

Features

- Protection of Charger Reverse Connection
- Protection of Battery Cell Reverse Connection
- Over-temperature Protection
- Overcharge Current Protection
- Two-step Overcurrent Detection:
Over Discharge Current
Load Short Circuiting
- Charger Detection Function
- 0V Battery Charging Function
- RoHS Compliant and Lead (Pb) Free
- 45mΩ Low $R_{SS(ON)}$ Internal Power MOSFET
- Delay Times are generated inside
- High-accuracy Voltage Detection
- Low Current Consumption
Operation Mode: 2.5μA typ.
Power-down Mode: 1.5μA typ.
- Only One External Capacitor Required
- Available in SOT23-5 Package
- -40°C to +85°C Temperature Range

Applications

- One-Cell Li-ion Battery Pack
- Power Bank
- One-Cell Li-poly Battery Pack
- IOT Sensor/Electronic Toys

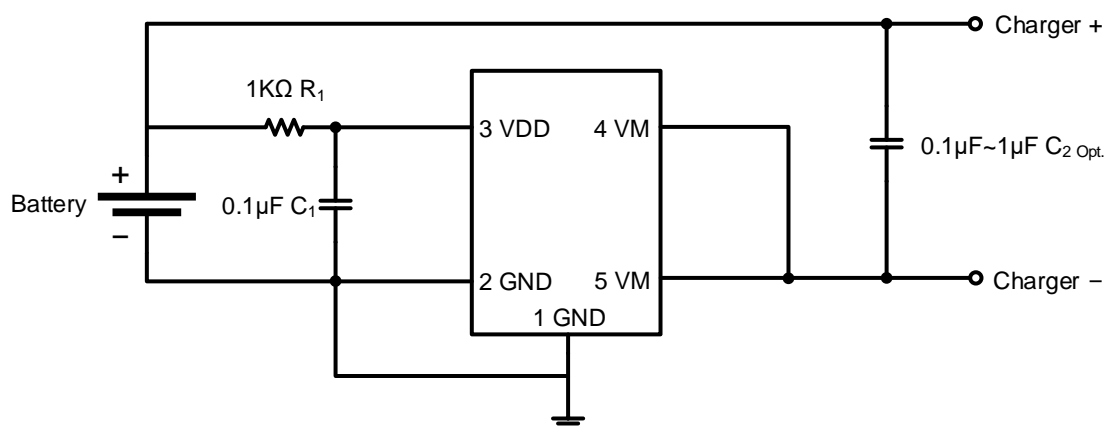
General Description

The BRCL3130ME is a high integration solution for lithium-ion/polymer battery protection. BRCL3130ME contains internal power MOSFET, high-accuracy voltage detection circuits and delay circuits.

BRCL3130ME has all the protection functions required in the battery application including overcharging, over discharging, overcurrent and load short circuiting protection etc. The accurate overcharging detection voltage ensures safe and full utilization charging. The low standby current drains little current from the cell while in storage. The device is not only targeted for digital cellular phones, but also for any other Li-Ion and Li-Poly battery-powered information appliances requiring long-term battery life.

The BRCL3130ME requires a minimal number of readily available, external components and is available in a space saving SOT23-5 package.

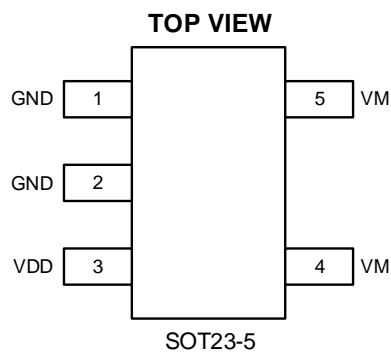
Typical Application Circuit



Typical Application Circuit

Pin Description

Pin Configuration



Pin Configuration

Pin Description

Pin	Name	Function
1	GND	Ground Pin
2	GND	Ground Pin
3	VDD	Power Supply Pin
4	VM	The negative terminal of the battery pack. The internal FET switch connects this terminal to GND
5	VM	The negative terminal of the battery pack. The internal FET switch connects this terminal to GND

Absolute Maximum Ratings ^{(1) (2)}

VDD Input Voltage	-0.3V to 6V	VM Input Voltage	-6V to 10V V _{BS}
Operating Temperature Range	-40°C to +85°C	Storage Temperature Range	-55°C to 150°C
Lead Temperature (Soldering, 10s)	+300°C	Junction Temperature.....	+125°C
θ _{JA}	250°C/W	ESD (Human Body Made) HMB.....	2KV
θ _{JC}	130°C/W	ESD (Machine Made) MM.....	200V

Note 1: Exceeding these ratings may damage the device.

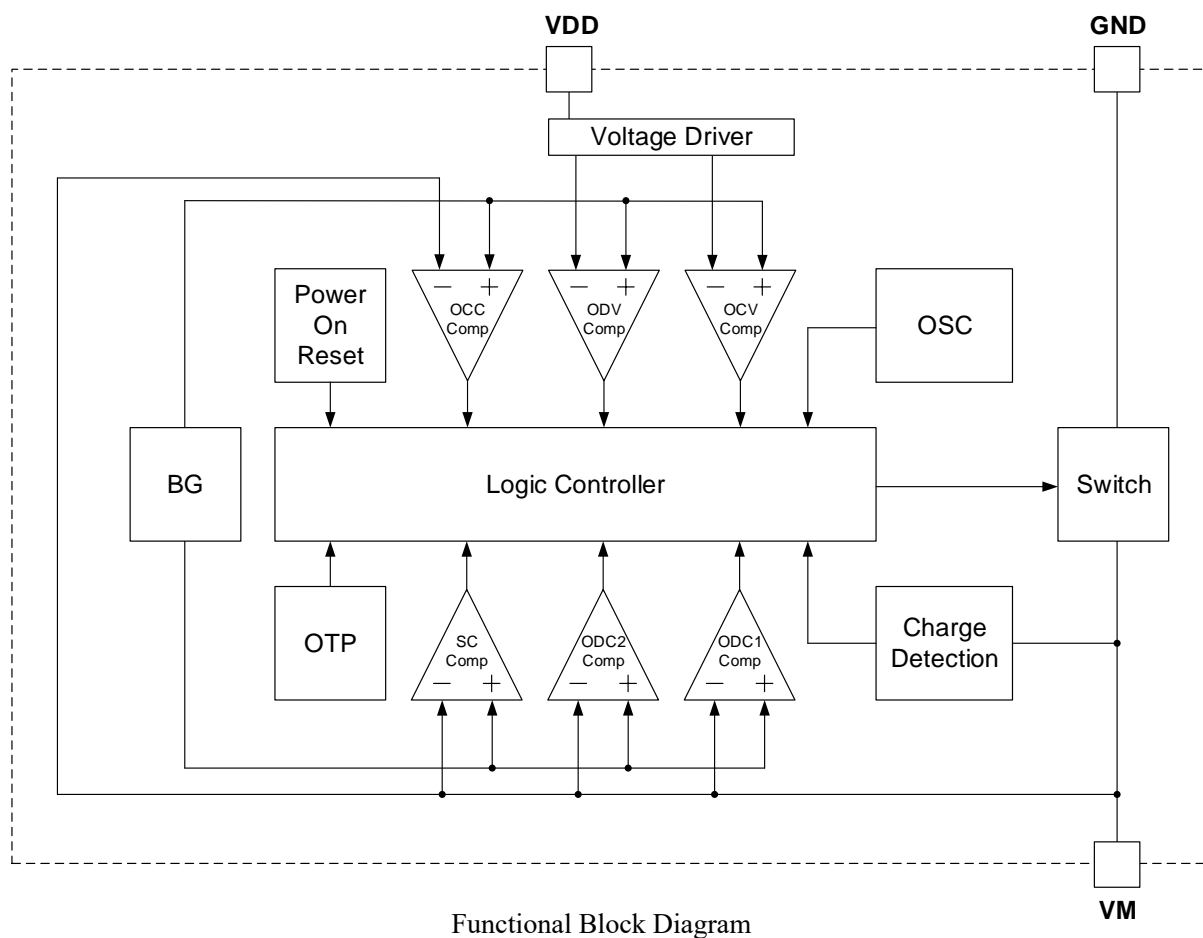
Note 2: The device is not guaranteed to function outside of its operating conditions.

Electrical Characteristics ⁽³⁾

Parameter	Symbol	Test Conditions	Min	Typ.	Max	Unit
Detection Voltage						
Overcharge Detection Voltage	V _{CU}		4.25	4.3	4.35	V
Overcharge Release Voltage	V _{CL}		4.05	4.1	4.15	V
Overdischarge Detection Voltage	V _{DL}		2.3	2.4	2.5	V
Overdischarge Release Voltage	V _{DR}		2.9	3.0	3.1	V
Charger Detection Voltage	*V _{CHA}			-0.12		V
Detection Current						
Overdischarge Current1 Detection	*I _{IOV1}	V _{DD} =3.6V		3		A
Load Short-Circuiting Detection	*I _{SHORT}	V _{DD} =3.6V		15		A
Current Consumption						
Current Consumption in Operation	I _{OPE}	V _{DD} =3.6V VM=0V		2.5	5	μA
Current Consumption in power Down	I _{PDN}	V _{DD} =2.0V VM floating		1.5	4	μA
VM Internal Resistance						
Resistance between VM and V _{DD}	*R _{VMD}	V _{DD} =3.6V VM=1.0V		320		kΩ
Resistance between VM and GND	*R _{VMS}	V _{DD} =2.0V VM=1.0V		25		kΩ
FET on Resistance						
Equivalent FET on Resistance	*R _{SS(ON)}	V _{DD} =3.6V I _{VM} =1.0A		45		mΩ
Over Temperature Protection						
Over Temperature Protection	*T _{SHD+}			130		°C
Over Temperature Recovery Degree	*T _{SHD-}			100		°C
Detection Delay Time						
Overcharge Voltage Detection Delay Time	t _{CU}			128	200	mS
Overdischarge Voltage Detection Delay Time	t _{DL}			40	60	mS
Overdischarge Current Detection Delay Time	*t _{IOV}	V _{DD} =3.6V		10		mS
Load Short-Circuiting Detection Delay Time	*t _{SHORT}	V _{DD} =3.6V		80		μS

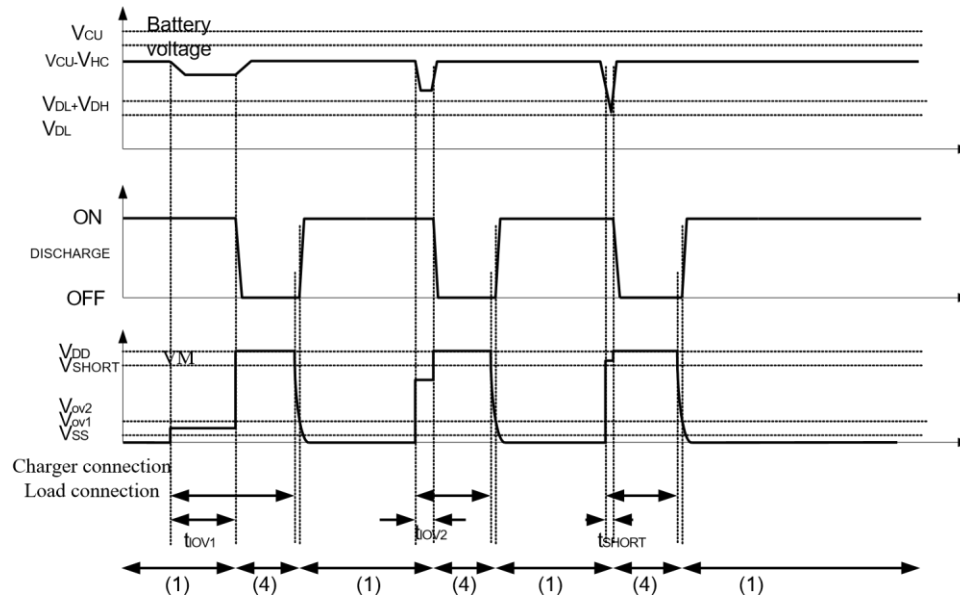
Note 3: *The parameter is guaranteed by design.

Functional Block Diagram



Functional Block Diagram

Overdischarge current detection

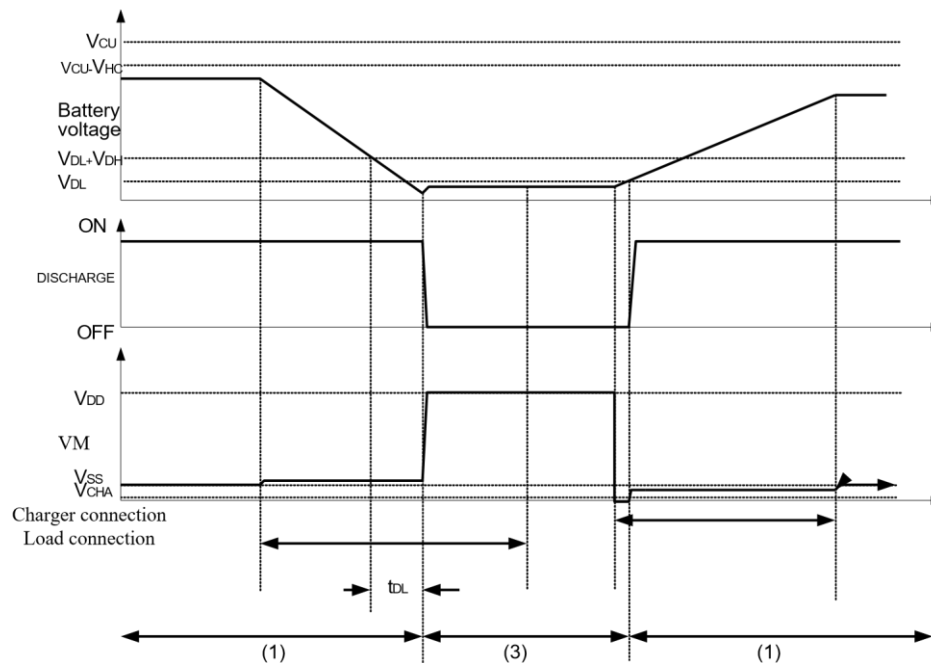


Overdischarge Current Detection

Remark:

- (1) Normal condition (2) Overcharge voltage condition
(3) Overdischarge voltage condition (4) Overcurrent condition

Charger Detection



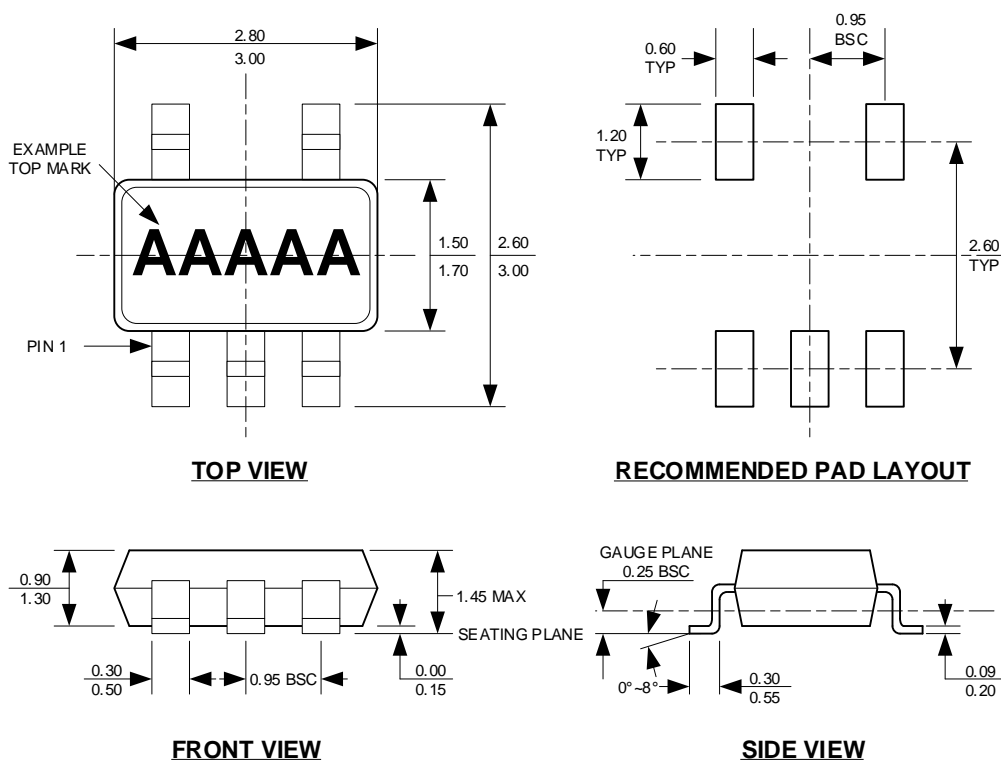
Charger Detection

Remark:

- (1) Normal condition (2) Overcharge voltage condition
(3) Overdischarge voltage condition (4) Overcurrent condition


Package Description

SOT23-5



NOTE:

1. CONTROL DIMENSION IS IN INCHES. DIMENSION IN BRACKET IS IN MILLIMETERS.
2. PACKAGE LENGTH DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
3. PACKAGE WIDTH DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
4. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.004" INCHES MAX.
5. DRAWING CONFORMS TO JEDEC MS-012, VARIATION BA.
6. DRAWING IS NOT TO SCALE.

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