

1cell Li-ion/Li-polymer battery protection IC MM3722 Series

Outline

MM3722 series are Li-ion battery protection IC and detect charge current / discharge current with high precision by current sensing resistor (Rsns). In the One-cell battery pack, on resistance of the FET SW has been used for over-current/short-current detection. MM3722 realize over-current/short-current protection with high accuracy and with no temperature dependence by using a chip resistor.

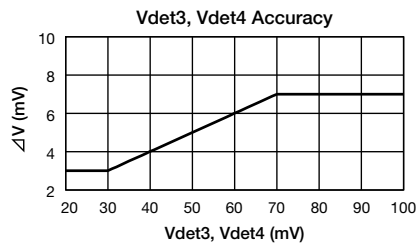
Features

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

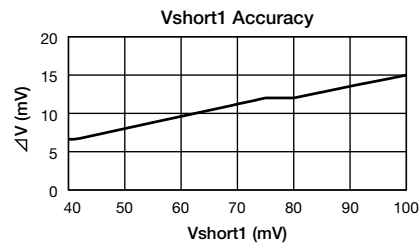
(1) Range and accuracy of detection voltage

● Overcharge detection voltage	3.6V to 5.0V, 5mV step	Accuracy±20mV Accuracy±25mV (Topr=-20 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 150mV, 1mV step	Accuracy±Δ (Note1)
● Charging overcurrent detection voltage	-150mV to -20mV, 1mV step	Accuracy±Δ (Note1)
● Short detection voltage1	40mV to 250mV, 1mV step	Accuracy±Δ (Note2)
● Short detection voltage2	VDD-0.9V	Accuracy±300mV
● 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



Note2 : Short detection voltage1 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 and CS 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	Negative power supply voltage input terminal
		2	Positive power supply voltage input terminal
		3	Current detection terminal
		4	Charger negative voltage input terminal
		5	Charge FET control terminal
		6	Discharge FET control terminal

Product Line up

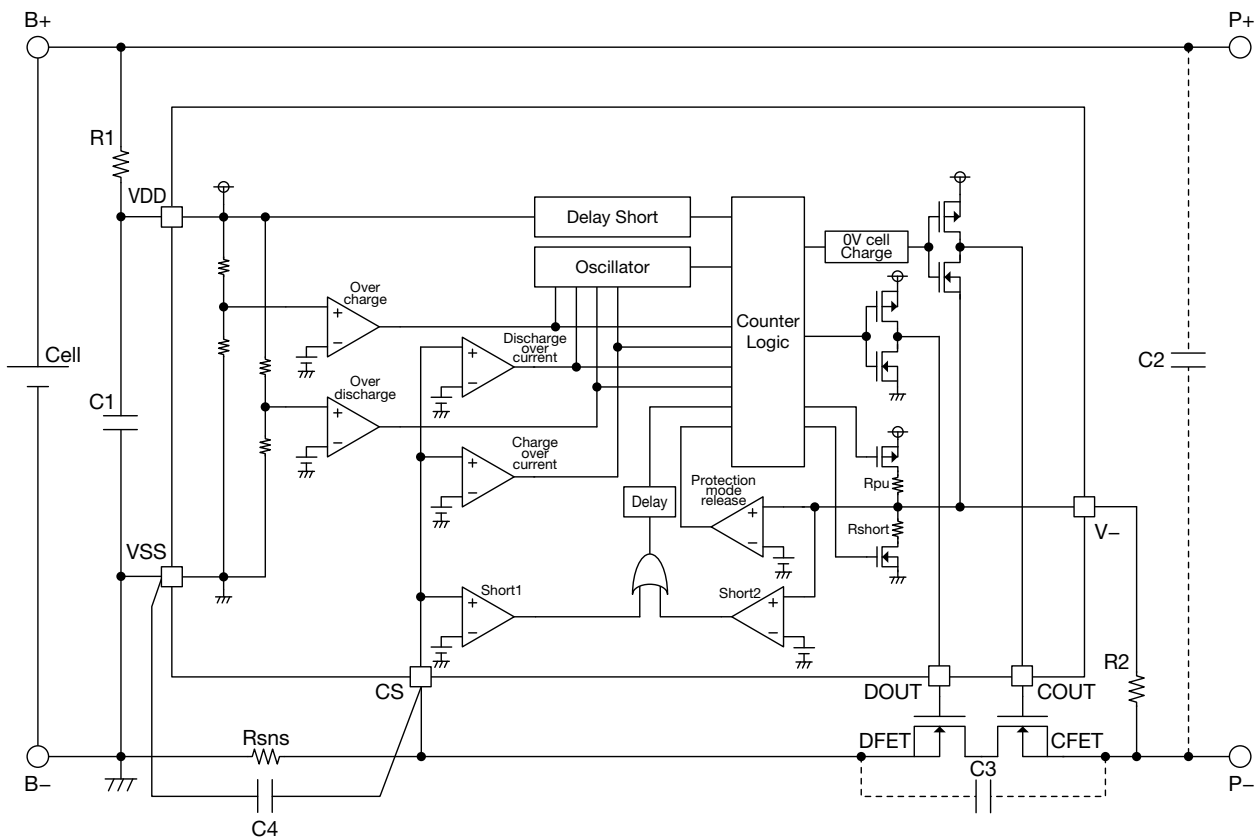
Product name	Package	0V charge prohibition voltage	Protection mode latch function			Hys-Cancel		Discharging overcurrent release range extended function.	Overcharge detection voltage [V]	Overcharge detection voltage [V]	Overdischarge detection voltage [V]	Overdischarge detection voltage [V]	Discharging overcurrent detection voltage [V]	Charging overcurrent detection voltage [V]	Short detection voltage [V]	Delay time (Note2)
			Overcharge	Overdischarge	Discharge overcurrent	Overcharge	Overdischarge									
MM3722AJ1YRE	SON-6C	Permission	Disable	Disable	Disable	Enable	Enable	Yes (VDD-0.9V)	4.425	4.225	2.500	2.900	0.036	-0.020	0.060	B
MM3722AJ4RRE	SSON-6J	Permission	Disable	Disable	Disable	Enable	Enable	Yes (VDD-0.9V)	4.470	4.270	2.500	2.900	0.049	-0.031	0.160	C
MM3722AM1RRE	SSON-6J	0.9	Disable	Disable	Disable	Enable	Enable	Yes (VDD-0.9V)	4.475	4.275	2.500	2.900	0.032	-0.020	0.060	B
MM3722KF1RRE	SSON-6J	0.9	Enable	Enable	Disable			Yes (1.0V)	4.280	4.280	2.400	2.400	0.032	-0.030	0.180	A
MM3722KF2RRE	SSON-6J	0.9	Enable	Enable	Disable			Yes (1.0V)	4.425	4.425	2.400	2.400	0.034	-0.022	0.180	A
MM3722KF3RRE	SSON-6J	0.9	Enable	Enable	Disable			Yes (1.0V)	4.425	4.425	2.800	2.800	0.040	-0.030	0.180	A
MM3722KF4RRE	SSON-6J	1.5	Enable	Enable	Disable			Yes (1.0V)	4.425	4.425	2.600	2.600	0.040	-0.030	0.180	A

Note2 : Delay time

	tVdet1 [s]	tVrel1 [ms]	tVdet2 [ms]	tVrel2 [ms]	tVdet3 [ms]	tVrel3 [ms]	tVdet4 [ms]	tVrel4 [ms]	tshort [μs]
A	1.000	8.00	20.00	1.00	12.00	1.00	16.00	1.00	250
B	1.024	16.00	96.00	1.00	12.00	1.00	10.00	1.00	300
C	1.024	16.00	125.00	1.00	16.00	1.00	8.00	1.00	250

Please inquire to us, if you need another spec.

Application Circuit



Symbol	Part	Min.	Typ.	Max.	Purpose
R1	Resistor		100	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
Rsns	Resistor			20mΩ	Current detection resistance
C4	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.

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 • 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.