Revision 1.0.0
PCN Issue Date: 08/25/2017

PROCESS CHANGE NOTIFICATION

PCN1714

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

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

CONFIGURATION DEVICE CYCLONE III MAX II MAX II Z	UBGA|U88 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	CONFIGURATION DEVICE	UBGA - 88
	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-1-0-0.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 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 testing will be 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 Plan and Schedule section)

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 Plan and Schedule:

The replacement substrate material is already qualified and being used on other FPGA products and meets quality and reliability requirements. (See Table 5)

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)	1000X	85ºC/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

Additional qualification testing will be performed to further evaluate the quality and reliability performance of the replacement substrate material applied to the product-package combination for this specific PCN.

Table 5: Qualification Data

Test	Time point	Conditions	# of Lots	SS/lot	Schedule of Completion
High Temperature Storage Test (Bake)	1000hrs	150°C	4	77	Mid-September 2017
Temperature Cycle Test (TCB)	1000X	-55°C /125°C	5	77	
Highly Accelerated Stress Test (HAST)	96hrs	130°C / 85%RH with bias	4	77	
Unbiased Highly Accelerated Stress Test (uHAST)	96hrs	130°C / 85%RH	5	77	

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

Affected Part Numbers

EPM7256AEFC256-10	M570ZM6NKA	EP1C12F324C6	EPM7512AEFI17-10GA
EPM7256AEFC256-10N	M570ZM6NLA	EP1C12F324C6AA	EPM7512AEFI256-10
EPM7256AEFC256-5	EPM570M256C4N	EP1C12F324C6N	EPM7512AEFI256-10N
EPM7256AEFC256-5N	EPM570M256C5N	EP1C12F324C7	EPM7512AEFI256-7
EPM7256AEFC256-7	EPM570M256I5N	EP1C12F324C7N	EPM7KAEFI256BB
EPM7256AEFC256-7N	EPM570ZM256C6N	EP1C12F324C8	EP3CLS150F484C7
EPM7256AEFI256-7	EPM570ZM256C7N	EP1C12F324C8N	EP3CLS150F484C7N
EPM7256AEFI256-7GA	EPM570ZM256I8N	EP1C12F324C8NGA	EP3CLS150F484C8
EPM7256AEFI256-7N	EP3C25U256C7ES	EP1C12F324I7	EP3CLS150F484C8N
EPM7KAEFC256AB	EP3C25U256C7NAD	EP1C12F324I7N	EP3CLS150F484I7
EPM7128AEFC100-10	EP3C25U256C7NAE	EP1C20F400C6	EP3CLS150F484I7N
EPM7128AEFC100-10N	EP3C25U256C8ES	EP1C20F400C6AB	EP3CLS200F484C7
EPM7128AEFC100-5	EP3C10U256C7N	EP1C20F400C6N	EP3CLS200F484C7N
EPM7128AEFC100-5N	HC210WF484AO	EP1C20F400C7	EP3CLS200F484C8
EPM7128AEFC100-7	HC210WF484AOP	EP1C20F400C7N	EP3CLS200F484C8ES
EPM7128AEFC100-7N	HC210WF484AOR	EP1C20F400C8	EP3CLS200F484C8N
EPM7128AEFI100-7	HC210WF484AP	EP1C20F400C8N	EP3CLS200F484I7
EPM7128AEFI100-7N	HC210WF484APP	EP1C20F400C8NAC	EP3CLS200F484I7N
EPM7256AEFC100-10	HC210WF484APR	EP1C20F400I7	EP3CLS200F484I7NAA
EPM7256AEFC100-10N	HC210WF484NAB	EP1C20F400I7N	EP3C25F256C8NAD
EPM7256AEFC100-5	HC210WF484NAD	EPC16UC88	EP3C25F256C8NAA
EPM7256AEFC100-7	HC210WF484NAJ	EPC16UC88AB	EP1C6F256C6
EPM7256AEFC100-7GZ	EPM570ZM144C6N	EPC16UC88II	EP1C6F256C7
EPM7256AEFC100-7N	EPM570ZM144C7N	EPC16UC88N	EP1C6F256C8
EPM7256AEFI100-7	EPM570ZM144I8N	EPC16UC88SS	EP1C6F256I7
EPM7256AEFI100-7N	EP1C4F324C6	EPC16UI88AA	EP1C6F256C8EC
EPM7064AEFC100-10	EP1C4F324C6N	EPC16UI88N	EP1C6F256C8N
EPM7064AEFC100-10N	EP1C4F324C7	EP1C20F324C6	EP1C6F256C6N
EPM7064AEFC100-4	EP1C4F324C7N	EP1C20F324C6N	EP1C6F256C6NGA
EPM7064AEFC100-4N	EP1C4F324C8	EP1C20F324C7	EP1C6F256C7N
EPM7064AEFC100-7	EP1C4F324C8N	EP1C20F324C7N	EP1C6F256I7N
EPM7064AEFC100-7N	EP1C4F324I7	EP1C20F324C8	EP1C6F256C7NAB
EPM570F256C5NRR	EP1C4F324I7N	EP1C20F324C8N	EP1C12F256C6
EPM570ZF256C7N	EP1C4F400C6	EP1C20F324C8NGA	EP1C12F256C7
EPM570ZM100C6N	EP1C4F400C6N	EP1C20F324I7	EP1C12F256C8
EPM570ZM100C7N	EP1C4F400C7	EP1C20F324I7N	EP1C12F256I7
EPM570ZM100I8N	EP1C4F400C7N	EPM7512AEF256C10GZ	EP1C12F256C8EC
M570ZM6NAA	EP1C4F400C8	EPM7512AEFC256-10	EP1C12F256C6AA
M570ZM6NCA	EP1C4F400C8N	EPM7512AEFC256-10N	EP1C12F256C8N
M570ZM6NDA	EP1C4F400C8NAA	EPM7512AEFC256-12	EP1C12F256C6N
M570ZM6NFA	EP1C4F400C8NAB	EPM7512AEFC256-12N	EP1C12F256C7N
M570ZM6NHA	EP1C4F400I7	EPM7512AEFC256-7	EP1C12F256I7N
M570ZM6NJA	EP1C4F400I7N	EPM7512AEFC256-7N	EP1C12F256I7NGA