

# LTC4079

## 60V, 250mA Linear Charger with Low Quiescent Current

### DESCRIPTION

Demonstration circuit 2133A features a simple battery charger circuit using the [LTC®4079](#) high-voltage monolithic linear charger. The DC2133 has an input voltage range from 2.7V to 60V and is capable of supplying up to 250mA charge current. The charge voltage is jumper-selectable to 4.2V or 8.4V. Charge current is adjustable via the PROG pin and initially programmed for 99mA. In shutdown or when unpowered, LTC4079 consumes only 10nA from the battery.

DC2133A is initially configured to enable charging from application of  $V_{IN}$  above the LTC4079 UVLO threshold.

The NTC input is connected to an on-board resistance to enable charging with only a 2-wire battery connection; however an external thermistor may be used with the NTC test point.

Termination is accomplished by timer method. Charging status is reflected by the CHRG LED.

**Design files for this circuit board are available at <http://www.linear.com/demo/DC2133A>**

LT, LT, LTC, LTM, Linear Technology and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.

### PERFORMANCE SUMMARY Specifications are at $T_A = 25^\circ\text{C}$

PARAMETER	CONDITIONS	TYPICAL VALUE
Input Voltage Range		2.7V to 60V
Default Charging Voltage	$V_{BAT} = 4.2$	4.2V
Default Charging Current	$R_{PROG} = 3.01k$	99mA
PROG Pin Voltage	$R_{PROG} = 3.01k, I_{CHG} = 99mA$	2.5V
Input Regulation Voltage	EN = REG (JP1)	10.3V
Default Charge Timer	$C_{TMR} = 0.068\mu F$	3h 45 min

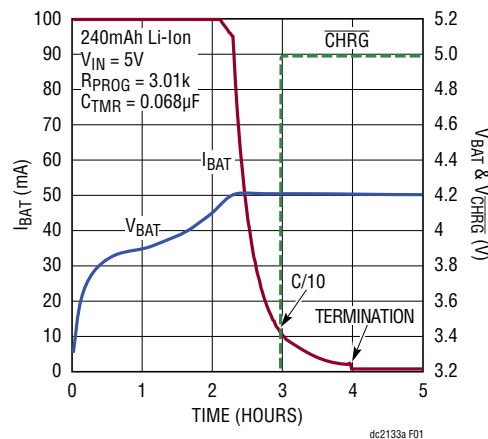


Figure 1. Typical Battery Charge Cycle

## QUICK START PROCEDURE

Demonstration circuit 2133 is easy to set up to evaluate the performance of LTC4079. Refer to Figure 2 for proper measurement equipment setup and follow the procedure below.

1. The jumpers are initially set as below for a typical 4.2V charging application:

JP1	JP2	JP3	JP4	JP5
EN	NTC	TIMER	VBAT	LED
ON	INT	ON	4.2	ON

2. With all power off, connect the input supply, battery, and meters as shown in Figure 2.

**Note:** Depending on the input cable and power supply impedance, hot plugging an input supply may cause overvoltage transients that can damage the board. R1 and C1 form an input transient damping network that mitigates this. See AN-88 for component selection.

3. Turn on the input power supply. Adjust the input voltage and current limit to the desired value.
4. Monitor the PROG pin voltage for a scaled representation of the output current according to the relationship:

$$I_{BAT} = \frac{250 \cdot V_{PROG}}{R_{PROG}}$$

**Note:** Minimize capacitance on the PROG pin to prevent charger instability.

5. Allow the battery to charge for a complete cycle.  $\overline{CHRG}$  will disable the LED when the charge current has dropped below 10mA, but the timer will continue to run and charge current will flow until the timer period ends.

### Optional

1. While powered off, change the setting of the EN jumper, JP1, to REG to evaluate the enable input regulation feature, or to OFF to disable charging.
2. Use an external thermistor connected to the NTC jumper, JP2, set to EXT.
3. To terminate charge on current, disable the TIMER input with JP3 set to OFF. LTC4079 will terminate on C/10 only.
4. The  $\overline{CHRG}$  LED can be disconnected to measure the true quiescent current of the LTC4079 in shutdown or for connection to external pull-up logic by setting the LED jumper, JP5 to OFF.
5. To change the battery charging voltage, set the  $V_{BAT}$  jumper, JP4. Alternatively, the feedback resistors may be adjusted for custom values, according to the battery voltage.

**Note:** DO NOT change the  $V_{BAT}$  with  $V_{IN}$  applied.

**QUICK START PROCEDURE**

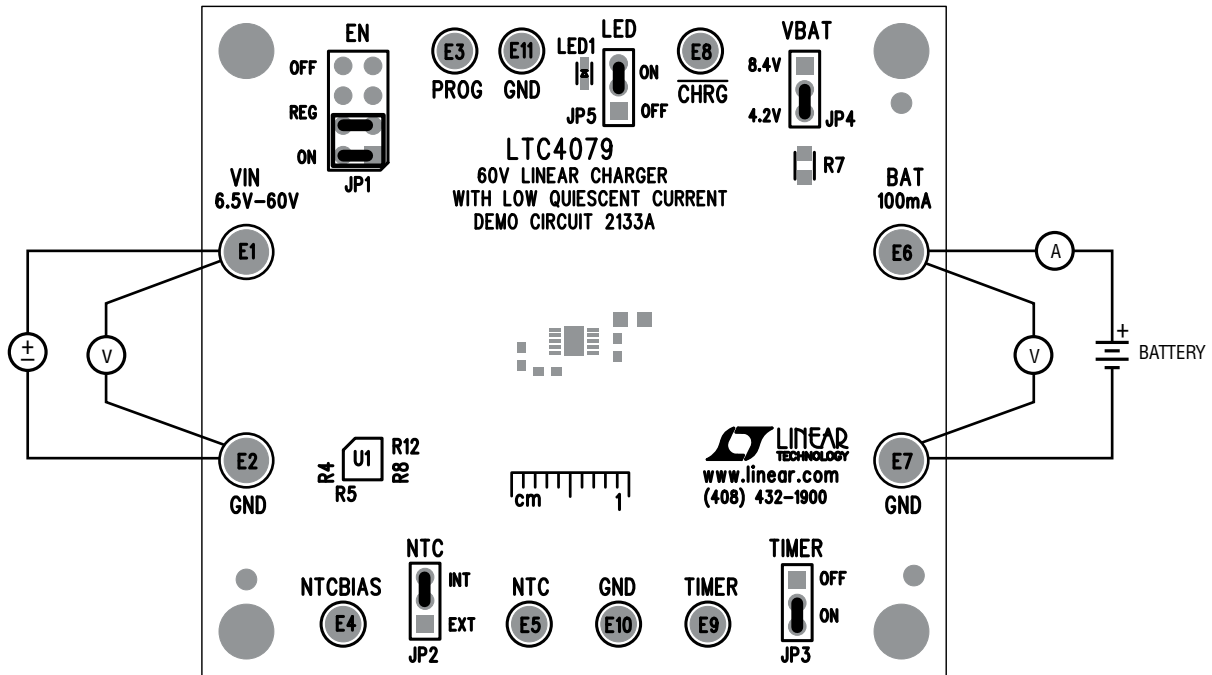


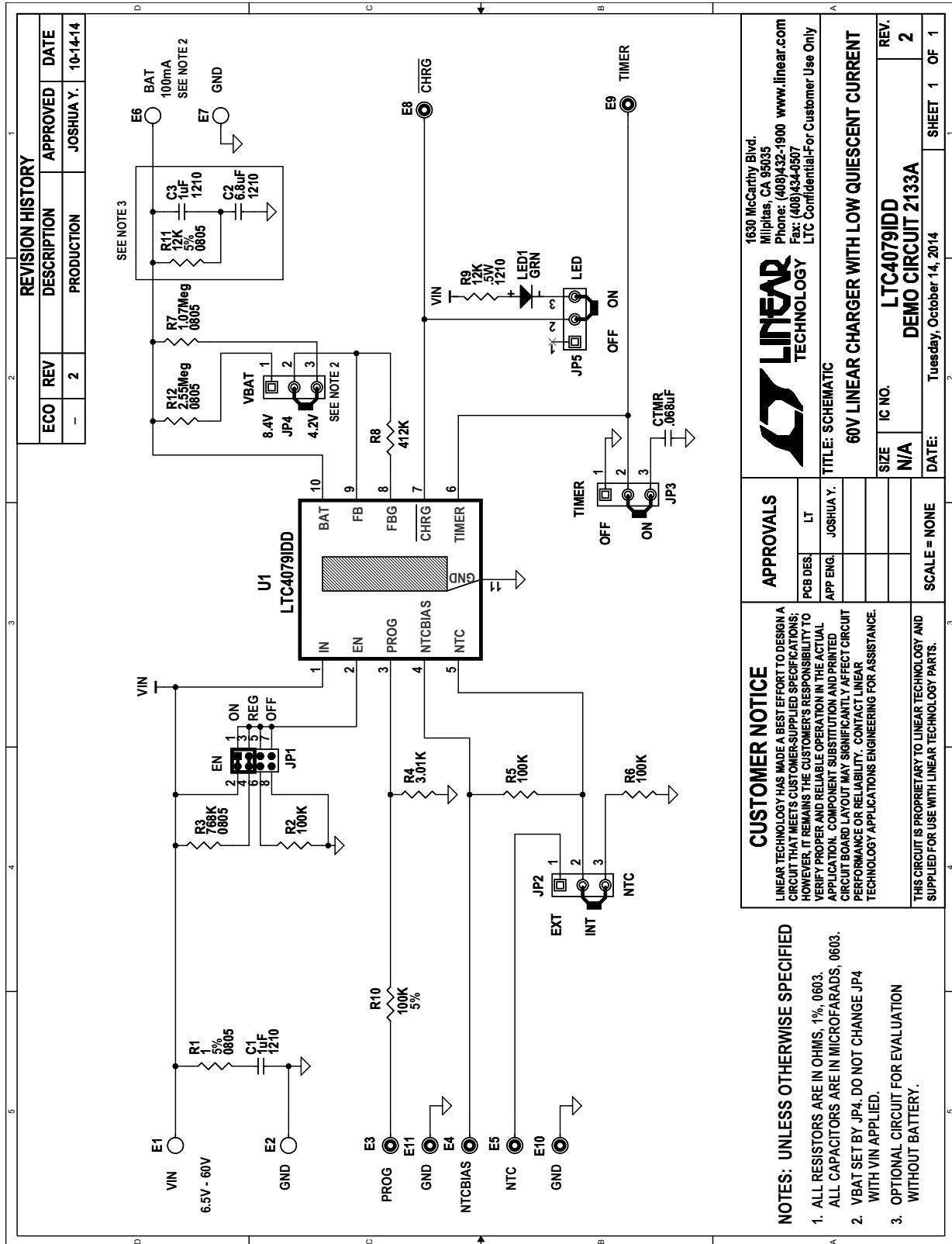
Figure 2. Proper Measurement Equipment Setup

# DEMO MANUAL DC2133A

## PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
<b>Required Circuit Components</b>				
1	1	C1, C3	CAP, CHIP, X7R, 1 $\mu$ F, 20%, 100V, 1210	AVX, 12101C105MAT2A
2	1	C2	CAP, CHIP, X5R, 6.8 $\mu$ F, 10%, 25V, 1210	TDK, C3225X5R1E685K
3	1	CTMR	CAP, CHIP, X7R, 0.068 $\mu$ F, 10%, 50V, 0603	MURATA, GRM188R71H683KA93D
4	3	R2, R5, R6	RES, CHIP, 100k $\Omega$ , 1%, 0603	VISHAY, CRCW0603100KFKEA
5	1	R3	RES, CHIP, 768k $\Omega$ , 1%, 0805	VISHAY, CRCW0805768KFKEA
6	1	R4	RES, CHIP, 3.01k $\Omega$ , 1%, 0603	VISHAY, CRCW06033K01FKEA
7	1	R7	RES, CHIP, 1.07M $\Omega$ , 1%, 0805	VISHAY, CRCW08051M07FKEA
8	1	R8	RES, CHIP, 412k $\Omega$ , 1%, 0603	VISHAY, CRCW0603412KFKEA
9	1	R12	RES, CHIP, 2.55M $\Omega$ , 1%, 0805	VISHAY, CRCW08052M55FKEA
10	1	U1	I.C., LTC4079IDD	LINEAR TECH., LTC4079IDD#PBF
<b>Additional Demo Board Circuit Components</b>				
1	1	LED1	DIODE, LED, SMT, GREEN, 0603	LITE-ON, LTST-C190KGKT
2	1	R1	RES, CHIP, 1 $\Omega$ , 5% 0805	VISHAY, CRCW08051R00JNEA
3	1	R9	RES, CHIP, 12k $\Omega$ , 3/4W, 5%, 1210	VISHAY, CRCW121012K0JNEAHP
4	1	R10	RES, CHIP, 100k $\Omega$ , 1%, 0603	VISHAY, CRCW0603100KFKEA
5	1	R11	RES, CHIP, 12k $\Omega$ , 5%, 0805	VISHAY, CRCW080512K0JNEA
<b>Hardware: For Demo Board Only</b>				
1	4	E1, E2, E6, E7	TEST POINT, TURRET, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	7	E3, E4, E5, E8, E9, E10, E11	TEST POINT, TURRET, 0.062"	MILL-MAX, 2308-2-00-80-00-00-07-0
3	1	JP1	2 x 4 PIN JUMPER, 0.1"	SAMTEC, TSW-104-07-L-D
4	4	JP2, JP3, JP4, JP5	3 PIN JUMPER, 2mm	SULLINS, NRPNO31PAEN-RC
5	1	XJP1	SHUNT, 2 x 2, 0.1"	SAMTEC, MNT-102-BK-G
6	4	XJP2, XJP3, XJP4, XJP5	SHUNT, 0.079"	SAMTEC, 2SN-BK-G
7	4	STAND-OFF	STAND-OFF, NYLON 0.25"	KEYSTONE, 8831(SNAP ON)

**SCHEMATIC DIAGRAM**



# DEMO MANUAL DC2133A

---

## DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

**Please read the DEMO BOARD manual prior to handling the product.** Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology  
1630 McCarthy Blvd.  
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».



## JONHON

«**JONHON**» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«**FORSTAR**» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А