General Description

The DW01A battery protection IC is design ed 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 DW01A 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

DW01A

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=3.9V).**
- **Auto recovery**
- **0v charging**
- **Precision Overcharge Protection Voltage 4.3V ± 50mV for the DW01A**
- **Load Detection Function during Overcharge Mode.**
- **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：**
  built-in cell of mobile phone
  digital product cell
  camera cell
  portable power

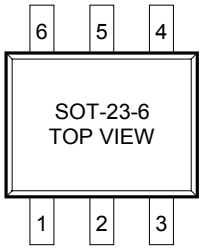
- Reflow soldering internal actual temperature < 250 degrees, time in high temperature < 7 s.

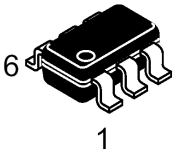
Product Name List

Model	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)
	SOT-23-6					
DW01	DW01A	4.300±0.050	4.100±0.050	2.40±0.100	3.0±0.100	150±30

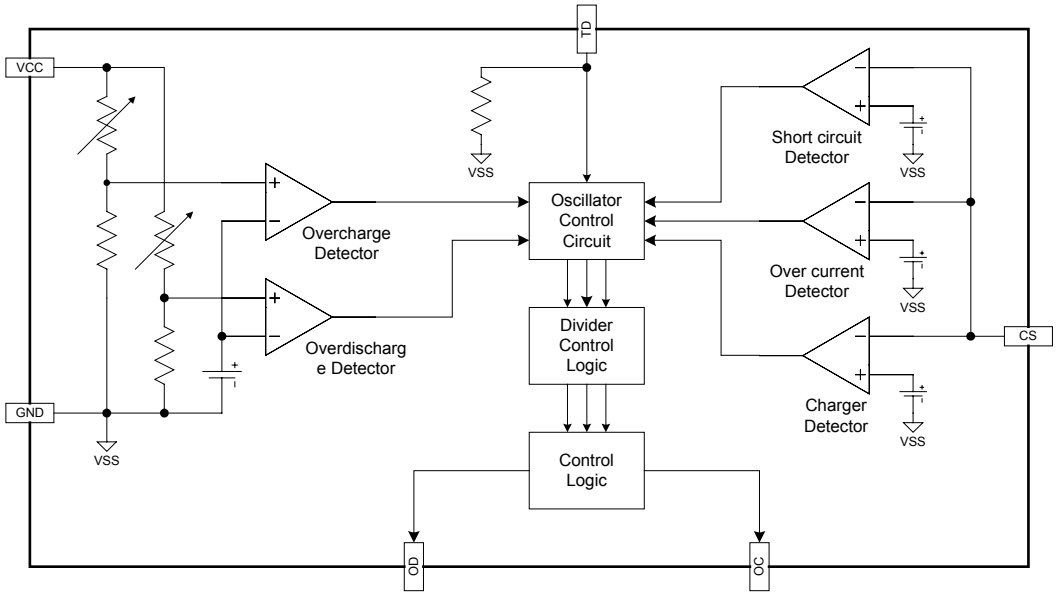
Pin Configuration

Pin No.	Symbol	Description
1	OD	MOSFET gate connection pin for discharge control
2	CS	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

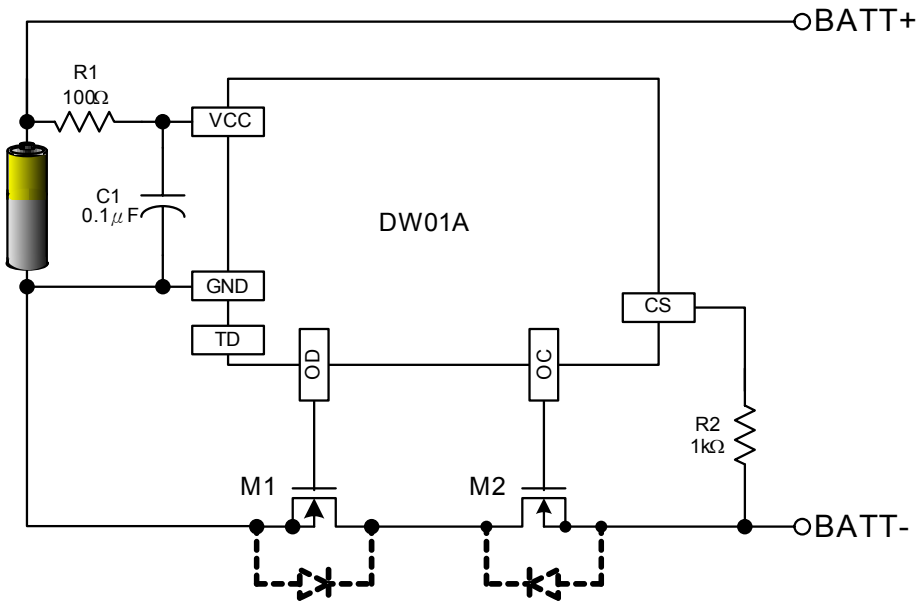




Functional Block Diagram



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}	VSS-0.3 to VSS+10	V
OC output pin voltage	V_{OC}	VDD-26 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-26 to VDD+0.3	V
Operating Temperature Range	T_{OP}	-40 to +85	°C
Storage Temperature Range	T_{ST}	-40 to +125	°C

Note: DW01A contains a circuit that will protect it from static discharge; but please take special care that no excessive static electricity or voltage which exceeds the limit of the protection circuit will be applied to it.

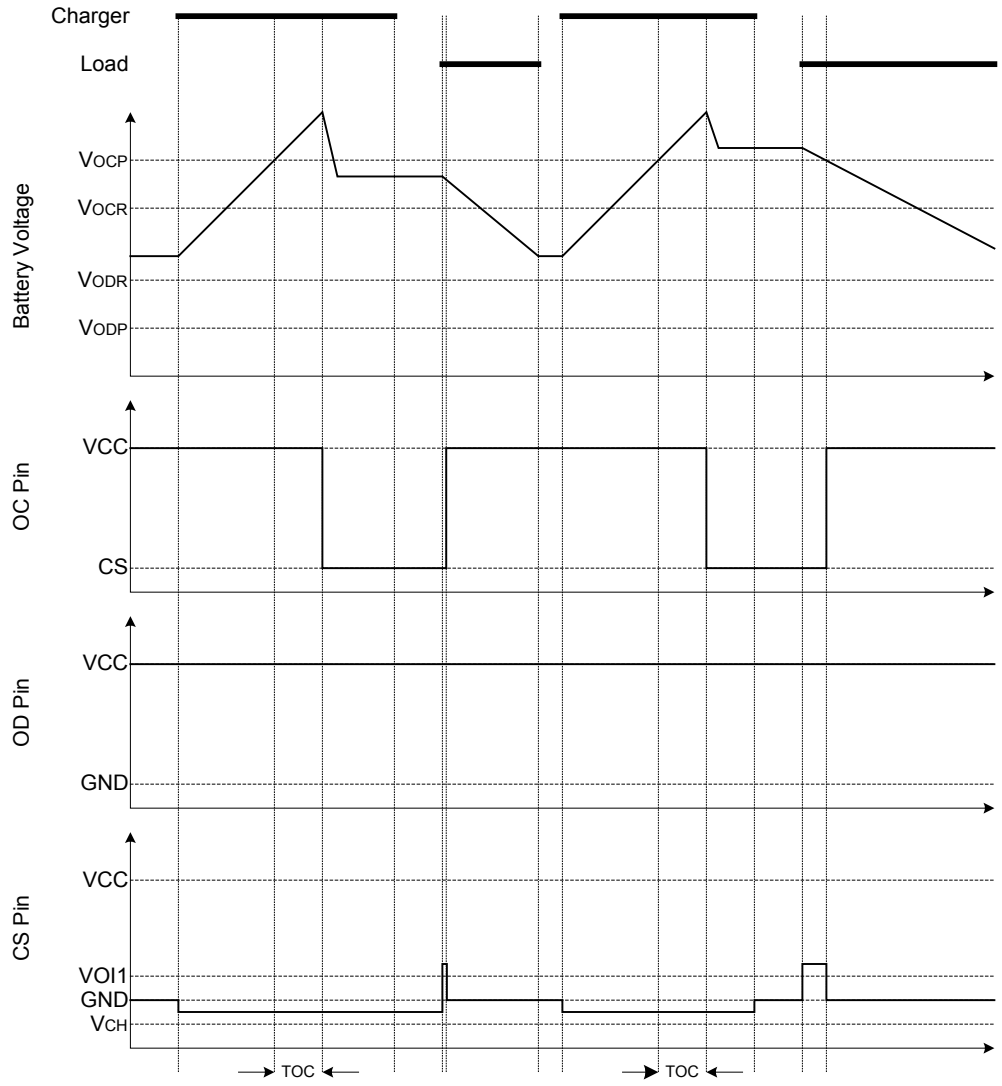
Electrical Characteristics

(Ta=25°C unless otherwise specified)

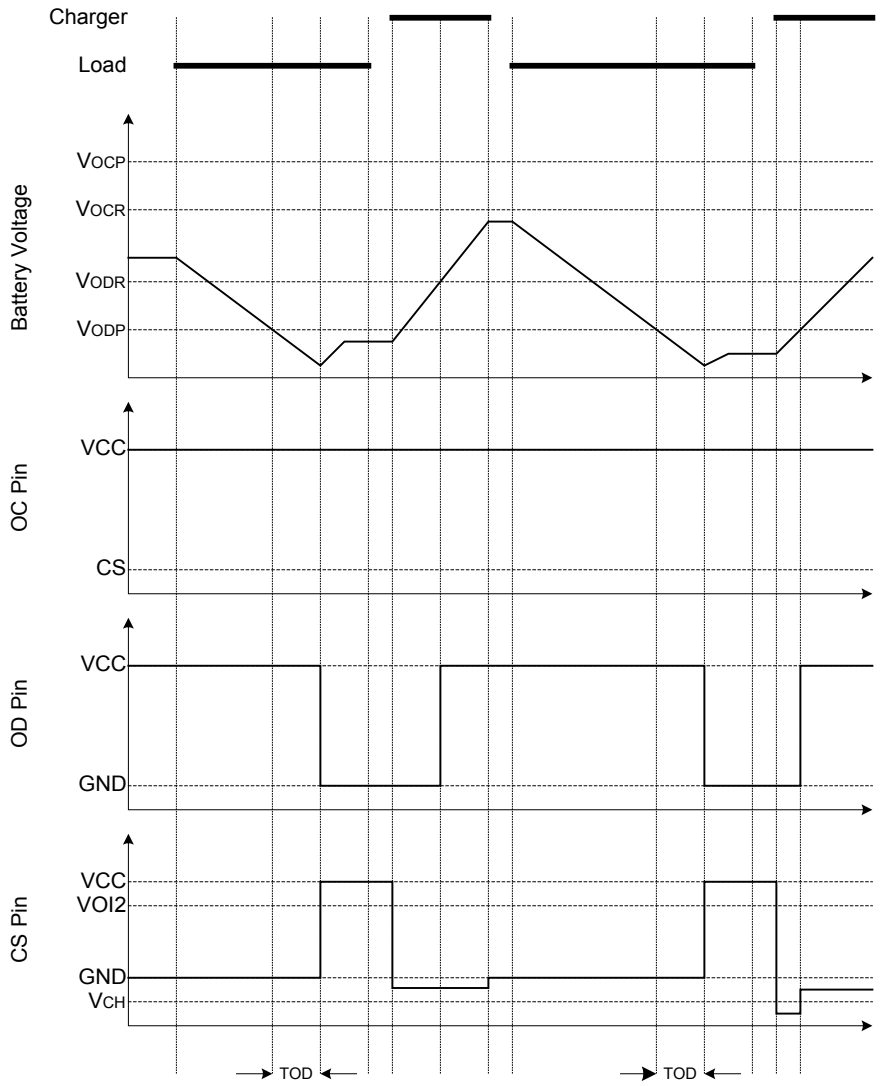
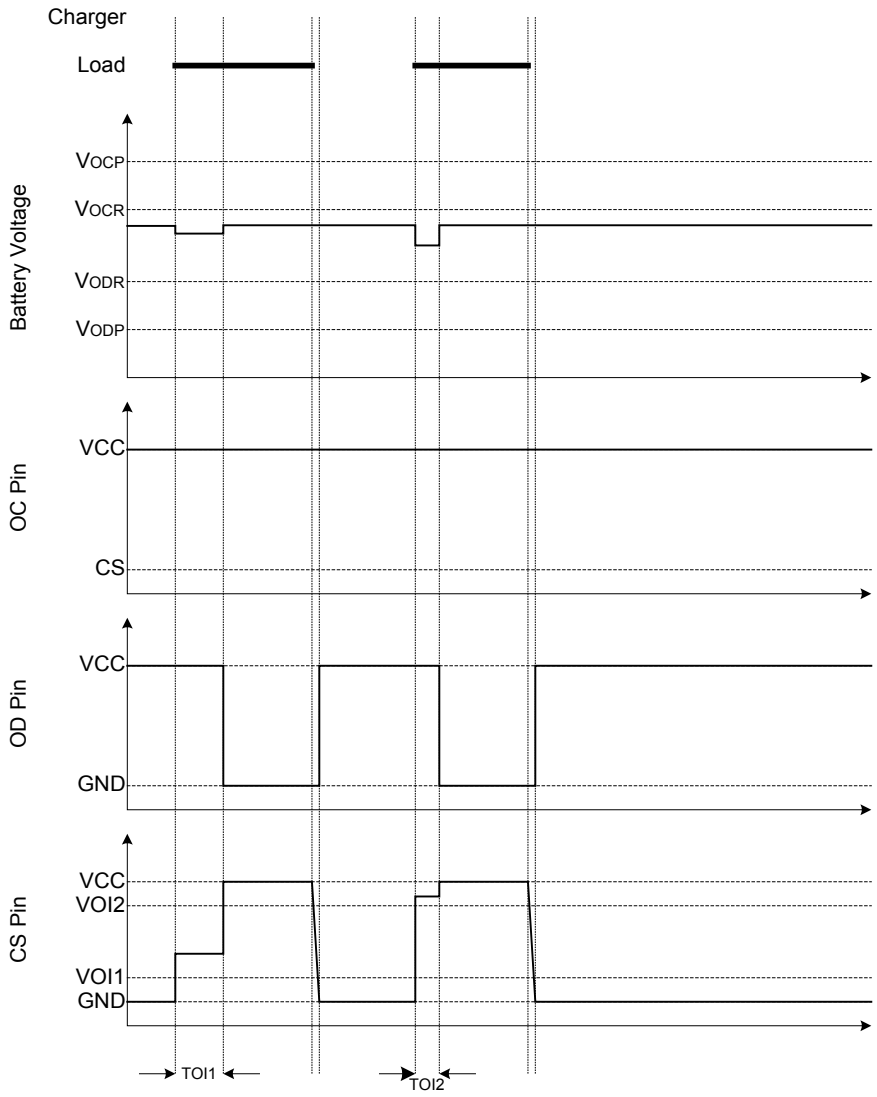
PARAMETER	TEST CONDITIONS	SYMBOL	Min	Typ	Max	UNIT
Supply Current	V_{CC}=3.9V	I_{CC}		3.0	6.0	μA
Power-Down Current	V_{CC}=2.0V	I_{PD}			3.0	μA
Overcharge Protection Voltage	DW01 A	V_{OCP}	4.25	4.30	4.35	V
Overcharge Release Voltage		V_{OCR}	4.05	4.10	4.15	V
Overdischarge Protection Voltage		V_{ODP}	2.30	2.40	2.50	V
Overdischarge Release Voltage		V_{ODR}	2.90	3.00	3.10	V
Overcurrent Protection Voltage		V_{OIP}(V_{OI1})	120	150	180	mV
Short Current Protection Voltage	V_{CC}=3.6V	V_{SIP}(V_{OI2})	1.25	1.35	1.45	V
Overcharge Delay Time		T_{OC}		80	200	ms
Overdischarge Delay Time	V_{CC}=3.6V to 2.0V	T_{OD}		40	100	ms
Overcurrent Delay Time (1)	V_{CC}=3.6V	T_{OI1}		10	20	ms
Overcurrent Delay Time (2)	V_{CC}=3.6V	T_{OI2}		5	100	μs
Charger Detection Threshold Voltage		V_{CH}	-1.2	-0.7	-0.2	V
OD Pin Output “H” Voltage		V_{DH}	V_{CC}-0.1	V_{CC}-0.02		V
OD Pin Output “L” Voltage		V_{DL}		0. 1	0.5	V
OC Pin Output “H” Voltage		V_{CH}	V_{CC}-0.1	V_{CC}-0.02		V
OC Pin Output “L” Voltage		V_{CL}		0.1	0.5	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