2 to 4cell Li-ion/Li-polymer battery Secondary protection IC
MM3508A Series

Outline

MM3508A series is a double protection IC for 1 to 4 serial cells lithium-ion / lithium-polymer rechargable battery for secondary protection IC. It detects battery voltage for each cell.

The FUSE cutting signal is the output between period of time. And the CELL voltage is released by electric discharge after FUSE was cut.

Features　　(Unless otherwise specified, Topr=+25°C)

1. Range and accuracy of overcharge detection/hysteresis voltage
   - ● Overcharge detection voltage　　4.0V to 4.5V, 5mV step　　Accuracy±20mV (Topr=0 to +50°C)
   - ● Overcharge hysteresis voltage　　−500mV to −50mV, 50mV step　　Accuracy±20%

2. Range of detection delay time
   - ● Overcharge detection delay time　　1ms to $(1ms \times 2^{n1}) + (1ms \times 2^{n2})$

     *n1 and n2 can select two arbitrary integers between 0 to 13. (However n1≠n2)

3. Low current consumption
   Typ. 3.5μA, Max. 5.0μA (Vcell=4.0V)
   Typ. 0.15μA, Max. 0.30μA (Vcell=2.3V)

4. Absolute maximum ratings
   - ● VDD pin　　VSS−0.3 to VSS+28V
   - ● OV pin　　VSS−0.3V to VDD+0.3V
   - ● Storage temperature　　−55°C to +125°C
   - ● Operation temperature　　−40°C to +110°C

5. The FUSE cutting signal is the output between period of time. And the CELL voltage is released by electric discharge resistance of "60KΩ" after FUSE was cut.
   And CELL stops an electric discharge if the CELL voltage becomes less than the electric discharge release voltage.

Pin Assignment

Top view SOT-26A	Pin No.	Function
	1	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	2	The input terminal of the positive voltage of V3 cell and the negative voltage of V4 cell
	3	The input terminal of the power supply of IC and the positive voltage of V4 cell
	4	Output of over charge detection (Output type is CMOS)
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell

Top view SSON-6A	Pin No.	Function
	1	The input terminal of the power supply of IC and the positive voltage of V4 cell
	2	The input terminal of the positive voltage of V3 cell and the negative voltage of V4 cell
	3	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	4	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	Output of over charge detection (Output type is CMOS)

2 to 4cell Li-ion/Li-polymer battery Secondary protection IC
MM3508B Series

Outline

MM3508B series is a double protection IC for 1 to 4 serial cells lithium-ion / lithium-polymer rechargable secondary battery.It detects battery voltage for each cell.

Each of these IC composed of four voltage detectors, reference voltage sources, oscillator, counter circuit and logical circuits.

Features　　　(Unless otherwise specified, Topr=+25°C)

1. Range and accuracy of overcharge detection/hysteresis voltage
   - Overcharge detection voltage　　　　4.0V to 4.5V, 5mV step　　　　Accuracy±20mV (Topr=0 to +50°C)
   - Overcharge hysteresis voltage　　　　–500mV to –50mV, 50mV step　　Accuracy±20%

2. Range of detection delay time
   - Overcharge detection delay time　　　$1ms$ to $(1ms \times 2^{n1}) + (1ms \times 2^{n2})$

     *n1 and n2 can select two arbitrary integers between 0 to 13. (However n1≠n2)

3. Low current consumption
   Typ. 3.5µA, Max. 5.0µA (Vcell=4.0V)
   Typ. 0.15µA, Max. 0.30µA (Vcell=2.3V)

4. Absolute maximum ratings
   - VDD pin　　　　　　　　　　　VSS–0.3 to VSS+28V
   - OV pin　　　　　　　　　　　　VSS–0.3V to VDD+0.3V
   - Storage temperature　　　　　　–55°C to +125°C
   - Operation temperature　　　　　–40°C to +110°C

Pin Assignment

Top view SOT-26A	Pin No.	Function
	1	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	2	The input terminal of the positive voltage of V3 cell and the negative voltage of V4 cell
	3	The input terminal of the power supply of IC and the positive voltage of V4 cell
	4	Output of over charge detection (Output type is CMOS)
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell

SOT-26A top view pins: V1(6) VSS(5) OV(4) / V2(1) V3(2) VDD(3)

Top view SSON-6A	Pin No.	Function
	1	The input terminal of the power supply of IC and the positive voltage of V4 cell
	2	The input terminal of the positive voltage of V3 cell and the negative voltage of V4 cell
	3	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	4	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	Output of over charge detection (Output type is CMOS)

SSON-6A top view pins: OV(6) VSS(5) V1(4) / VDD(1) V3(2) V2(3)

- Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.
- The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

2 to 3cell Li-ion/Li-polymer battery Secondary protection IC
MM3508C Series

Outline

MM3508C series is a double protection IC for 2-4 cell Li batteries.

It detects battery voltage for each cell.

The terminal CT is used to control the output voltage of the terminal OV.

Features   (Unless otherwise specified, Topr=+25°C)

1. Range and accuracy of overcharge detection/hysteresis voltage
   - Overcharge detection voltage   4.0V to 4.5V, 5mV step   Accuracy±20mV (Topr=0 to +50°C)
   - Overcharge hysteresis voltage   –500mV to –50mV, 50mV step   Accuracy±20%

2. Range of detection delay time
   - Overcharge detection delay time   1ms to $(1ms \times 2^{n1}) + (1ms \times 2^{n2})$

   *n1 and n2 can select two arbitrary integers between 0 to 13. (However n1≠n2)

3. Low current consumption
   Typ. 3.0μA, Max. 5.0μA (Vcell=4.0V)
   Typ. 2.5μA, Max. 4.0μA (Vcell=2.3V)

4. Absolute maximum ratings
   - VDD pin   VSS-0.3 to VSS+28V
   - OV pin   VSS-0.3V to VDD+0.3V
   - Storage temperature   –55°C to +125°C
   - Operation temperature   –40°C to +110°C

5. The terminal CT is used to control the output voltage of the terminal OV.

Pin Assignment

Top view	Pin No.	Function
SOT-26A		
	1	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell
	2	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	3	The input terminal of the power supply of IC and the positive voltage of V4 cell
	4	Output of over charge detection (Output type is CMOS)
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	The input terminal of OV output control signal

SOT-26A pins: CT(6) VSS(5) OV(4) / V1(1) V2(2) VDD(3)

Top view	Pin No.	Function
SSON-6A		
	1	The input terminal of the power supply of IC and the positive voltage of V4 cell
	2	The input terminal of the positive voltage of V2 cell and the negative voltage of V3 cell
	3	The input terminal of the positive voltage of V1 cell and the negative voltage of V2 cell
	4	The input terminal of OV output control signal
	5	The input terminal of the ground of IC and the negative voltage of V1 cell
	6	Output of over charge detection (Output type is CMOS)

SSON-6A pins: OV(6) VSS(5) CT(4) / VDD(1) V2(2) V1(3)

Selection Guide (3000pcs/Reel)

Product name	Package	Function	Overcharge detection voltage [V]	Overcharge hysteresis voltage[mV]	Overcharge detection dead time [s]	Output type	Latch function	Stand by function	PTC function
			$V_{CELL}U$	V_{HYS}	T_{OV}				
MM3508A01RRE	SSON-6A	1 to 4 cells	4.220±0.02	500±100	4.10±0.9	CMOS Output Active High	○	○	–
MM3508A02RRE	SSON-6A	1 to 4 cells	4.350±0.02	500±100	4.10±0.9		○	○	–
MM3508A03RRE	SSON-6A	1 to 4 cells	4.450±0.02	500±100	4.10±0.9		○	○	–
MM3508A04RRE	SSON-6A	1 to 4 cells	4.320±0.02	500±100	4.10±0.9		○	○	–
MM3508A05RRE	SSON-6A	1 to 4 cells	4.370±0.02	500±100	4.10±0.9		○	○	–
MM3508A06RRE	SSON-6A	1 to 4 cells	4.500±0.02	500±100	4.10±0.9		○	○	–
MM3508A07RRE	SSON-6A	1 to 4 cells	4.375±0.02	500±100	4.10±0.9		○	○	–
MM3508B01RRE	SSON-6A	1 to 4 cells	4.450±0.02	500±100	5.00±1.5		–	○	–
MM3508B06RRE	SSON-6A	1 to 4 cells	4.350±0.02	V4 : 620±100 V3 to V1 : 270±100	4.00±1.2		–	○	–
MM3508B07RRE	SSON-6A	1 to 4 cells	4.300±0.02	V4 : 620±100 V3 to V1 : 270±100	4.00±1.2		–	○	–
MM3508B08RRE	SSON-6A	1 to 4 cells	4.450±0.02	V4 : 620±100 V3 to V1 : 270±100	4.00±1.2		–	○	–
MM3508B09RRE	SSON-6A	1 to 4 cells	4.500±0.02	V4 : 620±100 V3 to V1 : 270±100	4.00±1.2		–	○	–
MM3508C01RRE	SSON-6A	1 to 3 cells	4.350±0.02	390±160	4.00±1.2		–	–	○
MM3508C01NRH	SOT-26A	1 to 3 cells	4.350±0.02	390±160	4.00±1.2		–	–	○
MM3508C02RRE	SSON-6A	1 to 3 cells	4.350±0.02	390±160	5.65±1.7		–	–	○
MM3508C02NRH	SOT-26A	1 to 3 cells	4.350±0.02	390±160	5.65±1.7		–	–	○
MM3508C03RRE	SSON-6A	1 to 3 cells	4.450±0.02	390±160	5.65±1.7		–	–	○
MM3508C03NRH	SOT-26A	1 to 3 cells	4.450±0.02	390±160	5.65±1.7		–	–	○
MM3508C04RRE	SSON-6A	1 to 3 cells	4.450±0.02	390±160	4.00±1.7		–	–	○

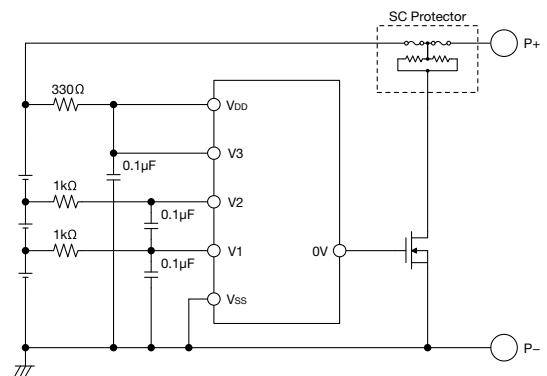Please inquire to us, if you request a rank other than the above.
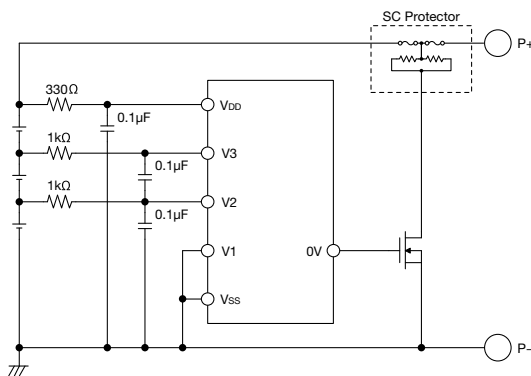
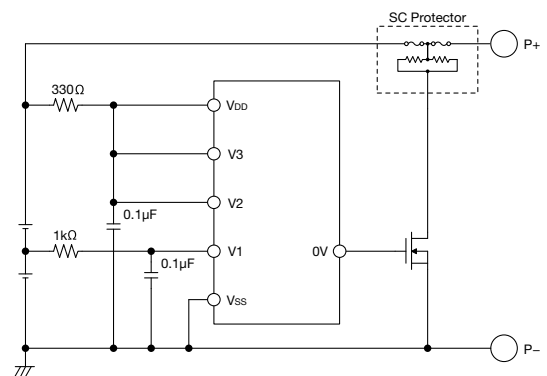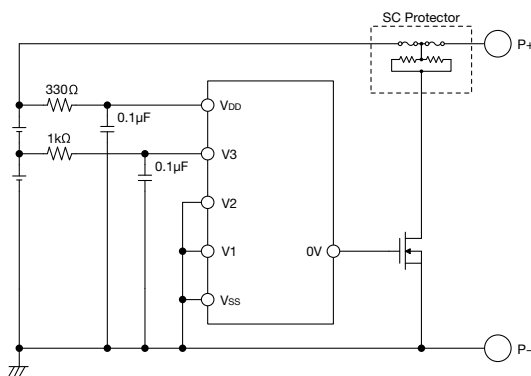## Application Circuit

3508A/3508B

(1) When using it for 4 cells

(2) When using it for 3 cells

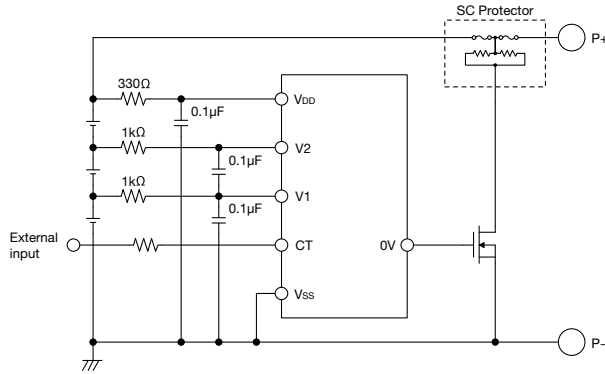#### (3) When using it for 2 cells

The voltage change becomes big according to an excessive current, and the current of the bias in IC is turned off temporarily. It is this influence, and there is a possibility that the output logic becomes unstable. In that case, please set the time constant of CR connected with the power supply terminal so that the variation in power source may become 1V/100μsec or more.

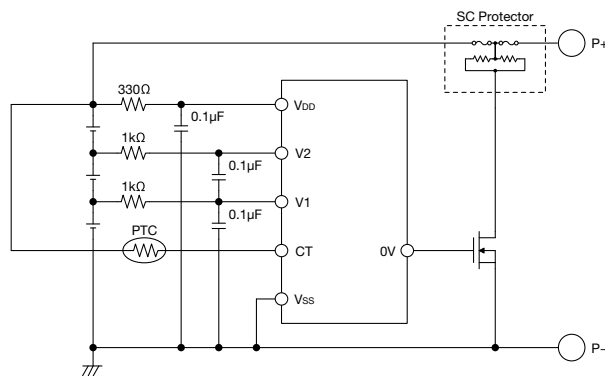The constant of the mark is a standard.

3508C

(1) When using it for 3 cells

(2) When using it by the overheat protection by PTC

When connecting a battery, it is recommended to make a short circuit by connecting a jumper between the output and VSS and then remove the output jumper at the completion of installing all the cells.

The constant of the mark is a standard.