General Description

The DW01 battery protection IC is designed to protect lithium-ion/polymer battery from damage or degrading the lifetime due to overcharge, overdischarge,and/or overcurrent for one-cell lithium -ion/polymer battery powered systems, such as cellular phones.

The ultra-small package and less required external components make it ideal to integrate the DW01 into the limited space of battery pack. The accurate ±50mV overcharging detection voltage ensures safe and full utilization charging. The very low standby current drains little current from the cell while in storage.

Ordering Information

PACKAGE TYPE
SOT-23-6

TEMPERATURE RANGE
-40°C~+85°C

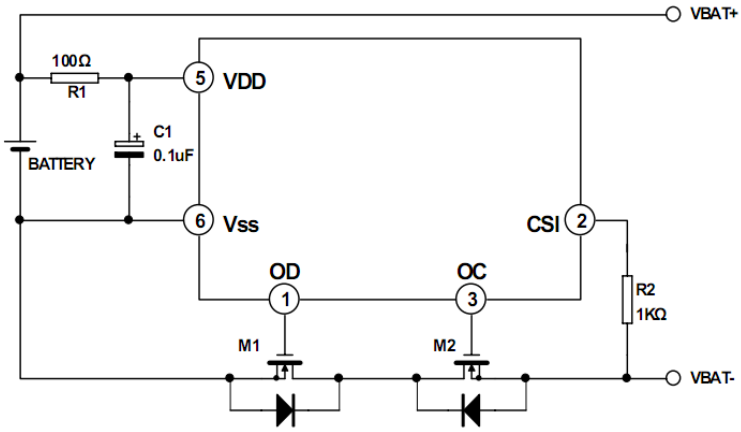
OVERCHARGE PROTECTION
4.3V± 50mV

Applications

- **Protection IC for One-Cell Lithium-Ion / Lithium-Polymer Battery Pack**

Features

- 工作电流低
- 过充检测4.30V，过充释放4.10V
- 过放检测2.4V，过放释放3.0V
- 过流检测0.16V，短路电流检测1.3V
- 充电器检测
- 过电流保护复位电阻
- 带自恢复功能
- 0V充电使能
- 工作电压范围广



典型应用电路图

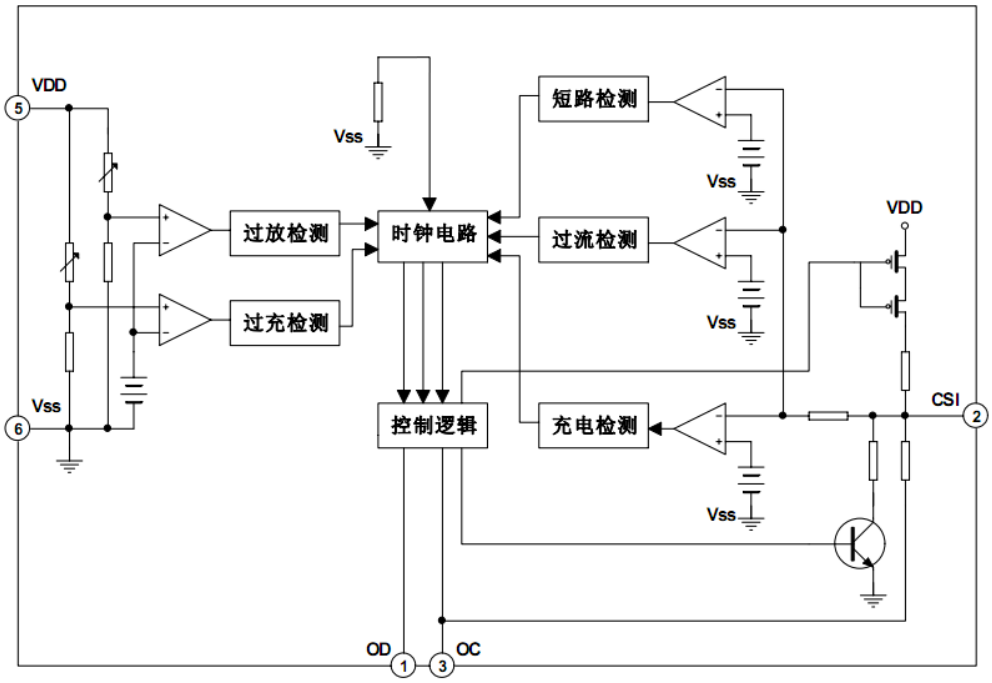
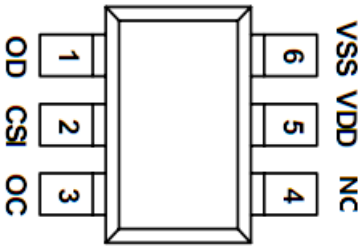


图2 功能框图

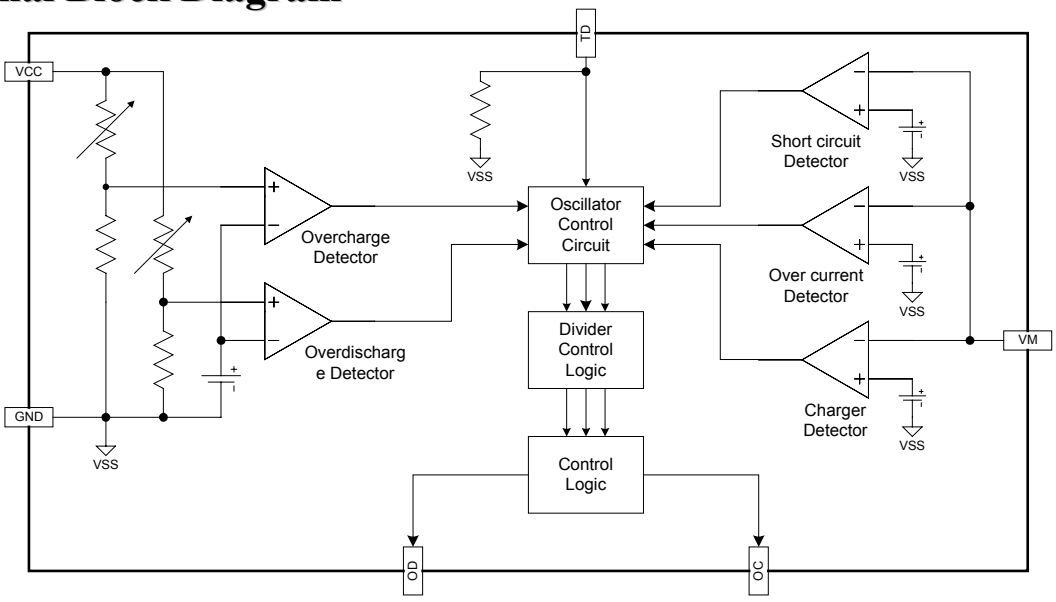
Product Name List

Product	Package	Overcharge detection voltage [VOCP] (V)	Overcharge release voltage [VOCR] (V)	Overdischarge detection voltage [VODL] (V)	Overdischarge release voltage [VODR] (V)	Overcurrent detection voltage [VOI1] (mV)	0V battery charge function	Stand by function release
DW01	SOT-23-6	4.300±0.050	4.100±0.050	2.40 ±0.1	3.00 ±0.1	150±0.03	available	Auto Recovery

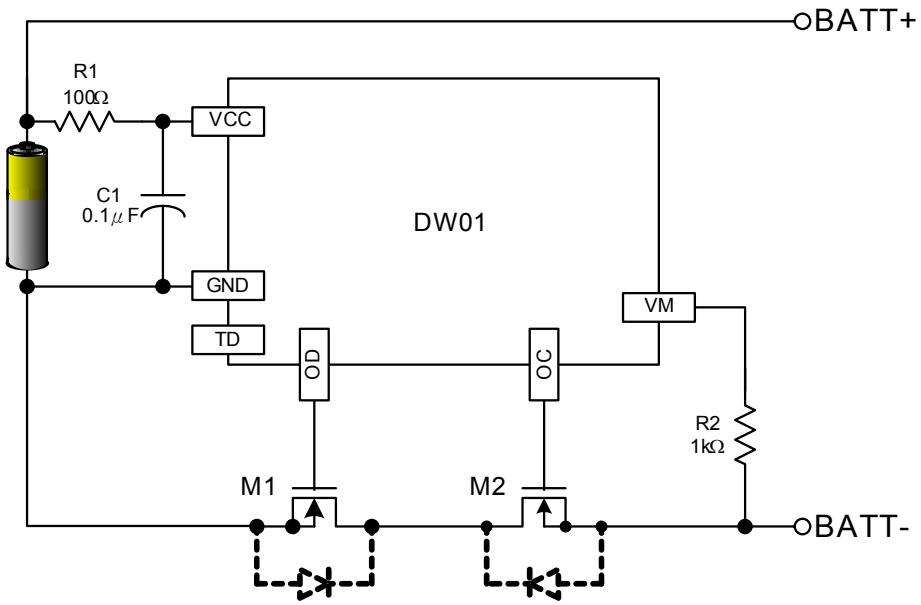


引脚号	管脚名称	I/O	功能描述
1	OD	O	放电控制 FET 门限连接管脚
2	CSI	I/O	电流感应输入管脚，充电器检测。
3	OC	O	充电控制 FET 门限连接管脚。
4	NC	---	无连接
5	VDD	I	正电源输入管脚。
6	VSS	I	负电源输入管脚。

Functional Block Diagram



Typical Application Circuit



Absolute Maximum Ratings

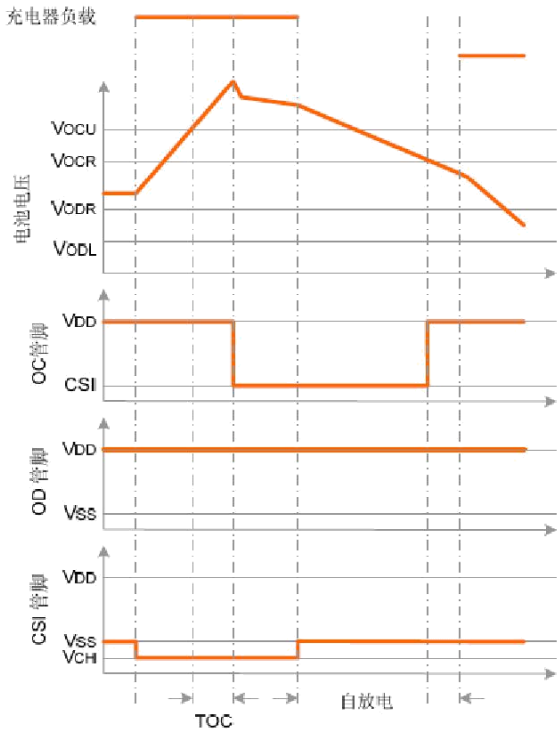
参数	符号	参数范围值	单位
电源电压	VDD	VSS-0.3~VSS+8	V
OC 输出管脚电压	VOC	VDD-15~VDD+0.3	V
OD 输出管脚电压	VOD	VSS-0.3~VDD+0.3	V
CSI 输入管脚电压	VCSI	VDD-15~VDD+0.3	V
工作温度	Topr	-40~+85	℃
存储温度	Tstg	-40~+125	℃

Electrical Characteristics

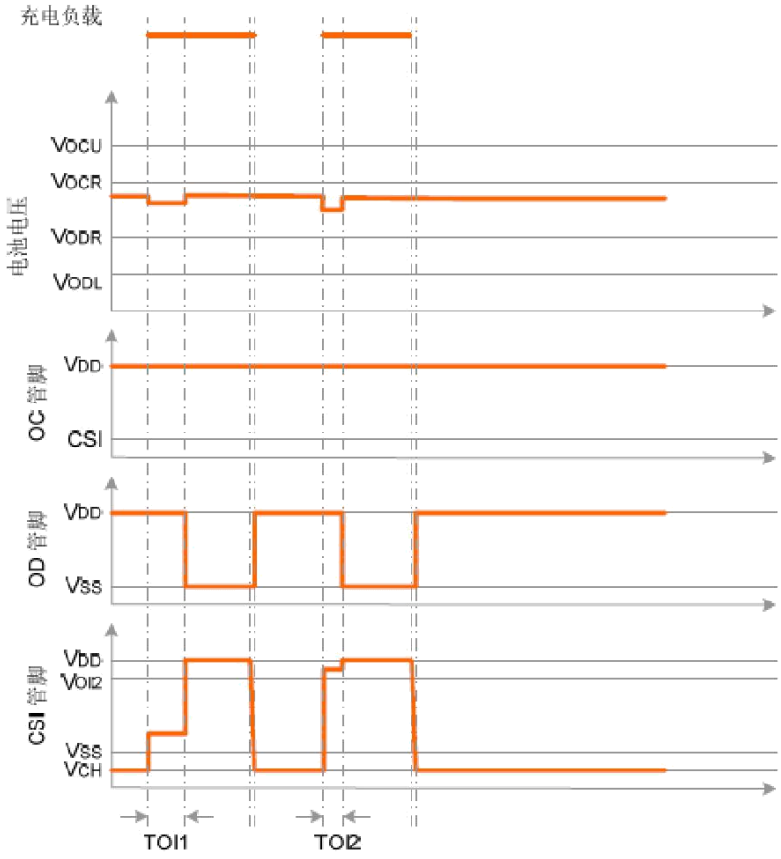
(Ta=25°C unless otherwise specified)

参数	符号	测试条件	最小值	典型值	最大值	单位
工作电压						
工作电压	VDD	--	1.5	--	8	V
电流消耗						
工作电流	IDD	VDD=3.9V	--	4.0	6.0	uA
检测电压						
过充电检测电压	VOCU	--	4.25	4.30	4.35	V
过充电释放电压	VOCR	--	4.05	4.10	4.15	V
过放电检测电压	VODL	--	2.30	2.40	2.50	V
过放电释放电压	VODR	--	2.90	3.00	3.10	V
过电流1检测电压	VOI1	--	0.13	0.16	0.19	V
过电流2（短路电流）检测电压	VOI2	VDD=3.6V	0.80	1.30	1.75	V
过电流复位电阻	Rshort	VDD=3.6V	5	10	20	KΩ
充电器检测电压	VCH	--	-1.1	-0.7	-0.3	V
迟延时间						
过充电检测迟延时间	TOC	VDD=3.6V~4.4V	--	80	200	ms
过放电检测迟延时间	TOD	VDD=3.6V~2.0V	--	40	120	ms
过电流1检测迟延时间	TOI1	VDD=3.6V	--	10	20	ms
过电流2（短路电流）检测迟延时间	TOI2	VDD=3.6V	-	50	120	us
其他						
OC管脚输出高电平电压	Voh1	--	VDD-0.1	VDD-0.02	--	V
OC管脚输出低电平电压	Vol1	--	--	0.1	0.5	V
OD管脚输出高电平电压	Voh2	--	VDD-0.1	VDD-0.02	--	V
OD管脚输出低电平电压	Vol2	--	-	0.1	0.5	

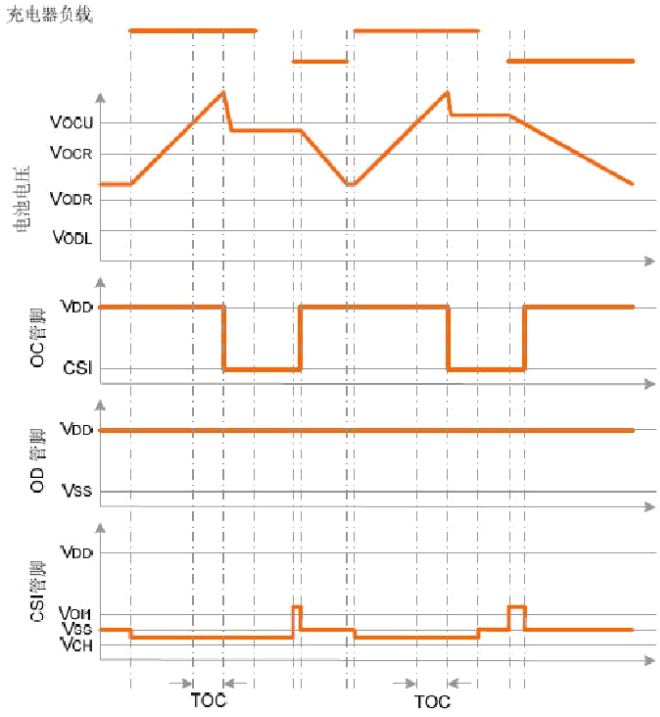
- 过充电状态→自放电状态→正常状态



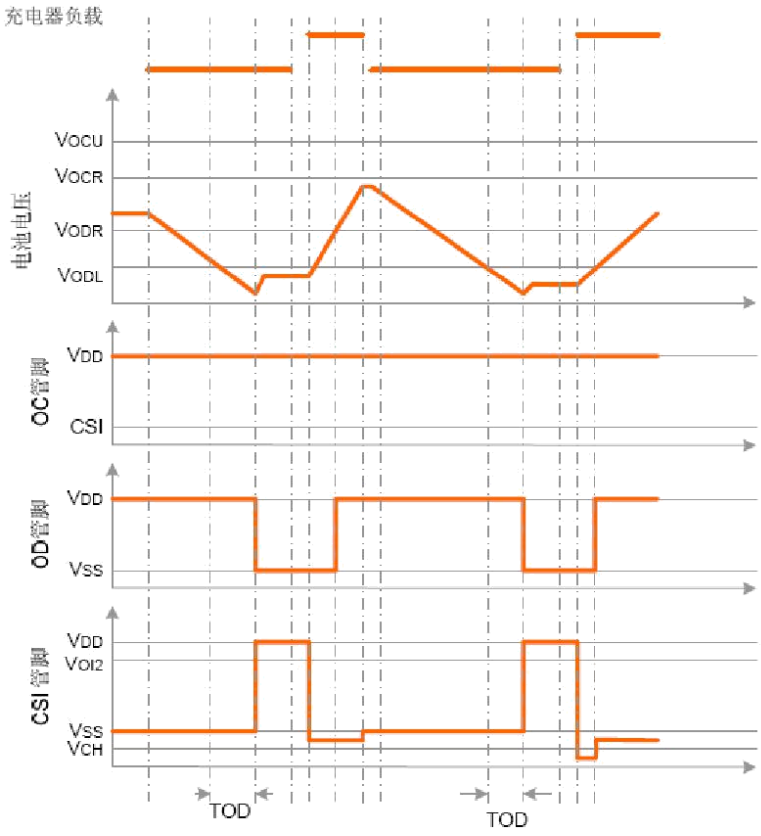
- 过充电状态→正常状态



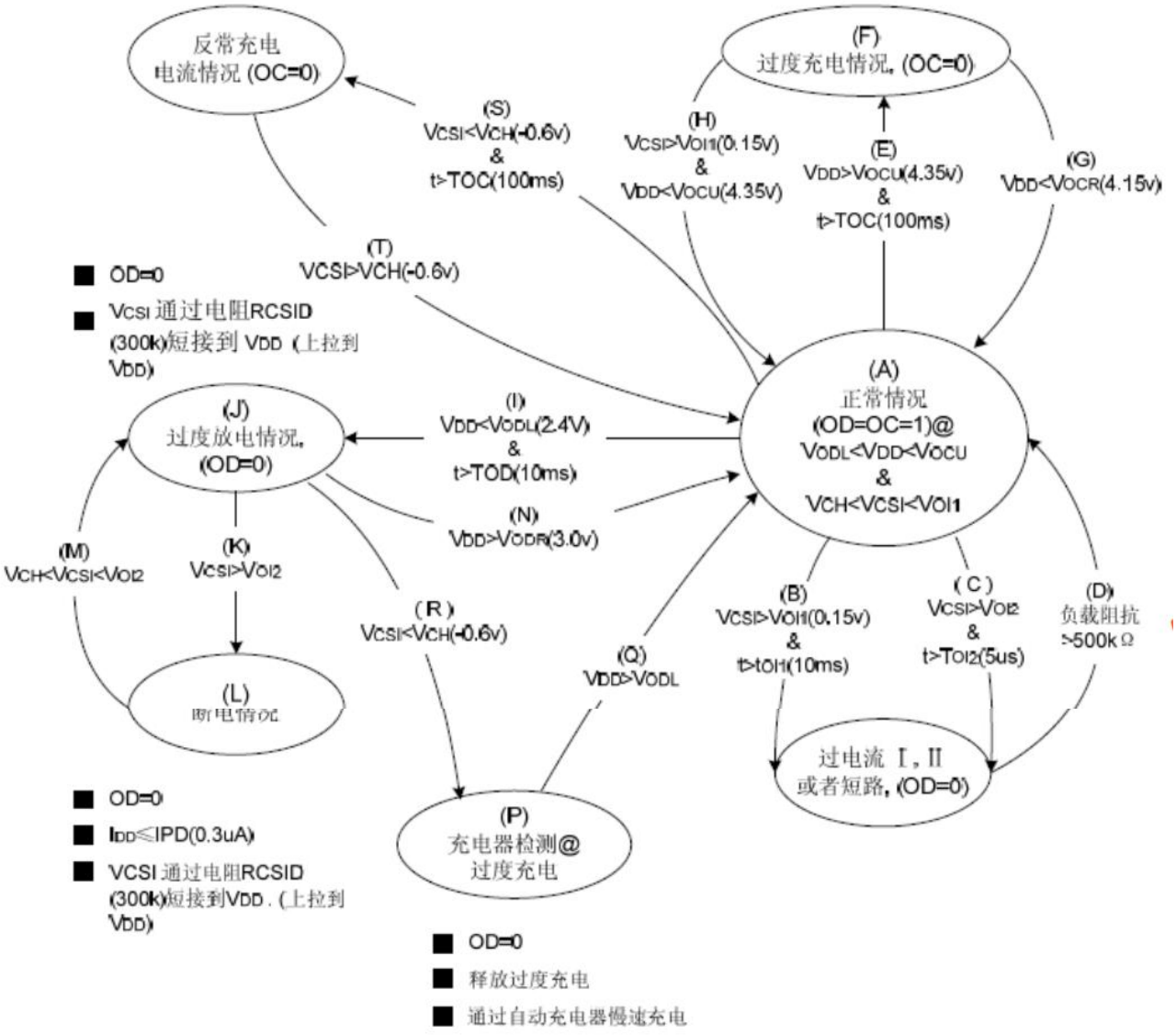
- 过充电状态→负载放电→正常状态



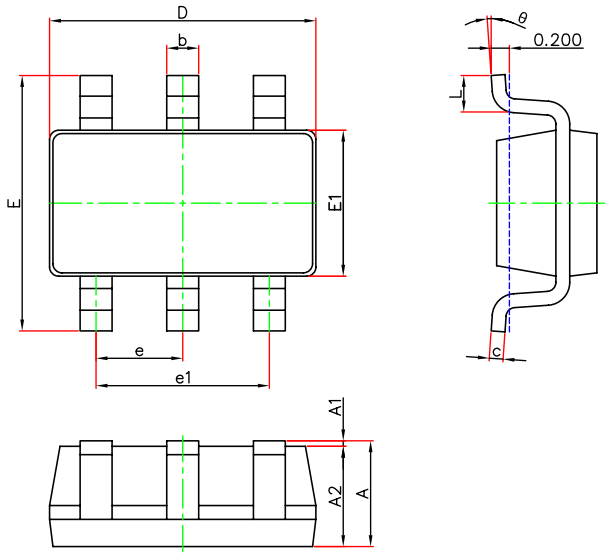
- 过充电状态→充电器充电→正常状态



操作状态图

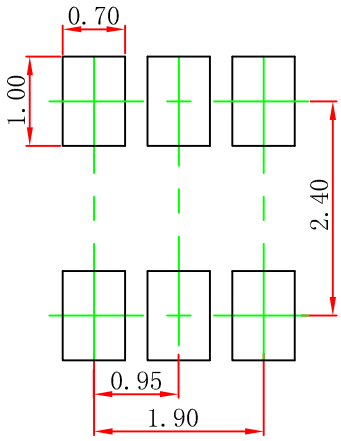

反常充电
电流情况 (OC=0)
(S)
VCSI<VCH(-0.6v)
&
t>TOC(100ms)
(F)
过度充电情况, (OC=0)
(H)
VCSI>VOI1(0.15V)
&
VDD<VOCU(4.35V)
(E)
VDD>VOCU(4.35v)
&
t>TOC(100ms)
(G)
VDD<VOCR(4.15v)
(T)
VCSI>VCH(-0.6v)
OD=0
VCSI 通过电阻RCSID
(300k)短接到 VDD (上拉到
VDD)
(A)
正常情况
(OD=OC=1)@
VODL<VDD<VOCU
&
VCH<VCSI<VOI1
(J)
过度放电情况,
(OD=0)
(I)
VDD<VODL(2.4V)
&
t>TOD(10ms)
(N)
VDD>VODR(3.0v)
(M)
VCH<VCSI<VOI2
(K)
VCSI>VOI2
(R)
VCSI<VCH(-0.6v)
(L)
断电情况
(Q)
VDD>VODL
(B)
VCSI>VOI1(0.15v)
&
t>tOI1(10ms)
(C)
VCSI>VOI2
&
t>TOI2(5us)
(D)
负载阻抗
>500kΩ
过电流 Ⅰ, Ⅱ
或者短路, (OD=0)
OD=0
IDD≤IPD(0.3uA)
VCSI 通过电阻RCSID
(300k)短接到VDD . (上拉到
VDD)
(P)
充电器检测@
过度充电
OD=0
释放过度充电
通过自动充电器慢速充电

SOT-23-6 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT-23-6 Suggested Pad Layout



Note:

1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only