

# Voltage Monitor IC for Li-ion Cell Balance

## MM3513 Series

### Outline

The MM3513 series are voltage monitor ICs for rechargeable Lithium-ion or Lithium-polymer batteries, using a high voltage CMOS process. Each Lithium-ion or Lithium-polymer battery can be balanced. Each of these ICs is composed of voltage detectors, reference voltage sources, an oscillator, a counter circuit and logical circuits.

### Features

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

**(1) High-accuracy detection voltage**

- Detection voltage 3.5V to 4.5V, 5mV steps Accuracy±20mV  
Accuracy±25mV (Topr=-5 to +60°C)
- Hysteresis voltage 0V to 0.4V, 50mV steps  
However, "Detection voltage-Hysteresis voltage<3.5V" is disabled.

**(2) Range of Detection delay time**

- Detection delay time Selectable from 0.25s , 1.0s , 1.2s , 4.5s

**(3) Low current consumption**

- Normal mode Typ. 1.5µA, Max. 3.0µA
- Stand-by mode Max. 0.5µA

**(4) Absolute maximum ratings**

- VDD pin VSS-0.3V to 12V
- OUT pin VDD-0.3V to VDD+0.3V
- DS pin VSS-0.3V to VDD+0.3V
- Storage temperature -55 to +125°C
- Operation temperature -40 to +85°C

### Pin Assignment

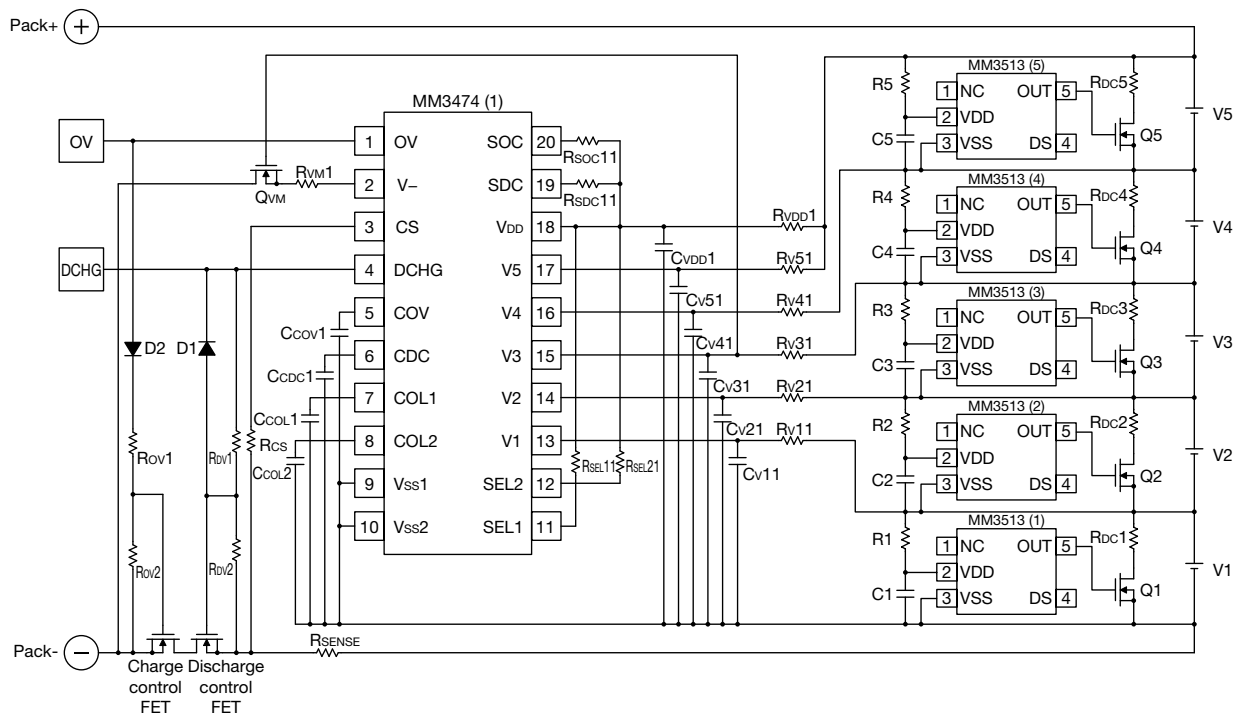
Top view SOT-25A	Pin No.	Function
	1	No connection.
	2	VDD terminal. Connected to IC substrait.
	3	VSS terminal. Connected to ground.
	4	Delay shorten terminal.
	5	Output of detecting voltage. Output type is CMOS.

**Selection Guide** (3,000pcs/Reel)

Product name	Package	Detection voltage [V]	Hysteresis voltage [V]	Detection delay time [sec]
		Vdet	Vhys	tVdet
MM3513A01NRH	SOT-25A	4.150	0.010	0.25
MM3513B01NRH	SOT-25A	3.750	0.010	0.25
MM3513C01NRH	SOT-25A	4.200	0.010	0.25
MM3513D01NRH	SOT-25A	3.600	0.010	0.25
MM3513D02NRH	SOT-25A	3.600	0.100	0.25
MM3513F01NRH	SOT-25A	3.650	0.010	0.25
MM3513H01NRH	SOT-25A	4.175	0.010	0.25
MM3513J01NRH	SOT-25A	3.475	0.010	0.25

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

**Application Circuit**



- Resistors R1 to R5 and capacitors C1 to C5 stabilize a supply voltage ripple. However, if the resistors R1 to R5 are increased, the detection voltage raises due to through-current in the IC. Therefore, adjust the value to 1kΩ or less. Moreover, the capacitors C1 to C5 should be 0.01μF or more to ensure stable operation.
- For resistors RDC1 to RDC5, the value of bypass current is determined.