PROCESS CHANGE NOTIFICATION
PCN1604
Material Change for Cyclone® III, Cyclone IV GX, Cyclone IV E Products in BGA Package

Change Description:
This notification is to announce a change in the Bill of Material (BOM) for Cyclone III, Cyclone IV GX, Cyclone IV E products in BGA packages.

Table 1:

<table>
<thead>
<tr>
<th>Material</th>
<th>Change From</th>
<th>Change To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Molding Compound (EMC)</td>
<td>Nitto GE100 series</td>
<td>Sumitomo G750 series</td>
</tr>
<tr>
<td>Bond Wire</td>
<td>Bare Copper Wire</td>
<td>Palladium-Coated Copper (PCC) Wire</td>
</tr>
</tbody>
</table>

Note: The rest of the BOM remain the same.

Sumitomo G750 molding compound and PCC bond wire materials are both established and widely used in the industry. These materials are also qualified and already used in other Altera products.

Recommended Action
Customers are requested to:

1. Acknowledge receipt of this notification.
2. Review the change, and to provide feedback or approval of this change at the earliest convenience.
Please refer to “Product Transition Dates” for key milestones.

Upon implementation, Altera may still 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>
<thead>
<tr>
<th><strong>Milestone</strong></th>
<th><strong>Date</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Last date to acknowledge receipt of this notification(^1)</td>
<td>August 29, 2016</td>
</tr>
<tr>
<td>Estimated earliest shipment date of changed products (change implementation) (^2)</td>
<td>December 30, 2016</td>
</tr>
</tbody>
</table>

Note 1: JESD46D stipulates that a change is deemed acceptable if no response or acknowledgement is received within 30 days from the date of the notification.

Note 2: Effective the first ship date listed in Table 2, Altera will begin the shipment of changed products.

Altera reserves the right to continue the shipment of pre-change product after the change implementation date, and customers will receive shipments of either pre-conversion or changed product.

**Reason for Change:**

The change is due to process standardization and continuous process improvement. The combination of the G750 series epoxy molding compound and the PCC wire is already widely used in other products, with excellent process and field performance.

**Impact and Benefit of Change:**

The change does not affect the form, fit, and function of the product. There is no impact to the electrical and mechanical specifications. The change has been successfully evaluated to meet or exceed the quality and reliability requirements. (See Qualification Data, Table 3 below).
Products Affected:

Product Family: Cyclone III, Cyclone IV GX, Cyclone IV E
Package: FBGA – 169/256/324, MBGA- 164, and UBGA-256, 484

See Appendix 1 for the complete list of affected Ordering Part Numbers (OPN).

Method to Identify Change Product:

It is important to note that pre-change and post-change products are considered as interchangeable parts / alternates. The shipment of pre-change products may continue until inventory is depleted, and customers may receive shipments of either pre-change or post-change products.

Qualification Data:

Table 3

<table>
<thead>
<tr>
<th>Test</th>
<th>Conditions</th>
<th># of Lots</th>
<th>Sample Size (SS) / Lot</th>
<th>Results (Fail / Total SS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHAST</td>
<td>85% RH, 130C 96 hours</td>
<td>4</td>
<td>25 – 45 units</td>
<td>0/150</td>
</tr>
<tr>
<td>THB</td>
<td>85% RH, 85C. Vcc, max 1000 hours</td>
<td>4</td>
<td>25 – 45 units</td>
<td>0/118</td>
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<tr>
<td>TCB</td>
<td>-55 C / +125 C 1000 cycles</td>
<td>4</td>
<td>25 – 45 units</td>
<td>0/150</td>
</tr>
<tr>
<td>High Temperature Storage</td>
<td>150C 1000 hours</td>
<td>3</td>
<td>25 – 45 units</td>
<td>0/90</td>
</tr>
</tbody>
</table>

Vehicle Devices:
Cyclone III, IV, V
FBGA – 780/896 pins
Contact

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

Customer Notifications Subscription

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

If you would like to receive automatic customer notifications by email, please subscribe to our customer notification mailing list at:

https://www.altera.com/subscriptions/email/signup/eml-index.jsp

Altera references JESD46 guidelines for PCN.

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Rev</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/15/2016</td>
<td>1.0.0</td>
<td>Initial Release</td>
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</table>

Alterna references JESD46 guidelines for PCN.

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

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# Appendix 1
Affected Ordering Part Numbers (OPNs)

<table>
<thead>
<tr>
<th>Cyclone III</th>
<th>Cyclone III</th>
<th>Cyclone III</th>
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<td>EP3C10M164C7N</td>
<td>EP3C16U484C6</td>
<td>EP3C25F324C8NSZ</td>
<td>EP3C40U484I7NSZ</td>
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