

描述 / Descriptions

单节锂电池保护IC

For one cell lithium-ion/polymer battery protection IC.

特征 / Features

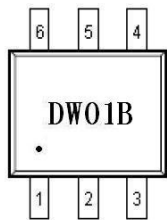
过电压充电保护阈值 Over voltage charging protection threshold	4.3 V	精度 Accuracy	±50 mV
过电压充电恢复阈值 Over voltage charging restore threshold	4.1 V	精度 Accuracy	±50 mV
过电压放电保护阈值 Over voltage discharge protection threshold	2.5 V	精度 Accuracy	±75 mV
过电压放电恢复阈值 Over voltage discharge recovery threshold	2.9 V	精度 Accuracy	±75 mV
过电流放电保护阈值 Discharge overcurrent detection voltage	0.15 V	精度 Accuracy	±20 mV
过电压充电保护延迟时间 Over voltage charging protection delay time	110ms	精度 Accuracy	±30%
过电压放电保护延迟时间 Over voltage discharge protection delay time	55ms	典型值 Typ	±30%
过电流放电保护延迟时间 Over current discharge protection delay time	7ms	典型值 Typ	±30%
0V 充电功能 0V battery charge function		允许 Admit	
低功耗模式 A Low Power Consumption mode		允许 Admit	

用途 / Applications

用于锂电池的充电、放电保护电路、电话机电池或其它锂电池高精度保护器。

For rechargeable lithium battery, discharge protection circuit, telephone or other lithium battery with high precision protector

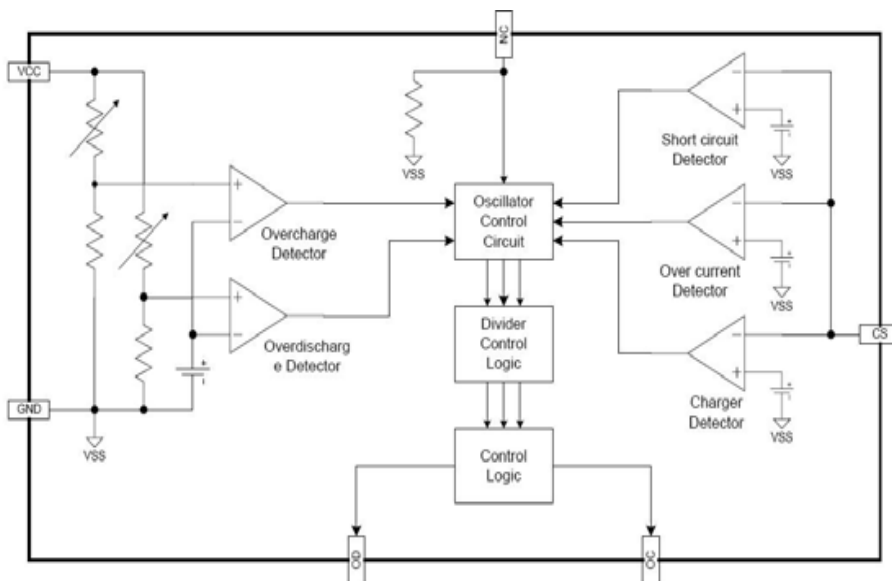
引脚排列 / Pinning



SOT23-6

引脚名称 Pin Name	引脚序号 Pin Number	引脚功能 Pin Function
DO	1	放电控制输出端 Discharge control output terminal
VM	2	充/放电电流检测输入端 Charge/discharge current detection input
CO	3	充电控制输出端 Charge control output terminal
NC	4	不接 Not connected
V _{DD}	5	电源输入端 Power input
V _{SS}	6	电源接地端 Power ground terminal

内部等效电路 / Equivalent Circuit



极限参数 / Absolute Maximum Ratings(Ta=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Power supply	V _{DD}	-0.3 ~ 10	V
VM pin Input voltage	V _M	V _{DD} -35 to V _{DD} +0.3	V
OC output pin voltage	V _{CO}	V _{DD} -35 to V _{DD} +0.3	V
OD output pin voltage	V _{DO}	V _{DD} -0.3 to V _{DD} +0.3	V
Power Dissipation	P _D	625	mW
Operating Temperature	T _{opr}	-40 to +85	°C
Storage Temperature	T _{stg}	-65 to +150	°C
Junction Temperature	T _J	150	°C

电性能参数 / Electrical Characteristics(Ta=25°C & - 40°C≤Ta≤85°C)

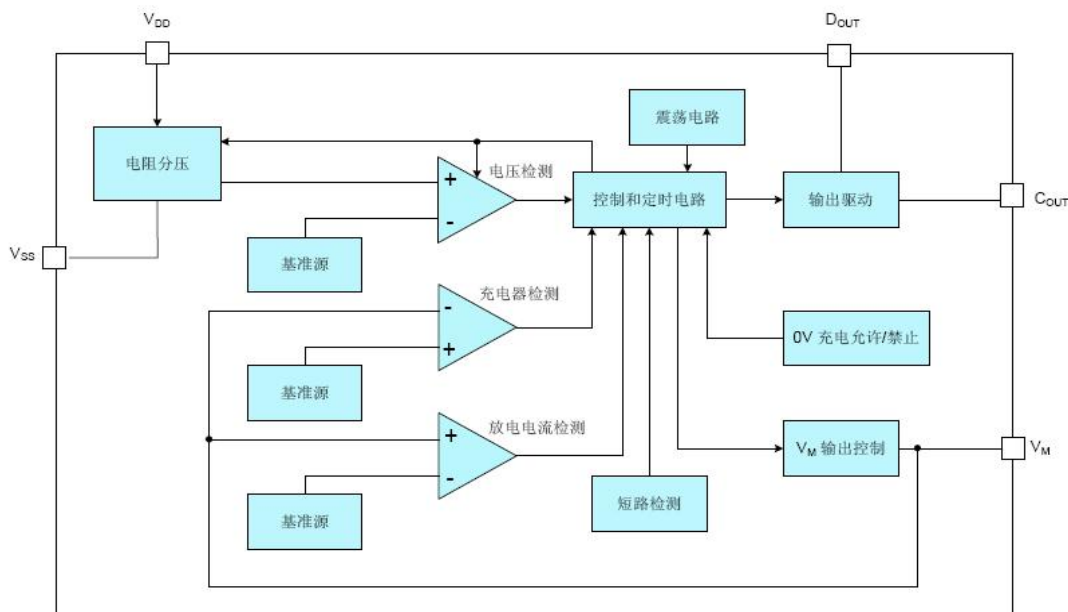
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Power supply	V _{DD}	-40°C≤T _a ≤85°C	1.5		10	V
Over voltage charging protection threshold (low to high)	V _{OC}	T _a =25°C	V _{OC} TYP-0.050	V _{OC} TYP	V _{OC} TYP+0.050	V
		-40°C≤T _a ≤85°C	V _{OC} TYP-0.080	V _{OC} TYP	V _{OC} TYP+0.080	V
Over voltage charging restore threshold (high to low)	V _{OCR}	T _a =25°C R1=100Ω (注1)	V _{OCR} TYP-0.050	V _{OCR} TYP	V _{OCR} TYP+0.050	V
		40°C≤T _a ≤85°C R1=100Ω (注1)	V _{OCR} TYP-0.080	V _{OCR} TYP	V _{OCR} TYP+0.080	V
Over voltage charging protection delay time	t _{OC}	V _{DD} =3.6V→4.4V T _a =25°C	0.7×t _{OC} TYP	t _{OC} TYP	1.3×t _{OC} TYP	ms
Over voltage discharge protection threshold (high to low)	V _{OD}	T _a =25°C	V _{OD} TYP-0.075	V _{OD} TYP	V _{OD} TYP+0.075	V
		-40°C≤T _a ≤85°C	V _{OD} TYP-0.105	V _{OD} TYP	V _{OD} TYP+0.105	V
Over voltage discharge recovery threshold (low to high)	V _{ODR}	T _a =25°C	V _{ODR} TYP-0.075	V _{ODR} TYP	V _{ODR} TYP+0.075	V
		-40°C≤T _a ≤85°C	V _{ODR} TYP-0.105	V _{ODR} TYP	V _{ODR} TYP+0.105	V
Over voltage discharge protection delay time	t _{OD}	V _{DD} =3.6V→2.4V T _a =25°C	0.7×t _{OD} TYP	t _{OD} TYP	1.3×t _{OD} TYP	ms
Over current discharge protection threshold	V _{EDI}	T _a =25°C	V _{EDI} TYP-0.020	V _{EDI} TYP	V _{EDI} TYP+0.020	V
Over current discharge protection delay time	t _{EDI}	T _a =25°C	0.7×t _{EDI} TYP	T _{EDI} TYP	1.3×t _{EDI} TYP	ms
Over current discharge recovery delay time	t _{EDIR}	T _a =25°C	1.20	1.80	2.40	ms
Battery short circuit protection threshold	V _{SHORT}	V _M 端电压 T _a =25°C	0.82	1.36	1.75	V

电性能参数 / Electrical Characteristics(Ta=25°C)

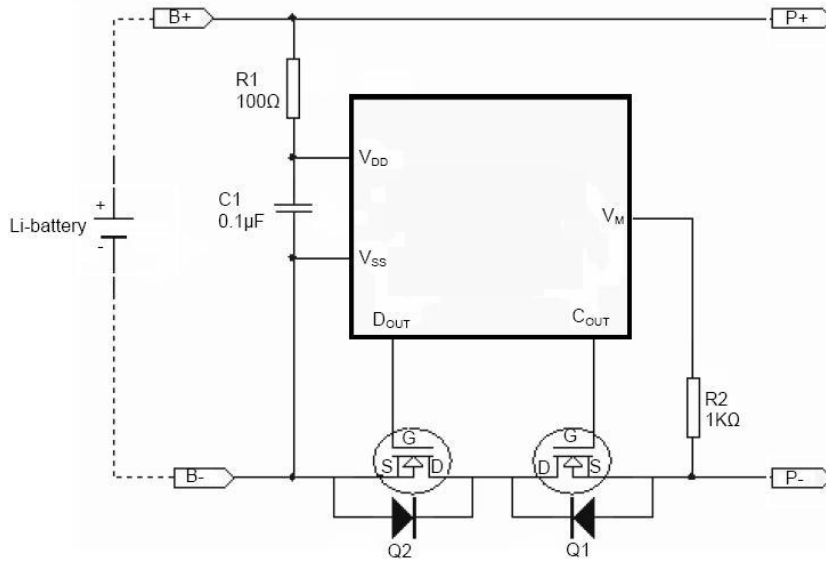
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Battery short circuit protection delay time	t _{SHORT}	Ta=25°C	200	400	600	μs
The charger voltage detection	V _{CHG}	V _{DD} =3.0V Ta=25°C	-0.27	-0.5	-0.86	V
Between VM to VDD of the pull-up resistor	R _{VMD}	V _{DD} =1.8V, V _M =0V Ta=25°C	100	300	900	kΩ
The pull-down resistor between VM to VSS	R _{VMS}	Ta=25°C	15	30	45	kΩ
The COT output low pull-down resistor		Ta=25°C		4		MΩ
CO output high level		V _{DD} =3.9V, Ta=25°C I _{CO} =10μA	V _{DD} -0.4	V _{DD} -0.2		V
DO output low level		V _{DD} =2.0V, Ta=25°C I _{DO} =10μA		0.2	0.4	V
DO output high level		V _{DD} =3.9V, Ta=25°C I _{DO} =10μA	V _{DD} -0.4	V _{DD} -0.2		V
Power supply current	I _{DD}	V _{DD} =3.9V Ta=25°C		2.0	6.0	μA
A low power consumption mode the quiescent current	I _{PDWN}	V _{DD} =2.0V Ta=25°C		0.7	1.0	μA
0V charging allowed voltage threshold (0V charging allowed type)	V _{OV_CHG}	Ta=25°C	1.2			V
0V charging prohibition threshold (0V charging prohibition model)	V _{OV_INH}	V _M =-2.0V Ta=25°C			1.2	V

注：1.除非特别说明，所有电压值均相对于VSS而言；
2.参见应用电路图。

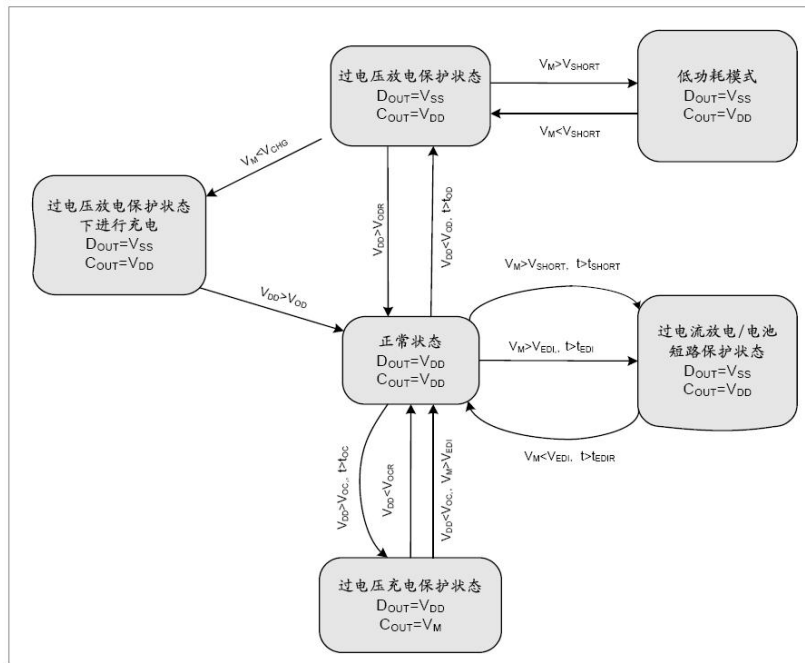
模块图/ Block Diagram:



应用电路图/ Application Circuits:



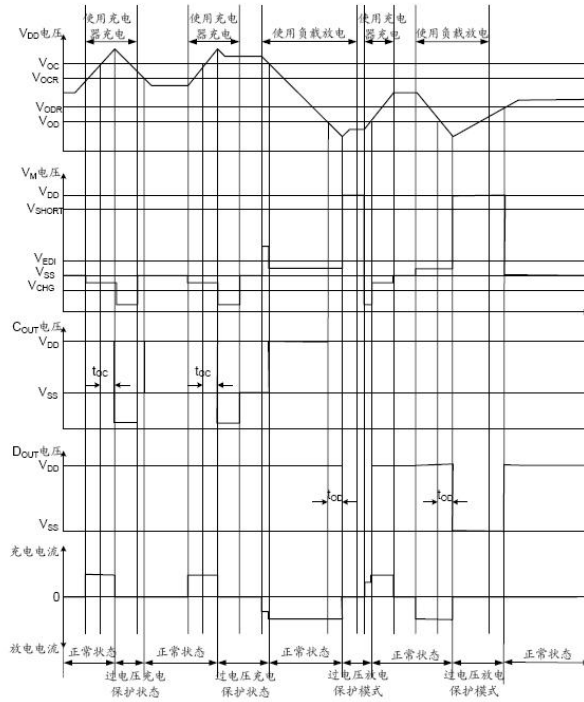
各状态之间的转换图：



工作时序图/ Timing Chart

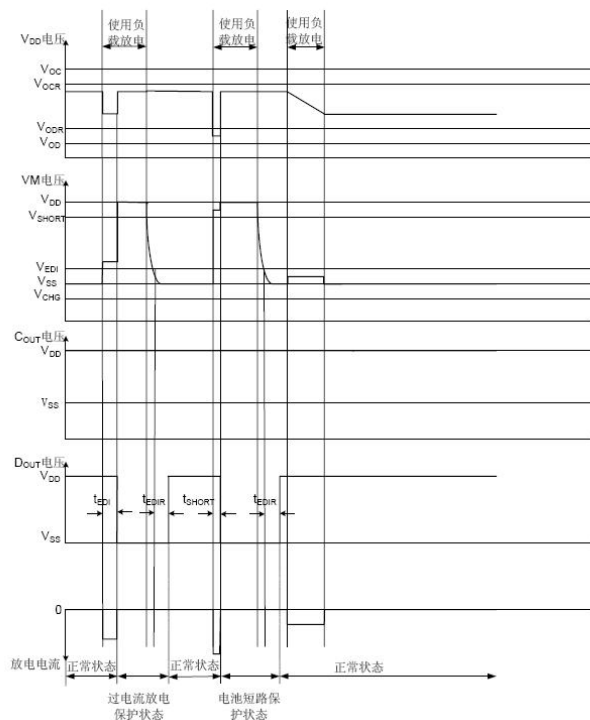
(1) 过充保护/过充恢复& 过放保护/过放恢复

Overcharge protection / overcharge recovery & Over-discharge protection / over-discharge recovery:

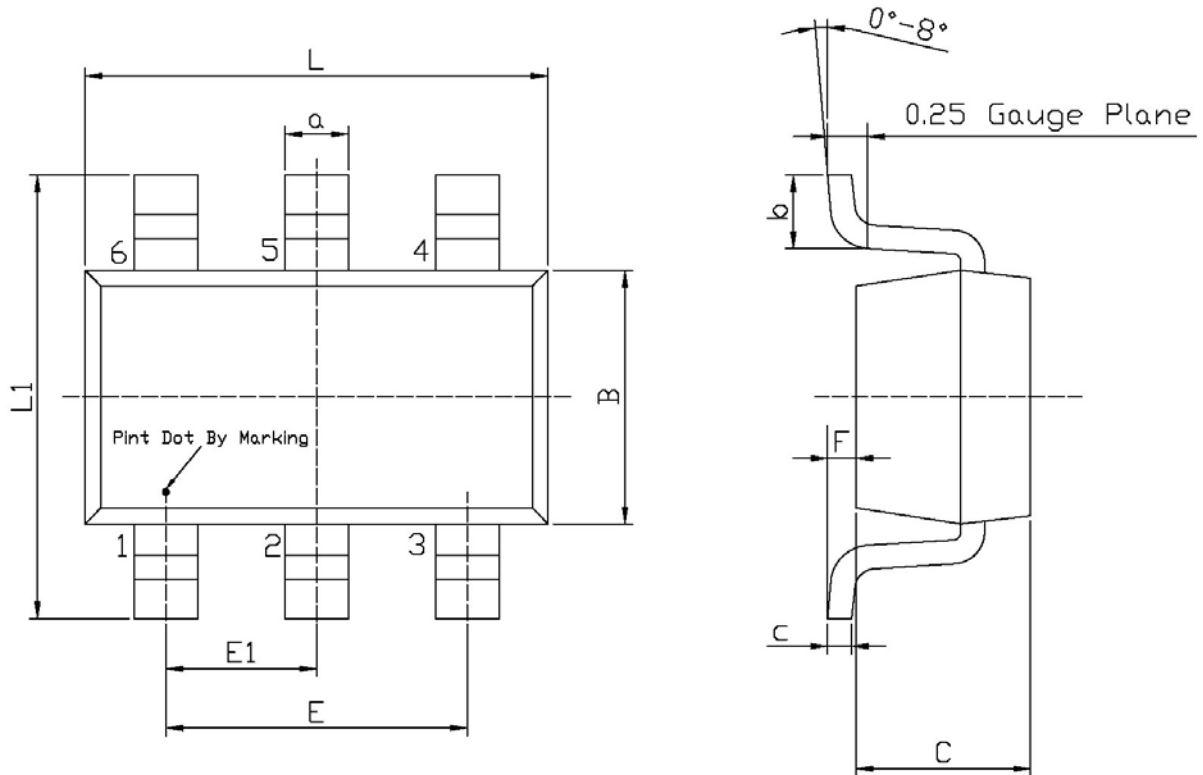


(2) 过流保护检测& 负载短路保护检测

Overcurrent detection & Load short-circuit protection detection



外形尺寸圖 / SOT-23-6 Package Dimensions



Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
L	2.82	3.02	E1	0.85	1.05
B	1.50	1.70	a	0.35	0.50
C	0.90	1.30	c	0.10	0.20
L1	2.60	3.00	b	0.35	0.55
E	1.80	2.00	F	0	0.15