1cell Li-ion/Li-polymer battery protection IC
MM3724 Series

Outline

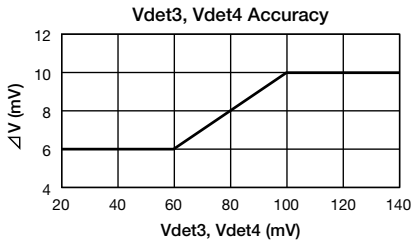
The MM3724 series are protection IC using high voltage CMOS process for overcharge, overdischarge and overcurrent protection of the rechargeable Lithium-ion or Lithium-polymer battery. The overcharge, overdischarge, discharging overcurrent, charging overcurrent, and short protection of the rechargeable one-cell Lithium-ion or Lithium-polymer battery can be detected. Each of these IC composed of four voltage detectors, short detection circuit, reference voltage sources, oscillator, counter circuit and logical circuits.

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

(1) Range and accuracy of detection voltage

●Overcharge detection voltage	3.6V to 5.0V, 5mV step	Accuracy±20mV
		Accuracy±25mV (Topr=–20°C to +60°C)
●Overcharge release voltage	Vdet1–0.2V to Vdet1, 5mV step	Accuracy±30mV
●Overdischarge detection voltage	2.0V to 3.0V, 50mV step	Accuracy±35mV
●Overdischarge release voltage	2.0V to 3.0V, 50mV step	Accuracy+65/-35mV (In case Vdet2=Vrel2)
		Accuracy+90/-65mV (In case Vdet2≠Vrel2)
●Discharging overcurrent detection voltage	20mV to 300mV, 1mV step	Accuracy±⊿ (Note1)
●Charging overcurrent detection voltage	–300mV to –20mV, 1mV step	Accuracy±⊿ (Note1)
●Short detection voltage	40mV to 350mV, 1mV step	Accuracy±8%
●0V battery charge inhibition battery voltage	1.3V to 1.8V / 0.1V step	Accuracy±100mV
	0.9V	Accuracy±300mV

Note1 : Current detection voltage Accuracy



(2) Delay time setting

●Overcharge detection delay time	256ms to 4.6s
●Overdischarge detection delay time	8ms to 256ms
●Discharging overcurrent detection delay time	8ms to 256ms
●Charging overcurrent detection delay time	6ms to 64ms
●Short detection delay time	250μs to 400μs

(3) Current consumption

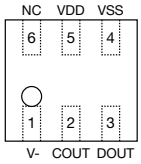
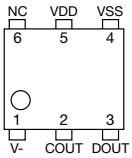
●Normal mode	Typ. 3.0μA, Max. 6.0μA
●Stand-by mode	Max. 0.1μA (In case Overdischarge latch function Enable.)
	Max. 0.6μA (In case Overdischarge latch function Disable.)

(4) 0V battery Charge function — Selectable ”Permission” or ”Inhibition”

(5) Absolute maximum ratings

●VDD pin	VSS–0.3V to +12V
●COUT pin and V– pin	VDD–28V to VDD+0.3V
●DOUT pin	VSS–0.3V to VDD+0.3V
●Storage temperature	–55°C to +125°C
●Operation temperature	–40°C to + 85°C

Pin Assignment

Top view		Pin No.	Function
SSON-6J	SON-6C		
		1	Charger negative voltage input terminal
		2	Charge FET control terminal
		3	Discharge FET control terminal
		4	Negative power supply voltage input terminal
		5	Positive power supply voltage input terminal
		6	No connection

Product Line up

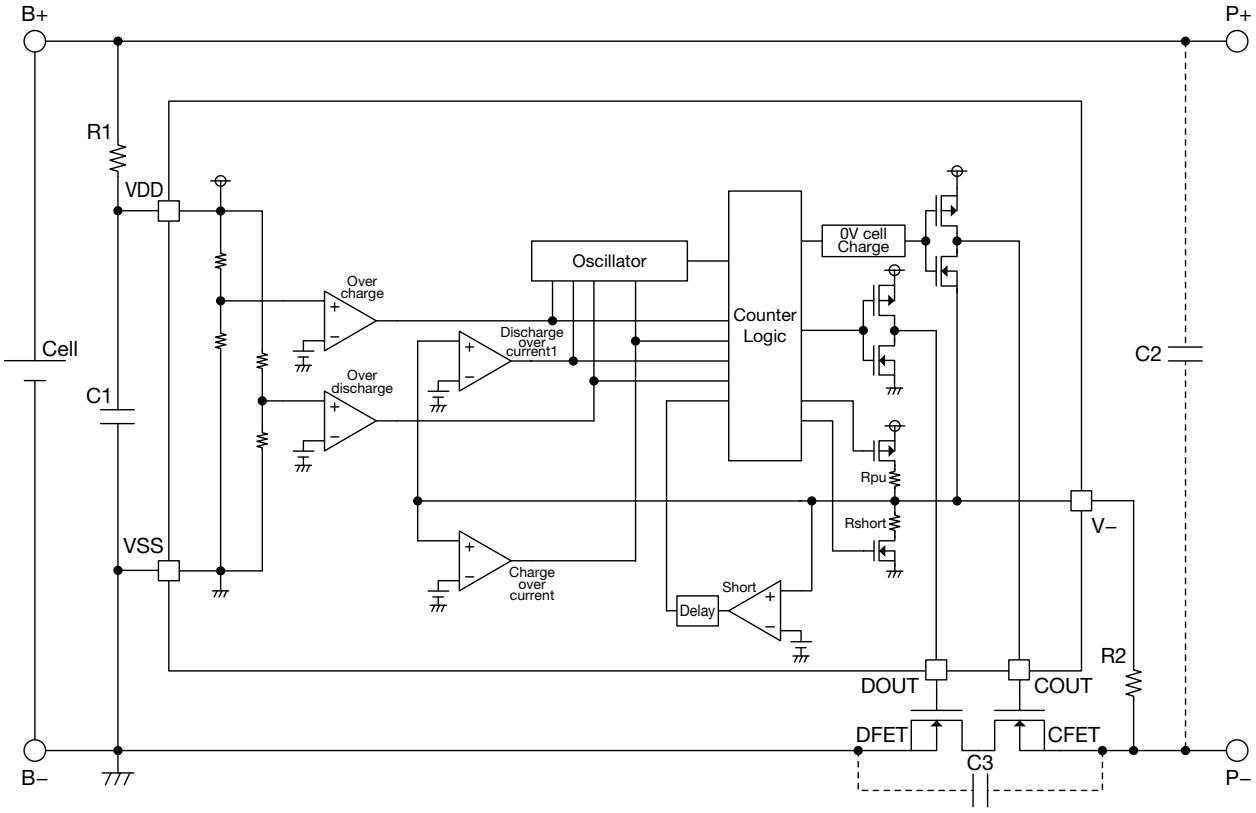
Product name	Package	0V charge	Protection mode latch function			Hys-Cancel		Discharging overcurrent release range extended function.	Overcharge detection voltage [V]	Overcharge detection voltage [V]	Overdischarge detection voltage [V]	Overdischarge detection voltage [V]	Discharging overcurrent detection voltage 1 [V]	Charging overcurrent detection voltage [V]	Short detection voltage [V]	Delay time (Note2)
			Overcharge	Overdischarge	Discharge overcurrent	Overcharge	Overdischarge		Vdet1	Vrel1	Vdet2	Vrel2	Vdet3-1	Vdet4	Vshort	
									V	V	V	V	V	V	V	
MM3724AC1RRE	SSON-6J	0.9	Disable	Disable	Disable	Enable	Enable	Yes (VDD-0.9V)	4.425	4.225	2.500	2.900	0.032	–0.020	0.150	A
MM3724CF3RRE	SSON-6J	0.9	Disable	Enable	Disable	Enable		Yes(VDD-0.9V)	4.280	4.080	2.300	2.300	0.064	–0.020	0.150	A
MM3724VK1RRE	SSON-6J	2.4	Disable	Enable	Disable	Enable		Disable	4.415	4.240	2.800	2.800	0.050		0.900	B

Note2 : Delay time

	tVdet1 [s]	tVrel1 [ms]	tVdet2 [ms]	tVrel2 [ms]	tVdet3 [ms]	tVrel3 [ms]	tVdet4 [ms]	tVrel4 [ms]	tshort [µs]
A	1.024	16.00	96.00	1.00	12.00	1.00	10.00	1.00	300
B	1.024	8.00	24.00	4.00	12.00	4.00			400

Please inquire to us, if you need another spec.

Application Circuit



Symbol	Part	Min.	Typ.	Max.	Purpose
R1	Resistor		100Ω	1kΩ	For voltage fluctuation, For ESD
C1	Capacitor	0.01μF	0.1μF	1.0μF	For voltage fluctuation
R2	Resistor		1.0kΩ	10kΩ	Current limit for charger reverse connection
C2	Capacitor		0.1μF		For exogenous noise
C3	Capacitor		0.1μF		For exogenous noise
DFET CFET	Nch MOS FET				Charge and discharge control

This typical application circuit and constant value do not guarantee proper operation.
Please evaluate thoroughly by actual application to set up constants.