

PROCESS CHANGE NOTIFICATION

PCN0715

ALTERNATE KYOCERA SUBSTRATE FOR FLIP-CHIP PACKAGES

Change Description

This is an update to PCN0715, published Oct 2007. Altera is introducing an alternate Kyocera substrate as an additional source for the Stratix[®] FPGA Flip-Chip packages. This change is being implemented with the intent to utilize this alternate Kyocera (LFSOP) substrate in place of the current ENIG substrate. Kyocera is a fully qualified substrate supplier which is used for other Altera packages.

The Stratix FPGA Flip-Chip packages are built with either a Kyocera or Kinsus substrate. The alternate Kyocera lead-free SOP (LFSOP) substrate will be fabricated with materials, configuration and technology that differ from the existing substrate materials. For customers receiving the existing Kyocera (ENIG) substrate, there will be a slight reduction in the overall package height of approximately 0.2 mm when moving to the alternate (LFSOP) substrate. For customers currently receiving Kinsus substrates, the overall package outline dimensions will remain unchanged. A summary of package construction properties is provided in Table 1.

This change does not affect the current moisture sensitivity rating levels (per JEDEC J-STD-020C).

Reason for Change

Altera is introducing the alternate Kyocera (LFSOP) substrate as an additional source to better support future demand. This change will also allow Altera to standardize the flip-chip package outline dimensions for the Stratix family BGA packages. In addition, LFSOP surface finish has better shock resistance compared to ENIG.

In effort to maintain a dual source strategy for critical materials, Altera will continue to have the flexibility to ship product using both Kinsus (Electrolytic) and Kyocera (LFSOP) substrates.

Table 1: Summary of Package Construction

Item	Current Kinsus Substrate	Current Kyocera Substrate	Alternate Kyocera Substrate
Core Height	0.8 mm	1.0 mm	0.8 mm
Ball Pad Surface Finish	Electrolytic (NiAu)	ENIG (Electroless Nickel Immersion Gold)	LFSOP (Lead-free Solder-On-Pad) SnAgCu
Build-Up Material	ABF-GX3	ABF-SH9K	ABF-GX3

Products Affected

Table 2 lists the products affected by this change. A list of ordering part numbers is available upon request.

Table 2: Affected Product Lines

Stratix Product Line	Pin Count	Package Type	Current Substrate Options		Migrate to Alternate Source	Product Transition Time Frame
			Kyocera (ENIG) (1.0 mm)	Kinsus (Electro) (0.8 mm)	Kyocera (SOP) (0.8mm)	
EP1S10	484	FBGA	√	√	√	February 2008
	780		√	√		February 2008
EP1S20	484	FBGA	√	√	√	March 2008
	780		√	√		February 2008
EP1S25	780	FBGA	√	√	√	February 2008
	1020		√	n/a		February 2008
EP1S30	780	FBGA	√	√	√	February 2008
	1020		√	√		February 2008
EP1S40	780	FBGA	√	√	√	March 2008
	1020		√	√		February 2008
	1508		√	n/a		March 2008
EP1S60	956	BGA	√	n/a	√	April 2008
	1020	FBGA	√	√		February 2008
	1508		√	n/a		March 2008
EP1S80	956	BGA	√	n/a	√	March 2008
	1020	FBGA	√	√		February 2008
	1508		√	√		March 2008

Notes:

- Changes from Kyocera to Alternate Kyocera include: package height, plating finish and BU material
- Changes from Kinsus to Alternate Kyocera include: plating finish only

Product Traceability and Transition Dates

Customers may receive products with this change beginning with a date code marking of 0749 on the top of the package. See Figure 1. The products listed in Table 2 will transition to the new substrate as existing substrate inventories are consumed.

Figure 1. Date Code Marking

Altera Date Code Marking Format
A XβZαα 0749 T

Qualification Data

Qualification data is listed below. See Table 3.

Table 3: Summary of the Qualification Data

Representative Packages	Qualification Test	Read Out	Results
FC1020	Life Test	1000 hrs	0 /25
	High Temp Bake @150°C	1000 hrs	0 /27
	PCL 3 + Temp Humidity Bias (85°C /85% RH)	1000 hrs	0 /25
	PCL 3 + Temp Cycle "B" (-55°C to 125°C)	1000 cyc	0 /25
	PCL 3 + Unbiased HAST (130°C/85%RH)	96 hrs	0 /26
FC1508	Life Test	1000 hrs	0 /25
	High Temp Bake @ 150°C	1000 hrs	0 /25
	PCL 3 + Temp Humidity Bias (85°C /85% RH)	1000 hrs	0 /25
	PCL 3 + Temp Cycle "B" (-55°C to 125°C)	1000 cyc	0 /50
	PCL 3 + Unbiased HAST (110°C/85%RH)	264 hrs	0 /25

Contact

For more information, please contact your local Altera sales representative or Altera Customer Quality Engineering at customer-quality@altera.com.

In accordance with JESD46-C, this change is deemed acceptable to the customer if no acknowledgement is received within 30 days from this notification.

Revision History

Date	Rev	Description
10/03/2007	1.0.0	Initial Release
12/12/2007	1.0.1	Revise qualification results date to "Dec 07"
01/11/2008	1.1.1	Added qual data and minor edits for better clarification