

NX48P0407

48 V Type-C CC and SBU protection IC for USB PD EPR

Rev. 1.0 — 27 August 2024

Product short data sheet

1 General description

The NX48P0407 is a CC and SBU protection IC, which can protect the short-to-VBUS damage on Type-C CC and SBU pins by ultrafast response of overvoltage protection detection. USB Type-C allows VBUS voltage to increase up to 48 V through a PD 3.1 protocol. CC1/2 and SBU1/2 pins can be shorted to VBUS of 48 V due to mechanical twisting and sliding of the connector since Type-C connector contact pins are 25 % closer to each other than a micro-USB connector. Moisture or fine dust may also cause the 48 V VBUS pin to be shorted to adjacent pins.

The NX48P0407 integrates IEC 61000-4-2 ESD protection on CON_CC1 and CON_CC2, +/-15 kV air discharge and +/-8 kV contact discharge, which helps to reduce external BOM cost. NX48P0407 CON_CC1/2 and CON_SBU1/2 pins are designed to be surge protected up to +80 V.



2 Features and benefits

- Type-C 48 V short-to-VBUS protection
 - CON_CC1/CON_CC2: up to 60 V_{DC}
 - CON_SBU1/CON_SBU2: up to 60 V_{DC}
- Dead-battery Mode Rd integrated on CON_CCx
- Low RON for OVP FET paths
 - CC OVP switch: 250 mΩ
 - SBU OVP switch: 3.6 Ω
- Robust IEC-61000-4-2 ESD protection
 - Contact discharge +/-8 kV: CON_CCx/CON_SBUx
 - Air discharge +/-15 kV: CON_CCx/CON_SBUx
- Low standby quiescent current of CC path: ~40 μA
- Fast OVP turn off time: 60 ns
- HVQFN16 package

3 Applications

- USB-PD extended power range (EPR) applications
- Laptop, notebook, portable workstation PC

4 Block diagram

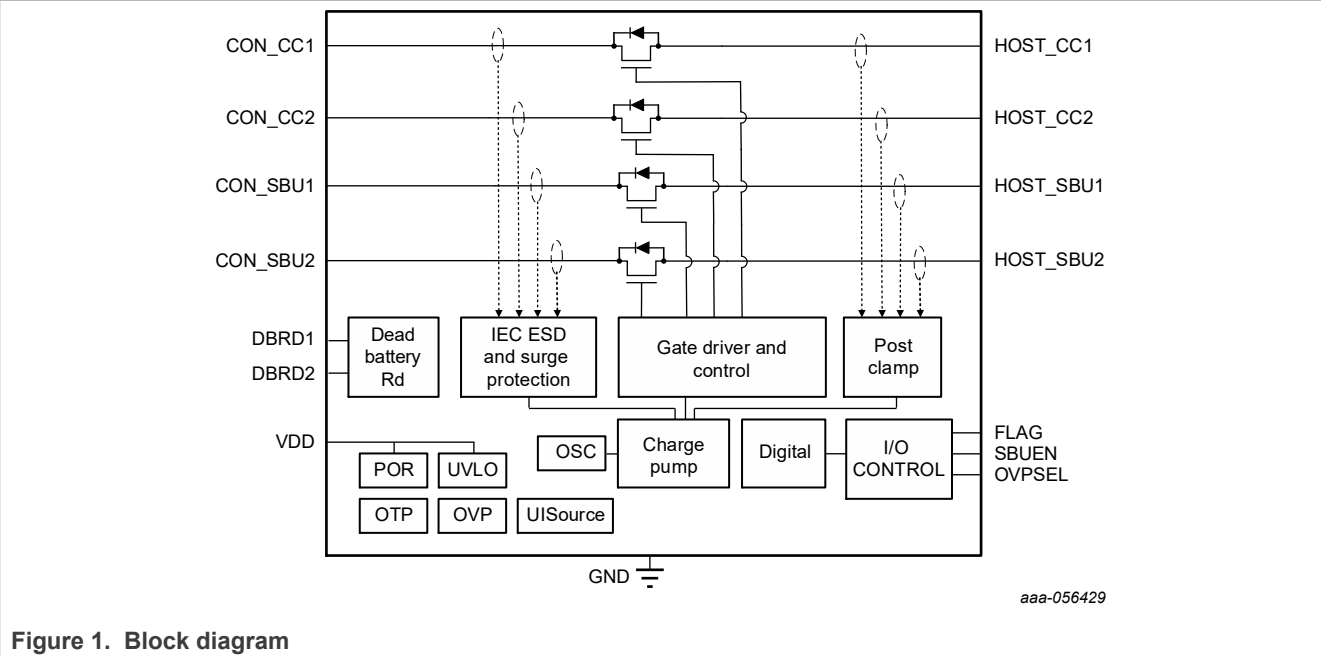
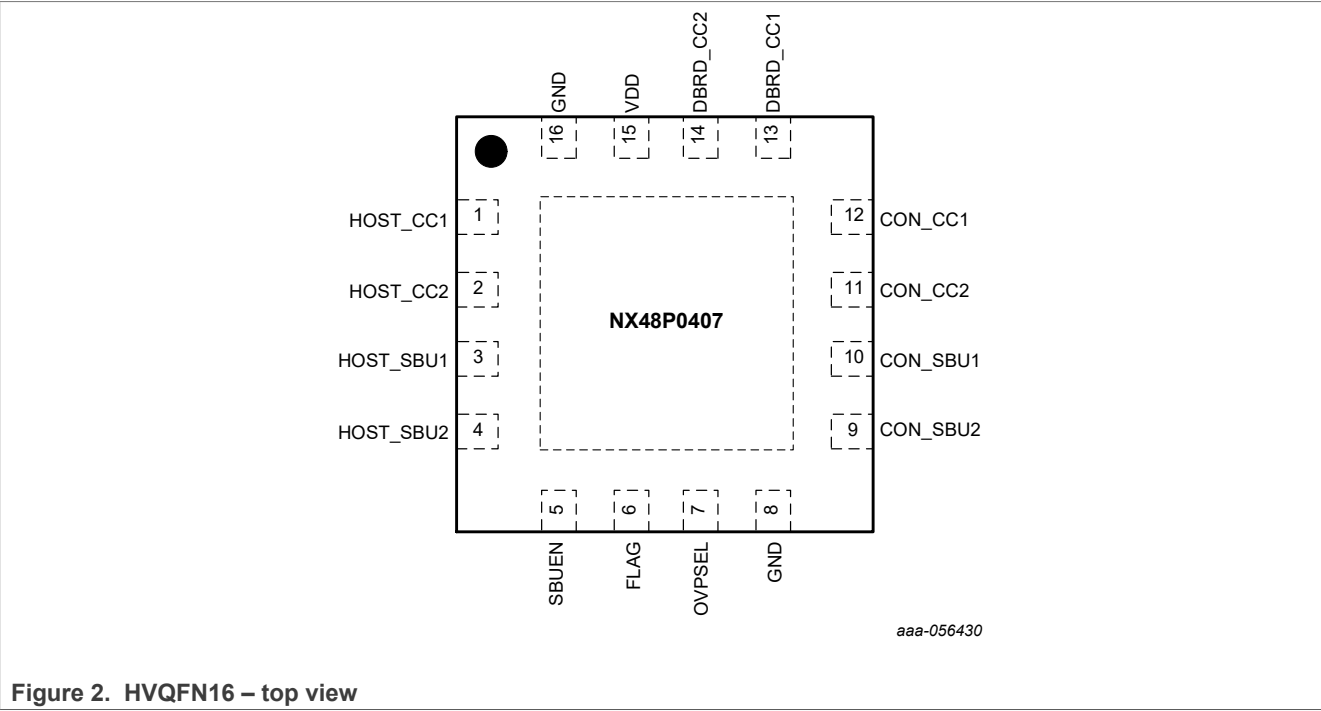


Figure 1. Block diagram

5 Pinning information

5.1 Pinning



5.2 Pin description

Table 1. Pin type definition

Pin type	Description	Pin type	Description	Pin type	Description
PI	Power Input	AO	Analog Output	DIO	Digital Input/ Output
PO	Power output	AIO	Analog Input/Output	AG	Analog Ground
PIO	Power Input/Output	DI	Digital Input	PG	Power Ground
AI	Analog Input	DO	Digital Output		

Table 2. Pin description

Pin name	Pin number	Type	Description
HOST_CC1	1	P/AIO	System side CC1. Connect CC1 of USB CC/PD controller.
HOST_CC2	2	P/AIO	System side CC2. Connect CC2 of USB CC/PD controller.
HOST_SBU1	3	A/DIO	System side SBU1.
HOST_SBU2	4	A/DIO	System side SBU2.
SBUEN	5	DI	SBU switch enable/disable control pin. SBUEN is driven high to enable SBU switch. (1.8 MΩ Internal pull-down resistor)

Table 2. Pin description...continued

Pin name	Pin number	Type	Description
FLAG	6	DO	Open-drain output indicating fault condition. Low when Fault condition happens, external pull-up resistor is required.
OVPSEL	7	DI	For SBU OVP SEL of options
GND	8	AG	Ground
CON_SBU2	9	A/DIO	Type-C connector side SBU2. Connect SBU2 of Type-C USB connector.
CON_SBU1	10	A/DIO	Type-C connector side SBU1. Connect SBU2 of Type-C USB connector.
CON_CC2	11	P/AIO	Type-C connector side CC2. Connect CC2 of Type-C USB connector.
CON_CC1	12	P/AIO	Type-C connector side CC1. Connect CC2 of Type-C USB connector.
DBRD_CC1	13	AG	Dead-Battery Mode RD of CC1.
DBRD_CC2	14	AG	Dead-Battery Mode RD of CC2.
V _{DD}	15	PI	Power supply input; connect System voltage and bypass 1 μF capacitor to GND.
GND	16	AG	Ground.

7 Revision history

Table 3. Revision history

Document ID	Release date	Description
NX48P0407_SDS v.1.0	27 August 2024	• Initial version

Legal information

Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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