PROCESS CHANGE NOTIFICATION
PCN0708 UPDATE

ENCAPSULANT MATERIAL CHANGE FOR BGA Pb-FREE PACKAGES

Change Description

This is an update to PCN0708, published July 2007. Altera is implementing encapsulant material changes on the ball-grid array (BGA) Pb-free packages assembled in Amkor Korea and Philippines. The changes are summarized in Table 1.

Table 1: Summary of Material Changes

Package	Material Type	Current Material	New Material
Ball-Grid Array (BGA) Pb-free	Encapsulant	Sumitomo CRP-3300NH	Hysol CB0260AT
	Encapsulant Dam	Sumitomo CRP-3900	Hysol CB062

The encapsulant material property comparisons for both the current and the new materials are listed in Appendix 1.

This change does not affect the overall package dimensions or the current moisture sensitivity rating levels (*per* JEDEC *J-STD-020C*).

Reason for Change

Sumitomo, the current supplier, has announced discontinuance of supply of the CRP-3300NH and CRP-3900 encapsulant materials.

Products Affected

Table 2 lists the products affected by this change. Specific ordering codes are available upon request.

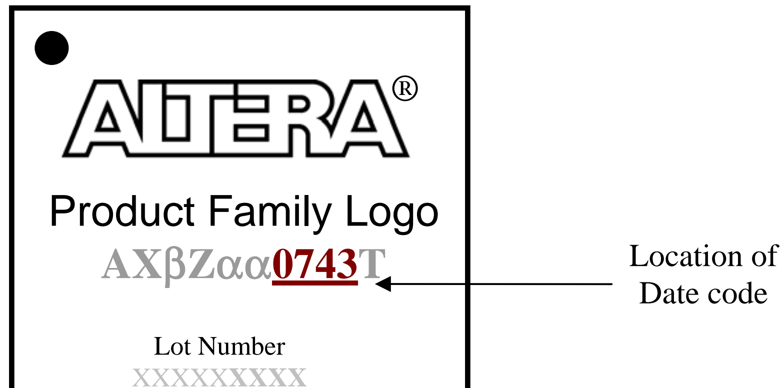
Table 2: Affected Product Lines

Package	Pin Count	Product Line
BGA	256	EPM7512AE
	356	EPF10K100A
		EPF10K100E
		EPF10K50V
		EP20K100
		EP20K100E
		EP20K160E
		EP20K200E
	652	EP20K400E

Identification and Traceability

This change will be implemented starting the week of October 22, 2007. Customers may receive products with this change beginning with a date code marking of 0743 on the top of the package. See Figure 1. Because the transition to the new materials will occur as the current materials are consumed, the week of October 22, 2007 indicates the earliest date that the change can occur for any of the affected devices.

Figure 1. Date Code Marking



Qualification Data

Product qualification data supporting the Hysol encapsulant materials is listed in Appendix 2.

Contact

For more information, please contact your local Altera sales representative or 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
07/20/2007	1.0.0	Initial Release
10/22/2007	1.1.0	Update Qualification Data

Appendix 1:

Material Properties Comparison for Sumitomo and Hysol Encapsulant Materials

Material Properties	unit	Encapsulant material		Encapsulant Dam material	
		Current	Recommended	Current	Recommended
		Sumitomo CRP-3300NH	Hysol CBO260AT	Sumitomo CRP-3900	Hysol CB062
Viscosity	Pa.S	32	34	20	120
Gel Time	min	10	11	10	10
Filler content	wt%	75	75	70	76
Filler type(s)		Spherical silica	Spherical silica	Spherical silica	Spherical silica
Filler average size	µm	6	8	6	10
Specific gravity	-	1.8	1.8	1.8	1.8
Tg	C	90	149	90	125
CTE (a1)	cm/cm/Cx10-6	22	17	27	17
CTE (a2)	cm/cm/Cx10-6	80	67	80	83
Flexural Strength	GPa	0.1	0.13	0.1	0.1
Flexural Modulus	GPa	14	12.65	14	4.6
Pot Life	hrs	8	24	8	24
Shelf life	months	6 @ -40C	6 @ -40C	6 @ -40C	6 @ -40C
Flammability	-	UL94-HB	UL94-HB	UL94-HB	UL94-HB
Alpha Emmission	-	Non Alpha Grades	Low Alpha Grades	Non Alpha Grades	Non Alpha Grades

Appendix 2 :

Qualification Data for the Hysol Encapsulant Material

Representative Package	Qualification Test	Read Out	Results
BGA 356	PCL3 + HAST (Highly Accelerated Stress Test)	96 hrs	0/50
	High Temp Bake @ 150° C	1000 hrs	0/50
	PCL3 + TCB (Temperature Cycle "B")	1000 cycs	0/50
	PCL3 + Unbiased HAST (Highly Accelerated Stress Test)	96 hrs	0/50
	Life test	1000 hrs	0/50
BGA 652	PCL3 + HAST (Highly Accelerated Stress Test)	96 hrs	0/50
	High Temp Bake @ 150° C	1000 hrs	0/50
	PCL3 + TCB (Temperature Cycle "B")	1000 cycs	0/50
	Life test	1000 hrs	0/50