

## Photovoltaic Cell Battery Charger / Solar Cell Li-On Battery Trickle Charger

This is a tiny module that allows users to charge small Li-ion batteries, CR2032 or equivalent, from a low power source such as a small photovoltaic cell. The project consists of the **LTC3105** step-up DC-DC converter chip which features Maximum Power Point Control (MPPC) and 250mV start-up voltage which enables operational directly from low power, high impedance alternative power sources such as photovoltaic cells. A user-programmable MPPC set point maximizes the energy that can be extracted from any power source. Burst Mode operation, with a proprietary self-adjusting peak current, optimizes converter efficiency and output voltage ripple overall operating conditions. The circuit works with single-cell or dual-cell in parallel. The operating supply of this project is as low as **225mV** and a maximum of 5V. Input supply should not exceed 5V DC. The module is programmed to output **4.1V** which is important to charge the Li-On battery. Jumper J1 should be open for normal operation, close to disable the output.

The output voltage is adjustable and can be programmed using feedback resistors R1, R2, R4, and R5. It is important to have 1% tolerance for all feedback resistors.

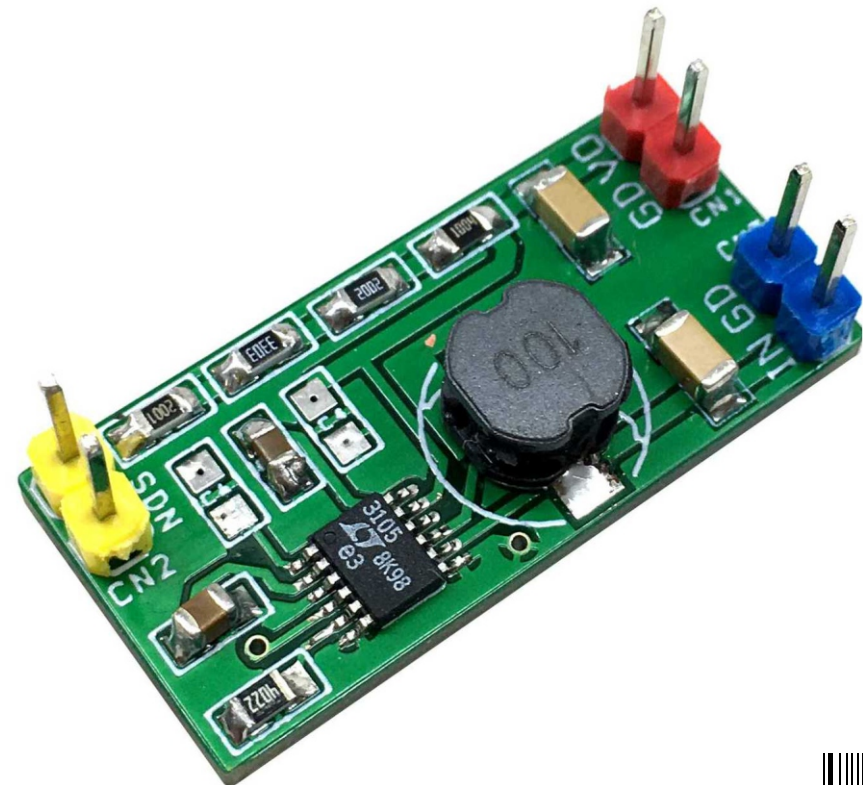
**MPPC** The maximum power point control circuit allows the user to set the optimal input voltage operating point for a given power source. The MPPC circuit dynamically regulates the average inductor current to prevent the input voltage from dropping below the MPPC threshold. When VIN is greater than the MPPC voltage, the inductor current is increased until VIN is pulled down to the MPPC set point. If VIN is less than the MPPC voltage, the inductor current is reduced until VIN rises to the MPPC set point.

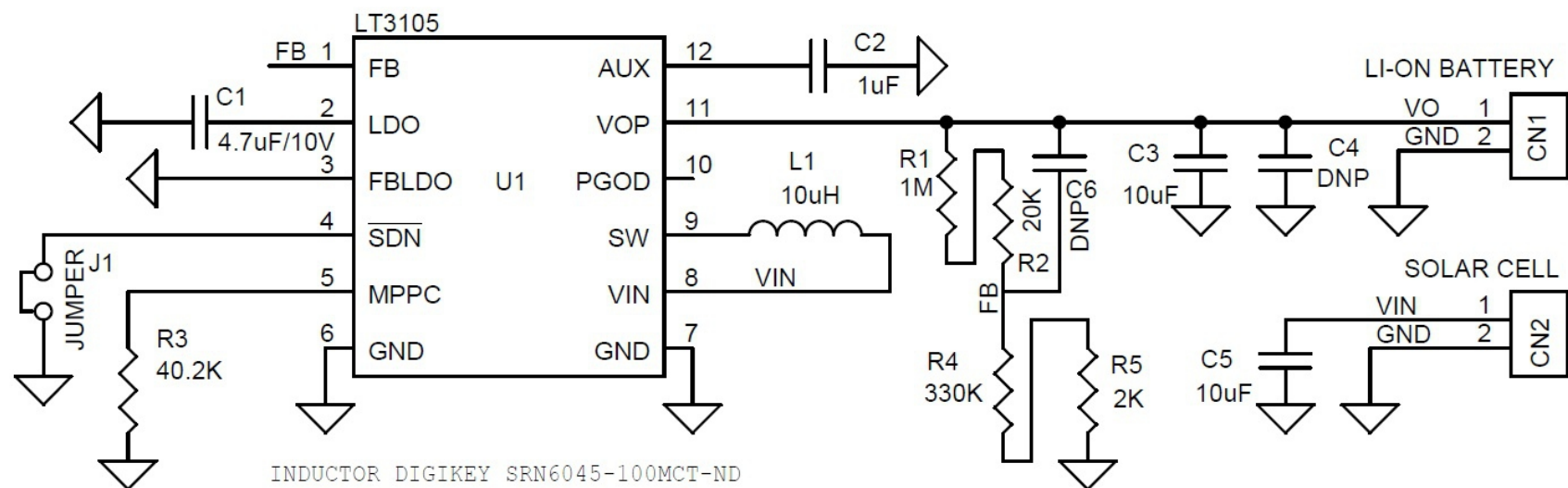
**Trickle Charge:** Trickle charging means charging a fully charged battery at a rate equal to its self-discharge rate, thus enabling the battery to remain at its fully charged level.

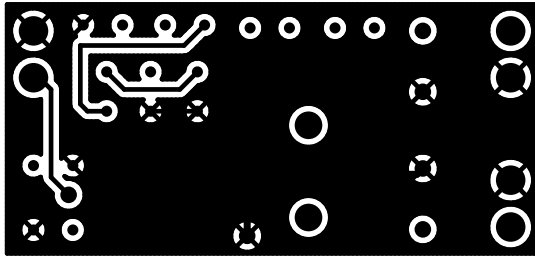
**NIMH Battery Charging:** charging NiMH battery is also possible with this module by changing feedback resistors value, R4 = 470K, R5= 0 Ohms. R1 and R2 remain unchanged. This change will provide 3.2V output and it's sufficient to charge 2x NiMH batteries.

### Features

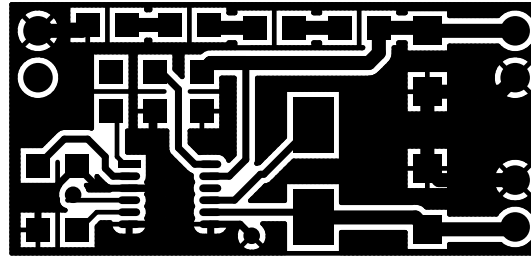
- Input Supply 225mV to 5V (Photovoltaic Cell)
- Output 4.1V / Approx. 20mA
- Maximum Power Point Control
- Output Disconnect and Inrush Current Limiting
- VIN > VOUT Operation
- Soft Start
- Automatic Power Adjust
- PCB Dimensions 29.05MM X 13.81MM



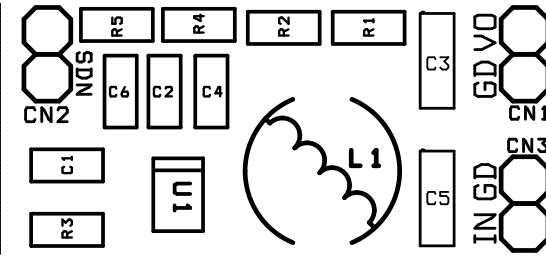




Bottom Layer



Top Layer



Silk Screen Top

PCB Dimensions 29.05MM X 13.81MM

BOM				
SR.	QNTY.	REF.	DESC.	DIGIKEY/MOUSER
1	1	CN1	2 PIN MALE HEADER CONNECTOR 2.54MM	DIGIKEY 732-5321-ND
2	1	CN2	2 PIN MALE HEADER CONNECTOR 2.54MM	DIGIKEY 732-5321-ND
3	1	C1	4.7uF/10V SMD SIZE 0805	DIGIKEY 1276-2972-1-ND
4	1	C2	1uF/10V SMD SIZE 0805	DIGIKEY 1276-1275-1-ND
5	2	C3,C5	10uF/10V SMD SIZE1206	DIGIKEY 399-13194-1-ND
6	2	C4,C6	DNP/OMIT	
7	1	J1	JUMPER	2 PIN JUMPER CLOSURE
8	1	L1	10uH 8MM	DIGIKEY SRN6045-100MCT-ND
9	1	R1	1M SMD SIZE 0805	Tolerance 1%
10	1	R2	20K SMD SIZE 0805	Tolerance 1%
11	1	R3	40.2K SMD SIZE 0805	Tolerance 1%
12	1	R4	330K SMD SIZE 0805	Tolerance 1%
13	1	R5	2K SMD SIZE 0805	Tolerance 1%
14	1	U1	LT3105	DIGIKEY LTC3105EMS#TRPBFCT-ND

