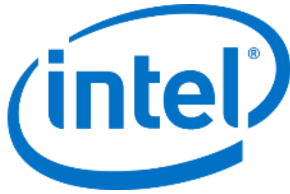

Revision 1.1.0
PCN Issue Date: 09/27/2017

PROCESS CHANGE NOTIFICATION
PCN1714

Substrate Material Change for Selected Ball Grid Array – Wire Bond Package Types

This is not a new PCN issuance.

PCN1714 Rev 1.1.0 includes the completion of the Qualification Data and the removal of 13 Ordering Part Numbers (OPNs); please see the revision history table for information specific to this update.

Change Description:

Intel® Programmable Solutions Group ("Intel PSG", formerly Altera) is announcing a change in substrate material for selected wire bond ball grid array package types.

The existing substrate material supplier is discontinuing production of the halogenated core and prepreg materials for laminated substrate by end of 2017.

The replacement material is already qualified and used in high volume on other FPGA products for >5 years.

Table 1: Changes to BOM

Product Family	Package-Pin	Affected Material	Change From	Change To
CYCLONE CYCLONE III CYCLONE III LS HARDCOPY II MAX 7000A MAX II MAX II Z	FBGA|F324 FBGA|F256 FBGA|F484 FBGA|F484 FBGA|F100|F256 FBGA|F256 FBGA|F256	Core and Prepreg Material	Mitsubishi HL832	Mitsubishi HL832NX-A
		Solder Mask Material	Taiyo AUS303	Taiyo AUS 308
CYCLONE	FBGA|F256|F324|F400	Core and Prepreg Material	Mitsubishi HL832EX	Mitsubishi HL832NX-A
		Solder Mask Material	Taiyo AUS 303	Taiyo AUS 308
CYCLONE III MAX II MAX II Z	UBGA|U256 MBGA|M256 MBGA|M100|M144|M256	Core and Prepreg Material	Mitsubishi HL832HS	Mitsubishi HL832NX-A
		Solder Mask Material	Taiyo AUS303	Taiyo AUS 308

Note: The rest of the Bill of Materials (BOM) remain the same

Products Affected:

Table 2

Package Type	Product Family	Package – Pin Count
Wire Bond	CYCLONE	FBGA - 256/324/400
	CYCLONE III	FBGA - 256; UBGA- 256
	CYCLONE III LS	FBGA - 484
	HARDCOPY II	FBGA - 484
	MAX 7000A	FBGA – 100/256
	MAX II	FBGA – 256; MBGA - 256
	MAX II Z	FBGA- 256; MBGA – 100/144/256

The list of affected OPNs can be downloaded in Excel form:
www.altera.com/content/dam/altera-www/global/en_US/pdfs/literature/pcn/pcn1714-opn-list-rev-1-1-0.xlsx

Recommended Action

Customers are requested to:

1. Acknowledge receipt of this notification.
2. Review and provide approval of this change at the earliest convenience.

Please refer to the "Product Transition Dates" for the key milestones.

Upon implementation, Intel PSG may continue to ship pre-change material until inventory is depleted.

Product Transition Dates:

Customers are requested to take note of the key dates shown in the table below.

Table 3

Milestone	***Date***
Last date to acknowledge receipt of this notification[1]	September 29, 2017
Estimated earliest shipment date of changed products[2]	February 28, 2018
Last date to order Pre-PCN material	October 30, 2017

Note 1: J-STD-046, section 3.2.3.1b, stipulates that lack of acknowledgement of the PCN within 30 days constitutes acceptance of the change.

Note 2: Effective the earliest ship date listed above, Intel PSG may begin the shipment of changed products.

Intel PSG reserves the right to continue shipment of pre-change product after the change implementation date, and customers will receive shipments of either pre-change or post-change product.

Reason for Change:

The existing substrate material supplier is discontinuing production of the halogenated core and prepreg materials for laminated substrate by end of year 2017. The supplier is no longer able to maintain consistent production efficiency and short lead times of halogenated materials due to decreasing demand.

The halogen-free core, prepreg, and solder mask materials also support corporate and customer green initiatives related to controlled or restricted substances.

Impact and Benefit of Change:

The change will not impact the form, fit, and function of the product. Product datasheet and package specifications remain the same.
The replacement substrate material is already being used on other FPGA products and meets quality and reliability requirements.

Additional qualification has been performed to further evaluate the quality and reliability performance of the replacement substrate material applied to the product-package combination for this specific PCN. (See Qualification Data Section, Table 5)

Method to Identify Change Product:

An earliest datecode of implementation can be identified and shared upon request as reference information related to this change. This earliest datecode of implementation may vary per product and depends on the depletion of existing inventory.

Upon implementation, Intel PSG may continue to ship pre-change material until inventory is depleted.

Qualification Data:

The replacement substrate material is already qualified and being used on other FPGA products and meets quality and reliability requirements. (See Table 4)

Table 4: Existing Data from other Product-Package combination:

Test	Time point	Conditions	# of Lots	SS/lot	Results
Temperature Cycle Test (TCB)	1000X	-55°C /125°C	8	25	0/200
Temperature Humidity Bias Test (THB)	1000hrs	85°C/85% RH	8	25	0/200
Unbiased Highly Accelerated Stress Test (uHAST)	96hrs	130°C / 85%RH	8	25	0/200

Note 1: Preconditioning (J-STD-020, MSL3 @ 245C/260C) performed on all samples prior to each reliability test.
Note 2: Testing was performed using Stratix II, Stratix IV, and Arria II devices
Note 3: Rel#: 14040049, 14090025, 16040001, 14100026, 14100027, 15030037, 15080071, 15060060, 15100042

Qualification testing was performed to further evaluate the quality and reliability performance of the replacement substrate material applied to the product-package combination for this specific PCN. (See Table 5)

Table 5: Qualification Data

Test	Time point	Conditions	# of Lots	SS/lot	Results (Fail/Total SS)
High Temperature Storage Test (Bake)	1000hrs	150°C	3	76-77	0/230
Temperature Cycle Test (TCB)	1000X	-55°C /125°C	5	77-82	0/393
Highly Accelerated Stress Test (HAST)	96hrs	130°C / 85%RH with bias	3	75-83	0/253
Unbiased Highly Accelerated Stress Test (uHAST)	96hrs	130°C / 85%RH	4	76-82	0/312

Note 1: Preconditioning (J-STD-020, MSL3 @ 245C/260C) performed on all samples prior to each reliability test.
Note 2: Rel#: 17060012, 17060016, 17060018/17080014, 17060027, 17060051

Table 5a: Vehicle Devices

Package Type	Package	Base Die
Wire Bond	FBGA - 484	EP3CLS200T60
	FBGA - 400	EP1C20Y13
	UBGA - 88	EPC16FS35
	PBGA - 672	EP1S25T13

Note: Qualification vehicles were selected to represent various die and package combinations, to identify the largest die or package, or largest die-to-package ratio.

Contact

For more information, please contact Sales or Customer Quality Engineering (CQE) in your region, or submit a Service Request at Intel PSG's mySupport website.

Customer Notifications Subscription

Customers that have subscribed to Intel PSG's customer notification mailing list will receive the PCN document automatically via email.

If you would like to receive customer notifications by email, please subscribe to our customer notification mailing list at:
https://www.altera.com/subscriptions/email/signup/eml-index.jsp

Intel PSG references J-STD-046 guidelines for PCN.
In accordance with J-STD-046, this change is deemed acceptable to the customer if no acknowledgement is received within 30 days from date of notification.

Revision History

Date	Rev	Description
08/25/2017	1.0.0	Initial Release
09/27/2017	1.1.0	Qualification Data Update and removal of the following Affected Ordering Part Numbers due to Overlap with PDN1708 and PDN1620: EPC16UC88 EPC16UC88AB EPC16UC88II EPC16UC88N EPC16UC88SS EPC16UI88AA EPC16UI88N EPM7256AEFC256-5 EPM7256AEFC256-5N EPM7256AEFI256-7 EPM7256AEFI256-7GA EPM7256AEFI256-7N EPM7KAEFC256AB

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