

TUSB211-Q1 USB 2.0 High Speed Signal Conditioner

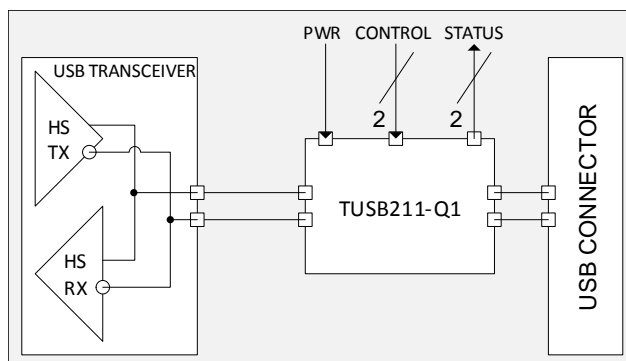
1 Features

- Qualified for Automotive Applications
- Compatible with USB 2.0, OTG 2.0, and BC 1.2
- Support for LS, FS, HS Signaling
- Active Power Consumption of 55 mW (Typical) with 3.3-V Single Supply
- Selectable Signal Gain Via External Pulldown Resistor
- Does not Break DP, DM Trace
- Scalable Solution – Daisy Chain Device for High Loss Applications
- Compact 1.6 mm x 1.6 mm QFN

2 Applications

- Automotive Infotainment
- Notebooks
- Desktops
- Docking Stations
- Cell Phones
- Active Cable, Cable Extenders
- Backplane
- Televisions
- Tablets

4 Simplified Schematic



3 Description

The TUSB211-Q1 is a USB High-Speed (HS) signal conditioner, designed to compensate for ISI signal loss in a transmission channel.

The device has a patent-pending design which is agnostic to USB Low Speed (LS) and Full Speed (FS) signals. LS and FS signal characteristics are unaffected by the TUSB211-Q1. HS signals are compensated.

Programmable signal gain permits fine tuning device performance to optimize High Speed signals at the connector. This helps to pass USB High Speed electrical compliance tests.

The footprint of TUSB211-Q1 does not break the continuity of the DP/DM signal path. This permit risk free system design of a complete USB channel.

In addition, TUSB211-Q1 is compatible with the USB On-The-Go (OTG) and Battery Charging (BC) protocols.

Device Information⁽¹⁾

| PART NUMBER | PACKAGE | BODY SIZE (NOM) |
|-------------|------------|-----------------|
| TUSB211-Q1 | X2QFN (12) | 1.60mm x 1.60mm |

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



5 Revision History

| DATE | REVISION | NOTES |
|------------|----------|------------------|
| April 2015 | * | Initial release. |

6 Device and Documentation Support

6.1 Documentation Support

6.2 Trademarks

All trademarks are the property of their respective owners.

6.3 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.

6.4 Glossary

[SLYZ022](#) — *TI Glossary*.

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

7 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 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|---------|
| TUSB211QRWBRQ1 | PREVIEW | X2QFN | RWB | 12 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | -40 to 105 | Q1 | |

(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.

OBSELETE: 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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OTHER QUALIFIED VERSIONS OF TUSB211-Q1 :

- Catalog: [TUSB211](#)

NOTE: Qualified Version Definitions:

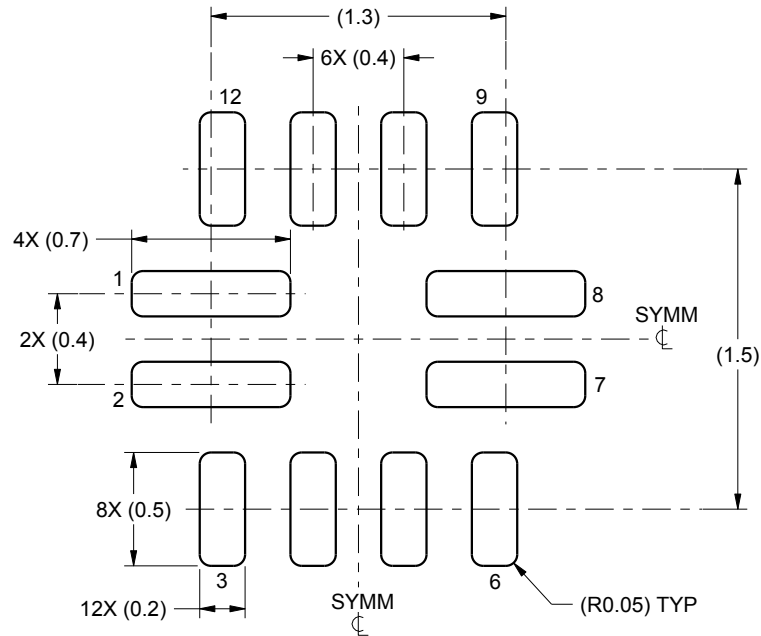
- Catalog - TI's standard catalog product

EXAMPLE BOARD LAYOUT

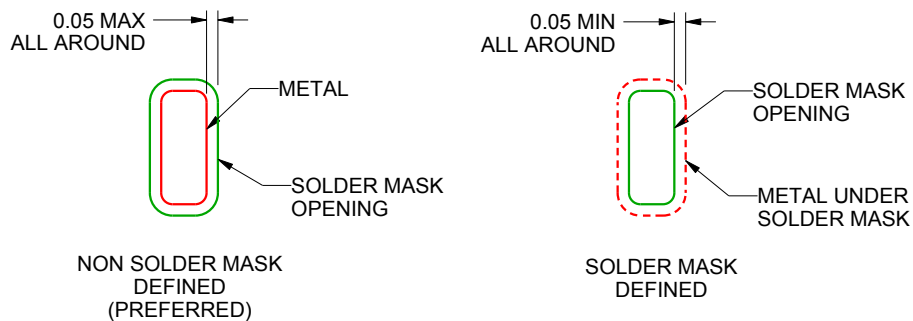
RWB0012A

X2QFN - 0.4 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
SCALE:30X



SOLDER MASK DETAILS

4221631/A 12/2014

NOTES: (continued)

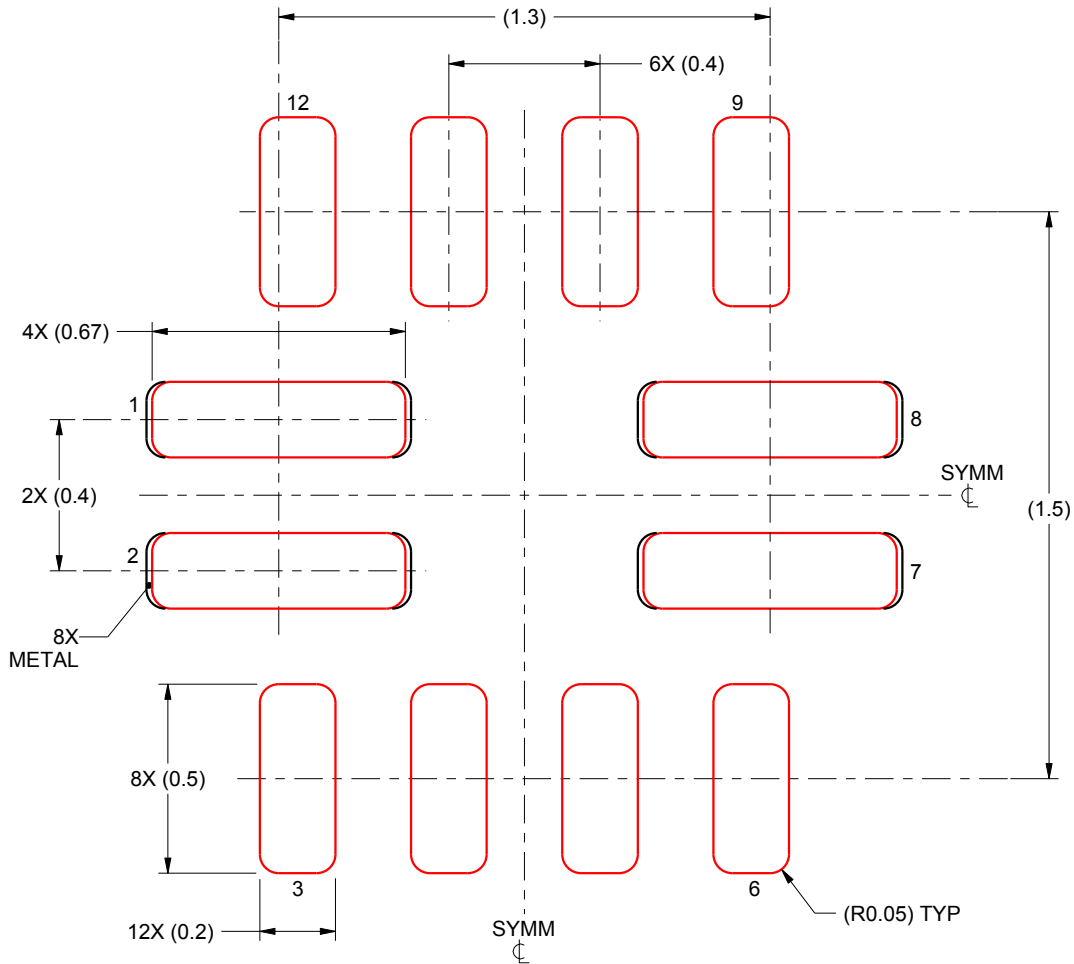
3. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

EXAMPLE STENCIL DESIGN

RWB0012A

X2QFN - 0.4 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
PADS 1,2,7 & 8
96% PRINTED SOLDER COVERAGE BY AREA
SCALE:50X

4221631/A 12/2014

NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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