CHANGE NOTIFICATION

Linear Technology Corporation
1630 McCarthy Blvd., Milpitas, CA 95035-7417
(408) 432-1900

May 11, 2015

Dear Sir/Madam: PCN# 051115

Subject: Notification of Change to LT3651-8.2/LT3651-8.4 Die and Datasheet

Please be advised that Linear Technology Corporation has made a minor metal mask change to the LT3651-8.2/LT3651-8.4 devices to improve overall efficiency, in particular at current levels below 4A. The improvement was achieved by optimizing the high-side switch turn on which reduces switch driver loss.

This change was qualified by performing characterization over the full operating temperature and voltage ranges and rigorous engineering evaluation across a range of application conditions. Revised silicon samples are available now. In addition, the datasheet will be changed to reflect the improved efficiency performance and changes to the boost drive current. These changes are shown on the attached pages of the marked-up datasheet. Product built using the new die and tested to the updated specifications will be shipped after July 11, 2015.

Should you have any further questions or concerns please contact your local Linear Technology Sales person or you may contact me at 408-432-1900 ext. 2077, or by e-mail at jason.hu@linear.com. If I do not hear from you by July 11, 2015, we will consider this change to be approved by your company.

Sincerely,

Jason Hu
Quality Assurance Engineer

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating junction temperature range, otherwise specifications are at T_A = 25°C (Note 2). V_{IN} = 20V, $\overline{SHDN}$ = 2V, SENSE = BAT = $V_{BAT(FLT)}$, C_{TIMER} = 0.68µF, R_T = 50k, CLP = CLN = V_{IN}, BOOST – SW = 4V.

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{IN} Operating Range		●	9.0		32	V
V_{IN} OVLO Threshold	V_{IN} Rising		32	35	40	V
V_{IN} OVLO Hysteresis				1.1		V
V_{IN} UVLO Threshold	V_{IN} Rising	●		8.7	9.0	V
V_{IN} UVLO Hysteresis				0.2		V
Battery Float Voltage, $V_{BAT(FLT)}$	LT3651-8.2	 ●	8.16 8.12	8.2	8.24 8.28	V V
	LT3651-8.4	 ●	8.36 8.32	8.4	8.44 8.48	V V
Battery Recharge Voltage Hysteresis	Threshold Voltage Relative to $V_{BAT(FLT)}$			–200		mV
Battery Precondition Threshold Voltage, $V_{BAT(PRE)}$	LT3651-8.2, V_{BAT} Rising LT3651-8.4, V_{BAT} Rising			5.65 5.80		V V
Battery Precondition Threshold Hysteresis	Threshold Voltage Relative to $V_{BAT(PRE)}$			90		mV
Operating V_{IN} Supply Current	CC/CV Mode, Top Switch On, I_{SW} = 0 Standby Mode Shutdown ($\overline{SHDN}$ = 0)			8.6 80 17		mA µA µA
Top Switch On Voltage	$V_{IN} – V_{SW}$, I_{SW} = 4A			480		mV
Bottom Switch On Voltage	V_{SW}, I_{SW} = 4A			–140		mV
BOOST Supply Current	Switch High, I_{SW} = 0, 2.5V < ($V_{BOOST} – V_{SW}$) < 8.5V			~~40~~	17	mA
BOOST Switch Drive	I_{BOOST}/I_{SW}, I_{SW} = 4A			~~25~~	22	mA/A
Precondition Current Sense Voltage	$V_{SENSE} – V_{BAT}$, V_{BAT} = 5.0V			14		mV
Input Current Limit Voltage	$V_{CLP} – V_{CLN}$, I_{LIM} Open	●	70	95	115	mV
CLP Input Bias Current				120		nA
CLN Input Bias Current				36		µA
I_{LIM} Bias Current		●	43	50	57	µA
System Current Limit Programming Gain	$V_{ILIM}/(V_{CLP} – V_{CLN})$, V_{ILIM} = 0.5V			11.5		V/V
Maximum Charge Current Sense Voltage	$V_{SENSE} – V_{BAT}$, V_{BAT} = 7.5V, $V_{RNG/SS}$ > 1.1V	●	88	95	103	mV
C/10 Trigger Sense Voltage	$V_{SENSE} – V_{BAT}$	●	4.5	8.6	12.3	mV
BAT Input Bias Current	Charging Terminated			0.1	1	µA
SENSE Input Bias Current	Charging Terminated			0.1	1	µA
RNG/SS Bias Current		●	44	50	56	µA
Charge Current Limit Programming Gain	$V_{RNG/SS}/(V_{SENSE} – V_{BAT})$, $V_{RNG/SS}$ = 0.5V	●	8.5	10.8	12.5	V/V
NTC Range Limit (High)	V_{NTC} Rising	●	1.25	1.36	1.45	V
NTC Range Limit (Low)	V_{NTC} Falling	●	0.27	0.29	0.31	V
NTC Threshold Hysteresis	% of Threshold			10		%
NTC Disable Impedance	Minimum External Impedance to GND	●	150	470		kΩ
NTC Bias Current	V_{NTC} = 0.75V	●	46.5	50	53.5	µA
Shutdown Threshold	$V_{\overline{SHDN}}$ Rising	●	1.15	1.20	1.23	V
Shutdown Hysteresis				95		mV
$\overline{SHDN}$ Input Bias Current				–10		nA
Status Low Voltage	$V_{\overline{CHRG}}$, $V_{\overline{FAULT}}$, $V_{\overline{ACPR}}$, Load = 10mA	●			0.45	V

LT3651-8.2/LT3651-8.4

Monolithic 4A High Voltage 2-Cell Li-Ion Battery Charger

FEATURES

- **Wide Input Voltage Range: 9V to 32V (40V Absolute Maximum)**
- **Programmable Charge Current Up to 4A**
- **Selectable C/10 or Onboard Timer Termination**
- **Dynamic Charge Rate Programming/Soft-Start**
- **Programmable Input Current Limit**
- ±0.5% Float Voltage Accuracy
- ±7.5% Charge Current Accuracy
- ±4% C/10 Detection Accuracy
- NTC Resistor Temperature Monitor
- Auto-Recharge at 97.5% Float Voltage
- Auto-Precondition at <70% Float Voltage
- Bad Battery Detection with Auto-Reset
- Average Current Mode, Synchronous Switcher
- User Programmable Frequency
- Low Profile (0.75mm) 5mm × 6mm 36-Lead QFN Package

APPLICATIONS

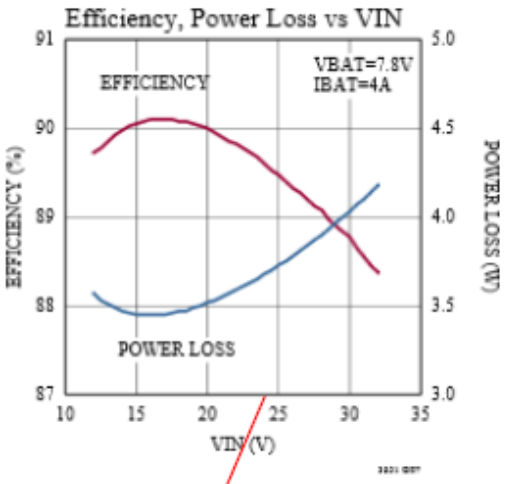
- Industrial Handheld Instruments
- 12V to 24V Automotive and Heavy Equipment
- Desktop Cradle Chargers
- Notebook Computers

DESCRIPTION

The LT®3651-8.2/LT3651-8.4 are 2-cell, 4A Li-Ion/Polymer battery chargers that operate over a 9V to 32V input voltage range. An efficient monolithic average current mode synchronous switching regulator provides constant current, constant voltage charging with programmable maximum charge current. A charging cycle starts with battery insertion or when the battery voltage drops 2.5% below the float voltage. Charger termination is selectable as either charge current or internal safety timer timeout. Charge current termination occurs when the charge current falls to one-tenth the programmed maximum current (C/10). Timer based termination is typically set to three hours and is user programm
below C/10 until timeout). Or
the LT3651-8.2/LT3651-8.4 s
into a standby mode.

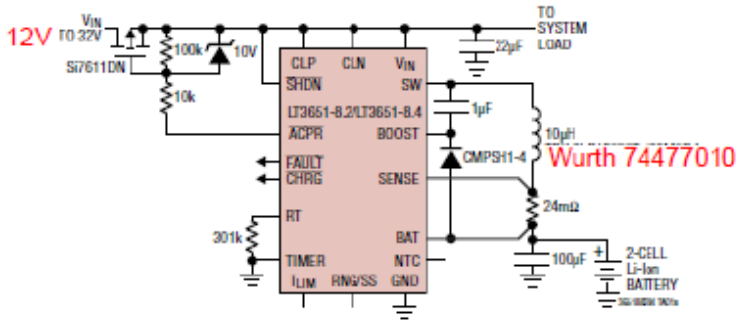
The LT3651-8.2/LT3651-8.4 c
A discharged battery is precor
charge and generates a signal i
monitors battery temperature
range. Excessive die temperat
Charge current is also reduce
current to prevent excessive i

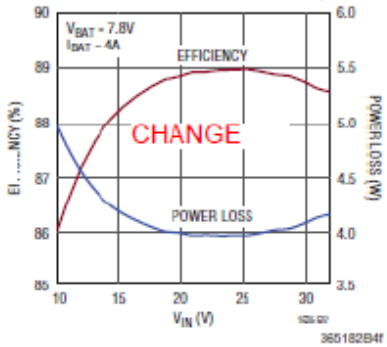
The LT3651-8.2/LT3651-8.4
6mm 36-lead QFN package.



TYPICAL APPLICATION

12V to 32V 2-Cell 4A Charger





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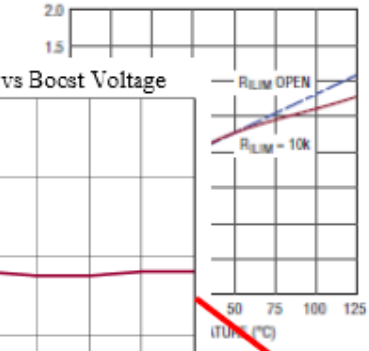
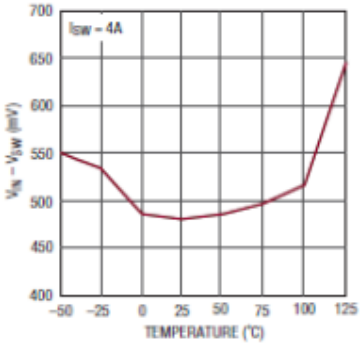
TYPICAL PERFORMANCE CHARACTERISTICS

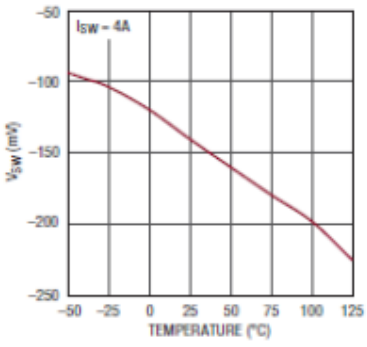
Input Current Limit Voltage Threshold vs Temperature



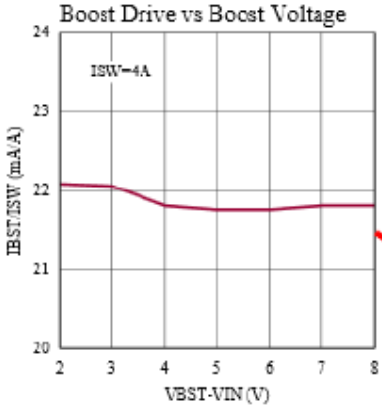
Topside Switch V_{ON} vs Temperature



Bottom Side Switch V_{ON} vs Temperature



Boost Drive vs Boost Voltage



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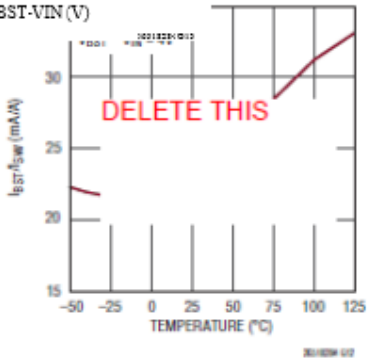
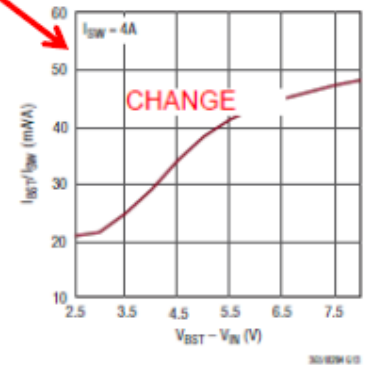
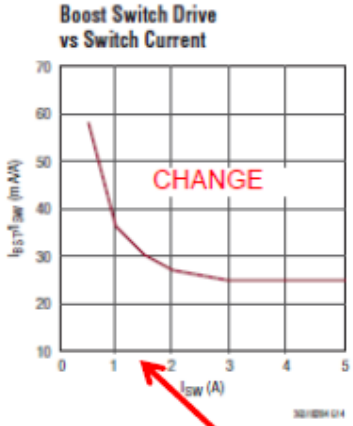


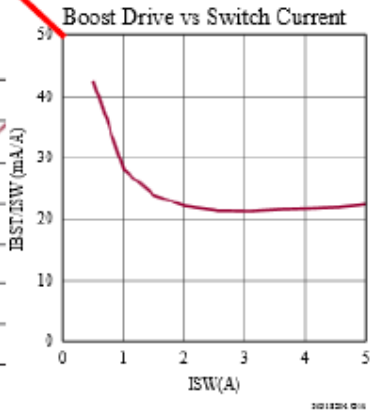
Boost Drive vs Boost Voltage



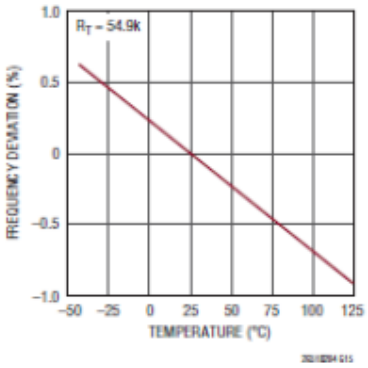
Boost Switch Drive vs Switch Current



Boost Drive vs Switch Current



Oscillator Frequency vs Temperature



Timer Resistor (R_T) vs Period and Frequency