MM3684 Series

2023/07/20

Outline

The MM3684 series are protection IC using high voltage CMOS process for overcharge, secondary overcharge, overdischarge, overcurrent and temperature protection of the rechargeable Lithium-ion or Lithium-polymer battery. The overcharge, overdischarge, discharging overcurrent, charging overcurrent, temperature of the rechargeable 3 to 5 cells Lithium-ion or Lithium-polymer battery can be detected. The internal circuit of IC is composed by the voltage detector, the reference voltage source, delay time control circuit, and the logical circuit, etc.

Product Series

For 3 to 5cells

Features

1) Range and accuracy of detection/release voltage

- Overcharge detection voltage 1 (0V output) 3.6V to 4.5V, 5mV steps Accuracy ±25mV
- Overcharge release voltage 1 (0V output) 3.4V to 4.5V, 50mV steps Accuracy ±50mV
- Overcharge detection voltage 2 (PF output) 3.6V to 4.5V, 5mV steps Accuracy ±25mV
- Overdischarge detection voltage 1 2.0V to 3.0V, 50mV steps Accuracy ±80mV
- Overdischarge detection voltage 2 2.0V to 3.0V, 50mV steps Accuracy ±100mV
- Overdischarge release voltage 2.0V to 3.5V, 50mV steps Accuracy ±100mV
- Discharging overcurrent detection voltage 1 30mV to 300mV, 5mV steps Accuracy ±15%
- Discharging overcurrent detection voltage 2 Twice or 4 times of discharging overcurrent 1 Accuracy ±20%
- Short detection voltage 4 or 8 times of discharging overcurrent 1 Accuracy ±100mV
- Charging overcurrent detect voltage -300mV to -20mV, 5mV steps Accuracy ±10mV

2) Range of detection delay time

- Overcharge detection delay time 1 Setting by a capacitor of COV pin. Accuracy ±50%
- Overcharge release delay time 1 Setting by a capacitor of COV pin. Accuracy ±50%
- Overcharge detection delay time 2 Setting by a capacitor of CPF pin. Accuracy ±50%

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●Overdischarge detection delay time Setting by a capacitor of CUV pin. Accuracy ±50%
●Overdischarge release delay time Setting by a capacitor of CUV pin. Accuracy ±50%
●Discharging overcurrent detection delay time 1 Setting by a capacitor of DCOC pin. Accuracy ±50%
●Discharging overcurrent detection delay time 2 Setting by a capacitor of DCOC pin. Accuracy ±50%
●Short detection delay time Selection from 100μs, 200μs, 300μs Accuracy -50%, +100%
●Discharging overcurrent release delay time Setting by a capacitor of DCOC pin. Accuracy ±50%
●Charging overcurrent detection delay time Setting by a capacitor of CCOC pin. Accuracy ±50%
●Charging overcurrent release delay time Setting by a capacitor of CCOC pin. Accuracy ±50%
●Temperature protection detection ON time Setting by a capacitor of CIOT pin. Accuracy ±50%
●Temperature protection detection OFF time Setting by a capacitor of CIOT pin. Accuracy ±50%

3) The setting for three cell , for four cell , and for fi ve cell protection can be set with the SEL1,2 pin.

4) Threshold of over-discharge detection can be switched to over-discharge detection voltage 1, 2 at the DVSEL terminal.

5) 0V battery charge function Selection from ”Prohibition” or ”Permission”

6) Power save mode built-in

7) Achieve low consumption by making the temperature detection for regulator and temperature detection circuit to intermittent operation

8) Low current consumption
●VDD pin current consumption (Vcell=4.3V) Typ. 15.0μA, Max. 25.0μA
●VDD pin current consumption (Vcell=3.5V) Typ. 10.0μA, Max. 20.0μA
●VDD pin current consumption at power save(Vcell=1.8V) Typ. 3.0μA, Max. 6.0μA
●V5 pin current consumption (Vcell=4.3V) Typ. 1.0μA, Max. 2.0μA
●V5 pin current consumption (Vcell=3.5V) Typ. 0.8μA, Max. 1.5μA
●V5 pin current consumption (Vcell=1.8V) Max. 0.5μA

Specifications

Product name	Package	0V battery charge function	Overcharge detection voltage [V]	Overcharge release voltage [V]	Overdischarge detection voltage [V]	Overdischarge release voltage [V]

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MM3684C01WBH	VSOP-24A	Permission	4.225	4.100	2.700	3.000

Product name	Discharging overcurrent detection voltage1 [V]	Discharging overcurrent detection voltage2 [V]	Charging overcurrent detection voltage [V]	Short detection voltage [V]	Overcharge detection delay time [s]	Overcharge release delay time [ms]	Overdischarge detection delay time [ms]
MM3684C01WBH	0.1000	0.2000	-0.0200	0.450	1.000	100.0	1000.0

Product name	Overdischarge release delay time [ms]	Discharging overcurrent detection delay time 1 [ms]	Discharging overcurrent detection delay time 2 [ms]	Discharging overcurrent release delay time [ms]	Charging overcurrent detection delay time [ms]	Charging overcurrent release delay time [ms]	Short detection delay time [ms]
MM3684C01WBH	100.0	1000.0	250.0	100.00	470.0	47.0	0.200

Product name	High temperature detection temperature 1 [deg.C]	High temperature release temperature 1 [deg.C]	High temperature detection temperature 2 [deg.C]	High temperature release temperature 2 [deg.C]
MM3684C01WBH	70	65	50	45

Package

VSOP-24A