



Cross-Ship of Lead-Free Bump in Lead-Free Substrates for Virtex-4 FPGAs (FFG/SFG Packages)

XCN20006 (v1.1) December 7, 2020

Product Change Notice

Overview

The purpose of this notification is to announce Xilinx® will begin the transition to lead-free materials of the devices in the Virtex®-4 FPGAs product family as a continuation of [XCN19005](#). Defense-grade “XQ” and Automotive “XA” device-packages are not affected by this PCN.

Xilinx lead-free flip-chip products denoted by the package code “FFG” or “SFG” will be shipped with *either* the current eutectic C4 bump and associated substrate *or* the new lead-free C4 bump and associated lead-free substrate. These packages meet JEDEC Publication 95 SPP-024 guideline of 10 mil (0.25mm) coplanarity specification at room temperature. Xilinx recommends reviewing existing reflow profiles to ensure they meet JEDEC Publication 95 SPP-024 requirements.

Current non lead-free flip-chip products denoted by the package code “FF” or “SF” will also be shipped with *either* the current eutectic C4 bump and associated substrate *or* the new lead-free C4 bump and associated lead-free substrate. The BGA solder balls will remain eutectic.

There are no changes to reliability, form, fit, or function.

Description

Xilinx offers lead-free components that comply with the European Union’s RoHS-3 directive (2015/863) identified by adding the character “G” to the package designator portion of the part number. Under the current RoHS directive Exemption 15a, Xilinx large die flip-chip packages are exempt from the full lead-free requirements. Exemption 15a specifies that lead is allowed in solder bumps to complete a viable electrical connection between semiconductor die and substrate within integrated-circuit flip-chip packages for single die of 300 mm² or larger in any semiconductor technology node.

Specific material changes include the C4 bump, substrate, and underfill used in assembly. The current RoHS parts in “G” packages use bumps, substrate, and underfill appropriate for eutectic solder (*eutectic material set*). The new bumps, substrate, and underfill (*lead-free material set*) enables the use of fully lead-free solder bumps. There are no differences in package reliability, form, fit or function using the lead-free material set. There are no external dimension changes for lead-free packages (BGA balls will remain lead-free). There are no changes to the package outline drawing.

Products Affected

This change affects all speed, package, and temperature variations of “XC” commercial (C), industrial (I) and extended (E) device-package combinations listed in the tables below. Any associated Specification Control Documents (SCDs) are also affected.

Table 1: Virtex-4 Products Affected

Device	Package	Device	Package
XC4VFX100	FF1152	XC4VLX160	FF1513
XC4VFX100	FFG1152	XC4VLX160	FFG1513
XC4VFX100	FF1517	XC4VLX200	FF1513
XC4VFX100	FFG1517	XC4VLX200	FFG1513
XC4VFX12	FF668	XC4VLX25	FF668
XC4VFX12	FFG668	XC4VLX25	FFG668
XC4VFX12	SF363	XC4VLX25	SF363
XC4VFX12	SFG363	XC4VLX25	SFG363
XC4VFX140	FF1517	XC4VLX40	FF1148
XC4VFX140	FFG1517	XC4VLX40	FFG1148
XC4VFX20	FF672	XC4VLX40	FF668
XC4VFX20	FFG672	XC4VLX40	FFG668
XC4VFX40	FF1152	XC4VLX60	FF1148
XC4VFX40	FFG1152	XC4VLX60	FFG1148
XC4VFX40	FF672	XC4VLX60	FF668
XC4VFX40	FFG672	XC4VLX60	FFG668
XC4VFX60	FF1152	XC4VLX80	FF1148
XC4VFX60	FFG1152	XC4VLX80	FFG1148
XC4VFX60	FF672	XC4VSX25	FF668
XC4VFX60	FFG672	XC4VSX25	FFG668
XC4VLX100	FF1148	XC4VSX35	FF668
XC4VLX100	FFG1148	XC4VSX35	FFG668
XC4VLX100	FF1513	XC4VSX55	FF1148
XC4VLX100	FFG1513	XC4VSX55	FFG1148
XC4VLX15	FF668	XCE04F10	FF1152
XC4VLX15	FFG668	XCE04L10	FF1513
XC4VLX15	SF363	XCE04L4	FF1148
XC4VLX15	SFG363	XCE04L6	FF1148
XC4VLX160	FF1148	XCE04L8	FFG1148
XC4VLX160	FFG1148	XCE04S2	FFG668

Key Dates and Ordering Information

Xilinx will begin cross-shipping the new material set for C4 bumps, substrate, and underfill on February 10, 2021.

Until the cross-ship date, products with “G” packages will only be shipped with the eutectic material set. After the cross-ship date, the products with “G” packages will be shipped with *either* eutectic or lead-free material sets. All products with “G” packages are expected to ship with the lead-free material set when the RoHS directive removes Exemption 15a.

Traceability

To enable traceability, any products with “G” packages shipped that use the new lead-free material set will be marked with a special Pb-Free character in the upper right corner of the part as shown in [Figure 1](#) below. There will be no mark for the eutectic material set. Marking changes are reflected in the product documents [UG075](#), available on www.xilinx.com. The RoHS compliant mark will not be on the FF or SF packages with eutectic BGA solder balls.

Lead-free material can be also identified in the MBB (Moisture Barrier Bag) and inner box labels (trays or tubes) as shown in [Figure 2](#). For bare-die products, customers shall optimize their reflow profile accordingly.



Figure 1: Package Topmark Example

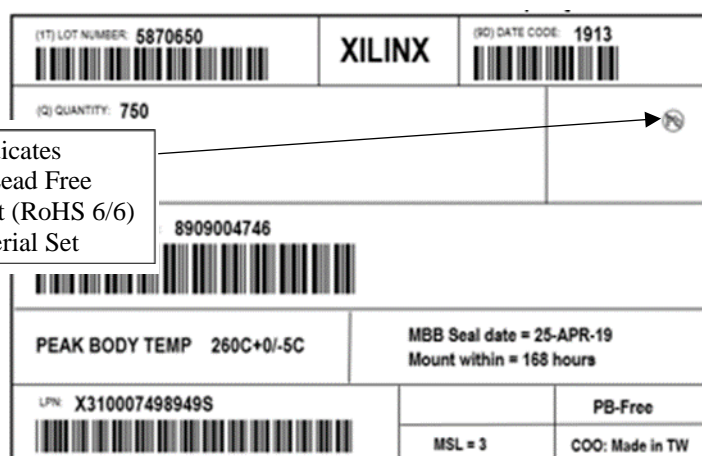


Figure 2: MBB / Inner Bag Label Example

Note: Refer to [XCN16014](#) for 2D barcode additional marking.

Qualification Data

Qualification data will be available upon request.

Response

Acknowledgement required within 30 days of receipt of this notice. No feedback or response of the PCN within 30 days constitutes acceptance of the change. For additional information or questions, please contact your Xilinx sales representative.

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The following table shows the revision history for this document.

Date	Version	Revision
08/24/2020	1.0	Initial release.
12/07/2020	1.1	Added coplanarity specification statement.

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