# DP3T SWITCH WITH IMPEDANCE DETECTION MICRO-USB SWITCH TO SUPPORT USB, UART, AUDIO, AND CHARGER DETECTION

**Check for Samples: TSU5611**

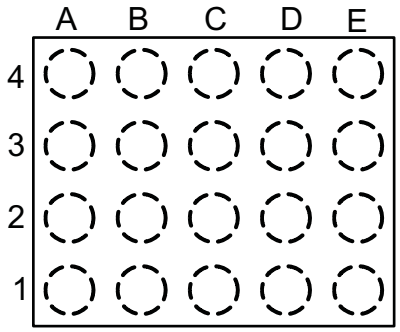
## FEATURES

- **Compatible Accessories**
  - **USB Data Cable**
  - **UART Cable**
  - **Charger (Dedicated Charger or Host/Hub Charger)**
  - **Stereo Headset With Mic**
- **Integrated LDOs for VREF and Mic Bias**
- **USB and UART Path Supports USB 2.0 High Speed**
- **Audio Path Provides Negative Rail Support and Click/Pop Reduction**
- **Supports Factory Test Mode**
- **1.8-V Compatible $I^2C$ Interface**
- **ESD Performance Tested Per JESD 22**
  - **1500-V Human-Body Model (A114-B, Class II)**
  - **1000-V Charged-Device Model (C101)**

## APPLICATIONS

- **Cell Phones & Smart Phones**
- **Tablet PCs**
- **Digital Cameras & Camcorders**
- **GPS Navigation Systems**
- **Micro USB Interface with USB/UART**

**YZP PACKAGE**
**TOP VIEW**




## DESCRIPTION

The TSU5611 is designed to interface the cellular phone UART, USB, and audio chips with external peripherals via a micro-USB connector. The switch features impedance detection for identification of various accessories that are attached through DP and DM of the micro-USB port. When an accessory is plugged into the micro-USB port, the switch uses a detection mechanism to identify the accessory (see the State Machine for details). It will then switch to the appropriate channel—data, audio, or UART.

The TSU5611 has an I2C interface for communication with the cellular phone baseband or applications processor. An interrupt is generated when anything plugged into the micro-USB is detected. Another interrupt is generated when the device is unplugged.

**ORDERING INFORMATION(1)**

| $T_A$ | PACKAGE(2) | | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|---|---|---|---|---|
| –40°C to 85°C | WSCP–YZP (0.5-mm pitch) | Tape and Reel | TSU5611YZPR | A7 |

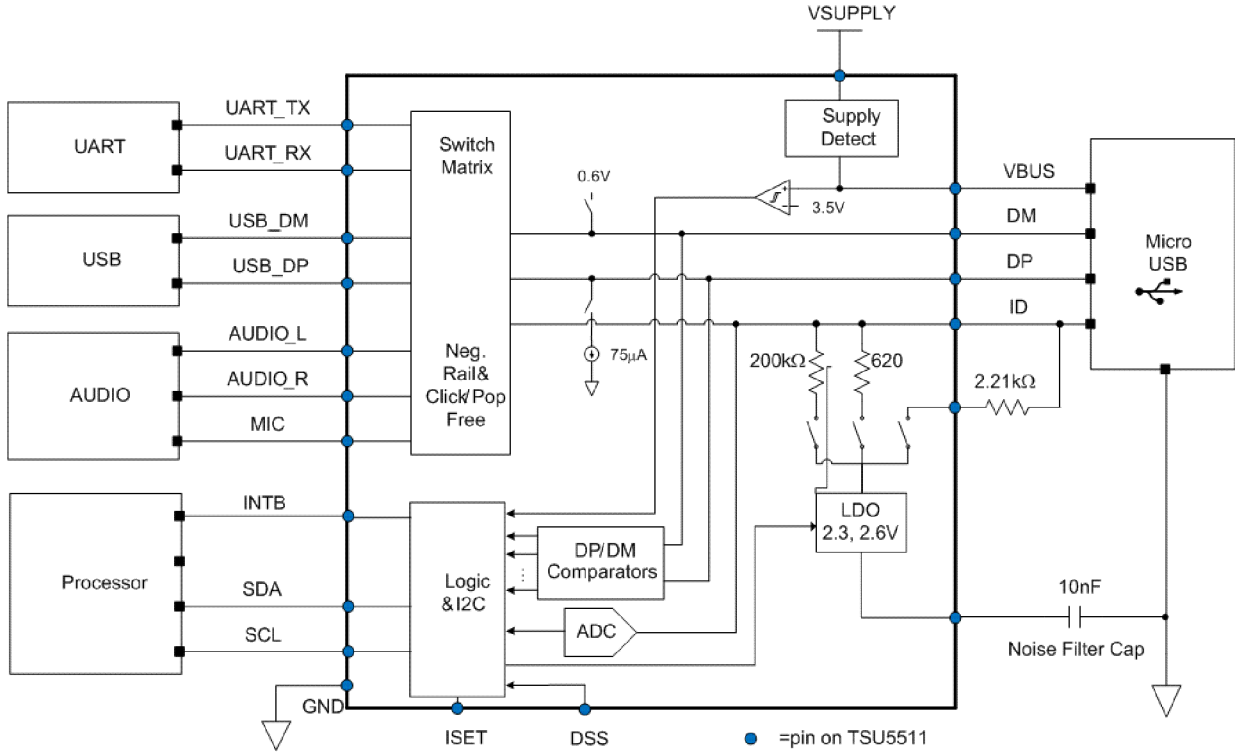
(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI Web site at www.ti.com.
(2) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

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.

## SUMMARY OF TYPICAL CHARACTERISTICS

| | USB PATH | UART PATH | AUDIO PATH | MIC PATH |
|---|---|---|---|---|
| Number of switches | 1 | 1 | 1 | 1 |
| ON-state resistance (rON) | 5 Ω | 5 Ω | 3 Ω | 8.8 Ω |
| ON-state resistance match (ΔrON) | 1 Ω | 1 Ω | 1.1 Ω | N/A |
| ON-state resistance flatness (rON(flat)) | 0.24 Ω | 0.24 Ω | 0.1 Ω | 0.5 Ω |
| Turn-on/turn-off time (tON/tOFF) | 1 ms | 1 ms | 1 ms | 1 ms |
| Bandwidth (BW) | 830 MHz | 830 MHz | 788 MHz | 573 MHz |
| OFF isolation (OISO) | –22 dB | –22 dB | –75 dB | –100 dB |
| Crosstalk (XTALK) | –40 dB | –40 dB | –50 dB | –50 dB |
| Total harmonic distortion (THD) | N/A | N/A | 0.05% | 0.0017% |
| Leakage current (INO(OFF)/INC(OFF)) | 100 nA | 100 nA | 100 nA | 100 nA |
| Package options | YZP package, 0.5-mm pitch | | | |

## APPLICATION BLOCK DIAGRAM



To request a full data sheet, please send an email to:
signal-switches@list.ti.com

## PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TSU5611YZPR | ACTIVE | DSBGA | YZP | 20 | 3000 | RoHS & Green | SNAGCU | Level-1-260C-UNLIM | -40 to 85 | A7 | Samples |

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

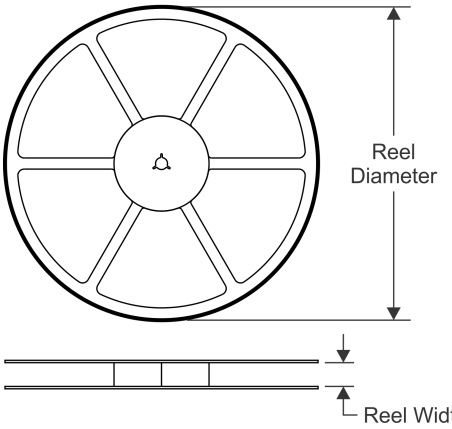
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

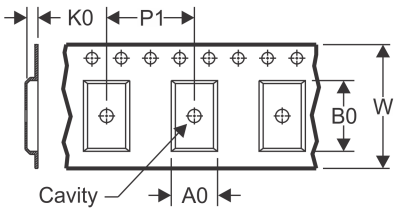
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

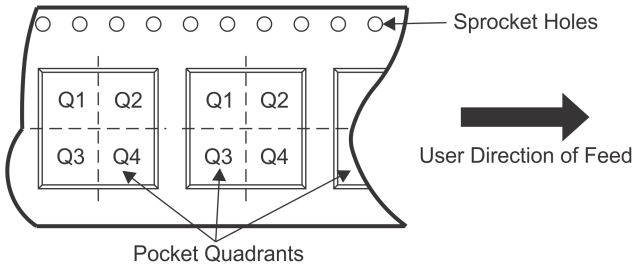



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

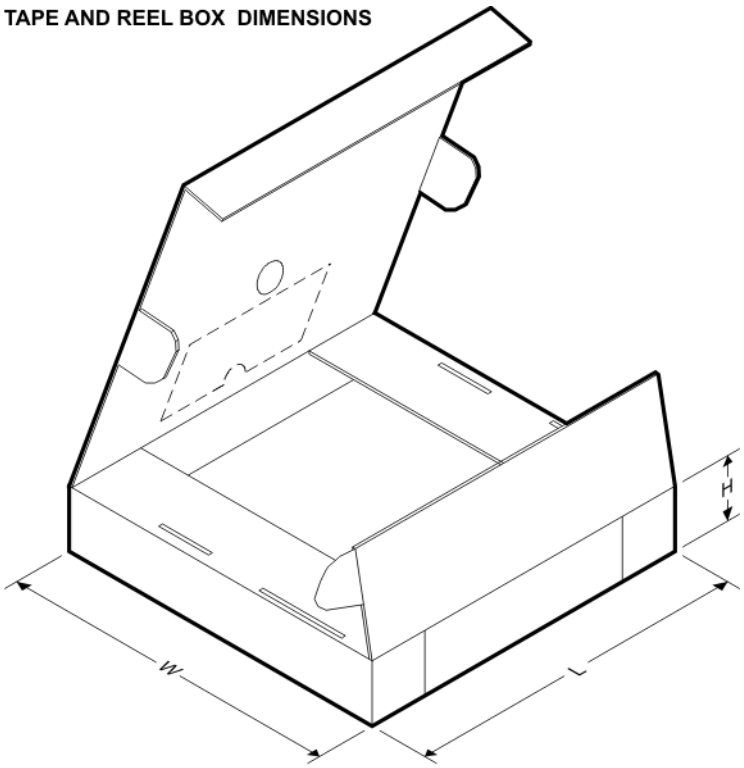
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSU5611YZPR | DSBGA | YZP | 20 | 3000 | 180.0 | 8.4 | 1.99 | 2.49 | 0.56 | 4.0 | 8.0 | Q1 |

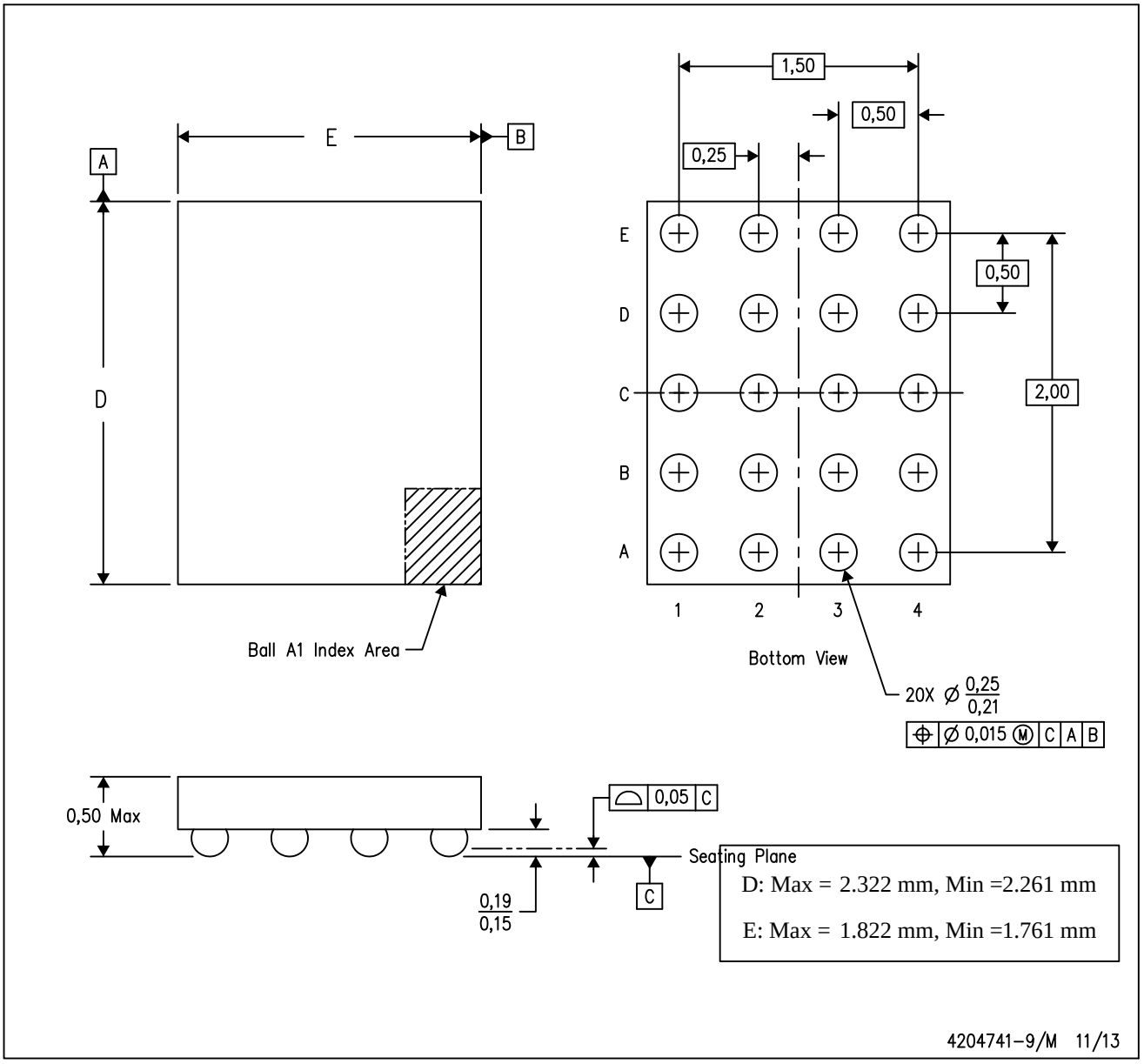
**TAPE AND REEL BOX DIMENSIONS**




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| TSU5611YZPR | DSBGA | YZP | 20 | 3000 | 182.0 | 182.0 | 20.0 |

YZP (R–XBGA–N20) DIE–SIZE BALL GRID ARRAY




NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. NanoFree™ package configuration.

NanoFree is a trademark of Texas Instruments.

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