

PROCESS CHANGE NOTIFICATION

PCN1408

Transfer of Wafer Bump Operations

Change Description:

This is an update to PCN1408; please see the revision history table for information specific to this update.

Altera® announces the transfer of wafer bump operations from Taiwan Semiconductor Manufacturing Corporation, Taiwan (TSMC) to Amkor Technology, Korea (ATK) on select part numbers from the following families of products: APEX™, APEX™ II, Excalibur™, Mercury™, Stratix® GX and HardCopy®.

The list of product lines affected is available in Table 1 of this notification.

Recommended Action:

Customers are encouraged to review the key milestones listed in the “Product Qualification and Transition Dates” section and take the necessary action to approve this change at the earliest. Upon the implementation of the change (see dates in Table 3), Altera will start sourcing production shipments from ATK, i.e., the new bump operations site.

Reason for Change:

TSMC has announced a shutdown of the facility that houses the wafer bump process step in the FlipChip product manufacturing flow. As a result, Altera is implementing this change to enable product longevity and supply continuity, by establishing the capability to produce equivalent

product from an alternate location. ATK is a fully qualified assembly and test service provider for several products in Altera's portfolio.

Benefit of Change:

Customers will benefit from continued product supply.

Products Affected:

This change will apply to the following product lines. The ordering part numbers currently open for order entry are listed in Appendix 1.

Table 1: Affected Product Lines

Product Family	Product Line
APEX™ 20K	EP20K400
APEX™ 20KC	EP20K1000C
	EP20K600C
	EP20K400C
APEX™ 20KE	EP20K1500E
	EP20K1000E
	EP20K600E
	EP20K400E
APEX™ II	EP2A15
	EP2A25
	EP2A40
Excalibur™	EPXA4
Mercury™	EP1M120
	EP1M350

Table 1: Affected Product Lines (Continued)

Product Family	Product Line
Stratix® GX	EP1SGX10C
	EP1SGX10D
HardCopy®	HC1S30
	HC1S40
	HC1S60
	HC1S80
	HC20K1000
	HC20K400
	HC20K600

Products processed at ATK will use the same Assembly Bill-of-Material (BOM) and process flow, with the following exceptions:

Table 2: Key Differences in BOM^[1]

<i>BOM Attribute</i>	<i>TSMC (Current)</i>	<i>ATK (New)</i>
Bump Composition	High Lead	Eutectic SnPb

[1] Not applicable to EP1SGX10C and EP1SGX10D, as these products currently use the new BOM. The only change applicable to the two products is the transfer of manufacturing facility.

Product Traceability Information:

ATK material can be distinguished upon request, by the individual lot number marked on the package top-mark and on the shipment box label. All elements of marking and box labeling schemes will be consistent with current material.

Product Qualification and Transition Dates:

Customers are requested to take note of the key dates shown in Table 3.

Table 3: Product Qualification and Transition Dates

<i>Milestone</i>	<i>Date</i>
Last date to acknowledge receipt of this notification*	03/06/2015
Qualification data available for review	03/01/2015
Qualification samples available to order	03/01/2015
Last date to order qualification samples	04/01/2015
Last date to request additional information or clarification	08/01/2015
Change implementation (i.e., date shipment of material from ATK commences)	11/01/2015

* Note, in accordance with JESD46D, this change is deemed acceptable if no response or acknowledgement is received within 30 days from the date of this notification.

Effective the change implementation date listed in Table 3, shipments of the affected part numbers will be sourced from ATK. Altera reserves the right to ship pre-converted product following the change implementation date, until inventory is depleted. In other words, customers should expect to receive a mix of pre-converted and new product for a period of time after change implementation.

Customers desiring to procure a last time order of pre-converted product in lieu of qualifying this change are required to place requests via their local sales representative no later than 08/01/2015, i.e., the last date to request additional information. Please note that additional terms and conditions (and where applicable, terms specific to HardCopy[®]) may apply—contact your local sales representative for details.

Samples:

Samples of material processed at ATK will be available to order starting 03/01/2015, via your local sales representative. Please visit the following URL to find a sales office in your region:

<http://www.altera.com/corporate/contact/sales/worldwide/con-sales-ww.jsp>

Sample orders must be placed no later than the last date to order qualification samples, as shown in Table 3. Please note that samples may not be built ahead of time for all part numbers affected, and may be subject to factory published lead-times.

Qualification Data:

Qualification data will be collected to ensure that the products processed at ATK meet or exceed Altera’s quality and reliability specifications. The qualification plan is summarized in Table 4.

Table 4: Qualification Plan

Qualification Test	Standard	Readout	Total # of Lots
High Temp Bake @ 150°C	JESD22-A103	1000 hrs	3 lots
Unbiased HAST (130°C / 85%RH)	JESD22-A110B	96 hrs	3 lots
Temperature Cycle “B” (-55°C to 125°C)	JESD22-A104D	1000 cyc	3 lots
Temp Humidity Bias (85°C /85%RH)	JESD22-A101B	1000 hrs	2 lots
Life Test @ 125°C	JESD22-A108	1000 hrs	2 lots

Contact

For more information, please contact Altera Technical Support by submitting a Service Request at Altera’s [mySupport](#) website.

Customer Notifications Subscription

Customers that have subscribed to Altera’s customer notification mailing list will receive updates automatically via email.

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

In accordance with JESD46D, this change is deemed acceptable to the customer if no acknowledgement is received within 30 days from this notification.

Revision History

Date	Rev	Description
02/06/2015	1.0.0	Initial Release
04/10/2015	1.1.0	Revise Appendix 1: Affected Ordering Part Numbers

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Appendix 1: Affected Ordering Part Numbers

Mercury™	Stratix® GX	APEX™ II	Excalibur™
EP1M120F484C5	EP1SGX10CF672C5	EP2A15B724C7DM	EPXA4F672C1
EP1M120F484C6	EP1SGX10CF672C5N	EP2A15F672C7	EPXA4F672C1GZ
EP1M120F484C6N	EP1SGX10CF672C6	EP2A15F672C7AA	EPXA4F672C2
EP1M120F484C7	EP1SGX10CF672C6GA	EP2A15F672C7N	EPXA4F672C3
EP1M120F484C7N	EP1SGX10CF672C6N	EP2A15F672C8	EPXA4F672C3GZ
EP1M120F484I6	EP1SGX10CF672C6NGA	EP2A15F672C9	EPXA4F672I2
EP1M120F484I6N	EP1SGX10CF672C7	EP2A15F672C9N	
EP1M350F780C5	EP1SGX10CF672C7GA	EP2A15F672I8	APEX™ 20K
EP1M350F780C6	EP1SGX10CF672C7N	EP2A25F672C7	EP20K400FC672-1
EP1M350F780C7	EP1SGX10DF672C5	EP2A25F672C8	EP20K400FC672-1X
EP1M350F780I6	EP1SGX10DF672C5N	EP2A25F672C9	EP20K400FC672-1XGZ
EP1M350F780I6AA	EP1SGX10DF672C6	EP2A25F672I8	EP20K400FC672-2
EP1M350F780I6N	EP1SGX10DF672C6N	EP2A40F1020C7	EP20K400FC672-3
	EP1SGX10DF672C7	EP2A40F1020C8	EP20K400FI672-2V
	EP1SGX10DF672C7N	EP2A40F1020C9	
	EP1SGX10DF672I6	EP2A40F1020I8	
	EP1SGX10DF672I6N	EP2A40F672C7	
		EP2A40F672C8	
		EP2A40F672C9	

Appendix 1: Affected Ordering Part Numbers (Continued)

APEX™ 20KC	APEX™ 20KE	APEX™ 20KE (Contd.)	HardCopy®
EP20K1000CB652C7	EP20K1000EB652C1GZ	EP20K400EFC672-2	HC1S30F780*
EP20K1000CB652C8	EP20K1000EBC652-1	EP20K400EFC672-2N	HC1S40F780*
EP20K1000CB652C9	EP20K1000EBC652-1X	EP20K400EFC672-2X	HC1S60F1020*
EP20K1000CF33C7	EP20K1000EBC652-2	EP20K400EFC672-2XB	HC1S80F1020*
EP20K1000CF33C8	EP20K1000EBC652-2X	EP20K400EFC672-3	HC20K1000FC672*
EP20K1000CF33C9	EP20K1000EBC652-3	EP20K400EFC672-3N	HC20K400FC672*
EP20K1000CF672C7	EP20K1000EBI652-2X	EP20K400EFI672-2N	HC20K600BC652*
EP20K1000CF672C7GZ	EP20K1000EFC33-1	EP20K400EFI672-2X	HC20K600FC672*
EP20K1000CF672C7N	EP20K1000EFC33-1X	EP20K600EF672C1NGZ	
EP20K1000CF672C8	EP20K1000EFC33-2	EP20K600EF672C1XGZ	
EP20K1000CF672C9	EP20K1000EFC33-2X	EP20K600EFC33-1	
EP20K400CF672C7	EP20K1000EFC33-3	EP20K600EFC33-1X	
EP20K400CF672C7GA	EP20K1000EFC672-1	EP20K600EFC33-2	
EP20K400CF672C8	EP20K1000EFC672-1X	EP20K600EFC33-2X	
EP20K400CF672C8AA	EP20K1000EFC672-2	EP20K600EFC33-3	
EP20K400CF672C8N	EP20K1000EFC672-2B	EP20K600EFC672-1	
EP20K400CF672C9	EP20K1000EFC672-2X	EP20K600EFC672-1N	
EP20K400CF672I8	EP20K1000EFC672-3	EP20K600EFC672-1X	
EP20K600CF672C7	EP20K1000EFI672-2X	EP20K600EFC672-1XN	
EP20K600CF672C8	EP20K1500EBC652-1	EP20K600EFC672-2	
EP20K600CF672C8N	EP20K1500EBC652-1X	EP20K600EFC672-2N	
EP20K600CF672C9	EP20K1500EBC652-2	EP20K600EFC672-2X	
EP20K600CF672I8	EP20K1500EBC652-2X	EP20K600EFC672-3	
EP20K600CF672I8AA	EP20K1500EBC652-3	EP20K600EFC672-3N	
	EP20K1500EFC33-1	EP20K600EFI672-2X	
	EP20K1500EFC33-1X		
	EP20K1500EFC33-2		
	EP20K1500EFC33-3		
	EP20K1500EFC33-2X		
	EP20K400EF27C1XNGA		
	EP20K400EF27C1XNGZ		
	EP20K400EFC672-1		
	EP20K400EFC672-1N		
	EP20K400EFC672-1X		
	EP20K400EFC672-1XN		

* Includes part numbers that contain a suffix