NT1660/NT1662/NT1663 /NT1664 Series

Lithium-Ion/Polymer/Iron Protector

Features

- High accuracy voltage detection circuit
  - Overcharge detection : ±25mV
- Low power consumption
  - Supply current: 6.6uA max. (Ta=+25℃)
- Delay times of overcharge is generated by an internal circuit (fixed).
- Built-in breaking wire detector function
- Package: 8 pin SOP、20 pin TSSOP、48 pin LQFP
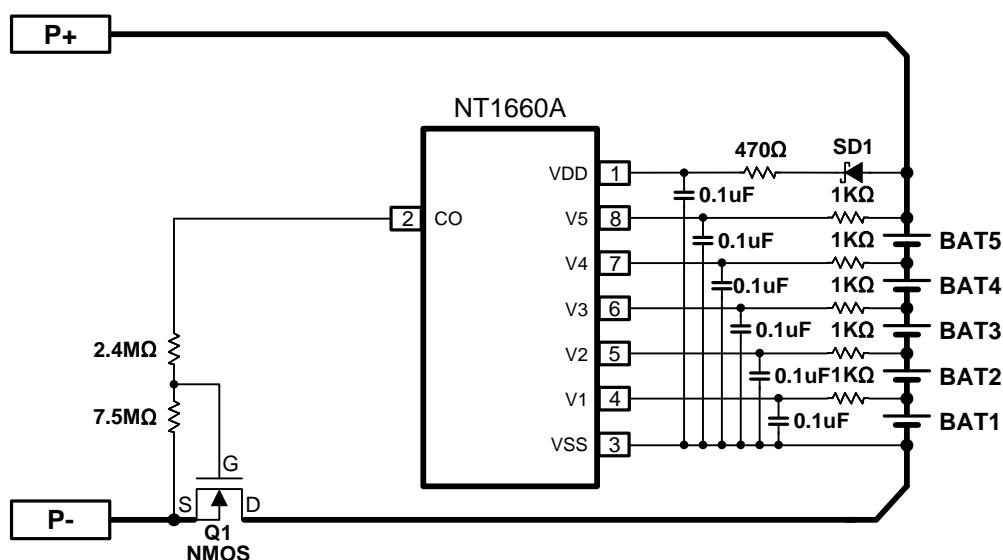- Lead-free, Sn 100%, Halogen-free

Description

The NT1660/NT1662/NT1663/NT1664 series are the 4~20-cell secondary protection IC for lithium-ion /lithium-polymer /lithium-iron phosphate rechargeable battery pack. The high accuracy voltage detector and delay time circuits are built in NT1660/NT1662/NT1663/NT1664 series with state-of-the-art design and process.
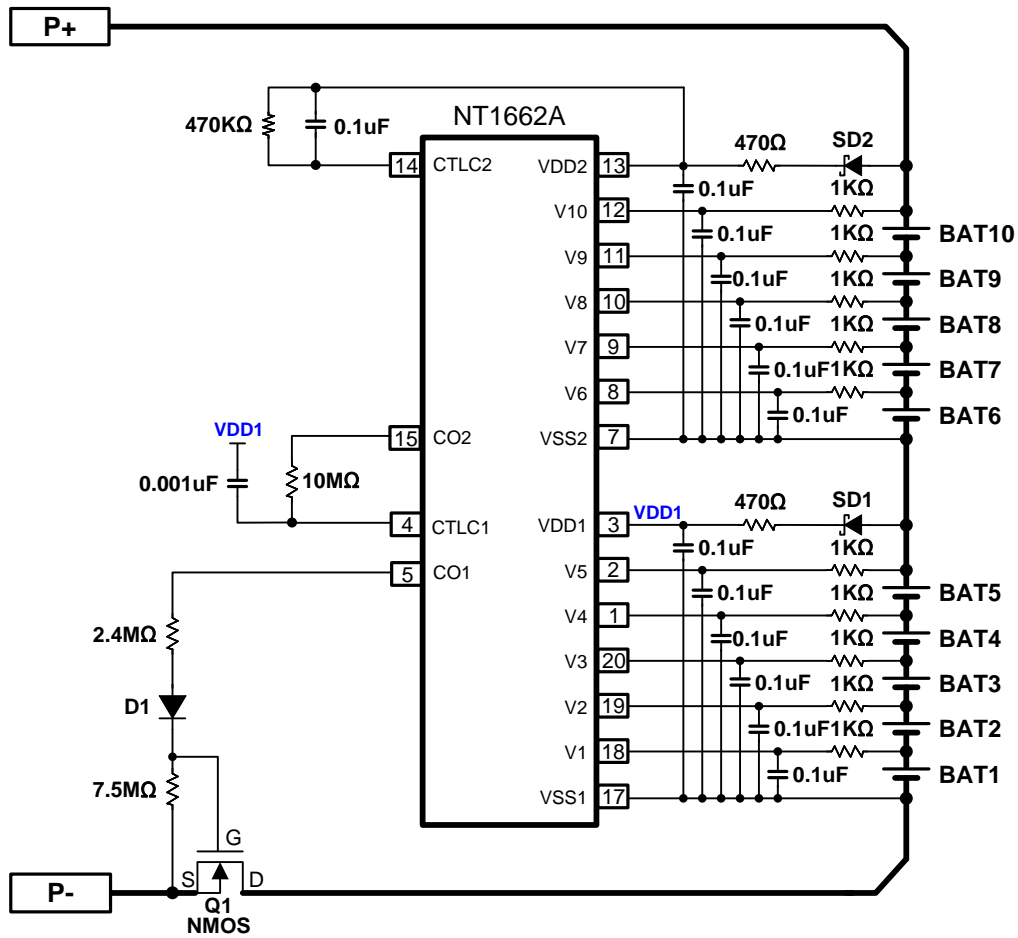
Applications

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

Typical Application Circuit

- **NT1660A**

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.
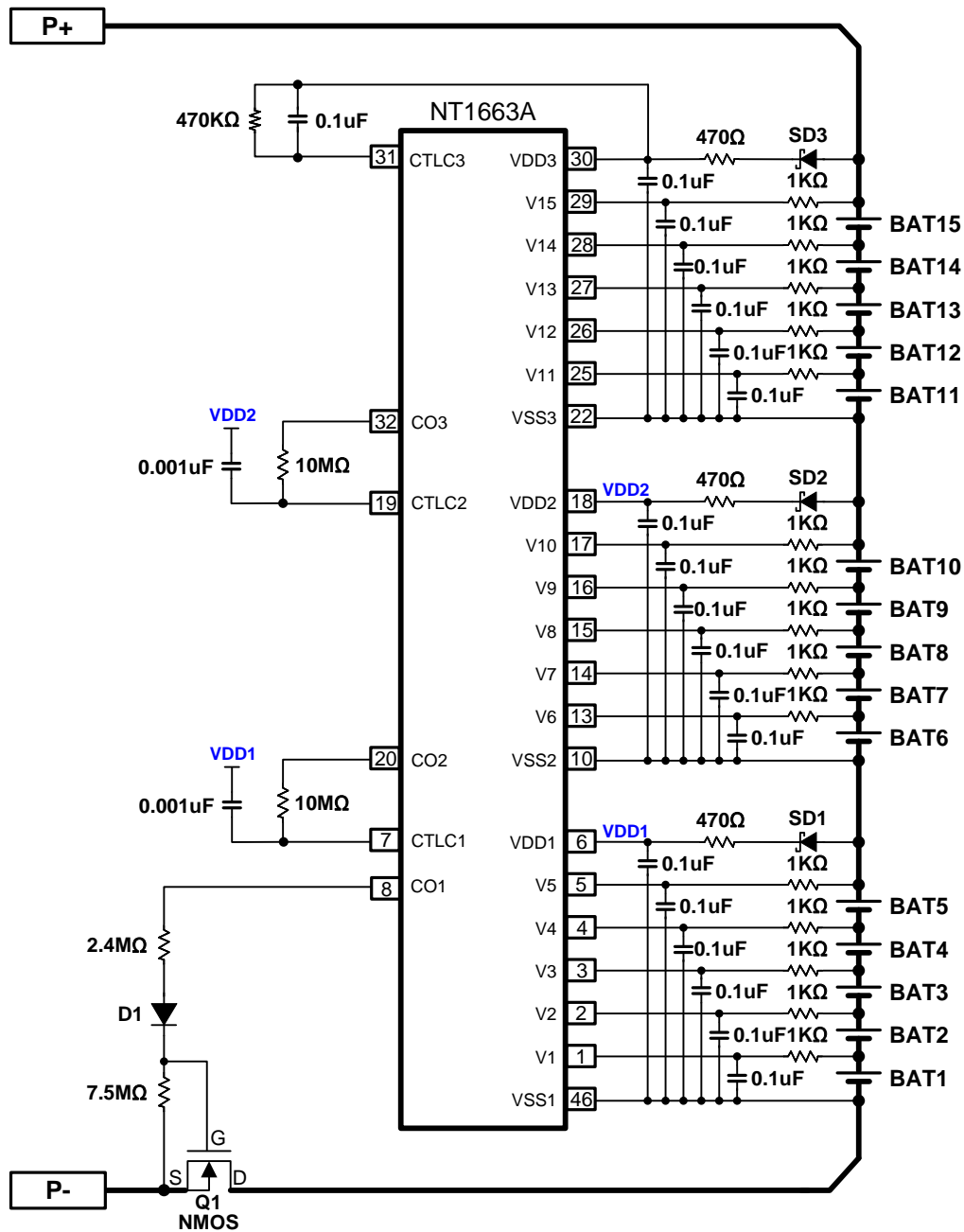
■ **NT1662A**

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.
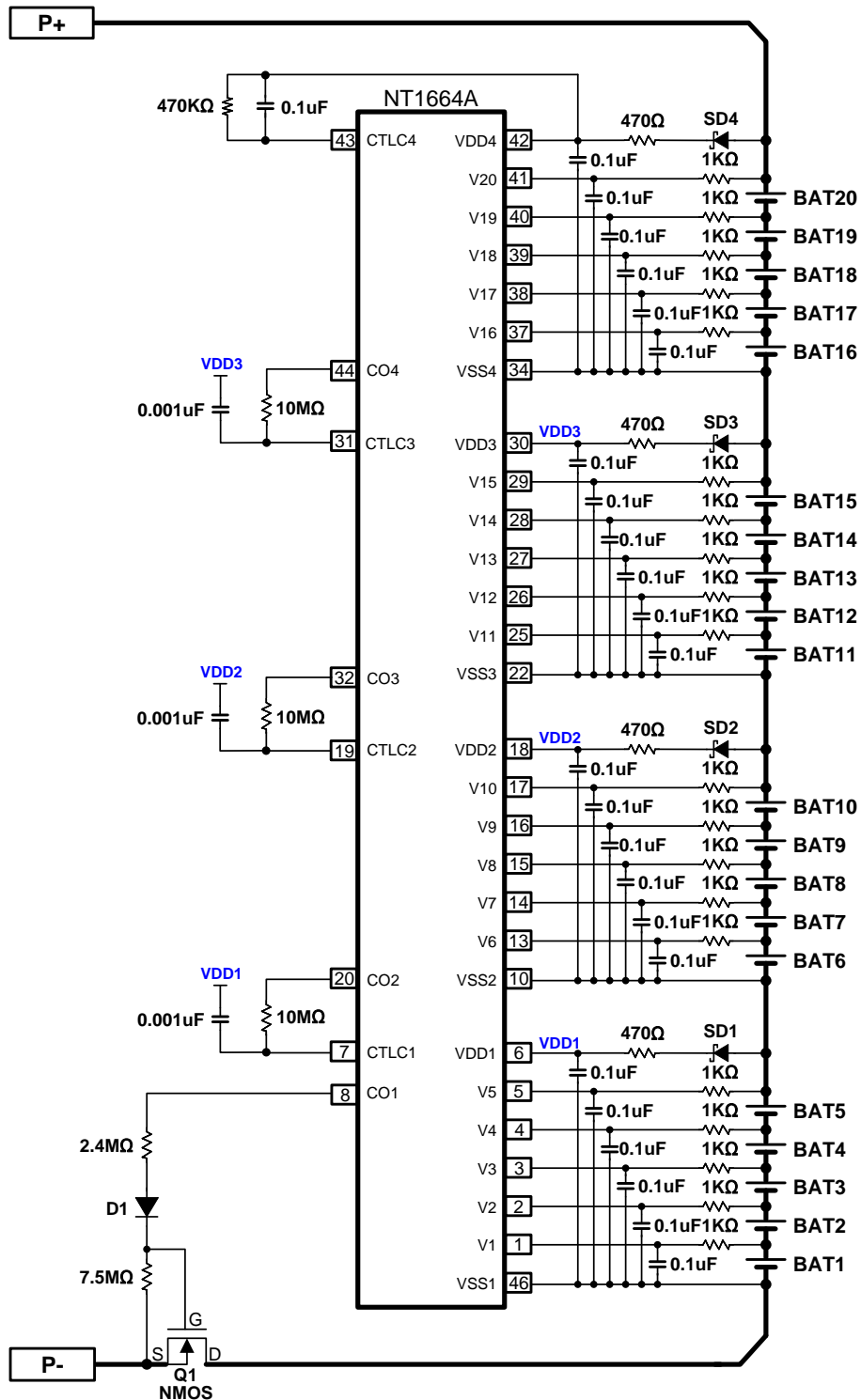
■ **NT1663A**

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.

■ **NT1664A**

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.
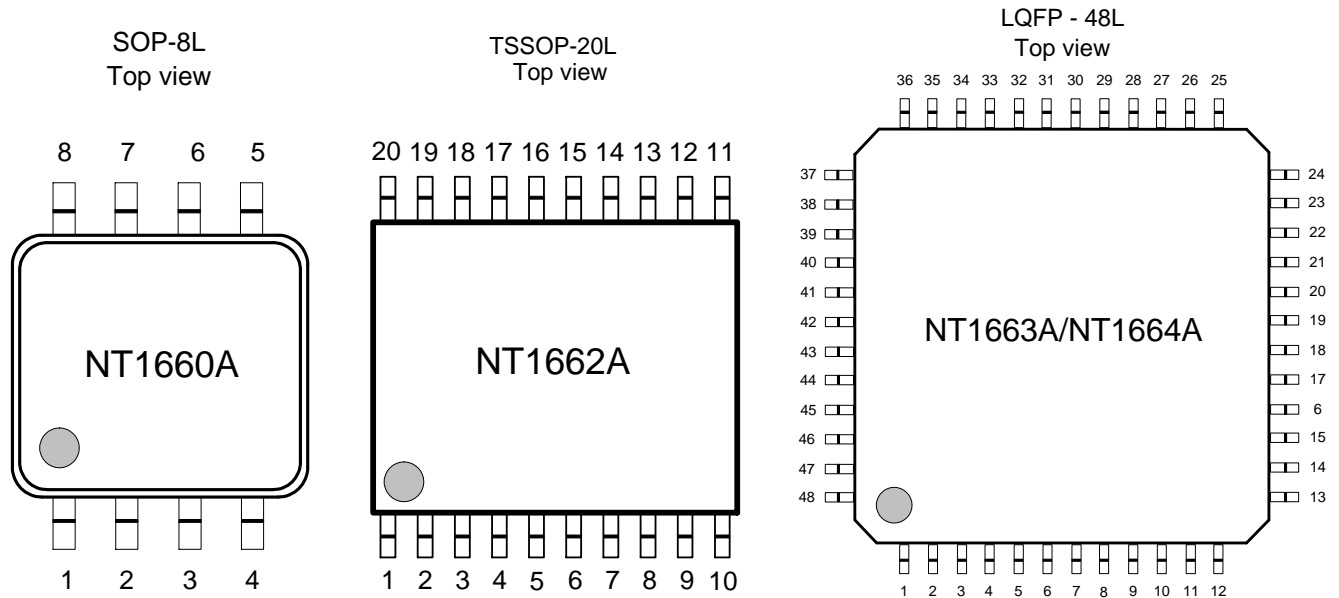
Package and Pin Configurations

SOP-8L
Top view

TSSOP-20L
Top view

LQFP - 48L
Top view

Pin No				Symbol	Pin description
NT1660A	NT1662A	NT1663A	NT1664A		
1	-	-	-	VDD	Power supply input pin
-	3	6	6	VDD1	Power supply input pin -1
-	13	18	18	VDD2	Power supply input pin -2
-	-	30	30	VDD3	Power supply input pin -3
-	-	-	42	VDD4	Power supply input pin -4
3	-	-	-	VSS	Reference voltage
-	17	46	46	VSS1	Reference voltage -1
-	7	10	10	VSS2	Reference voltage -2
-	-	22	22	VSS3	Reference voltage -3
-	-	-	34	VSS4	Reference voltage -4

(Continued)

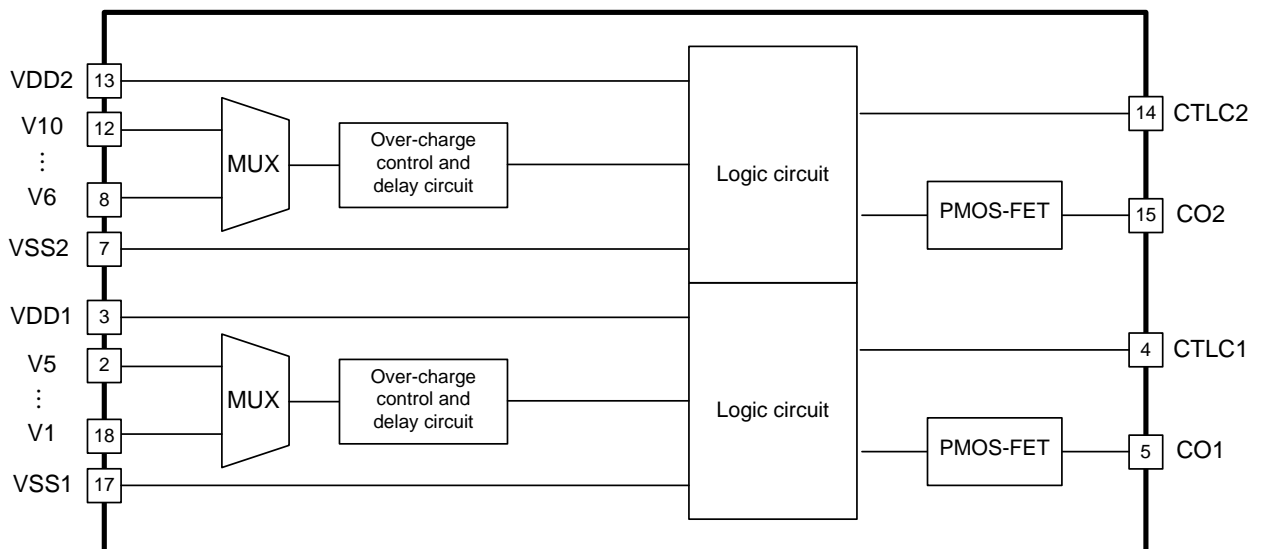| Pin No				Symbol	Pin description
NT1660A	NT1662A	NT1663A	NT1664A		
4	18	1	1	V1	Cell BAT1 positive voltage and cell BAT2 negative voltage input pin.
5	19	2	2	V2	Cell BAT2 positive voltage and cell BAT3 negative voltage input pin.
6	20	3	3	V3	Cell BAT3 positive voltage and cell BAT4 negative voltage input pin.
7	1	4	4	V4	Cell BAT4 positive voltage and cell BAT5 negative voltage input pin.
8	2	5	5	V5	Cell BAT5 positive voltage and cell BAT6 negative voltage input pin.
-	8	13	13	V6	Cell BAT6 positive voltage and cell BAT7 negative voltage input pin.
-	9	14	14	V7	Cell BAT7 positive voltage and cell BAT8 negative voltage input pin.
-	10	15	15	V8	Cell BAT8 positive voltage and cell BAT9 negative voltage input pin.
-	11	16	16	V9	Cell BAT9 positive voltage and cell BAT10 negative voltage input pin.
-	12	17	17	V10	Cell BAT10 positive voltage and cell BAT11 negative voltage input pin.
-	-	25	25	V11	Cell BAT11 positive voltage and cell BAT12 negative voltage input pin.
-	-	26	26	V12	Cell BAT12 positive voltage and cell BAT13 negative voltage input pin.
-	-	27	27	V13	Cell BAT13 positive voltage and cell BAT14 negative voltage input pin.
-	-	28	28	V14	Cell BAT14 positive voltage and cell BAT15 negative voltage input pin.
-	-	29	19	V15	Cell BAT15 positive voltage and cell BAT16 negative voltage input pin.
-	-	-	37	V16	Cell BAT16 positive voltage and cell BAT17 negative voltage input pin.
-	-	-	38	V17	Cell BAT17 positive voltage and cell BAT18 negative voltage input pin.
-	-	-	39	V18	Cell BAT18 positive voltage and cell BAT19 negative voltage input pin.
-	-	-	40	V19	Cell BAT19 positive voltage and cell BAT20 negative voltage input pin.
-	-	-	41	V20	Cell BAT20 positive voltage.

(Continued)

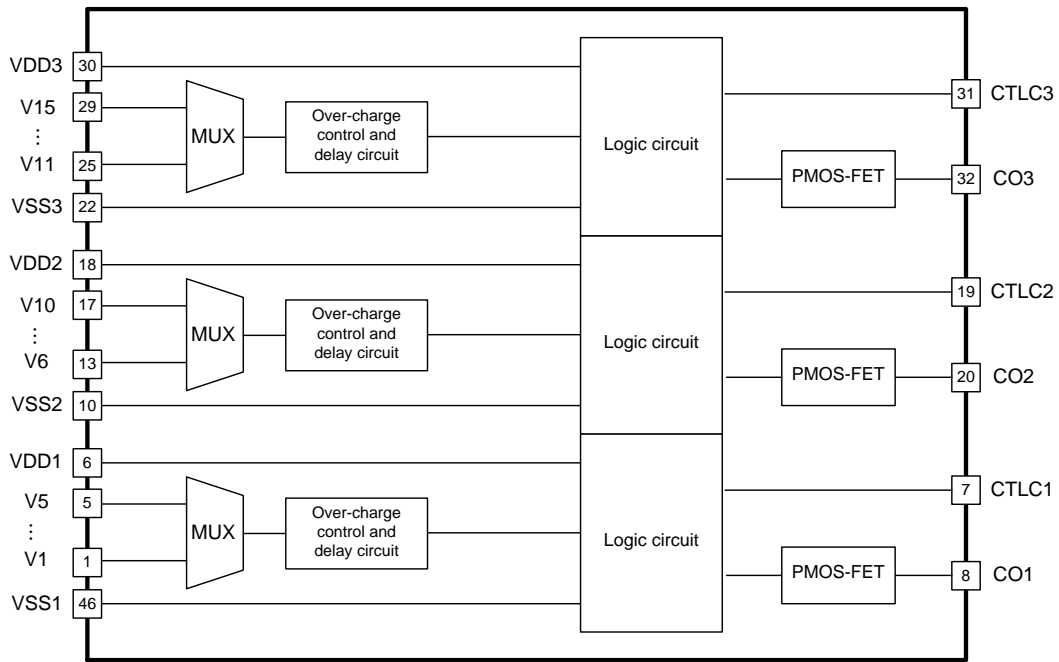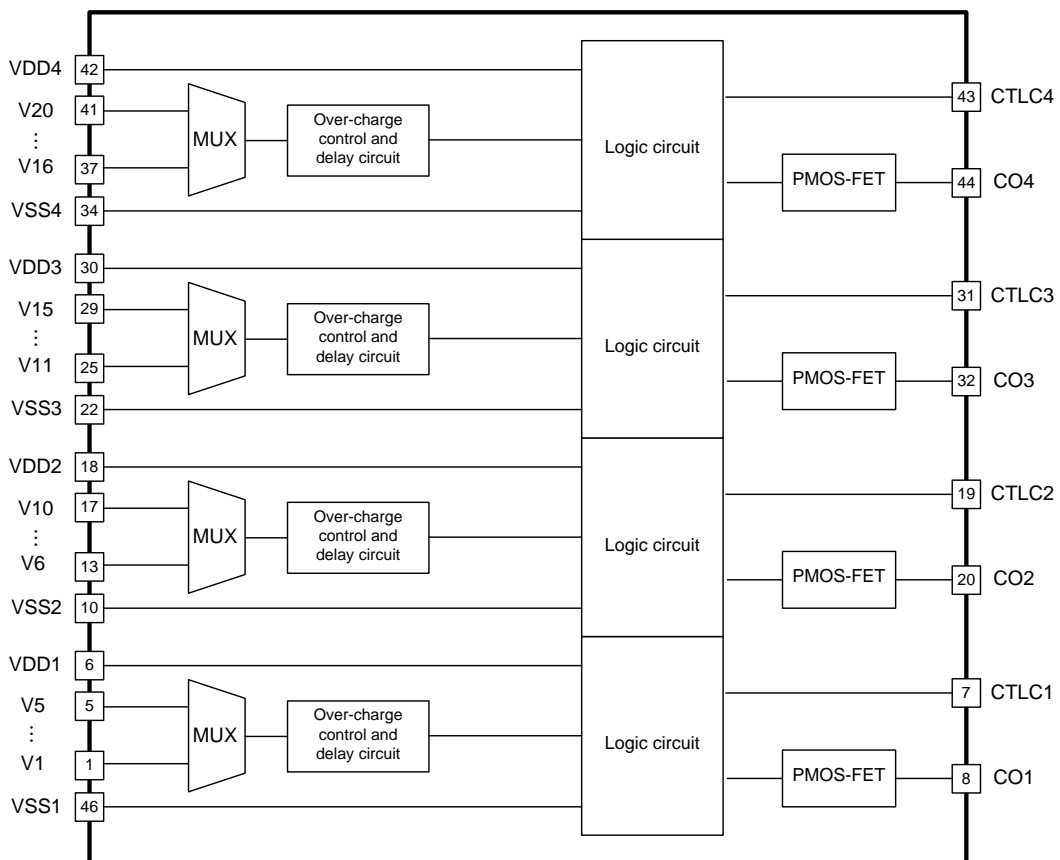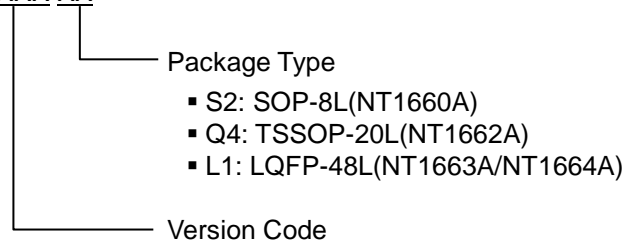| Pin No.				Symbol	Pin description
NT1660A	NT1662A	NT1663A	NT1664A		
2	-	-	-	CO	FET gate control pin for charging path (Pch open-drain output). ● Normal mode : High ● Overcharge mode : Hi-impedance
-	5	8	8	CO1	FET gate control pin for charging path -1 (Pch open-drain output). ● Normal mode : High ● Overcharge mode : Hi-impedance
-	15	20	20	CO2	FET gate control pin for charging path -2 (Pch open-drain output). ● Normal mode : High ● Overcharge mode : Hi-impedance
-	-	32	32	CO3	FET gate control pin for charging path -3 (Pch open-drain output). ● Normal mode : High ● Overcharge mode : Hi-impedance
-	-	-	44	CO4	FET gate control pin for charging path -4 (Pch open-drain output). ● Normal mode : High ● Overcharge mode : Hi-impedance
-	-	-	-	CTLC	The control terminal of output overcharge detection ● $I_{CTLC} > I_{CTLC}H$ CO pin : Normal mode ● $I_{CTLC} < I_{CTLC}L$ CO pin : Hi-impedance
-	4	7	7	CTLC1	The control terminal of output overcharge detection -1. ● $I_{CTLC} > I_{CTLC}H$ CO pin : Normal mode ● $I_{CTLC} < I_{CTLC}L$ CO pin : Hi-impedance
-	14	19	19	CTLC2	The control terminal of output overcharge detection -2. ● $I_{CTLC} > I_{CTLC}H$ CO pin : Normal mode ● $I_{CTLC} < I_{CTLC}L$ CO pin : Hi-impedance
-	-	31	31	CTLC3	The control terminal of output overcharge detection -3. ● $I_{CTLC} > I_{CTLC}H$ CO pin : Normal mode ● $I_{CTLC} < I_{CTLC}L$ CO pin : Hi-impedance
-	-	-	43	CTLC4	The control terminal of output overcharge detection -4. ● $I_{CTLC} > I_{CTLC}H$ CO pin : Normal mode ● $I_{CTLC} < I_{CTLC}L$ CO pin : Hi-impedance
-	6,16	9,11,12,21,23,24,33-45,47,48	9,11,12,21,23,24,33,35,36,45,47,48	N/C	No Connect. (Floating)

Block Diagram

■ **NT1660A**

■ **NT1662A**

■ **NT1663A**

■ **NT1664A**

Ordering Information

NT166xA(x=0,2,3,4)-<u>XXX</u> <u>XX</u>

Package Type
- S2: SOP-8L(NT1660A)
- Q4: TSSOP-20L(NT1662A)
- L1: LQFP-48L(NT1663A/NT1664A)

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)	Overcharge detection delay time t_{VDET1} (s) ±30%	Overcharge release condition	Built-in breaking wire detector function
NT1660A	F1A	S2	4.250	4.150	1	Voltage release	Yes
NT1660A	J1A	S2	4.300	4.200	1		
NT1662A	F1A	Q4	4.250	4.150	1		
NT1662A	J1A	Q4	4.300	4.200	1		
NT1663A	F1A	L1	4.250	4.150	1		
NT1663A	J1A	L1	4.300	4.200	1		
NT1664A	F1A	L1	4.250	4.150	1		
NT1664A	J1A	L1	4.300	4.200	1		