

# PROCESS CHANGE NOTIFICATION

## PCN1105

### Introducing “Green” Materials and Bill of Material change for the Cyclone II and MAX II Devices

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#### Change Description

*This is an update to PCN1105; please see the revision history table for information specific to this update.*

Altera is introducing “Green” Bill of Materials for the Cyclone® II and MAX® II device families. The new bill of materials is classified as “low halogen” as defined in JEDEC JS709, is EU-RoHS compliant and does not contain published REACH SvHC. In addition, all package types will transition from gold (Au) to copper (Cu) bond wire and utilize ASE as a second source assembly site.

#### Recommended Action

No action is recommended as a result of this change. Altera’s product qualification methodology is a rigorous process that is used to ensure products meet or exceed the Quality and Reliability requirements.

This change does not affect the fit or function as defined in the product data sheets and is backwards compatible with existing devices. There is a slight increase to the mold compound coverage for the F484, F672 and F896 packages; however, the overall package outline dimensions remain the same; refer to Figure 1.

#### Reason for Change

Altera is committed to conducting its business operations in a manner that sustains the environment. This includes maintaining the compliance of Altera products to applicable environmental regulations. The conversion to low halogen packages is in alignment with known regulatory trends for the semiconductor industry. Conversion to copper wire is aligned with Altera’s standard bill of materials for wire bond products.

This change is also being implemented to improve manufacturing efficiency and to better support long-term demand for the affected products. A second-source assembly site is Altera’s standard practice and also supports supply-chain risk-mitigation strategy by establishing the capability to produce equivalent product from multiple qualified locations.

## Products Affected

The product lines affected by this change are listed in Tables 1 & 2. Appendix 1 contains a list of the current ordering part numbers.

Table 1: Affected Product Lines

Product Family	Product Line	Pin Count	Package	Estimated Sample Availability	Estimated Earliest Shipment
<b>Cyclone II</b>	EP2C5	144	TQFP	Now	Feb 2012
		208	PQFP	Now	Feb 2012
		256	FBGA	Now	Feb 2012
	EP2C8	144	TQFP	Now	Feb 2012
		208	PQFP	Now	Feb 2012
		256	FBGA	Now	Feb 2012
	EP2C8A	256	FBGA	Now	Feb 2012
	EP2C15A	256	FBGA	Now	Feb 2012
		484	FBGA	Now	Feb 2012
	EP2C20	240	PQFP	Now	Feb 2012
		256	FBGA	Now	Feb 2012
		484	FBGA	Now	Feb 2012
	EP2C20A	256	FBGA	Now	Feb 2012
		484	FBGA	Now	Feb 2012
	EP2C35	484	UBGA	Now	Feb 2012
			FBGA	Now	Feb 2012
		672	FBGA	Now	Feb 2012
	EP2C50	484	UBGA	Now	Feb 2012
			FBGA	Now	Feb 2012
		672	FBGA	Now	Feb 2012
EP2C70	672	FBGA	Now	Feb 2012	
	896	FBGA	Now	Feb 2012	

Table 2: Affected Product Lines

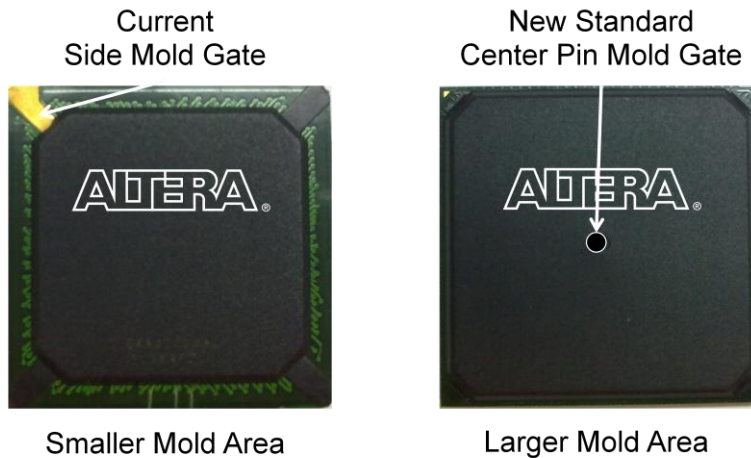
Product Family	Product Line	Pin Count	Package	Estimated Sample Availability	Estimated Earliest Shipment
<b>MAX II</b> <i>Series</i>	EPM240	100	TQFP	Now	April 2012
		100	MBGA	Now	April 2012
		100	FBGA	Now	April 2012
	EPM240G	100	TQFP	Now	April 2012
		100	MBGA	Now	April 2012
		100	FBGA	Now	April 2012
	EPM240Z	68	MBGA	Now	April 2012
		100	MBGA	Now	April 2012
	EPM570	100	TQFP	Now	April 2012
		100	MBGA	Now	April 2012
		100	FBGA	Now	April 2012
		144	TQFP	Now	April 2012
		256	MBGA	Now	April 2012
		256	FBGA	Now	April 2012
	EPM570G	100	TQFP	Now	April 2012
		100	MBGA	Now	April 2012
		100	FBGA	Now	April 2012
		144	TQFP	Now	April 2012
		256	MBGA	Now	April 2012
		256	FBGA	Now	April 2012
	EPM570Z	100	MBGA	N/A	N/A
		144	MBGA	N/A	N/A
		256	MBGA	N/A	N/A
		256	FBGA	N/A	N/A
	EPM1270	144	TQFP	Now	April 2012
		256	MBGA	Now	April 2012
		256	FBGA	Now	April 2012
	EPM1270G	144	TQFP	Now	April 2012
		256	MBGA	Now	April 2012
		256	FBGA	Now	April 2012
EPM2210	256	FBGA	Now	April 2012	
	324	FBGA	Now	April 2012	
EPM2210G	256	FBGA	Now	April 2012	
	324	FBGA	Now	April 2012	

*Note: Earliest shipment is 90 days from sample availability  
Please visit Altera's sample request page for availability.*

For device samples please visit <http://www.samplecomponents.com/scripts/SampleCenter.dll?Altera>

There is a slight variation to the package “form” as the mold compound extends to the edge of the substrate; refer to Figure 1. The affected Fine Line (BGA) packages include the F484, F672 and F896.

**Figure 1. Comparative images of the difference in mold compound coverage**



*Note: The overall package dimensions will remain the same*

## Product Traceability and Transition Dates

The earliest shipment of the Cyclone II products could occur in February 2012. Customers may receive products with the new bill of materials beginning with a date-code marking of 1201 or later on the top of the package; refer to Figure 2. However, initial samples may have an earlier date code marking.

The top side marking can also be used to identify the new material set. A datecode marking with the letter “U” as the last character represents the new bill of materials; refer to Figure 2.

**Figure 2: Date-code Marking**

### Altera Date-code Marking Format

A XβZαα**1201**U

## Qualification Data

Copper wire has been fully qualified by Altera and is currently used in high volume production. Extensive environmental data has been collected to ensure that products continue to meet or exceed Altera's quality and reliability requirements.

Supporting qualification data is summarized in Table 3.

**Table 3: Summary of Supporting Qualification Data**

Product Line	Package	Qualification Test	Readout	Results
Cu Bondwire Validation	F672	High Temp Bake @ 150C	1000 hrs	0 / 25
		Temp Humidity Bias (85C /85%RH)	1000 hrs	0 / 19
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 25
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 25
EP3C120	F780	Life Test @ 125C	1000 hrs	0 / 88
		High Temp Bake @ 150C	1000 hrs	0 / 369
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 945
		Temp Humidity Bias (85C /85%RH)	1000 hrs	0 / 80
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 505
EP1C12	F324	Life Test @ 125C	1000 hrs	0 / 75
		High Temp Bake @ 150C	1000 hrs	0 / 250
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 50
		Biased HAST (130C / 85%RH)	96 hrs	0 / 274
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 275
EP1C6	T144	High Temp Bake @ 150C	1000 hrs	0 / 77
		Biased HAST (130C / 85%RH)	96 hrs	0 / 77
		Autoclave (121C / 15 psi)	96 hrs	0 / 77
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
EP2C70	F896	High Temp Bake @ 150C	1000 hrs	0 / 45
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77

**Table 3: Summary of Supporting Qualification Data (Continued)**

<b>Product Line</b>	<b>Package</b>	<b>Qualification Test</b>	<b>Readout</b>	<b>Results</b>
EP3C10	E144	Life Test @ 125C	1000 hrs	0 / 80
		High Temp Bake @ 150C	1000 hrs	0 / 45
		Temp Humidity Bias (85C /85%RH)	1000 hrs	0 / 80
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 80
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 80
EP3C16	E144	Life Test @ 125C	1000 hrs	0 / 80
		High Temp Bake @ 150C	1000 hrs	0 / 45
		Temp Humidity Bias (85C /85%RH)	1000 hrs	0 / 79
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 80
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 80
EP3C25	E144	Life Test @ 125C	1000 hrs	0 / 80
		High Temp Bake @ 150C	1000 hrs	0 / 45
		Temp Humidity Bias (85C /85%RH)	1000 hrs	0 / 80
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 80
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 80
EP3C16	Q240	High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55 to 125C)	1000 cyc	0 / 25
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 25
EP3C40	Q240	High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 25
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 25
EP3C25	Q240	High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 25
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 25

**Table 3: Summary of Supporting Qualification Data (Continued)**

Product Line	Package	Qualification Test	Readout	Results
EPM240Z	M100	Life Test @ 125C	1000 hrs	0 / 77
		High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77
EPM570Z	F256	Life Test @ 125C	1000 hrs	0 / 77
		High Temp Bake @ 150C	1000 hrs	0 / 24
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
		Biased HAST (130C / 85%RH)	96 hrs	0 / 77
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77
EPM570Z	Q144	Life Test @ 125C	1000 hrs	0 / 77
		High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
		Biased HAST (130C / 85%RH)	96 hrs	0 / 77
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77
EPM1270Z	Q144	Life Test @ 125C	1000 hrs	0 / 77
		High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
		Biased HAST (130C / 85%RH)	96 hrs	0 / 77
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77
EPM2210Z	F256	Life Test @ 125C	1000 hrs	0 / 77
		High Temp Bake @ 150C	1000 hrs	0 / 25
		Temperature Cycle "B" (-55C to 125C)	1000 cyc	0 / 77
		Biased HAST (130C / 85%RH)	96 hrs	0 / 77
		Unbiased HAST (130C / 85%RH)	96 hrs	0 / 77

## 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>

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

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## Revision History

Date	Rev	Description
06/04/2011	1.0.0	Initial Release
07/08/2011	1.1.0	Updated OPN list, estimated sample availability and earliest shipment dates.
11/23/2011	1.2.0	Added MAX II qualification data, revised estimated earliest shipment dates and enhanced traceability scheme.
03/12/2012	1.3.0	Removed the EPM570Z product line from the Affected Ordering Part Numbers list. Updated sample availability dates.

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## Appendix 1: Affected Ordering Part Numbers



EP2C5F256C6	EP2C15AF256C6N	EP2C35F484C6*	EP2C50F484I8N*
EP2C5F256C6N	EP2C15AF256C7N	EP2C35F484C6N	EP2C50F672C6*
EP2C5F256C7	EP2C15AF256C8N	EP2C35F484C7*	EP2C50F672C6N*
EP2C5F256C7N	EP2C15AF256I8N	EP2C35F484C7N*	EP2C50F672C7*
EP2C5F256C8*	EP2C15AF484C6N	EP2C35F484C8*	EP2C50F672C7N*
EP2C5F256C8N	EP2C15AF484C7N	EP2C35F484C8N*	EP2C50F672C8*
EP2C5F256I8	EP2C15AF484C8N*	EP2C35F484I8	EP2C50F672C8N*
EP2C5F256I8N	EP2C15AF484I8N	EP2C35F484I8N	EP2C50F672I8*
EP2C5Q208C7		EP2C35F672C6	EP2C50F672I8N
EP2C5Q208C7N	EP2C20AF256I8N	EP2C35F672C6N	EP2C50U484C6
EP2C5Q208C8	EP2C20AF484I8N	EP2C35F672C7*	EP2C50U484C6N
EP2C5Q208C8N	EP2C20F256C6	EP2C35F672C7N	EP2C50U484C7
EP2C5Q208I8	EP2C20F256C6N	EP2C35F672C8*	EP2C50U484C7N
EP2C5Q208I8N	EP2C20F256C7	EP2C35F672C8N*	EP2C50U484C8
EP2C5T144C6	EP2C20F256C7N	EP2C35F672I8*	EP2C50U484C8N
EP2C5T144C6N	EP2C20F256C8*	EP2C35F672I8N*	EP2C50U484I8
EP2C5T144C7	EP2C20F256C8N	EP2C35U484C6	EP2C50U484I8N
EP2C5T144C7N	EP2C20F256I8	EP2C35U484C6N	
EP2C5T144C8	EP2C20F256I8N	EP2C35U484C7	EP2C70F672C6
EP2C5T144C8N*	EP2C20F484C6	EP2C35U484C7N	EP2C70F672C6N*
EP2C5T144I8	EP2C20F484C6N	EP2C35U484C8	EP2C70F672C7*
EP2C5T144I8N	EP2C20F484C7*	EP2C35U484C8N	EP2C70F672C7N*
	EP2C20F484C7N	EP2C35U484I8	EP2C70F672C8*
EP2C8AF256I8N	EP2C20F484C8*	EP2C35U484I8N	EP2C70F672C8N*
EP2C8F256C6*	EP2C20F484C8N*		EP2C70F672I8
EP2C8F256C6N	EP2C20F484I8	EP2C50F484C6*	EP2C70F672I8N
EP2C8F256C7	EP2C20F484I8N	EP2C50F484C6N*	EP2C70F896C6
EP2C8F256C7N	EP2C20Q240C8	EP2C50F484C7	EP2C70F896C6N
EP2C8F256C8*	EP2C20Q240C8N	EP2C50F484C7N	EP2C70F896C7
EP2C8F256C8N*		EP2C50F484C8*	EP2C70F896C7N
EP2C8F256CXN		EP2C50F484C8N*	EP2C70F896C8*
EP2C8F256I8		EP2C50F484I8	EP2C70F896C8N*
EP2C8F256I8N			EP2C70F896I8
EP2C8Q208C7			EP2C70F896I8N
EP2C8Q208C7N			
EP2C8Q208C8*			
EP2C8Q208C8N			
EP2C8Q208I8			
EP2C8Q208I8N			
EP2C8T144C6			
EP2C8T144C6N			
EP2C8T144C7			
EP2C8T144C7N			
EP2C8T144C8			
EP2C8T144C8N			
EP2C8T144I8			
EP2C8T144I8N			

## Appendix 1: Affected Ordering Part Numbers (continued)

### MAX II Series

EPM240F100C4N	EPM570GF100C5N	EPM570T100C5N	EPM1270T144C4
EPM240F100C5N	EPM570GF100I5N	EPM570T100I5*	EPM1270T144C4N
EPM240F100I5	EPM570GF256C3	EPM570T100I5N	EPM1270T144C5*
EPM240F100I5N	EPM570GF256C3N	EPM570T144C3*	EPM1270T144C5N*
EPM240GF100C5N	EPM570GF256C4	EPM570T144C3N*	EPM1270T144I5
EPM240GF100I5N	EPM570GF256C4N	EPM570T144C4	EPM1270T144I5N
EPM240GM100C5N	EPM570GF256C5*	EPM570T144C4N	
EPM240GM100I5N	EPM570GF256C5N	EPM570T144C5*	EPM2210F256C3
EPM240GT100C3*	EPM570GF256I5	EPM570T144C5N*	EPM2210F256C3N
EPM240GT100C3N	EPM570GF256I5N	EPM570T144I5*	EPM2210F256C4*
EPM240GT100C4*	EPM570GM100C5N	EPM570T144I5N	EPM2210F256C4N
EPM240GT100C4N	EPM570GM100I5N		EPM2210F256C5*
EPM240GT100C5*	EPM570GM100I8N	EPM1270F256C3	EPM2210F256C5N
EPM240GT100C5N	EPM570GM256C5N	EPM1270F256C3N	EPM2210F256I5
EPM240GT100I5*	EPM570GM256I5N	EPM1270F256C4	EPM2210F256I5N
EPM240GT100I5N*	EPM570GT100C3	EPM1270F256C4N*	EPM2210F324C3
EPM240M100C4N	EPM570GT100C3N	EPM1270F256C5*	EPM2210F324C3N
EPM240M100C5N*	EPM570GT100C4	EPM1270F256C5N*	EPM2210F324C4*
EPM240M100I5N	EPM570GT100C4N	EPM1270F256I5*	EPM2210F324C4N
EPM240T100C3*	EPM570GT100C5*	EPM1270F256I5N*	EPM2210F324C5
EPM240T100C3N	EPM570GT100C5N	EPM1270GF256C3	EPM2210F324C5N*
EPM240T100C4*		EPM1270GF256C3N	EPM2210F324I5
EPM240T100C4N*	EPM570GT100I5*	EPM1270GF256C4	EPM2210F324I5N
EPM240T100C5*	EPM570GT100I5N*	EPM1270GF256C4N	EPM2210GF256C3
EPM240T100C5N*	EPM570GT144C3	EPM1270GF256C5	EPM2210GF256C3N
EPM240T100I5*	EPM570GT144C3N	EPM1270GF256C5N*	EPM2210GF256C4
EPM240T100I5N*	EPM570GT144C4	EPM1270GF256I5	EPM2210GF256C4N
	EPM570GT144C4N	EPM1270GF256I5N	EPM2210GF256C5*
	EPM570GT144C5*	EPM1270GM256C5N	EPM2210GF256C5N
EPM570F100C4N	EPM570GT144C5N	EPM1270GM256I5N	EPM2210GF256I5
EPM570F100C5N*	EPM570GT144I5	EPM1270GT144C3	EPM2210GF256I5N
EPM570F100I5	EPM570GT144I5N	EPM1270GT144C3N	EPM2210GF324C3
EPM570F100I5N	EPM570M100C4N	EPM1270GT144C4	EPM2210GF324C3N
EPM570F256C3	EPM570M100C5N*	EPM1270GT144C4N	EPM2210GF324C4
EPM570F256C3N	EPM570M100I5	EPM1270GT144C5	EPM2210GF324C4N
EPM570F256C4	EPM570M100I5N	EPM1270GT144C5N	EPM2210GF324C5
EPM570F256C4N	EPM570M256C4N	EPM1270GT144I5	EPM2210GF324C5N
EPM570F256C5*	EPM570M256C5N	EPM1270GT144I5N	EPM2210GF324I5
EPM570F256C5N*	EPM570M256I5N	EPM1270M256C4N	EPM2210GF324I5N
EPM570F256I5	EPM570T100C3	EPM1270M256C5N*	
EPM570F256I5N	EPM570T100C3N	EPM1270M256I5N	
	EPM570T100C4	EPM1270T144C3*	
	EPM570T100C4N	EPM1270T144C3N	
	EPM570T100C5*		

### MAX III

EPM240ZM100C6N	EPM240ZM68C6N
EPM240ZM100C7	EPM240ZM68C7N
EPM240ZM100C7N*	EPM240ZM68I8N
EPM240ZM100I8N	

*Note:* \* Also include part numbers which contain a suffix.