MM3694 Series

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Outline

The MM3694 series are protection IC using high voltage CMOS process for overcharge, overdischarge, overcurrent and temperature
protection of the rechargeable Lithium-ion or Lithium-polymer battery. The overcharge, overdischarge, discharging overcurrent, chargingovercurrent, temperature of the rechargeable 3 to 5cell 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 3.6V to 4.5V, 5mV steps Accuracy ±25mV
● Overcharge release voltage 3.4V to 4.5V, 50mV steps Accuracy ±50mV
● Overdischarge detection voltage 2.0V to 3.0V, 50mV steps Accuracy ±80mV
● 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 Setting by a capacitor of COV pin. Accuracy ±50%
● Overcharge release delay time Setting by a capacitor of COV pin. Accuracy ±50%
● 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) 0V battery charge function Selection from "Prohibition" or "Permission"

5) Power save mode built-in

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

7) 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]
MM3694A02WBH	VSOP-24A	Permission	4.250	4.150	2.500	3.000
MM3694A04WBH	VSOP-24A	Permission	4.225	4.125	2.500	3.000
MM3694A05WBH	VSOP-24A	Permission	4.200	4.100	2.700	3.000
MM3694C01WBH	VSOP-	Prohibition	4.280	4.220	2.750	3.050

MM3694C01WBE							
24B	Prohibition	4.380	4.230	2.750	3.050		

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]
MM3694A02WBH	0.1000	0.1600	-0.0500	0.400	1.000	100.0	1000.0
MM3694A04WBH	0.1000	0.1600	-0.0500	0.400	1.000	100.0	1000.0
MM3694A05WBH	0.1000	0.1600	-0.0500	0.400	1.000	100.0	1000.0
MM3694C01WBE	0.1000	0.1600	-0.0480	0.400	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]
MM3694A02WBH	100.0	470.0	47.0	47.00	470.0	47.0	0.200
MM3694A04WBH	100.0	470.0	47.0	47.00	470.0	47.0	0.200
MM3694A05WBH	100.0	470.0	47.0	47.00	470.0	47.0	0.200
MM3694C01WBE	100.0	470.0	47.0	47.00	470.0	47.0	0.200

Product name	High temperature detection temperature 1 [deg.C]	High temperature release temperature 1 [deg.C]	Low temperature detection temperature 1 [deg.C]	Low temperature release temperature 1 [deg.C]
MM3694A02WBH	60	50	0	10
MM3694A04WBH	60	50	0	10
MM3694A05WBH	60	50	0	10
MM3694C01WBE	60	50	0	10

Package

VSOP-24A