DS90UB953-Q1 MIPI CSI-2 FPD-Link III Serializer for 2MP/60fps Cameras and RADAR

1 Features

- AEC-Q100 Qualified for Automotive Applications:
  - Device Temperature Grade 2:–40°C to +105°C Ambient Operating Temperature Range
  - Device HBN ESD Classification Level ±4kV
  - Device CDM EDS Classification Level C
- Serializer/Deserialiser (SerDes) Chipset, Supporting Automotive Driver Assist Camera Image Sensors
- FPD-Link III Serial Interface
- MIPI D-PHY / CSI-2 Version 1.1 Compliant System Interface
  - Supports 1,2 or 4 Lane
  - Supports up to 830 Mbps per lane (4 lanes)
  - Supports up to 1.5Gbps/lane (1 or 2 lanes)
- Multi-Camera Synchronization
- Monitoring/Reporting for Diagnostics
- Supports Coax or Shielded Twist-Pair (STP) Cable
- Receivers support Adaptive Receive Equalization
- High-Speed Bi-Directional Control Data Channel Supporting GPIOs and I²C
- I²C with High-Speed Mode
- Single Power Supply at 1.8V
- Typical Power Dissipation 0.325W
- Wide Temperature Range: –40°C to 105°C
- Small Serializer QFN Package and Footprint (5 mm x 5 mm)

2 Applications

- AUTOMOTIVE DRIVER ASSIST
  - Camera Monitor Systems (CMS)
  - Surround View Systems for Parking Assist
  - Front Cameras for Collision Mitigation
  - Rear-View Cameras for Backup Protection
  - Interior Cameras for Driver Monitoring and Gesture Recognition

3 Description

The DS90UB953 Serializer represents the next generation in FPD-III serializers designed to support automotive cameras. These cameras may be used to support automotive driver assist systems which use multiple remote cameras. The DS90UB953 supports image sensors with resolutions of up to 1920x1200 at 60 fps. The FPD-III interface supports the video transport needs with a 4 Gbps forward channel and a 1Mbps bidirectional control channel. This is sufficient to support up to 4 MIPI CSI-2 lanes, operating at 830Mbps each, as well as the CCI control interface while still leaving room for additional support and diagnostic functions.

The DS90UB953/954 chipset is fully AEC-Q100 qualified with a –40°C to 105°C wide temperature range. The DS90UB953 serializer comes in a small footprint, Quad Flat No-Lead package option in order to support small, compact, space constrained automotive camera modules.

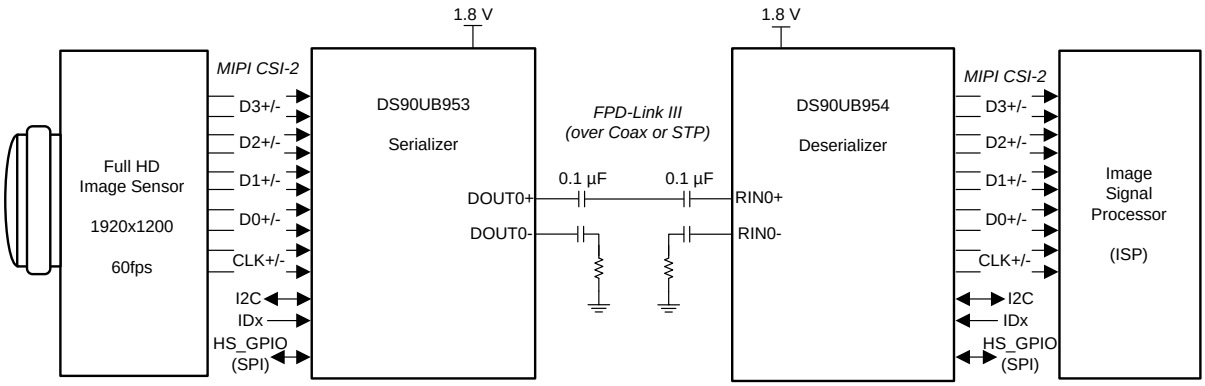
Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
DS90UB953-Q1	QFN (36)	5 mm x 5 mm

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

PRODUCT PREVIEW

Typical Application



4 Description continued

The DS90UB953 chipset is designed to drive both 50Ω Single-ended Coaxial, as well as 100Ω Shielded-Twisted Pair (STP) cable assemblies and when paired with an appropriate FPD-III Receiver can support over 15 meters of coaxial cable.

The serialized FPD-Link III interface supports video and full duplex control data transmission including GPIO, SPI, and I2C communication. The device uses a single 1.8V power supply.

5 Device and Documentation Support

5.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

5.2 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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5.3 Trademarks

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5.4 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.5 Glossary

SLYZ022 — *TI Glossary*.

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

6 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.

PRODUCT PREVIEW

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
DS90UB953TRHBRQ1	PREVIEW	VQFN	RHB	32	3000	TBD	Call TI	Call TI	-40 to 105		
DS90UB953TRHBTQ1	PREVIEW	VQFN	RHB	32	250	TBD	Call TI	Call TI	-40 to 105		

(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)

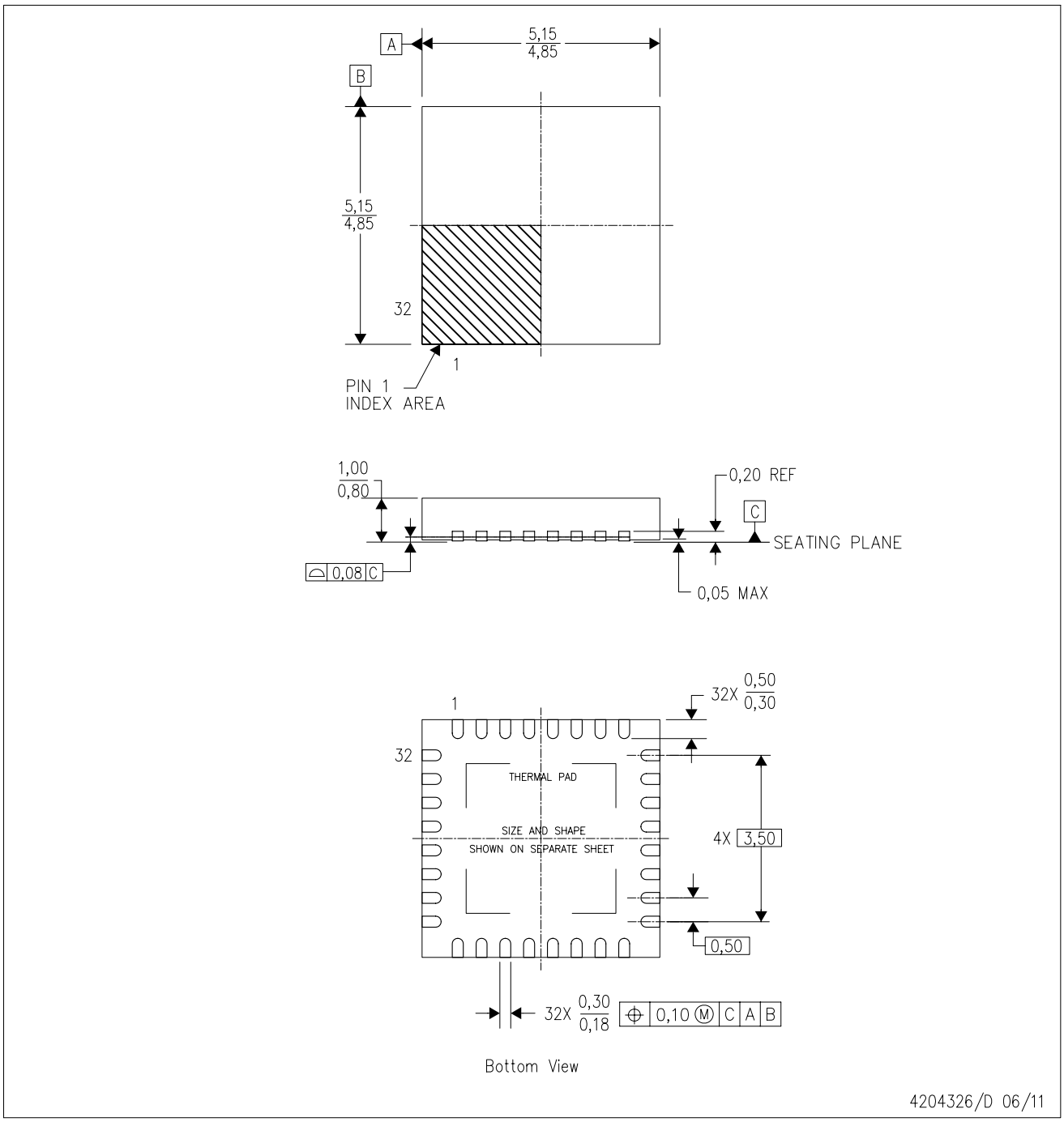
(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(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.

RHB (S–PVQFN–N32) PLASTIC QUAD FLATPACK NO–LEAD



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. 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. Falls within JEDEC MO–220.

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