1 to 3 cells lithium–ion/lithium–polymer battery secondary protection IC

MM3563 series

Outline

MM3563 series are secondary protection IC using high voltage CMOS process for overcharge protection of the rechargeable lithium–ion or lithium-polymer battery. The high accuracy overcharge detection of each cell of the rechargeable 1 to 3–cell Lithium-ion or Lithium-polymer battery is possible. Each of these IC composed of four voltage detectors, reference voltage sources, oscillator, counter circuit and logical circuits. The ultra-small package SSON-6A is used to minimize footprints.

Features

(Unless otherwise specified,Ta=25℃)

1) Range and accuracy of detection/release voltage

・Overcharge detection voltage	4.0V to 4.5V, 5mV steps	Accuracy±20mV
・Hysteresis voltage	50mV to 500mV	Accuracy±50mV～100mV

2) Range of detection delay time

・Overcharge detection delay time	1ms to $(1ms\times2^{n1})+(1ms\times2^{n2})$ *n1 and n2 can select two arbitrary integers between 0 to 13. (However n1≠n2)

3) Low current consumption

・Current consumption1 (VCELL=4.0V)	Typ. 1.5uA, Max. 3.0uA
・Current consumption2 (VCELL=2.3V)	Typ. 0.15uA, Max. 0.30uA

4) Package type

・SSON-6A	2.00 × 1.80 × 0.75 [mm]
・SOT-26A	2.90 × 2.80 × 1.15 [mm]

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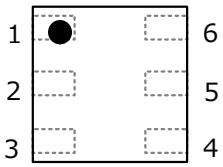
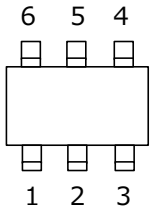
Pin explanations

SSON-6A	Pin No.	Symbol	Function
	1	VDD	The input terminal of the power supply of IC
	2	V3	The input terminal of the positive voltage of V3 cell
	3	V2	The input terminal of the positive voltage of V2 cell, and the negative voltage of V3 cell
	4	V1	The input terminal of the positive voltage of V1 cell, and the negative voltage of V2 cell
	5	VSS	The input terminal of the ground of IC, and the negative voltage of V1 cell
	6	OV	Output of over charge detection. Output type is CMOS

SOT-26A	Pin No.	Symbol	Function
	1	V2	The input terminal of the positive voltage of V2 cell, and the negative voltage of V3 cell
	2	V3	The input terminal of the positive voltage of V3 cell
	3	VDD	The input terminal of the power supply of IC
	4	OV	Output of over charge detection. Output type is CMOS
	5	VSS	The input terminal of the ground of IC, and the negative voltage of V1 cell
	6	V1	The input terminal of the positive voltage of V1 cell, and the negative voltage of V2 cell

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage	V_{DDMAX}	-0.3	18.0	V
OV pin input voltage	V_{OMAX}	VSS-0.3	VDD+0.3	V
Storage temperature	T_{STG}	-55	125	℃

Recommended Operating Conditions

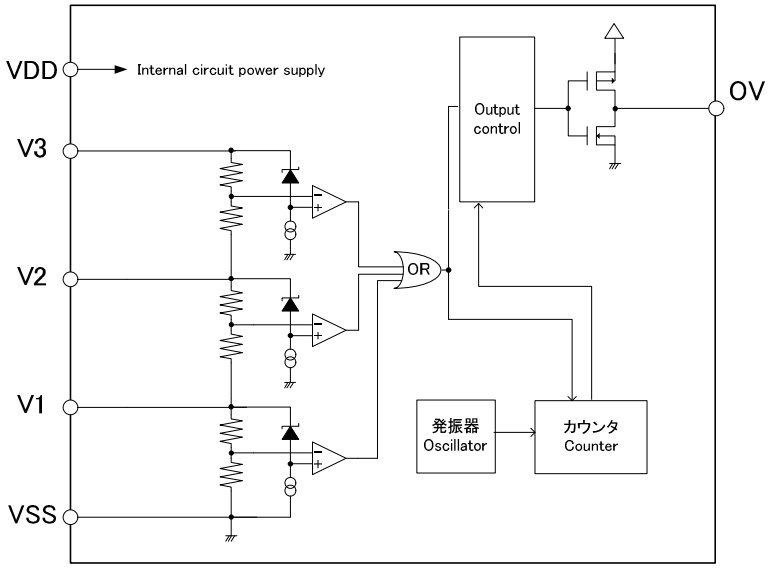
Parameter	Symbol	Min	Max	Unit
Operating ambient temperature	Topr	-40	110	℃
Operating voltage	Vop	2.0	18.0	V

Electrical characteristics

(Unless otherwise specified,Ta=25℃)

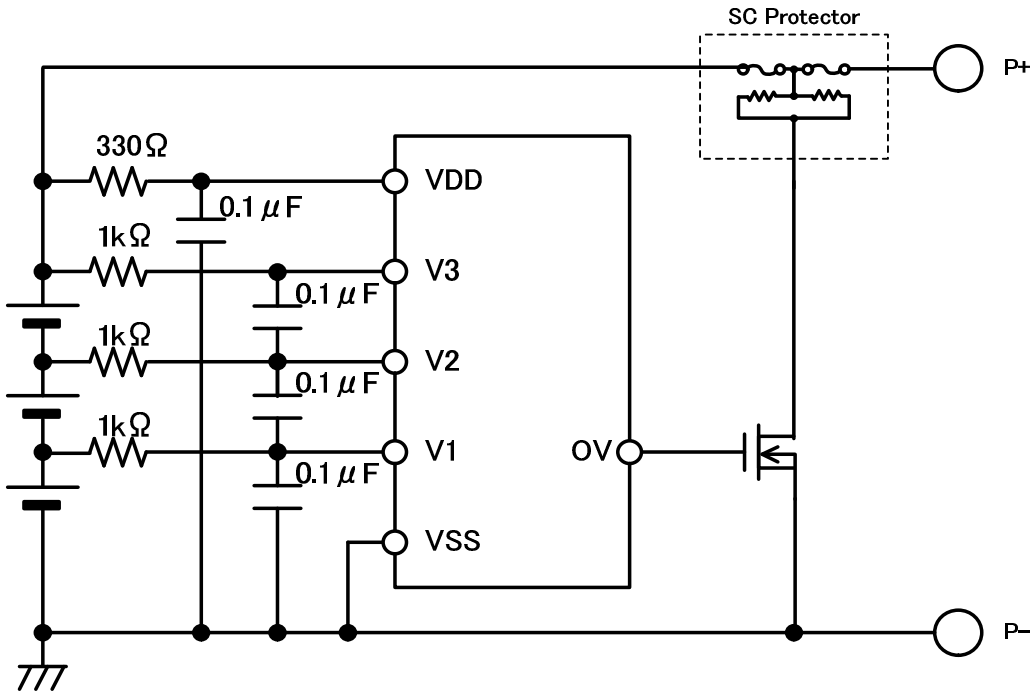
Parameter	Symbol	Note	Min	Typ	Max	Unit
Output current						
OV pin source current	$I_{SO}O_V$	V_{OV}=VIN-0.5V	250	-	-	uA
OV pin sink current	$I_{SI}O_V$	V_{OV}=0.5V	250	-	-	uA
Current consumption						
Consumption current 1	I_{DD1}	VCELL=4.0V	-	1.5	3.0	uA
Consumption current 2	I_{DD2}	VCELL=2.3V	-	0.15	0.30	uA
V2 pin input current	I_{V2}	VCELL=3.5V	-300	-	300	nA
V1 pin input current	I_{V1}	VCELL=3.5V	-300	-	300	nA
Detection/Release voltage						
Overcharge detection voltage	$V_{CELL}U$	Ta=+25℃	Typ-0.020	$V_{CELL}U$	Typ+0.020	V
		Ta=0～+60℃	Typ-0.025		Typ+0.025	
		Ta=-40～+110℃	Typ-0.070		Typ+0.070	
Overcharge release voltage	$V_{CELL}O$		Typ-0.05~0.10	$V_{CELL}O$	Typ+0.05~0.10	V
Standby Voltage	Vst		2.4	3.0	3.6	V
Detection delay time						
Overcharge detection dead time	tovd		Typ*0.7	tovd	Typ*1.3	s

Block diagram



Typical application circuit

・When using it for 3 cells



※1.constant of the mark is a standard.

※2.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.