



Wafer-Level Chip-Scale Package Guide

Technical Note

FPGA-TN-02312-1.1

June 2022

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Acronyms in This Document

A list of acronyms used in this document.

Acronym	Definition
IC	Integrated Circuit
PCB	Printed Circuit Board
TNR	Tape-and-Reel
WLCS	Wafer-Level Chip-Scale Package

1. Introduction

Wafer-level chip-scale packages (WLCSP) are an advanced package style in which the semiconductor integrated circuit (IC) is mounted directly to the printed circuit board (PCB), face-down, by way of solder balls that are attached directly to the IC without the need for an interposer or wirebonds. This enables the use of a smaller solder ball diameter and tighter ball pitch, as well as a shorter electrical path between the IC and PCB, resulting in improved electrical and thermal performance, as well as reduced package assembly requirements.



Figure 1.1. 25-Ball WLCSP Package (Actual Size: 2.5x2.5 mm)

2. WLCSP Shipping Options

WLCSP devices are offered in 13" tape-and-reel (TNR) shipping configurations except 1000 units per reel smaller devices may use 7" tape-and-reel. Figure 2 shows a typical segment of carrier tape, including the pockets where the individual WLCSP devices would be placed and the sprocket holes for feeding the tape into automated assembly equipment. The devices are placed with the solder balls facing down and pin 1 orientation for all devices in the same location. Adhesive cover tape (not shown) is used to seal the devices in their pockets.

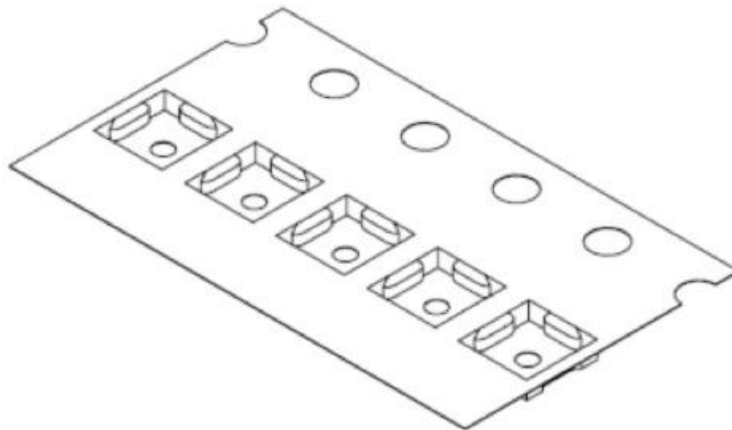


Figure 2.1. Carrier Tape

3. WLCSP PCB Layout and Considerations

WLCSP packages are similar to other BGA packages with regard to the PCBs the packages are to be mounted on. PCB layout design and breakout suggestions are outlined in [PCB Layout Recommendations for BGA Packages \(FPGA-TN-02024\)](#). For application-specific assembly guidance, consult the design guidelines of the assembly service provider.

4. WLCSP Solder Reflow and Rework

Assembly and rework parameters for WLCSP packages are similar to other BGA packages. Please refer to [Solder Reflow Guide for Surface Mount Devices \(FPGA-TN-02041\)](#), which outlines the reflow parameters for all of the various package styles offered, including WLCSP.

Technical Support Assistance

Submit a technical support case through www.latticesemi.com/techsupport.

Revision History

Revision 1.1, June 2022

Section	Change Summary
All	<ul style="list-style-type: none">Changed the document number from TN1242 to FPGA-TN-02312.Migrated the document to new template.
WLCSP Shipping Options	Added the option '7" tape-and-reel' for smaller devices.

Revision 1.0, June 2011

Section	Change Summary
All	Initial release



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