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

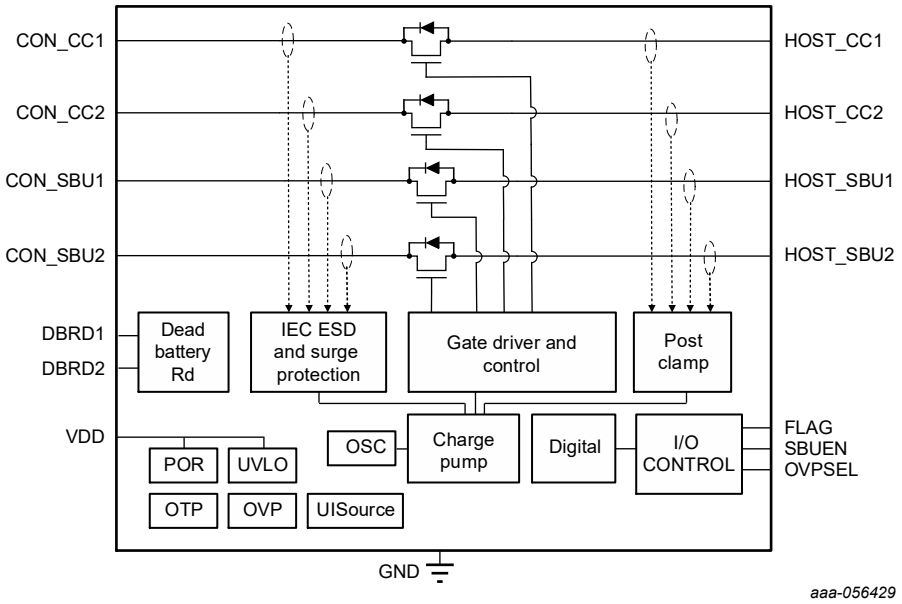


Figure 1. Block diagram

5 Pinning information

5.1 Pinning

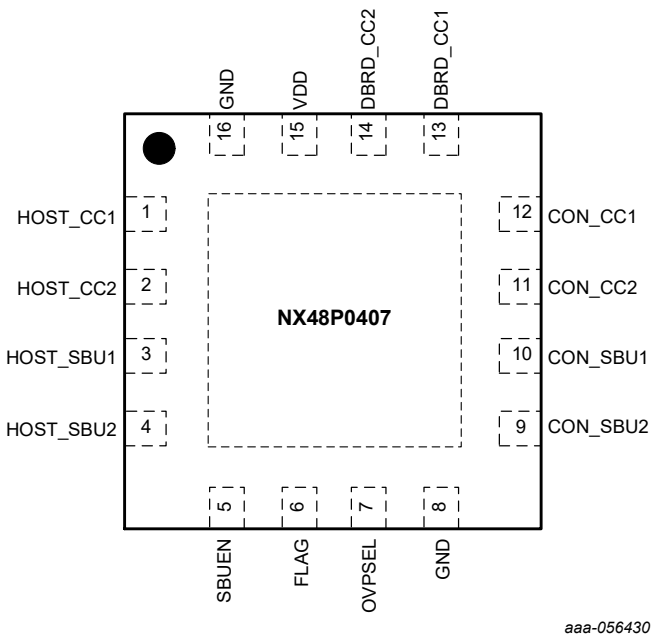


Figure 2. HVQFN16 – top view

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

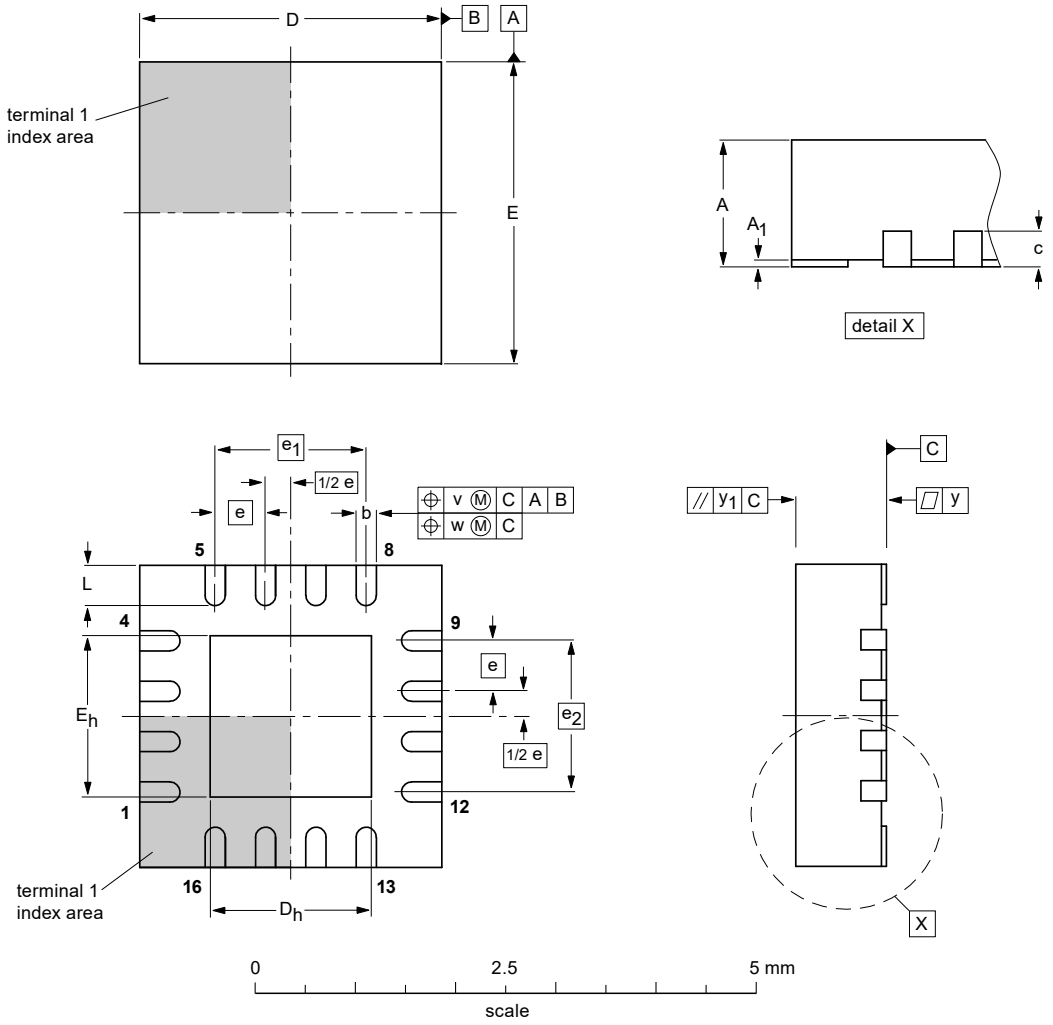
Pin name	Pin number	Type	Description
HOST_CC1	1	P/AIO	System side CC1. Connect CC1 of USB CC/PD controller.
HOST_CC2	2	P/AIO	System side CC2. Connect CC2 of USB CC/PD controller.
HOST_SBU1	3	A/DIO	System side SBU1.
HOST_SBU2	4	A/DIO	System side SBU2.
SBUEN	5	DI	SBU switch enable/disable control pin. 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.

6 Package outline

HVQFN16: plastic thermal enhanced very thin quad flat package; no leads; 16 terminals; body 3 x 3 x 0.85 mm **SOT758-1**



DIMENSIONS (mm are the original dimensions)

UNIT	$A^{(1)}$ max.	A_1	b	c	$D^{(1)}$	D_h	$E^{(1)}$	E_h	e	e_1	e_2	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	3.1 2.9	1.75 1.45	3.1 2.9	1.75 1.45	0.5	1.5	1.5	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.
2. Terminal 1 feature shape, size and location may vary.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT758-1	- - -	MO-220	- - -			~~02-10-21~~ 24-05-24

Figure 3. Package outline SOT758-1 (HVQFN16)

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.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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