

PI2DPX2020

1.8V 20Gbps USB4/TBT4/DP2.1 DP-Alt Linear ReDriver with AUX-SBU Switch

Description

The DIODES PI2DPX2020 is a 20Gbps non-blocking USB Type-C® DP-Alt mode linear ReDriver™ in a 4-to-4 configuration operated by a 1.8V power supply. It supports multiple operation modes through I2C bus settings for single-port USB4 Gen 3 and Gen 2/USB3.2 Gen 2, dual-port USB4 Gen 3x2 and Gen 2x2/USB3.2 Gen 2x2, 1-port USB3.2 Gen 2/2-lane DP2.1 (UHBR20) and 4-lane DP2.1 (UHBR20). It swaps the high speed channels under the flip and non-flip plug connection in compliance to Type-C connector with the integrated AUX crossbar switch for SBU pins.

The non-blocking linear ReDriver design ensures that the differential signals conveying pre-shoot and de-emphasis equalization waveforms from the transmitter side to the receiver side help optimize the overall channel link adjustment conducted by the system transmitter and receiver that has been equipped with DFE. The CTLE equalizers are implemented at the inputs of the ReDriver to compensate the channel loss and reduce the ISI jitters. The programmable flat gain adjustments support the eye diagram opening.

The CTLE EQ gains and flat gains are individually programmable on each channel for flexible tuning via the I2C register settings. The on-chip signal detector and DP AUX Listener enable the ReDriver to enter the USB power saving mode or the DP D3 power down mode to further reduce standby power consumption.

Application(s)

- Laptop, Desktop and AIO PCs
- Workstation and Server
- Docking Station
- Display Monitor
- Gaming Console
- Active Cable

Features

- 4-to-4 linear ReDriver channel configuration with CTLE gain compensation up to 16dB @20Gbps.
- Configurable for USB4 Gen 3 (20Gbps x1 or x2), TBT4 (20.625Gbps x1 or x2), USB4 Gen 2/USB3.2 GEN2 (10Gbps x1 or x2), USB3.2 Gen2 x1/2-lane DP2.1(UHBR20/UHBR13, UHBR10), 4-lane DP2.1(UHBR20/UHBR13/UHBR10).
- Default Hi-Z for high speed channels and SBU pins compliant to USB-C Safe State .
- Ultra low latency (< 300ps) for better interoperability and data throughput.
- Individual controls on CTLE gain (6 to 16dB @10Ghz), Flat Gain (-4 to +2dB).
- Integrated AUX channel crossbar switch for side band signal.
- Type-C connector flip and non-flip plug support.
- I2C Slave support with speed up to 1MHz.
- Low Power - USB and DisplayPort active U0 (300mW), and USB Deep Slumber mode U1/U2/U3 (3mW), Modern Standby (1.8mW).
- Single Power Supply: 1.8V +/-5%.
- Industrial Temperature Support: -40°C to +85°C.
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2).
- Halogen and Antimony Free. “Green” Device (Note 3).
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative.
- <https://www.diodes.com/quality/product-definitions/>
- Packaging (Pb-free & Green):
 - Tiny 32-pin WLGA 2.85mm x 4.5mm (0.4 mm pitch).

Ordering Information

Ordering Number	Package Code	Description
PI2DPX2020FLAEX	FLA	32-Pin, W-LGA4528-32

Notes:

- E = Pb-free and Green
- X suffix = Tape/Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, “Green” and Lead-free.
3. Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.