

HD3SS3220 USB Type-C DRP Port Controller with SuperSpeed 2:1 MUX

1 Features

- USB Type-C Port Controller with Integrated 2:1 SuperSpeed Mux
- Compatible to USB Type-C™ Specifications
- Supports USB 3.1 G1 and G2 up to 10 Gbps
- Supports up to 15 W of Power Delivery with 3-A Current Advertisement and Detection
- Mode Configuration
 - Host Only – DFP/Source
 - Device Only – UFP/Sink
 - Dual Role Port - DRP
- Channel Configuration (CC)
 - Attach of USB Port Detection
 - Cable Orientation Detection
 - Role Detection
 - Type-C Current Mode (Default, Mid, High)
- $V_{(BUS)}$ Detection and VCONN Support for Active Cables
- Audio and Debug Accessory Support
- Supports for Try.SRC and Try.SNK DRP Modes
- Configuration Control through GPIO and I²C
- Low Active and Standby Current Consumptions
- Industrial Temperature Range of –40 to 85°C

2 Applications

- USB Host, Device, Hub
- Mobile Phones, Tablets and Notebooks
- USB Peripherals such as Thumb Drives, Portable Hard Disks, Set Top Box

3 Description

HD3SS3220 is a USB SuperSpeed (SS) 2:1 mux with DRP port controller. The device provides Channel Configuration (CC) logic and 5V VCONN sourcing for ecosystems implementing USB Type-C. The HD3SS3220 can be configured as a Downstream Facing Port (DFP), Upstream Facing Port (UFP) or a Dual Role Port (DRP) making it ideal for any application.

The HD3SS3220, in DRP mode, alternates presenting itself as a DFP or UFP according to the Type-C specifications. The CC logic block monitors the CC1 and CC2 pins for pull-up or pull-down resistances to determine when a USB port has been attached and its port role. Once a USB port has been attached, the CC logic also determines the orientation of the cable and configures the USB SS mux accordingly. Finally, CC logic advertises or detects Type-C current mode – Default, Mid, or High in DFP and UFP modes respectively.

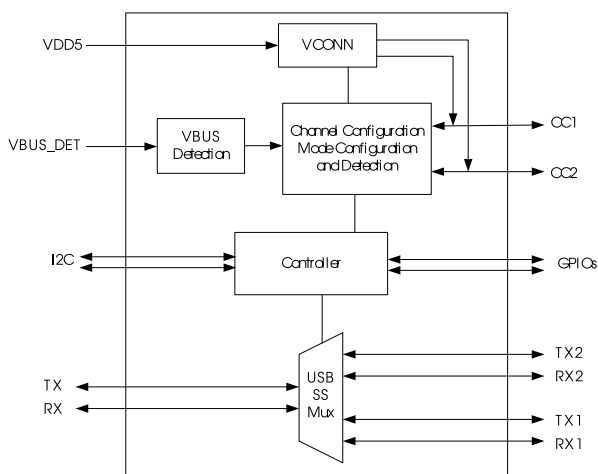
Excellent dynamic characteristics of the integrated mux allow switching with minimum attenuation to the SS signal eye diagram and very little added jitter. The device's switch paths deploy adaptive common mode voltage tracking resulting identical channel despite different common mode voltage for RX and TX channels.

Device Information⁽¹⁾

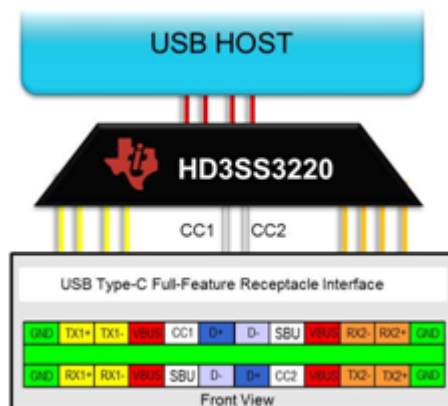
| PART NUMBER | PACKAGE | BODY SIZE (NOM) |
|-------------|---------------|-------------------|
| HD3SS3220 | VQFN RNH (30) | 2.50 mm x 4.50 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Simplified Schematic



Typical Application



PRODUCT PREVIEW



4 Device and Documentation Support

4.1 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

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4.2 Trademarks

E2E is a trademark of Texas Instruments. All other trademarks are the property of their respective owners.

4.3 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

4.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|---------|
| HD3SS3220IRNHR | PREVIEW | WQFN | RNH | 30 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | -40 to 85 | HD3220 | |
| HD3SS3220IRNHT | PREVIEW | WQFN | RNH | 30 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | -40 to 85 | HD3220 | |
| HD3SS3220RNHR | PREVIEW | WQFN | RNH | 30 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | 0 to 70 | HD3220 | |
| HD3SS3220RNHT | PREVIEW | WQFN | RNH | 30 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | 0 to 70 | HD3220 | |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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