

/ Descriptions

BRCL3230DZN	/	BRCL3230DZN
	MOSFET	
BRCL3230DZN	DFN1×1-4L	
	BRCL3230DZN	

The BRCL3230DZN series product is a high integration solution for lithium-ion/polymer battery protection. BRCL3230DZN contains advanced power MOSFET, high-accuracy voltage detection circuits and delay circuits.

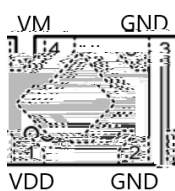
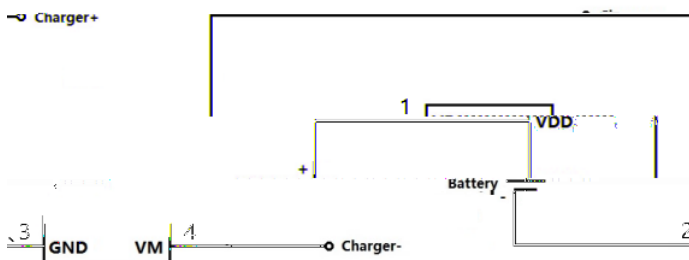
BRCL3230DZN is put into an ultra-small DFN1×1-4L package and only one external component makes it an ideal solution in limited space of battery pack. BRCL3230DZN has all the protection functions required in the battery application including overcharging, overdischarging, overcurrent and load short circuiting 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.

/ Features

- ◆ 60mΩ MOSFET
- ◆ RC
- ◆ DFN1×1-4L
- ◆ 0V
- ◆ 2.5uA <0.1uA;
- ◆ Integrate advanced power MOSFET with Equivalent of 60m $R_{DS(ON)}$;
- ◆ Internal integration RC without any peripheral devices;
- ◆ Ultra-small DFN1 1-4L package;
- ◆ Over-temperature Protection; Overcharge Current Protection; Overdischarge Current Protection; Load Short Circuiting Protection;
- ◆ Charger detection function; 0V battery charging function; delay times are generated inside; High-accuracy voltage detection.
- ◆ Low Current Consumption; Operation Mode: 2.5 A typ; Power-down Mode: <0.1uA typ ;
- ◆ The Overdischarge is not self recovery and needs to be activated;
- ◆ HF Product.

/ Applications

One-Cell lithium-ion battery pack; Lithium-Polymer battery pack.



Pin Number	Pin Name	Pin Description
1	VDD	Power Supply
2 3	GND	Ground, connect the negative terminal of the battery to this pin.
4	VM	The negative terminal of the charger. The internal FET switch connects this terminal to GND.

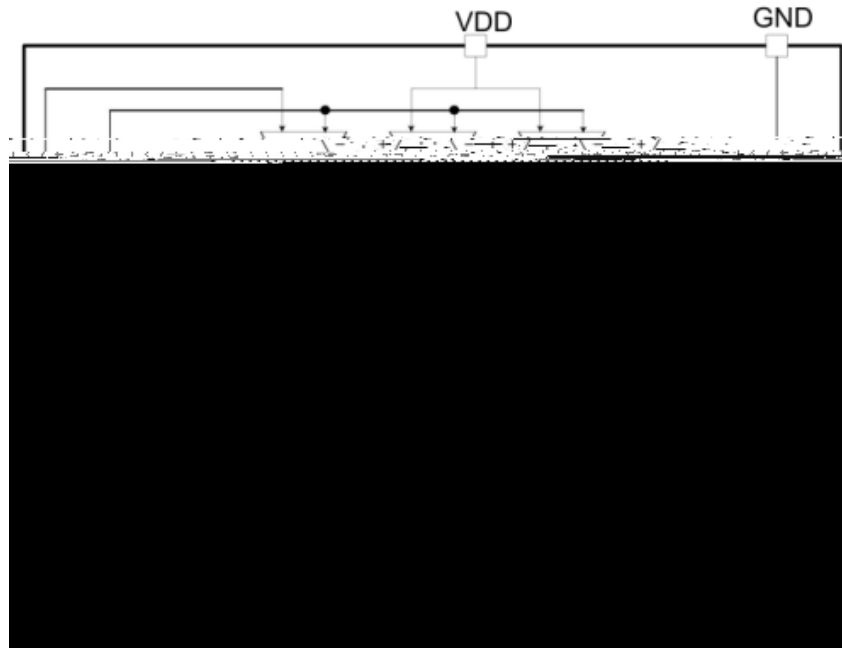
/ Marking

See Marking Instructions.

/Parameter	/Symbol	/Value	/Unit
V_{DD} input pin voltage	V_{IN}	-0.3 to +6	V
V_M input pin voltage	V_{VM}	-9 to +9	V
Maximum Junction Temperature	T_J	125	
Operating Junction Temperature	T_{opr}	-40 to +85	
Storage Temperature	T_{stg}	-55 to +150	
Package Thermal Resistance	R_{JA}	250	/W
ESD HBM	ESD	2000	V

/Parameter	/Symbol	/Test Condition	/Min	/Typ	/Max	/Unit
Overcharge Detection Voltage	V_{CU}		4.25	4.30	4.35	V
Overcharge Release Voltage	V_{CL}		4.05	4.10	4.15	V
Overdischarge Detection Voltage	V_{DL}		2.70	2.80	2.90	V
Overdischarge Release Voltage	V_{DR}		2.90	3.00	3.10	V
Charger Detection Voltage	V_{CHA}		-0.3	-0.4	-0.5	V
Overcharge Current Detection	I_{IOCC}	$V_{dd}=3.6V$	0.4	0.7	1.0	A
Overdischarge Current1 Detection	I_{IOV1}	$V_{dd}=3.6V$	0.4	0.7	1.0	A
Load Short-Circuiting Detection	I_{SHORT}	$V_{dd}=3.6V$	6	12	18	A
Current Consumption in Normal Operation	I_{OPE}	$V_{dd}=3.6V$ $V_M=0V$		2.5	3.5	A
Current Consumption in power Down	I_{PDN}	$V_{dd}=2V$, V_M floating			0.1	A
Equivalent FET on Resistance	R_{DS}	$V_{dd}=3.6V$ $I_{VM}=0.3A$		60		m
Over Temperature Protection	T_{SHD+}			140		
Over Temperature Recovery Degree	T_{SHD-}			115		
Overcharge Current Detection Delay Time	T_{OCC}	$V_{dd}=3.6V$	7	9	11	ms
Overcharge Voltage Detection Delay Time	T_{CU}	$V_{dd}=3.6V\sim 4.4V$	100	150	200	ms
Overdischarge Voltage Detection Delay Time	T_{DL}	$V_{dd}=3.6V\sim 2.0V$	30	40	50	ms
Overdischarge Current1 Detection Delay Time	T_{IOV1}	$V_{dd}=3.6V$	7	9	11	ms
Load Short-Circuiting Detection Delay Time	T_{SHORT}	$V_{dd}=3.6V$		100	300	us

2 Functional Block Diagram



2 Functional Description

BRCL3230DZN

60mΩ

The BRCL3230DZN monitors the voltage and current of a battery and protects it from being damaged due to overcharge voltage, overdischarge voltage, overdischarge current, and short circuit conditions by disconnecting the battery from the load or charger. The peripheral circuit is very simple. The MOSFET is integrated and its R

is as low as 60mΩ typical.

2 Normal Operating mode

If no exception condition is detected, charging and discharging can be carried out freely. This condition is called the normal operating mode.

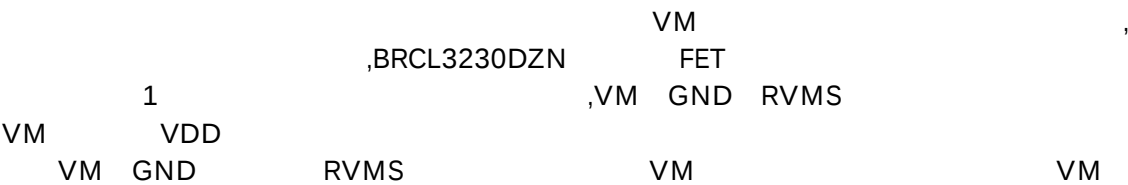
2 Overdischarge Condition



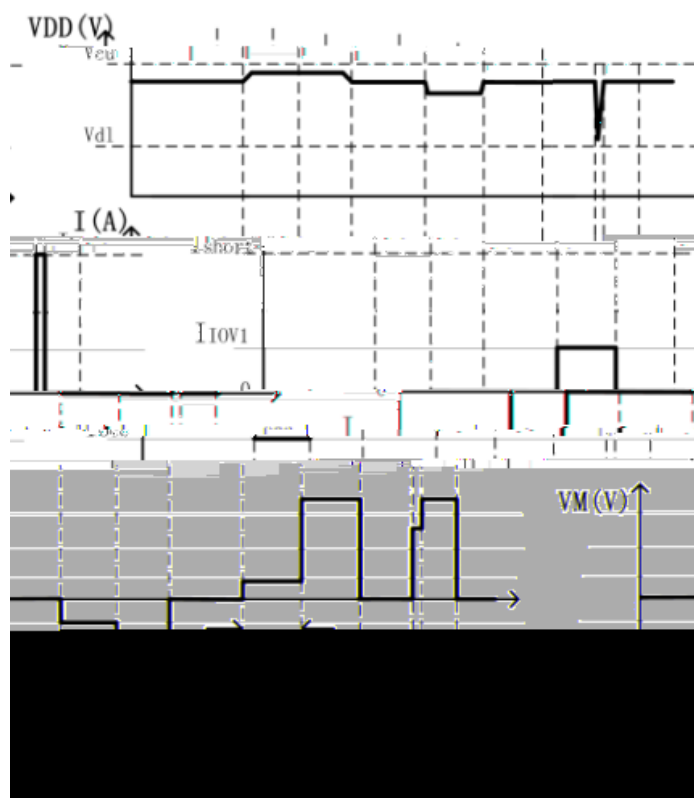
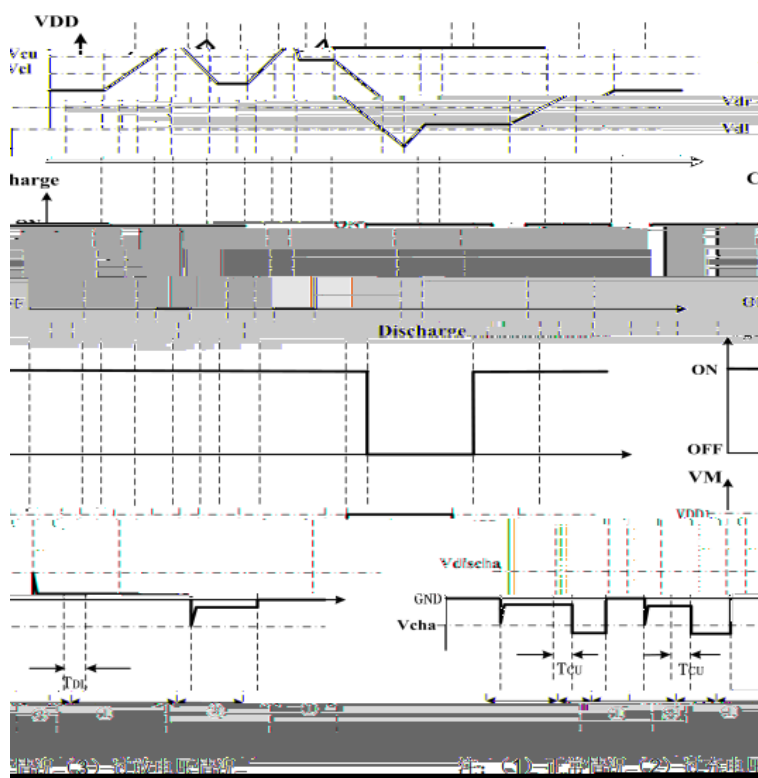
When the battery voltage drops below the overdischarge detection voltage (VDL) during discharging under normal condition and it continues for the overdischarge detection delay time (tDL) or longer, the BRCL3230DZN turns the discharging control FET off and stops discharging. This condition is called overdischarge condition. After the discharging control FET is turned off, the VM pin is pulled up by the RVMD resistor between VM and VDD in BRCL3230DZN the current of the chip is reduced to the power-down current (IPDN). This condition is called power-down condition. The VM and VDD pins are shorted by the RVMD resistor.

Note: If the VM pin voltage is no less than the charger detection voltage (VCHA), when the battery under overdischarge condition is connected to a charger, the overdischarge condition is released (the discharging control FET is turned on) as usual, provided that the battery voltage reaches the overdischarge release voltage (VDR) or higher.

2 Overcurrent Condition



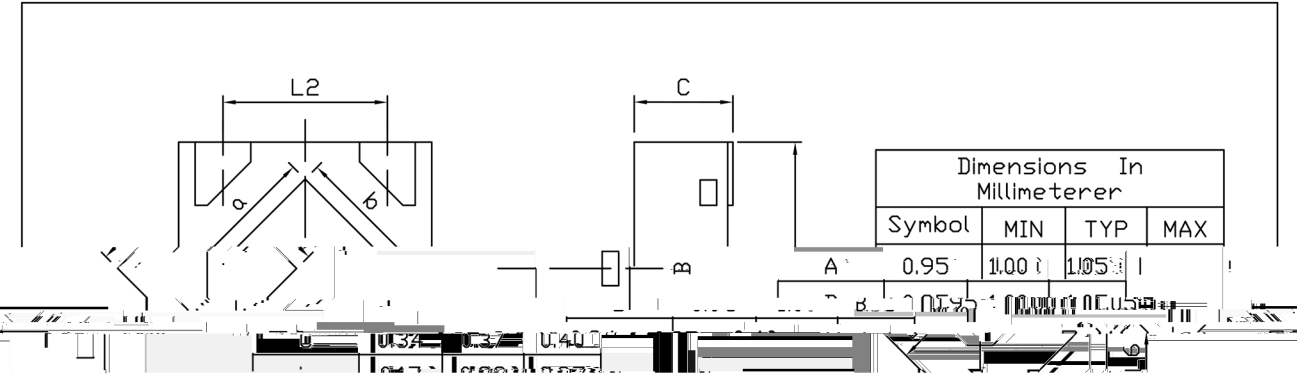
2 Timing Chart



/ Package Dimensions

DFN1X1-4L-A

Unit:mm



BRCL3230DZN

Rev.C Apr.-2022

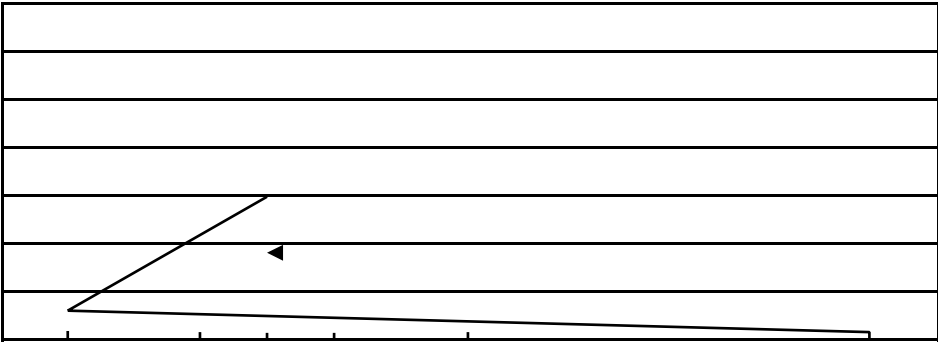


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DATA SHEET

/ Marking Instructions

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