

Outline

MC3002 series are protection IC with integrated MOS-FET for protection of the rechargeable Lithium-ion or Lithium-polymer battery. The overcharge, overdischarge and discharging and

charging overcurrent protection of the rechargeable one-cell Lithium-ion or Lithium-polymer battery can be detected.

Features

(Unless otherwise specified, Ta=25°C)

(1) Range and accuracy of detection/release voltage

- Overcharge detection voltage.....4.15V to 4.50V, 5mV steps Accuracy±22mV
Accuracy±27mV
(Topr=-5°C to +60°C)
- Overcharge release voltage4.00V to 4.35V *1..... Accuracy±50mV
- Overdischarge detection voltage2.00V to 3.00V *2..... Accuracy±100mV
- Overdischarge release voltage.....2.00V to 3.00V *2..... Accuracy±100mV
- Discharge overcurrent detection voltage30mV to 100mV, 1mV steps Accuracy±6mV
- Charging overcurrent detect voltage-100mV to -30mV, 1mV steps..... Accuracy±9mV
- Short detection voltage.....Selection from 0.36, 0.56, 0.90V Accuracy±100mV
- Over voltage charger detection voltage.....VDD-8.0V fixed Accuracy±2.0V
- Over voltage charger release voltageVDD-7.3V fixed..... Accuracy±1.5V

(2) Range of detection delay time

- Overcharge detection delay timeSelection from 1.0s, 4.5s, 6.25s
- Overdischarge detection delay timeSelection from 100ms, 256ms
- Discharging overcurrent detection delay time ...Selection from 8ms, 12ms, 16ms, 20ms, 34ms
- Charging overcurrent detection delay time.....Selection from 8.5ms, 25ms, 32.5ms
- Short detection delay time.....Selection from 0.50ms, 0.75ms

(3) 0V battery charge functionSelection from “Permission” or “Prohibition”

(4) The overcharge detection delay timer reset time function (function for the pulse charge) is provided. fixed

(5) Low current consumption

- Normal modeTyp. 3.0μA, Max. 5.2μA
- Stand-by modeMax. 0.1μA
(For “Charger connection release” the overdischarge release condition.)
Max. 0.5μA
(For “Voltage release” the overdischarge release condition.)

(6) MOS-FET

- Source to Source on state resistance.....Typ. 10.6mΩ (@VCC=3.7V)

(7) Absolute maximum ratings

- VDD pin-0.3V to +8V
- V- pin.....VCC-12V to VCC+0.3V
- Drain-source voltage.....Max. 12V
- Drain currentMax. 12V
- Total Power DissipationMax. 1.0W
- Storage temperature-40°C to +125°C
- Operation temperature.....-40°C to +85°C

*1 Hysteresis voltage between Overcharge detection and release voltage is selectable from 0.10V/0.15V/0.20V/0.25V.

*2 Please inquire to us about details of the setting of Overdischarge detection and release voltage.

Pin assignment

PLP-4D

| Pin no. | Symbol | Function |
|---------|--------|--|
| 1 | S1 | S1 is a source pin of Discharge MOS-FET and a negative power supply, which is connected to the negative terminal of the battery. |
| 2 | VDD | VCC is a positive power supply pin, which is connected to the positive terminal of the battery through Rvcc (330 to 470 ohm). |
| 3 | V- | V- is an input pin that detects overcurrent. This pin is connected to the source terminal of Charge MOS-FET through Ridt (2.7 KΩ). |
| 4 | S2 | S2 is a source pin of Charge MOS-FET, which is connected to a negative power supply terminal of chargers. |
| - | D | D is a common pin of two drains of Charge MOS-FET and Discharge MOS-FET. D must be open electrically. |

LINE UP

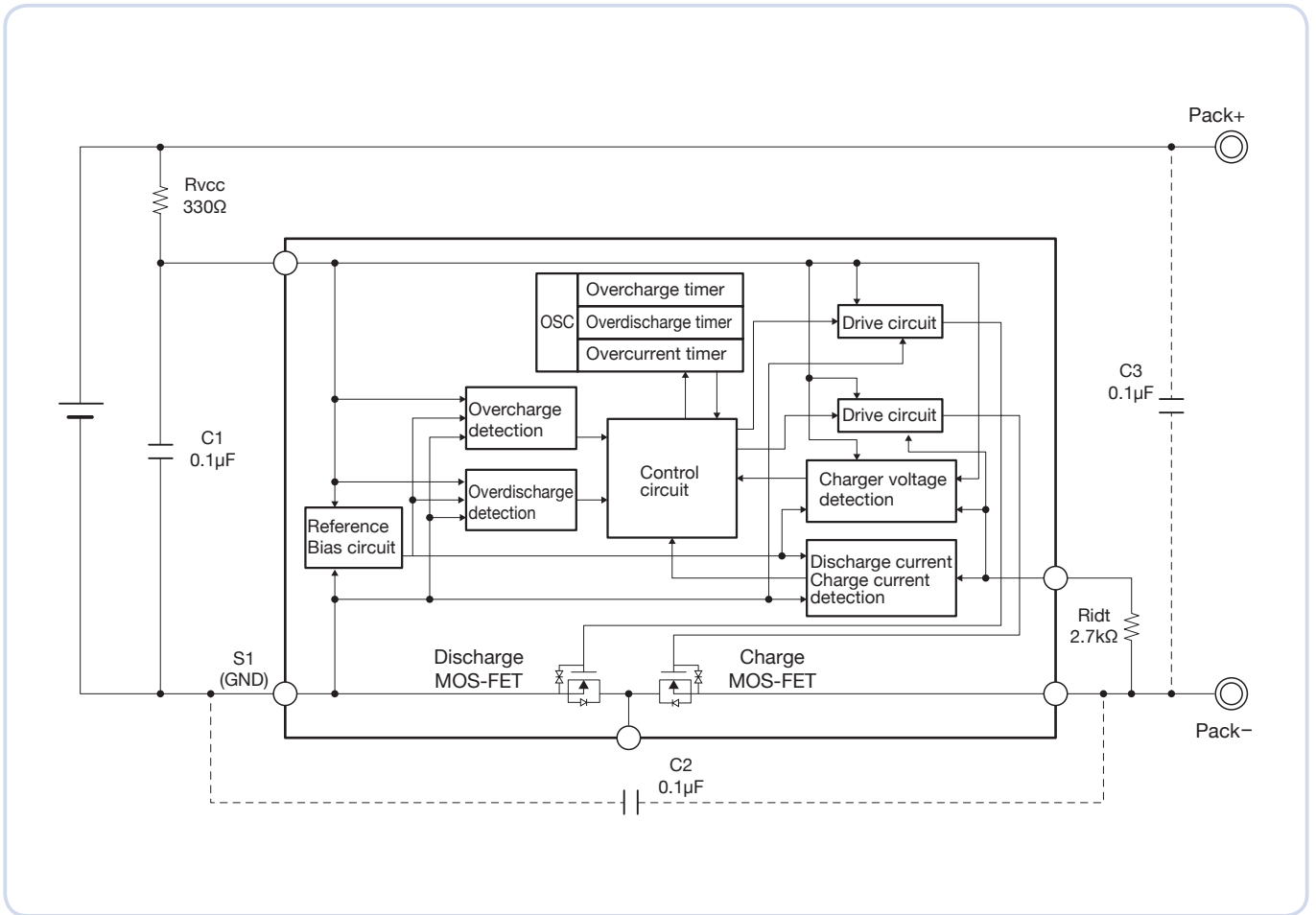
| Product name | Package | Optional function | | Detection / Release voltage | | | | | | Detection delay time | | | | | Optional function | | |
|--------------|---------|----------------------------|--|------------------------------|----------------------------|---------------------------------|-------------------------------|---|--|-------------------------|---------------------------------|------------------------------------|--|---|----------------------------|-------------------------------------|----------------------------------|
| | | 0V battery charge function | Discharge overcurrent detection voltage becomes dependent on VDD | Overcharge detection voltage | Overcharge release voltage | Overdischarge detection voltage | Overdischarge release voltage | Discharging overcurrent detection voltage (@VCC=3.5V) | Charging overcurrent detection voltage (@VCC=3.5V) | Short detection voltage | Overcharge detection delay time | Overdischarge detection delay time | Discharging overcurrent detection delay time | Charging overcurrent detection delay time | Short detection delay time | Discharge current limit (@VCC=3.5V) | Charge current limit (@VCC=3.5V) |
| | | | | | | | | | | | | | | | | | |
| MC3002CL1GAM | PLP-4D | ○ | ○ | 4.425 | 4.225 | 2.500 | 2.900 | 0.073 | -0.073 | 0.360 | 1.0 | 100.0 | 12.0 | 8.5 | 500 | 6.75 | 6.75 |
| MC3002CL2GAM | PLP-4D | ○ | ○ | 4.275 | 4.275 | 2.300 | 2.900 | 0.084 | -0.084 | 0.360 | 1.0 | 100.0 | 20.0 | 32.5 | 500 | 7.80 | 7.80 |

*1 0V battery charge function ○ Permission × Prohibition
 *2 Optional functions ○ Provided. × Not provided.

PLP-4D ... 5,000pcs/Reel

Please inquire to us, if you request a rank other than the above.

Typical application circuit



- The resistors that are inserted into each pin are to protect the IC. They help to remove ESD and latch-up damages.
- The capacitors help to reduce the effects of transient variations in voltage and electromagnetic waves, and to improve ESD tolerance of the IC.
Please use either C2 or C3, or both of them by request of your application.
- These values in the above figure are for example. Please choose appropriate values.