

# High-performance eUSB2 repeaters



Moving towards lower node technology (5nm, 3nm, etc.) brings significant benefits on area reduction due to packing more transistors in a smaller area. These new technologies use transistors operating at lower supply voltages and thereby increasing the cost to produce 3.3V IOs needed for standard protocol as USB2.0. In order to be able to connect new SoCs to legacy USB2 interface, the industry has introduced a new technology called eUSB2 (Embedded USB2).

eUSB supports IOs voltage swing up to 1.2V. Hence, to connect to legacy USB2 interfaces, an eUSB2 to USB2 repeater is needed, boosting the signal to comply with 3.3V IOs required by USB2 interface.

PTN3222x is a highly integrated and high performance eUSB2 to USB2 repeater family developed by NXP. The family includes multiple devices with different packages and

some specific configurations for dedicated SoCs. In addition, the family has devices supporting 1.8V or 1.2V on the control I/Os (Reset and I2C I/Os).

## Main Features:

- 1-port eUSB2 to USB2 redriver functionality
- Supports host only repeater, device only repeater and dual mode repeater role
- Supports all USB2.0 data rates:
  - Low speed operation (1.5 Mbps)
  - Full speed operation (12 Mbps)
  - High speed operation (480 Mbps)
- Integrated and selectable pullup and pulldown resistors on both eUSB2 and USB2 ends

## Robustness:

- USB2 data pins tolerate 5.5 V (DC) for 24 hours
- USB2 data pins withstand short to GND for 24 hours
- USB2 data pins withstand collision on DP/DN pins due to faulty USB devices
- GPIOs and high speed data pins are backpower safe

## Operating conditions:

- Power supplies - VDD3V3, VDD1V8
- ESD HBM 2 kV CDM 500 V
- Temperature range -40 °C to +85 °C

## Packages:

- WLCSP12 package (1.55 mm x 1.18 mm x 0.455 mm body, 0.35 mm pitch)
- QFN12 package (1.75 mm x 2.2 mm body, 0.4 mm pitch)

## Target applications:

- Smartphones, Smartwatches, Portable Electronics
- Notebooks, Laptops, Desktops, Tablets.
- Routers, Hubs, Protocol bridges.

## PTN3222 Family variants

Device	Package	Status	I/O VDD (*)	Comments
PTN3222CUK	WLCSP12	Production	1.8V	General market
PTN3222DUK	WLCSP12	Production	1.8V	Recommend for QCOM platform (*2)
PTN3222EUK	WLCSP12	Production	1.2V	General market
PTN3222GM	QFN12	Production	1.8V	General market
PTN3222DHN	QFN12 (*3)	Development (*4)	1.8V	Automotive market

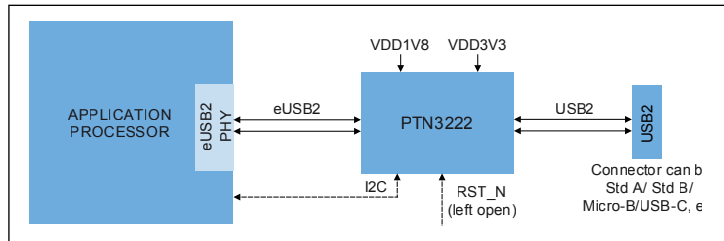
Note \*: I2C interface and Reset I/Os

Note \*2: Platforms SM8450/SM8475

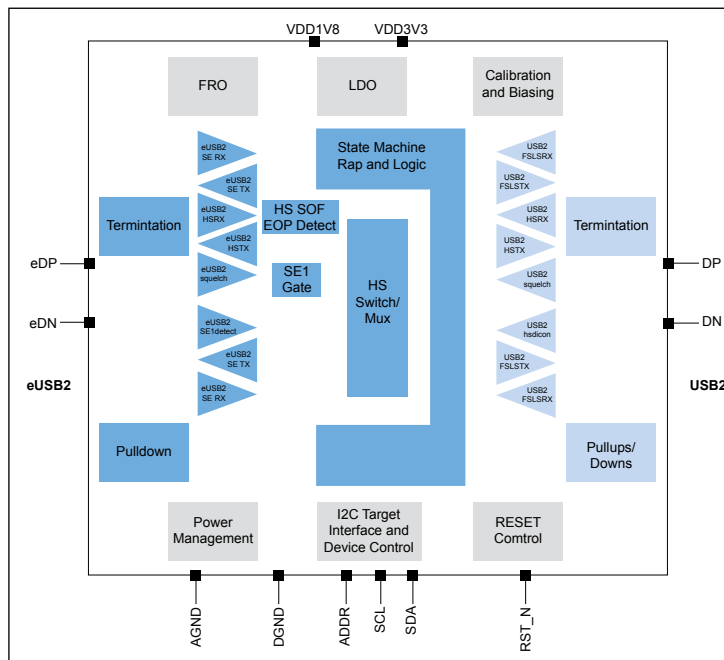
Note \*3: QFN variant with Wettable Flanks -- Ideal for automotive applications (AEC-Q100 -- Grade B)

Note \*4: Samples available in October '24. Release in Q3 '25

## Application Circuit



## Block Diagram



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