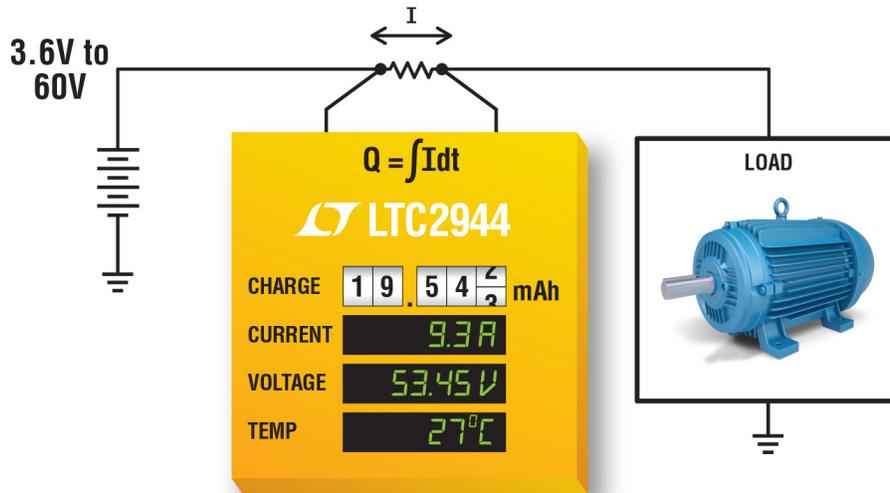


# 60V Battery Gas Gauge

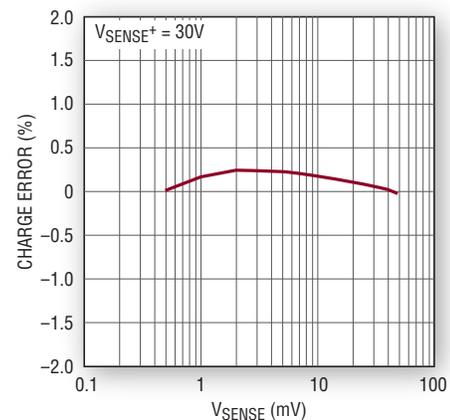


The LTC<sup>®</sup>2944 multicell battery gas gauge makes direct measurements of 3.6V to 60V battery stacks. Absolutely no level shifting circuitry is required to interface with multicell voltages, minimizing current consumption and preserving measurement accuracy. The LTC2944 is a true high voltage gas gauge that measures charge, voltage, current and temperature to within 1% accuracy — all of the essential parameters required to accurately assess battery state of charge (SOC).

## Features

- Measures Accumulated Battery Charge and Discharge
- 3.6V to 60V Operating Range for Multicell Applications
- 16-Bit ADC Measures Voltage, Current and Temperature
- 1% Charge, Voltage, Current and Temperature Accuracy
- I<sup>2</sup>C/SMBus Interface
- Configurable Alert Output/Charge Complete Input
- Quiescent Current <150µA
- Small 8-Pin 3mm × 3mm DFN Package

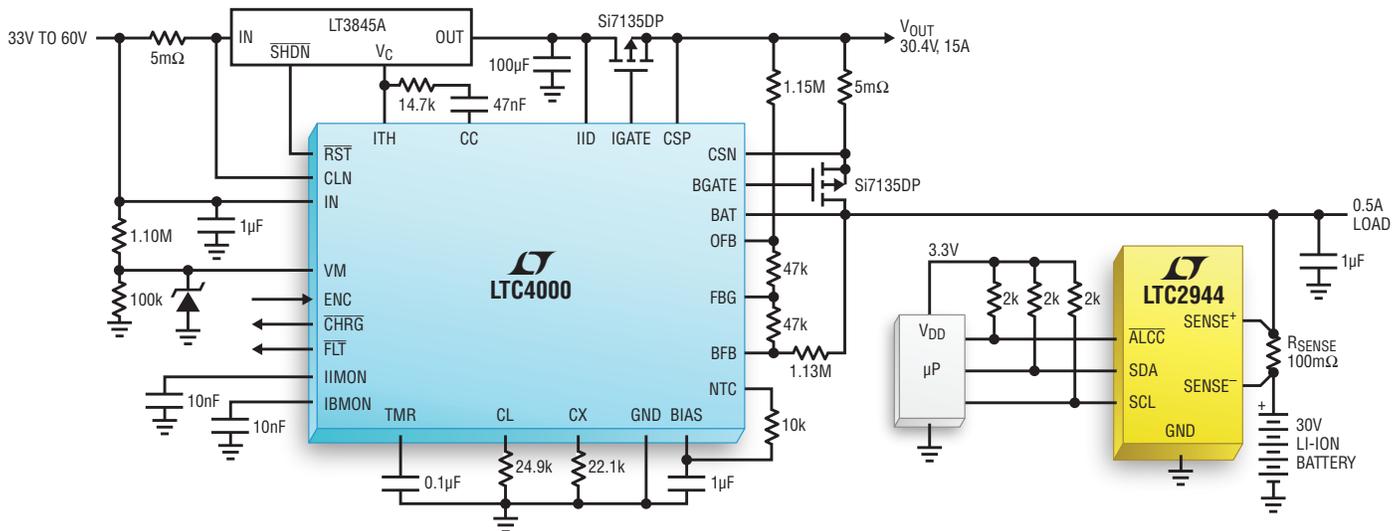
Total Charge Error vs Differential Sense Voltage



## Battery Gas Gauges and Power Monitors

Part Number	Operating Range (V)	Interface	Integrated Sense Resistor	Measures					
				Energy	Charge	Power	Voltage	Current	Temperature
LTC2941/LTC2941-1	2.7 to 5.5	I <sup>2</sup> C	-/1A		•				
LTC2942/LTC2942-1	2.7 to 5.5	I <sup>2</sup> C	-/1A		•		•		•
LTC2943/LTC2943-1	3.6 to 20	I <sup>2</sup> C	-/1A		•		•	•	•
LTC2944	3.6 to 60	I <sup>2</sup> C			•		•	•	•
LTC4151	7 to 80	I <sup>2</sup> C					•	•	
LTC2945	0 to 80	I <sup>2</sup> C				•	•	•	
LTC2946	0 to 100	I <sup>2</sup> C		•	•	•	•	•	•
LTC2947	0 to 15	I <sup>2</sup> C	30A	•	•	•	•	•	•
LTC4150	2.7 to 8.5	Interrupt			•				

# Power Management Multicell Battery Chargers



The LTC4000 is a high voltage controller and power manager that converts virtually any externally compensated DC/DC power supply into a full-featured battery charger. The LTC4000 is capable of driving typical DC/DC converter topologies, including buck, boost, buck-boost, SEPIC and flyback. The device offers precision input and charge current regulation and operates across a wide 3V to 60V input and output voltage range, making it compatible with a variety of input voltage sources, battery stacks and chemistries including lithium-ion/polymer/phosphate and sealed lead-acid (SLA). Typical applications include high power battery charger systems, high performance portable instruments, battery backup systems, industrial battery-equipped devices and notebook/subnotebook computers.

## Battery Chargers for Multicell Applications

Part Number	Maximum Charge Current (A)	V <sub>BAT</sub> Range (V)	Battery Chemistry	Number of Battery Cells (Series)	Input Voltage (V)	Integrated Power Transistor	Synchronous	Charge Termination	Package (mm × mm)
<b>Switch Mode Multichemistry Buck (Step-Down) Battery Chargers</b>									
LTC4121	0.4	3.6 to 18	SLA LiFePO <sub>4</sub> Li-Ion	SLA 1-5 LiFePO <sub>4</sub> 1-4 Li-Ion	4.3 to 40	✓	✓	Timer	3×3 QFN-16
LT3652	2	3.3 to 14.4	SLA LiFePO <sub>4</sub> Li-Ion	SLA 1-4 LiFePO <sub>4</sub> 1-3 Li-Ion	4.9 to 32 <sup>†</sup>	✓	–	Timer or C/10	3×3 DFN-12, MSOP-12E
LT3652HV	2	3.3 to 18	SLA LiFePO <sub>4</sub> Li-Ion	SLA 1-5 LiFePO <sub>4</sub> 1-4 Li-Ion	4.9 to 34 <sup>†</sup>	✓	–	Timer or C/10	3×3 DFN-12, MSOP-12E
LTC4009/LTC4009-1 <sup>‡</sup> / LTC4009-2 <sup>‡</sup>	4	2 to 28	NiMH NiCd SLA Li-Ion	2-18 Ni, 1-6 Li-Ion	6 to 28	–	✓	External µC	4×4 QFN-20
LTC4012/LTC4012-1 <sup>‡</sup> / LTC4012-2 <sup>‡</sup> /LTC4012-3	4	2 to 28	NiMH NiCd SLA Li-Ion	2-18 Ni, 1-6 Li-Ion	6 to 28	–	✓	External µC	4×4 QFN-20
LTC4015	15+ <sup>§</sup>	Up to 35	SLA LiFePO <sub>4</sub> Li-Ion	SLA 1-9 LiFePO <sub>4</sub> 1-8 Li-Ion	4.5 to 35	–	✓	Timer + C/X	5×7 QFN-38
LTC4000 <sup>#</sup> /LTC4000-1 <sup>#</sup> <sup>§</sup>	50 <sup>§</sup>	3 to 60	SLA LiFePO <sub>4</sub> Li-Ion	SLA 1-16 LiFePO <sub>4</sub> 1-14 Li-Ion	3 to 60 <sup>@</sup>	–	–	Timer + C/X	4×5 QFN-28 SSOP-28
<b>Switch Mode Multichemistry Buck-Boost Battery Chargers</b>									
LTC4020	20+ <sup>§</sup>	2.5 to 55	LiFePO <sub>4</sub> Li-Ion	1-15 LiFePO <sub>4</sub> 1-13 Li-Ion	4.5 to 55	–	✓	Timer + C/X	5×7 QFN-38
<b>Switch Mode Li-Ion Buck (Step-Down) Battery Chargers</b>									
LTC4001/LTC4001-1*	2	4.2	Li-Ion	1	4 to 5.5	✓	✓	Timer	3×3 QFN-16
LT3650-4.1/LT3650-4.2	2	4.1, 4.2	Li-Ion	1	4.75 to 32 <sup>†</sup> (40 Max)	✓	–	Timer + C/10	3×3 DFN-12 MSOP-12E
LT3650-8.2/LT3650-8.4	2	8.2, 8.4	Li-Ion	2	9 to 32 <sup>†</sup> (40 Max)	✓	–	Timer + C/10	3×3 DFN-12 MSOP-12E
LT3651-4.1/LT3651-4.2	4	4.1, 4.2	Li-Ion	1	6.5 to 32	✓	✓	Timer + C/10	5×6 QFN-36
LT3651-8.2/LT3651-8.4	4	8.2, 8.4	Li-Ion	2	9 to 32	✓	✓	Timer + C/10	5×6 QFN-36

<sup>†</sup> Minimum start-up voltage is +3.3V above V<sub>BATMAX</sub> <sup>‡</sup> -1 and -2 versions are fixed voltage options for 1-4 Li-Ion cells <sup>§</sup> -1 option has MPPC (Maximum Power Point Control) \* 4.1V cell voltage  
<sup>#</sup> Charging controller requires externally compensated switching regulator <sup>§</sup> Depends on external components <sup>@</sup> Greater than 60V is possible without the input current regulation/measurement function