1. General Description

SWD1811A is single-cell lithium-ion/lithium polymer rechargeable battery protection IC. Integrated low Rdson power MOSFET and only two external components make the protection board highly compact. SWD1811A has full protection including over charging voltage protection, over discharging voltage protection, over current protection, short protection and over temperature protection. SWD1811A is available in DFN1X1-4L package

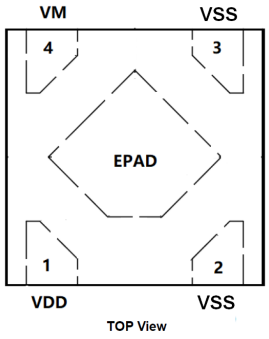
2. Features

1. Integrate 60 mΩ Rdson Power MOSFET
2. Ultra-small DFN1X1-4L Package
3. Over-temperature Protection
4. Three steps Over current protection
5. Low Current Consumption
   - Operation Mode: 1.5 μA .
   - Power-down Mode: 0.5 μA .
6. RoHS Compliant and Lead (Pb) Free

3. Applications

1-cell lithium-ion rechargeable battery packs
1-cell lithium polymer rechargeable battery packs

4. Package and Pin Description

Pin	Symbol	Description	DFN1x1-4L
1	VDD	Power Supply	
2	VSS	Battery Ground	
3	VSS	Battery Ground	
4	VM	Connect to Output Ground	
EPAD	NC	NC OR Battery Ground	

5. Absolute Maximum Ratings

(Note: Do not exceed these limits to prevent damage to the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

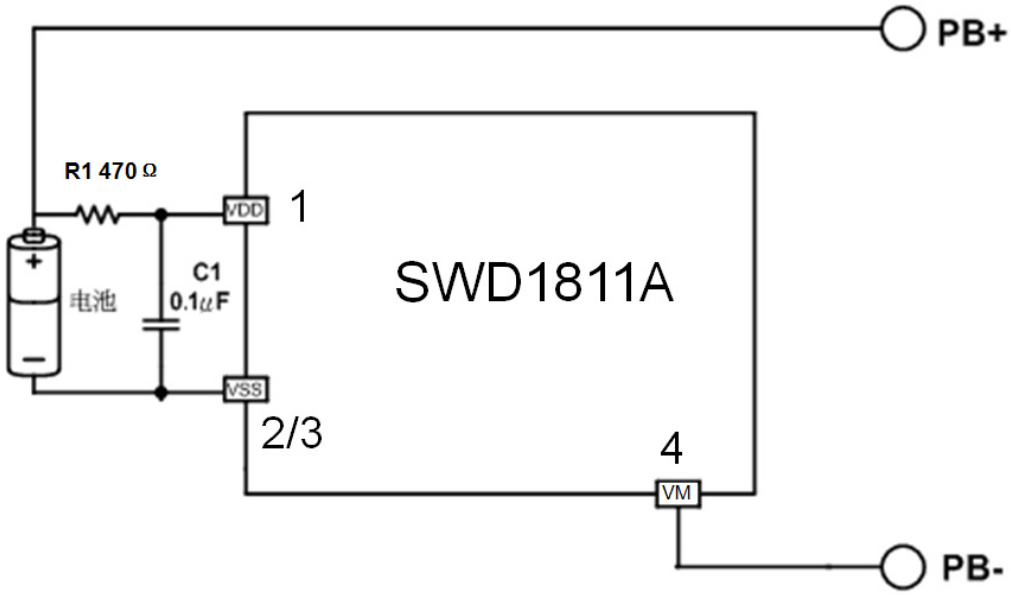
Parameter	Symbol	Value	Unit
VDD input pin voltage	V_{DD}	VSS-0.3~VSS+6	V
VDD input pin voltage	V_{VM}	-8~ +10	V
Operating Ambient Temperature	T_{OP}	-40~+85	℃
Maximum Junction Temperature	T_{ST}	-40~+125	℃
Power Dissipation at T=25°C	P_D	200	mW
ESD (HBM)	ESD	4000	V

6. Electrical Characteristics

（VSS=0V，Ta＝25℃，unless otherwise specified）

Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Input Voltage						
VDD input pin voltage	V_{DSOP1}	-	0	-	6.0	V
VM input pin voltage	V_{DSOP2}	-	-6.0	-	6.0	V
Current Consumption						
Operating Current	I_{DD}	VDD=3.9V		1.5	5.0	uA
Power Down Current	I_{PD}	VDD=2.0V		0.5	1.0	uA
Detection Voltage						
Overcharge Protection Voltage	V_{CO}	R1=100Ω	4.250	4.300	4.350	V
Overcharge Protection Release Voltage	V_{CR}	R1=100Ω	4.080	4.150	4.220	V
Overdischarge Protection Voltage	V_{DL}	R1=100Ω	2.700	2.800	2.900	V
Overdischarge Protection Release Voltage	V_{DR}	R1=100Ω	2.900	3.000	3.100	V
Overdischarge Protection Current	I_{IOV}	V_{DD}=3.5V	0.4	0.8	1.3	A
Load Short-Circuiting Detection	I_{Short}	V_{DD}=3.5V	1.0	1.5	2.0	A
Overcharge Protection Current	I_{COV}	V_{DD}=3.5V	0.3	0.8	1.3	A
Detection Delay Time						
Overcharge Voltage Detection Delay Time	T_{OC}	V_{DD}=3.8V → 4.5V		100		ms
Overdischarge Voltage Detection Delay Time	T_{OD}	V_{DD}=3.2V → 2.2V		100		ms
Overdischarge Current Delay Time	T_{DIP}	V_{DD}=3.0V		50		ms
Load Short-Circuiting Detection Delay Time	T_{SIP}	V_{DD}=3.6V		150		μs
FET on Resistance						
Equivalent FET on Resistance	Rds(on)	V_{DD}=3.6V, I_{VM}=1.0A,	55	60	65	mΩ
0V Charging						
0V Charge Voltage	V_{0CH}	Can Be Charged	-	-	-	V

7. Typical Application Circuit



8. Description of Operation

8.1. Normal Status

SWD1811A monitors the battery voltage VDD and VM pin voltage to control charging and discharging. When VDD voltage is between overdischarge detection voltage and overcharge detection voltage, and VM voltage is in the range from the charger detection voltage to discharge overcurrent detection voltage, the IC turns MOSFET on. This condition is called the normal status. Under this condition, charging and discharging can both be carried out freely.

8.2. Overcharge Protection

When the voltage of the battery cell exceeds the overcharge protection voltage (VOCV) beyond the overcharge delay time (TOCV) period, charging is inhibited by turning off power MOSFET. The overcharge condition is released in two cases:

1. The voltage of the battery cell becomes lower than the overcharge release voltage (VOCR) through self-discharge.
2. The voltage of the battery cell falls below the overcharge protection voltage (VOCV) and a load is connected. When the battery voltage is above VOCV, the overcharge condition will not release even a load is connected to the pack.

8.3. Over Charging Current Protection

When the charging current becomes higher than discharge protection Current (ICHA) and beyond over discharge current delay time period, charging is inhibited. Inhibition of charging is immediately released when the charger is removed.

8.4. Overdischarge Protection

When the voltage of the battery cell goes below the overdischarge protection voltage (VODV) beyond the overdischarge delay time (TODV) period, discharging is inhibited. Inhibition of discharging is immediately released when the voltage of the battery cell becomes higher than overdischarge release voltage (VODR).

8.5. Overcurrent Protection

When the discharging current becomes higher than a specified Overdischarge Current and beyond over discharge current delay time period, discharging is inhibited. Inhibition of discharging is immediately released when the load is released or the impedance between EB+ and EB- is larger than 500kΩ. The SWD1811A provides three over current detection levels with three over current delay time corresponding to each over current detection level.

8.6. Over Temperature Protection

When IC temperature becomes higher than a specified value, SWD1811A will turn off Power MOSFET whatever in discharging or charging condition. In discharging condition, Inhibition of discharging is released when temperature lower than Over Temperature Recovery Degree and load also released. In charging condition, Inhibition of charging is released when temperature lower than over temperature recovery degree and charger also removed.

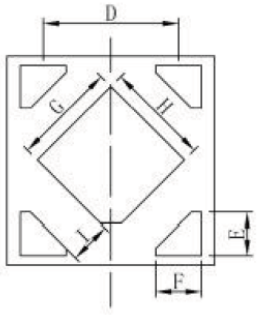
8.7. Charger detection

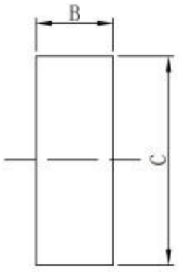
When over discharge occurs, discharging is inhibited. However, charging is still permitted through the parasitic diode of MOSFET. Once the charger is connected to the battery pack, SWD1811A detects the voltage between VM and GND is below charge detection threshold voltage (VCHA), Power MOSFET will turn on when Battery cell voltage is higher than Overdischarge Protection Voltage.

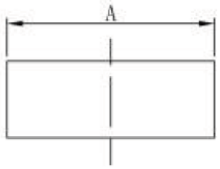
8.8. Power Saving after Overdischarge

When overdischarge occurs, the SWD1811A will enter into power-down mode.

9. DFN1x1-4L Package Outline Dimensions







Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	0.950	1.000	1.050
B	0.320	0.370	0.420
C	0.950	1.000	1.050
D	0.600	0.650	0.700
E	0.175	0.225	0.275
F	0.170	0.220	0.270
G	0.440	0.490	0.540
H	0.440	0.490	0.540
I	0.140	0.190	0.240

单击下面可查看定价，库存，交付和生命周期等信息

>>SiliconWisdom(矽睿半导体)