

USB Type-C ESD protection evaluation board

USB Type-C® has extended the options for the USB interface significantly. This versatility comes with an increase of complexity, especially three main challenges - signal integrity, system-level ESD robustness and footprint. To support engineers who are designing application around USB Type-C®, Nexperia offers a demonstration dongle to show how typical protection solutions are applied in an USB Type-C® environment.

The NEVB21-USBC1 is an evaluation board for showcasing miniaturized ESD protection on the USB Type-C port. It features Nexperia's new DFN0603-3 package which offers a 2-channel protection solution inside an industry standard 0201" (0603 mm) package. The DFN0603-3 footprint improves the RF behavior by less return loss through smaller solder pads.

It offers a 2-in-1 solution, where two ESD protection devices are provided in the same footprint as one. Keeping the benefits of TrEOS technology, very low capacitance, very low clamping and very high robustness, and also showing outstanding RF performance on very fast data lines.

Nexperia's evaluation board NEVB2021-USBC1 is the perfect test vehicle for direct benchmarking of a complete USB Type-C interface. Beside super speed data line protection it features protection of all the other relevant data, control and supply lines in USB Type-C.

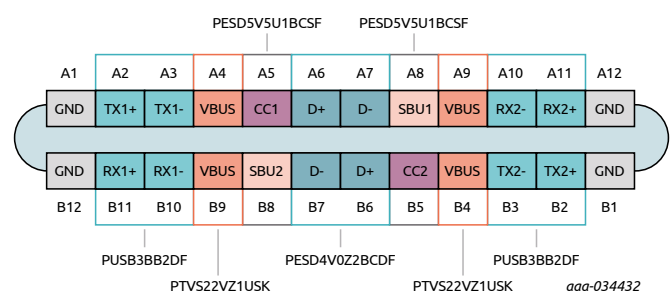







Fig. 1 USB Type-C interface protection with Nexperia's ESD protection

Focus Products

- › USB Type-C protection and filtering
- › TrEOS protection for high-speed data lines
- › Automotive infotainment/SerDes

Key features and benefits

- › Surge robustness up to 11 A for data lines
- › Plug and Play application
- › TrEOS ESD protection in DFN0603-3
 - Capacitance down to 0.2pF
 - Surge robustness up 11 A
 - Clamping down to 4.4 V @8A 8/20µs surge
- › Small footprint and high symmetry
- › DFN0603-3 is built on an industry-standard 0201" (0603mm) footprint

Type number	Package name	Size (mm)	C_d [max] (pF)	V_{RWM} [max] (V)	I_{PPM} (A)	Protected pin
PUSB3BB2DF	 DFN0603-3	0.63 x 0.33 x 0.25	0.26	4	8	Tx, Rx; D+/D-
PESD4V0Z2BCDF	 DFN0603-3	0.63 x 0.33 x 0.25	0.37	4	11	Tx, Rx; D+/D-
PESD5V5S1BSF	 DSN0603-2	0.6 x 0.3 x 0.3	6.2	5.5	11	CC, SBU
PESD5V5U1BCSF	 DSN0603-2	0.6 x 0.3 x 0.3	6	5.5	5.4	CC, SBU
PTVS22VZ1USK	 DSN1608-2	1.6 x 0.8 x 0.29	247	22	37	V_{BUS}

Setup and results

For quick start just place the NEVB2021-USBC1 between a Host device (e.g. computer) and a Client device (e.g. storage device supporting USB3.2) as shown below. The easiest way is to stream or copy a large file like a 4k video directly on or to the host device from the storage device.

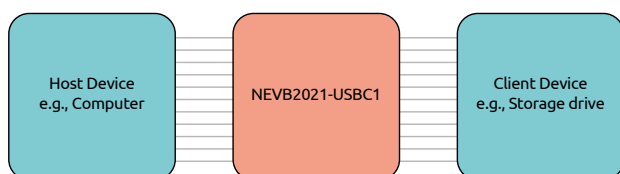


Fig. 2 Typical test setup for the NEVB2021-USBC1

Key applications

- › Portable & Wearables
- › Notebooks interfaces
- › Computing interfaces
- › Automotive video interfaces
- › USB Type-C®
 - USB4 and USB3.2
 - USB2
 - CC, SBU
 - V_{bus}

© 2022 Nexperia B.V.

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

nexperia.com

Date of release:
October 2022

Printed:
In the Netherlands

