5A, Multi-Chemistry Battery Charger IC With Photovoltaic Cell MPPT Function CN3722 application circuit

1、 Introduction

The CN3722 is a solar battery-powered PWM buck-mode charge management IC, with the solar cell maximum power point tracking. CN3722 is suitable for single or multiple lithium or lithium iron phosphate battery charge management, with a small package outline, less external components and simple to use, etc..

2、 Feature

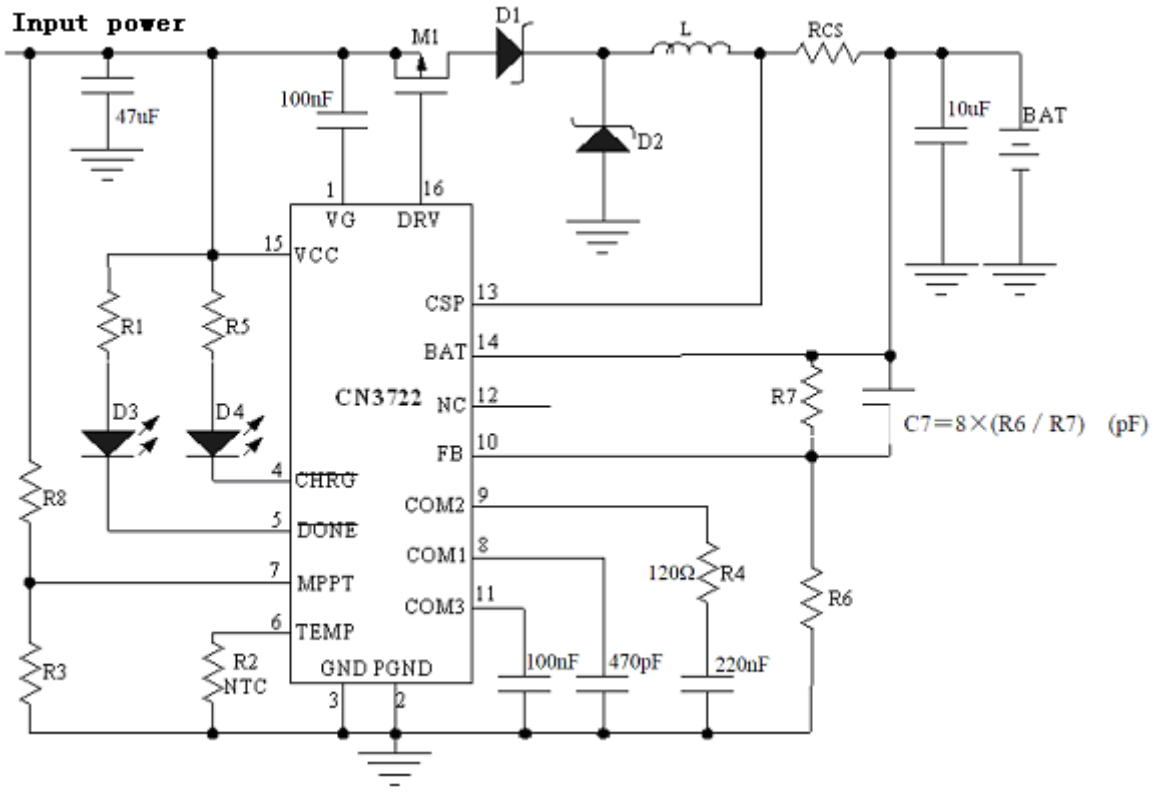
- Photovoltaic Cell Maximum Power Point Tracking
- Wide Input Voltage: 7.5V to 28V
- Complete Charger Controller for 1 or multi-cell Lithium-ion Battery or LiFePO4 Battery
- Charge Current Up to 5A
- High PWM Switching Frequency: 300KHz
- Constant Charging Voltage Set By the External Resistor Divider
- Charging Current is programmed with a sense resistor
- Automatic Conditioning of Deeply Discharged Batteries
- Battery Temperature Monitoring
- 2 Status Indications
- Soft Start
- Battery Overvoltage Protection
- Operating Ambient Temperature －40℃ to ＋85℃
- Available in 16 Pin TSSOP Package
- Pb-free , RoHS Compliant, and Halogen Free

3、 Application

- The Charger Powered by Photovotaic cell
- Electric Tools
- Battery-Backup Systems
- Standalone Battery Chargers

Typical application circuit 1

Use temperature monitoring, charging and end-of-charge display.



①Input Power VCC options: VCC minimum input voltage more than rechargeable battery full voltage 2V, but the maximum can not exceed 28V.

②Capacitor selection: Input and output capacitors can be selected according to the specific circuit ripple factor, if the ripple of the circuit is relatively large, should choose a large capacitance, the ripple is relatively small, select a relatively small capacitance.Generally, 50V10uF capacitance is to meet the requirement, selectrolytic capacitor is appropriate; C2, C3, C4, C5, ceramic capacitors, value to the application schematic. C7 is also a ceramic capacitor, the formula is C7 = 8 × (R6/R7) (pF).

③PMOS M1 options: Generally, when the charge current is less than 2.5A, to select AO3407A; when the charging current of 2.5A-5A, select SI4435DY.

④Schottky diodes D1 and D2 options: Generally, when the charge current is less than 2.5A to select 30BQ015; when the charge current is 2.5A-5A to select 50WQ03FN.

⑤Inductor L options: As the following table.

Charge Current	Input Voltage	Inductor Value
1A	>20V	40uH
	<20V	30uH
2A	>20V	30uH
	<20V	20uH
3A	>20V	20uH
	<20V	15uH
4A	>20V	15uH
	<20V	10uH
5A	>20V	10uH
	<20V	8uH

⑥Resistor Rcs options: When the charging current is 1A, Rcs = 0.2Ω; when the charging current of 2A, Rcs = 0.1Ω; when the charge current is 3A, Rcs = 0.067Ω; when the charging current is 4A, Rcs = 0.05Ω; when the chargecurrent of 5A, Rcs = 0.04Ω.

⑦Resistor R3 and R8 choice: CN3722 solar cell maximum power point tracking MPPT pin voltage is regulated to 1.04V, the temperature coefficient is -0.4% / ° C, two resistors R3 and R8 can achieve the maximum power point tracking for solar cells to form a voltage divider network.. Solar maximum power point voltage as follows:

V(solar panel maximum power point voltage) = 1.04 × (1 + R8/R3)

⑧The output voltage Vout: Vout feedback to FB pin by resistors R6 and R7 composed of resistor voltage divider network, CN3722 output voltage Vout determined according to the FB pin voltage. FB pin voltage when the battery is fully charged, the modulation in 2.416V.

Taking into account the bias current into the FB pin , voltage Vout:

V_{out}＝2.416×（1＋R7 / R6）＋I_B×R7

Among them, the I_B is a FB pin bias current, the typical value is 50nA.

For example: Vout =12V, the resistor R6 = 68K, resistor R7 = 270K.

★ When using high current charging, pay attention to the following.

（1）The MOS transistor of choice is the key ,on-resistance is less than 5 milliohms, preferably less than 3 milliohms, at the same time Qg less than 15nC. PCB copper area connected MOS transistor pins must be as large as possible to increase the cooling capacity and current capability.

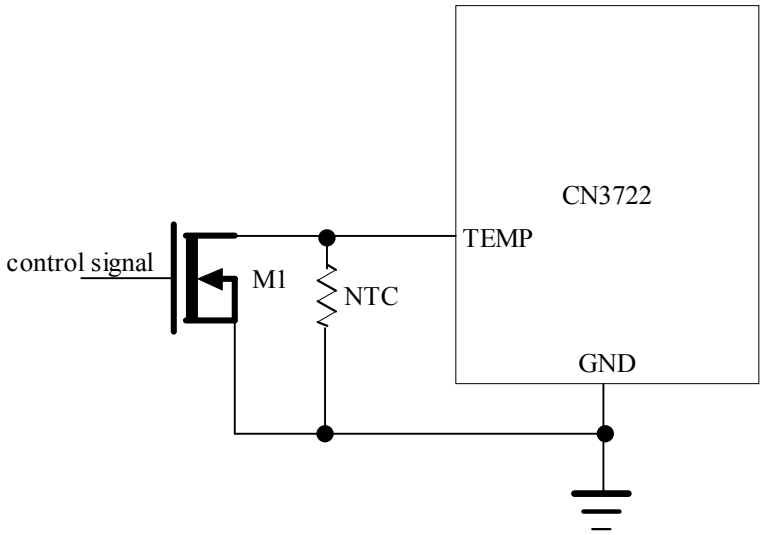
（2）The choice of the diode. Diode forward voltage must be as small as possible, preferably between 0.1 volts to 0.2 volts, with a few diodes in parallel, enhanced thermal capacity. Copper connecting pins of the diode must be as large as possible to enhance the cooling capacity and current capability.

（3）Inductor core to be able to process enough power. Under the premise of the same output power, the volume of sdndust core much smaller than the volume of the ferrite core.

（4）The power of the current sense resistor should have 2 watts, the cooling capacity is also very important to use several resistors in parallel, we should try to copper, to enhance the cooling capacity and current capability.

Typical application circuit 2

TEMP pin can prohibit charging.



When the control signal is high, M1 turns on, the TEMP pin is low, prohibit charging;
When the control signal is low, the M1 turn off,the TEMP pin voltage is determined by the NTC resistance value, the normal battery temperature monitoring.