SLM6705

2 Cell Switching Li-ion Battery Charger

Description

SLM6705 is a 2 cell Li-ion battery charger that supports wide voltage input. It is a synchronous buck converter with a fixed frequency of 700KHz. It has a charging efficiency of more than 95%, and a very small calorific value.

SLM6705 includes a complete charging termination circuit, automatic recharging and a preset charging voltage of 8.4V with an accuracy of ±1.0%. SLM6705 has many functions, such as anti back filling protection, output short circuit protection, chip and battery temperature protection.

SLM6705 is packaged in an E-SOP8 package with a heat sink and requires very few peripheral components, enabling it to be embedded in a variety of hand held applications as an efficient charger for high-capacity batteries.

Maximum Rating

- Input power voltage(VIN): -0.3V~22V
- BAT, VS: -0.3V~20V
- LX: -0.3V~VIN+0.3V
- BST: LX-0.3V~LX+5.5V
- NCHRG, NACOK: -0.3V~VIN+0.3V
- NTC: -0.3V~6.5V
- Short circuit duration of BAT: continuous
- Maximum junction temperature: 145℃
- Working environment temperature range: -40℃~85℃
- Storage temperature range : -65℃~125℃
- Welding temperature (10 seconds): 260℃

Features

- Fixed switching frequency of 700KHz
- High output efficiency of more than 95%
- There is no need to prevent reverse current diode
- No external power MOS transistor or freewheeling diode is required
- Accuracy of 8.4V charging voltage with accuracy of ± 1%
- Display power status and charging status
- Battery-side reverse leakage current less than 5uA
- 5.55V trickle charging
- Soft start limits surge current
- Battery temperature monitoring function
- Output short circuit protection function
- 8-pin SOP package with heat sink

Applications

- Mobile telephone
- Tablet
- MP3 and MP4 players
- Digital camera
- Electronic dictionary
- GPS
- Portable equipment,various chargers

Complete Charge Cycle

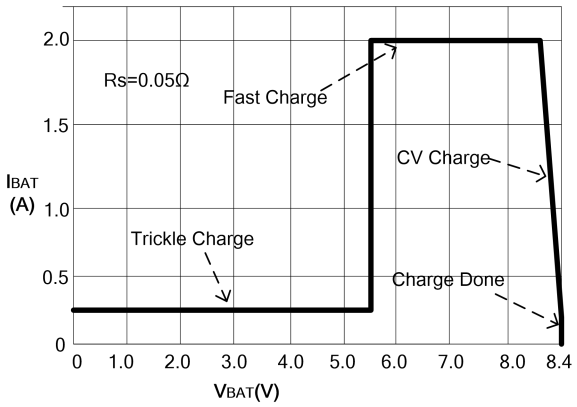

Figure 1

Typical Application

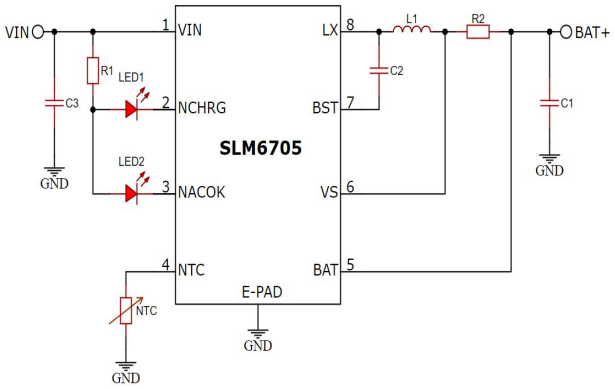

Figure 2

Application Tips

Efficient heat dissipation of the chip is a prerequisite to ensure that the chip maintains a high charging current for a long time.

The small form factor of the SOP8 package requires special attention to the layout of the PC board for heat dissipation of the chip. It is important to maximize the available charging current. The heat sink path for dissipating the heat generated by the IC runs from the chip to the lead frame and through the heat sink at the bottom to the copper side of the PC board.The copper foil of the PC board, which is the main heat sink for the IC, should be as wide as possible and extend outward to a larger area of the foil in order to dissipate the heat to the surroundings.

Placing perforations in the PCB to the internal layer or the back layer also has a significant effect in improving the overall thermal performance of the charger, see Figure 3. In the position of the SLM6705 on the PC board, a 2.5*6.5mm square PAD is placed as the heat sink for the SLM6705, and six perforations with a 0.6mm hole diameter and a 1mm hole spacing are placed as the heat sinks on the PAD. When the chip is soldered, the solder is poured in from the back layer of the PC, so that the heat sink at the bottom of the SLM6705 is effectively connected to the heat sink of the PC board, thus ensuring the efficient heat dissipation of the SLM6705.

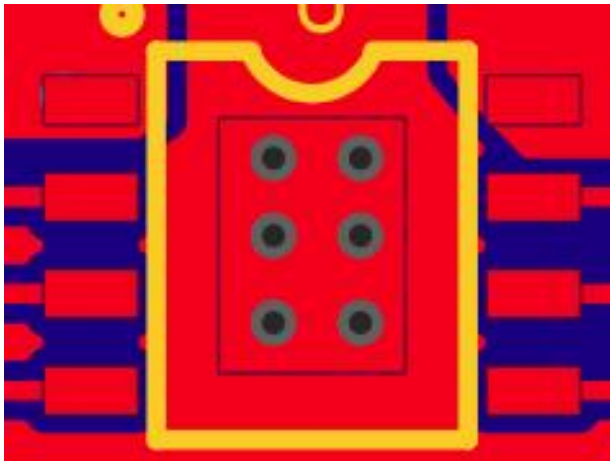

Figure 3

When PCB layout is designing, other heat sources independent of charging IC should be considered, because their own temperature will affect the overall temperature rise and maximum charging current.

Pin Description

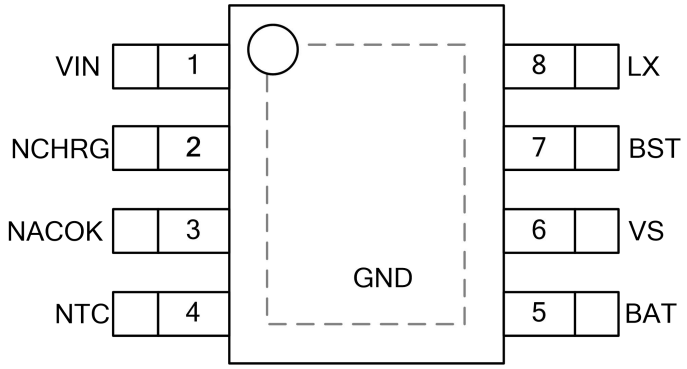

Figure 4 Pin package

PIN	Symbol	Function
1	VIN	Input voltage terminal
2	NCHRG	Battery charging indication terminal
3	NACOK	Power status indication terminal
4	NTC	Battery temperature detection input terminal
5	BAT	Battery voltage detection terminal
6	VS	Battery current detection terminal
7	BST	Bootstrap terminal
8	LX	Switch output terminal
Exposed PAD	GND	Ground

PIN Configuration

VIN(PIN 1): Input voltage terminal

NCHRG(PIN 2): State of charge indication terminal. When the charger charges the battery, the pin is pulled to the low level by the internal switch, indicating that the charging is in progress, otherwise the pin is in the high resistance state.

NACOK(PIN 3): Power status indication terminal.This pin is pulled low by the internal switch when the input voltage is greater than the battery voltage and above the under voltage protection voltage, otherwise the pin is in a high resistance state.

NTC(PIN 4): Battery temperature detection input terminal.Connect this end to the NTC sensor of the battery to turn off the charging when the battery temperature is too high or too low, if you don't use this function, you can leave it hanging or connect a 10KΩ resistor to GND.

BAT(PIN 5): Battery voltage detection terminal.Connect the positive terminal of the battery to this pin to monitor the battery voltage in real time.

VS(PIN 6): Battery current detection terminal.Connect a high precision resistor between VS and BAT to monitor the charging current in real time.

BST(PIN 7): Bootstrap terminal.A small capacitor is connected between the BST and the LX to be used as a drive power supply for the internal upper power tube.

LX(PIN 8): Switch output terminal.This terminal is connected to an external inductor as the output of the charging current.

GND(Exposed PAD): Power Ground.