SN75LVPE802 Two-Channel 8 Gbps SATA Express Equalizer and Redriver

1 Features

- Q100 Automotive Qualified
- SATA Express Support
- Selectable Equalization and De-Emphasis
- Hot Plug Capable
- Receiver Detect and OOB Support
- Integrated Output Squelch
- Multirate Operation
  - SATA: 1.5 Gpbs, 3 Gpbs, 6 Gpbs
  - PCIe: 2.5 Gbps, 5 Gbps, 8 Gbps
- Excellent Jitter and Loss Compensation Capability to Over 24-Inch (61-cm) FR4 Trace
- Low Power
  - < 220 mW (Typical)
  - < 50 mW (in Auto Low-Power Mode)
  - < 5 mW (in Standby Mode)
- 20-Pin 4-mm × 4-mm QFN Package
- High Protection Against ESD Transient
  - HBM: 10,000 V
  - CDM: 1,500 V
  - MM: 200 V

2 Applications

- Tablets
- Notebooks
- Desktops
- Docking Stations

3 Description

The SN75LVPE802 is a versatile dual channel, SATA Express signal conditioner supporting data rates up to 8 Gbps. The device supports SATA Gen 1, 2, and 3 specifications as well as PCIe 1, 2, 3. The SN75LVPE802 operates from a single 3.3-V supply and has 100-Ω line termination with self-biasing feature, making the device suitable for AC coupling. The inputs incorporate an out-of-band (OOB) detector, which automatically squelches the output when the input differential voltage falls below threshold while maintaining a stable common-mode voltage. The device is also designed to handle spread spectrum clocking (SSC) transmission per SATA standard.

The SN75LVPE802 handles interconnect losses at its input with selectable equalization settings that can be programmed to match the loss in the channel. For data rates of 3 Gbps and lower, the SN75LVPE802 equalizes signals for a span of up to 50 inches of FR4 board material. For data rates of 8 Gbps, the device compensates up to 40 in of FR4 material. The equalization level is controlled by the setting of the signal control pin EQ.

Two de-emphasis levels can be selected on the transmit side to provide 0 or 1.2 dB of additional high-frequency loss compensation at the output.

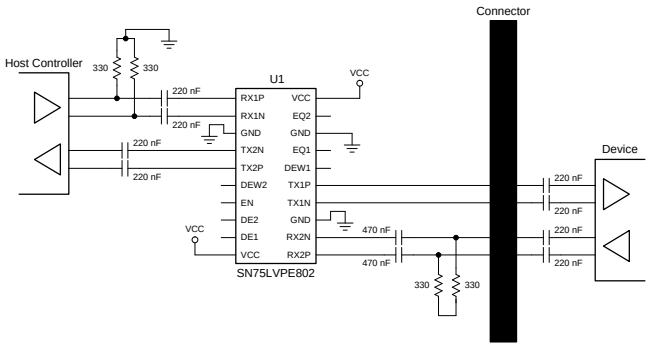
The device is hot-plug capable (requires use of AC coupling capacitors at differential inputs and outputs) preventing device damage under device hot-insertion such as async signal plug/removal, unpowered plug/removal, powered plug/removal, or surprise plug/removal.

Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
SN75LVPE802	WQFN (20)	4.00 mm x 4.00 mm

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

Simplified Schematics



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.

TI E2E™ Online Community ***TI's Engineer-to-Engineer (E2E) Community.*** Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

4.2 Trademarks

E2E is a trademark of Texas Instruments.
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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
SN75LVPE802RTJR	PREVIEW	QFN	RTJ	20	3000	TBD	Call TI	Call TI	-40 to 85	LVP802	
SN75LVPE802RTJT	PREVIEW	QFN	RTJ	20	250	TBD	Call TI	Call TI	-40 to 85		

(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)

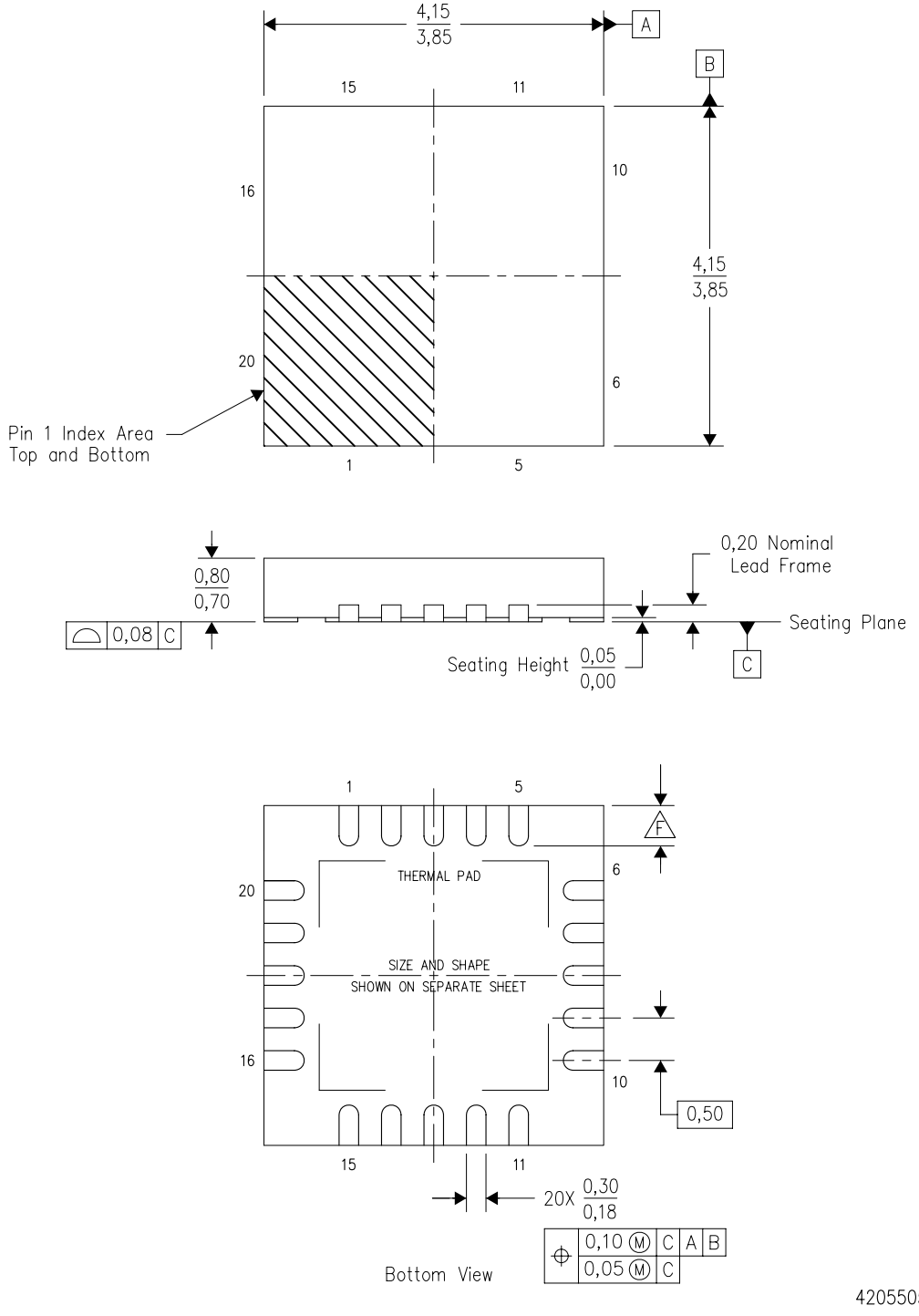
(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(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.

RTJ (S–PWQFN–N20) PLASTIC QUAD FLATPACK NO–LEAD



NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5–1994.
B. This drawing is subject to change without notice.
C. QFN (Quad Flatpack No–Lead) package configuration.
D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
F. Check thermal pad mechanical drawing in the product datasheet for nominal lead length dimensions.

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