

PROCESS CHANGE NOTIFICATION

PCN0813

POLYIMIDE WAFER COAT REMOVAL FOR SELECTED ALTERA DEVICES

Change Description

Altera is implementing a change to the wafer coat on selected product lines fabricated at Taiwan Semiconductor Manufacturing Co. (TSMC). This change includes the exclusion of the existing polyimide wafer coat for the Cyclone[®] FPGA, Cyclone II FPGA, MAX[®] II CPLD, and Stratix[®] FPGA product families.

Recommended Action

No action is required as a result of this change.

Reason for Change

Altera is implementing this change in order to be consistent with the current wafer-fabrication practices. Historically, polyimide coat has been used to reduce mechanical stress between the top surface of the die and the package mold compound. With current technologies, the die surface to package mold compound interface is robust, therefore eliminating the need for the polyimide coating. This change is fully qualified and the data is included in this PCN. Products assembled with the non-polyimide coated wafers meet Altera's high quality and reliability requirements. By being more consistent with current wafer-fabrication practices, this change also improves the availability of supply and the overall product life.

Products Affected

The product lines affected by this change are listed in Table 1. A list of ordering part numbers is included in Appendix 1. The products will transition to the non-polyimide wafers as the current inventory is consumed.

Table 1: Affected Product Lines

| Product Family | Product Line | Package Type | Product Transition |
|-----------------|--------------|------------------------------------|--------------------|
| Cyclone II FPGA | EP2C5 | T144, Q208, F256 | Dec 2008 |
| | EP2C5A | T144, F256 | Dec 2008 |
| | EP2C8 | T144, Q208, F256 | Dec 2008 |
| | EP2C8A | F256 | Dec 2008 |
| | EP2C15A | F256, F484 | Dec 2008 |
| | EP2C20A | | Dec 2008 |
| | EP2C20 | Q240, F256, F484 | Dec 2008 |
| | EP2C35 | U484, F484, F672 | Dec 2008 |
| | EP2C50 | | Dec 2008 |
| | EP2C70 | F672, F896 | Dec 2008 |
| Cyclone FPGA | EP1C3 | T100, T144 | Dec 2008 |
| | EP1C4 | F324, F400 | Dec 2008 |
| | EP1C6 | T144, Q240, F256 | Dec 2008 |
| | EP1C12 | Q240, F256, F324 | Dec 2008 |
| | EP1C20 | F324, F400 | Dec 2008 |
| MAX II CPLD | EPM240 | T100, F100, M100 | Dec 2008 |
| | EPM240G | | Dec 2008 |
| | EPM570 | T100, T144, F100, F256, M100, M256 | Dec 2008 |
| | EPM570G | | Dec 2008 |
| | EPM1270 | T144, F256, M256 | Dec 2008 |
| | EPM1270G | | Dec 2008 |
| | EPM2210 | F256, F324 | Dec 2008 |
| | EPM2210G | | Dec 2008 |
| Stratix FPGA | EP1S10 | B672, F672 | Dec 2008 |
| | EP1S20 | | Dec 2008 |
| | EP1S25 | | Dec 2008 |

Product Traceability and Transition Dates

This change will be implemented in December 2008. Customers may receive products with this change beginning with a date-code marking of 0843 or later on the top of the package. See Figure 1. The 0843 date-code marking indicates the earliest date that the new material may be used for any of the affected devices.

Figure 1. Date-Code Marking

| Altera Date Code Marking Format |
|---------------------------------|
| A XβZαα 0843 T |

Qualification Data

Qualification data is summarized in Table 2.

Table 2. Summary of Qualification Data

| Product Family | Product Line | Representative Packages | Qualification Test | Read Out | Results |
|-----------------|--------------|---|---|-------------|---------|
| Cyclone II FPGA | EP2C50 | F672 | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycle | 0 /64 |
| | | | High Temp Bake @ 150° C | 1000 hrs | 0 /64 |
| | | | PCL 3 +Temperature Humidity Bias (85°C/85%RH) | 1000 hrs | 0 /50 |
| Cyclone FPGA | EP1C12 | F324 | PCL 3 + HAST (130°C/85%RH) | 96 hrs | 0 /50 |
| | | | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycles | 0 /154 |
| | Q240 | PCL 3 + HAST (130°C/85%RH) | 96 hrs | 0 /100 | |
| | | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycles | 0 /204 | |
| MAX II CPLD | EPM1270 | F256 | Life Test | 1000 hrs | 0 /308 |
| | | | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycles | 0 /180 |
| | | T144 | Life Test | 1000 hrs | 0 /154 |
| | | | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycles | 0 /90 |
| | | | PCL 3 + HAST (130°C/85%RH) | 96 hrs | 0 /90 |
| Stratix FPGA | EP1S25 | F672 | PCL 3 + HAST (130°C/85%RH) | 96 hrs | 0 /100 |
| | | | PCL 3 + Temp Cycle "B" (-55°C to 125°C) | 1000 cycles | 0 /200 |

Contact

For more information, please contact 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 |
|------------|-------|-----------------|
| 10/14/2008 | 1.0.0 | Initial Release |

Appendix 1. Affected Ordering Part Numbers

| | | | | |
|----------------|-----------------|-----------------|-----------------|----------------|
| EP2C5F256C6 | EP2C8AF256A7N | EP2C35F672C7N | EP2C70F672I8 | EP1C6F256C7NAB |
| EP2C5F256C6N | EP2C8AF256I8N | EP2C35F672C8 | EP2C70F672I8N | EP1C6F256C8 |
| EP2C5F256C7 | | EP2C35F672C8KK | EP2C70F896C6 | EP1C6F256C8EC |
| EP2C5F256C7N | EP2C15AF256A7N | EP2C35F672C8N | EP2C70F896C6N | EP1C6F256C8ES |
| EP2C5F256C8 | EP2C15AF256C6N | EP2C35F672I8 | EP2C70F896C7 | EP1C6F256C8N |
| EP2C5F256C8KK | EP2C15AF256C7N | EP2C35F672I8KK | EP2C70F896C7N | EP1C6F256I7 |
| EP2C5F256C8N | EP2C15AF256C8N | EP2C35F672I8N | EP2C70F896C8 | EP1C6F256I7N |
| EP2C5F256I8 | EP2C15AF256I8N | EP2C35U484C6 | EP2C70F896C8KK | EP1C6Q240C6 |
| EP2C5F256I8N | EP2C15AF484A7N | EP2C35U484C6N | EP2C70F896C8N | EP1C6Q240C6N |
| EP2C5Q208C7 | EP2C15AF484C6N | EP2C35U484C7 | EP2C70F896C8NKK | EP1C6Q240C7 |
| EP2C5Q208C7N | EP2C15AF484C7N | EP2C35U484C7N | EP2C70F896I8 | EP1C6Q240C7ES |
| EP2C5Q208C8 | EP2C15AF484C8N | EP2C35U484C8 | EP2C70F896I8N | EP1C6Q240C7N |
| EP2C5Q208C8N | EP2C15AF484I8N | EP2C35U484C8N | | EP1C6Q240C8 |
| EP2C5Q208I8 | | EP2C35U484I8 | EP1C3T100A8N | EP1C6Q240C8ES |
| EP2C5Q208I8N | EP2C20AF256A7N | EP2C35U484I8N | EP1C3T100C6 | EP1C6Q240C8N |
| EP2C5T144C6 | EP2C20AF256I8N | | EP1C3T100C6N | EP1C6Q240I7 |
| EP2C5T144C6N | EP2C20AF484A7N | EP2C50F484C6 | EP1C3T100C7 | EP1C6Q240I7N |
| EP2C5T144C7 | EP2C20AF484I8N | EP2C50F484C6KK | EP1C3T100C7N | EP1C6T144C6 |
| EP2C5T144C7N | EP2C20F256C6 | EP2C50F484C7 | EP1C3T100C8 | EP1C6T144C6N |
| EP2C5T144C8 | EP2C20F256C6N | EP2C50F484C7N | EP1C3T100C8N | EP1C6T144C7 |
| EP2C5T144C8N | EP2C20F256C7 | EP2C50F484C8 | EP1C3T100I7 | EP1C6T144C7N |
| EP2C5T144C8NLO | EP2C20F256C7N | EP2C50F484C8KK | EP1C3T100I7N | EP1C6T144C8 |
| EP2C5T144I8N | EP2C20F256C8 | EP2C50F484C8N | EP1C3T144A8N | EP1C6T144C8AA |
| | EP2C20F256C8KK | EP2C50F484C8NKK | EP1C3T144C6 | EP1C6T144C8N |
| EP2C5AF256A7N | EP2C20F256C8N | EP2C50F484I8N | EP1C3T144C6N | EP1C6T144I7 |
| EP2C5AF256I8N | EP2C20F256I8 | EP2C50F484I8NKK | EP1C3T144C7 | EP1C6T144I7N |
| EP2C5AT144A7N | EP2C20F256I8N | EP2C50F672C6 | EP1C3T144C7N | |
| | EP2C20F484C6 | EP2C50F672C6KK | EP1C3T144C8 | EP1C12F256C6 |
| EP2C8F256C6 | EP2C20F484C6N | EP2C50F672C6N | EP1C3T144C8N | EP1C12F256C6AA |
| EP2C8F256C6KK | EP2C20F484C7 | EP2C50F672C7 | EP1C3T144I7 | EP1C12F256C6N |
| EP2C8F256C6N | EP2C20F484C7KK | EP2C50F672C7KK | EP1C3T144I7N | EP1C12F256C7 |
| EP2C8F256C7 | EP2C20F484C7N | EP2C50F672C7N | | EP1C12F256C7N |
| EP2C8F256C7N | EP2C20F484C8 | EP2C50F672C7NKK | EP1C4F324C6 | EP1C12F256C8 |
| EP2C8F256C8 | EP2C20F484C8KK | EP2C50F672C8 | EP1C4F324C6N | EP1C12F256C8EC |
| EP2C8F256C8KK | EP2C20F484C8N | EP2C50F672C8KK | EP1C4F324C7 | EP1C12F256C8N |
| EP2C8F256C8N | EP2C20F484I8 | EP2C50F672C8N | EP1C4F324C7N | EP1C12F256I7 |
| EP2C8F256C8NAB | EP2C20F484I8N | EP2C50F672C8NKK | EP1C4F324C8 | EP1C12F256I7N |
| EP2C8F256C8NKK | EP2C20Q240C8 | EP2C50F672I8 | EP1C4F324C8N | EP1C12F324C6 |
| EP2C8F256CXNAA | EP2C20Q240C8N | EP2C50F672I8KK | EP1C4F324I7 | EP1C12F324C6AA |
| EP2C8F256I8 | | EP2C50F672I8N | EP1C4F324I7N | EP1C12F324C6N |
| EP2C8F256I8N | EP2C35F484C6 | EP2C50U484C6 | EP1C4F400C6 | EP1C12F324C7 |
| EP2C8Q208C7 | EP2C35F484C6N | EP2C50U484C6N | EP1C4F400C6N | EP1C12F324C7N |
| EP2C8Q208C7N | EP2C35F484C7 | EP2C50U484C7 | EP1C4F400C7 | EP1C12F324C8 |
| EP2C8Q208C8 | EP2C35F484C7KK | EP2C50U484C7N | EP1C4F400C7N | EP1C12F324C8N |
| EP2C8Q208C8KK | EP2C35F484C7N | EP2C50U484C8 | EP1C4F400C8 | EP1C12F324I7 |
| EP2C8Q208C8N | EP2C35F484C8 | EP2C50U484C8N | EP1C4F400C8N | EP1C12F324I7N |
| EP2C8Q208I8 | EP2C35F484C8KK | EP2C50U484I8 | EP1C4F400C8NAA | EP1C12Q240C6 |
| EP2C8Q208I8N | EP2C35F484C8N | EP2C50U484I8N | EP1C4F400C8NAB | EP1C12Q240C6N |
| EP2C8T144C6 | EP2C35F484C8NAA | EP2C70F672C6 | EP1C4F400I7 | EP1C12Q240C7 |
| EP2C8T144C6N | EP2C35F484C8NKK | EP2C70F672C6N | EP1C4F400I7N | EP1C12Q240C7N |
| EP2C8T144C7 | EP2C35F484I8 | EP2C70F672C7 | | EP1C12Q240C8 |
| EP2C8T144C7N | EP2C35F484I8N | EP2C70F672C7KK | EP1C6F256C6 | EP1C12Q240C8N |
| EP2C8T144C8 | EP2C35F672C6 | EP2C70F672C7NKK | EP1C6F256C6N | EP1C12Q240I7 |
| EP2C8T144C8N | EP2C35F672C6N | EP2C70F672C8 | EP1C6F256C7 | EP1C12Q240I7N |
| EP2C8T144I8N | EP2C35F672C7 | EP2C70F672C8KK | EP1C6F256C7ES | |
| | EP2C35F672C7KK | EP2C70F672C8N | EP1C6F256C7N | |

Appendix 1. Affected Ordering Part Numbers (continued)

| | | | | |
|------------------|-----------------|------------------|------------------|-------------------|
| EP1C20F324C6 | EPM240T100C5N | EPM570GT100I5 | EPM1270F256C3 | EPM1270T144C4ES |
| EP1C20F324C6N | EPM240T100C5NRR | EPM570GT100I5N | EPM1270F256C3ES | EPM1270T144C4N |
| EP1C20F324C7 | EPM240T100C5RR | EPM570GT100I5NRR | EPM1270F256C3N | EPM1270T144C5 |
| EP1C20F324C7N | EPM240T100C5TT | EPM570GT100I5RR | EPM1270F256C4 | EPM1270T144C5ES |
| EP1C20F324C8 | EPM240T100I5 | EPM570GT144C3 | EPM1270F256C4ES | EPM1270T144C5N |
| EP1C20F324C8N | EPM240T100I5N | EPM570GT144C3N | EPM1270F256C4N | EPM1270T144C5NAA |
| EP1C20F324I7 | EPM240T100I5NRR | EPM570GT144C4 | EPM1270F256C4NES | EPM1270T144C5RR |
| EP1C20F324I7N | EPM240T100I5RR | EPM570GT144C4N | EPM1270F256C4NRR | EPM1270T144I5 |
| EP1C20F400C6 | | EPM570GT144C5 | EPM1270F256C4RR | EPM1270T144I5N |
| EP1C20F400C6AB | EPM570F100C4N | EPM570GT144C5N | EPM1270F256C5 | EPM1270T144C5AA |
| EP1C20F400C6N | EPM570F100C5N | EPM570GT144C5TT | EPM1270F256C5ES | EPM1270T144C5ESAA |
| EP1C20F400C7 | EPM570F100I5 | EPM570GT144I5 | EPM1270F256C5N | |
| EP1C20F400C7N | EPM570F100C5NAA | EPM570GT144I5N | EPM1270F256C5N | EPM2210F256A5N |
| EP1C20F400C8 | EPM570F100I5N | EPM570M100C4N | EPM1270F256C5NAA | EPM2210F256C3 |
| EP1C20F400C8N | EPM570F256C3 | EPM570M100C5N | EPM1270F256C5NES | EPM2210F256C3 |
| EP1C20F400C8NAC | EPM570F256C3N | EPM570M100C5NAA | EPM1270F256C5NRR | EPM2210F256C3N |
| EP1C20F400I7 | EPM570F256C4 | EPM570M100C5N | EPM1270F256C5RR | EPM2210F256C4 |
| EP1C20F400I7N | EPM570F256C4N | EPM570M100I5N | EPM1270F256I5 | EPM2210F256C4N |
| | EPM570F256C5 | EPM570M256C4N | EPM1270F256I5N | EPM2210F256C4RR |
| EPM240F100C4N | EPM570F256C5TT | EPM570M256C5N | EPM1270F256I5NRR | EPM2210F256C5 |
| EPM240F100C5N | EPM570F256C5N | EPM570M256I5N | EPM1270F256I5RR | EPM2210F256C5N |
| EPM240F100C5N | EPM570F256C5NRR | EPM570T100A5N | EPM1270GF256C3 | EPM2210F256C5RR |
| EPM240F100I5N | EPM570F256C5RR | EPM570T100C3 | EPM1270GF256C3N | EPM2210F256I5 |
| EPM240GF100C5N | EPM570F256I5 | EPM570T100C3N | EPM1270GF256C4 | EPM2210F256I5N |
| EPM240GF100I5N | EPM570F256I5N | EPM570T100C4 | EPM1270GF256C4N | EPM2210F324A5N |
| EPM240GM100C5N | EPM570GF100C5N | EPM570T100C4N | EPM1270GF256C5 | EPM2210F324C3 |
| EPM240GM100I5N | EPM570GF100I5N | EPM570T100C5 | EPM1270GF256C5N | EPM2210F324C3N |
| EPM240GT100C3 | EPM570GF256C3 | EPM570T100C5TT | EPM1270GF256C5RR | EPM2210F324C4 |
| EPM240GT100C3N | EPM570GF256C3N | EPM570T100C5N | EPM1270GF256I5 | EPM2210F324C4N |
| EPM240GT100C3TT | EPM570GF256C4 | EPM570T100C5NAA | EPM1270GF256I5N | EPM2210F324C4RR |
| EPM240GT100C4 | EPM570GF256C4N | EPM570T100C5NRR | EPM1270GM256C5N | EPM2210F324C5 |
| EPM240GT100C4N | EPM570GF256C5 | EPM570T100C5RR | EPM1270GM256I5N | EPM2210F324C5N |
| EPM240GT100C4TT | EPM570GF256C5N | EPM570T100I5 | EPM1270GT144C3 | EPM2210F324C5NRR |
| EPM240GT100C5 | EPM570GF256C5RR | EPM570T100I5TT | EPM1270GT144C3N | EPM2210F324I5 |
| EPM240GT100C5N | EPM570GF256C5TT | EPM570T100I5N | EPM1270GT144C4 | EPM2210F324I5N |
| EPM240GT100C5TT | EPM570GF256I5 | EPM570T100I5RR | EPM1270GT144C4N | EPM2210GF256C3 |
| EPM240GT100I5 | EPM570GF256I5N | EPM570T144A5N | EPM1270GT144C5 | EPM2210GF256C3N |
| EPM240GT100I5N | EPM570GM100C5N | EPM570T144C3 | EPM1270GT144C5N | EPM2210GF256C4 |
| EPM240GT100I5NRR | EPM570GM100I5N | EPM570T144C3N | EPM1270GT144I5 | EPM2210GF256C4N |
| EPM240GT100I5RR | EPM570GM256C5N | EPM570T144C3NRR | EPM1270GT144I5N | EPM2210GF256C5 |
| EPM240M100C4N | EPM570GM256I5N | EPM570T144C3RR | EPM1270M256C4N | EPM2210GF256C5N |
| EPM240M100C5NAA | EPM570GT100C3 | EPM570T144C4 | EPM1270M256C5N | EPM2210GF256C5RR |
| EPM240M100C5N | EPM570GT100C3N | EPM570T144C4N | EPM1270M256C5NAA | EPM2210GF256I5 |
| EPM240M100I5N | EPM570GT100C4 | EPM570T144C5 | EPM1270M256I5N | EPM2210GF256I5N |
| EPM240T100A5N | EPM570GT100C4N | EPM570T144C5N | EPM1270T144A5N | EPM2210GF324C3 |
| EPM240T100C3 | EPM570GT100C5 | EPM570T144C5NRR | EPM1270T144C3 | EPM2210GF324C3N |
| EPM240T100C3N | EPM570GT100C5N | EPM570T144C5RR | EPM1270T144C3ES | EPM2210GF324C4 |
| EPM240T100C3RR | EPM570GT100C5RR | EPM570T144C3TT | EPM1270T144C3N | EPM2210GF324C4N |
| EPM240T100C3TT | EPM570GT100C5TT | EPM570T144C5TT | EPM1270T144C3RR | EPM2210GF324C5 |
| EPM240T100C4 | | EPM570T144I5 | EPM1270T144C4 | EPM2210GF324C5N |
| EPM240T100C4N | | EPM570T144I5N | | EPM2210GF324I5 |
| EPM240T100C4TT | | EPM570T144I5TT | | EPM2210GF324I5N |
| EPM240T100C5 | | | | |
| EPM240T100C5AA | | | | |

Appendix 1. Affected Ordering Part Numbers (continued)

| | | | | |
|-----------------|--|--|--|--|
| EP1S10B672C6 | | | | |
| EP1S10B672C7 | | | | |
| EP1S10F672C6 | | | | |
| EP1S10F672C6N | | | | |
| EP1S10F672C7 | | | | |
| EP1S10F672C7AA | | | | |
| EP1S10F672C7N | | | | |
| EP1S10F672I7 | | | | |
| EP1S10F672I7N | | | | |
| EP1S20B672C6 | | | | |
| EP1S20B672C6N | | | | |
| EP1S20B672C7 | | | | |
| EP1S20B672C7N | | | | |
| EP1S20F672C6 | | | | |
| EP1S20F672C6N | | | | |
| EP1S20F672C7 | | | | |
| EP1S20F672C7N | | | | |
| EP1S20F672I7 | | | | |
| EP1S20F672I7N | | | | |
| EP1S25B672C6 | | | | |
| EP1S25F672C6 | | | | |
| EP1S25F672C6N | | | | |
| EP1S25F672C7 | | | | |
| EP1S25F672C7N | | | | |
| EP1S25F672C8 | | | | |
| EP1S25F672C8N | | | | |
| EP1S25F672C8NAC | | | | |
| EP1S25F672I7 | | | | |
| EP1S25F672I7N | | | | |