

PTN36001

SuperSpeed USB 3.0 redriver

Rev. 1 — 7 September 2015

Product short data sheet

1. General description

PTN36001 is a small, low power SuperSpeed USB 3.0 redriver IC that enhances signal quality by performing receive equalization on the deteriorated input signal followed by transmit de-emphasis maximizing system link performance for mobile applications. With its superior differential signal conditioning and enhancement capability, the device delivers significant flexibility and performance scaling for various systems with different PCB trace and cable channel conditions.

PTN36001 is a dual-channel device that supports data signaling rate of 5 Gbit/s through each channel. The data flow of one channel is facing the USB host, and another channel is facing the USB peripheral or device. Each channel consists of a high-speed Transmit (Tx) differential lane and a high-speed Receive (Rx) differential lane.

PTN36001 is powered from a 1.8 V supply and is available in a small X2QFN12 package (1.25 mm × 2.1 mm × 0.35 mm) with 0.4 mm pitch.

2. Features and benefits

- Supports USB 3.0 specification (SuperSpeed only)
- Compliant to SuperSpeed USB 3.0 standard
- Support of two channels
- Two control pins to select optimized signal conditions
 - ◆ Receive equalization on each channel to recover from InterSymbol Interference (ISI) and high-frequency losses, with provision to choose equalization gain settings per channel
 - ◆ Transmit de-emphasis on each channel delivers pre-compensation suited to channel conditions
 - ◆ Output swing adjustment
- Integrated termination resistors provide impedance matching on both transmit and receive sides
- Automatic receiver termination detection
- Low active power: 200 mW/111 mA (typical) for $V_{DD} = 1.8\text{ V}$



- Power-saving states:
 - ◆ 5.4 mW/3 mA (typical) when in U2/U3 states
 - ◆ 3.6 mW/2 mA (typical) when no connection detected
 - ◆ 10.8 μ W/6 μ A (typical) when in Deep power-saving state
- Excellent differential and common return loss performance
 - ◆ 10 dB differential and 10 dB common-mode return loss for 10 MHz to 1250 MHz
- Flow-through pinout to ease PCB layout and minimize crosstalk effects
- Hot Plug capable
- Power supply: $V_{DD} = 1.8$ V (typical)
- Compliant with JESD 78 Class II
- Very thin X2QFN12 package: 1.25 mm \times 2.1 mm \times 0.35 mm, 0.4 mm pitch
- ESD protection exceeds 7000 V HBM per JDS-001-2012 and 1000 V CDM per JESD22-C101
- Latch-up testing is done to JEDEC Standard JESD78 which exceeds 100 mA
- Operating temperature range: 0 °C to 85 °C

3. Applications

- Laptops, tablets
- Active cables
- Notebook/netbook/nettop platforms
- Docking stations and AIO platforms
- USB 3.0 peripherals such as flat panel display, consumer/storage devices, printers or USB 3.0 capable hubs/repeaters

4. System context diagrams

[Figure 1](#) illustrates PTN36001 usage.

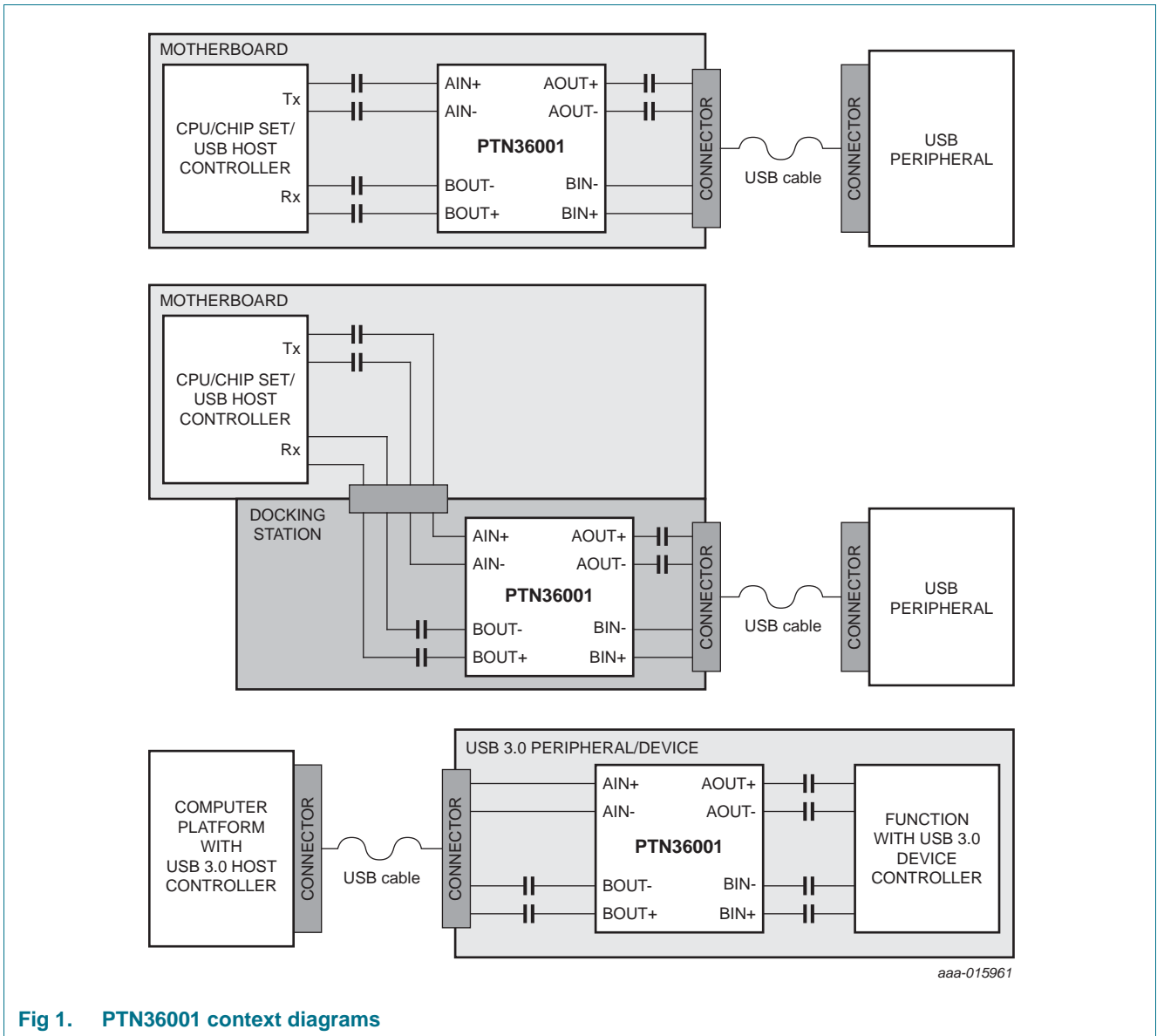


Fig 1. PTN36001 context diagrams

5. Ordering information

Table 1. Ordering information

| Type number | Topside marking | Package | | Version |
|-------------|-----------------|---------|--------------------------------------------------------------------------------------------------------------|-----------|
| | | Name | Description | |
| PTN36001 | 001 | X2QFN12 | plastic, super thin quad flat package; no leads; 12 terminals; body 1.25 × 2.10 × 0.35 mm; 0.4 mm lead pitch | SOT1408-1 |

5.1 Ordering options

Table 2. Ordering options

| Type number | Orderable part number | Package | Packing method | Minimum order quantity | Temperature |
|-------------|-----------------------|---------|---------------------------------|------------------------|-----------------------------------|
| PTN36001 | PTN36001HXAZ | X2QFN12 | Reel 7" Q1/T1 *Standard mark | 500 | T _{amb} = 0 °C to +85 °C |
| PTN36001 | PTN36001HXZ | X2QFN12 | Reel 7" Q1/T1 *Standard mark | 6000 | T _{amb} = 0 °C to +85 °C |

6. Block diagram

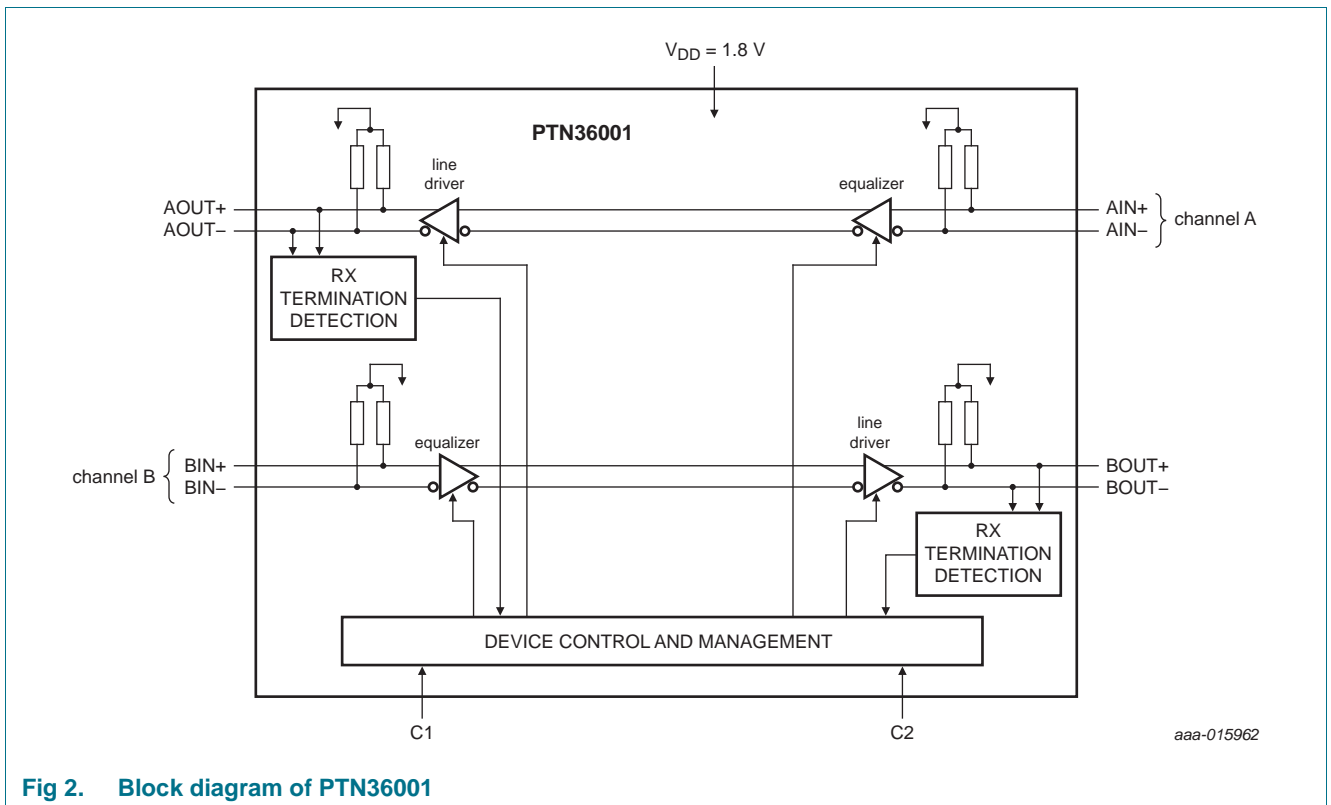


Fig 2. Block diagram of PTN36001

7. Revision history

Table 3. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|--------------|--------------------------|---------------|------------|
| PTN36001_SDS v.1 | 20150907 | Product short data sheet | - | - |

8. Legal information

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| 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. |
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10. Contents

| | | |
|-----------|--------------------------------------|----------|
| 1 | General description | 1 |
| 2 | Features and benefits | 1 |
| 3 | Applications | 2 |
| 4 | System context diagrams | 2 |
| 5 | Ordering information | 4 |
| 5.1 | Ordering options | 4 |
| 6 | Block diagram | 4 |
| 7 | Revision history | 5 |
| 8 | Legal information | 6 |
| 8.1 | Data sheet status | 6 |
| 8.2 | Definitions | 6 |
| 8.3 | Disclaimers | 6 |
| 8.4 | Trademarks | 7 |
| 9 | Contact information | 7 |
| 10 | Contents | 8 |

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