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

Features

- **Reduction in Board Size due to Miniature Package SOT-23-6.**

- **Ultra-Low Quiescent Current at 3 μA (Vcc=3.6V).**

- **Overdischarge Current at 4 μA (Vcc=1.8V).**

- **Precision Overcharge Protection Voltage 4.3V ± 50mV**

- **Two Detection Levels for Overcurrent Protection.**

- **Delay times are generated by internal circuits. No external capacitors required.**
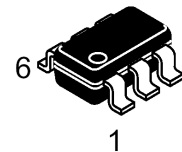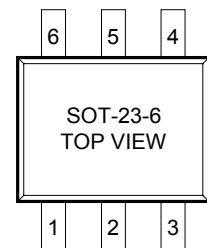
Applications

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

Product Name List

Product	Package	Overcharge detection voltage [V_{OCP}] (V)	Overcharge release voltage [V_{OCR}] (V)	Overdischarge detection voltage [V_{ODP}] (V)	Overdischarge release voltage [V_{ODR}] (V)	Overcurrent detection voltage [V_{OI1}] (mV)	0V battery charge function	Stand by function release
DW01	SOT-23-6	4.300±0.050	4.100±0.050	2.50±0.1	2.90±0.1	150±20	available	Auto Recovery

Pin Configuration

Pin No.	Symbol	Description
1	OD	MOSFET gate connection pin for discharge control
2	VM	Input pin for current sense, charger detect
3	OC	MOSFET gate connection pin for charge control
4	TD	Test pin for reduce delay time
5	VCC	Power supply, through a resistor (R1)
6	GND	Ground pin

Functional Block Diagram
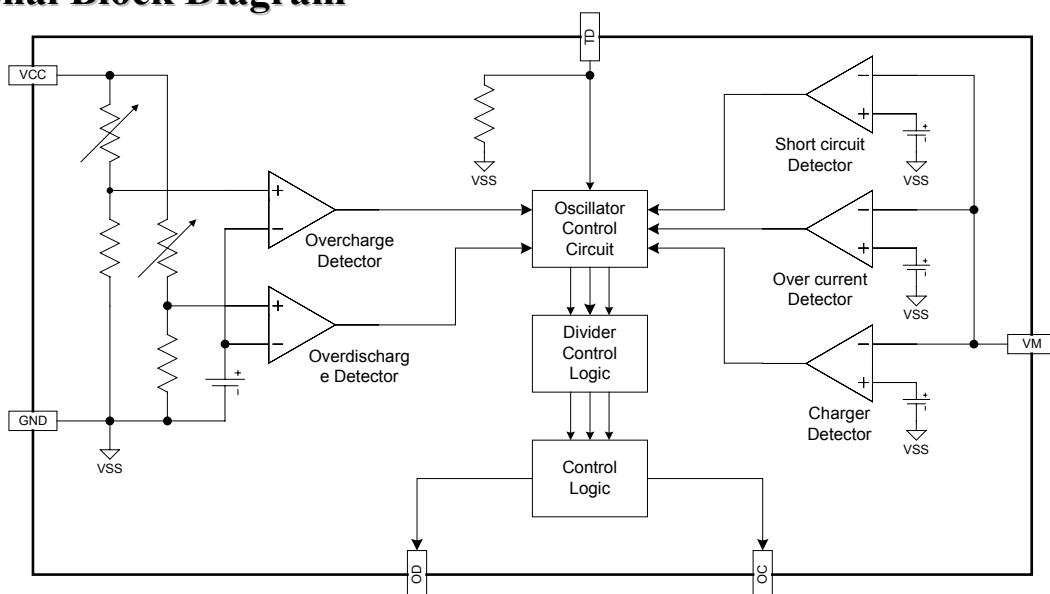
Typical Application Circuit
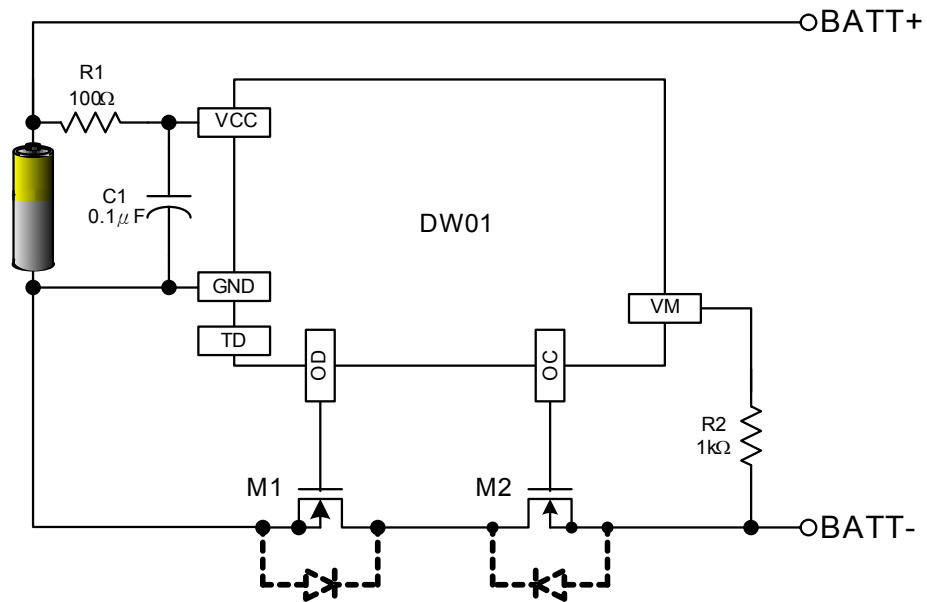
Absolute Maximum Ratings

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

Item	Symbol	Rating	Unit
Input voltage between VDD and VSS	V_{DD}	0.3 to 10	V
OC output pin voltage	V_{OC}	VDD-24 to VDD+0.3	V
OD output pin voltage	V_{OD}	VSS-0.3 to VDD+0.3	V
CS input pin voltage	V_{CS}	VDD-24 to VDD+0.3	V
Operating Temperature Range	T_{OP}	-40 to +85	°C
Storage Temperature Range	T_{ST}	-40 to +125	°C

# Electrical Characteristics

(Ta=25°C unless otherwise specified)

| PARAMETER	TEST CONDITIONS	SYMBOL	Min	Typ	Max	UNIT
Supply Current	V_{CC}=3.6V	I_{CC}		3.0	6.0	μA
Power-Down Current	V_{CC}=1.8V	I_{PD}			4	μA
0V Battery Charge Starting Charger Voltage		V_{0CHA}	1.2			V
Overcharge Protection Voltage		V_{OC}	4.25	4.30	4.35	V
Overcharge Release Voltage		V_{OCR}	4.05	4.10	4.15	V
Overdischarge Protection Voltage		V_{OD}	2.40	2.50	2.60	V
Overdischarge Release Voltage		V_{ODR}	2.80	2.90	3.00	V
Overcurrent Protection Voltage		V_{EDI}	130	150	170	mV
Short Current Protection Voltage		V_{short}	0.82	1.36	1.75	V
Overcharge Delay Time		T_{OC}		110	200	ms
Overdischarge Delay Time	V_{CC}=3.6V to 2.4V	T_{OD}		55	200	ms
Overcurrent Delay Time (1)		T_{EDI}		7	20	ms
Overcurrent Delay Time (2)		T_{short}		400	600	μs
OD Pin Output "H" Voltage	V_{CC}=3.9V I_{CO}=10uA	D_{out}H	V_{CC}-0.4	V_{CC}-0.2		V
OD Pin Output "L" Voltage	V_{CC}=2V I_{DO}=10uA	D_{out}L		0. 2	0.5	V
OC Pin Output "H" Voltage	V_{CC}=3.9V I_{CO}=10uA	C_{out}H	V_{CC}-0.1	V_{CC}-0 02		V

Timing Diagram

1. Overcharge Condition →Load Discharging → Normal Condition
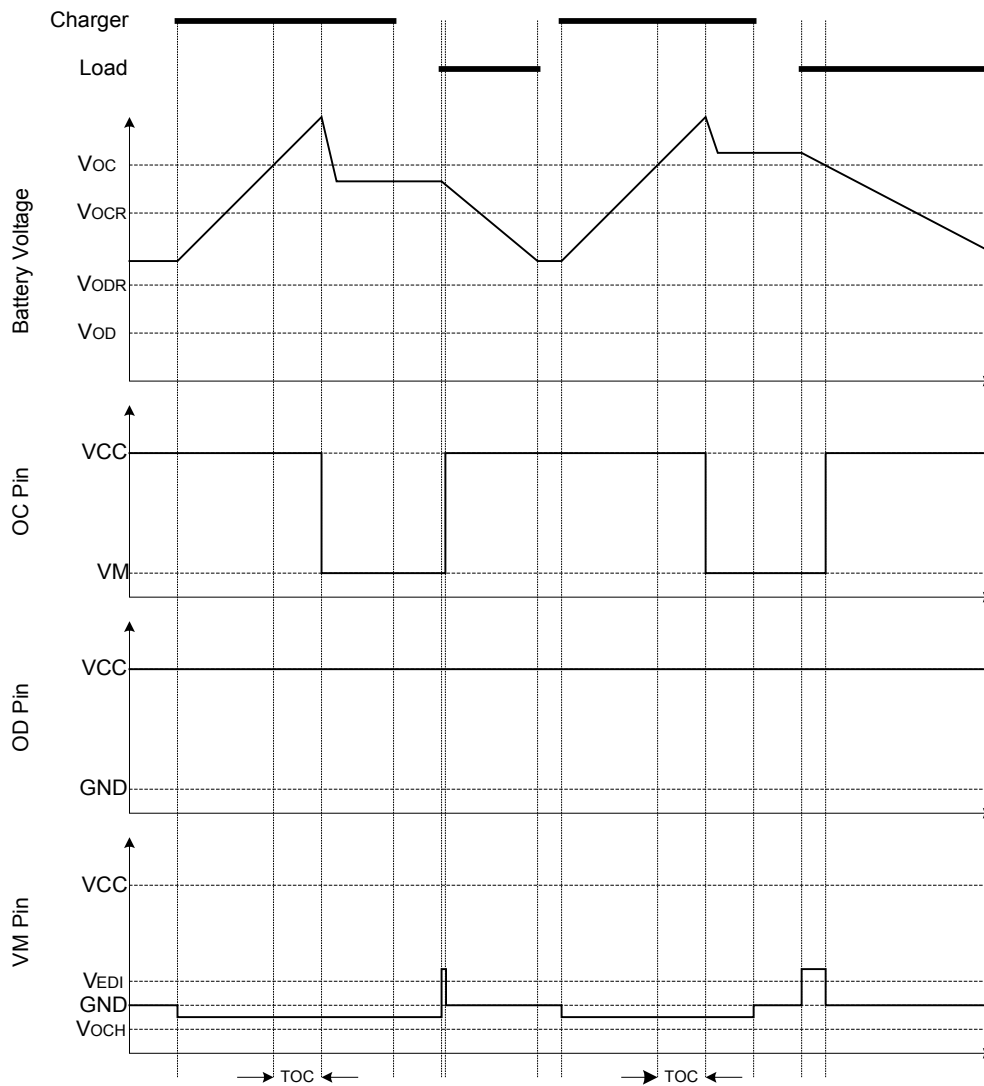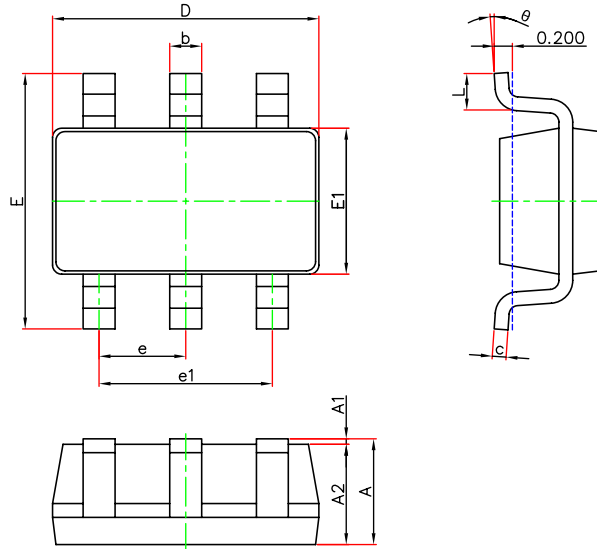
2. Overdischarge Condition → Charging by a Charger →Normal Condition
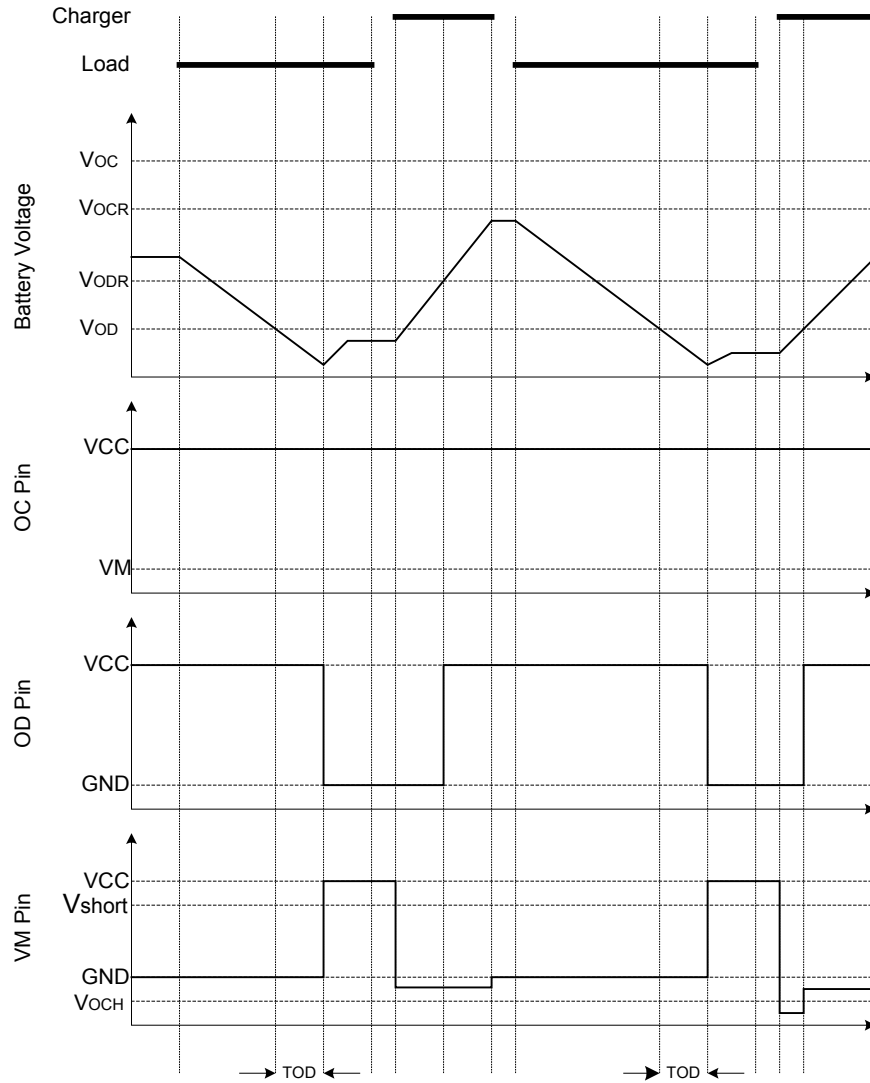
### 3. Over Current Condition → Normal Condition
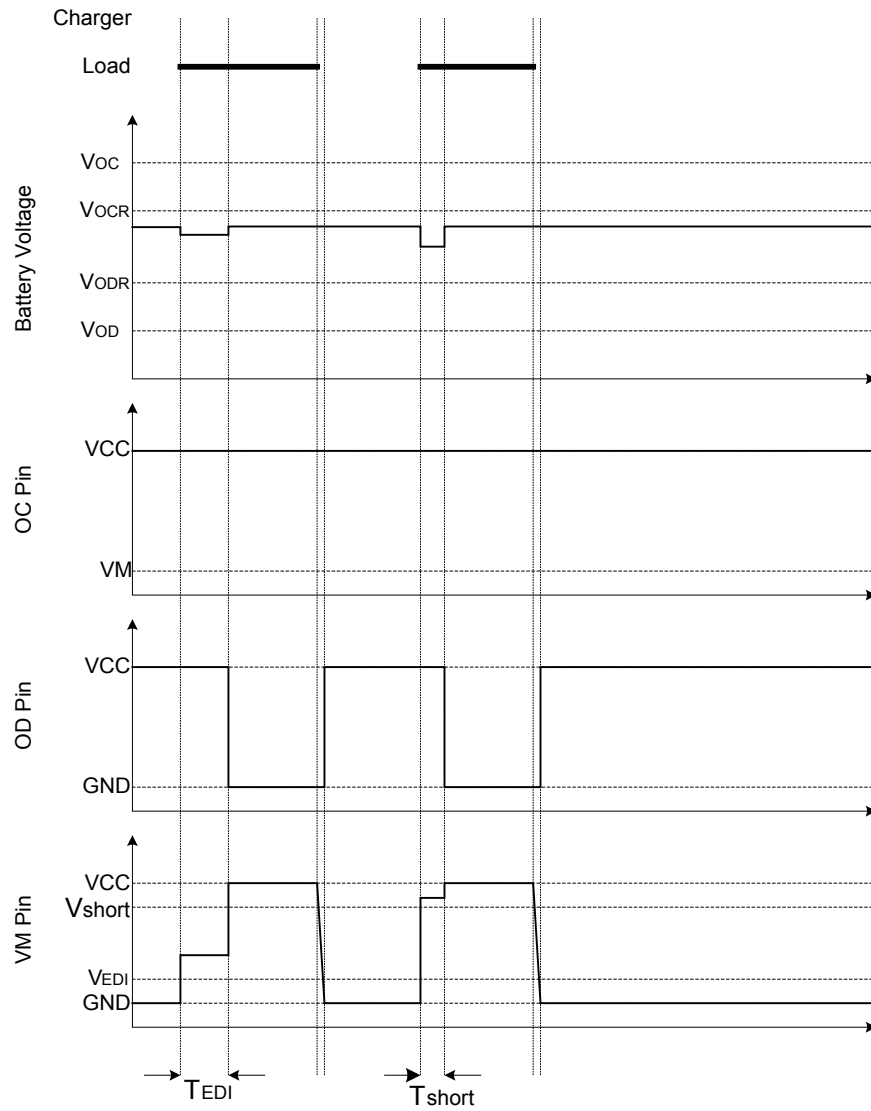
SOT-23-6 Package Outline Dimensions

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
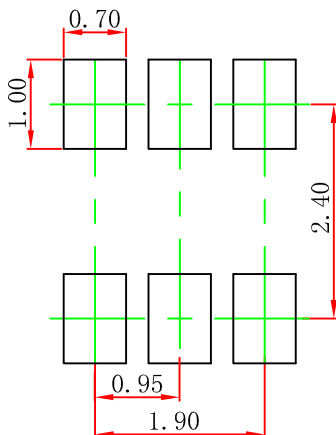
Note:

1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only