



# Lead-Free Bump Conversion for Virtex-4/-5/-6 and Series 7 FPGAs Defense (XQ) and Space (XQR) Flip-Chip Products

XCN21013 (v1.1) September 12, 2022

Product Change Notice

## Overview

The purpose of this notification is to announce the transition to lead-free C4 bump and lead free substrates for the Defense-grade flip chip “XQ” devices in the Virtex<sup>®</sup>-4, Virtex<sup>®</sup>-5, Virtex<sup>®</sup>-6 and Series 7 FPGAs product families. In addition, the Space-grade flip chip “XQR5VFX130 and XQRKU060” devices will also convert to lead-free C4 bumps.

This change is required since Xilinx’s bumping supplier is discontinuing their SnPb bumping line. All other Xilinx commercial-grade “XC” and defense-grade “XQ” product are already in production with lead-free C4 bumps (Ref [XCN16022](#) & [XCN20006](#)). This includes the “XQ” UltraScale™ and UltraScale+™ device families.

Current non-lead-free flip-chip products in Tables 1-4 denoted by the package code “FF”, “FFG”, “EF”, “RF”, “RFG”, “CN”, “CNA”, “RB”, “RS”, “SF” or “Die” 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. The BGA solder balls will remain eutectic, and the CN solder columns will not change.

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

## Description

The conversion to lead-free bumps on the “XQ” product will necessitate specific material changes to the C4 bumps, the organic package substrates, and the underfill used in assembly. The current material set uses C4 bumps, substrates, 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.

The conversion to lead-free bumps on the “XQR5VFX130” space-grade device will necessitate specific material changes to the C4 bump and the underfill used in assembly while the “XQRKU060” space-grade device will only have the C4 bump material changed. There is no change in the material set of the XQR5VFX130 and XQRKU060 ceramic package substrates.

There are no differences in the package reliability, form, fit or function with the change to lead-free bumps. There are no external dimension changes to the packages. For the “XQ” the BGA solder balls will remain Eutectic SnPb and the “XQR” will remain with solder columns. The “XQ” BGA packages meet JEDEC Publication 95 SPP-024 guideline of 10 mil (0.25mm) coplanarity specification at room temperature.

## Products Affected

This change affects all speed, package, and temperature variations of “XQ” defense-grade and “XQR” space-grade device-package combinations listed in the tables below. Any associated Specification Control Documents (SCDs) are also affected.

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Table 1: Virtex-4 Products Affected

Device	Package
XQ4VFX100	FF1152
XQ4VFX60	FFG1152
XQ4VLX100	FF1148
XQ4VLX25	FF668
XQ4VLX25	SF363
XQ4VLX40	FF668
XQ4VLX60	EF668
XQ4VLX60	FF1148
XQ4VLX60	FF668
XQ4VLX80	FF1148
XQ4VSX55	FF1148
XQ4VFX100	DIE
XQ4VLX25	DIE
XQ4VLX60	DIE

Table 2: Virtex-5 Products Affected

Device	Package
XQ5VFX100T	EF1136
XQ5VFX130T	EF1738
XQ5VFX200T	FF1738
XQ5VFX70T	EF1136
XQ5VLX110T	EF1136
XQ5VLX155T	EF1136
XQ5VLX220T	EF1738
XQ5VLX330T	EF1738
XQ5VSX240T	FF1738
XQ5VSX50T	EF665
XQ5VLX110	EF676
XQ5VLX85	EF676
XQ5VFX130T	DIE
XQ5VFX200T	DIE
XQ5VLX220T	DIE
XQ5VSX50T	DIE

Table 3: Virtex-6 Products Affected

Device	Package
XQ6VLX240T	RF1759
XQ6VLX240T	RF1156
XQ6VLX130T	RF1156
XQ6VLX240T	RF784
XQ6VLX130T	RF784
XQ6VLX130T	DIE

Table 4: Series 7 and XQDAISY Products Affected

Device	Package
XQ7A200T	RB484
XQ7A200T	RB676
XQ7A200T	RS484
XQ7K325T	RF676
XQ7K325T	RF900
XQ7K410T	RF900
XQ7VX690T	RF1158
XQ7VX690T	RF1761
XQ7VX485T	RF1761
XQ7Z030	RB484
XQ7Z030	RF676
XQ7Z045	RF676
XQ7Z045	RF900
XQ7Z045	RF676
XQ7Z100	RF1156
XQ7Z100	RF900
XQ7K325T	DIE
XQDAISY	CN1752
XQDAISY	CNA1509

Table 5: XQR Products Affected

Device	Package
XQRKU060	CNA1509
XQRKU060	DIE
XQR5VFX130	CN1752
XQR5VFX130	DIE



## Key Dates and Ordering Information

XQ devices qualification is complete enabling cross-shipping with the new material set for C4 bumps, substrate, and underfill starting in December 2022. Until the cross-ship date, products will only be shipped with the eutectic material set. After the cross-ship date, the products will be shipped with *either* eutectic or lead-free material sets.

XQR devices will transition to new material upon qualification completion by 2023. This PCN will be updated to reflect the cut over date codes. Until then, devices will only be shipped with the eutectic material set.

## 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 AMD-Xilinx sales representative.

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## Revision History

The following table shows the revision history for this document.

Date	Version	Revision
10/04/2021	1.0	Initial release - Early Access
09/12/2022	1.1	Initial release - Publication

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