

GLF73910-AD01C

Ultra-Efficient I_QSmart™ Battery Protection IC

DESCRIPTION

The EV011-GLF73910-AD01C evaluation board features the GLF73910-AD01C that is an I_QSmart™ ultra-efficient, full battery protection IC with the accurate over charging voltage, over discharging voltage, and short circuit protections for lithium battery safety.

When the battery is charged past the over voltage detection level, the GLF73910-AD01C switch opens in a preset delay time. As the battery voltage decreases below the over discharge detection voltage level, the GLF73910-AD01C is turned off immediately, consuming an ultra-low leakage current (I_{SD}) to save the battery. In addition, at load short conditions, the GLF73910-AD01C is latched off and remain the off state in a preset delay time.

The GLF73910-AD01C is activated by applying V_{ON} to the VOUT pin from a charger or a DC power supplier.

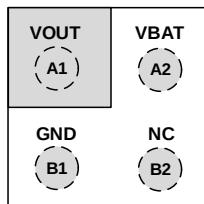
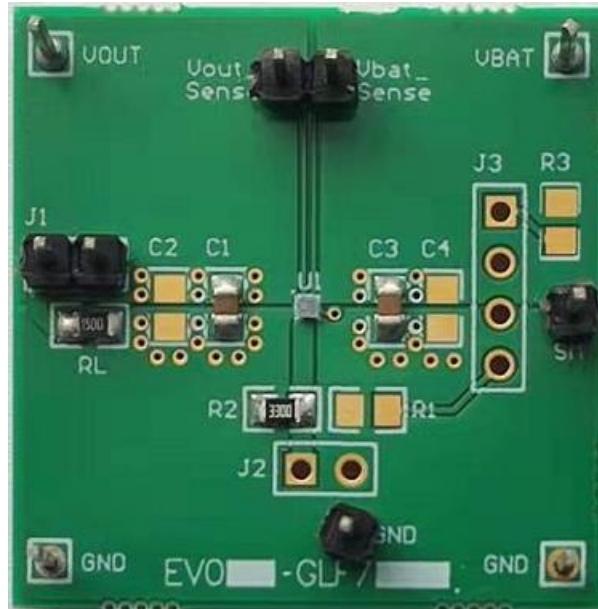
FEATURES

- V_{OC} , Over Charge Detection: $4.35 V_{BAT}$
 - Monitor VOUT to release V_{OC}
- V_{OD} , Over Discharge Detection: $2.80 V_{BAT}$
- Load Short Circuit Protection with Delay Time to avoid a false trigger
- 1.5 A Continuous Charging Current Capability from VOUT to VBAT Pin
- 0 V Battery Charging
- Main Switch is Activated by Applying V_{ON} the VOUT Pin from Charger
- Low R_{ON} : 36 mΩ Typ. @ 3.6 V_{BAT}
- $I_Q = 720$ nA Typ @ 3.6 V_{BAT}
- $I_{SD} = 70$ nA Typ @ $V_{BAT} < V_{OD}$
- Latch-off at Over Discharge Detection and Short Circuit Protection. Apply V_{ON} to VOUT pin to turn on again
- Reverse Polarity Connection Protection
- 0.97 mm x 0.97 mm x 0.55 mm Chip Scale Package 4 Bumps, 0.5 mm Pitch

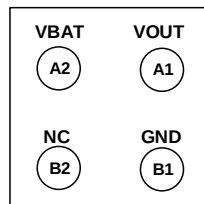
PRODUCT TABLE

Eval Board Ordering Info	Part Number	Top Mark	R_{ON} (Typ) $V_{BAT}=3.6$ V	Over Charge Voltage V_{OC}	Over Discharge voltage V_{OD}	0 V Charging
EV011-GLF73910-AD01C	GLF73910-AD01C	CE	36 mΩ	4.35 V	2.80 V	Available

EVALUATION BOARD, DEVICE PACKAGE, AND PINOUT



TOP VIEW



BOTTOM VIEW

0.97 mm x 0.97 mm x 0.55 mm WLCSP

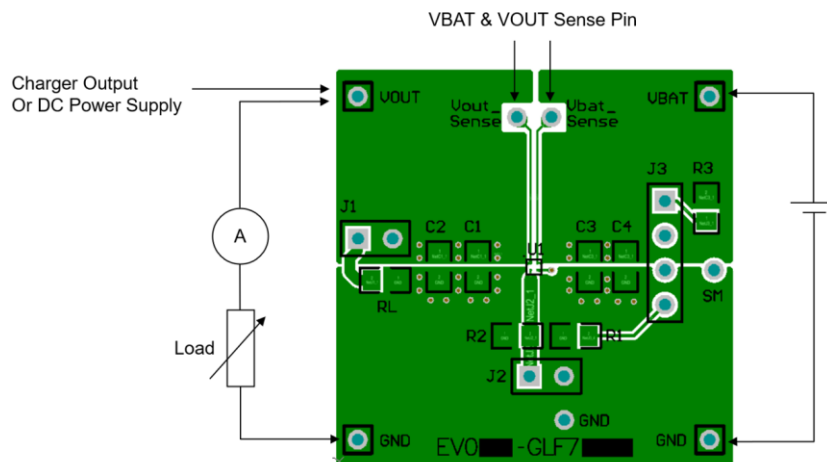
Pin #	Name	Description
A1	VOUT	VOUT pin is connected to the charger output and system load. If the switch is in the off state, applying the appropriate voltage (V_{ON}) to V_{OUT} turns the switch back on.
A2	VBAT	VBAT pin is connected to the positive terminal of a battery pack to monitor the battery voltage. When the V_{BAT} voltage reaches the V_{OD} , the main switch is turned off and maintains the off state to save the battery from discharging.
B1	GND	Ground
B2	NC	No Connection. Leave it open.

QUICK START GUIDE

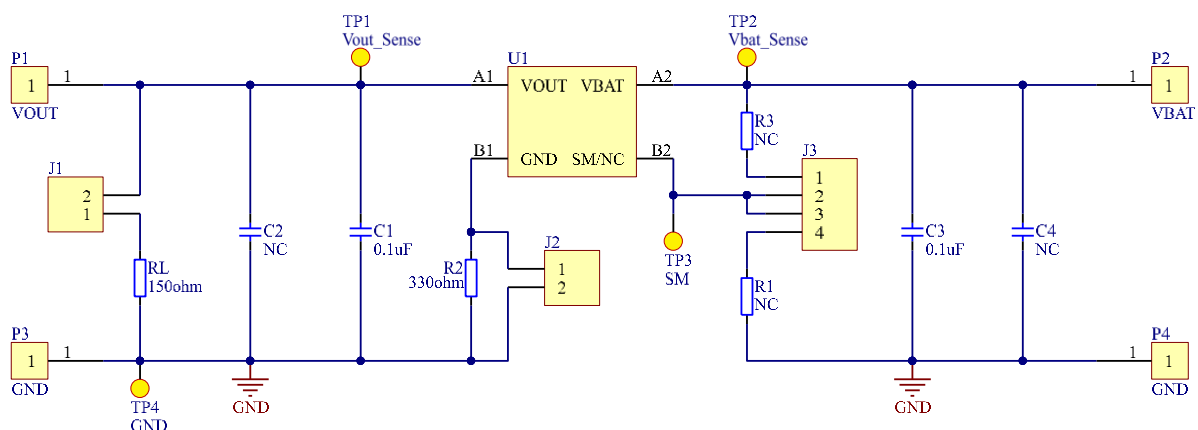
The evaluation board EV011-GLF73910-AD01C is easy to set up to evaluate the performance of GLF73910-AD01C-AD01C.

1. Connect the positive and negative terminals of the input power supply or a Li-battery pack higher than 3 V to VBAT pin and GND respectively. The Vbat_Sense and Vout_Sense can be used for measurement points. Make sure there is no high peak voltage generated when a VBAT input source is hot-plugged in.
2. Applying V_{ON} to the VOUT pin is necessary to turn on the GLF73910-AD01C switch. With a charger IC connected with the VOUT on the board, enabling the charger IC can start charging.
3. The load resistor, $R_L=150\ \Omega$, has been populated on the PCB board. Short the J1 to use the R_L . To increase the output current, connect an electronic load to VOUT pin and GND.
4. When the VBAT voltage decreases to the V_{OD} , the GLF73910-AD01C is latched-off. In order to wake up the
- latched-off GLF73910-AD01C, the on voltage, V_{ON} needs to be applied to VOUT connector from a charger IC or a DC power supplier.
5. When the VBAT voltage reaches the V_{OC} , the GLF73910-AD01C switch is turned off to stop charging and gets back to the on state as the VBAT voltage decreases by V_{OC_HYS} , 120 mV below V_{OC} .
6. When the I_{OUT} current exceeds the I_{SC} , the GLF73910-AD01C is latched off immediately. In order to restart, set GLF73910-AD01C within the range of operating voltage and current, the V_{ON} needs to be applied to VOUT pin.
7. The $R_2 = 150\ \Omega$ between the GND pin and the ground plane on the board prevents the GLF73910-AD01C from being damaged by a reverse polarity connection of a battery.

TEST SETUP



SCHEMATIC



BILL OF MATERIALS

Qty	Reference	Value	Part Description	Note
1	U1	GLF73910-AD01C	GLF73910-AD01C	GLF Integrated Power
1	C1	0.1 uF	Cap., X7R, 50 V, 10 % 0805	YAGEO CC0805KKX7R9BB104
1	C3	0.1 uF	Cap., X7R, 50 V, 10 % 0805	YAGEO CC0805KKX7R9BB104
1	R2	330 Ω	Resistor, 5 % 0805	YAGEO RC0805FR-07330RL
1	RL	150 Ω	Resistor, 5 % 0805	YAGEO RC0805FR-07150RL
1	J1	Jumper	Jumper	
2	J2, J3	Jumper	Jumper	DNP (Do Not Place)
4	R1, R3, C2, C4	-	-	DNP (Do Not Place)

PRINTED CIRCUIT BOARD LAYOUT

Fig 1. Top Layer

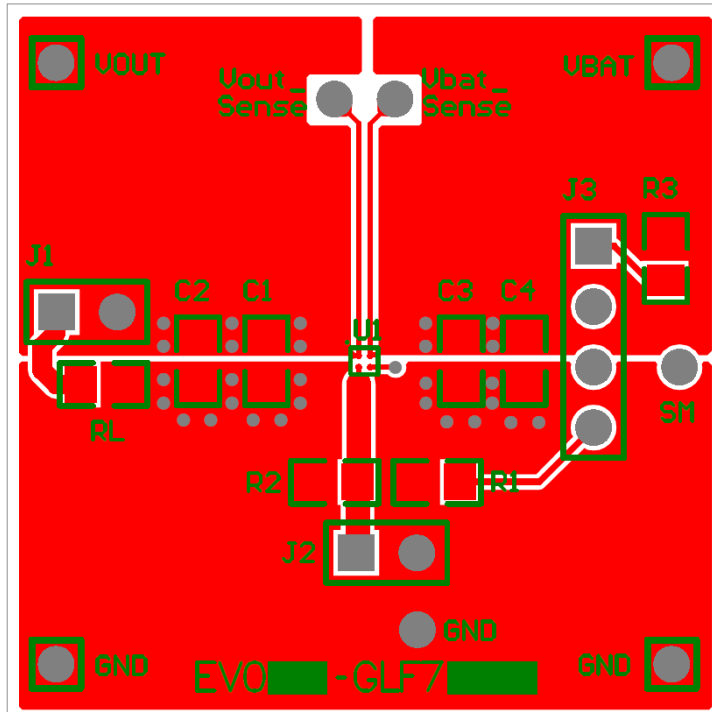
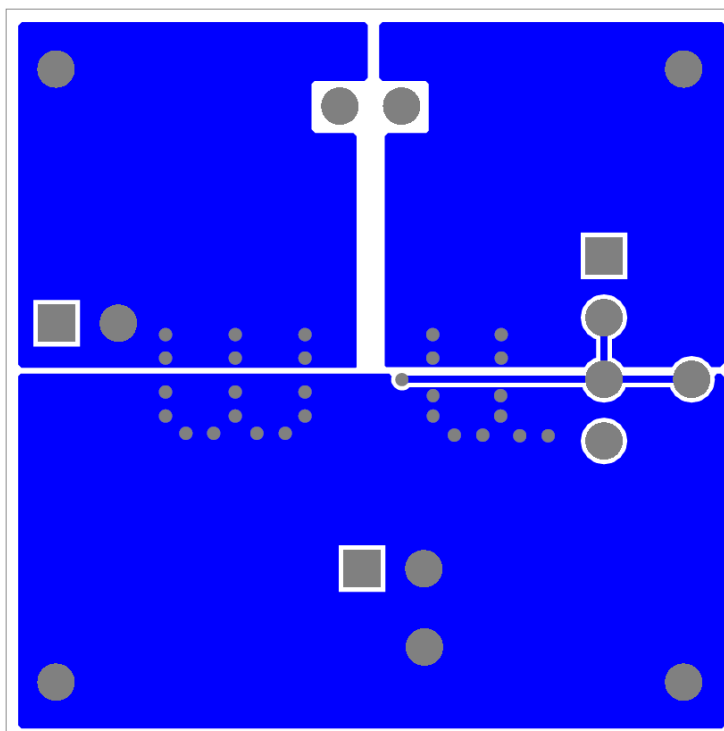


Fig 2. Bottom Layer



SPECIFICATION DEFINITIONS

Document Type	Meaning	Product Status
Target Specification	This is a target specification intended to support exploration and discussion of critical needs for a proposed or target device. Spec limits including typical, minimum, and maximum values are desired, or target, limits. GLF reserves the right to change limits at any time without warning or notification. A target specification in no way guarantees future production of the device in question.	Design / Development
Preliminary Specification	This is a draft version of a product specification. The specification is still under internal review and subject to change. GLF reserves the right to change the specification at any time without warning or notification. A preliminary specification in no way guarantees future production of the device in question.	Qualification
Product Specification	This document represents the anticipated production performance characteristics of the device.	Production

NOTICE: The evaluation board provided by GLF Integrated Power is intended for use for ENGINEERING DEVELOPMENT, OR EVALUATION PURPOSES ONLY and is not for any commercial use. The user assumes all responsibility and liability for proper and safe handling of the goods.