LTM8061-4.1/LTM8061-4.2/ LTM8061-8.2/LTM8061.4 32V, 2A µModule Li-Ion Battery Charger

DESCRIPTION

Demonstration circuits 1645A-A, 1645A-B, 1645A-C and 1645A-D feature the LTM8061, a 32V, 2A µModule® Li-Ion battery charger. Operating from a 6.5V to 32V input source, the 1645A-A and 1645A-B demo circuits charge single cell Li-Ion batteries to float voltages of 4.1V or 4.2V respectively. The 1645A-C and 1645A-D demo circuits operate from a 12V to 32V input source, and charge dual cell Li-Ion battery packs to float voltages of 8.2V or 8.4V. JP1 turns the converter on or off. JP2 allows for easy selection of C/10 or timer charge termination. The LTM8061 datasheet must be read in conjunction with this demo manual for working on or modifying the demo circuit 1645A.

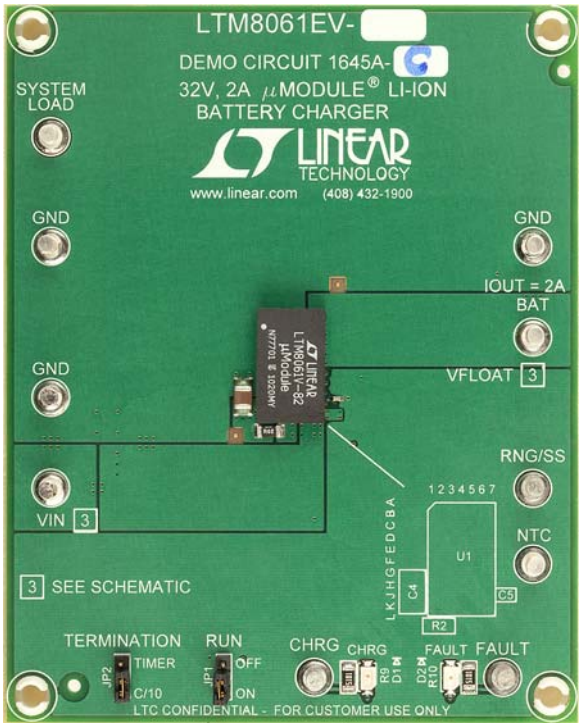
Design files for this circuit board are available at http://www.linear.com/demo

PERFORMANCE SUMMARY

Table 1. Typical Secifications of the Demoboard (T_A = 25°C)

Input Supply Range	6.5V to 32V (-A and -B), 12V to 32V (-C and -D)
Typical Output Current Limit for All Versions	2A
Float Voltage Accuracy	4.08V to 4.12V (-A), 4.18V to 4.22V (-B) 8.16V to -8.24V (-C), 8.36V to 8.44V (-D)

BOARD PHOTO



QUICK START PROCEDURE

Demonstration circuits 1645A-A, 1645A-B, 1645A-C and 1645A-D are easy to set up to evaluate the performance of the LTM8061-4.1, LTM8061-4.2, LTM8061-8.2, LTM8061-8.4.

Refer to Figure 1 for proper measurement and equipment setup.

DC1645A-A and DC1645A-B

Follow the procedure below for demo circuits 1645A-A and 1645A-B

1. Jumper and Power Supply Setting:

   JP1 = ON PS1 = OFF

   JP2 = C/10 PS2 = OFF

2. Turn on PS2 and slowly increase the voltage to 2.7V while monitoring the current into the BAT pin. If the current is less than 5mA, turn on PS1 and increase voltage to 12V.

3. Verify that the battery charging current, I_{BAT}, is between 250mA and 350mA. The CHRG LED should be on and the FAULT LED should be off.

4. Increase PS2 until V_{BAT} is 3.6V. Verify the input current, I_{IN}, is between 700mA and 850mA, the battery current, I_{BAT}, is between 1.775A and 2.225A and that the CHRG LED remains on.

5. Increase PS2 until V_{BAT} is 4.3V. Verify the battery charging current, I_{BAT}, is less than 5mA and the CHRG LED is off.

6. Decrease PS2 until V_{BAT} is 3.9V. Verify the battery current, I_{BAT}, is between 1.775A and 2.225A and the CHRG LED is on.

7. Decrease PS2 until V_{BAT} is 3.6V. Connect a 10k resistor from RNG/SS to ground. Verify the charging current, I_{BAT}, is between 850mA and 1.0A. Verify the voltage at $V_{RNG/SS}$, is between 450mV and 550mV. Remove the 10k resistor.

8. Set JP1 to OFF. Verify the charging current, I_{BAT}, is less than 5mA and the FAULT LED and the CHRG LED are off.

9. Set JP1 to ON. Connect a jumper from the NTC pin to ground. Verify the charging current, I_{BAT}, is less than 5mA and the FAULT LED and the CHRG LED are on.

10. Remove the jumper from NTC to ground. Verify the charging current, I_{BAT}, is between 1.775A and 2.225A, the FAULT LED is off and the CHRG LED is on.

11. This concludes the test for the A and B versions. Turn off PS1 and PS2.

DC1645A-C and DC1645A-D

Follow the procedure below for demo circuits -C and -D

1a. Jumper and Power Supply Setting:

   JP1 = ON PS1 = OFF

   JP2 = C/10 PS2 = OFF

2a. Turn on PS2 and slowly increase the voltage to 5.4V while monitoring the current into the BAT pin. If the current is less than 5mA, turn on PS1 and increase voltage to 12V.

3a. Verify that the battery charging current, I_{BAT}, is between 250mA and 350mA. The CHRG LED should be on and the FAULT LED should be off.

4a. Increase PS2 until V_{BAT} is 7.2V. Verify the input current, I_{IN}, is between 1200mA and 1700mA, the battery current, I_{BAT}, is between 1.775A and 2.225A and the CHRG LED remains on.

5a. Increase PS2 until V_{BAT} is 8.6V. Verify the battery charging current, I_{BAT}, is less than 5mA and the CHRG LED is off.

6a. Decrease PS2 until V_{BAT} is 7.8V. Verify the battery current, I_{BAT}, is between 1.775A and 2.225A and that the CHRG LED is on.

7a. Decrease PS2 until V_{BAT} is 7.2V. Connect a 10k resistor from RNG/SS to ground. Verify the charging current, I_{BAT}, is between 800mA and 1.0A. Verify the voltage at $V_{RNG/SS}$, is between 450mV and 550mV. Remove the 10k resistor.

QUICK START PROCEDURE

8a. Set JP1 to OFF. Verify the charging current, I_{BAT}, is less than 5mA and the FAULT LED and the CHRG LED are off.

9a. Set JP1 to ON. Connect a jumper from the NTC pin to ground. Verify the charging current, I_{BAT}, is less than 5mA and the FAULT LED and the CHRG LED are on.

10a. Remove the jumper from NTC to ground. Verify the charging current, I_{BAT}, is between 1.775A and 2.225A, the FAULT LED is off and the CHRG LED is on.

11a. This concludes the test for the C and D versions. Turn off PS1 and PS2.

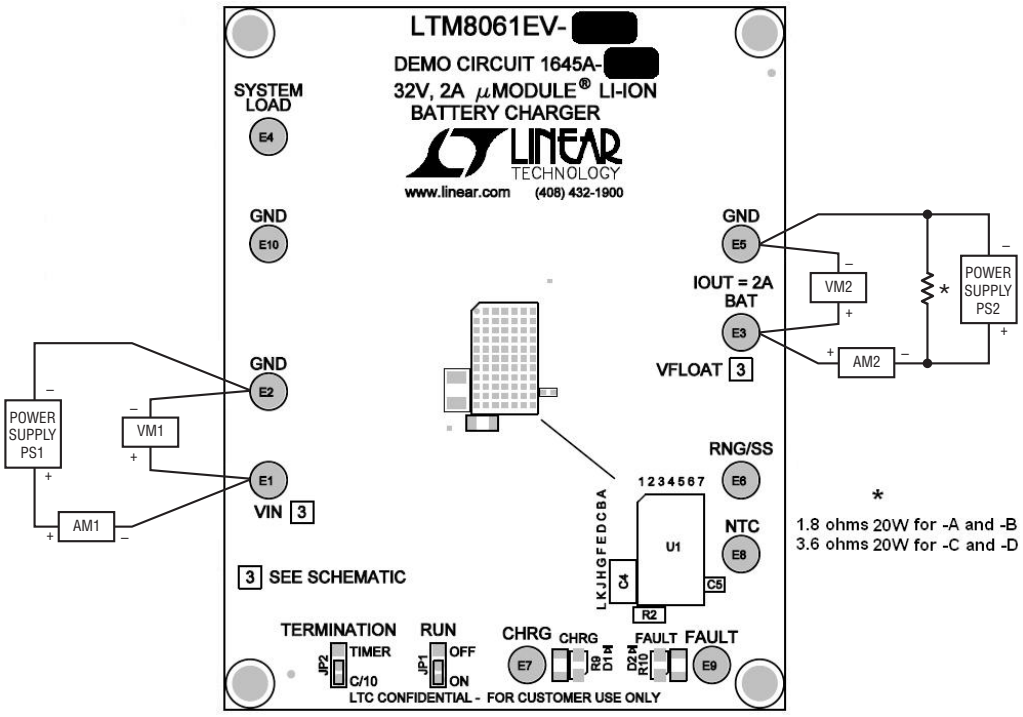


Figure 1. DC1645A Proper Equipment Setup

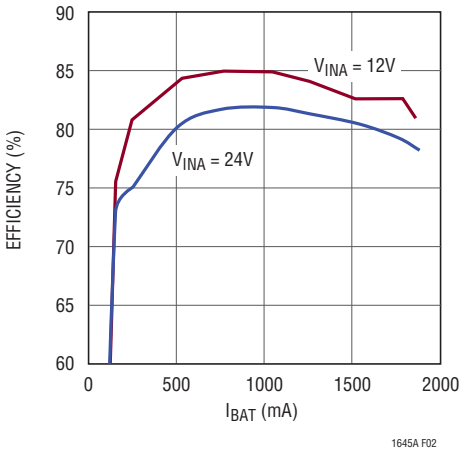


Figure 2. Efficiency vs I_{BAT}, 4.1V_{BAT}

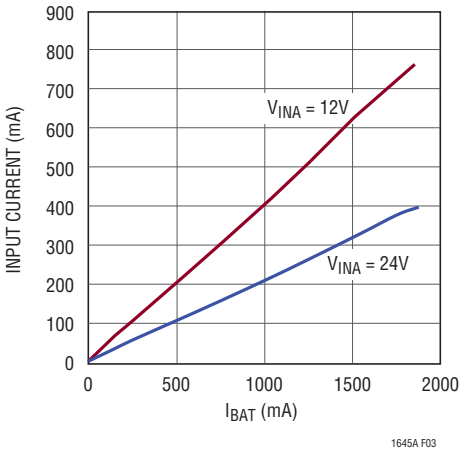


Figure 3. Input Current vs I_{BAT}, 4.1V_{BAT}

QUICK START PROCEDURE

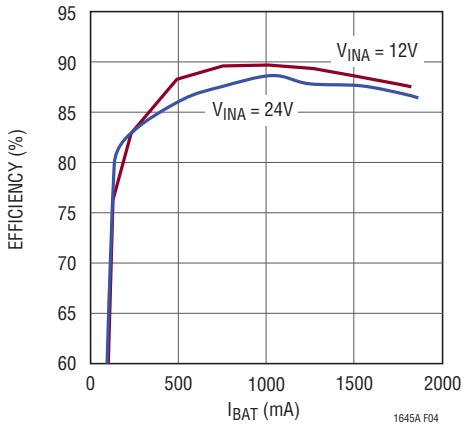


Figure 4. Efficiency vs I_{BAT}, 8.2V_{BAT}

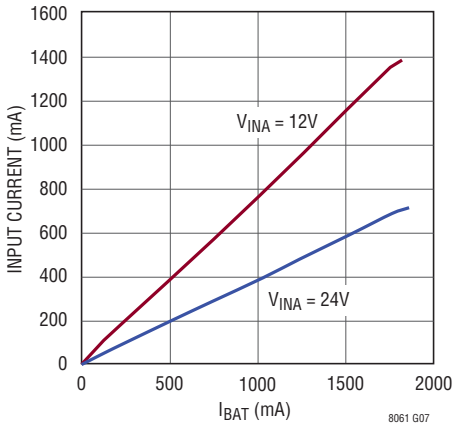
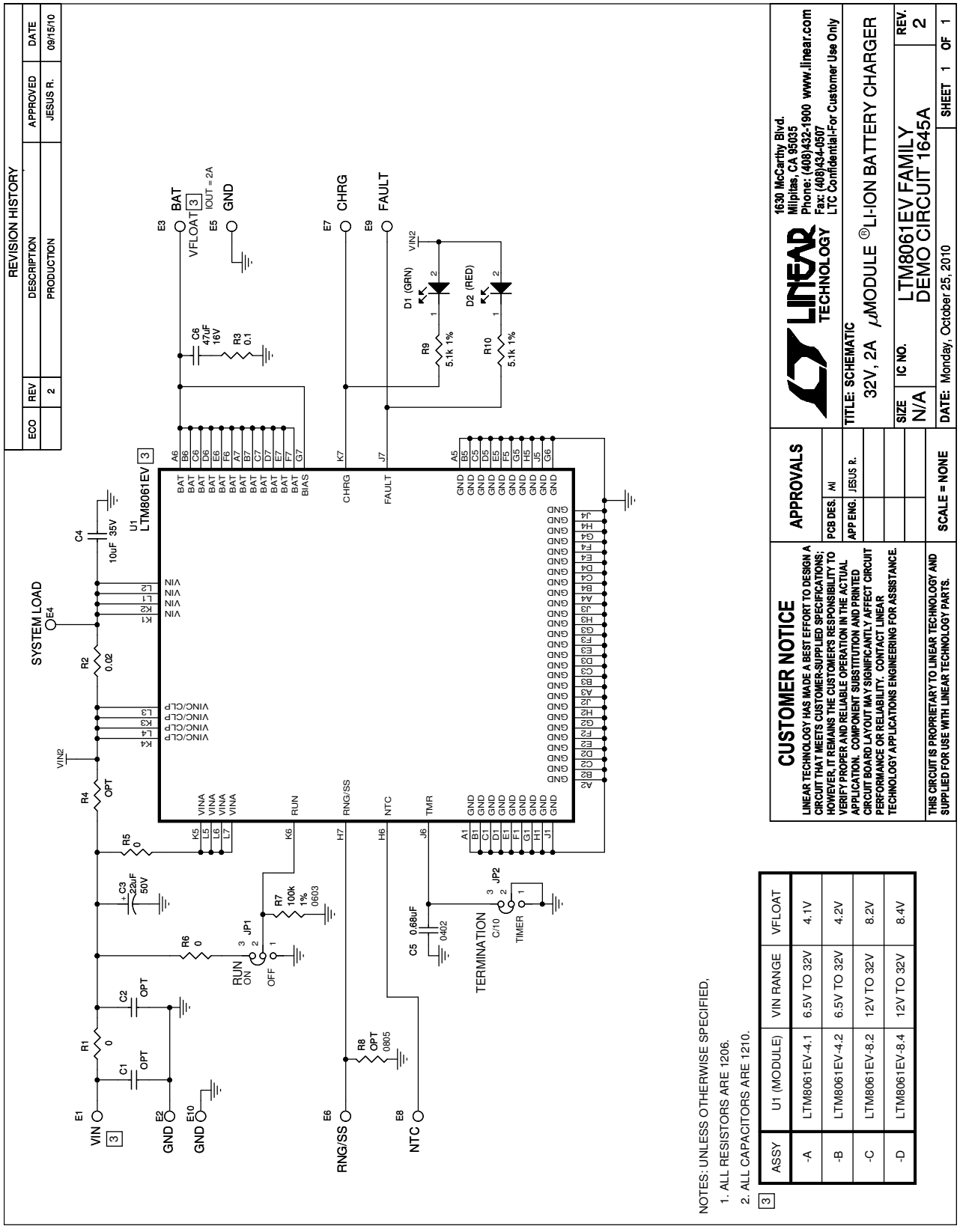


Figure 5. Input Current vs I_{BAT}, 8.2V_{BAT}

PARTS LIST

ITEM	QUANTITY	REFERENCE-DESCRIPTION	DESCRIPTION	MANUFACTURERS PART NUMBER
Required Circuit Components				
1	1	C4	CAP, 10µF 10% 35V X5R, 1210	MURATA, GRM32ER7YA106KA12L
2	1	C5	CAP, 0.68µF 10% 10V X5R, 0402	MURATA, GRM155R61A684KE15D
3	1	C6	CAP, 47µF 20% 16V X5R, 1210	TAIYO YUDEN, EMK325BJ476MM-G
4	1	R2	RES, 0.02Ω 1% 1/2W, 1206	IRC, LR1206LF-01-R020-F
5	1	R3	RES, 0.1Ω 1% 1/2W, 1206	IRC, LRC1206-01-R100-F
6	1	U1	IC, 32V, 2A µModule Li Ion Battery Chrager	LTM8061EV-4.1 (-A only) LTM8061EV-4.2 (-B only) LTM8061EV-8.2 (-C only) LTM8061EV-8.4 (-D only)
7	1		FAB, PRINTED CIRCUIT BOARD	DEMO CIRCUIT 1645A
Additional Demo Board Circuit Components				
1	0	C1,C2	CAP, 4.7µF 10% 50V X7R, 1210 OPT.	MURATA, GRM32ER71H475KA091B OPT
2	1	C3	CAP, 22µF 20% 50V	SUNCON, 50CE22BS
3	1	D1	LED, GREEN	PANASONIC, LN1351C
4	1	D2	LED, RED	PANASONIC, LN1251C
5	3	R1,R5,R6	RES, 0Ω JUMPER, 1206	NIC, NRC12ZOTRF
6	0	R4	RES, OPT. 1206	OPTION
7	1	R7	RES, 100k 1% 1/10W, 0603	NIC, NRC06F1003TRF
8	0	R8	RES, OPT. 0805	OPTION
9	2	R9,R10	RES, 5.1k 1% 1/4W, 1206	NIC, NRC12F5101TRF
Hardware For Demo Board Only				
1	10	E1-E10	TURRET	MILL MAX, 2501-2-00-80-00-00-07-0
2	2	JP1, JP2	HEADER, 3-PIN, 2mm	SAMTEC, TMM-103-02-L-S
3	2	JP1, JP2	SHUNT, 2mm	SAMTEC, 2SN-BK-G
4	4		STANDOFF, SNAP ON	KEYSTONE, 8834

SCHEMATIC DIAGRAM



NOTES: UNLESS OTHERWISE SPECIFIED,
1. ALL RESISTORS ARE 1206.
2. ALL CAPACITORS ARE 1210.

[3]

ASSY	U1 (MODULE)	VIN RANGE	VFLOAT
-A	LTM8061EV-4.1	6.5V TO 32V	4.1V
-B	LTM8061EV-4.2	6.5V TO 32V	4.2V
-C	LTM8061EV-8.2	12V TO 32V	8.2V
-D	LTM8061EV-8.4	12V TO 32V	8.4V

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Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035