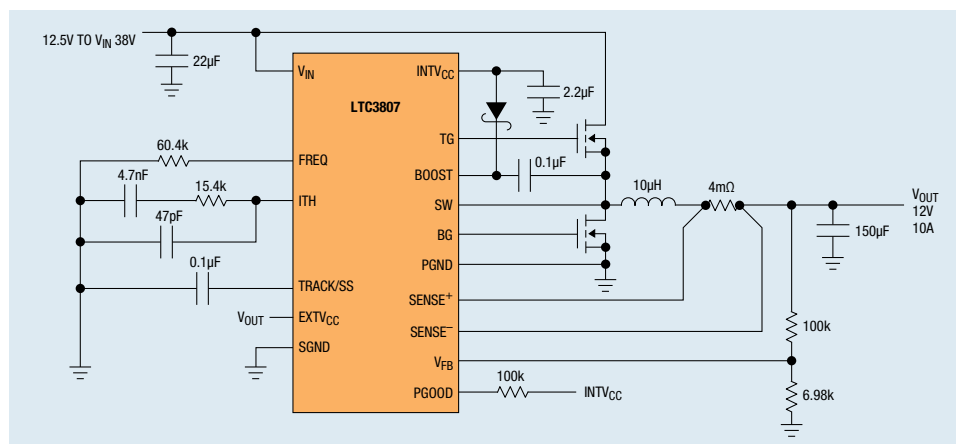
36V_{IN} to 40V_{IN} Max Input Low Quiescent Current Synchronous DC/DC Controllers

LTC3807: Low I_Q, Synchronous Step-Down Controller with 24V Output Voltage Capability

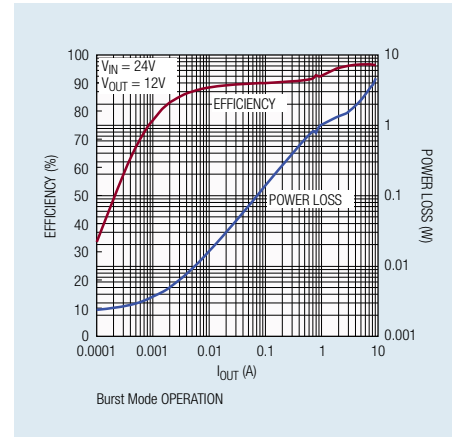
- Wide V_{IN} Range: 4V to 38V (40V Abs Max)
 - Low Operating I_Q: 50μA
 - Wide Output Voltage Range: 0.8V ≤ V_{OUT} ≤ 24V
 - R_{SENSE} or DCR Current Sensing
 - Phase-Lockable Frequency (75kHz to 750kHz)
 - Programmable Fixed Frequency (50kHz to 900kHz)
 - Selectable Continuous, Pulse-Skipping or Low Ripple Burst Mode
- Operation at Light Load



LTC3807
50% Scale
Demo Board



Efficiency and Power Loss vs Output Current



36V_{IN} to 38V_{IN} Max Input Low Quiescent Current Synchronous DC/DC Controllers

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency (kHz)	Ext Sync Range (kHz)	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3807	Synchronous Step-Down	4 to 38	25	0.8	50 to 900	75 to 850	50	14	150	QFN-20, TSSOP-20
LTC7812	Synchronous Buck + Boost	4.5 to 38	2 X 10	0.8	75 to 850	75 to 850	28	10	150	QFN-32
LTC3834	Synchronous Step-Down	4 to 36	25	0.8	140 to 650	140 to 650	30	14	125	DFN-16, SSOP-16
LTC3834-1	Synchronous Step-Down	4 to 36	25	0.8	140 to 650	140 to 650	30	14	125	QFN-20, TSSOP-20
LTC3857/-1	Dual Synchronous Step-Down	4 to 38	20/20	0.8	140 to 650	50 to 900	50	8	125	QFN-32/SSOP-28
LTC3859AL	Buck/Buck/Boost	4.5 to 38	10/10/10	0.8	50 to 900	75 to 850	28	10	150	QFN-38/TSSOP-38
LTC3786	Synchronous Step-Up	4.5 to 38	10	Up to 60	50 to 900	75 to 850	50	14	150	QFN-20, TSSOP-20
LTC3787	Synchronous Step-Up	4.5 to 38	20	Up to 60	50 to 900	75 to 850	135	8	150	QFN-28, SSOP-28
LTC3788/-1	Synchronous Step-Up	4.5 to 38	10/10	Up to 60	50 to 900	75 to 850	125	8	150	QFN-32

36V_{IN}to 40V_{IN} Max Input DC/DC Controllers

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency (kHz)	Ext Sync Range (kHz)	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3851A/-1	Synchronous Step-Down	4 to 40	25	0.8	250 to 750	250 to 750	1mA	15	150	QFN-16, SSOP-16
LTC3878	Synchronous Step-Down	4 to 38	25	0.8	Constant On-Time	n/a	1.5mA	18	125	SSOP-16
LTC3879	Synchronous Step-Down	4 to 38	25	0.6	Constant On-Time	n/a	1.5mA	18	125	QFN-16, MSOP-16
LTC3854	Synchronous Step-Down	4.5 to 38	25	0.8	400	n/a	2mA	15	125	MSOP-12, DFN-12
LTC3866	Synchronous Step-Down	4.5 to 36	25	0.6	250 to 770	250 to 770	3.2mA	30	125	QFN-24, TSSOP-24
LTC3839	2-Phase Synchronous Step-Down	4.5 to 38	50	0.6	200 to 2MHz	200 to 2MHz	3mA	15	125	QFN-32
LTC3855	Dual Synchronous Step-Down	4.5 to 38	25/25	0.6	250 to 770	250 to 770	3.5mA	30	125	QFN-40, SSOP-38
LTC3869/-2	Dual Synchronous Step-Down	4 to 38	25/25	0.6	250 to 780	250 to 780	3mA	30	125	QFN-28, TSSOP-28
LTC3862/-1/-2	2-Phase Step-Up	4 to 36	8	*	50 to 650	50 to 650	1.8mA	30	150	QFN-24, SSOP-24, TSSOP-24
LT3757A	Boost, Flyback, SEPIC and Inverting	2.9 to 40	4	3.3	100 to 1MHz	100 to 1MHz	1.6mA	1	150	DFN-10, MSOP-10

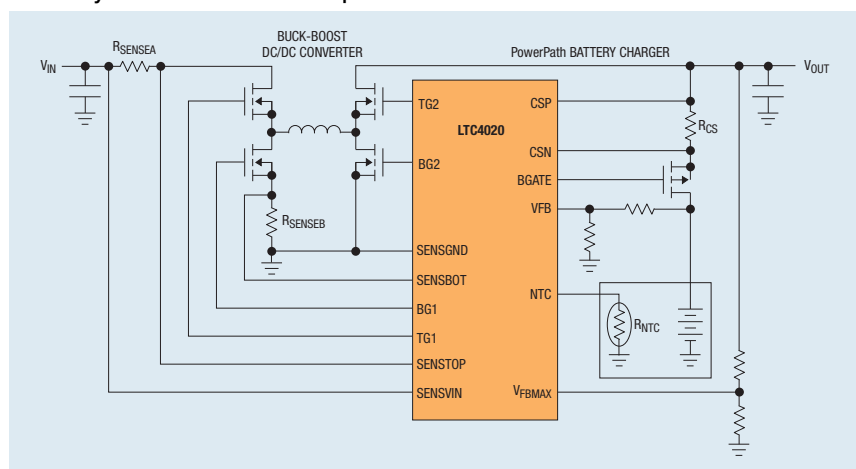
* Dependent on External Components

High Voltage Power Managers and Battery Chargers

LTC4020: 55V Buck-Boost Multi-Chemistry Battery Charger

- Wide Voltage Range: 4.5V to 55V Input, Up to 55V Output (60V Absolute Maximums)
- Synchronous Buck-Boost DC/DC Controller
- Li-Ion and Lead-Acid Charge Algorithms
- $\pm 0.5\%$ Float Voltage Accuracy
- $\pm 5\%$ Charge Current Accuracy
- Instant-On for Heavily Discharged Batteries
- Ideal Diode Controller Provides Low Loss PowerPath
- When Input Power is Limited
- Input Voltage Regulation for High Impedance Input Supplies and Solar Panel Peak Power Operation
- Onboard Timer for Protection and Termination
- Bad Battery Detection with Auto-Reset
- NTC Input for Temperature Qualified Charging
- Binary Coded Open-Collector Status Pins
- Low Profile (0.75mm) 38-Pin 5mm \times 7mm QFN Package

Efficiency and Power Loss vs Output Current



High Voltage Battery Chargers and Power Managers

Part Number	Charge Current Wall (A)	# of Battery Cells (Series)	Max Charge Current USB (mA)	Power Manager Topology	Input Voltage (V)	Standby Current (μ A)	Other Features	Charge Termination	PowerPath™ Control	Package
LTC4079	0.25	Up to 60V Lead-Acid Li-ion LiFePO ₄	0.25	n/a	1.2V to 60V	4	MPPC (DVReg)	Timer + C/10	n/a	3x3 DFN-10
LTC4121	0.4	3.6V to 18V	n/a	Switching	4.3V to 40V	2.5	<1	Timer	n/a	3x3 QFN-16
LTC4089*	1.2	1	500	Linear	4.35V to 5.5V USB, 6 to 36V, 40V Max Adapter	50	2.5	Timer + C/10	yes	3x6 DFN-22
LTC4089-5	1.2	1	500	Linear	4.35V to 5.5V USB, 6V to 36V, 40V Max Adapter	50	2.5	Timer + C/10	yes	3x6 DFN-22
LTC4089-1*&	1.2	1	500	Linear	4.35V to 5.5V USB, 6V to 36V, 40V Max Adapter	50	2.5	Timer + C/10	yes	3x6 DFN-22
LTC4090	1.2	1	500	Linear	4.35V to 5.5V USB, 6V to 38V, 60V Max Adapter	50	2.5	Timer + C/10	yes	3x6 DFN-22
LTC4098*	1.5	1	700	Buck Switching	4.35V to 5.5V USB, 6V to 38V & 60V Transient Adapter, 66V OVP	25	3.5	Timer + C/10	yes	3x4 QFN-20
LT3650-4.2/8.4	2	1-2	n/a	Buck Switching	4.75V to 32V / 9V to 32V, 40V Abs Max	85	15	Timer + C/10	n/a	3x3 DFN-12, TSSOP-16
LT3652/HV	2	3.3V-14.4/18V	n/a	Buck Switching	4.95V to 32/34V, 40V Abs Max	85	15	Timer + C/10	n/a	3x3 DFN-12, MSOP-12E
LTC4015	20A ^	Up to 35V Lead-Acid Li-ion LiFePO ₄	n/a	Buck Switching	4.5V to 35V	112	MPPT, ADC, Coulomb Ctr, Dig Telemetry	Timer + C/x	yes	5x7 QFN-38
LTC4013	20A ^	Up to 60V Lead-Acid Li-ion LiFePO ₄	n/a	Buck Switching	4.5V to 60V	480	MPPT	Timer + C/10	INFET only (no BATFET)	4x5 QFN-28
LTC4020	20A ^	Up to 55V Lead-Acid Li-ion LiFePO ₄	n/a	Buck-Boost Switching	4.5V to 55V	30	MPPC	Timer + C/10	yes	5x7 QFN-38
LTC4000/-1**	>20A	3V to 60V	n/a	n/a	3V to 60V	400	MPPC (-1)	Timer or C/x	external	4x5 QFN-28, SSOP-28

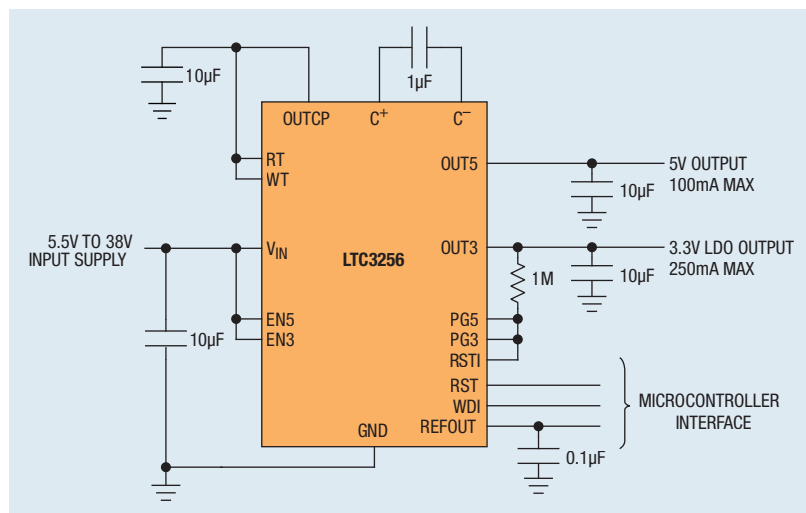
* Bat-Track adaptive output control & 4.1V cell voltage ^ depends on external components ** Battery charging controller – works in conjunction with externally compensated switching regulator
For a more detailed review of Linear's extensive portfolio of battery chargers, see the Battery Charging and Management Solutions Brochure.

High Voltage Charge Pumps

LTC3256: Wide V_{IN} Range Dual Output 350mA Step-Down Charge Pump with Watchdog Timer

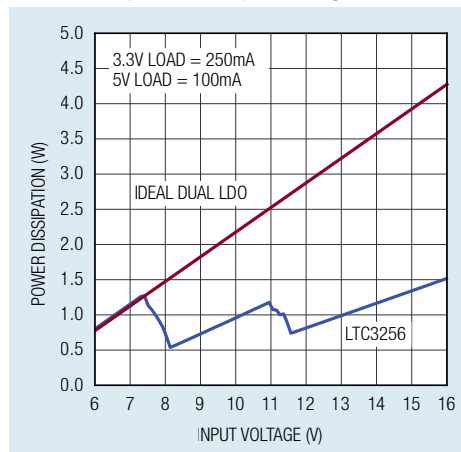
- Input Voltage Range: 5.5V to 38V
- Independently Enabled 5V and 3.3V Fixed Outputs
- 5V Output: 100mA Max
- 3.3V LDO Output: 250mA Max
- Multimode Step-Down Charge Pump (2:1, 1:1) with Automatic Mode Switching
- Low Quiescent Current: 20 μ A with Both Outputs Regulating (No Load)
- Engineered for Diagnostic Coverage in ISO 26262 Systems
- 1.1V Reference Output for System Diagnostics
- Power-On Reset and Watchdog Controller with Adjustable Timing
- Overcurrent Fault Protection on Each Output
- Overtemperature Protection
- 150°C Max Operating Junction Temperature
- Thermally Enhanced 16-Lead MSOP Package

High Efficiency Dual Output Power Supply



LTC3256
Actual Size
Demo Board

Power Dissipation vs Input Voltage



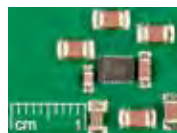
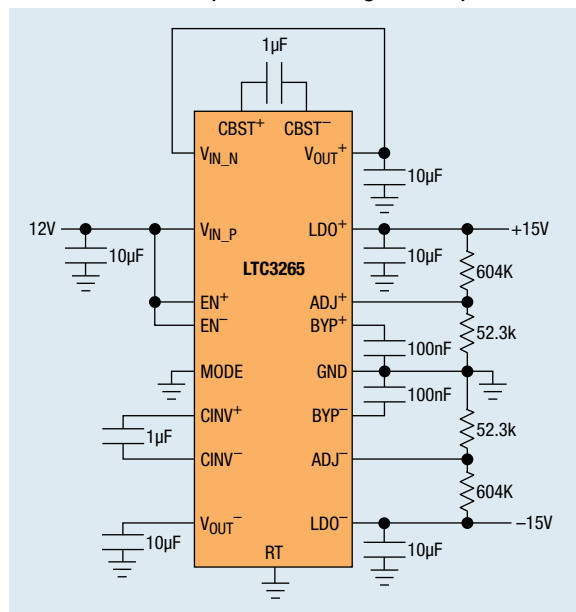
High Voltage Charge Pumps

Part Number	V_{IN} Range (V)	V_{OUT} (V)	I_Q	Max I_{OUT}	Topology	LDO Post Regulator	Max Junc Temp (°C)	Package
LTC3255	4 – 48	2.4 to 12.5	20 μ A	50mA	Step-Down	No	150	3x3 DFN-10, MSOP-10E
LTC3260	4.5 – 32	\pm Adj	100 μ A	100mA	Dual/Inverting	Yes	150	3x4 DFN-14, MSOP-16E
LTC3265	4.5 – 32	$\pm 1.2V$ to $\pm V_{IN}$	135 μ A	100mA	Boost/Inv + 2 LDOs	Yes	150	3x5 DFN-18, TSSOP-20E
LTC3261	4.5 – 32	$-V_{IN}$	60 μ A	100mA	Inverting	No	150	MSOP-12E
LTC3245	2.7 – 38	3.3, 5, Adj	18 μ A	250mA	Buck-Boost	No	150	3x4 DFN-12, MSOP-12E
LTC3256	5.5 – 38	5 / 3.3	18 μ A	100/250mA	Step-Down + LDO	Yes	150	MSOP-16E

LTC3265: Low Noise Dual Supply with Boost and Inverting Charge Pumps

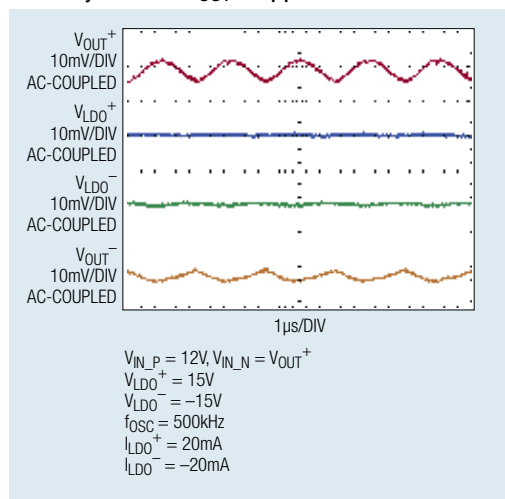
- Boost Charge Pump Generates $2 \cdot V_{IN_P}$ (V_{IN_P} Range: 4.5V to 16V)
- Inverting Charge Pump Generates $-V_{IN_N}$ (V_{IN_N} Range: 4.5V to 32V)
- Low Noise Positive LDO Post Regulator Up to 50mA
- Low Noise Negative LDO Post Regulator Up to 50mA
- 135 μ A Quiescent Current in Burst Mode Operation with Both LDO Regulators On
- 50kHz to 500kHz Programmable Oscillator Frequency
- Stable with Ceramic Capacitors
- Short-Circuit/Thermal Protection
- Low Profile 3mm \times 5mm 18-Lead DFN and Thermally Enhanced 20-Lead TSSOP Packages

Low Noise ± 15 V Outputs from a Single 12V Input



LTC3265
Actual Size
Demo Board

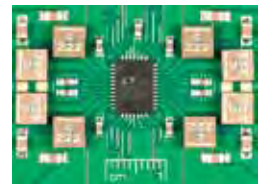
LDO Rejection of $V_{OUT} \pm$ Ripple



Low Voltage (<6V_{IN}) Point-of-Load Synchronous Step-Down Switching Regulators

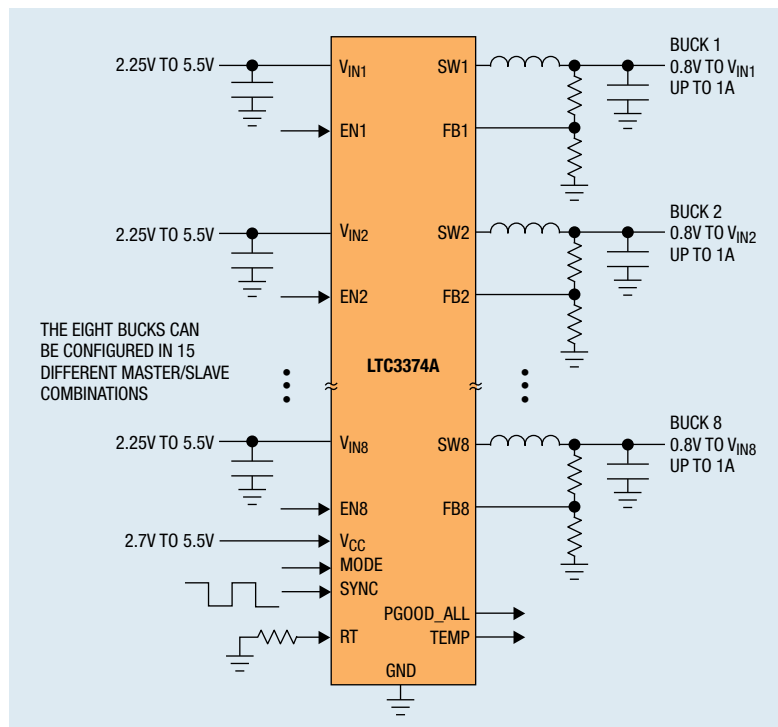
LTC3374A: High Accuracy 8-Channel Parallelable 1A Buck DC/DC Converter

- 8-Channel 1A Independent Step-Down DC/DCs
- Master-Slave Configurable for Up to 4A of Output Current with a Single Inductor
- Independent 2.25V to 5.5V V_{IN} Supplies for Each DC/DC
- All DC/DCs Have 0.8V to V_{IN} Output Range
- ±1% VFB Accuracy, for Buck 1 (1A to 4A)
- Thermally Enhanced 38-Lead 5mm × 7mm QFN and TSSOP Packages

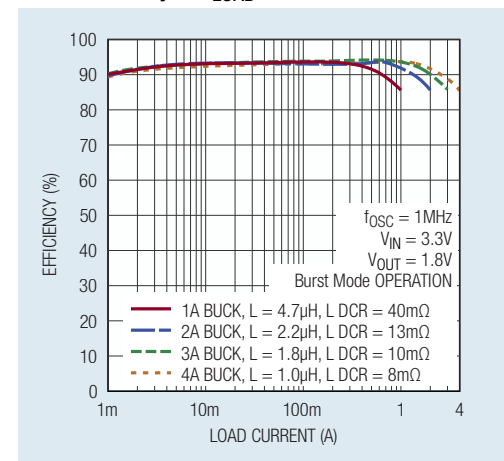


LTC3374
Actual Size
Demo Board

Eight Synchronous 1A Buck Regulators



Buck Efficiency vs I_{LOAD}



Low Voltage (<6V_{IN}) Point-of-Load Synchronous Step-Down Switching Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT(MIN)} (V)	Frequency (MHz)	Ext Sync Range (MHz)	I _O (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3410/B	Synchronous	2.5 to 5.5	0.3	0.8	2.25	n/a	26	1	125	SC70
LTC3542	Synchronous	2.5 to 5.5	0.5	0.6	2.25	1 to 3	26	1	125	2x2 DFN-6, ThinSOT™
LTC3547/B	Dual Synch	2.5 to 5.5	0.3/0.3	0.6	2.25	n/a	40	1	125	2x3 DFN-8
LTC3406A/AB	Synchronous	2.5 to 5.5	0.6	0.6	1.5	n/a	20	1	125	ThinSOT
LTC3406AB-2	Synchronous	2.5 to 5.5	0.6	0.6	2.25	1.4 to 4	200	1	125	ThinSOT
LTC3448	Synchronous	2.5 to 5.5	0.6	0.6	2.25	1 to 3	32	1	125	MSOP-8E, DFN-8
LTC3543	Synchronous	2.5 to 5.5	0.6	0.6	2.25	1 to 3	45	1	125	2x3 DFN-6
LTC3544/B	Quad Synch	2.25 to 5.5	0.3/0.2/0.2/0.1	0.8	2.25	n/a	80	1	125	3x3 QFN-16
LTC3560	Synchronous	2.5 to 5.5	0.8	0.6	2.25	1 to 3	16	1	125	ThinSOT
LTC3561	Synchronous	2.6 to 5.5	1	0.8	850kHz to 4MHz	n/a	240	1	125	3x3 DFN-10
LTC3446	Synchronous + LDOs	2.7 to 5.5	1.0/0.3/0.3	0.4	2.25	n/a	140	1	125	4x3 DFN-14
LTC3407A	Dual Synch	2.5 to 5.5	0.6/0.6	0.6	1.5	1.5MHz	40	1	125	MSOP-10, 3x3 DFN-10
LTC3409	Dual Synch	1.6 to 5.5	0.6/0.6	0.6	1.7/2.6	1MHz to 3MHz	65	1	125	3x3 DFN-8
LTC3419	Dual Synch	2.5 to 5.5	0.6/0.6	0.6	2.25	n/a	55	1	125	MSOP-10, 3x3 DFN-10
LTC3548	Dual Synch	2.5 to 5.5	0.8/ 0.4	0.6	2.25	2.25	40	1	125	MSOP-10, 3x3 DFN-10
LTC3411A	Synchronous	2.5 to 5.5	1.25	0.8	300kHz to 4.0MHz	400kHz to 4MHz	40	1	125	3x3 DFN-10, MSOP-10
LTC3407A-2	Synchronous	2.5 to 5.5	0.8/ 0.8	0.6	2.25	2.25	40	1	125	MSOP-10, 3x3 DFN-10
LTC3568	Synchronous	2.5 to 5.5	1.8	0.8	850kHz to 4MHz	400kHz to 4MHz	60	1	125	3x3 DFN-10,
LTC3417A-2	Dual Synch	2.25 to 5.5	1.5/1.0	0.8	2.25	2.25	125	1	125	TSSOP-20E, 3x5 DFN-20
LTC3545	Triple Synch	2.25 to 5.5	0.8/0.8/0.8	0.6	2.25	1 to 3	58	1	125	3x3 QFN-16
LTC3612	Synchronous	2.25 to 5.5	3.0	0.6	300kHz to 4.0MHz	300kHz to 4.0MHz	70	1	150	TSSOP-20E, 3x4 QFN-20
LTC3412A	Synchronous	2.25 to 5.5	3.0	0.8	300kHz to 4.0MHz	300kHz to 4.0MHz	64	1	125	TSSOP-16E, QFN
LTC3414	Synchronous	2.25 to 5.5	4.0	0.8	300kHz to 4.0MHz	300kHz to 4.0MHz	64	1	125	TSSOP-20E
LTC3614	Synchronous	2.25 to 5.5	4.0	0.6	300kHz to 4.0MHz	300kHz to 4.0MHz	75	1	150	3x5 QFN-24
LTC3416	Synchronous	2.25 to 5.5	4.0	0.8	300kHz to 4.0MHz	n/a	300	1	125	TSSOP-20E
LTC3615	Dual Synchronous	2.25 to 5.5	3.0 x 2	0.6	300kHz to 4.0MHz	300kHz to 4.0MHz	130	1	150	TSSOP-24E, 4x4 QFN-24
LTC3616	Dual Synchronous	2.25 to 5.5	6.0	0.6	300kHz to 4.0MHz	300kHz to 4.0MHz	75	1	150	3x5 QFN-24
LTC3370	Quad Synch	2.5 to 5.5	8A (4 ch)	0.8	1 to 3	1 to 3	63	1	150	5x5 QFN-32
LTC3371	Quad Synch	2.5 to 5.5	8A (4 ch)	0.8	1 to 3	1 to 3	68	1	150	5x7 QFN-38, TSSOP-38E
LTC3374/A*	Octal Synch	2.5 to 5.5	8A (8 ch)	0.8	1 to 3	1 to 3	63	1	150	5x7 QFN-38, TSSOP-38E
LTC3375^	Octal Synch	2.5 to 5.5	8A (8 ch)	0.8	1 to 3	1 to 3	68	1	150	7x7 QFN-48
LTC3418	Synchronous	2.25 to 5.5	8.0	0.8	300kHz to 4.0MHz	300kHz to 4.0MHz	300	1	125	5x7 QFN-38
LT8642S**	Dual Silent Switcher 2 Synchronous Step-Down	3 to 18	10.0	0.8	220kHz to 2.2MHz	220kHz to 2.2MHz	40	1	125	4x4 LGA-24

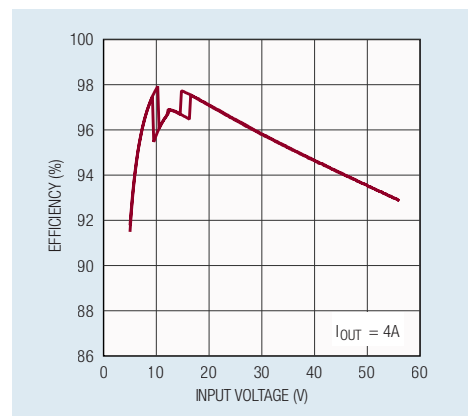
*Higher Efficiency Version, ^I₂C**Silent Switcher 2: Internal Capacitors for V_{IN}, BST, INN_{CC}

36V_{IN} to 80V_{IN} Max Synchronous Buck-Boost Switching Regulators

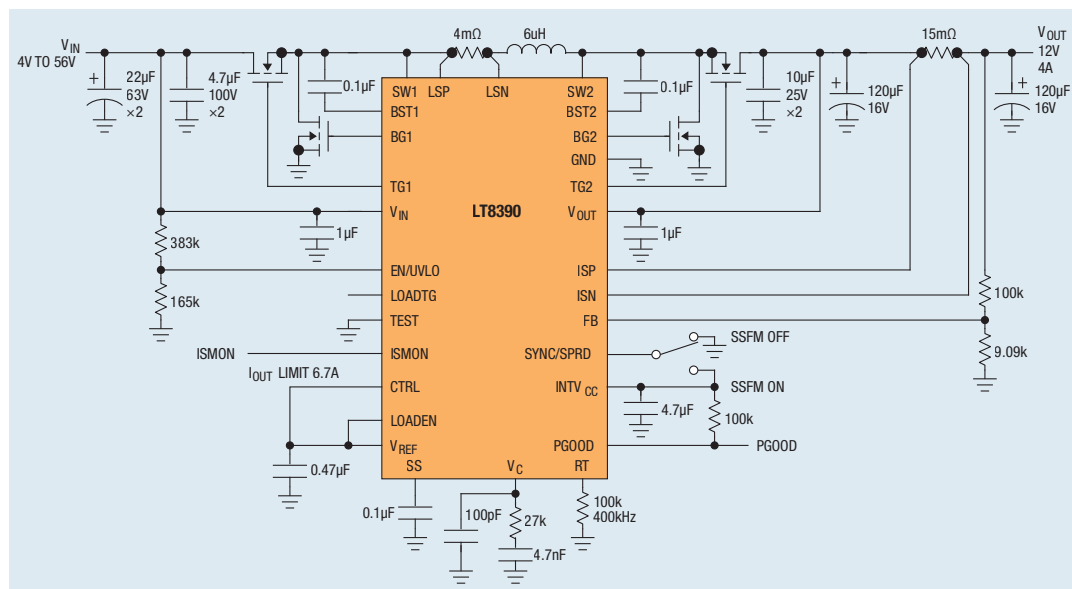
LT8390: 60V Synchronous 4-Switch Buck-Boost Controller with Spread Spectrum

- 4-Switch Single Inductor Architecture Allows V_{IN} Above, Below or Equal to V_{OUT}
- Wide V_{IN} Range: 4V to 60V, V_{OUT} 0V to 60V
- Synchronous Switching: Up to 98% Efficiency
- Proprietary Peak-Buck Peak-Boost Current Mode
- Spread Spectrum Frequency Modulation for Low EMI
- ±1.5% Output Voltage Accuracy: 1V = V_{OUT} = 60V
- ±3% Input or Output Current Accuracy with Monitor
- TSSOP-28E and 4x5 QFN-28 Packages

Efficiency vs V_{IN}



98% Efficient 48W (12V, 4A) Miniature Buck-Boost Voltage Regulator



LT8390
75% Scale
Demo Board

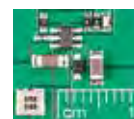
36V_{IN} to 80V_{IN} Max Synchronous Buck-Boost Switching Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT} Range (V)	Frequency (MHz)	Ext Sync Range (MHz)	I _Q (μA)	I _{SD} (μA)	Max Junc Temp (°C)	Package
LTC3131	Synchronous Buck-Boost Regulator	1.5 to 40	0.2	1.0 to 40	1.2	1.2	6	1	150	4x4 QFN-20, TSSOP-20E
LT3433	Buck-Boost Regulator	4 to 60	0.4	3.3 to 20	200kHz	n/a	100	10	125	TSSOP-16E
LTC3114	Synchronous Buck-Boost Regulator	2.2 to 40	1	2.7 to 40	1.2	1.2	30	1	150	3x5 DFN-16, TSSOP-16E
LTC3115/-1	Synchronous Buck-Boost Regulator	2.7 to 40	2	2.7 to 40	100kHz to 2MHz	100kHz to 2MHz	30	1	150	4x5 DFN-20, TSSOP-20E
LTC3136	Synchronous Buck-Boost Regulator	2.4 to 60	2.5	2.4 to 60	200kHz to 2MHz	200kHz to 2MHz	6	1	150	4x4 DFN-24
LTC3789	Synchronous Buck-Boost Controller	4 to 40	10	0.8 to 38	200kHz to 400kHz	200kHz to 400kHz	3mA	40	125	SSOP-24, 4x5 QFN-28
LT8390	Synchronous Buck-Boost Controller	4.0 to 60	20.00	0 to 60	150kHz to 650kHz	150kHz to 650kHz	270	1	150	4x5 QFN-28, TSSOP-28E
LT8705A	Synchronous Buck-Boost Controller	2.8 to 80	20.00	1.3 to 80	100kHz to 400kHz	100kHz to 400kHz	2.7mA	1	125	5x7 QFN-38, TSSOP-38E

Monolithic Step-Up DC/DC Converters

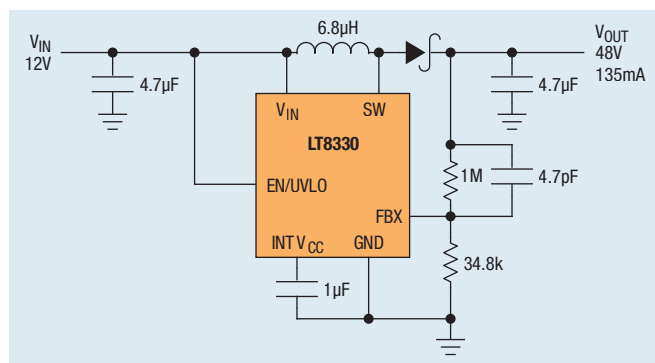
LT8330: Low I_Q Boost/SEPIC/Inverting Converter with 1A, 60V Switch

- 3V to 40V Input Voltage Range
- 1A, 60V Power Switch
- $I_Q < 6\mu A$
- Fixed 2MHz Switching Frequency
- Positive or Negative Output Voltage Programming
- SOT-23-5 or 2x3 DFN-8 Package

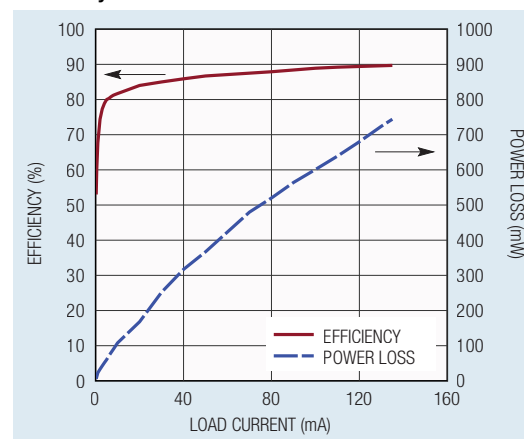


LT8330
Actual Size
Demo Board

48V Boost Converter



Efficiency and Power Loss



High Voltage—Outputs to 140V

Part Number	Device Architecture	V_{IN} Range (V)	V_{OUT} (MAX) (V)	I_{SW} (A)	Frequency (MHz)	I_Q (μA)	I_{SD} (μA)	Max Junc Temp ($^{\circ}C$)	Package
LT3461/A	Boost	2.5 to 16	38	0.30	1.3/3	2.8	1	125	ThinSOT
LT3460	Boost	2.5 to 16	36	0.32	1.3	2.0	1	125	SC70, ThinSOT
LT1945	Boost	1 to 15	36	0.35	COT	20 μA	1	125	MSOP-10
LT8331	Boost	4.5 to 100	140	0.50	100kHz to 500kHz	6 μA	1	125	HV MSOP-16E
LT3495/B/B-1	Boost	2.3 to 16	40	0.65/0.35	LNAPC	60 μA	1	125	2x3 DFN-10
LT1930/A	Boost	2.6 to 16	36	1.00	1.2/2.2	4.2/5.5	1	125	ThinSOT
LT8330	Boost	2.7 to 40	65	1.00	2	6 μA	1	150	3x3 DFN-8, MSOP-8
LT8580	Boost	2.55 to 40	65	1.00	200kHz to 1.5MHz	1.2	1	150	2x3 DFN-8, SOT-23-8
LT3467	Boost	2.4 to 16	40	1.10	1.3	1.0	1	125	ThinSOT
LT1946/A	Boost	2.45 to 16	35	1.50	2.7	3.6	1	125	MSOP-8E
LT1618	Boost	1.6 to 18	36	1.50	1.4	1.8	1	125	MSOP-10
LT3580	Boost	2.5 to 32	42	2.00	200kHz to 2.5MHz	1.0	1	150	3x3 DFN-8, MSOP-8
LT8335	Boost	2.7 to 25	28	2.00	2	6 μA	1	150	3x3 DFN-8,
LT8582	Boost	2.5 to 22, 40MAX	42	3.00	200kHz to 2.5MHz	2.1	1	125	4x7 QFN-24
LT3581	Boost	2.5 to 22, 40MAX	42	3.30	200kHz to 2.5MHz	1.9	1	125	3x4DFN-14, MSOP-16E
LT3956	Boost	4.5 to 80	84	3.30	100kHz to 1MHz	1.6	1	125	5x6 QFN-36
LT3958/A	Boost	5 to 80	84	3.30	100kHz to 1MHz	1.6	1	125	5x6 QFN-36
LT8741	Boost, Buck	2.6 to 50	50	2 x 2A	100kHz to 2MHz	70 μA	1	125	TSSOP-20E
LT3957/A	Boost	3 to 40	40	5.00	100kHz to 1MHz	1.7	1	125	5x6 QFN-36
LT3579/-1	Boost	2.5 to 16, 40MAX	42	6.00	200kHz to 2.5MHz	1.9	1	125	4x5 QFN-20, TSSOP-20E

Low Noise LDOs

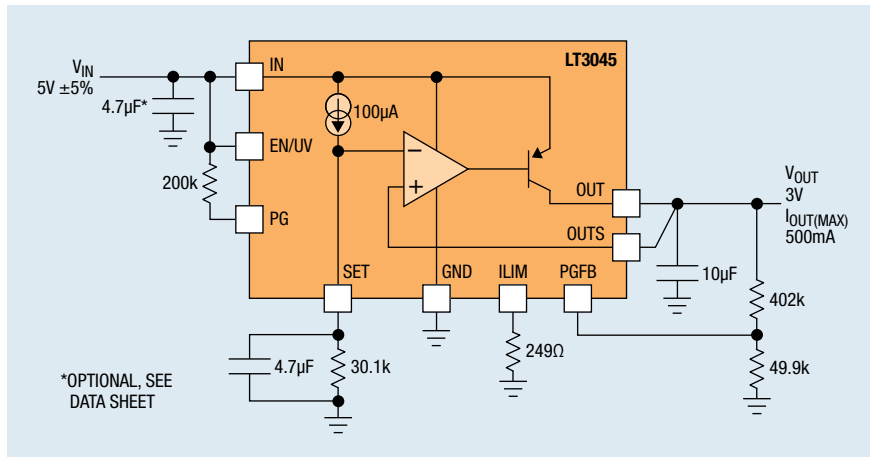
LT3045: 20V, 500mA, Ultralow Noise, Ultrahigh PSRR Linear Regulator

- Ultralow RMS Noise: $0.8\mu\text{V}_{\text{RMS}}$ (10Hz to 100kHz)
- Ultralow Spot Noise: $2\text{nV}/\sqrt{\text{Hz}}$ at 10kHz
- Ultrahigh PSRR: 76dB at 1MHz
- Output Current: 500mA
- Wide Input Voltage Range: 1.8V to 20V
- Single Capacitor Improves Noise and PSRR
- 100 μA SET Pin Current: $\pm 1\%$ Initial Accuracy



LT3045
75% Scale
Demo Board

5V to 3.3V Ultralow Noise LDO Regulator



Low Noise LDOs: Negative Regulators

Part Number	Device Architecture	V_{IN} Range (V)	I_{OUT} (A)	$V_{\text{OUT(MIN)}}$ (V)	Dropout Voltage (V)	Noise (μV_{RMS})	I_{Q} (μA)	I_{SD} (μA)	Output Voltage (V)	Max Junc Temp (°C)	Package
LT1964	Single	-1.9 to -20	200mA	-1.21	0.34	30	30	3	Adj, -5	125	ThinSOT
LT3032	Dual	± 1.9 to ± 20	150mA/150mA	± 1.22	0.30/0.34	20/30	55	<1	Adj, ± 5	125	3x4 DFN-14
LT1175	Single	-4.3 to -20	500mA	-3.8	0.50	n/a	45	10	Adj, -5	125	DD, SOT-223, SO-8, PDIP8
LT3090	Single	-1.5 to -36	600mA	0	0.3	18	1mA	<1	Adj (0 to -32)	150	3x3 DFN-12, MSOP-12E
LT3091	Single	-1.5 to -36	1.5A	0	0.3	18	1.2mA	<1	Adj (0 to -32)	150	4x3 DFN-14, DPAK-7, TO-220, TSSOP-16E
LT3015	Single	-1.9 to -30	1.5A	-1.22	0.34	60	1.2mA	<1	Adj (-1.22V to -29.3V), Fixed	125	3x3 DFN-8, MSOP-12E, DD-Pak, TO-220
LT1185	Single	-4.3 to -35	3A	-2.40	0.80	n/a	2.5mA	1	Adj	125	TO-220

Low Noise LDOs: Positive Regulators

Part Number	Device Architecture	V _{IN} Range (V)	I _{OUT} (A)	V _{OUT} (MIN) (V)	Dropout Voltage (V)	Noise (μV _{RMS})	I _Q (μA)	I _{SD} (μA)	Output Voltage (V)	Max Junc Temp (°C)	Package
LT3014/HV	Single	3.0 to 80	20mA	1.22	0.35	115	7	<1	Adj (1.22 to 60)	125	3x3 DFN-8, ThinSOT
LT3007 #	Single	2.0 to 45	20mA	0.6	0.28	92	3	<1	Adj, 1.2, 1.5, 1.8, 2.5, 3.3, 5	125	ThinSOT
LT3008	Single	2.0 to 45	20mA	0.6	0.28	92	3	<1	Adj, 1.2, 1.5, 1.8, 2.5, 3.3, 5	125	2x2 DFN-6, ThinSOT
LT3010/-5	Single	3.0 to 80	50mA	1.275	0.30	100	30	<1	Adj, 5	140	ThinSOT
LT3011	Single	3.0 to 80	50mA	1.24	0.30	100	45	<1	Adj	140	3x3 DFN-10, MSOP-12E
LT1761	Single	1.8 to 20	100mA	1.22	0.30	20	20	1	Adj, 1.5, 1.8, 2, 2.5, 2.8, 3, 3.3, 5	125	ThinSOT
LT3050	Single	2.0 to 45	100mA	0.6	0.30	30	50	<1	Adj, 3.3, 5	125	2x3 DFN-12, MSOP-12E
LT3060	Single	1.6 to 45	100mA	0.6	0.30	30	40	<1	Adj, 1.2, 1.5, 1.8, 2.5, 3.3, 5	150	2x2 DFN-8, ThinSOT
LT3061 ^	Single	1.6 to 45	100mA	0.6	0.25	30	45	<1	Adj (0.6 to 19)	150	2x3 DFN-8, MSOP-8E
LT3023	Dual	1.8 to 20	100mA/100mA	1.22	0.30	20	40	1	Adj (1.22 to 20)	125	3x3 DFN-10, MSOP-10E
LT3027	Dual	1.8 to 20	100mA/100mA	1.22	0.30	20	40	1	Adj (1.22 to 20)	125	3x3 DFN-10, MSOP-10E
LT1762	Single	1.8 to 20	150mA	1.22	0.30	20	25	1	Adj, 2.5, 3, 3.3, 5	125	MSOP-8
LTC1844	Single	1.6 to 6.5	150mA	1.25	0.11	30	40	1	Adj, 1.5, 1.8, 2.5, 2.8, 3.3	125	ThinSOT
LT3062	Single	1.6 to 45	200mA	0.6	0.30	30	45	<1	Adj (0.6 to 40)	150	2x3 DFN-8, MSOP-8E
LT3063 ^	Single	1.6 to 45	200mA	0.6	0.30	30	45	<1	Adj (0.6 to 19)	150	2x3 DFN-8, MSOP-8E
LT3042 ^^	Single	1.8 to 20	200mA	0	0.35	0.85	2.0mA	<1	Adj (0 to 15)	150	3x3 DFN-10, MSOP-10E
LT3082	Single	1.2 to 40	200mA	0	1.3	33	500	n/a	Adj (0 to 38.5)	125	3x3 DFN-8, ThinSOT, SOT-223
LT3012	Single	4 to 80	250mA	1.24	0.40	100	40	1	Adj (1.24 to 60)	140	3x4 DFN-12, TSSOP-16E
LT3013	Single	4 to 80	250mA	1.24	0.40	100	65	1	Adj (1.24 to 60)	140	3x4 DFN-12, TSSOP-16E
LT1962	Single	1.8 to 20	300mA	1.22	0.27	20	30	1	Adj, 1.5, 1.8, 2.5, 3, 3.3, 5	125	MSOP-8
LT1763	Single	1.8 to 20	500mA	1.22	0.30	20	30	1	Adj, 1.5, 1.8, 2.5, 3, 3.3, 5	125	3x4 DFN-12, SO-8
LT3045 ^^	Single	1.8 to 20	500mA	0	0.27	0.85	2.2mA	<1	Adj (0 to 15)	150	3x3 DFN-10, MSOP-12E
LT3085	Single	1.2 to 36	500mA	0	0.275	33	1mA	n/a	Adj (0 to 35.7)	125	2x3 DFN-6, MSOP-8E
LT3055	Single	2.0 to 45	500mA	0.6	0.35	25	65	1	Adj (0.6 to 40)	150	3x4 DFN-16, MSOP-16E
LT3065	Single	2.0 to 45	500mA	0.6	0.3	25	55	1	Adj (0.6 to 40)	150	3x3 DFN-10, MSOP-12E
LT3066 ^	Single	1.6 to 45	500mA	0.6	0.30	30	45	<1	Adj (0.6 to 19)	125	3x4 DFN-12, MSOP-12E
LT3024	Dual	1.8 to 20	100/500mA	1.22	0.30	20	60	1	Adj (1.22 to 20)	125	3x4 DFN-12, TSSOP-16E
LT3028	Dual	1.8 to 20	100/500mA	1.22	0.30	20	60	1	Adj (1.22 to 20)	125	3x5 DFN-16, TSSOP-16E
LT3029	Dual	1.8 to 20	500/500mA	1.215	0.30	20	55/55	<1	Adj (1.215 to 19.5)	150	3x4 DFN-16, MSOP-16E
LT3030	Dual	1.8 to 20	750/250mA	1.215	0.30	20	110/70	<1	Adj (1.215 to 19.5)	150	4x5 QFN-28, TSSOP-20E
LT3088	Single	1.2 to 40	800mA	0	1.20	27	350	n/a	Adj (0 to 38.8)	150	3x3 DFN-8, SOT-223, DD-Pak-3
LT3089	Single	1.2 to 40	800mA	0	1.20	27	350	n/a	Adj (0 to 38.8)	125	4x4 DFN-12, TSSOP-16, DD-Pak-7
LT1965	Single	1.8 to 20	1.1	1.20	0.29	40	500	1	Adj (1.20 to 20)	125	3x3 DFN-8, MSOP-8E, TO-220-5, DDPak-5
LT3080	Single	1.2 to 36 (40VMAX)	1.1	0	0.3 **	40	1mA	1	Adj (0 to 36) ***	125	3x3 DFN-8, MSOP-8E, TO-220-5, SOT-223
LT1963/A	Single	2.1 to 20	1.5	1.21	0.34	40	1mA	1	Adj, 1.5, 1.8, 2.5, 3.3	125	DDPak-5, TO-220-5, SOT-223, SO-8
LT3081	Single	1.2 to 40	1.5	0	1.2	30	1.1mA	n/a	Adj (0 to 38.8)	150	4x4 DFN-12, TSSOP-16, TO-220-7, DD-Pak-7
LT3086	Single	1.55 to 36	2.1	0.4	1.2	35	330	<1	Adj (0.4 to 32)	125	4x5 DFN-16, TSSOP-16, TO-220-7, DD-Pak-7
LT3083	Single	1.2 to 8/18 * 3	3	0	1.45	40	1mA	n/a	Adj (0 to 75 or 0 to 17.5 *)	125	4x4 DFN-12, TSSOP-16E, TO-220, DD-Pak-5
LT1764/A	Single	2.7 to 20	3	1.21	0.34	40	1mA	1	Adj, 1.8, 2.5, 3.3	125	DDPak-5, TO-220-5
LT3070	Single	0.95 to 3	5	0.8	0.085	25	1.1mA	n/a	Adj (0.8 to 1.8)	125	4x5 QFN-28
LT3071	Single	0.95 to 3	5	0.8	0.085	25	1.1mA	n/a	Adj (0.8 to 1.8)	125	4x5 QFN-28

* DD-Pak and TO-220 packages

** in two-supply operation

*** single resistor VOUT set

^ active output discharge

^^ PSRR >70dB up to 4MHz

FMEA fault tolerant version of LT3008

Small Solutions with μ Module Regulators

μ Module Regulators for Automotive

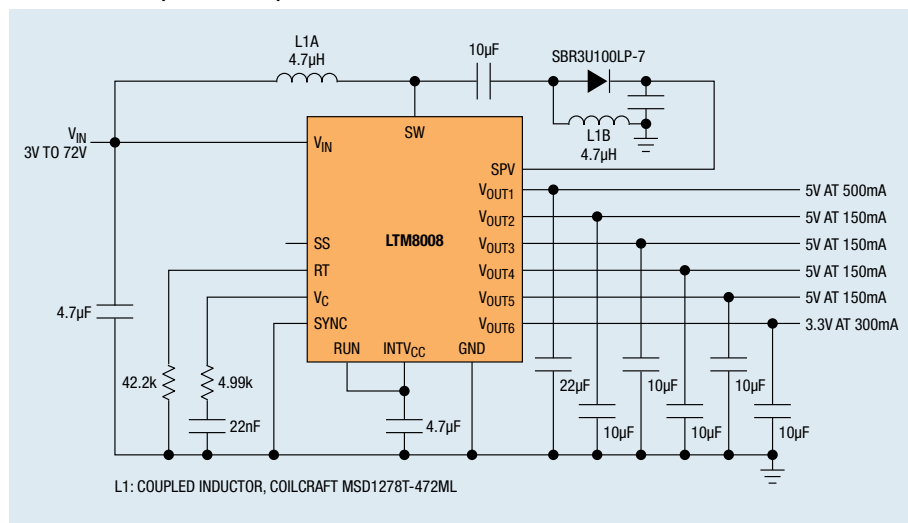
The highly integrated single and multiple output DC/DC μ Module regulators incorporate Linear Technology's stringent design, manufacturing and qualification disciplines. They address the need for compact and reliable point-of-load voltage regulators in automotive applications such as driving LEDs and powering an ECU (engine control unit).

Part Number	Function	Output Channel	V_{IN} Range	V_{OUT} Range	I_{OUT}	FMEA Compliant	Switching Frequency	Quiescent Current	Package Type	Package Size (mm)
LTM8003	Step-Down Switching Regulator	1	3.4V to 40V	0.97V to 18V	3.5A	Yes	200kHz to 3MHz	25 μ A	BGA	6.25 x 9 x 3.32
LTM8008	1 x SEPIC and 6 x LDOs	6	3V to 72V	1 x 3.3V 5 x 5V	1 x 500mA (5V) 1 x 300mA (3.3) 4 x 150mA (5V)	No	100kHz to 1MHz	1.6mA	LGA	15 x 15 x 2.82
LTM8005	LED Driver	1	5V to 38V	1.2V to 38V	1.6A	No	100kHz to 1MHz	35 μ A	BGA	9 x 11.25 x 2.22

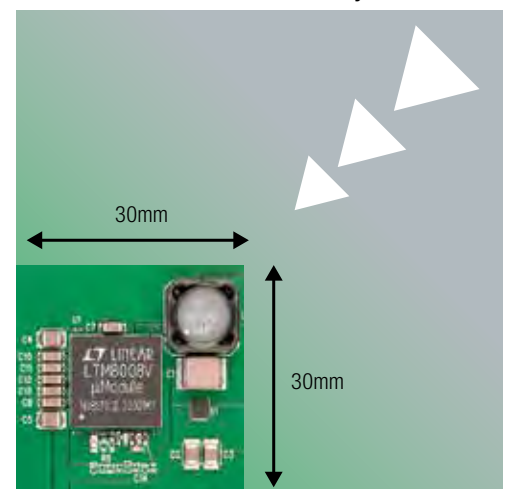
LTM8008: 72V V_{IN} , 6 Outputs DC/DC SEPIC μ Module Regulator

- One SEPIC Converter with Six Linear Regulators
- Wide Input Voltage Range: 3V to 72V, 6V Start
- 15mm x 15mm x 2.82mm LGA Package
- Wide Temperature Range : -40°C to 150°C

LTM8008 6-Output DC/DC μ Module

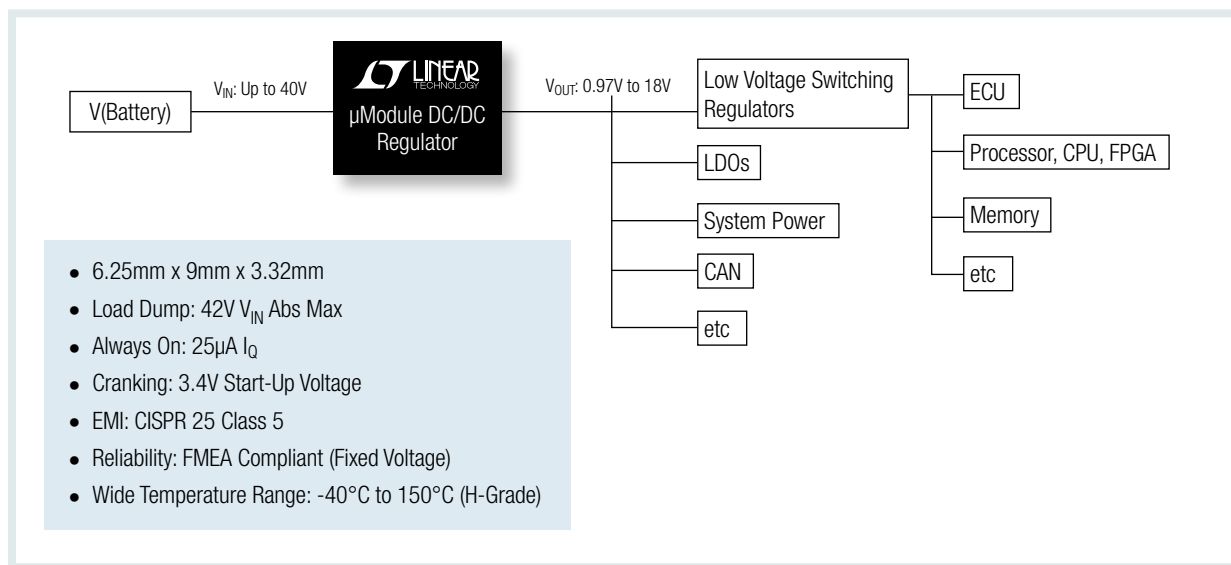


Compared to Conventional Solutions, the LTM8008 Reduces Solution Size by 90%

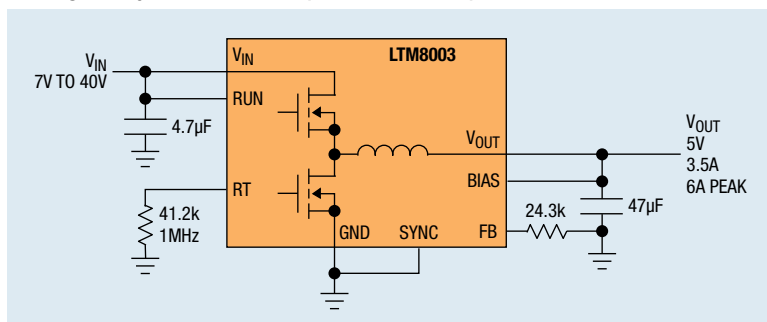


Small Solution Size

LTM8003: 150° Operation, 40V_{IN}, FMEA Compliant Step-Down μ Module Regulator



LTM8003 Typical Application. The LTM8003 Integrates an Inductor in the Package. Only 4 External Components Are Required.



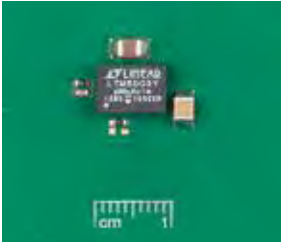
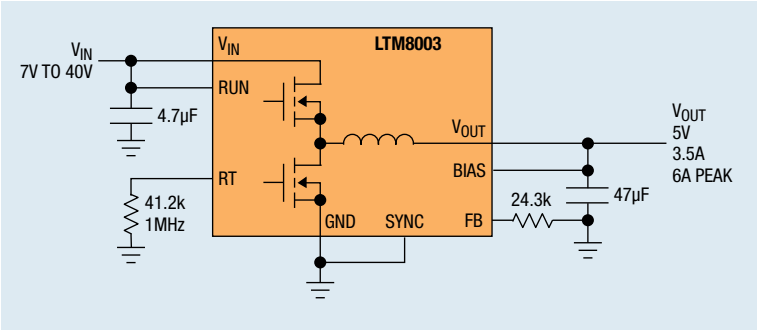
LTM8003

75% Scale
Demo Board

FMEA Compliant Pinout, Low EMI μ Module Regulators

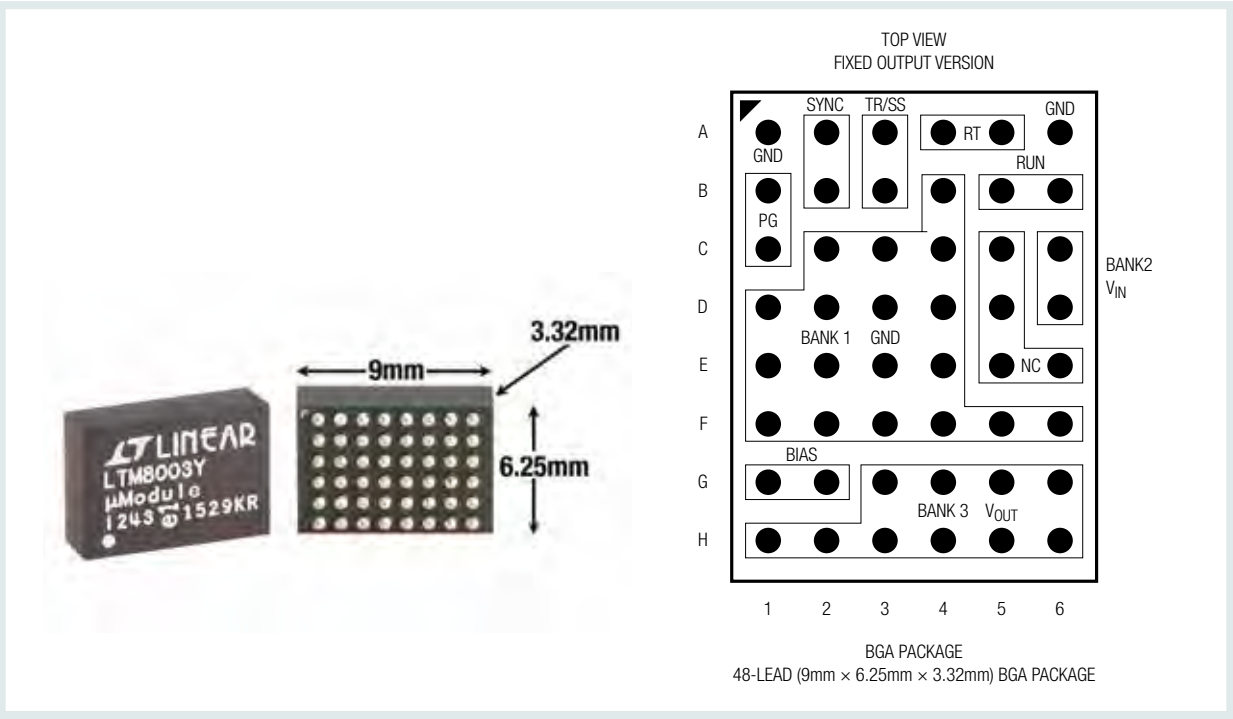
Part Number	I _{OUT}	V _{IN} Range	V _{OUT} Range	FMEA Compliant	I _Q	Switching Frequency	FMEA Compliant Pinout	Package Size (mm)
LTM8003	3.5A (Continuous), 6A (Peak)	3.4V to 40V	0.97V to 18V	Yes	25 μ A	200kHz to 3MHz	Yes	6.25 x 9 x 3.32 BGA

LTM8003 Typical Application. The LTM8003 Integrates an Inductor in the Package and Only 4 External Components Are Required.



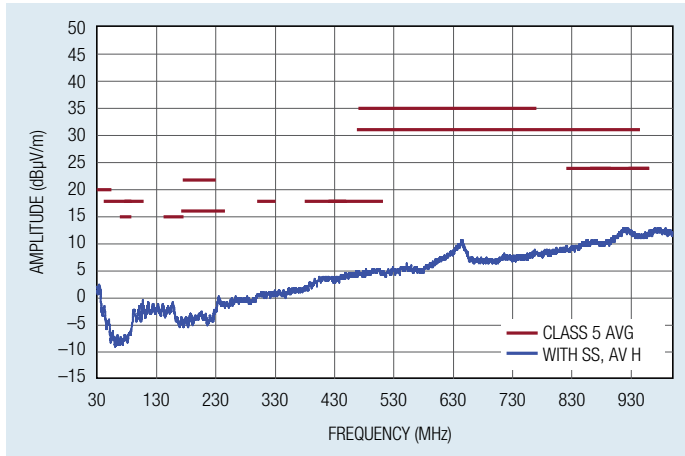
LTM8003
Actual Size
Demo Board

LTM8003 Package Photo and Pin Configuration. The LTM8003 has FMEA Compliant Pinout (Fixed Voltage Version).

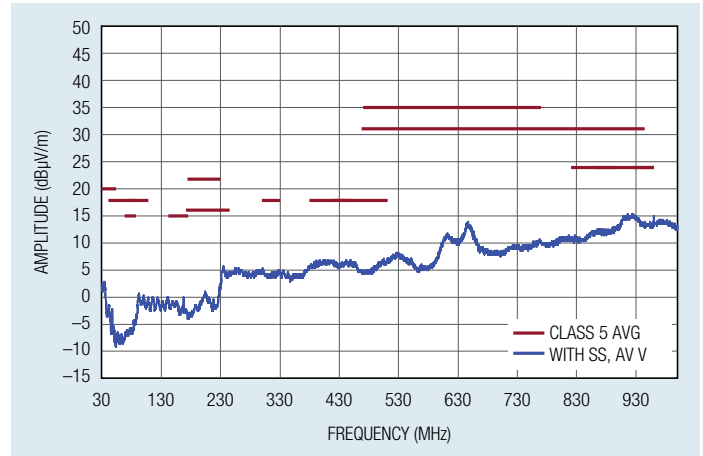


Silent Switcher Low EMI μ Module Regulators

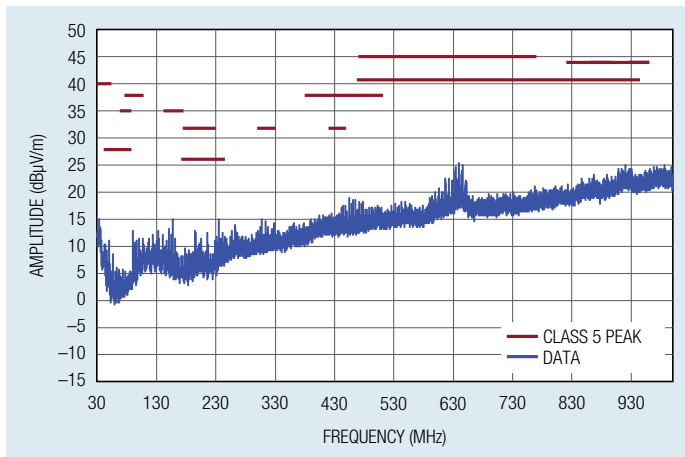
Horizontal Polarization Average, with Spread Spectrum



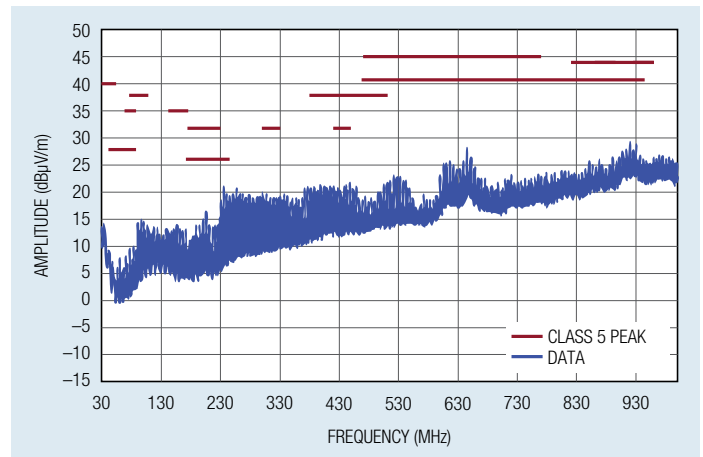
Vertical Polarization Average, with Spread Spectrum



Horizontal Polarization Average, without Spread Spectrum



Vertical Polarization Average, without Spread Spectrum

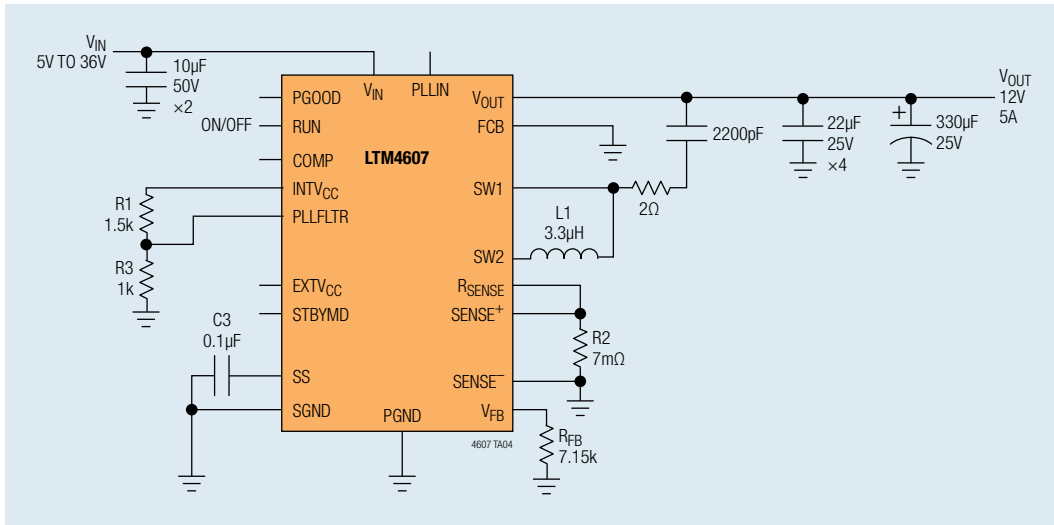


DC2416A EMI Performance in CISPR 25 Radiated Emission Test with and without Spread Spectrum ($14V_{IN}$, $I_{OUT} = 3.5A$). LTM8003 meets CISPR 25.

Buck-Boost μModule Regulators

Part Number	Topology	Inductor	Input Voltage Range	Output Voltage Range	I _{OUT} Peak (Buck Mode)	I _{OUT} Peak (Boost Mode: 6V _{IN} , 12V _{OUT})	Package Type	Package Size (mm)	Compatibility
LTM4605	4 Switch Buck-Boost	External	4.5V to 20V	0.8V to 16V	12A	5A	LGA	15 x 15 x 2.82	Pin Compatible
LTM4607	4 Switch Buck-Boost	External	4.5V to 36V	0.8V to 24V	10A	5A	LGA	15 x 15 x 2.82	Pin Compatible
LTM4609	4 Switch Buck-Boost	External	4.5V to 36V	0.8V to 34V	10A	4A	LGA, BGA	15 x 15 x 2.82 (LGA) 15 x 15 x 3.42 (BGA)	Pin Compatible
LTM8054	4 Switch Buck-Boost	Internal	5V to 36V	1.2V to 36V	5.4A	1.8A	BGA	15 x 11.25 x 3.42	—
LTM8055	4 Switch Buck-Boost	Internal	5V to 36V	1.2V to 36V	8.5A	3A	BGA	15 x 15 x 4.92	Pin Compatible
LTM8056	4 Switch Buck-Boost	Internal	5V to 58V	1.2V to 48V	5.5A	1.7A	BGA	15 x 15 x 4.92	Pin Compatible

LTM4607 Wide Input Voltage Range (5V_{IN}–36V_{IN}) Buck-Boost Converter 12V at 5A Output



DC1198B-B LTM4607 Demo Board. 6V_{IN}–36V_{IN} to 12V_{OUT}, 5A Single Inductor Buck-Boost Converter

50% Scale
Demo Board

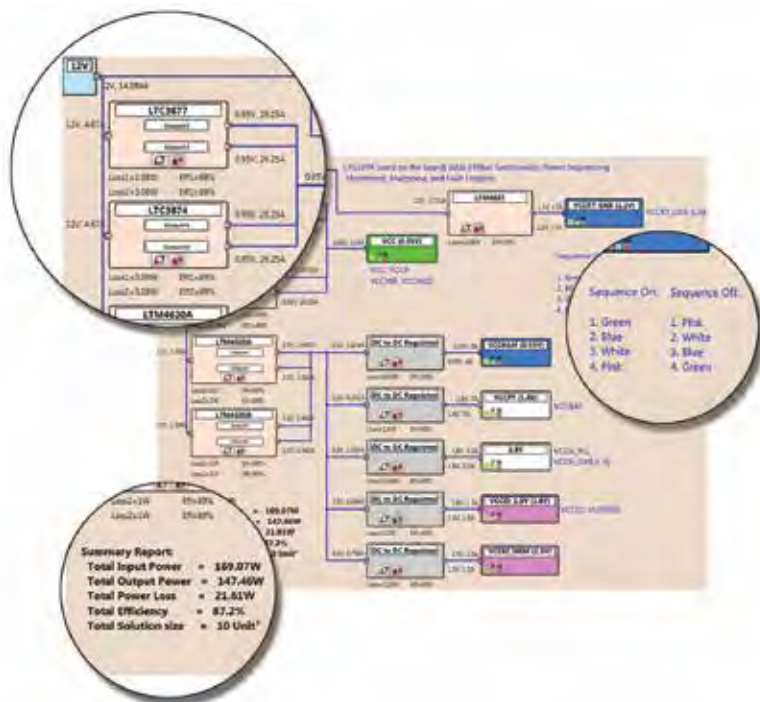
Powering FPGAs and Processors

μModule Regulators for FPGAs and Processors

Linear Technology offers tested and proven power management circuits for Altera and Xilinx FPGAs as well as NXP processors, available on www.linear.com/FPGA.

These boards are assembled, verified and sold by Altera, Xilinx and NXP or third-party development board providers. Contact us at refdesign@linear.com for technical support.

Power Tree for a Reference Design Board. Designed in LTpowerPlanner.



Power Management Solutions for Xilinx FPGAs



Power Management Solutions for NXP Processors



Power Management Solutions for Altera FPGAs



Battery Meter for Electric and Hybrid/Electric Vehicles

The single most important function of a battery gas gauge is to accurately indicate battery state of charge. Keeping track of the number of coulombs going into and out of the battery, accurately and over temperature can significantly improve vehicle range and peace of mind. Today, high voltage battery current monitoring solutions lack the accuracy needed, drift over temperature or utilize costly modules.

Linear Technology's LTC2949 is a high precision charge and energy meter for electrical and hybrid vehicles and other

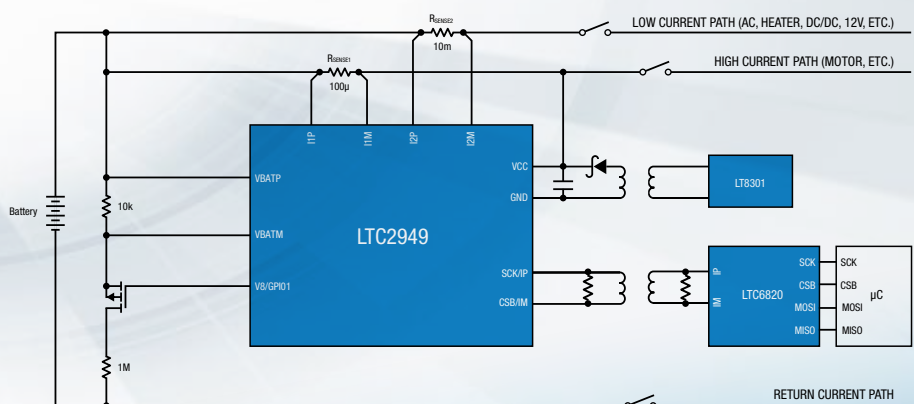
isolated current sense applications. It utilizes external, low cost, temperature compensated shunt resistors to monitor two contactors and report battery stack voltage, current and power consumption. The LTC2949 also reports accumulated battery charge and energy via an isoSPI™ interface, with up to 1% accuracy. High dynamic range enables the LTC2949 to monitor currents as high as 1000A to as low as 10mA. The device monitors and reports on system faults, including open wire detect, and is engineered to support the ISO 26262 safety case.

Electric Vehicle Battery Meter

Monitors Battery Stack Voltage, Current & Power Consumption

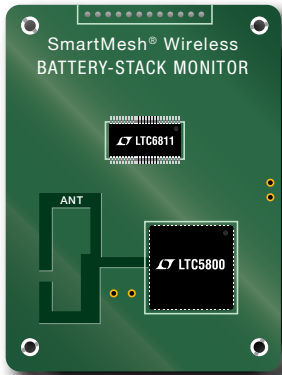
Reports Accumulated Battery Charge and Energy with Up to 1% Accuracy

Isolated Communication via isoSPI



Wireless BMS Architecture

LTC6811 High Voltage Battery Stack Monitor + SmartMesh



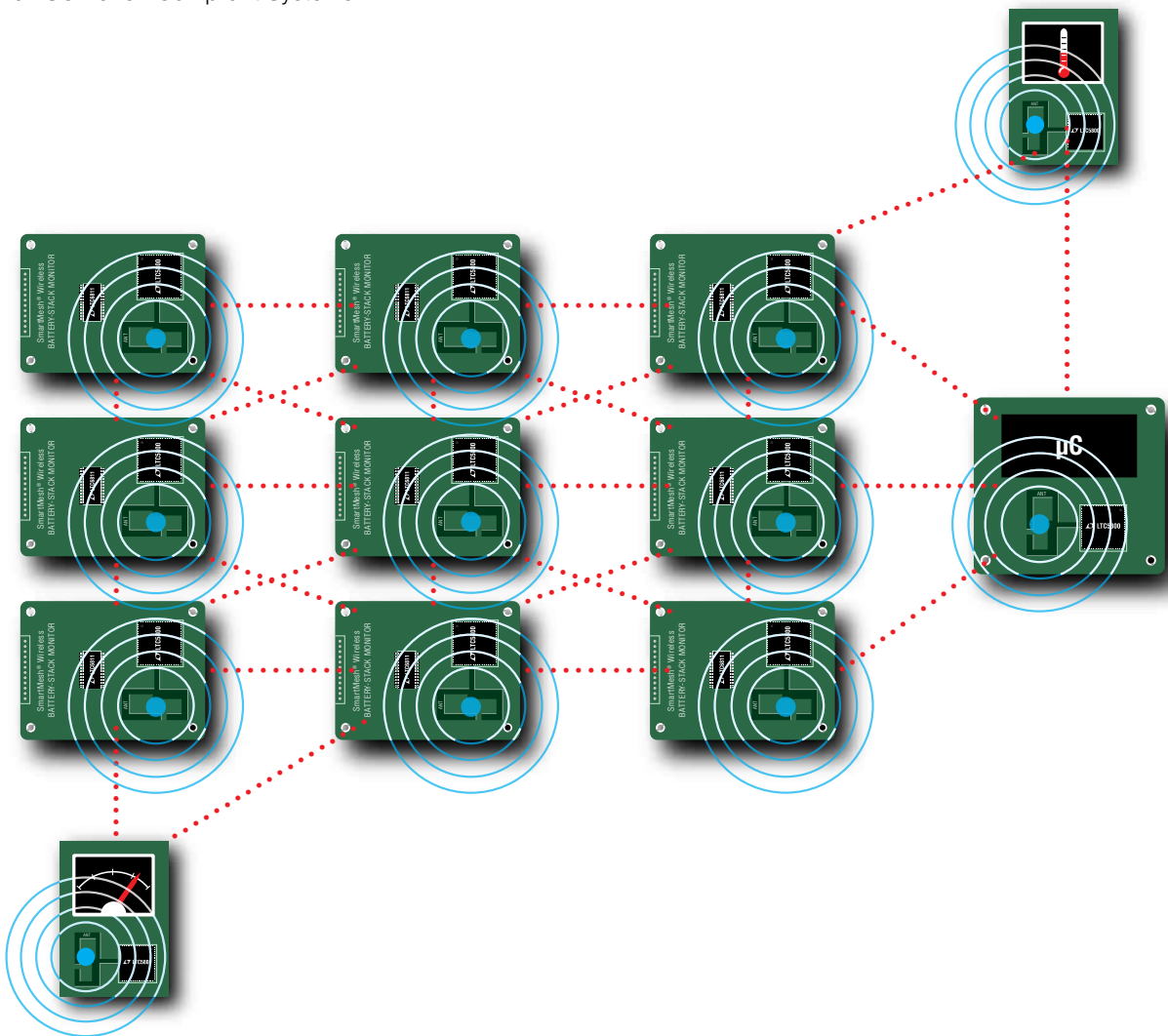
The LTC6811 is a complete battery measuring device for hybrid/electric vehicles that can measure up to 12 series-connected battery cell voltages with better than 0.04% accuracy. The Wireless BMS Architecture Concept combines the LTC6811 with the LTC5800 from Linear's SmartMesh wireless mesh networking product line. Field-proven in Industrial Internet of Things (IoT) applications, SmartMesh embedded wireless networks deliver >99.999% reliable connectivity in harsh RF environments by employing path and frequency diversity. The combination of these products enables a more reliable wireless battery management system for the next generation of electric vehicles.

LTC6811 Features:

- Measures 12 Battery Cells in Series
- Total Measurement Error: 1.2mV Max
- Built-in Programmable 3rd Order Noise Filter
- Passive Cell Balancing with Programmable Timer
- Engineered for ISO 26262 Compliant Systems

SmartMesh Features:

- >99.999% Reliability
- End-to-End Security and Data Encryption
- Precise Time Synchronization
- Self-Configuring and Self-Healing
 - Bidirectional Network



Measurement and Communications

isoSPI connects standard SPI devices using a single twisted pair of wire up to 100 meters with full galvanic isolation. The LTC6820 encodes SPI signals, up to 1Mbps, into a differential signal that is transmitted across a simple pulse transformer.

High Voltage Multicell Battery Stack Monitors

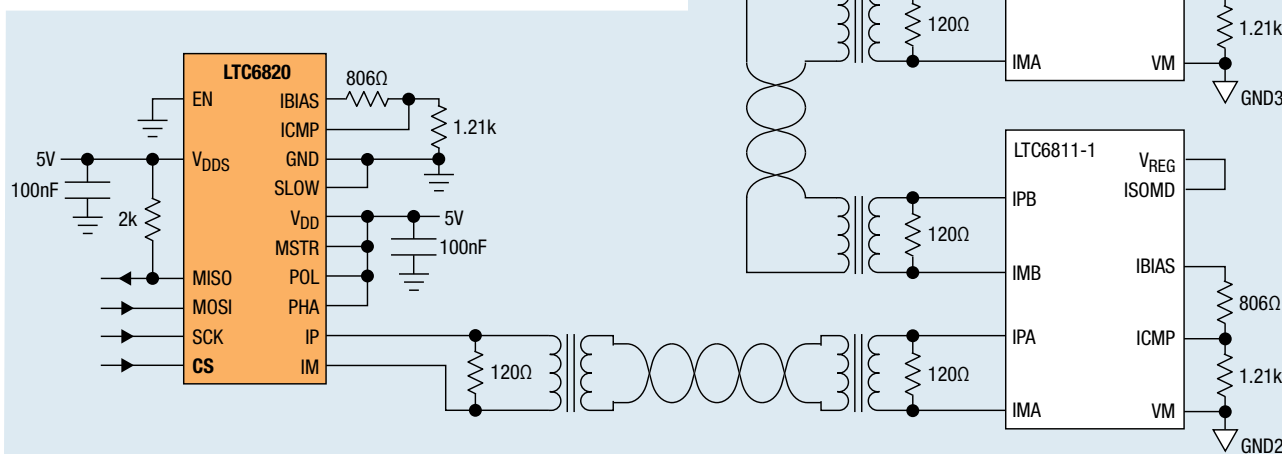
Hybrid electric and electric vehicles depend on battery stacks of up to hundreds of cells to develop the power required to drive the high performance electric motors. A battery managements system provides real-time measurements of each individual battery cell. These measurements must be highly accurate to maximize usable battery capacity, increase pack reliability, and ensure safety.

LTC6811: High Voltage Battery Stack Monitor

- Measures Up to 12 Battery Cells in Series
- 1.2mV Maximum Total Measurement Error
- Stackable Architecture Supports 100s of Cells
- Built-In isoSPI Interface
 - 1Mbps Isolated Serial Communication
 - Uses a Single Twisted Pair, Up to 100 Meters
 - Low EMI Susceptibility and Emissions



Communications—isoSPI



Active Battery Balancing ICs

Electric vehicles (EV) and plug-in hybrid vehicles (PHEV) are demanding longer usable run time from their battery stacks. These stacks of batteries are typically made of battery modules, each with as many as 12 Li-Ion cells stacked in series, offering a ~40V battery module. As the battery run time defines the very feasibility of these vehicles, maximizing

battery capacity is of primary importance. Batteries can always be made larger to improve driving range, but this increases the weight, size and cost of the vehicle. So the goal for automotive EV IC designers is to find ways to make the existing batteries run longer. One effective method is to employ active balancing.

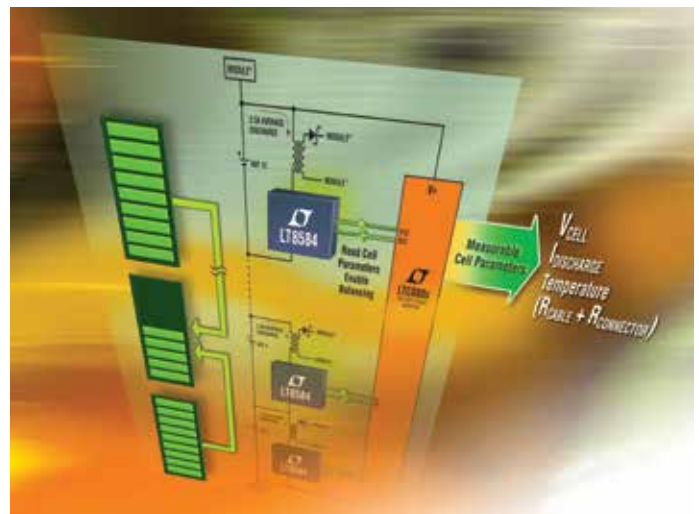
LTC3300-1/-2: High Efficiency/Addressable Bidirectional Multicell Battery Balancer

- Bidirectional Synchronous Flyback Balancing of Up to 6 Li-Ion or LiFePO₄ Cells in Series
- Up to 10A Balancing Current (Set by External Components)
- Bidirectional Architecture Minimizes Balancing Time and Power Dissipation
- Up to 92% Charge Transfer Efficiency
- Stackable Architecture Enables >1000V Systems
- Uses Simple 2-Winding Transformers
- 1MHz Daisy-Chainable Serial Interface with 4-Bit CRC Packet Error Checking
- Numerous Fault Protection Features
- 48-Lead Exposed Pad QFN and LQFP Packages



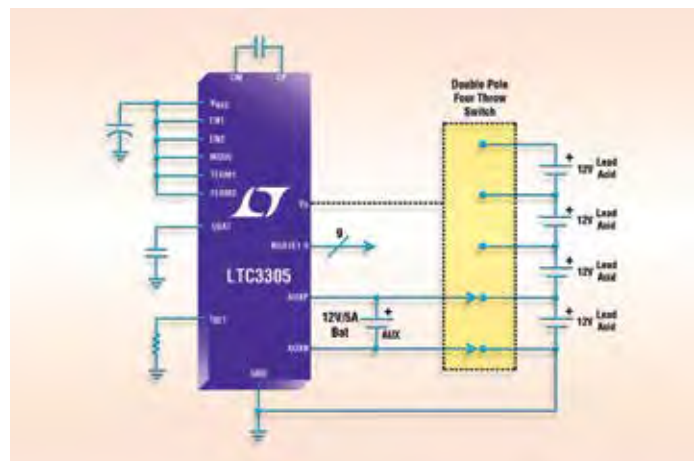
LT8584: 2.5A Monolithic Active Cell Balancer with Telemetry Interface

- 2.5A Typical Average Cell Discharge Current
- Integrated 6A/50V Power Switch
- Integrates Seamlessly with LTC680x Family (No Additional Software Required for "Simple Mode" Operation)
- Selectable Current and Temperature Monitors
- Ultralow Quiescent Current in Shutdown
- Engineered for ISO 26262 Compliant Systems
- Isolated Balancing:
 - Can Return Charge to Top of Stack
 - Can Return Charge to Any Combination of Cells in Stack
 - Can Return Charge to 12V Battery for Alternator Replacement
- Can Be Paralleled for Greater Discharge Capability
- 16-Lead TSSOP Package



LTC3305: Lead Acid Battery 4-Cell Balancer

- Single IC Balances Up to Four 12V Lead Acid Batteries in Series
- All N-FET Design
- Stackable to Balance Larger Series Battery Packs
- Standalone Operation Requires No External μ P or Control Circuitry
- Balancing Current Limited by External PTC Thermistor
- 38-Lead TSSOP and 7mm x 7mm 48-Lead LQFP Packages



High Efficiency LED Drivers

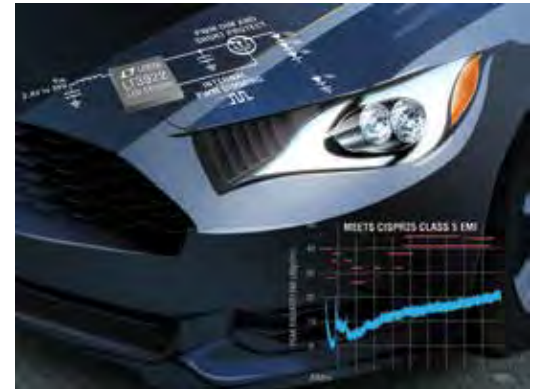
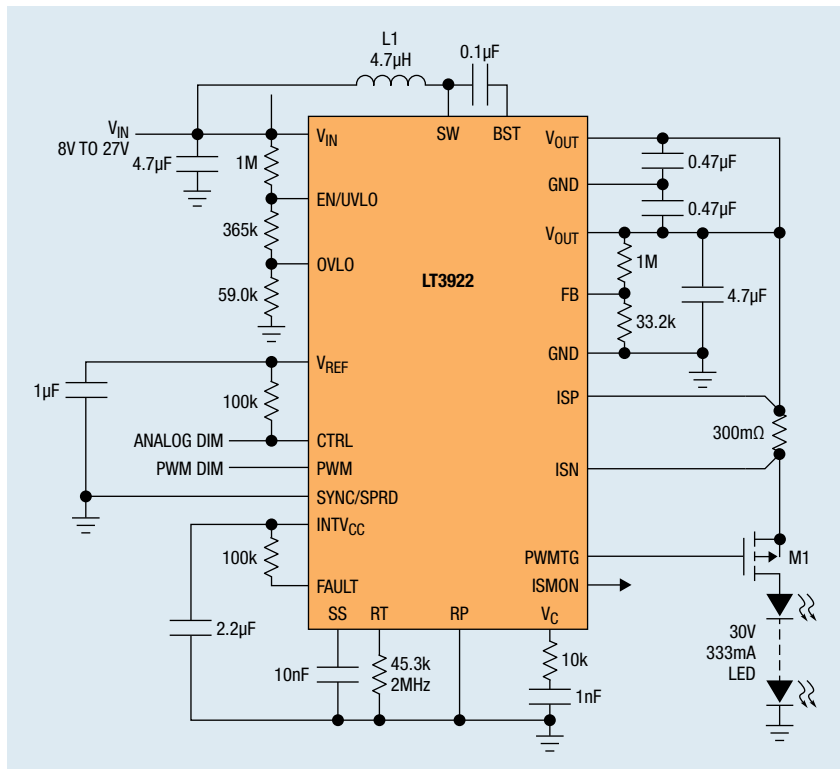
LT3922: 36V, 2A Synchronous Step-Up LED Driver

- 2.8V to 36V Input Voltage Range
- Up to 34V LED String Voltage
- $\pm 2\%$ LED Current and Output Voltage Regulation
- $\pm 2\%$ Output Voltage Regulation
- 5000:1 External PWM Dimming, 128:1 Internal PWM Dimming
- Silent Switcher Architecture for Low EMI
- Spread Spectrum Frequency Modulation
- Operates in Boost, Buck Mode and Buck-Boost Mode
- 4x5 QFN-28 Package

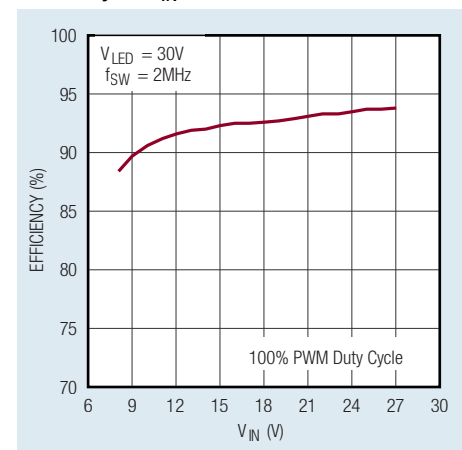


LT3922
Actual Size
Demo Board

2MHz, 93% Efficient 10W (30V, 333mA) Boost LED Driver



Efficiency vs V_{IN}



High Efficiency LED Drivers

Part Number	Topology	Dimming Type	Max # of LEDs X I_{LED} from 12 V_{IN}	LED Configuration	Input Voltage Range (V)	Max. Output Voltage (V)	I_{SW} (A)*	Frequency (MHz)	Over-Voltage Protection	Max Junc Temp (°C)	Package
LT3517	Buck, Boost, Buck/Boost	5000:1 PWM 20:1 Analog	4x 300mA	Series	3 to 30 (40 _{MAX})	45	1.3	250kHz to 2.5MHz	Yes	150	4x4 QFN-16, TSSOP-16E
LT3599	4-Channel Boost	3000:1 PWM 20:1 Analog	4 x 10 x 100mA	Four Parallel Strings	3 to 30 (36 _{MAX})	44	2	200kHz to 2.5MHz	Yes	150	5x5 QFN-32, TSSOP-28E
LT3518	Buck, Boost, Buck/Boost	5000:1 PWM 20:1 Analog	8x 300mA	Series	3 to 30 (40 _{MAX})	45	2.3	250kHz to 2.5MHz	Yes	150	4x4 QFN-16, TSSOP-16E
LT3922	Silent Switcher Buck, Boost, Buck/Boost	128:1 Int PWM 5000:1 PWM 20:1 Analog	11x 320mA	Series	3 to 36	40	2	200kHz to 2MHz	Yes	150	4x5 QFN-28
LT3932	Silent Switcher Buck	128:1 Int PWM 5000:1 PWM 20:1 Analog	3 X 2A	Series	40	n/a	2	200kHz to 2MHz	Yes	150	4x5 QFN-28
LT3478/-1	Buck, Boost, Buck/Boost	3000:1 PWM	6 x 1A	Series	2.8 to 36 (40 _{MAX})	40	4.5	200kHz to 2.25MHz	Yes	125	TSSOP-16E
LT3952	Buck, Boost, Buck/Boost	5000:1 PWM 20:1 Analog	7 x 1A	Series	3 to 42	60	4.5	200kHz to 3MHz	Yes	150	TSSOP-28E
LT3476	Buck, Boost, Buck/Boost Quad	1000:1 PWM	4 x 8 x 350mA	4 x Multiple Series String	2.8 to 16	36	4 x 1.5	200kHz to 2MHz	Yes	125	5x7 QFN-38
LT3760	8-Channel Boost	3000:1 PWM 25:1 Analog	8 x 10 x 100mA	Eight Parallel Strings	6 to 40	45	Ext FET	100kHz to 1MHz	Yes	125	TSSOP-28E
LT3754	16-Channel Boost	3000:1 PWM 25:1 Analog	16 x 10 x 50mA	Sixteen Parallel Strings	6 to 40	45	Ext FET	100kHz to 1MHz	Yes	125	5x5 QFN-28
LT3761/A	Buck, Boost, Buck/Boost LED Driver w/PWM	3000:1 PWM 20:1 Analog	14 x 1A	Series	4.5 to 60	80	Ext FET	100kHz to 1MHz	Yes	125	MSOP-16E
LT3797	Triple Buck, Boost, Buck/Boost	3000:1 PWM 20:1 Analog	3 x 14 x 1A	Series	2.5 to 40, 60 _{MAX}	100	Ext FET	100kHz to 1MHz	Yes	125	7x8 QFN-52
LT3795	Buck, Boost, Buck/Boost	3000:1 PWM 20:1 Analog	14 x 1A	Series	6 to 100	100	Ext FET	100kHz to 1MHz	Yes	125	TSSOP-28E
LT3796	Buck, Boost, Buck/Boost	3000:1 PWM 20:1 Analog	20 x 400mA	Series	6 to 100	100	Ext FET	100kHz to 1MHz	Yes	125	TSSOP-28E
LT8391	Synchronous Buck-Boost	128:1 Int PWM 2000:1 PWM 20:1 Analog	14 x 2A	Series	4 to 60	60	Ext FET	150kHz to 650kHz	Yes	125	TSSOP-28E 4x5 QFN-28
LT3755	Buck, Boost, Buck/Boost	3000:1 PWM 20:1 Analog	14 x 1A	Series	4.5 to 40	Limited By Ext. FET	Ext FET	100kHz to 1MHz	Yes	150	3x3 QFN-16, MSOP-16E
LT3756	Buck, Boost, Buck/Boost	3000:1 PWM 20:1 Analog	14 x 1A	Series	6 to 100	Limited By Ext. FET	Ext FET	100kHz to 1MHz	Yes	150	3x3 QFN-16, MSOP-16E
LT3956	Constant Current/Constant Voltage Converter	3000:1 PWM 20:1 Analog	18 x 0.35A	Series	4.5 to 80	80	Ext FET	100kHz to 1MHz	Yes	125	5x6 QFN-36

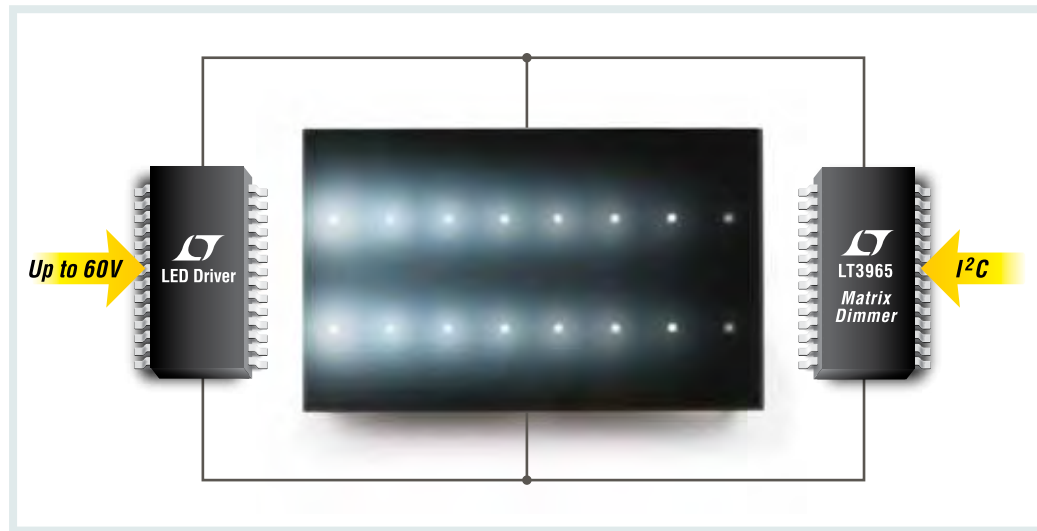
µModule LED Driver

Part Number	Topology	Dimming Type	Max # of LEDs X I_{LED} from 12 V_{IN}	LED Configuration	Input Voltage Range (V)	Max. Output Voltage (V)	I_{SW} (A)*	Frequency (MHz)	Over Voltage Protection	Max Junc Temp (°C)	Package
LTM8005	Boost	3000:1PWM	9x1.2A	Series	5 to 38	38	12	100kHz to 1MHz	Yes	150	9x11.25x2.22 BGA

LT3965: 8-Switch Matrix LED Dimmer

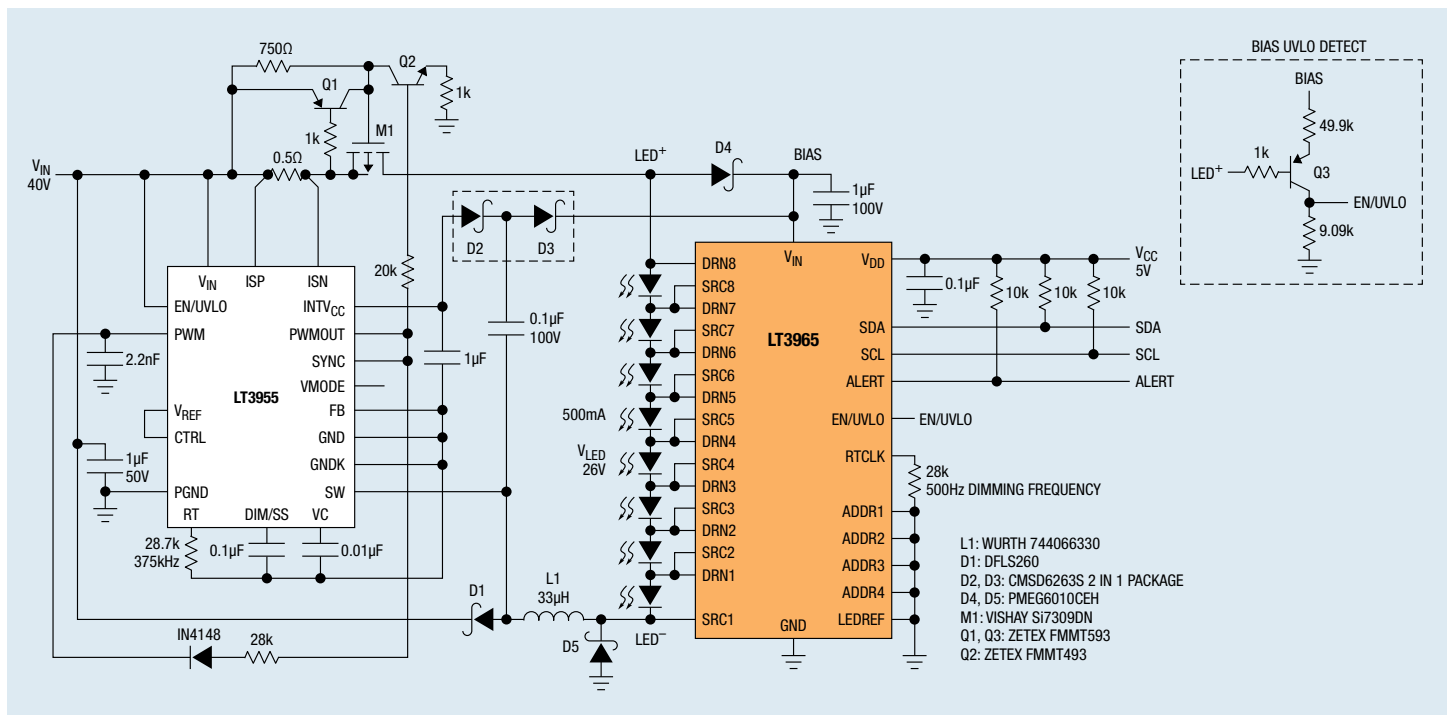
- Eight Independent 17V 330mΩ NMOS Switches
- Independent On/Off/Dimming Control of 1 to 4 LEDs for Each Switch
- I²C Multidrop Serial Interface with Programmable Open LED and Shorted LED Fault Reporting
- 16 Unique I²C Addresses
- V_{DD} Range: 2.7V to 5.5V and V_{IN} Range: 8V to 60V
- Digital Programmable 256:1 PWM Dimming
- Fade Transition Between PWM Dimming States
- Optional Internal Clock Generator or External Clock Source for PWM Dimming
- Open LED Overvoltage Protection
- Flicker Free PWM Dimming
- TSSOP-28E Package

Matrix LED Dimmer



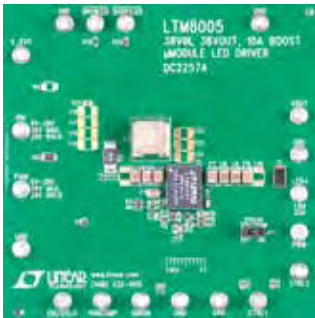
Any Brightness, Any Pattern with I²C Control

Matrix LED Dimmer Powered by a Buck Mode LED Driver



LTM8005: 38V_{IN}, 38V_{OUT} Boost μ Module LED Driver

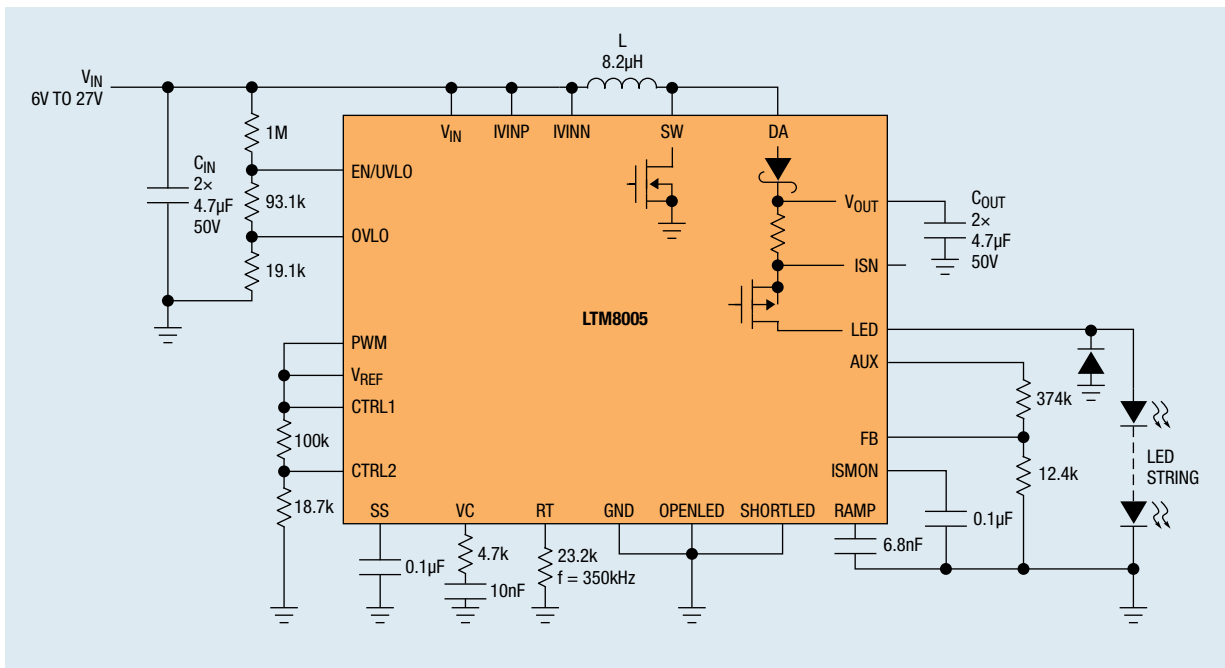
- Wide Input Voltage Range: 5V to 38V
- Adjustable LED Current Up to 1.6A
- 40V Internal Power Switch
- Internal Spread Spectrum Frequency Modulation
- 3000:1 True Color PWM™ Dimming
- 9mm × 11.25mm × 2.22mm BGA Package
- Wide Temperature Range: -40°C to 150°C



LTM8005
50% Scale
Demo Board



LTM8005 350mA at 30.5V to 35.5V LED Strings from 6V to 27V_{IN} (Boost)



PoDL

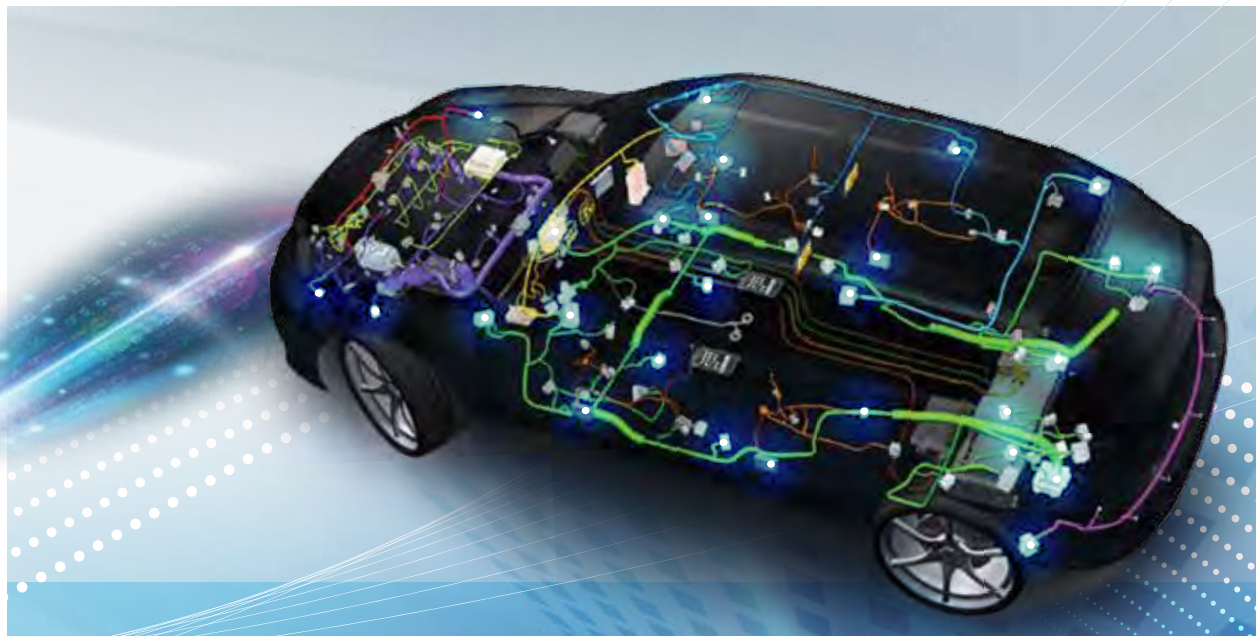
Power over Data Line (PoDL) Kicks Automotive Ethernet into High Gear

The future of autonomously driven vehicles is around the next bend.

For ADAS and self-driving vehicles, data bandwidth is becoming an increasing problem. To support video streaming and machine analysis the vehicle communication backbone needs to support data transfer rates on the order of 1Gbps to avoid image degradation. Today the wiring harnesses in vehicles support a mishmash of interface standards,

including proprietary standards like LVDS which can transmit high speed data in one direction only, have limited support for video inputs/outputs and utilize expensive STP or failure-prone coaxial cabling. This situation has driven the industry to define a new standard for automotive Ethernet, under IEEE 802.3bp, known as 1000BASE-T1. This standard utilizes a single unshielded twisted pair (UTP) and will be able to transfer bidirectional data at up to 1Gbps while meeting automotive EMC requirements.

High Bandwidth Automotive Ethernet Combined with PoDL Will Solve Many of Today's Interconnectivity Challenges, Enabling a Fully Networked Vehicle, in Addition to Bringing Significant Weight and Cost Advantages.



To further simplify connectivity, the IEEE taskforce (802.3bu) is finalizing the automotive industry's version of Power over Ethernet (PoE), to deliver power over the same twisted pair as the data. This will be known as Power over Data Line (PoDL), or "poodle," and the standard is expected to be ratified by early 2017. PoDL simplifies the distribution of power while also supporting the ISO 26262 safety case. Since the number of Ethernet nodes may reach as high as 80 nodes in luxury vehicles by 2020, and as many as 40 in standard vehicles, PoDL will significantly simplify the cabling.

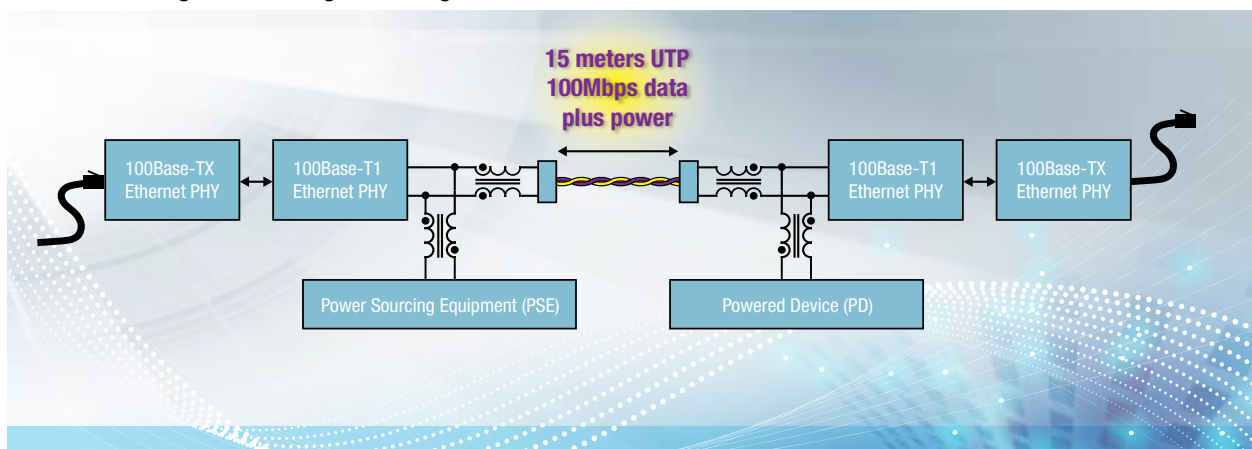
PoDL is the essential technology to minimize vehicle weight, cabling cost and footprint. Distributing power and data over the same twisted pair provides the intrinsic benefits of 100BASE-T1 and 1000BASE-T1 single twisted pair. The twisted pair cable weight can be reduced by as much as 30%, thus increasing fuel/battery economy. The wiring harness is the third heaviest subsystem in a modern car. UTP is easy to terminate, uses smaller connectors and is

significantly cheaper and more reliable than coax. Coax is at a disadvantage when flexed, with an estimated lifetime of just a few years.

Ethernet standardization ensures interoperability across all vehicle sensor types, enabling car manufacturers to source Ethernet PHYs and cables from multiple vendors. The standard will support isochronous virtual paths, so latency critical safety features can seamlessly share the network with low priority streaming applications. Standardization allows modularization, slashing design integration effort in an increasingly competitive industry.

Linear Technology offers an end-to-end PoDL solution, providing increased robustness from cable faults. Linear's complete PoDL application circuit meets stringent automotive signal integrity, EMI, and noise immunity requirements. IEEE 802.3bu compliant PSE and PD solutions will be available for sampling in late 2017. 100BASE-T1 Ethernet PHYs and 1000BASE-T1 PHYs are already sampling in the industry.

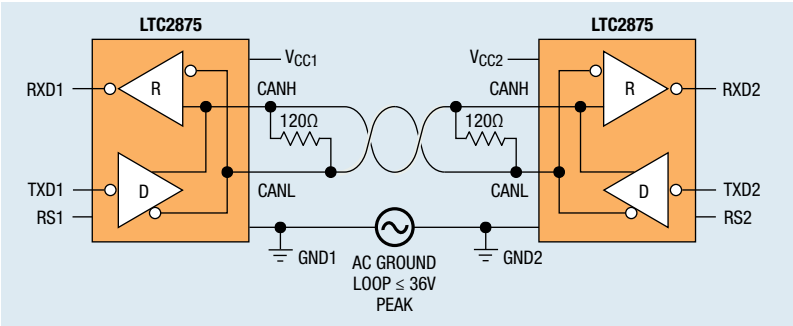
Save Vehicle Weight and Cabling Cost Using UTP/PoDL



CAN Transceivers

In practical CAN (controller area network) systems, installation cross-wiring faults, ground voltage faults or lightning induced surge voltages can cause overvoltage conditions that exceed absolute maximum ratings of typical transceivers. Linear Technology offers exceptionally rugged, high voltage tolerant CAN transceivers, that greatly reduces field failures without the need of costly external protection devices. These devices feature $\pm 60\text{V}$ overvoltage fault and $\pm 25\text{kV}$ HBM ESD protection on the data transmission lines, protecting bus pins during operation and shutdown.

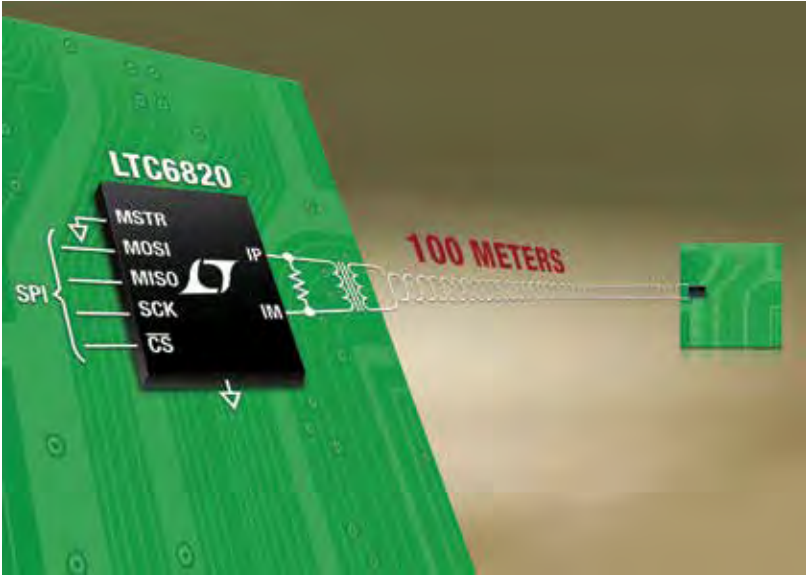
CAN Bus Link with Large Ground Loop Voltage



Product	Supply Voltage (V)	Max Data Rate (Mbps)	Fault Protection	ESD (kV)	Common Mode Transient Immunity	Common Mode Voltage	Shutdown (Yes/No)	Isolation Rating	Packages
LTC2875	3.3, 5	4	$\pm 60\text{V}$	25	30kV/ μs	$\pm 36\text{V}$	Yes		3x3 DFN-8, SO-8
LTM2889	3.3, 5	4	$\pm 60\text{V}$	25	30kV/ μs	$\pm 36\text{V}$	Yes	2500V _{RMS}	15x11.25 BGA-32

isoSPI

isoSPI connects standard SPI devices using a single twisted pair of wire up to 100 meters with full galvanic isolation. The LTC6820 encodes SPI signals, up to 100Mbps, into a differential signal that is transmitted across a simple pulse transformer.



SmartMesh—Embedded Wireless Sensor Networking

Embedded chips and printed circuit boards with mesh networking software that deliver:

- **>99.999% Data Reliability** in the most challenging RF environments
- **>10 Year Battery Life** for every node in the network, including routing ones
- **Complete Wireless Mesh Solution** so no network stack development is required

Features:

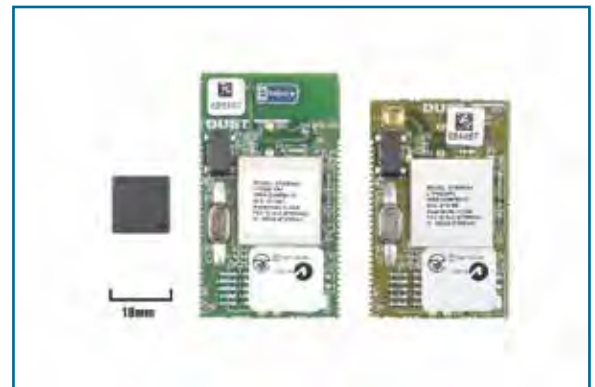
- Self-Forming, Self-Sustaining, Multi-Hop Mesh Network
- Time Synchronized Channel Hopping (TSCH) link layer, pioneered by Dust Networks®
 - **Channel Hopping on Each Transmission** for frequency diversity
 - **Redundant Pathways** for spatial diversity
 - **Low Power Packet Exchange**—Duty cycle of <1% without sacrificing network availability
 - **Zero In-Network Packet Collisions** for a highly scalable network
- Built-In Network Optimization Algorithms fix problems before they occur
- 2.4GHz IEEE 802.15.4 transceivers operate in globally license-free 2.4GHz band

Benefits:

- Field Proven Network
 - >50,000 customer networks
 - >7 Billion hours of customer operation in harsh RF environments
- Highly Resilient, Low Power Communications in some of the most demanding applications:
 - **Tough RF Environments** with extensive metal and concrete, including industrial plants, data centers, commercial building monitoring, bridges, tunnels
 - **Networks on Moving Vehicles**, including rail cars, cargo containers, semi-trucks and aircraft
 - **Dense Deployments**, where thousands of nodes operate within radio range of each other, for instance rail yards, data centers, utility scale solar farms
 - **Large Area Networks**, such as shipyards, street parking applications
 - **Long, Extended Networks**, including freight trains, pipelines, mines, tunnels
 - **Remote Monitoring**, where all nodes must be powered by battery or energy harvesting, such as oil fields or environmental monitoring
- Place a sensor anywhere – no communications or power lines to wireless nodes required
- Fast Time to Market
 - Wireless network software is already complete, heavily tested and has proven performance
 - Hardware available as QFN chips or pre-certified PCB modules



Deployed in thousands of rail cars, SmartMesh® networks ensure reliable wireless communications in mobile environments.



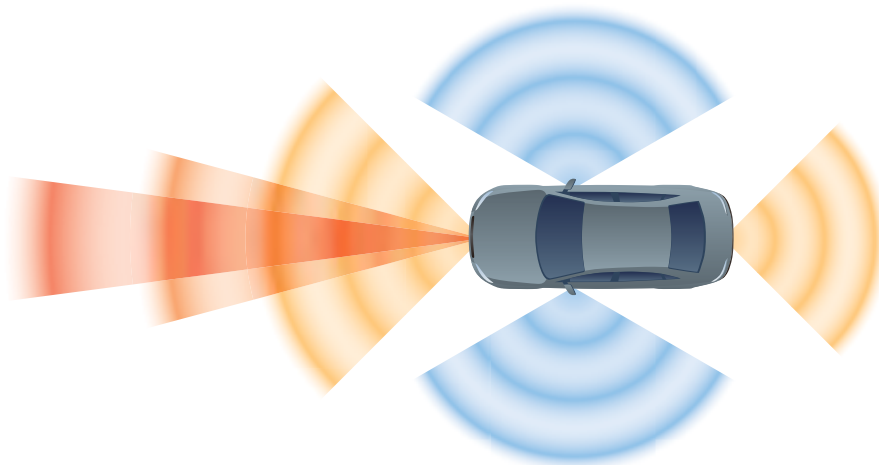
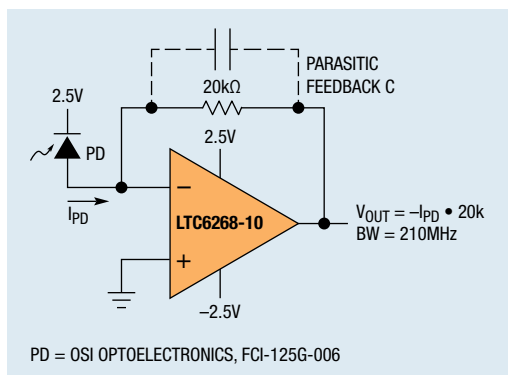
SmartMesh IP™ Modules and Managers are available as QFN chips and as pre-certified Printed Circuit Boards

To learn more about SmartMesh Embedded Wireless Sensor Mesh Networks, visit www.linear.com/dust.

Radar and Lidar

Collision avoidance systems require high speed, low noise amplifiers to scale and buffer sensor signals such as lidar and radar. Linear Technology provides a range of products including the LTC6268 and LTC6253 and differential output

amplifiers such as LTC6400-26 to enable next generation ADAS systems. We also offer a full range of high performance, low power, high speed ADCs which can be screened for higher operating temperatures and AEC-Q100 qualified.



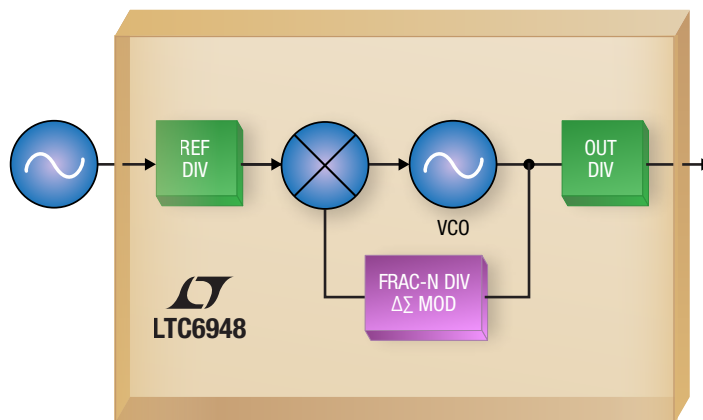
PLL Synthesizers

Features:

- 6GHz-Plus Frequency Generation
- Low -226dBc/Hz Normalized In-Band Phase Noise Floor
- -157dBc/Hz Wideband Output Phase Noise Floor
- -274dBc/Hz Normalized In-Band 1/f Noise
- Excellent Spurious Performance
- Integer-N or Fractional-N

Applications:

- Infotainment/GPS
- Satellite Uplink
- Femtocell
- Anti-Collision



PLL Synthesizer Snapshot

Part Number	Features	Frequency Range (GHz)	Phase Noise @ fRF=900MHz		Spurious Products	Vcc	Maximum Case Temperature	Package
			1MHz	40MHz				
LTC6945	Integer-N PLL	0.350 to 6	-155dBc/Hz	-161dBc/Hz	-103dBc	3.3V/5V	105°C	4x5 QFN-28
LTC6946	Integer-N PLL + VCO	0.373 to 5.79	-141dBc/Hz	-157dBc/Hz	-102dBc	3.3V/5V	105°C	4x5 QFN-28
LTC6947	Frac-N PLL	0.350 to 6	-149dBc/Hz*	-160dBc/Hz*	-97dBc	3.3V/5V	105°C	4x5 QFN-28
LTC6948	Frac-N PLL + VCO	0.373 to 6.39	-140dBc/Hz	-157dBc/Hz	-98dBc	3.3V/5V	105°C	4x5 QFN-28

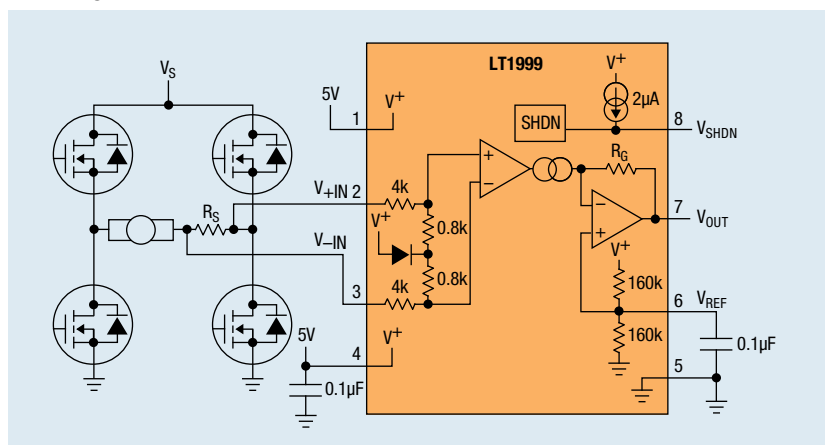
*At 2.4GHz

Current Sense Amplifiers

Applications:

- H-Bridge Motor Control
- Solenoid Current Sense
- PWM Control Loops
- Hydraulic Controls
- Lamp Monitoring
- Glow Plug Control
- Load Monitoring
- HEV/EV Battery Management Systems
- 12V / 24V Battery Monitoring
- High Voltage Data Acquisition
- Remote Sensing
- Overcurrent and Fault Detection
- Cable Drop Compensation
- Fuse/MOSFET Monitoring

Full Bridge Armature Current Monitor



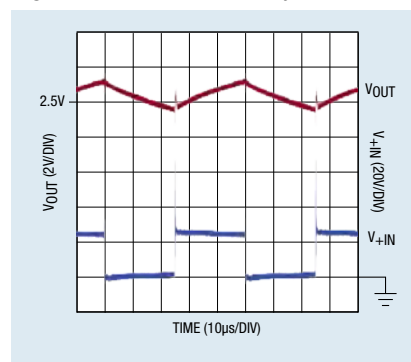
Part Number	Current Direction	Common Mode Voltage (V)	Response Time (µs)	V _{OS} Max (µV)	PSRR Min (dB)	Max Temperature Range	Comments
LT1999	Bidirectional	-5 to 80	2.5	750	80	-55°C to 150°C	High Speed AC Monitor, AC CMRR > 80db@100kHz
LT1997	Bidirectional	±160		50	98	-40°C to 125°C	±160V Common Mode Input Range
LT6375	Bidirectional	±270		300	101	-40°C to 125°C	±270V Common Mode Input Range, Diff Gain=1
LT1787	Bidirectional	2.5 to 65	10	150	100	-40°C to 125°C	Buffered Output; Simple Input Filtering
LT6100	Unidirectional	4.1 to 48	40	300	95	-40°C to 125°C	Buffered Output with 5 Gain Settings
LTC6101	Unidirectional	4.0 to 105	1	300	115	-40°C to 125°C	Fast, High Voltage Monitor
LTC6102	Unidirectional	4.0 to 105	1	10	115	-40°C to 125°C	Zero-Drift, Highest Precision
LTC6103	Unidirectional	4.0 to 70	1	450	106	-40°C to 125°C	Dual Precision Amplifiers
LTC6104	Bidirectional	4.0 to 70	1	450	105	-40°C to 125°C	Each Direction Gain Configurable
LT6105	Unidirectional	-0.3 to 44	3.5	300	94	-40°C to 125°C	Monitors Voltages Down to GND
LT6106	Unidirectional	2.7 to 44	3.5	250	106	-40°C to 125°C	Lowest Cost, Simple
LT6107	Unidirectional	2.7 to 44	3.5	350	106	-55°C to 150°C	Fully Tested at -55°C, 25°C, 150°C
LT6108	Unidirectional	2.7 to 60	3	125	120	-40°C to 125°C	Includes Comparator+Ref
LT6109	Unidirectional	2.7 to 60	3	125	120	-40°C to 125°C	Includes 2 Comparators+Ref
LT6110	Unidirectional	2.0 to 50	2	250	88	-40°C to 125°C	Line Drop Compensator
LT6118	Unidirectional	2.7 to 60	3	200	120	-40°C to 125°C	Includes Comparator with Power on Reset +Ref
LT6119	Unidirectional	2.7 to 60	3	200	120	-40°C to 125°C	Includes Comparator with Power on Reset +Ref

LT1999: High Voltage, Bidirectional Current Sense Amplifier

Features:

- Buffered Output with 3 Gain Options: 10, 20, 50
- Input Common Mode Voltage Range: -5V to 80V
- AC CMRR > 80dB at 100kHz
- Supply Range: 2.7V to 36V, 44V Absolute Maximum
- -3dB Bandwidth: 2MHz
- Low Offset Voltage: 1.5mV Maximum
- Smooth, Continuous Operation Over Entire Common Mode Range
- 4kV HBM Tolerant and 1kV CDM Tolerant
- Specified for -55°C to 150°C
- 8-Lead MSOP and 8-Lead SO (Narrow)

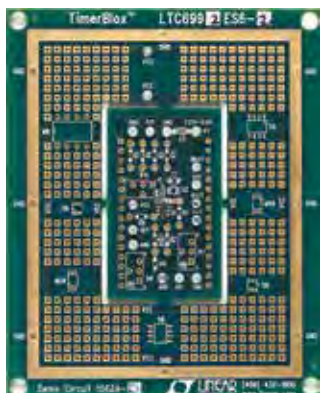
High AC Common Mode Rejection



TimerBlox® Products

Features:

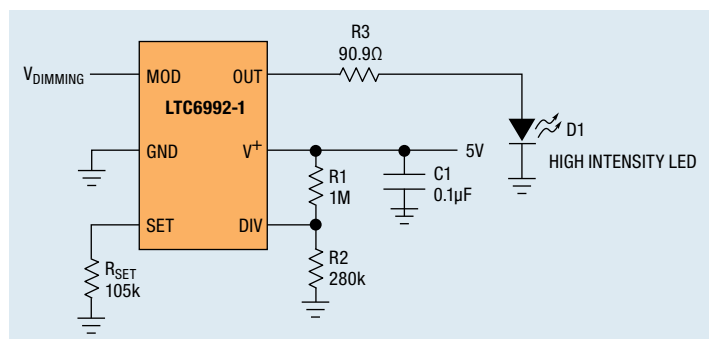
- Dedicated Timing Devices
 - Includes Internal Silicon Oscillator
 - Easily Programmed with Resistors
- $\pm 20\text{mA}$ Output Current
- $60\mu\text{A}$ to $250\mu\text{A}$ Supply Current
- 2.25V to 5.5V Single Supply Operation
- Small Size: SOT-23, $2 \times 3\text{mm}$ DFN
- Fast Start-Up
- Immune to Shock & Vibration
- Specified from -55°C to 125°C



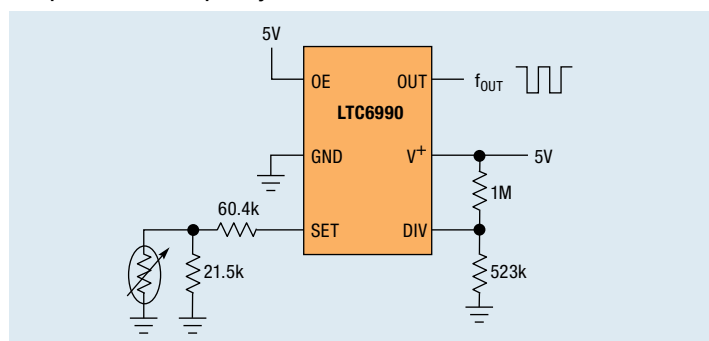
TimerBlox Board

50% Scale
Demo Board

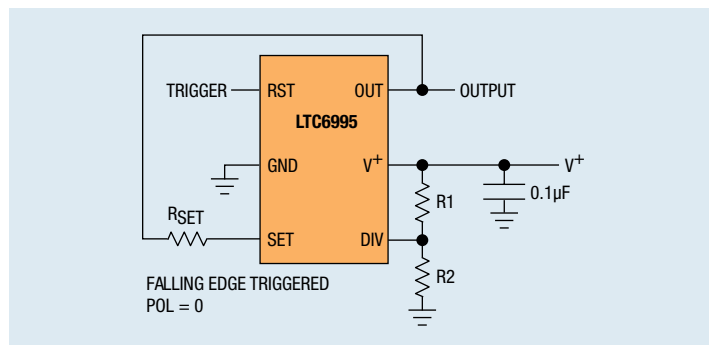
LED Dimming via Direct PWM Control



Temperature to Frequency Converter



Hardware Watchdog Timer



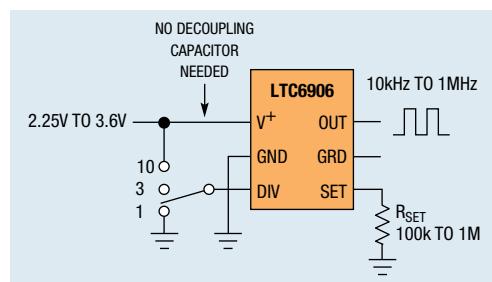
Part Number	Function	Operating Range	Package	Details
LTC6990	Voltage-Controlled Oscillator (VCO)	488Hz to 1MHz	SOT-23, DFN	Simple and Flexible Control
LTC6991	Low Frequency Clock	29μHz to 488Hz	SOT-23, DFN	Period from 2 msec Up to 9.5 Hrs
LTC6992-1	Pulse-Width Modulation (PWM)	3.8Hz to 1MHz	SOT-23, DFN	0% to 100% Pulse Width Control
LTC6992-2	Pulse-Width Modulation (PWM)	3.8Hz to 1MHz	SOT-23, DFN	5% to 95% Pulse Width Control
LTC6992-3	Pulse-Width Modulation (PWM)	3.8Hz to 1MHz	SOT-23, DFN	0% to 95% Pulse Width Control
LTC6992-4	Pulse-Width Modulation (PWM)	3.8Hz to 1MHz	SOT-23, DFN	5% to 100% Pulse Width Control
LTC6993-1	One-Shot Circuit	1μs to 34s	SOT-23, DFN	Rising Edge Trigger
LTC6993-2	One-Shot Circuit	1μs to 34s	SOT-23, DFN	Rising Edge Trigger, Retriggerable
LTC6993-3	One-Shot Circuit	1μs to 34s	SOT-23, DFN	Falling Edge Trigger
LTC6993-4	One-Shot Circuit	1μs to 34s	SOT-23, DFN	Falling Edge Trigger, Retriggerable
LTC6994-1	Delay Block	1μs to 34s	SOT-23, DFN	Rising or Falling Edge Trigger
LTC6994-2	Delay Block	1μs to 34s	SOT-23, DFN	Rising & Falling Edge Trigger
LTC6995-1	Long Duration Power-On Reset	1.024 ms to 9.54 hours	SOT-23, DFN	Active High Reset, Selectable Polarity
LTC6995-2	Long Duration Power-On Reset	1.024 ms to 9.54 hours	SOT-23, DFN	Active Low Reset, Selectable Polarity

Silicon Oscillators

Features:

- Simple Square Wave Oscillators
 - No Crystal
 - 1kHz to 170MHz Output Frequencies
- On-the-Fly Frequency Programmability
- Accuracy from 0.1% to 1.5%
- Low Power
- Small Size
- Fast Start-Up
- Immune to Shock & Vibration
- Specified from -55°C to 125°C

LTC6906 Micropower Clock Generator



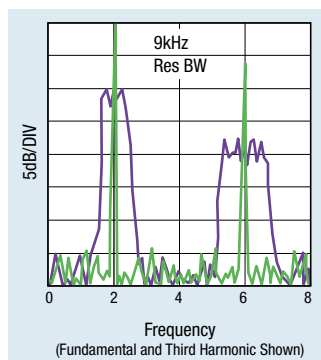
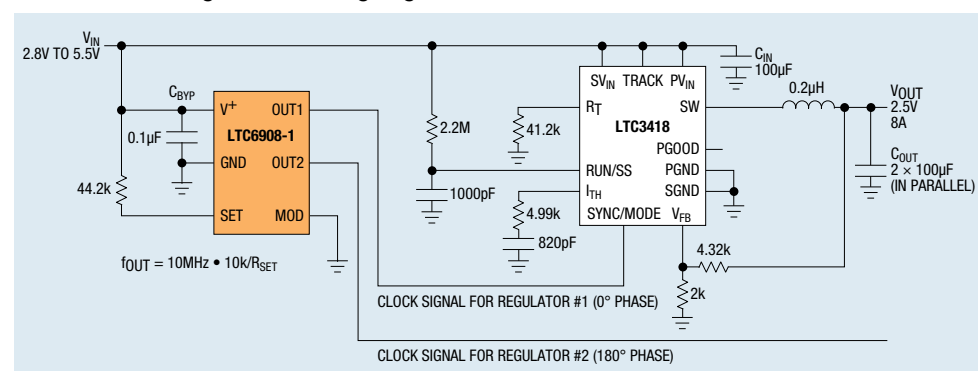
Part Number	Frequency Output	Max Error (%)	Supply Current	Package	Features
LTC1799	1kHz to 33MHz	1.5	1mA @ 3MHz	SOT-23	Frequency Set via 1 Resistor
LTC6903	1kHz to 68MHz	1.1	1.7mA @ 3MHz	MSOP-8	Frequency Set via SPI Interface
LTC6904	1kHz to 68MHz	1.1	1.7mA @ 3MHz	MSOP-8	Frequency Set via I2C Interface
LTC6905	17MHz to 170MHz	1.4	7mA @ 170MHz	SOT-23	Frequency Set via 1 Resistor, 100µsec Startup
LTC6905-xx	20MHz to 133MHz	1.0	10mA @ 133MHz	SOT-23	Pin Selectable Frequency
LTC6906	10kHz to 1MHz	0.5	60µA @ 1MHz	SOT-23	Frequency Set via 1 Resistor, Very Low Power
LTC6907	40kHz to 4MHz	0.5	275µA @ 4MHz	SOT-23	Frequency Set via 1 Resistor, Very Low Power
LTC6908	50kHz to 10MHz	1.5	400µA @ 50kHz	SOT-23	2 Phase Output with Spread Spectrum Capability
LTC6909	50kHz to 10MHz	1.5	400µA @ 50kHz	SOT-23	8 Phase Output with Spread Spectrum Capability
LTC6930	32.768kHz to 8.192MHz	0.09	400µA @ 50kHz	MS8, DFN	High Accuracy, Pin Selectable Frequency

LTC6908: Dual Output Oscillator for Switching Regulators

Features:

- Two Options: Outputs Complementary ($0^{\circ}/180^{\circ}$) or Quadrature ($0^{\circ}/90^{\circ}$)
- Ideal for Switching Regulator Phase Synchronization
- 50kHz to 10MHz Frequency Range
- One External Resistor Sets the Frequency
- Optional Spread Spectrum Modulation for Improved EMC
- 400µA Supply Current
- 260µs Start-Up Time
- Outputs Muted Until Stable
- Operates from a Single 2.7V to 5.5V Supply
- Available in Low Profile (1mm) ThinSOT and DFN (2mm x 3mm) Packages

Dual Phase Clocking for 2 Switching Regulators



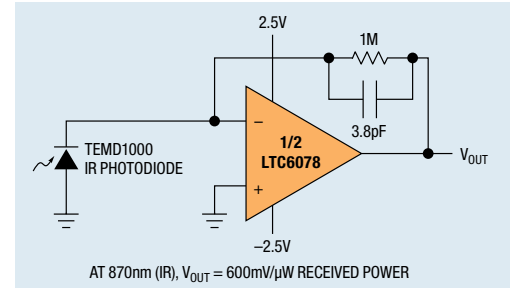
Spread Spectrum
Frequency
Modulation

Precision Operational Amplifiers

Features:

- High Precision Over Temperature:
 - I-Grade: –40°C to 85°C
 - H-Grade: –40°C to 125°C
- Over-The-Top® (OTT) Inputs Allow Operation with Input Voltages above V+

Photodiode Amplifier



Single Part Number	Dual Part Number	Quad Part Number	VOS Max 25°C (μV)	TCVOS Max (μV/°C)	IB Max 25°C (nA)	GBW Typ 25°C (MHz)	en Typ 25°C (nV/√Hz)	IS Max 25°C (mA)	VS Range (V)	Rail-to-Rail I/O	Temperature Grade
LTC2054HV	LTC2055HV		3	0.03	0.15	0.5		0.15	2.7 to 12	Out	I, H
LTC2050HV	LTC2051HV	LTC2052HV	3	0.03	0.075	3		1.2	2.7 to 12	Out	I, H
LTC2057			5	0.025	0.2	1.5	13	1.35	4.75 to 60	Out	I, H
LTC1050	LTC1051		5	0.05	0.03	2.5	90	1.5	4.75 to 18	Out	I, H
	LTC6078	LTC6079	25	0.7	0.001	0.75	18	0.072	2.7 to 6	Yes	I, H
	LT6020		30	0.5	3	0.4	46	0.1	3 to 30	Out	I, H
LT1028			40	0.8	90	75	0.85	9.5	8 to 44		I
LT6015	LT6016	LT6017	50	0.75 Typ	5	3.2	18	0.335	3 to 50	OTT	I, H
	LT1881	LT1882	50	0.8	0.2	1	14	0.9	2.4 to 40	Out	I, H
	LT1884	LT1885	50	0.8	0.4	2	9.5	0.9	2.4 to 40	Out	I
LT6018			50	0.5	.50	15	1.2	7.65	8 to 33	Out	I, H
LT6010	LT6011	LT6012	60	0.8	0.3	0.33	14	0.15	2.7 to 40	Out	I
LT6020			70	0.3	3	0.4	46	0.1	3 to 35	Out	I, H
LT6023			40	2.8	3	0.04	132	0.02	3 to 30	Out	I, H
	LTC6081	LTC6082	70	0.8	0.001	3.6	13	0.425	2.7 to 5.5	Yes	I, H
	LT1468	LT1469	75	2	40	90	5	5	9 to 36		I
	LT1678	LT1679	100	3	20	20	3.9	3.4	3 to 36	Yes	I
	LTC6244		100	2.5	0.075	50	8	7.4	2.8 to 7	Out	I, H
LTC6240	LTC6241	LTC6242	125	2.5	0.075	18	7	2.2	2.8 to 6	Out	I, H
	LT1013	LT1014	150	2	20	0.8	22	0.5	4 to 44	SS	I
LT1880			150	1.2	0.9	1.1	13	1.9	2.4 to 40	Out	I
LTC6360			250		30000	1000	2.3	17.5	4.75 to 5.25	Out	I, H
LTC6255	LTC6256	LTC6257	350	3	60	6.5	20	0.073	1.8 to 5.25	Yes	I, H
LT1637	LT1638	LT1639	350	3	50	1	27	0.25	1.8 to 44	OTT	I, H
LT6220	LT6221	LT6222	350	5	150	60	10	1	2.2 to 12.6	Yes	I
LT6233	LT6234	LT6235	350	3	3000	60	1.9	1.25	3 to 12.6	Out	I
LT1800	LT1801	LT1802	350	5	250	80	8.5	2	2.3 to 12.6	Yes	I
LT1494	LT1495	LT1496	375	2	1	0.0027	185	0.0015	2.1 to 36	OTT	I, H
LT1722	LT1723	LT1724	400	7	300	200	3.8	4.5	4.6 to 12.6		I
LT6003	LT6004	LT6005	500	5	0.09	0.002	325	0.001	1.6 to 16	Yes	I, H
LT1636	LT1490A	LT1491A	500	4	8	0.18	50	0.055	2 to 44	OTT	I, H
LT6202	LT6203	LT6204	500	24	7000	100	1.9	3.5	2.5 to 12.6	Yes	I
LTC6246	LTC6247	LTC6248	500		350	180	4.2	1	2.5 to 5.25	Yes	I, H
LT1806	LT1807		550	5	4000	325	3.5	13	2.5 to 12.6	Yes	I
LT1351	LT1352	LT1353	600	8	50	3	14	0.33	5.0 to 36		I
LT1970			600	10	600	3.6	15	13	5 to 36		I
LT1357	LT1358	LT1359	600	8	500	25	8	2.5	5 to 36		I
LT6000	LT6001	LT6002	750	5	5	0.05	75	0.016	1.8 to 18	Yes	I
	LTC6084	LTC6085	750	5	0.04	1.5	27	0.13	2.5 to 5.5	Yes	I, H
	LTC6087	LTC6088	750	5	0.04	14	12	1.2	2.7 to 5.5	Yes	I, H
LT1782			800	5	15	0.2	50	0.055	2.2 to 18	OTT	I, H
LT1783			800	5	80	1.25	20	0.3	2.2 to 18	OTT	I, H
LT1354	LT1355	LT1356	800	8	300	12	10	1.25	5 to 36		I
LTC6090	LTC6091		1000	5	0.05	12	14	3.9	9.5 to 140	Out	I, H

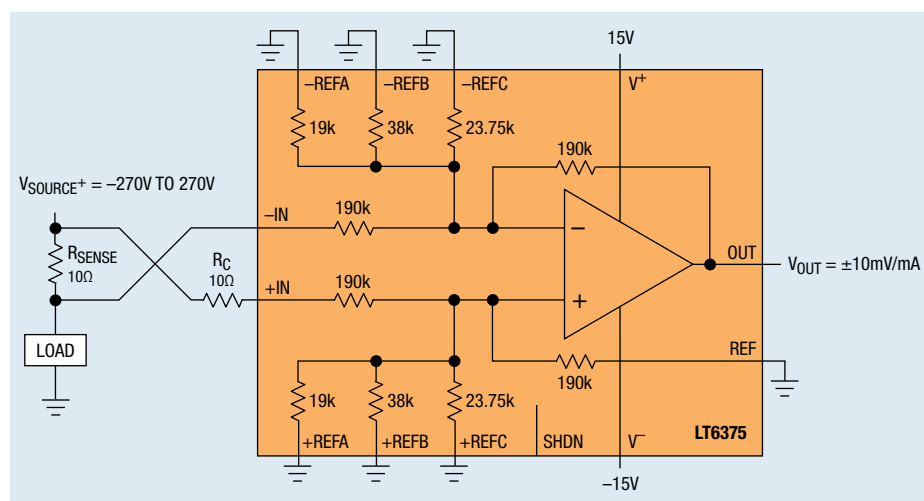
Notes: Some parameters vary between single/dual/quad versions • For a complete list of products and full specifications visit www.linear.com • OTT=Over-The-Top Inputs

Programmable Gain and Gain Selectable Amplifiers

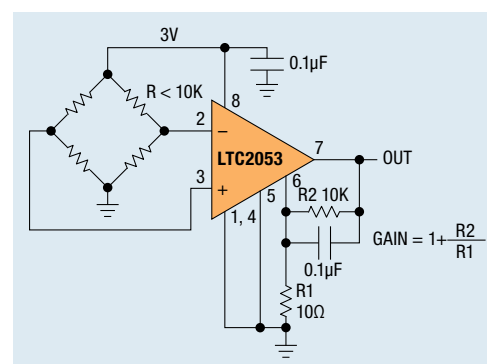
- High Precision Over Temperature:
 - I-Grade: -40°C to 85°C
 - H-Grade: -40°C to 125°C
- Integrated Resistors Simplify Design

Part Number	Channels	Gain Range	GBW (MHz)	Rail-to-Rail	V_s (V)	I_s (mA)	Temperature Grade	Features
LT1997-3	1	-13 to 14	1.4	IN/OUT	3.3 to 50	0.4	I, H	$\pm 160\text{V}$ Common Mode Range Selectable
LT6375	1		0.58	IN/OUT	3 to 50	0.4	I, H	$\pm 270\text{V}$ Common Mode Range Diff Amp
LTC6910	1	0 to 100	11	In/Out	2.7 to 10.5	3	I, H	Programmable 3-Bit Digital Gain Control
LTC6911	2	0 to 100	11	In/Out	2.7 to 10.5	3	I, H	Dual, Programmable Matched Channels
LTC6912	2	0 to 100	30	In/Out	2.7 to 10.5	2.75	I, H	Dual, Programmable Independent Channels
LTC6915	1	0 to 4096	0.2	In/Out	2.7 to 11	1.6	I, H	Zero-Drift PGA Instrumentation Amp
LT1991A	1	-13 to 14	0.56	Out	2.7 to 36	0.11	I, H	Precision Pin-Configurable Diff Amp
LT1990A	1	1 to 10	0.1	Out	2.7 to 36	0.12	I, H	$\pm 250\text{V}$ Input Pin-Configurable Diff Amp
LT1995	1	-7 to 8	30		5 to 36	8.5	I	High Speed Pin-Configurable Diff Amp
LT1996	1	-117 to 118	0.56	Out	2.7 to 36	0.11	I	Precision Pin-Configurable Diff Amp

$\pm 270\text{V}$ Input Common Mode Difference Amplifier



Differential Bridge Amplifier



Instrumentation Amplifiers

- High Precision Over Temperature:
 - I-Grade: -40°C to 85°C
 - H-Grade: -40°C to 125°C
- High Impedance Differential Inputs

Part Number	V_{os} Max 25°C (μV)	Gain Error Max (%)	CMRR MIN (dB)	I_b Max (nA)	V_s (V)	I_s (mA)	Temperature Grade	Features
LTC2053	10	0.01	105	10	2.7 to 11	1.300	I, H	Zero-Drift Instrumentation Amp
LT1167	40	0.02	126	0.35	4.6 to 40	1.300	I	Precision Low Bias Current In Amp
LT1168	40	0.02	126	0.25	4.6 to 40	0.530	I	Precision Power Current In Amp
LT1789	100	0.2	100	40	2.2 to 36	0.095	I	Micropower Precision In Amp
LTC6915	10	0.075	105	10	2.7 to 11	1.600	I, H	Zero-Drift PGA Instrumentation Amp

High Temp (125°C) Comparators

- Fully Specified for -40°C to 125°C Operation
- High Voltage, Over-The-Top Inputs
- High Voltage, Open Collector Outputs
- High Sink Current Output
- Ideal for Level Translation
- Combination Parts Include:
 - Internal Voltage Reference
 - Current Sense Amplifiers

Part Number	Channels	Internal Reference	V_s (V)	Max Input Voltage (V)	Max Output Voltage (V)	I_s Max (μA)	Prop Delay (μs)	Package
LT1716	1	No	2.7 to 44	44	V_{SUPPLY}	50	9	SOT23
Comparator Combined with Voltage Reference								
LT6700	2	400mV	1.4 to 18	18	18	15	18	SOT23, 2x3mm DFN
LT6700HV	2	400mV	1.4 to 18	18	36	15	18	SOT23, 2x3mm DFN
LT6703	1	400mV	1.4 to 18	18	18	11	18	SOT23, 2x2mm DFN
LT6703HV	1	400mV	1.4 to 18	18	36	11	18	SOT23, 2x2mm DFN
Comparator Combined with High Side Current Sense and Voltage Reference								
LT6108-1	1	400mV	2.7 to 60	60	60	650	3	MSOP8, 2x3mm DFN
LT6108-2	1	400mV	2.7 to 60	60	60	650	3	MSOP8, 2x3mm DFN
LT6109	2	400mV	2.7 to 60	60	60	700	3	MSOP10
LT6118	1	400mV	2.7 to 60	60	60	650	3	MSOP8, 2x3mm DFN
LT6119	2	400mV	2.7 to 60	60	60	700	3	MSOP10

High Speed Amplifiers

Features:

- High Gain Bandwidth Product and Slew Rate
- Fully Specified Over Temperature:
 - I-Grade: -40°C to 85°C
 - H-Grade: -40°C to 125°C

Part Number	Channels	GBW Typ 25°C (MHz)	Slew Rate Typ 25°C (V/ μs)	V_{OS} Max 25°C (μV)	I_B Max 25°C (nA)	e_n Typ 25°C (nV/ $\sqrt{\text{Hz}}$)	I_S Max 25°C (mA)	V_S Range (V)	Rail-to-Rail I/O	Temperature Grade
LTC6268-10 LTC6269-10	1/2	4000	1000	700	0.00002	4	18	3.1 to 5.25	Out	I, H
LTC6360	1	1000	135	250	30000	2.3	17.5	4.75 to 5.25	Out	I, H
LTC6252/3/4	1/2/4	720	280	350	650	2.75	3.5	2.5 to 5.25	Yes	I, H
LT6553/4	3	650	650	10000	50000		11	4.5 to 13.2		I
LT6555/6	3	650	650	16000	45000		12	4.5 to 12.6		I
LT6557/8	3	500	2200	40000	70000		25	3 to 7.5		I
LTC6268/9	1/2	500	400	700	0.00002	4.3	18	3.1 to 5.25	Out	I, H
LT1818/9	1/2	400	2500	1500	8000	6	10	3.5 to 12.6		I
LT1395/6/7	1/2/4	400	800	12000		4.5	6.5	3 to 12.6		H
LT1806/7	1/2	325	125	550	4000	3	13	2.5 to 12.6	Yes	I
LT1398/9	2/3	300	300	10000	50000	4.5	6.5	4 to 15.5		I
LT6552	1	300	2500	20000	50000	55	13.5	3 to 12.6	Out	I
LT1815/6/7	1/2/4	220	1500	1500	8000	6	7.8	2.5 to 12.6		I
LT6230/1/2	1/2/4	215	70	500	10000	1	3.75	3 to 12.6	Out	I
LT6210/1	1/2	200	700	6000	39000	6.5	8.3	3 to 13.2	Out	I
LT6300/1	2/4	200	600	5000	4000	8	13.5	8 to 27		I
LT1722/3/4	1/2/4	200	70	400	300	3.8	4.5	4.6 to 12.6		I
LT1468-2/9-2	2/4	200	30	75	40	5	5	9 to 36		I
LTC6246/7/8	1/2/4	180	90	500	350	4.2	1	2.5 to 5.25	Yes	I, H
LT6200/1	1/2	165	50	1000	40000	0.95	23	2.5 to 12.6	Yes	I
LT1809/10	1/2	160	300	2500	8000	16	17	2.5 to 12.6	Yes	I
LT6550/1	3/4	110	340	70000	65000	12	11	3 to 12.6	Out	I
LT1812/3/4	1/2/4	100	750	1500	4000	8	3.6	2.5 to 12.6		I
LT6205/6/7	1/2/4	100	600	4500	30000	9	5.6	3 to 12.6	Out	I, H
LT6202/3/4	1/2/4	100	25	500	7000	1.9	3.5	2.5 to 12.6	Yes	I

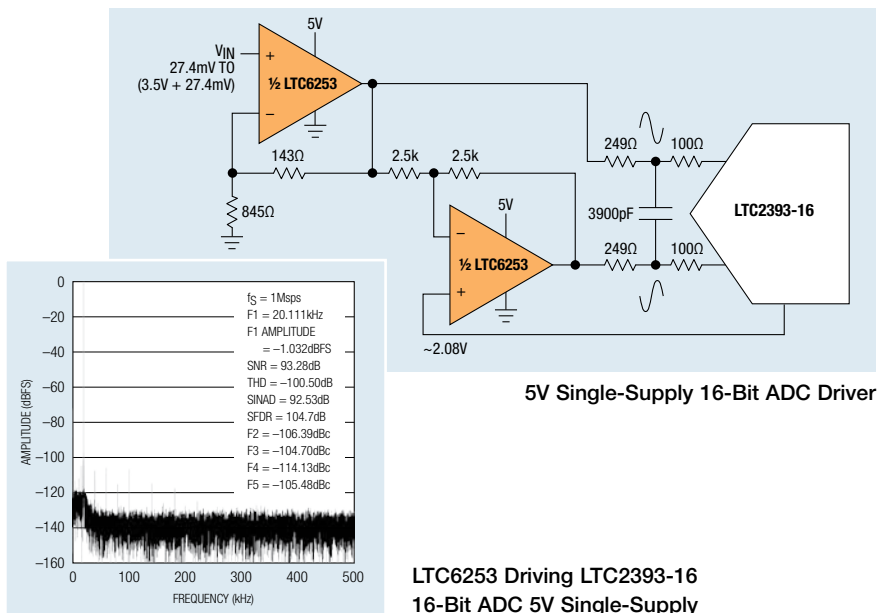
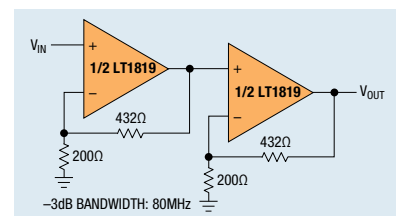
Notes: Some parameters vary between single/dual/quad version • For a complete list of products and full specifications visit www.linear.com

LTC6253: 720MHz, 3.5mA Power Efficient Rail-to-Rail I/O Op Amp

Features:

- Gain Bandwidth Product: 720MHz
- -3dB Frequency ($A_V = 1$): 400MHz
- Low Quiescent Current: 3.5mA Max
- High Slew Rate: 280V/ μs
- Input Common Mode Range Includes Both Rails
- Output Swings Rail-to-Rail
- Low Broadband Voltage Noise: 2.75nV/ $\sqrt{\text{Hz}}$
- Power-Down Mode: 42 μA
- Fast Output Recovery
- Supply Voltage Range: 2.5V to 5.25V
- Input Offset Voltage: 350 μV Max
- Large Output Current: 90mA

80MHz, 20dB Gain Block

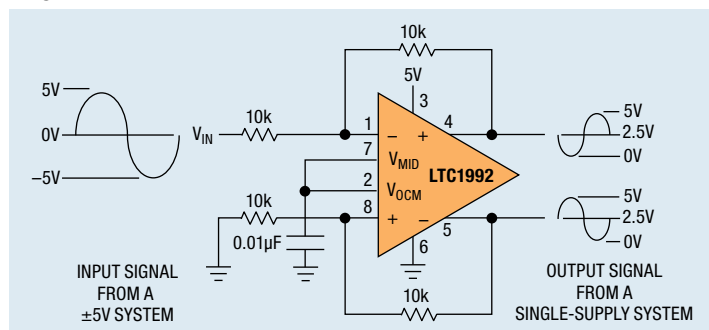


Differential Amplifiers/ADC Drivers

Applications:

- Pipeline ADC Drivers
- SAR ADC Drivers
- Differential Driver/Receiver
- Single-Ended to Differential Conversion

Single-Ended to Differential Conversion



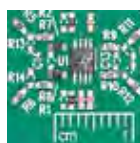
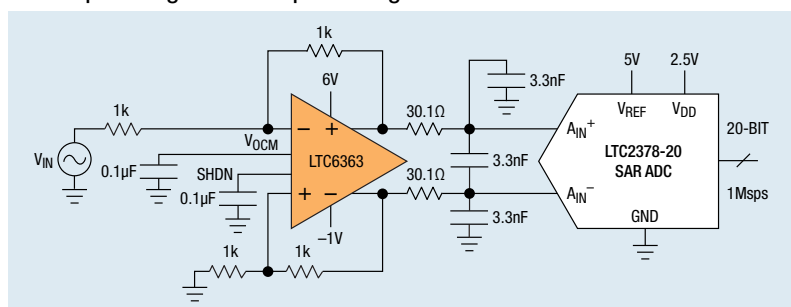
Part Number	Input Frequency (MHz)	Gain	-72dB HD2/HD3 (MHz)	-84dB HD2/HD3 (MHz)	Input-Referred Noise (nV/√Hz)	Settling Time (ns)	V _S (V)	I _S Max (mA)	Temperature Grade	Comments
LTC6417	DC to 700	0dB	140	30	1.5	0.8 (1%)	4.75 to 5.25	140	I	Can Drive 50Ω
LTC6409	DC to 600	Resistor Set	120	100	1.1	1.9 (1%)	2.7 to 5.25	56	I, H	Input Common Mode range includes Ground
LTC6404-1	DC to 100	Resistor Set	25	11	1.5	17 (0.01%)	2.7 to 5.25	35.5	I, H	Rail-to-Rail Out, AV≥1
LTC6404-2	DC to 100	Resistor Set	40	30	1.5	15 (0.01%)	2.7 to 5.25	38	I, H	Rail-to-Rail Out, AV≥2
LTC6404-4	DC to 100	Resistor Set	50	20	1.5	14 (0.01%)	2.7 to 5.25	39	I, H	Rail-to-Rail Out, AV≥4
LTC6406	DC to 70	Resistor Set	40	30	1.6	11 (0.1%)	2.7 to 3.5	22	I	Rail-to-Rail In
LTC6405	DC to 70	Resistor Set	35	24	1.6	11 (0.1%)	4.5 to 5.5	23	I	Rail-to-Rail In
LTC6403	DC to 40	Resistor Set	10	7	2.8	30 (0.1%)	2.7 to 5.25	11.8	I	Rail-to-Rail Out
LTC1992	DC to 2	1, 2, 5, 10 V/V, Resistor Set	0.05	0.01	35	2000 (1%)	2.7 to 12	1.2	I, H	Rail-to-Rail Out
LT6350	DC to 1	6dB, Resistor Configurable	1	0.4	1.9	240 (0.01%)	2.7 to 12	5.8	I, H	Rail-to-Rail In and Out
LTC6362	DC to 0.1	Resistor Set	0.1	0.06	3.9	180 (0.01%)	2.8 to 5.25	1.06	I, H	Rail-to-Rail In and Out
LTC6363	DC to 0.1	Resistor Set	0.1	0.05	2.9	420 (0.01%)	2.8 to 11	1.85	I, H	Rail-to-Rail Out

LTC6363: Precision Low Power RRIO Differential Op Amp

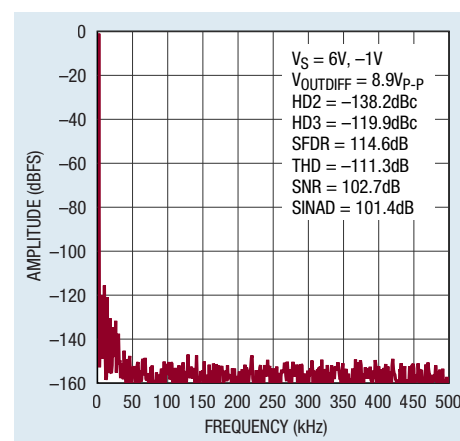
Features:

- 1mA Supply Current
- Single 2.8V to 11V Supply
- Fully Differential Input and Output
- 100μV Max Offset Voltage
- 160nA Max Input Bias Current
- Fast Settling: 780ns to 18-Bit, 8V_{P-P} Output
- Low Distortion: -116dBc at 1kHz, 8V_{P-P}
- Rail-to-Rail Inputs and Outputs
- 2.9nV/√Hz Input-Referred Noise
- 500MHz Gain-Bandwidth Product

DC Coupled Single-Ended Input Driving Differential 18-Bit ADC



LTC6363
Actual Size
Demo Board



RF Detectors

Applications:

- RF Sensing
- Remote Door Lock
- In-Car Cellular Compenser
- Software-Defined Radio



LTC5582
Actual Size
Demo Board

Part Number	Function	Op Frequency	Dynamic Range (dB)	Detect Range (dBm)	Accuracy (dB)	V _{CC} (V)	I _{CC} (mA)	Package
LT5538	Wideband Log Detector	40MHz – 3.8GHz	75	–75 to +5	± 1	3.0 to 5.25	29	3x3 DFN-8
LT5534	Log Average Power Detector	50MHz – 3GHz	60	–63 to –2	± 0.5	2.7 to 5.25	7	2x2 SC70
LTC5505	Schottky Peak Detector	0.3 – 3.5GHz	44	–32 to +18	± 2	2.7 to 5.25	0.5	SOT-23
LTC5507	Schottky Peak Detector	0.1 – 1GHz	46	–32 to +14	± 2	2.7 to 5.25	0.55	SOT-23
LT5537	Log-Linear Detector	LF – 1GHz	83	–80 to +10	± 1	2.7 to 5.25	13.5	3x2 DFN-8
LT5581	RMS Detector	10MHz – 6GHz	40	–34 to +6	± 1	2.7 to 5.25	1.4	3x2 DFN-8
LTC5582	RMS Detector	40MHz – 10GHz	57	–56 to +1	± 0.5	3.1 to 3.50	41.6	3x3 DFN-10
LTC5583	Dual RMS Detector	40MHz – 6GHz	60	–58 to +1	± 0.2	3.1 to 3.50	90.1	4x4 QFN-24
LTC5587	RMS + ADC	10MHz – 6GHz	40	–34 to +6	± 1	2.7 to 3.60	3	3x3 DFN-12
LTC5564	7ns Response Time Schottky Peak Detector + Fast Comparator	600MHz – 15GHz	25	–10 to +16	± 2	3.0 to 5.50	44	3x3 QFN-16
LTC5596	RMS Detector	100MHz – 40GHz	35	–37 to –2	±1	2.7 to 3.6	30	2x2 DFN-3

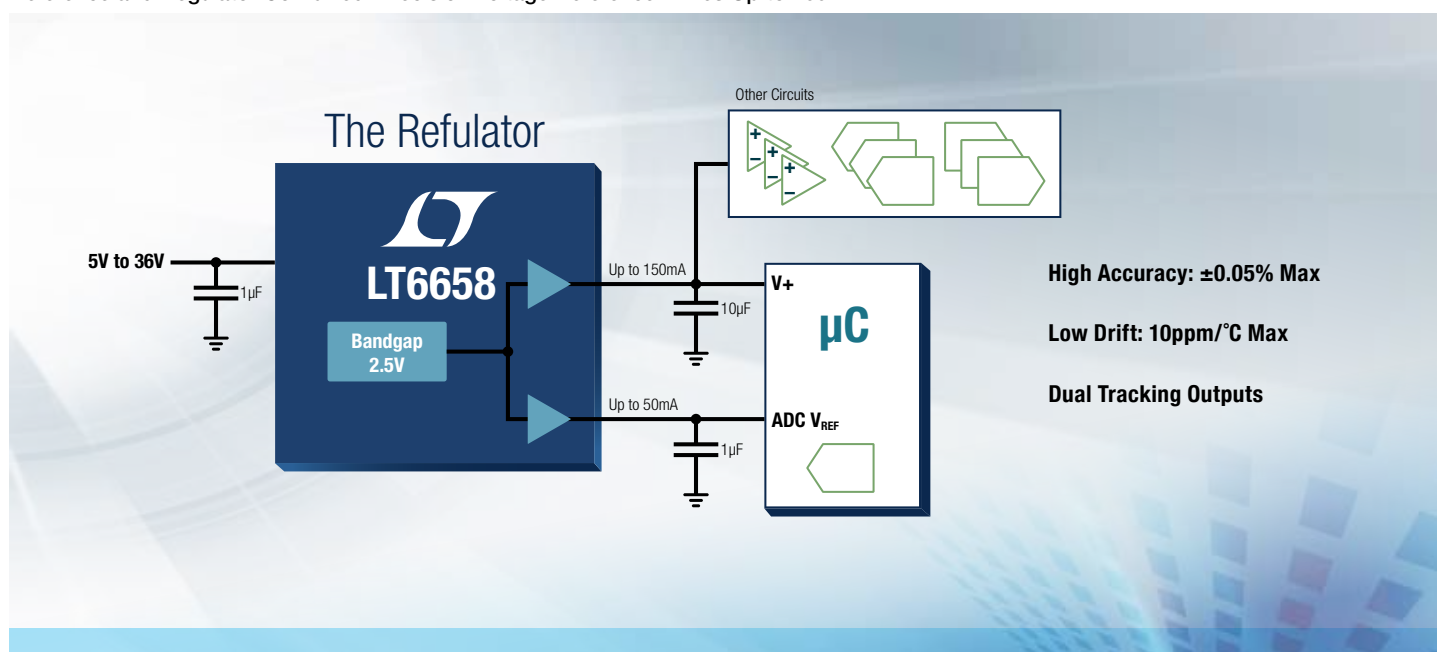
High Temp (125°C) Voltage References

Features:

- Fully Specified for High Temperature Operation
- Outstanding Accuracy, Drift and Noise
- Buffered Outputs for Symmetrical Drive
- Low Dropout and Low Power Shutdown
- Available in Ceramic Hermetic Packages
 - Immune from Humidity Effect
 - Excellent Long Term Stability
 - Excellent Thermal Hysteresis Performance

Part Number	Temperature Range	V _{OUT} (V)	Initial Accuracy	Temp Coeff Max (ppm/°C)	I _{OUT} (mA)	Package	Supply Voltage (V)	Features
LT6657A	-40°C to 125°C	1.25, 2.5, 3, 4.096, 5	±0.1%	1.5	±10	MSOP8	V _{OUT} +50mV to 40	0.5ppm Noise
LT6657B	-40°C to 125°C	1.25, 2.5, 3, 4.096, 5	±0.1%	3	±10	MSOP8	V _{OUT} +50mV to 40	0.5ppm Noise
LT6658A	-40°C to 125°C	1.2, 1.8, 2.5, 3, 3.3, 5	±0.05%	10	-40, +200	MSOP16E	V _{OUT} +2.5 to 36	Dual Tracking Outputs
LT6658B	-40°C to 125°C	1.2, 1.8, 2.5, 3, 3.3, 5	±0.1%	20	-40, +200	MSOP16E	V _{OUT} +2.5 to 36	Dual Tracking Outputs
LT6654A	-40°C to 125°C, -55°C to 125°C	1.25, 2.048, 2.5, 3, 3.3, 4.096, 5	±0.05%	10	±10	SOT23 Ceramic LS8	2.5 to 36	1.5ppm Noise, Excellent Load & Line Regulation
LT6654B	-40°C to 125°C, -55°C to 125°C	1.25, 2.048, 2.5, 3, 3.3, 4.096, 5	±0.1%	20	±10	SOT23 Ceramic LS8	2.5 to 36	1.5ppm Noise, Excellent Load & Line Regulation
LTC6652A	-40°C to 125°C	1.25, 2, 2.5, 3, 3.3, 4, 5	±0.05%	5	±5	MSOP8 Ceramic LS8	2.7 to 13.2	2ppm Noise, Low Dropout Shutdown <2μA
LTC6652B	-40°C to 125°C	1.25, 2, 2.5, 3, 3.3, 4, 5	±0.1%	10	±5	MSOP8 Ceramic LS8	2.7 to 13.2	2ppm Noise, Low Dropout Shutdown <2μA
LTC6655B	-40°C to 125°C	1.25, 2.048, 2.5, 3, 3.3, 4.096, 5	±0.025%	2	±5	MSOP8 Ceramic LS8	3.0 to 13.2	0.25ppm, Low Dropout Shutdown <20μA
LTC6655C	-40°C to 125°C	1.25, 2.048, 2.5, 3, 3.3, 4.096, 5	±0.05%	5	±5	MSOP8 Ceramic LS8	3.0 to 13.2	0.25ppm, Low Dropout Shutdown <20μA
LT1431MP/M	-55°C to 125°C	2.5, 5 or Adj.	±0.4%	50	1 to 100	SOP8 CERDIP	2.5 to 36	2.5V, 5V or Adjustable Shunt Regulator

Reference and Regulator Combined: Precision Voltage Reference Drives Up to 200mA



Notes:

Sales Offices

NORTH AMERICA

WESTERN U.S.

2085 E. Technology Cir., Ste. 101
Tempe, AZ 85284
Tel: (480) 777-1600
Fax: (480) 838-1104

7595 Irvine Center Dr., Ste. 120
Irvine, CA 92618
Tel: (949) 453-4650
Fax: (949) 453-4765

11300 W. Olympic Blvd., Ste. 700
Los Angeles, CA 90064
Tel: (818) 703-0835
Fax: (818) 703-0517

720 Sycamore Dr.
Milpitas, CA 95035
Tel: (408) 428-2050
Fax: (408) 432-6331

3009 Douglas Blvd., Ste. 140
Roseville, CA 95661
Tel: (916) 787-5210
Fax: (916) 787-0110

5465 Morehouse Dr., Ste. 155
San Diego, CA 92121
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Niwoot, CO 80503
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Salt Lake City, NV
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Lake Oswego, OR 97035
Tel: (503) 431-6960
Fax: (503) 431-6961

2018 156th Ave. NE, Ste. 100
Bellevue, WA 98007
Tel: (425) 748-5010
Fax: (425) 748-5009

MIDWEST U.S.

2040 E. Algonquin Rd., Ste. 512
Schaumburg, IL 60173
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Indiana
Tel: (847) 925-0860

Iowa
Tel: (847) 925-0860

Kansas
Tel: (913) 634-7966

Michigan
Tel: (440) 239-0817

7805 Telegraph Rd., Ste. 225
Bloomington, MN 55438
Tel: (952) 903-0605

Missouri
Tel: (913) 634-7966

Columbus, OH
Tel: (614) 488-4466

7550 Lucerne Dr., Ste. 106
Middleburg Heights, OH 44130
Tel: (440) 239-0817
Fax: (440) 239-1466

Wisconsin
Tel: (262) 331-4040

NORTHEAST U.S.

Connecticut
Tel: (860) 228-4104

15 Research Place
North Chelmsford, MA 01863
Tel: (215) 638-9667
Fax: (978) 656-4760

New York
Tel: (978) 656-4750

3220 Tillman Dr., Ste. 120
Bensalem, PA 19020
Tel: (215) 638-9667
Fax: (215) 638-9764

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Huntsville, AL
Tel: (256) 881-9850

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Tel: (770) 888-8137

170 Weston Oaks Ct.
Cary, NC 27513
Tel: (919) 677-0066
Fax: (919) 678-0041

8500 N. Mopac, Ste. 603
Austin, TX 78759
Tel: (512) 795-8000
Fax: (512) 795-0491

22515 Sail Harbour Ct.
Katy, TX 77450
Tel: (713) 463-5002

2301 W. Plano Pkwy., Ste. 109
Plano, TX 75075
Tel: (972) 733-3071
Fax: (972) 380-5138

CANADA

Calgary, AB
Tel: (403) 455-3577

Vancouver, BC
Tel: (604) 783-3084

Ottawa, ON
Tel: (613) 680-3473

Toronto, ON
Tel: (440) 239-0817

Montreal, QC
Tel: (514) 236-6261

ASIA/PACIFIC

AUSTRALIA/NEW ZEALAND

133 Alexander Street
Crows Nest, NSW 2065, Australia
Tel: +61 (0)2 9432 7803
Fax: +61 (0)2 9439 2738

Suite 121A, 89 High Street
Kew, Victoria 3101, Australia
Tel: +61 3 9854 6120

CHINA

Room 1763, Office Building
New Century Hotel
No. 6 Southern Road of Capital Gym
Haidian District
Beijing, China 100044
Tel: +86 (10) 6801-1080
Fax: +86 (10) 6805-4030

Unit 09, 14/F, Complex Building
No. 88 Shenghe Yi Rd., Hi-Tech Zone
Sichuan Province, **Chengdu City**
China 610041
Tel: +86 028-8555 9725
Fax: +86 028-8542 6859

Unit 1503-04, Metroplaza Tower 2
223 Hing Fong Road
Kwai Fong, N.T., **Hong Kong**
Tel: +852 2428-0303
Fax: +852 2348-0885

Room 2701, City Gateway
No. 398 Cao Xi North Road
Shanghai, China 200030
Tel: +86 (21) 6375-9478
Fax: +86 (21) 5465-5918

Room 2109-2111, 21/F, Block D
Southern International Plaza
3013 Yitian Road, Futian District
Shenzhen, China 518048
Tel: +86 755-2360-4866
Fax: +86 755-2360-4966

Room 1805, Tower A
Optics Valley International Plaza
No. 889 Luoyu Rd., Wuchang District
Wuhan, China 430074
Tel: +86 027-8665 9231
Fax: +86 027-8665 9241

Rm. 2410, Tower A, Greenland SOHO
No. 5 ZhangBa 1 Road
High-Tech Development Zone
Shaanxi Province
Xian, China 710065
Tel: +86 029-6851 8978 / 68518979
Fax: +86 029-6851 8976

INDIA

602, 6th Floor, Prestige Meridian-1
No. 29, MG Road, **Bangalore**
560001, India
Tel: +91 80 4012-4610
Fax: +91 80 4012-4612

JAPAN

7F, Sakuradori Ohtsu KT Bldg.
3-20-22 Marunouchi, Naka-ku
Nagoya-shi, 460-0002, Japan
Tel: +81 (52) 955-0056
Fax: +81 (52) 955-0058

6F Kearny Place Honmachi Bldg.
1-6-13 Awaza, Nishi-ku
Osaka-shi, 550-0011, Japan
Tel: +81 (6) 6533-5880
Fax: +81 (6) 6543-2588

8F Shuwa Kioicho Park Bldg.
3-6 Kioicho Chiyoda-ku
Tokyo, 102-0094, Japan
Tel: +81 (3) 5226-7291
Fax: +81 (3) 5226-0268

KOREA

10F, Yundang Building
439 Teheran-Ro, Gangnam-Gu
Seoul, Korea 06158
Tel: +82 (2) 792-1617
Fax: +82 (2) 792-1619

SINGAPORE

507 Yishun Industrial Park A
Singapore 768734
Tel: +65 6753-2692
Fax: +65 6752-0108

TAIWAN

8F-1, 77, Nanking E. Rd., Sec. 3
Taipei, Taiwan
Tel: +886 (2) 2505-2622
Fax: +886 (2) 2516-0702

EUROPE

FINLAND

Kirkkokatu 31
90100 **Oulu**, Finland
Tel: +358 (0)46 712 2171
Fax: +358 (0)46 712 175

Teknobulevardi 3-5, P.O. Box 35
FIN-01531 **Vantaa**, Finland
Tel: +358 (0)46 712 2171
Fax: +358 (0)46 712 2175

FRANCE

Parc Tertiaire Silic
2 Rue de la Couture, BP10217
94518 **Rungis** CEDEX, France
Tel: +33 (1) 56 70 19 90
Fax: +33 (1) 56 70 19 94

GERMANY

Haselburger Damm 4
D-59387 **Ascheberg**, Germany
Tel: +49 (2593) 9516-0
Fax: +49 (2593) 951679

Osterfeldstrasse 84, Haus C
D-85737 **Ismaning**, Germany
Tel: +49 (89) 962455-0
Fax: +49 (89) 963147

Jesinger Strasse 65
D-73230 **Kirchheim/Teck**, Germany
Tel: +49 (0)7021 80770
Fax: +49 (0)7021 807720

ITALY

Via Torri Bianche 3, Palazzo Larice
20871 **Vimercate (MB)**, Italy
Tel: +39 039 596 5080
Fax: +39 039 596 5090

SWEDEN

Electrum 204, Isafjordsgatan 22
SE-164 40 **Kista**, Sweden
Tel: +46 (8) 623 16 00
Fax: +46 (8) 623 16 50

UNITED KINGDOM

3 The Listons, Liston Road
Marlow, Buckinghamshire SL7 1FD
United Kingdom
Tel: +44 (1628) 477066
Fax: +44 (1628) 478153



Linear Technology Corporation

1630 McCarthy Blvd. Milpitas, CA 95035-7417 • Tel: 408-432-1900 • www.linear.com



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