



## **PROCESS CHANGE NOTIFICATION PCN0602 MOLD COMPOUND CHANGE FOR CYCLONE™ II PQFP & TQFP PACKAGES**

### **Change Description:**

Altera is adopting the Sumitomo G700 series mold compound as the standard mold material on its Cyclone™ II low-k dielectric Plastic Quad Flat Pack (PQFP) and Plastic Thin Quad Flat Pack (TQFP) packaged devices. Devices that are currently molded with the Sumitomo E730SJ series material will transition to the Sumitomo-G700 series mold compound. This mold material had been fully qualified by Altera. The qualification data and the material properties of the mold compounds are attached in Appendixes 1 through 3.

This change will not affect the form, fit, or function of the devices and does not change the current moisture sensitivity rating level of these packages.

In accordance with JESD46-B, lack of acknowledgement of this notification within 30 days constitutes acceptance of the change.

### **Reason for Change:**

Altera is standardizing on the Sumitomo G700 series mold compound for all of its products in low-k dielectric PQFP and TQFP packages.

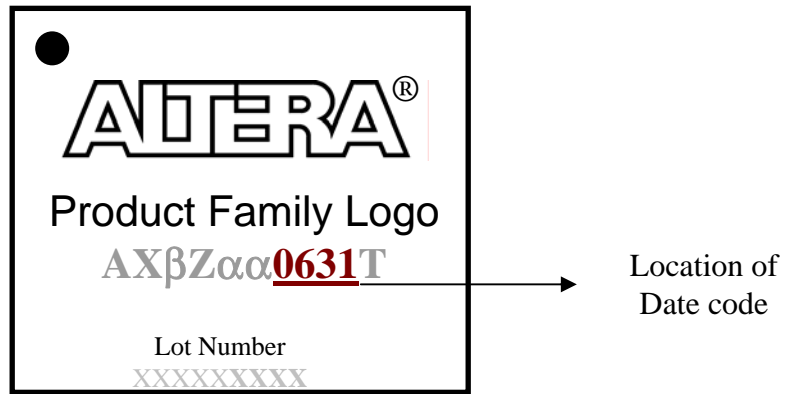
### **Products Affected:**

<b>Package</b>	<b>Pin Count</b>	<b>Product Line</b>
PQFP	208	EP2C5
		EP2C8
	240	EP2C20
TQFP	144	EP2C5
		EP2C8

## Product Traceability and Transition Dates:

This change will be implemented in Aug 2006 timeframe. Beginning with the top-mark date code of 0631, products molded with Sumitomo G700 series mold compound will begin shipping to customers. See Figure 1.

**Figure 1. Date Code Marking**



## Contact:

For more information on this change, please contact your local Altera<sup>®</sup> sales representative or Altera Customer Quality Engineering at [customer-quality@altera.com](mailto:customer-quality@altera.com).

## Appendix 1 – Qualification Data for the Sumitomo G700 Series Mold Compound

Representative Package	Qualification Test	Read Out	Results
PQFP 208	PCL 3 and Unbiased HAST	96 hrs	0/90
	Unbiased HAST	96 hrs	0/90
	PCL 3 and Temperature Cycle Condition B	1000 cyc	0/154
TQFP 144	PCL 3 and Unbiased HAST	96 hrs	0/45
	Unbiased HAST	96 hrs	0/45
	PCL 3 and Temperature Cycle Condition B	1000 cyc	0/77

## Appendix 2 – Material Properties for the Sumitomo G700 Series Mold Compound

Material Properties	Unit	Sumitomo G700 series
Epoxy		Multi Aromatic
Hardener		Multi Aromatic
Filler Type		Low-Alpha
Filler Content %	%	85-88
Spherical / Flake	%	Spherical
Filler Sieving Size	um	55-75
Flame Retardant		Br/Sb/P Free
Spiral Flow	cm	100
Gel Time	sec	30-35
CTE 1	ppm/°C	8-10
CTE 2	ppm/°C	38-47
Tg	° C	130
Flexural Strength (RT)	N/mm2	180-190
Flexural Modulus (RT)	N/mm2	20000-25000
Flexural Strength (260° C)	N/mm2	22-28
Flexural Modulus (260° C)	N/mm2	600-800
Specific Gravity	-	1.97-2
Water Absorption (boiling, 24hrs)	%	0.12-0.14
Flammability	UL-94	V-0

### Appendix 3 – Material Properties for the Sumitomo EME-E730SJ Series Mold Compound

Material Properties	Unit	Sumitomo EME-E730SJ
Spiral Flow	Cm	100
Gel Time	Sec	26
Koka's Viscosity	Pa-s	NA
CTE-1	$\times 10^{-5}/^{\circ}\text{C}$	0.8
CTE-2	$\times 10^{-5}/^{\circ}\text{C}$	3.3
Tg	$^{\circ}\text{C}$	125
Flex. Strength (@ 25° C)	$\text{N}/\text{mm}^2$	200
Flex. Strength (@240° C)	$\text{N}/\text{mm}^2$	24
Flex. Modulus (@ 25° C)	$\times 10^2\text{N}/\text{mm}^2$	250
Flex. Modulus (@ 240° C)	$\times 10^2\text{N}/\text{mm}^2$	9
Specific Gravity	-	2.01
Water Absorption (boiling, 24 hrs)	% weight gain	0.12
UL Flame Class	UL-94	V-0
Volume Resistivity @ 150° C	Ohm-cm	$3.1 \times 10^{13}$
Thermal Conductivity	$\text{W}/\text{m}\cdot^{\circ}\text{C}$	$98 \times 10^{-2}$