# One Cell Lithium-ion/Polymer Battery Protection IC

■ General Description

The LN8245B provides a high integration solution for lithium-ion/polymer battery protection. The LN8245B contains advanced power MOSFET, high-accuracy voltage detection circuits and delay circuits.

The LN8245B has all the protection functions required in the battery application including over-charging, over-discharging, over-current and load short circuiting protection etc. The low standby current drains little current from the cell while in storage.

The device is targeted for any Li-Ion and Li-Poly battery-powered information appliances requiring long-term battery life.

## ■ Package
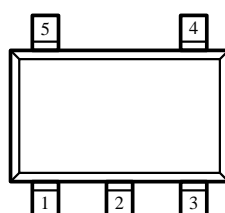
SOT23-5L
(TOP VIEW)

■ Features

- Protection of Charger Reverse Connection
- Protection of Battery Cell Reverse Connection
- High-accuracy Voltage Detection
- Charger Detection Function
- 0V Battery Charging Enable/Disable Function
- Integrate Advanced Power MOSFET(30mΩ)
- Low Current Consumption
  Operation Mode: 3.0μA typ.
  Power-down Mode: 1.5μA max.

■ Application

- One-Cell Lithium-ion Battery Pack
- Lithium-Polymer Battery Pack

■ Application Information
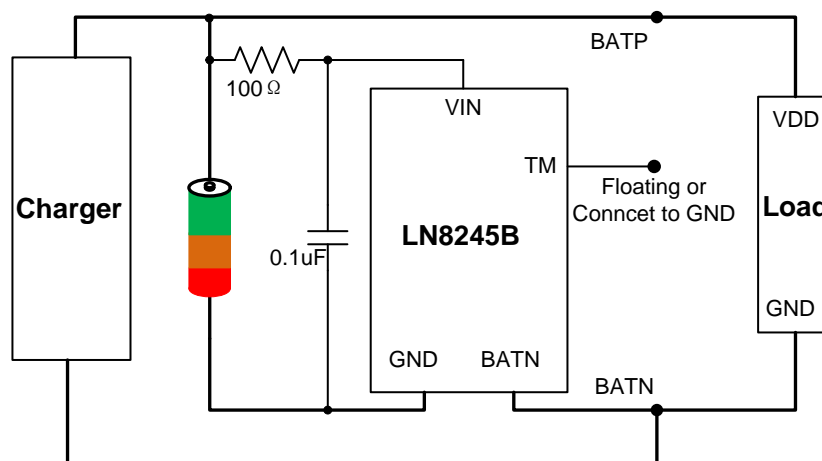
■ Functional Pin Description

Pin Name	Pin Number	Note
TM	1	Test terminal
GND	2	Ground
VIN	3	Power Supply
BATN	4	The negative terminal of battery pack
BATN	5	The negative terminal of battery pack

■ Ordering Information

LN8245B ①②③④ - ⑤

Designator	Symbol	Description
①	A	4.30V Over Charge Voltage Protect
②	A	10A Discharge Current Protect
③	M	SOT23-5L Package
④	R	Reel
	T	Tape
⑤	G	Green epoxy molding compound

■ Marking Information
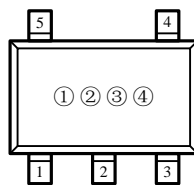
SOT23-5L
(TOP VIEW)

标号	标记	描述
①	A	4.30V Over Charge Voltage Protect
②	A	10A Discharge Protect
③	L	LN8245B
④	M	SOT23-5L
XXXX	Tracking information for internal quality	

● Function Block Diagram
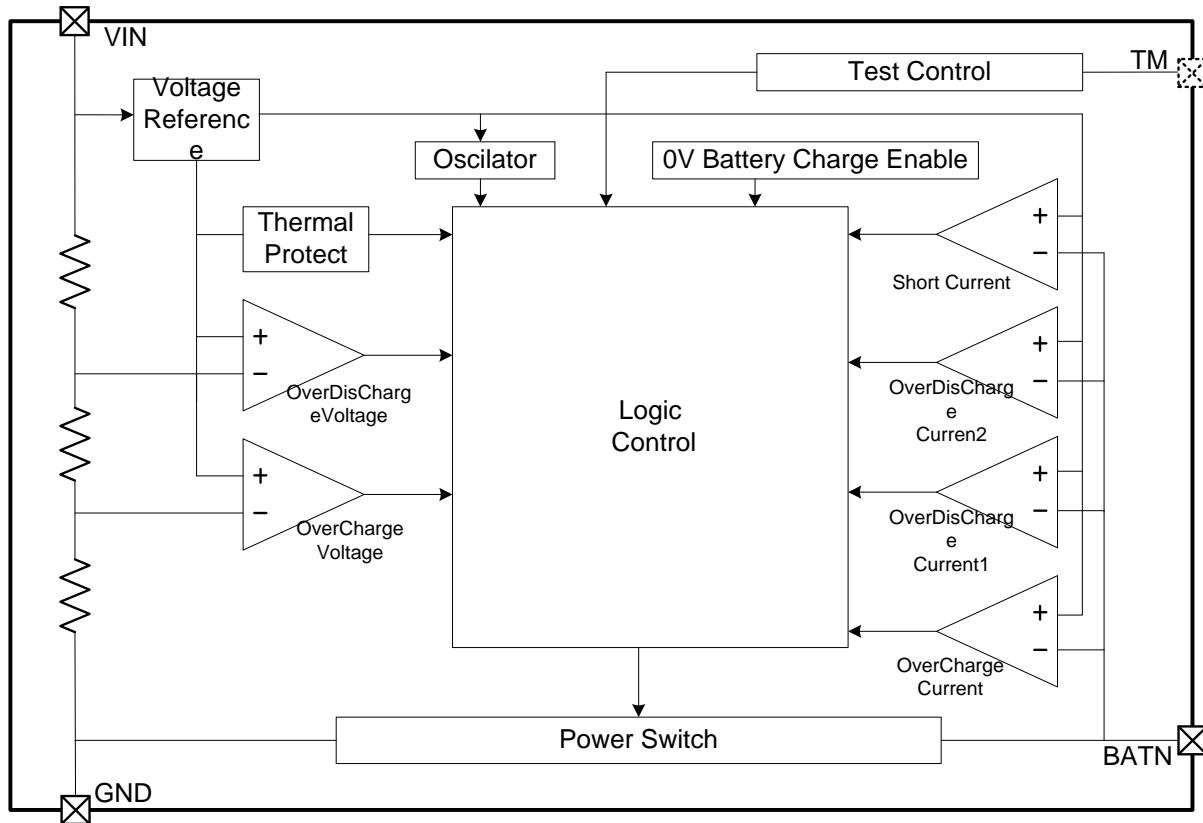
● Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Supply Voltage	VIN	GND-0.3～GND+6.0	V
Power Dissipation	PD@TA=25℃	0.4	W
Package Thermal Resistance(Junction to Ambient)		130	℃/W
Lead Temperature		260	℃
Ambient Temperature	Topa	-40～+85	℃
Storage Temperature	Tstr	-55～+125	
ESD Susceptibility	HBM	4000	V

● **Electrical Characteristics**

Note:V_{VIN} =3.5V, T_A=25℃,unless otherwise specification.

Parameters	Test Condition	Min	Typ	Max	Unit
Voltage					
Over-Charge Detection Voltage		4.27	4.30	4.33	V
Over-Charge Release Voltage		4.12	4.15	4.18	V
Over-Discharge Detection Voltage		2.46	2.50	2.54	V
Over-Discharge Release Voltage		2.96	3.00	3.04	V
Charger Detection Voltage			-0.50		V
Current					
Over-Discharge Current Detection 1	V_{DD}=3.5V		10		A
Over-Discharge Current Detection 2	V_{DD}=3.5V		15		A
Load Short Detection	V_{DD}=3.5V		25		A
Normal Operator Current	V_{DD}=3.5V, V_{BATN}=0V		3.0	6	uA
Power Down Current	V_{DD}=2.0V, BATN floating		1.5		uA
Delay Time					
Over-Charge Voltage Detection Delay Time			200		mS
Over-Discharge Voltage Detection Delay Time			50		mS
Over-Discharge Current Detection 1 Delay Time			12		mS
Over-Discharge Current Detection 2 Delay Time			2.5		mS
Load Short Detection Delay Time			40		uS
BATN Internal Resistance					
Internal Resistance between BATN and V_{DD}	V_{DD}=3.5V BATN=1.0V		320		kΩ
Internal Resistance between BATN and GND	V_{DD}=2.0V BATN=1.0V		100		kΩ
Power FET on Resistance	V_{DD}=3.5V, I_{BATN} =1.0A		30		mΩ
Over Temperature Protection			100		℃
Over Temperature Hybrid			20		℃
Note: Parameter with * is used for 4.35V Battery Protect, Other is for 4.2V Battery Protect					

● **Typical Operating Characteristics**

The LN8245B monitors the voltage and current of a battery and protects it from being damaged due to overcharge voltage, over-discharge voltage, over-discharge current, and short circuit conditions by disconnecting the battery from the load or charger. These functions are required in order to operate the battery cell within specified limits.

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.

Over-Charge Condition

When the battery voltage becomes higher than the over-charge detection voltage (V_{CU}) during charging under normal condition and the state continues for the overcharge detection delay time (t_{CU}) or longer, the LN8245B turns off the power switch FET.

Over-Discharge Condition

When the battery voltage drops below the over-discharge detection voltage (V_{DL}) during discharging under normal condition and it continues for the over-discharge detection delay time (t_{DL}) or longer, the LN8245B turns off the power switch FET and stops discharging. After over-discharging condition, the BATN pin is pulled up to high state by the internal control of LN8245B, the current of the chip is reduced to the power-down current (I_{PDN}).

At the over-discharge condition, when a charger is connected, the power switch FET is still off. At this time, charging is still permitted through the parasitic diode of the power switch FET, when the battery voltage becomes higher than the over-discharge detection voltage (V_{DL}), the LN8245B turns on the power switch FET and changes to the normal condition from the over-discharge condition.

Over-Current Condition

When the discharging current becomes equal to or higher than a specified value during discharging under normal condition and the state continues for the over-current detection delay time or longer, the LN8245B turns off power switch FET to stop discharging, and the BATN pin is pulled up to high state by the internal control of LN8245B. This condition includes over-current1, over-current2 or load short-circuiting.

The over-current condition returns to the normal mode when the load is released or the impedance between BATP and BATN is larger than 500kΩ.
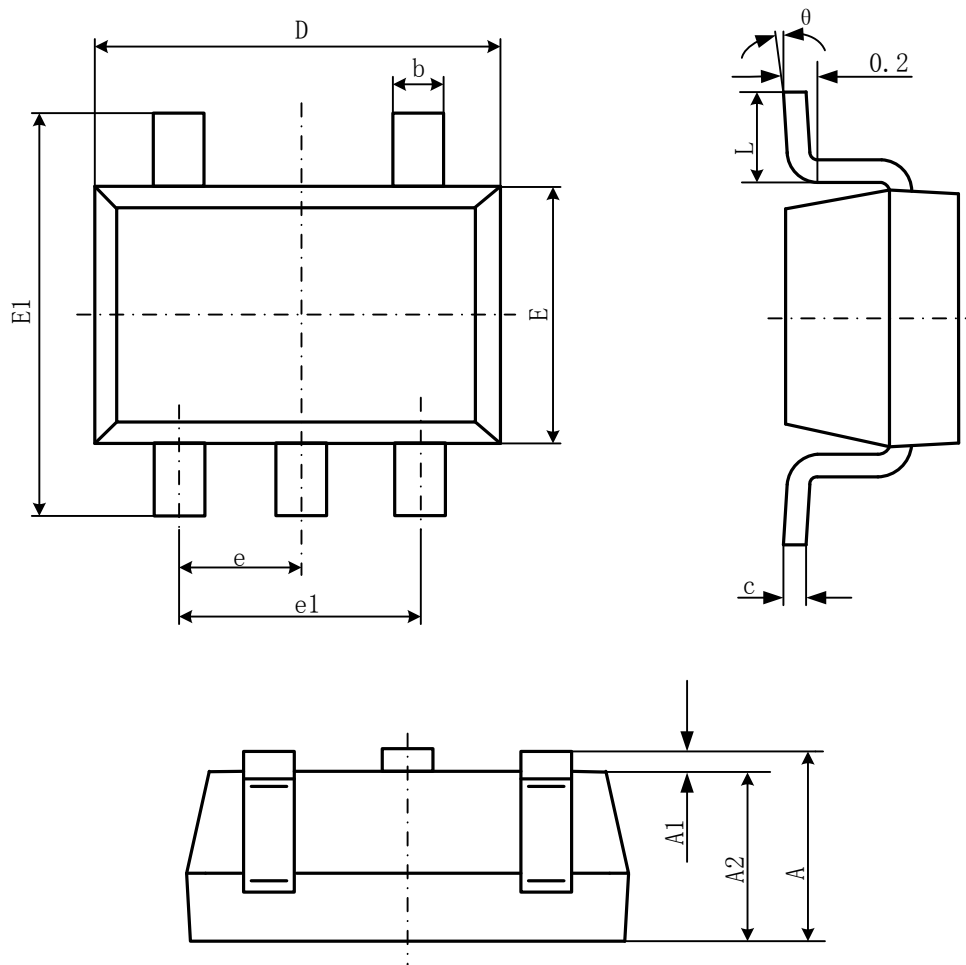
The LN8245B provides two over-current detection levels (10A and 15A) with two over-current delay time (T_{OI1} and T_{OI2}) corresponding to each over-current detection level.

Delay Circuits
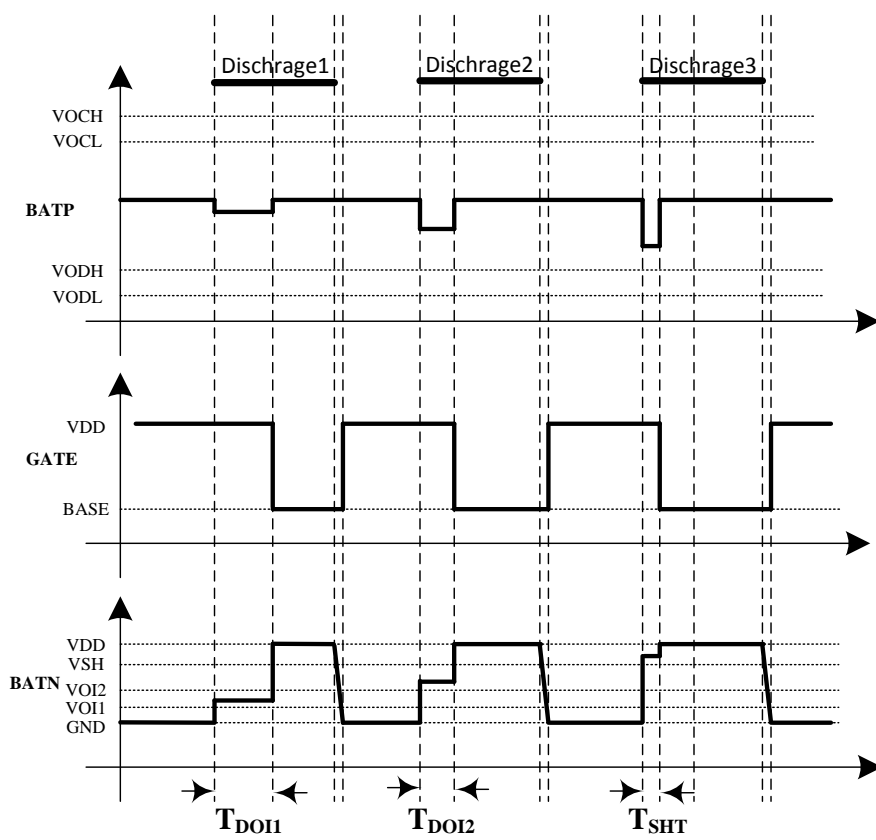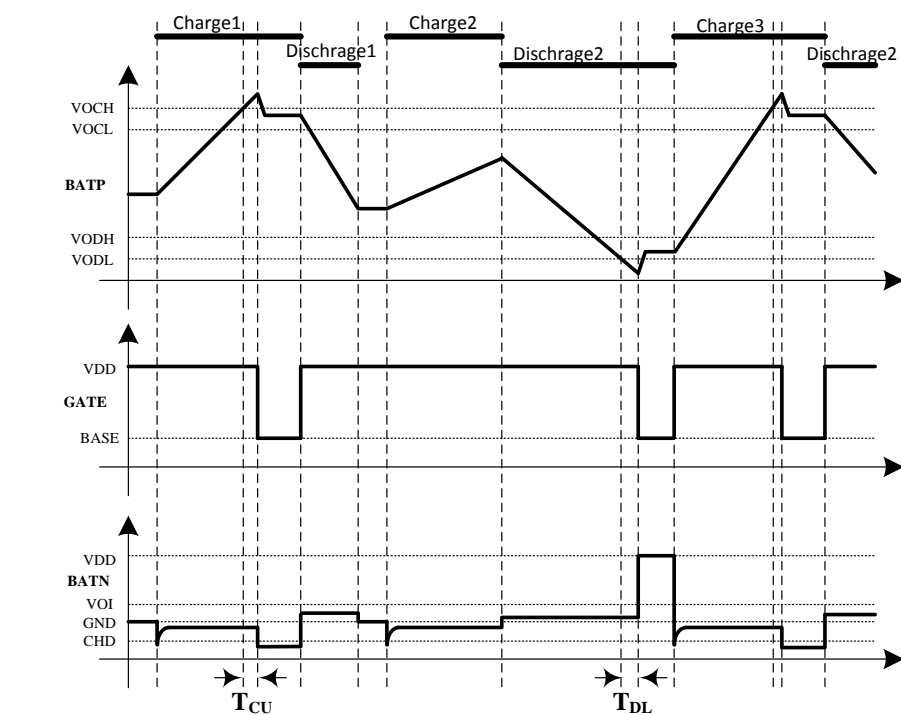
● **Package Information**

● **SOT23-5L**

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
E	1.500	1.700	0.059	0.067
E1	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°