

# TSER9615 V<sup>3</sup>Link™ 7.55 Gbps Serializer MIPI CSI-2 Interface for High-Speed, High-Resolution Cameras, RADAR, and Other Sensors

## 1 Features

- 7.55 Gbps (6 Gbps video payload) serializer supports high-speed sensors including 8 MP+ imagers
- Supports 3 data rates: 7.55 Gbps, 3.775 Gbps and 1.8875 Gbps.
- Power-over-Coax (PoC) compatible transceiver
- Single MIPI D-PHY port with 4 lanes
  - Compliant to MIPI D-PHY v2.1
  - 1 Clock lane and 1, 2 or 4 configurable data lanes
  - Up to 1.5 Gbps/lane
  - Supports polarity pin inversion (p/n)
  - Up to 16 virtual channels
- Single port MIPI CSI-2 receiver
  - Compliant to MIPI CSI-2 v2.1
  - Supports multiple data types and multi-exposure
- Advanced data protection and diagnostics including CRC data protection, sensor data integrity check, I<sup>2</sup>C write protection, voltage and temperature measurement, programmable alarm and line fault detection
- Flexible programmable output clock generator
- Supports single-ended coaxial cable and shielded-twisted-pair (STP) cable
- Ultra-low latency bidirectional I<sup>2</sup>C and GPIO control channel enables ISP control from ECU
- Single 1.8 V power supply
- Compatible with all V<sup>3</sup>Link Vision / Enhanced Vision deserializers
- Pin-to-pin compatible with the TSER953 serializer

## 2 Applications

- [Appliances](#)
- [Video surveillance](#)
- [Elevators and escalators](#)
- [Industrial robots](#)
- [Machine vision](#)
- [Patient monitoring and diagnostics](#)
- [Imaging](#)

## 3 Description

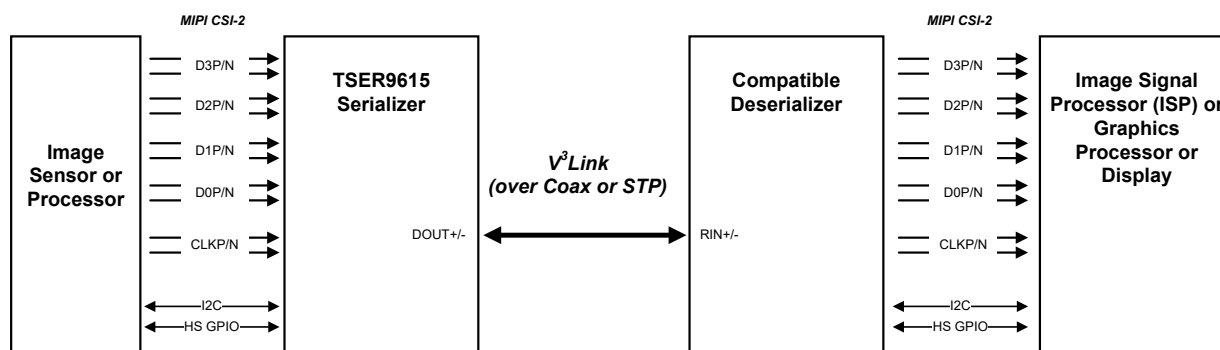
The TSER9615 serializer is part of TI's V<sup>3</sup>Link Enhanced Vision family and is designed to support ultra-high-speed data sensors including 8MP+ Imagers, satellite RADAR, LIDAR, and time-of-flight (ToF) sensors. The serializer delivers an 7.55 Gbps forward channel and an ultra-low latency, 47.1875 Mbps bidirectional control channel and supports power over a single coax (PoC) or STP cable. When the TSER9615 is used in Enhanced Vision mode, it provides the possibility to select between three data rates: 7.55 Gbps, 3.775 Gbps and 1.8875 Gbps. The TSER9615 features advanced data protection and diagnostic features. Together with a companion deserializer, the TSER9615 delivers precise multi-camera sensor clock and sensor synchronization.

The TSER9615 is qualified with a wide temperature range of –20°C to 85°C. The serializer comes in a small 5 mm × 5 mm VQFN package for space-constrained sensor applications.

### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	BODY SIZE (NOM)
TSER9615	VQFN (32)	5.00 mm × 5.00 mm

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



Typical Application



## 4 Device and Documentation Support

### 4.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* 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.

### 4.2 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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### 4.3 Trademarks

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### 4.4 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.

### 4.5 Glossary

#### [TI Glossary](#)

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

## PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">TSER9615RHBR</a>	Active	Production	VQFN (RHB)   32	3000   LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-20 to 85	T9615
TSER9615RHBR.A	Active	Production	VQFN (RHB)   32	3000   LARGE T&R	Yes	NIPDAU	Level-3-260C-168 HR	-20 to 85	T9615
<a href="#">TSER9615RHBT</a>	Active	Production	VQFN (RHB)   32	250   SMALL T&R	Yes	NIPDAU	Level-3-260C-168 HR	-20 to 85	T9615
TSER9615RHBT.A	Active	Production	VQFN (RHB)   32	250   SMALL T&R	Yes	NIPDAU	Level-3-260C-168 HR	-20 to 85	T9615

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **Lead finish/Ball material:** Parts 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.

<sup>(5)</sup> **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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## TAPE AND REEL INFORMATION



\*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
TSER9615RHBR	VQFN	RHB	32	3000	330.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2
TSER9615RHBT	VQFN	RHB	32	250	180.0	12.4	5.3	5.3	1.1	8.0	12.0	Q2

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TSER9615RHBR	VQFN	RHB	32	3000	367.0	367.0	35.0
TSER9615RHBT	VQFN	RHB	32	250	210.0	185.0	35.0

## GENERIC PACKAGE VIEW

**RHB 32**

**VQFN - 1 mm max height**

5 x 5, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.

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### VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



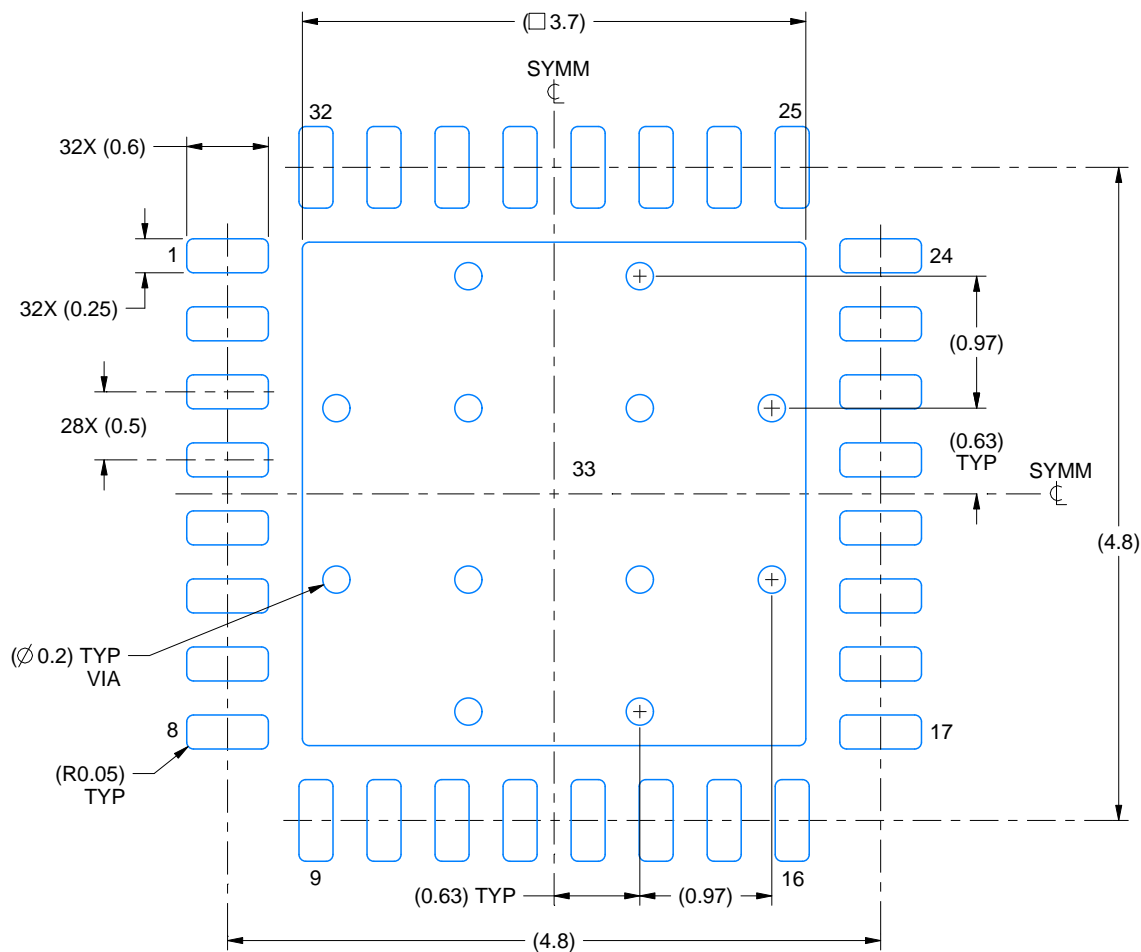
NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

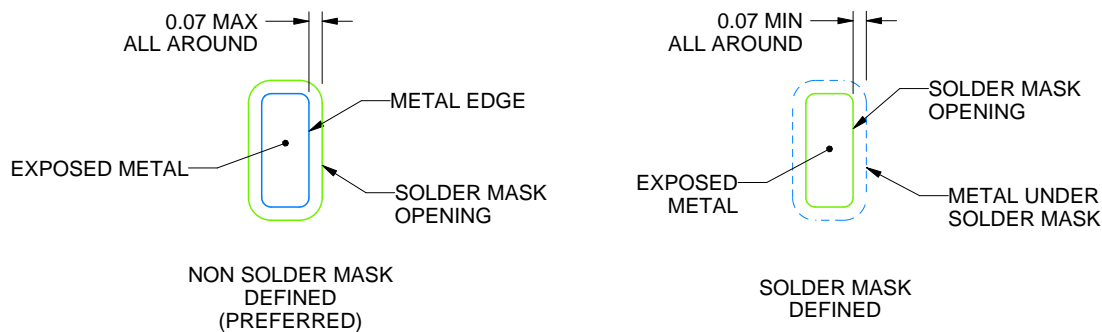
**RHB0032U**

### VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:18X



## SOLDER MASK DETAILS

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NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

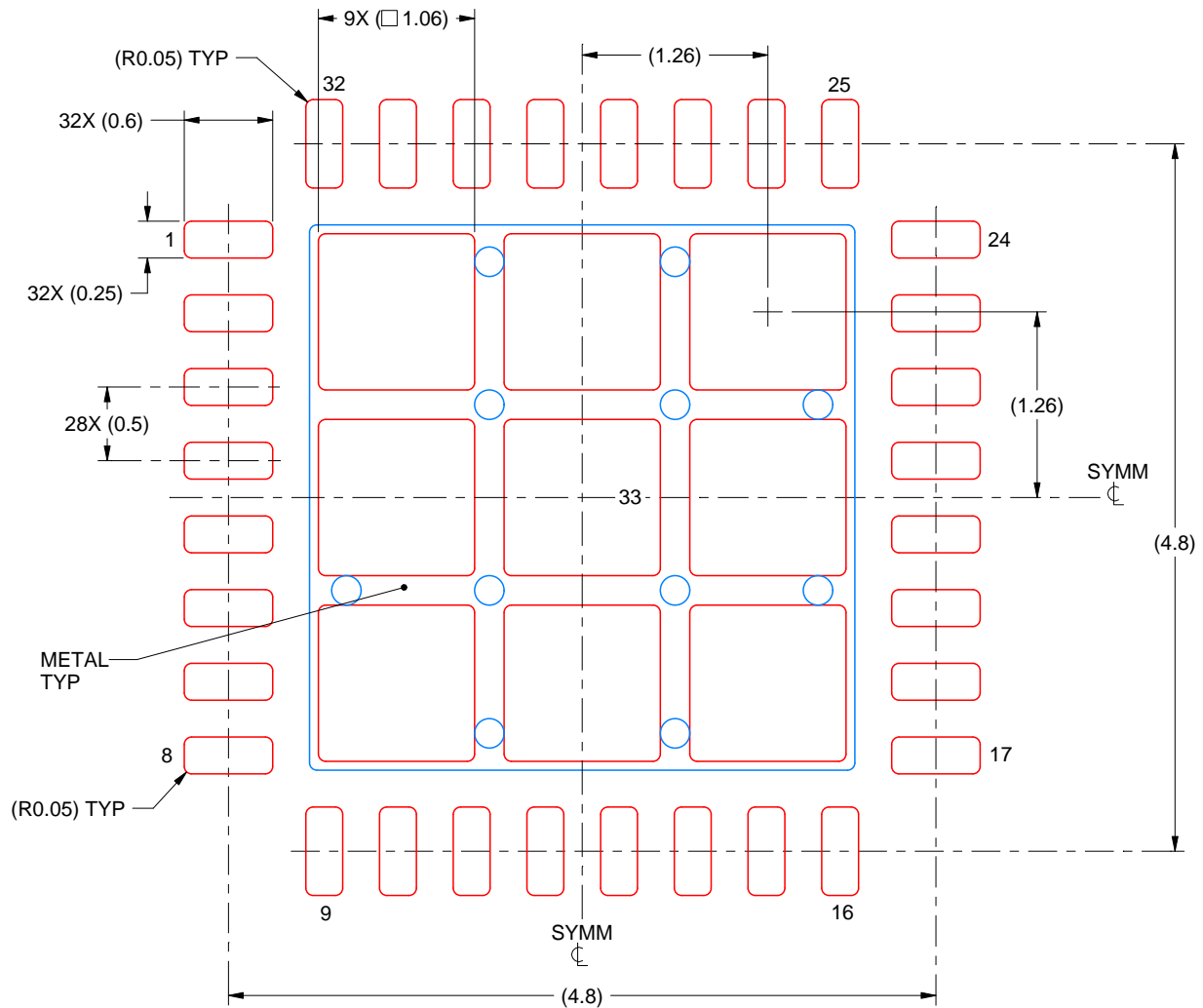


# EXAMPLE STENCIL DESIGN

RHB0032U

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



**SOLDER PASTE EXAMPLE**  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 33:  
74% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
SCALE:20X

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NOTES: (continued)

6. 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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