USB Type-C ESD protection evaluation board

Nexperia application notes are highly regarded for their technical detail and application insights. To assist design engineers further and bring application notes to life we have introduced our new Interactive Application Notes.

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.

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

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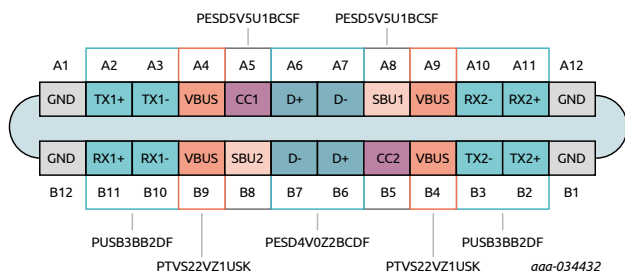› DFN0603-3 is built on an industry-standard 0201" (0603mm) footprint

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

nexperia

EFFICIENCY WINS.

Type number	Package name	Size	C_d [max] (pF)	V_{RWM} [max] (V)	I_{PPM} (A)
PUSB3BB2DF	DFN0603-3	0.63 x 0.33 x 0.25	0.26	4	8
PESD4V0Z2BCDF	DFN0603-3	0.63 x 0.33 x 0.25	0.37	4	11
PESD5V5U1BCSF	DSN0603-2	0.6 x 0.3 x 0.3	6	5.5	5.4
PTVS22VZ1USK	DSN1608-2	1.6 x 0.8 x 0.29	247	22	37

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.
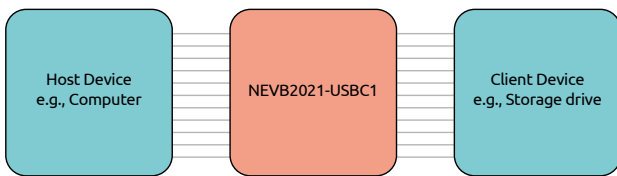
Key applications

› Portable & Wearables

› Notebooks interfaces

› Computing interfaces

› Automotive video interfaces

› USB Type-C®
  - USB4 (Gen2 and Gen3) and USB3.2

Fig. 2 Typical test setup for the NEVB2021-USBC1

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