

MM3280series

OUTLINE

The MM3511 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, short, charge

FEATURES

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

- 1) Range and accuracy of detection/release voltage
 - Overcharge detection voltage 3.8V to 4.5V, 5mV steps Accuracy ± 20mV
Accuracy ± 25mV (Topr=-5 to +60°C)
 - Overcharge release voltage 3.6V to 4.5V, 50mV steps Accuracy ± 30mV
 - Overdischarge detection voltage 2.0V to 3.0V, 50mV steps Accuracy ± 35mV
 - Overdischarge release voltage 2.0V to 3.5V, 50mV steps Accuracy ± 100mV
 - Discharging overcurrent detection voltage +50mV to +300mV, 5mV steps Accuracy ± 10mV
 - Charging overcurrent detection voltage ※1 -50mV to -300mV, 5mV steps Accuracy ± 20mV
 - Short detection voltage 0.7V, 0.8V, 0.9V Accuracy ± 100mV
 - Over voltage charger detection voltage ※1 VDD-8.0V fixed Accuracy ± 2.0V
 - Over voltage charger release voltage ※1 VDD-7.3V fixed Accuracy ± 2.0V
- 2) Range of detection delay time
 - Overcharge detection delay time Selection from 0.25s, 1.0s, 1.2s, 4.5s
 - Overdischarge detection delay time Selection from 20ms, 24ms, 96ms, 125ms, 144ms
 - Discharging overcurrent detection delay time Selection from 8ms, 12ms, 16ms, 20ms, 48ms
 - Charging overcurrent detection delay time Selection from 4ms, 6ms, 8ms, 16ms
 - Short detection delay time 200us, 300us, 400us
- 3) 0V battery charge function Selection from "Prohibition" or "Permission"
- 4) The overcharge detection delay timer reset time function (function for the pulse charge) is provided. ※1
- 5) Low current consumption
 - Normal mode Typ. 3.0uA, Max. 6.0uA
 - Stand-by mode Max. 0.1uA (For "Charger connection release" the overdischarge release condition.)
Max. 0.5uA (For "Voltage release" the overdischarge release condition.)
- 6) 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 to +125°C
 - Operation temperature -40 to +85°C
- 7) Package type
 - SSON-6E 1.60 × 1.80 × 0.55 [mm]
 - SSON-6J 1.40 × 1.40 × 0.55 [mm]
 - SSON-6K 2.00 × 2.00 × 0.75 [mm]
 - SON-6C 1.60 × 2.00 × 0.60 [mm]
 - SOT-26A, SOT-26B 2.90 × 2.80 × 1.15 [mm]

※1 Optional function

※2 Please inquire to us, if you need another spec.

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, Topr=+25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	unit
INPUT/OUTPUT VOLTAGE						
Operating input voltage	VDD1	VDD-VSS	1.5	-	5.5	V
Maximum forbidden voltage for 0V charging ※1	Vst	"Prohibition" function	0.6	0.9	1.2	V
Minimum operating voltage for 0V charging ※1		"Permission" function	-	-	1.2	V
COUT pin Nch ON voltage	Vol1	Iol=30uA, VDD=4.5V	-	0.4	0.5	V
COUT pin Pch ON voltage	Voh1	Ioh=-30uA, VDD=3.9V	3.4	3.7	-	V
DOUT pin Nch ON voltage	Vol2	Iol=30uA, VDD=2.0V	-	0.2	0.5	V
DOUT pin Pch ON voltage	Voh2	Ioh=-30uA, VDD=3.9V	3.4	3.7	-	V
CURRENT CONSUMPTION						
Current consumption	Idd	VDD=3.9V, V=-0V	-	3.0	6.0	uA
Current consumption at stand-by	Is	Vdet2 = Vrel2 ※2	-	-	0.1	uA
		Vdet2 ≠ Vrel2 ※3	-	-	0.5	uA
DETECTION/RELEASE VOLTAGE						
Overcharge detection voltage	Vdet1	Ta=+25°C	Typ-0.020	Vdet1	Typ+0.020	V
		Ta=-5~+60°C	Typ-0.025		Typ+0.025	
Overcharge release voltage	Vrel1	Vdet1 ≠ Vrel1	Typ-0.030	Vrel1	Typ+0.030	V
Overdischarge detection voltage	Vdet2		Typ-0.035	Vdet2	Typ+0.035	V
Overdischarge release voltage	Vrel2	Vdet2 ≠ Vrel2	Typ-0.100	Vrel2	Typ+0.100	V
Discharging overcurrent detection voltage	Vdet3		Typ-0.010	Vdet3	Typ+0.010	V
Charging overcurrent detection voltage ※4	Vdet4		Typ-0.020	Vdet4	Typ+0.020	V
Short detection voltage	Vshort		Typ-0.100	Vshort	Typ+0.100	V
Over voltage charger detection voltage ※4	Vchg1		6.0	8.0	10.0	V
Over voltage charger release voltage ※4	Vchg2		5.3	7.3	9.3	V
DETECTION DELAY TIME						
Overcharge detection delay time	tVdet1		Typ*0.8	tVdet1	Typ*1.2	s
Overcharge detection delay timer reset time ※4	tVrst1		11.2	16.0	21.6	ms
Overdischarge detection delay time	tVdet2		Typ*0.8	tVdet2	Typ*1.2	ms
Discharging overcurrent detection delay time	tVdet3			tVdet3		ms
Charging overcurrent detection delay time ※4	tVdet4			tVdet4		ms
Short detection delay time	tshort		Typ*0.7	tshort	Typ*1.4	us

- ※1 0V battery charge function is selected from "Prohibition" or "Permission".
- ※2 The release condition from the overdischarge is "Charger connection release"
- ※3 The release condition from the overdischarge is "Voltage release"
- ※4 Optional function

PIN EXPLANATIONS

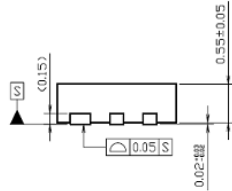
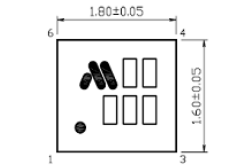
Top view		Pin No.				Symbol	Function
SSON-6E/6J/6K	SON-6C	Ver1	Ver2	Ver3	Ver4		
		1	6	2	6	V-	Input terminal connected to charger negative voltage.
		2	1	1	2	COUT	Output of overcharge detection.
		3	3	3	3	DOUT	Output of overdischarge detection.
		4	4	4	4	VSS	VSS terminal. Connected to ground.
		5	5	5	5	VDD	VDD terminal. Connected to IC substrate.
		6	2	6	1	DS	Delay shorten terminal.

Top view		Pin No.	Symbol	Function
SOT-26A/26B				
		1	DOUT	Output of overdischarge detection.
		2	V-	Input terminal connected to charger negative voltage.
		3	COUT	Output of overcharge detection.
		4	DS	Delay shorten terminal.
		5	VDD	VDD terminal. Connected to IC substrate.
		6	VSS	VSS terminal. Connected to ground.

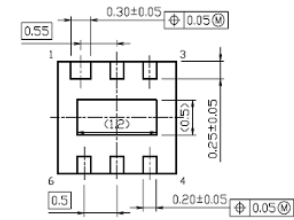
PACKAGE DIMENSIONS

SSON-6E

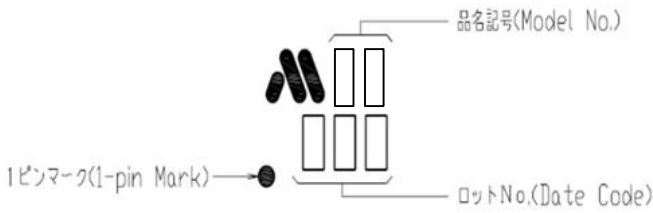
表面 (Top View)



裏面 (Bottom View)

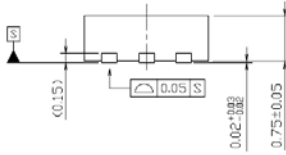
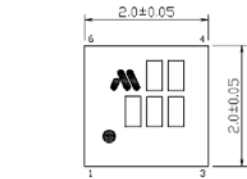


マーク内容 (Marking Contents)/SSON-6E、6K

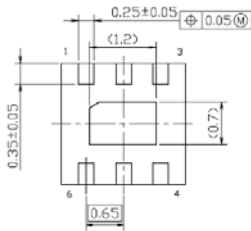


SSON-6K

表面 (Top View)

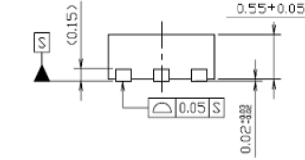
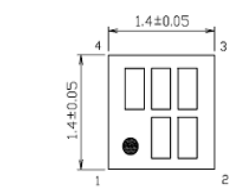


裏面 (Bottom View)

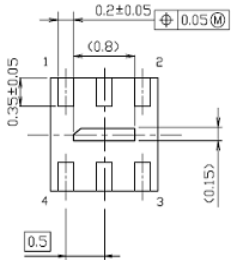


SSON-6J

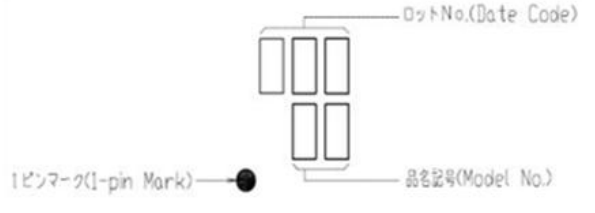
表面 (Top View)



裏面 (Bottom View)

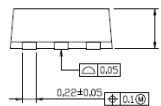
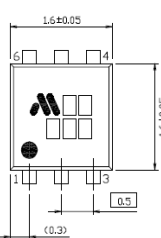


マーク内容 (Marking Contents)/SSON-6J

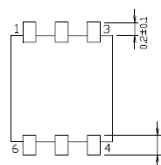


SON-6C

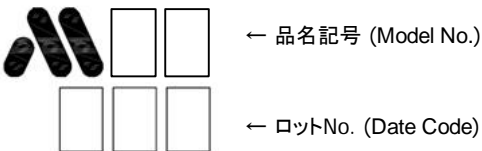
表面 (Top View)



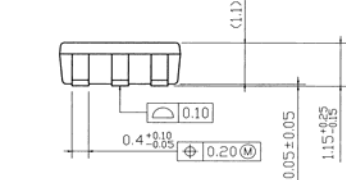
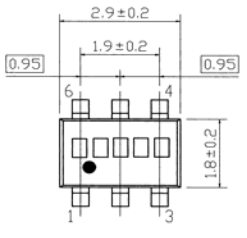
裏面 (Bottom View)



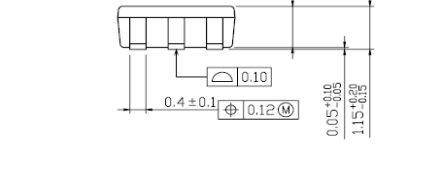
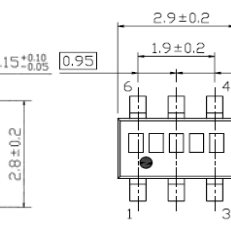
マーク内容 (Marking Contents)/SON-6C



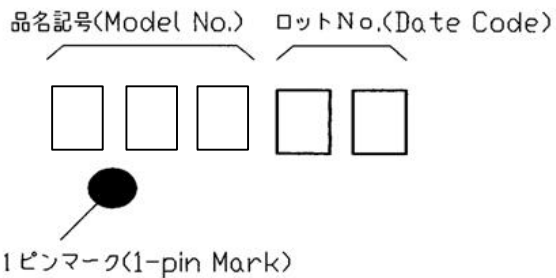
SOT-26A



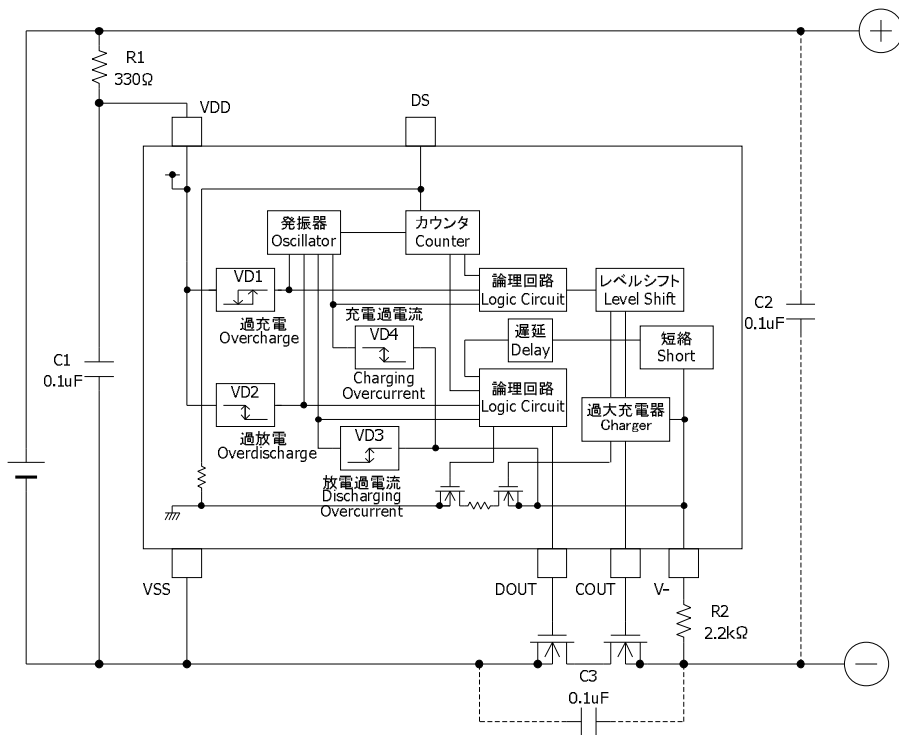
SOT-26B



マーク内容 (Marking Contents)/SOT-26A, B



BLOCK DIAGRAM / TYPICAL APPLICATION CIRCUIT



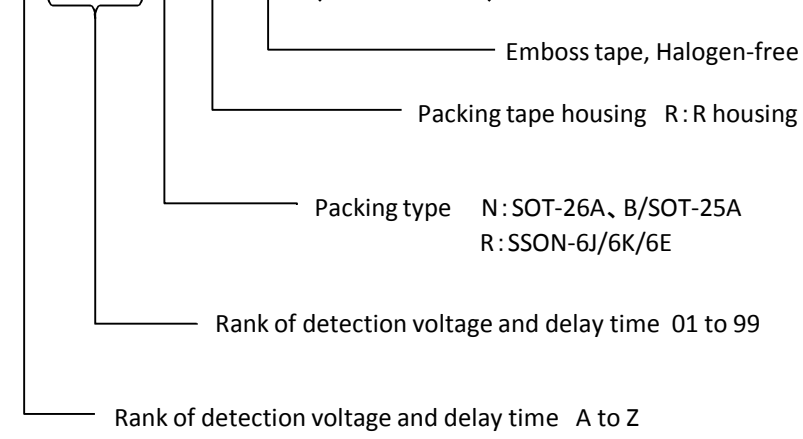
R1 and C1 stabilize a supply voltage ripple. However, the detection voltage rises by the current of penetration in IC of the voltage detection when R1 is enlarged, and the value of R1 is adjusted to 1kohm or less. Moreover, adjust the value of C1 to 0.01u

R1 and R2 resistors are current limit resistance if a charger is connected reversibly or a high-voltage charger that exceeds the absolute maximum rating is connected. R1 and R2 may cause a power consumption will be over rating of power dissipation, theref

C2 and C3 capacitors have effect that the system stability about voltage ripple or imported noise. After check characteristics, decide that these capacitors should be inserted or not, where should be inserted, and capacitance value, please.

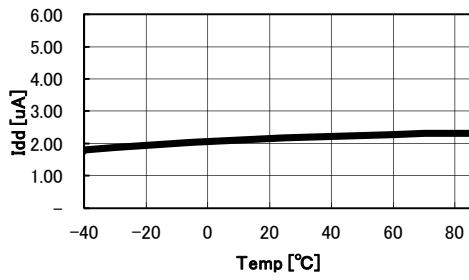
PRODUCT NAME

MM3280 **E(or H)**

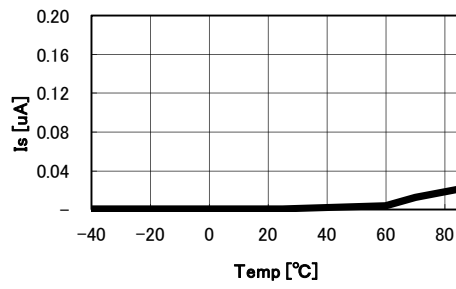


Temperature characteristics

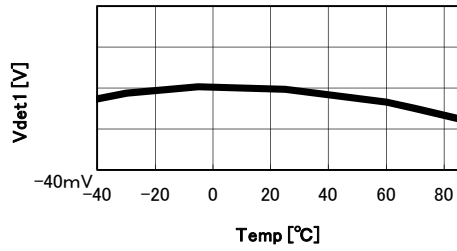
Current consumption



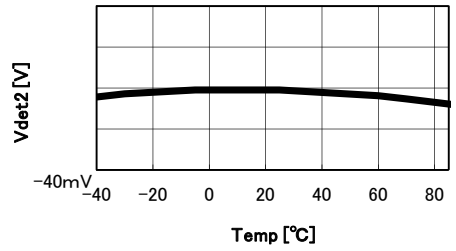
Current consumption at stand-by



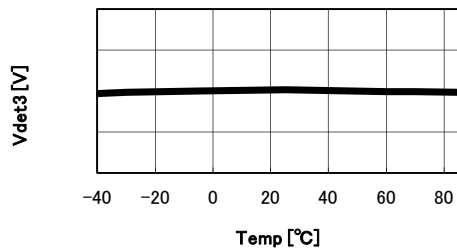
Overcharge detection voltage



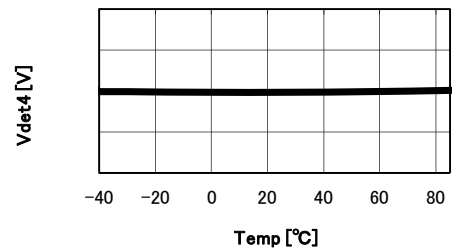
Overdischarge detection voltage



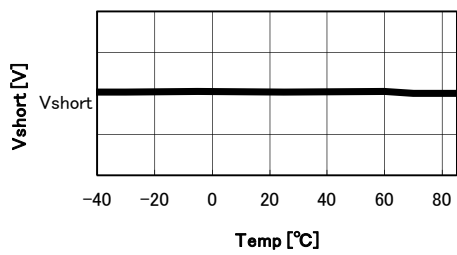
Discharging overcurrent detection voltage



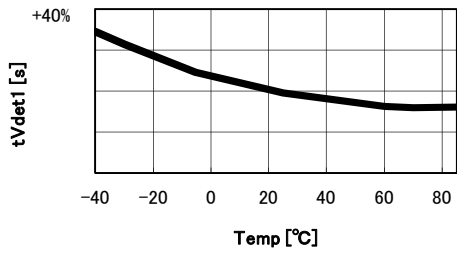
Charging overcurrent detection voltage



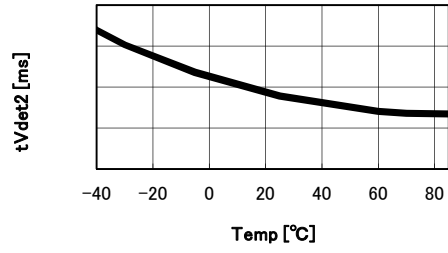
Short detection voltage



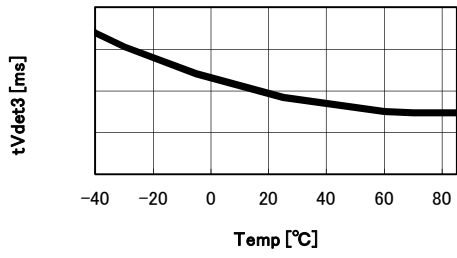
Overcharge detection delay time



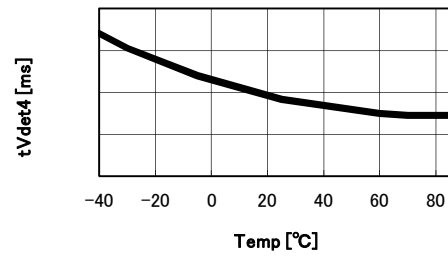
Overdischarge detection delay time



Discharging overcurrent detection delay time



Charging overcurrent detection delay time



Short detection delay time

