2-Cell Lithium-Ion/Polymer Protector

Features

- High accuracy voltage detection circuit
  - Over-charge detection : ±25mV
  - Over-discharge detection : ±80mV
  - Discharge over-current-1 detection : ±10%
  - Discharge over-current-2 detection : ±10%
  - Load short-circuiting detection : ±10%
  - Charge over-current detection : ±8mV/±10mV
- High withstand voltage
  - Absolute maximum rating: 30V
  - Operating voltage range: 3.5V to 12V
- Low power consumption
  - Supply current: 6.6uA max. (Ta=+25℃)
- Delay times of over-charge, load short-circuiting are generated by an internal circuit (fixed).
- Delay times of over-discharge, discharge over-current-1 and 2 are controlled by external capacitors.
- Built-in breaking wire detector function
- Package: 10 pin SOP
- Lead-free, Sn 100%, Halogen-free

Description

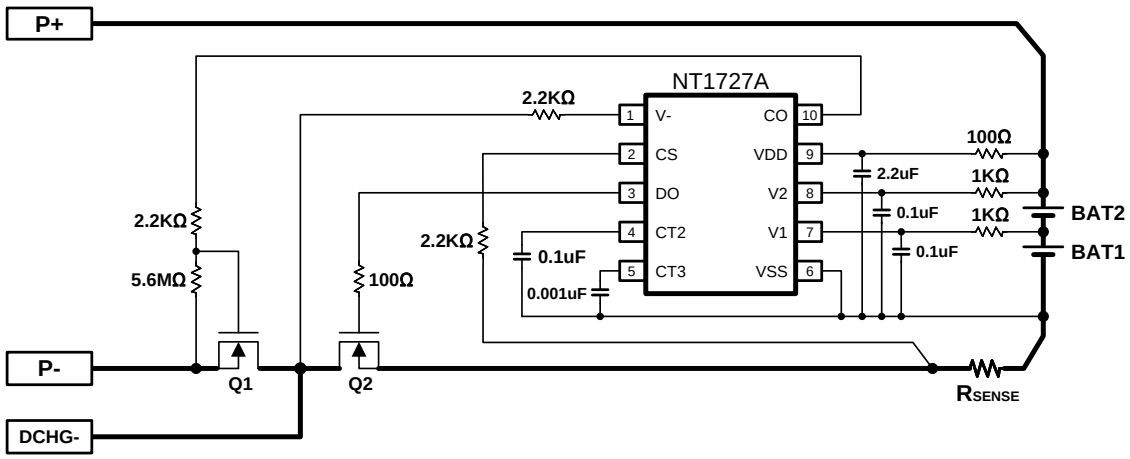
The NT1727 series is the 2-cell protection IC for lithium-ion/ lithium-polymer/lithium-iron phosphate rechargeable battery pack. The high accuracy voltage, current detector and delay time circuits are built in NT1727 series with state-of-the-art design and process.

The NT1727 series have three types of discharge over-current protection and one type of charge over-current protection.

Applications

- Lithium-ion rechargeable battery pack
- Lithium-polymer rechargeable battery pack
- Lithium-iron phosphate rechargeable battery pack

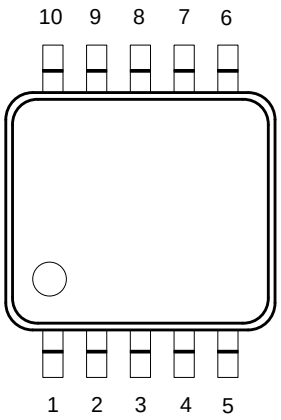
Typical Application Circuit



These devices have limited build-in ESD protection. The leads must be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

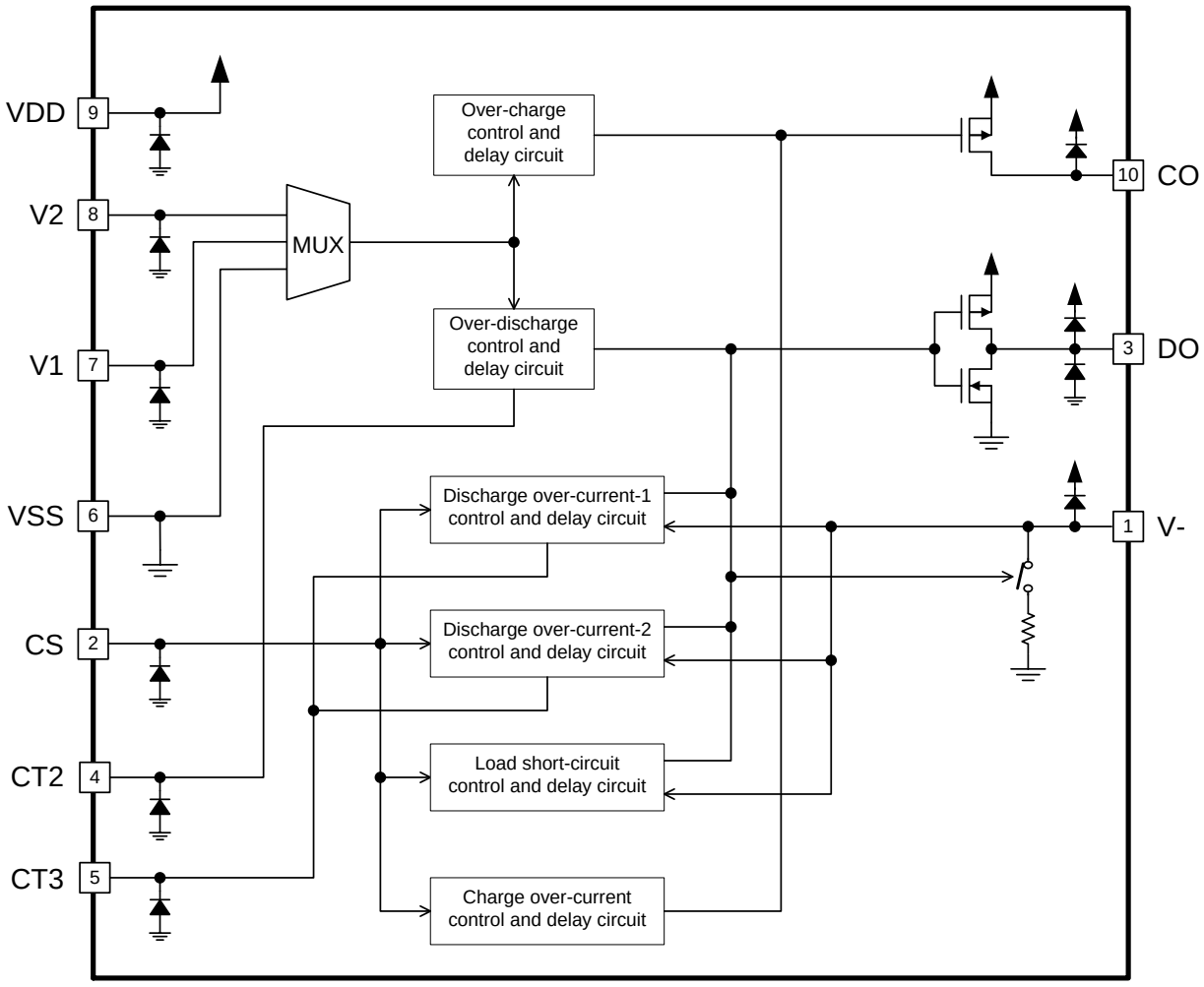
Package and Pin Configurations

SOP-10L
Top view



Pin No.	Symbol	Pin description
1	V-	Input terminal connected to charger negative voltage. Discharge over-current and load short-circuiting release detector.
2	CS	Input of overcurrent detection. Detected overcurrent by sense resistor between CS pin and VSS pin. Detected charger and load connection.
3	DO	FET gate control pin for discharging path (CMOS output) ● Normal mode : High ● Over-discharge mode : Low
4	CT2	Capacitor connection for over-discharge detection delay time.
5	CT3	Capacitor connection for discharge over-current-1 and 2 detection delay time.
6	VSS	The input terminal of the negative voltage of V1 cell. The input terminal of the ground of IC.
7	V1	Cell V1 positive voltage and cell V2 negative voltage input pin
8	V2	Cell V2 positive voltage input pin
9	VDD	Power supply input pin
10	CO	FET gate control pin for charging path (Pch open-drain output). ● Normal mode : High ● Over-charge mode : Hi-impedance

Block Diagram



Ordering Information

NT1727A-XXX XX

- XX: Package Type
  - S1: SOP-10L
- XXX: Version Code

Product version code:

Table 1: Detection threshold level

Product Name	Version Code	Package Type	Over-charge detection voltage V_{DET1} (V)	Over-charge release voltage V_{REL1} (V)	Over-discharge detection voltage V_{DET2} (V)	Over-discharge release voltage V_{REL2} (V)	Discharge over-current-1 detection voltage V_{DET31} (V)	Discharge over-current-2 detection voltage V_{DET32} (V)	Charge over-current detection voltage V_{DET4} (V)	Load short-circuiting detection voltage V_{SHORT} (V)
NT1727A	FKA	S1	4.250	4.150	2.500	3.000	—	0.100	-0.025	0.250
NT1727A	FQA	S1	4.250	4.150	2.800	3.000	0.100	0.400	-0.100	0.600

Remark: Please contact our sales for the products with detection voltage value other than those specified above.

Table 2: Function

Product Name	Version Code	Package Type	Over-charge release condition	Over-discharge release condition	0 V battery charge function	Built-in breaking wire detector function	Delay time (Table 3)
NT1727A	FKA	S1	Voltage release	(a) Voltage release or (b) Charge current release	Available	Yes	(1)
NT1727A	FQA	S1			Available	Yes	(1)

Remark: For the details, please refer to the description of "**Operations**"

Table 3: Delay time

Delay time	Over-charge detection delay time t_{VDET1} (s)	Over-discharge detection delay time t_{VDET2} (s) (at C_{CT2}=0.1uF)	Discharge over-current-1 detection delay time t_{VDET31} (ms)	Discharge over-current-2 detection delay time t_{VDET32} (ms) (at C_{CT3}=0.001uF)	Load short-circuiting detection delay time t_{SHORT} (us)	Charge over-current detection delay time t_{VDET4} (ms)
(1)	1 ±30%	1 ±50%	60 ±50%	10 ±50%	250 +60/-40%	100 ±30%