Battery Protection IC for 1-Cell Pack

Features

- High accuracy voltage detection circuit
  - Over-charge detection: ±15mV
  - Over-discharge detection voltage: ±35mV
  - Discharge over-current detection: ±15%/±10mV
  - Charge over-current detection: ±15%/±10mV
  - Load short-circuiting detection voltage: ±25%
- High withstand voltage
  - Absolute maximum ratings: 28V max. (COUT, V_{DD} − V-)
- Ultra small package: SOT-23-6, DFN-1.5x1.5-6L, SON-1.6x1.6-6L
- Lead-free, Sn 100%, Halogen-free

Description

The NT1715 series are the 1-cell protection IC for lithium-ion/lithium-polymer rechargeable battery pack. The high accuracy voltage, current detector and delay time circuits are built in NT1715 series with state-of-art design and process.

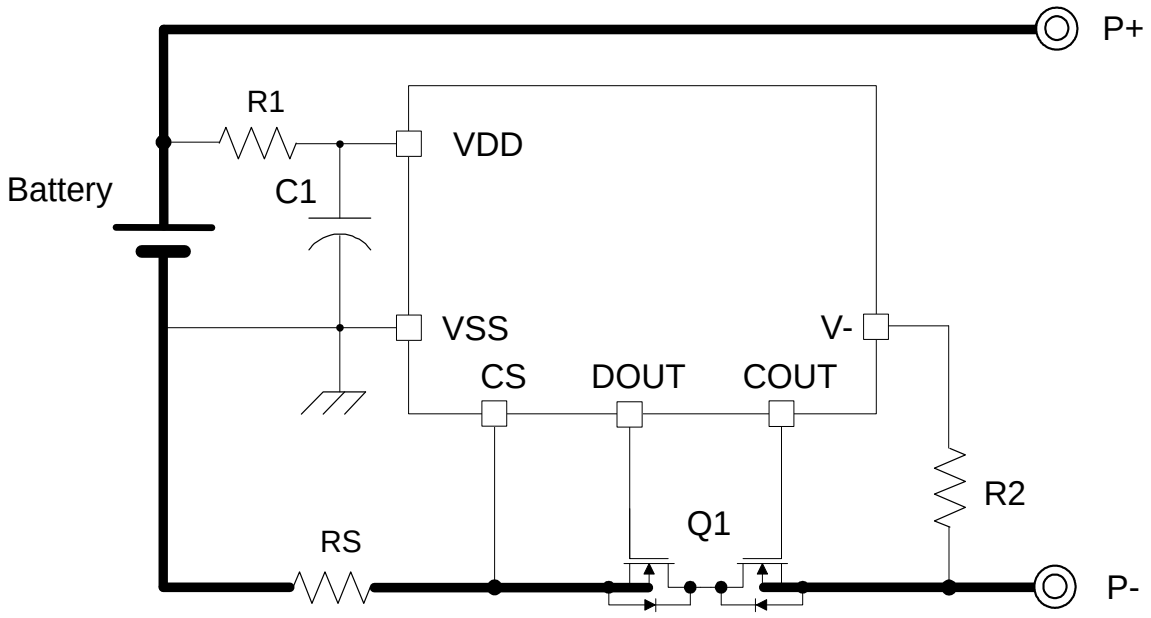
To minimize power consumption, NT1715 series activate power down mode when an over-discharge event is detected (for power-down mode enabled version). Besides, NT1715 series perform protection functions with five external components for miniaturized PCB.

The tiny package is especially suitable for compact portable device, i.e. slim mobile phone, tablet PC battery packs, Digital camera and Bluetooth earphone.

Applications

- Mobile phone battery packs
- Tablet PC battery packs
- Digital camera battery packs

Typical Application Circuit

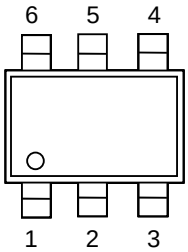


These devices have limited build-in ESD protection. The leads must be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

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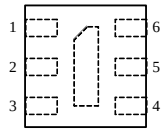
Package and Pin Configurations

SOT-23-6



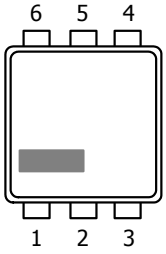
Pin No.	Symbol	Pin description
1	DOUT	Connection of discharge control FET gate
2	COUT	Connection of charge control FET gate
3	V-	Voltage detection between V- pin and VSS pin (Power Down and Load Detector pin)
4	CS	Current sense pin (low-voltage)
5	VDD	Connection for positive power supply input
6	VSS	Connection for negative power supply input

DFN-1.5x1.5-6L



Pin No.	Symbol	Pin description
1	VSS	Connection for negative power supply input
2	VDD	Connection for positive power supply input
3	CS	Current sense pin (low-voltage)
4	V-	Voltage detection between V- pin and VSS pin (Power Down and Load Detector pin)
5	COUT	Connection of charge control FET gate
6	DOUT	Connection of discharge control FET gate

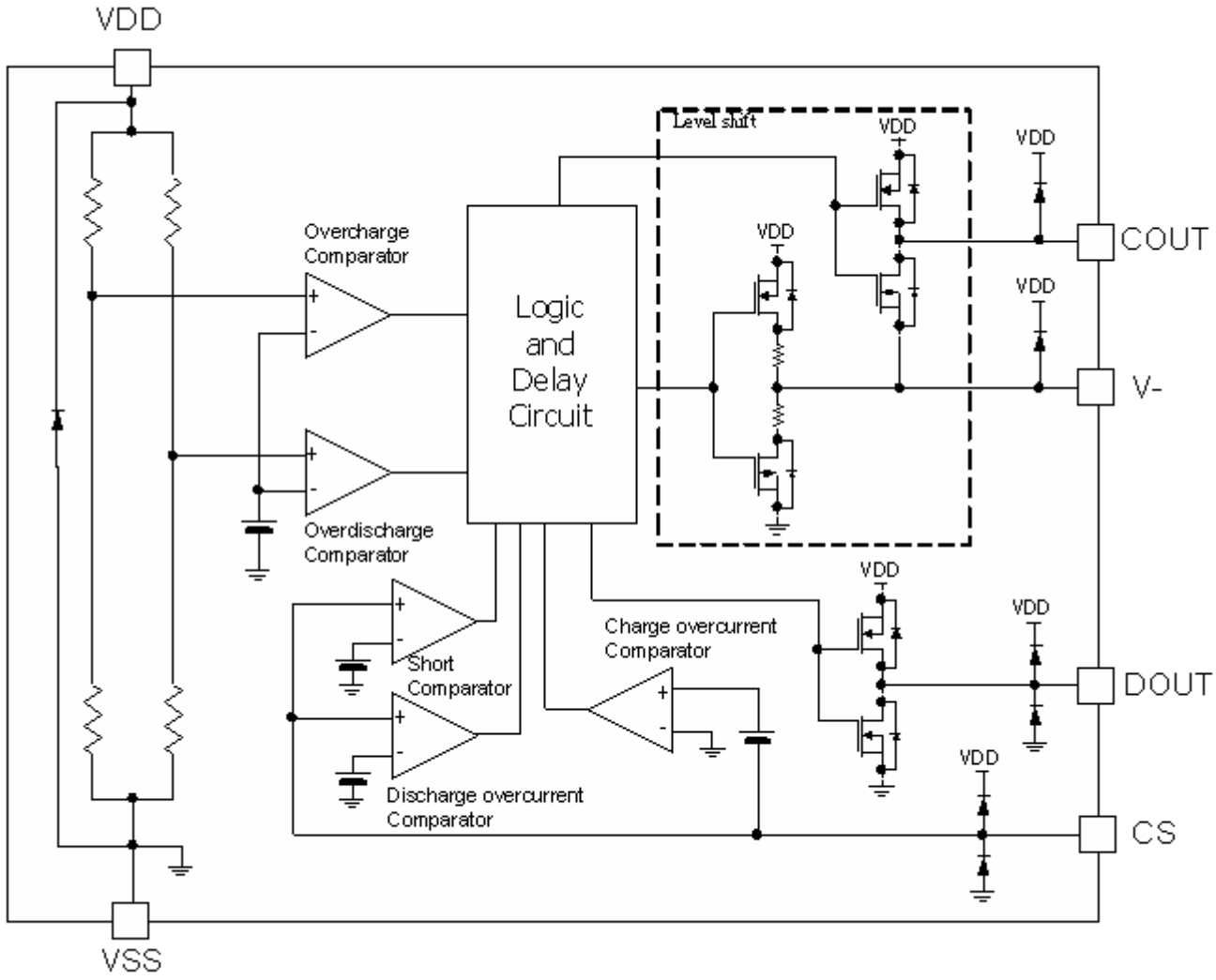
SON-1.6X1.6-6L



Pin No.	Symbol	Pin description
1	VSS	Connection for negative power supply input
2	VDD	Connection for positive power supply input
3	CS	Current sense pin (low-voltage)
4	V-	Voltage detection between V- pin and VSS pin (Power Down and Load Detector pin)
5	COUT	Connection of charge control FET gate
6	DOUT	Connection of discharge control FET gate

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Functional Block Diagram



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Ordering Information

NT1715A-XXX XX

- Package Type
  - A6: SOT-23-6
  - BB: DFN-1.5x1.5-6L
  - C1: SON-1.6x1.6-6L
- Version code

Product version code:

Table1: Detection threshold level table

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 detection voltage V_{DET3} (V)	Charge over-current detection V_{DET4} (V)	Load short-circuiting detection voltage V_{SHORT}(V)
NT1715A	HQA	BB/C1	4.280	4.080	2.800	3.000	0.090	-0.080	0.400
NT1715A	HQB	A6/BB/C1	4.280	4.280	2.800	2.800	0.040	-0.030	0.180
NT1715A	HQC	A6/BB	4.280	4.080	2.800	3.000	0.090	-0.080	0.180
NT1715A	NHB	A6/BB/C1	4.425	4.425	2.400	2.400	0.034	-0.022	0.180
NT1715A	NHE	A6	4.425	4.425	2.400	2.400	0.030	-0.035	0.180
NT1715A	NQA	BB/C1	4.425	4.225	2.800	3.000	0.105	-0.065	0.400
NT1715A	NQB	BB/C1	4.425	4.425	2.800	2.800	0.040	-0.030	0.180
NT1715A	QHA	BB/C1	4.475	4.475	2.400	2.400	0.034	-0.022	0.180
NT1715A	QHC	A6	4.475	4.475	2.400	2.400	0.030	-0.035	0.180
NT1715A	QQA	A6/BB/C1	4.475	4.475	2.800	2.800	0.040	-0.030	0.180

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

Table2: Latch function

Product Name	Version Code	Latch function of Over-charge	0V Battery Charge Function	Power Down Mode	Auto Over-discharge Recovery Function	Delay Time (Table3)
NT1715A	HQA	NO	Unavailable	Yes	No	(1)
NT1715A	HQB	YES	Unavailable	Yes	No	(2)
NT1715A	HQC	NO	Unavailable	Yes	No	(1)
NT1715A	NHB	YES	Unavailable	Yes	No	(2)
NT1715A	NHE	YES	Available	Yes	No	(1)
NT1715A	NQA	NO	Unavailable	Yes	No	(1)
NT1715A	NQB	YES	Unavailable	Yes	No	(2)
NT1715A	QHA	YES	Unavailable	Yes	No	(2)
NT1715A	QHC	YES	Available	Yes	No	(1)
NT1715A	QQA	YES	Unavailable	Yes	No	(2)

Table3: Delay Time table

Delay time	Over-charge delay time t_{VDET1} (S)	Over-discharge delay time t_{VDET2} (mS)	Discharge over-current delay time t_{VDET3} (mS)	Charge over-current delay time t_{VDET4} (mS)	Load short-circuiting delay time t_{SHORT} (uS)
(1)	1.00 +/- 20%	125 +/- 20%	8.0 +/- 20%	8.0 +/- 20%	250 +40% /- 30%
(2)	1.00 +/- 30%	20 +/- 30%	12 +/- 33.3%	16 +/- 31.2/%	250 +60% /- 28%

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