Cross-Ship of Lead-Free Bump in Lead-Free Substrates for Large Die (FFG/FBG/SBG Packages)

XCN19005 (v1.2) December 16, 2019 Product Change Notice

Overview

The purpose of this notification is to announce Xilinx® will begin the transition to lead-free materials of the larger devices in the Virtex®-5, Virtex®-6, Artix®-7, Kintex®-7, Virtex®-7 FPGAs and Zynq®-7000 product families as a continuation of XCN16022. 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", "FBG", or "SBG" 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 for large device sizes (>=300mm^2).

Current non lead-free flip-chip products denoted by the package code "FF", "FB", or "SB" 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 mm^2 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.

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Table 1: **Virtex-5 Products Affected**

Device	Package
XC5VFX130T	FF1738
XC5VFX130T	FFG1738
XC5VFX200T	FF1738
XC5VFX200T	FFG1738
XC5VLX220	FF1760
XC5VLX220	FFG1760
XC5VLX220T	FF1738
XC5VLX220T	FFG1738
XC5VLX330	FF1760
XC5VLX330	FFG1760
XC5VLX330T	FF1738
XC5VLX330T	FFG1738
XC5VLX330T	PF1738
XC5VLX330T	PFG1738
XC5VSX240T	FF1738
XC5VSX240T	FFG1738
XC5VTX150T	FF1156
XC5VTX150T	FFG1156
XC5VTX150T	FF1759
XC5VTX150T	FFG1759
XC5VTX240T	FF1759
XC5VTX240T	FFG1759
XC5VFX100T	FF1136
XC5VFX100T	FF1738
XC5VFX30T	FF665
XC5VFX70T	FF1136
XC5VFX70T	FF665
XC5VLX110	FF1153
XC5VLX110	FF1760
XC5VLX110	FF676

Device	Package
XC5VLX110T	FF1136
XC5VLX110T	FF1738
XC5VLX155	FF1153
XC5VLX155	FF1760
XC5VLX155T	FF1136
XC5VLX155T	FF1738
XC5VLX20T	FF323
XC5VLX30	FF676
XC5VLX30	FF324
XC5VLX30T	FF665
XC5VLX30T	FF323
XC5VLX50	FF676
XC5VLX50	FF1153
XC5VLX50	FF324
XC5VLX50T	FF1136
XC5VLX50T	FF665
XC5VLX85	FF1153
XC5VLX85	FF676
XC5VLX85T	FF1136
XC5VSX35T	FF665
XC5VSX50T	FF665
XC5VSX50T	FF1136
XC5VSX95T	FF1136
XCE05L22T	FF1738
XCE05L22T	FFG1738
XCE05L33	FFG1760
XCE05T24T	FFG1759
XCE05L11T	FF1136
XC5VSX95T	DIE

Table 2: **Virtex-6 Products Affected**

Device	Package	Device	Package
XC6VHX380T	FF1924	XC6VSX475T	FF1156
XC6VHX380T	FFG1924	XC6VSX475T	FFG1156
XC6VHX380T	FF1155	XC6VSX475T	FF1759
XC6VHX380T	FFG1155	XC6VSX475T	FFG1759
XC6VHX380T	FF1923	XC6VCX130T	FF784
XC6VHX380T	FFG1923	XC6VCX130T	FF1156
XC6VHX380T	FF1154	XC6VCX130T	FF484
XC6VHX380T	FFG1154	XC6VCX195T	FF1156
XC6VHX565T	FF1923	XC6VCX195T	FF784
XC6VHX565T	FFG1923	XC6VCX240T	FF1156
XC6VHX565T	FF1924	XC6VCX240T	FF784
XC6VHX565T	FFG1924	XC6VCX75T	FF484
XC6VLX365T	FF1156	XC6VCX75T	FF784
XC6VLX365T	FFG1156	XC6VHX250T	FF1154
XC6VLX365T	FF1759	XC6VHX255T	FF1155
XC6VLX365T	FFG1759	XC6VLX130T	FF784
XC6VLX550T	FF1759	XC6VLX130T	FF1156
XC6VLX550T	FFG1759	XC6VLX130T	FF484
XC6VLX550T	FF1760	XC6VLX195T	FF1156
XC6VLX550T	FFG1760	XC6VLX195T	FF784
XC6VLX760	FF1760	XC6VLX240T	FF1156
XC6VLX760	FFG1760	XC6VLX240T	FF1759
XC6VSX315T	FF1759	XC6VLX240T	FF784
XC6VSX315T	FFG1759	XC6VLX75T	FF484
XC6VSX315T	FF1156	XC6VLX75T	FF784
XC6VSX315T	FFG1156	XC6VLX240T	DIE

Table 3: **7-Series Product Affected**

Device	Package
XC7VX485T	FF1761
XC7VX485T	FFG1761
XC7VX485T	FF1930
XC7VX485T	FFG1930
XC7VX485T	FFG1158
XC7VX485T	FF1157
XC7VX485T	FFG1157
XC7VX485T	FF1927
XC7VX485T	FFG1927
XC7VX550T	FFG1158
XC7VX550T	FFG1927
XC7VX690T	FF1761
XC7VX690T	FFG1761
XC7VX690T	FF1930
XC7VX690T	FFG1930
XC7VX690T	FF1926
XC7VX690T	FFG1926
XC7VX690T	FF1157
XC7VX690T	FFG1157
XC7VX690T	FF1158
XC7VX690T	FFG1158
XC7VX690T	FF1927
XC7VX690T	FFG1927
XC7VX980T	FFG1928
XC7VX980T	FF1930
XC7VX980T	FFG1930
XC7VX980T	FF1926
XC7VX980T	FFG1926
XC7A200T	SB484
XC7A200T	FB676
XC7A200T	FB484
XC7A200T	FF1156
XC7K160T	FB484
XC7K160T	FB676
XC7K160T	FF676

Device	Package
XC7K325T	FF900
XC7K325T	FB900
XC7K325T	FF676
XC7K325T	FB676
XC7K355T	FF901
XC7K410T	FF676
XC7K410T	FB900
XC7K410T	FF900
XC7K420T	FF901
XC7K480T	FF1156
XC7K480T	FF901
XC7K70T	FB676
XC7K70T	FB484
XC7V585T	FF1761
XC7V585T	FF1157
XC7VX330T	FF1761
XC7VX330T	FF1157
XC7VX415T	FF1927
XC7VX415T	FF1157
XC7VX415T	FF1158
XC7Z030	FF676
XC7Z030	SB485
XC7Z030	FB484
XC7Z045	FF900
XC7Z045	FF676
XC7Z100	FF900
XC7VX485T	DIE
XC7VX690T	DIE
XC7Z030	DIE
XC7Z045	DIE
XC7Z100	DIE
XC7A200T	DIE
XC7K160T	DIE
XC7K325T	DIE
XC7K70T	DIE
XC7V585T	DIE

Key Dates and Ordering Information

Xilinx will begin cross-shipping the new material set for C4 bumps, substrate, and underfill on January 1, 2020. 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. Bare-die products will have clear cutoff dates.

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 UG195, UG475, UG365 and UG865, available on www.xilinx.com. The RoHS compliant mark will not be on the FF, FB or SB 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**

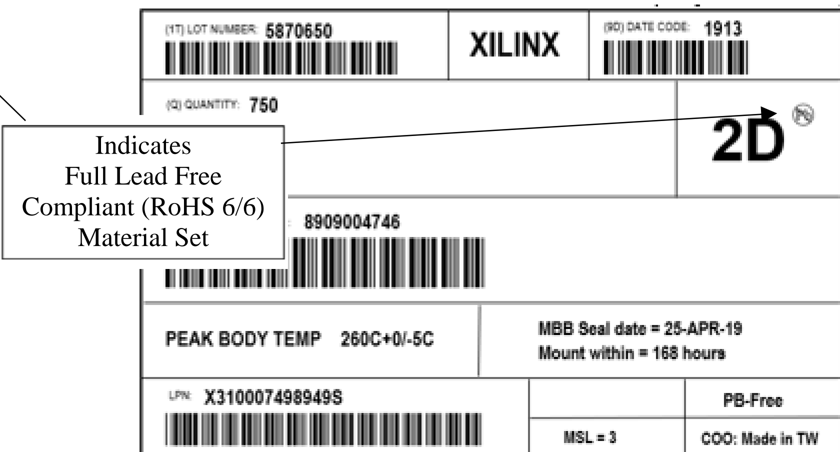

Figure 2: **MBB / Inner Bag Label Example**

Note: Refer to XCN16014 for 2D barcode additional marking.

Qualification Data

Qualification data will be available upon request.

Response

No response is required.

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Revision History

The following table shows the revision history for this document.

Date	Version	Revision
07/01/2019	1.0	Initial release.
10/14/2019	1.1	Added XC7A200T-DIE to Table 3.
12/16/2019	1.2	Added bare-die traceability.

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