2cells Li-ion/Li-polymer battery secondary protection IC

MM4128B/MM4129B Series

Outline

The MM4128B / MM4129B series is a double protection IC for 2 cell Li batteries. It detects battery voltage for each cell. The configuration of delay time can be achieved. Output at the time of detection can be held for a fixed period of time; therefore, this can maintain a regular disconnection time of a fuse. In addition, high cell voltage can be dropped and then stopped at the level where battery deterioration does not occur by Electrical discharge function of the IC after disconnecting the fuse.

Applications

Lithium-ion rechargeable battery pack
Lithium-polymer rechargeable battery pack

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating ambient temperature	Topr	-40	85	℃
Operating voltage	Vop	1.5	11.0	V

Features

(Unless otherwise specified,Ta=25℃)

1) Range and accuracy of detection/release voltage

・Overcharge detection voltage	3.6V～5.0V, 5mV Step	Accuracy±15mV
・Overcharge release voltage	3.1V～5.0V, 50mV Step	Accuracy±50mV
・Standby detection voltage	Selection from 2.5V, 3.5V	Accuracy±300mV

2) Range of detection delay time

・Overcharge detection delay time	Selection from 1s or 2s or 4s or 8s	Accuracy±20%
・Overcharge release delay time	Selection from 1ms or 2ms or 4ms or 8ms or	Accuracy±20%
・Overcharge detection timer reset delay time	16ms fixed	Accuracy+35%/-30%

3) Current consumption

・Current consumption（VCELL=4.0V）	Typ. 0.85uA, Max. 1.70uA
・Current consumption at standby（VCELL=2.0V）	Typ. 0.15uA, Max. 0.30uA

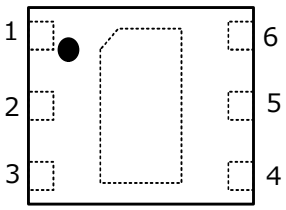
4) Package type

・ SSON-6U / SSON-6V	1.40 × 1.80 × 0.40 [mm]

Mitsumi Electric CO.,LTD.
Semiconductor Business Division
Strategy Engineering Department
tel:+81-46-230-3470

December 2022 Rev.5

Pin explanations

SSON-6U / SSON-6V	Pin No		Symbol	Function
	MM4128	MM4129		
	1	1	COUT	Output terminal of over charge detection.
	2	2	VDD	Positive power supply voltage input terminal.
	3	3	VBH	The input terminal of the positive voltage of H cell.
	4	5	VBL	The input terminal of the positive voltage of L cell, and the negative voltage of H cell.
	5	4	NC	No connection.
	6	6	VSS	Negative power supply voltage input terminal.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
VDD terminal supply voltage	V_{VDDMAX}	VSS-0.3	VSS+12	V
VBH terminal supply voltage	V_{VBHMAX}	VBL-0.3	VDD+0.3	V
COUT terminal Output voltage	$V_{COUTMAX}$	VSS-0.3	VDD+0.3	V
Voltage between VBH and VBL terminals	$V_{VBH-VBLMAX}$	VBH-8	VBH+0.3	V
Voltage between VBL and VSS terminals	$V_{VBL-VSSMAX}$	VSS-0.3	VSS+8	V
Storage temperature	T_{STG}	-55	125	℃

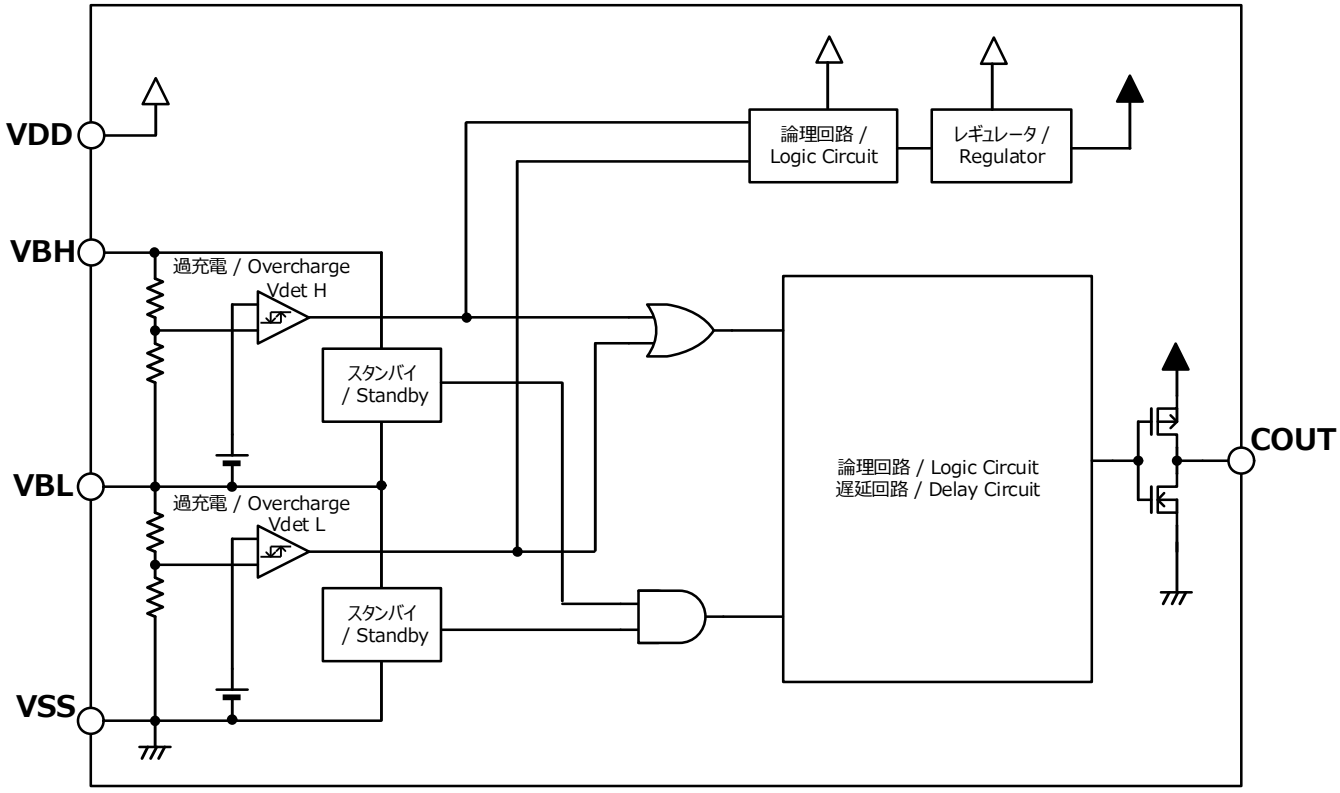
Electrical characteristics

(Unless otherwise specified,Ta=25℃)

Parameter	Symbol	Note	Min	Typ	Max	Unit
Output voltage						
COUT terminal output voltage H 1(CMOS)	V_{co_h1}	I_{COUT}=0uA, V_{CELL}=4.7V	Typ×0.85	※1	Typ×1.15	V
COUT terminal output voltage H 2(CMOS)	V_{co_h2}	I_{COUT}=50uA, V_{CELL}=4.7V	V_{co_h1}-0.5	V_{co_h1}-0.1	-	V
COUT terminal output voltage L	V_{co_l}	I_{COUT}=30uA, V_{CELL}=4.0V	-	0.2	0.5	V
Current consumption						
Current consumption	I_{DD}	V_{CELL}=4.0V	-	0.85	1.70	uA
Current consumption at standby	I_s	V_{CELL}=2.0V	-	0.15	0.30	uA
Current consumption of VBL terminal	I_{VBLtml}	V_{CELL}=4.0V	-0.3	-	0.3	uA
Detection/Release voltage						
Overcharge detection voltage	V_{det}	Ta=+25℃	Typ-0.015	V_{det}	Typ+0.015	V
		Ta=-5℃～+60℃	Typ-0.020		Typ+0.020	
Overcharge release voltage	V_{rel}		Typ-0.05	V_{rel}	Typ+0.05	V
Standby detection voltage	V_{std}		Typ-0.30	V_{std}	Typ+0.30	V
Detection delay time						
Overcharge detection delay time	t_{Vdet}		Typ-20%	t_{Vdet}	Typ+20%	s
Overdischarge release delay time	t_{Vrel}		Typ-20%	t_{Vrel}	Typ+20%	ms
Overcharge detection timer reset delay time	t_{Vrst}		11.2	16.0	21.6	ms

※1 COUT terminal output voltage H can be selected from 1.8V/3.3V/4.7V

Block diagram



Typical application circuit