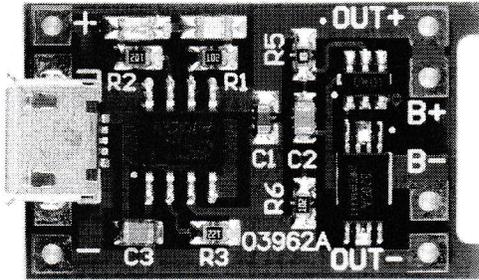




## Micro USB 5V 1A 18650 Lithium Battery TP4056 + DW01A Dual Function Charger Board with Protection Module



This is an enhanced USB-powered module for charging rechargeable lithium batteries using the constant-current/constant-voltage (CC/CV) charging method. This module uses both the TP4056 and the DW01A Li-Ion battery protection IC, which together provide CC/CV charging, along with protection against over-voltage, over-discharge, over-current and short circuits to protect the battery and the device that it is powering.

The device to be powered by the battery is connected to the module's OUT+ and OUT- connectors and the battery is connected to the B+ and B- connections. When connected to USB power, the module provides up to 1A charge current until the battery is charged, then switches to a constant voltage mode to keep it charged.

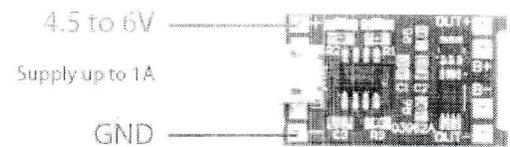
During use (when USB power is disconnected), if the battery voltage drops below about 2.4V (over-discharge), the DW01A protection IC disconnects the battery from the OUT connectors, disabling discharge to protect the battery from running at too low of a voltage and to protect the device being powered from an under-voltage condition.

When the module is then connected to USB power, it will trickle charge the battery to 2.9V (the over-discharge release voltage), at which point the charge current will be linearly increased to 1A maximum and the module will reconnect the battery to the OUT connections, allowing discharge of power from the battery to a connected load. Although the module cuts output power from the battery during an over-discharge situation, it still allows trickle charging of the battery to occur.

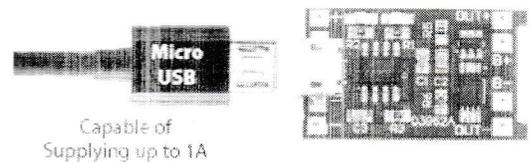
The module also protects against overcurrent and short-circuit protection - it will cut the output from the battery if the discharge rate exceeds 3A or if a short-circuit condition occurs.

### Specifications:

- Input: Micro USB female or + and - solder terminals
- Input voltage: 4.5-6V (recommended voltage 5V) at 1A
- Charge cut-off voltage: 4.2V + / - 1% (charges a 1S Lithium Ion Polymer Battery)
- Maximum charging current output: 1000mA (can be adjusted by changing the value of resistor R3, see table below)
- Battery overcharge protection voltage: 4.3V
- Battery discharge protection voltage: 2.4V
- Battery over-current protection level: 3A
- Board size: 27mm \* 17mm (29mm \* 17mm including USB connector overhang)
- Indicator LEDs:
  - Red: Charging
  - Blue: Power on, charge complete
- Working temperature: -10C - +85C



or



### Operation:

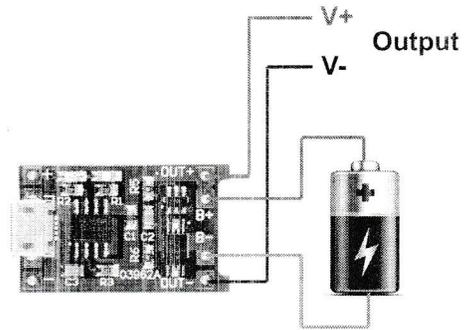
- Connect a micro USB cable for power, or 4.5V to 6V DC to the pads marked IN+ and IN- on left side of the module
- Connect a battery to the B+/B- pads on right side of module

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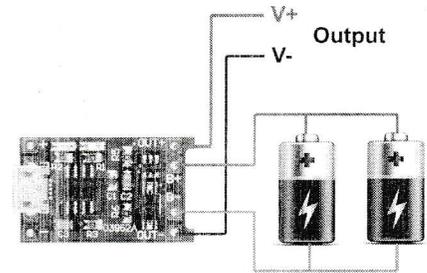
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- Connect a load (something for the battery to power) to the OUT+/OUT- pads on the right side
- If the load draws more than a few hundred milliamps of power, it should be disconnected when charging the battery
- The red LED indicates charging in progress, blue LED indicates charging is complete
- If the battery voltage drops below 2.4V, the module will disconnect the battery from the load, and will reconnect it when the voltage recovers to ~2.9V
- If the load draws more than 3A current, the module will disconnect the battery from the load.



You can connect two lithium batteries in parallel to form an equivalent single cell battery with a total capacity of twice that of the individual single cells, but we do not recommend connecting more than two batteries at a time to this module. See the connection diagram at right. Caution must be used when connecting two cells in parallel. Both cells must be at the same voltage level otherwise if one cell has a lower voltage than the companion cell the higher voltage cell will discharge into the lower voltage cell in an attempt to bring the two cells to the same voltage. If the voltages of the two cells differ enough the resulting current through both cells can be high enough to cause the cells to overheat or worse.



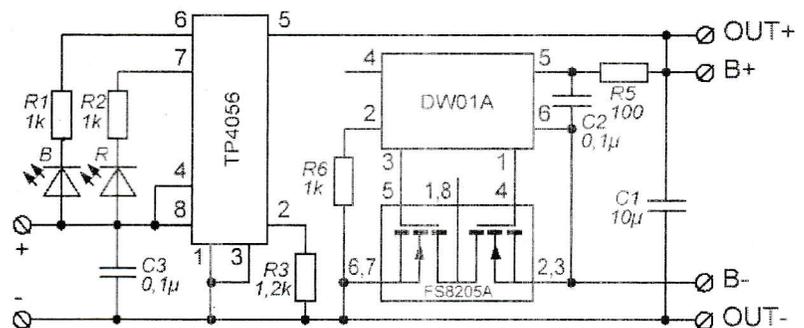
When charging two parallel cells connected to this charge module the charge current through each cell will be half of the total charge current from the charge module.

The charge current can be configured by changing the value of the  $R_{PROG}$  resistor R3. The table below specifies what resistor value to use for configuring different charge currents.

### Resistor R3 $R_{PROG}$ Current Settings

$R_{PROG}$ (kOhm)	$I_{BAT}$ (mA)
10	130
5	250
4	300
3	400
2	580
1.66	690
1.5	780
1.33	900
1.2	1000 (Factory default)

TP4056 1A Battery Charger Module with Protection Circuit



NOTE: Due to the nature and characteristics of lithium-ion batteries Envistia Mall is not responsible or liable for any damages, malfunction, injuries, fire, burns, or any other consequences or results that may occur with incorrect or correct use of this module or any battery, device, or item this module is used with, including following or using any instructions, guidance, or direction of any kind from Envistia Mall or others.