PROCESS CHANGE NOTIFICATION PCN0516
MOLD COMPOUND CHANGE FOR PBGA PACKAGES

Change Description:

Altera is adopting Sumitomo G770 series mold compound as the standard mold material on its plastic ball-grid array (PBGA) packaged devices. Devices in 225, 256, and 672 pin PBGA packages that are currently molded with Plaskon SMT-B-1 series material will transition to the Sumitomo G770 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.

Reason for Change:

Altera is standardizing the mold compound of its products in all PBGA packages to this Sumitomo G770 series mold compound.

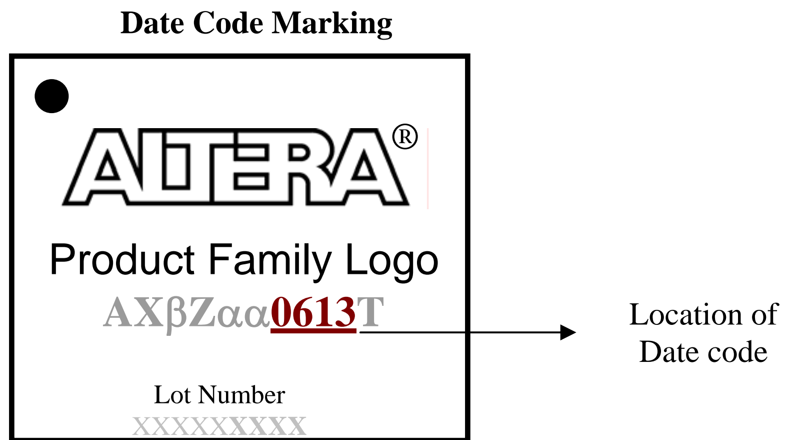
Products Affected:

Package	Pin Count	Product Line
PBGA	225	EPF8820A
	256	EPF6016B
		EPF6024A
	672	EP1S10
		EP1S20
		EP1S25

Product Traceability and Transition Dates:

This change will be implemented in March 2006 timeframe. Beginning with top mark date code of 0613, products molded with Sumitomo G770 series mold compound will begin shipping to customers.

Date Code Marking



Contact:

For more information on this change, please contact your local Altera® sales representative or Altera Customer Quality Engineering at customer-quality@altera.com.

Appendix 1 – Qualification Data

<table>
<tr><th>Packages</th><th>Representative Package</th><th>Qualification Test</th><th>Read Out</th><th>Results</th></tr>
<tr><td rowspan="8">PBGA
225, 256,
672</td><td rowspan="6">PBGA
672</td><td>High Temperature Bake
150° C</td><td>1000 hrs</td><td>0/134</td></tr>
<tr><td>Static Life test
125° C</td><td>1000 hrs</td><td>0/96</td></tr>
<tr><td>PCL 3 and
85° C/85% RH
Temperature and Humidity Bias</td><td>1000 hrs</td><td>0/50</td></tr>
<tr><td>PCL 3 and
Unbiased HAST</td><td>96 hrs</td><td>0/50</td></tr>
<tr><td>PCL 3 and
135° C/85% RH
Biased HAST</td><td>96 hrs</td><td>0/25</td></tr>
<tr><td>PCL 3 and
Temperature Cycle Condition B</td><td>1000 ∞</td><td>0/125</td></tr>
<tr><td rowspan="2">PBGA
896</td><td>PCL 3 and
Unbiased HAST</td><td>96 hrs</td><td>0/25</td></tr>
<tr><td>PCL 3 and
Temperature Cycle Condition B</td><td>1000 ∞</td><td>0/25</td></tr>
</table>

Appendix 2 – Material Properties for SUMITOMO G770 series

Material Properties	**Unit**	**Sumitomo G770 series**
Spiral Flow	Cm	150.000
Gel Time	sec	36.000
Koka's Viscosity	Pa-s	9.000
CTE-1	$x10^{-5}/C$	0.800
CTE-2	$x10^{-5}/C$	4.000
Tg	C	130.000
Flex. Strength (@ 25° C)	N/mm^2	165.000
Flex. Strength (@ 240° C)	N/mm^2	23.000
Flex. Strength (@ 260° C)	N/mm^2	21.000
Flex. Modulus (@ 25° C)	$x10^2N/mm^2$	255.000
Flex. Modulus (@ 240° C)	$x10^2N/mm^2$	8.000
Flex. Modulus (@ 260° C)	$x10^2N/mm^2$	7.000
Stress Index (-65° C ~ 175° C)	E2 (@240° C) N/mm^2	-26.195
Stress Index (-65° C ~ 175° C)	E2 (@260° C) N/mm^2	-26.028
CTE1 x E1		0.204
Specific Gravity	-	2.010
Water Absorption (boil 24 hrs)	%	0.170
UL Flammability (3.2 mmt)	UL-94	V-0
Volume Resistivity @ 150° C	Ohm-cm	$1x10^{11}$
Thermal Conductivity	W/mK	0.900
Voltage Breakdown	kV/mm	15.000
Dielectric Constant(@ 1 MHz)	-	4.000
Dissipation Factor (@ 1 MHz)	-	0.005

Appendix 3 – Material Properties for PLASKON SMT-B-1 series

Material Properties	Unit	Plaskon SMT-B-1 series
Spiral Flow	Cm	76.2 - 106.68
Gel Time	Sec	4 – 16
Koka's Viscosity	Pa-s	NA
CTE-1	$x10^{-5}/C$	1.25 - 1.95
CTE-2	$x10^{-5}/C$	Max. 7.0
Tg	C	Min. 200
Flex. Strength (@ 22° C)	N/mm^2	100
Flex. Strength (@215° C)	N/mm^2	40
Flex. Strength (@ 260° C)	N/mm^2	NA
Flex. Modulus (@ 22° C)	$x10^2N/mm^2$	130
Flex. Modulus (@ 215° C)	$x10^2N/mm^2$	60
Flex. Modulus (@ 260° C)	$x10^2N/mm^2$	NA
Specific Gravity	-	1.83 - 1.87
Water Absorption (boil 24 hrs)	%	0.70
UL Flammability (3.2 mmt)	UL-94	V0
Volume Resistivity @ 150° C	ohm-cm	3.1X10E12
Thermal Conductivity	W/mK	0.7
Voltage Breakdown	kV/mm	NA
Dielectric Constant (@ 1 MHz)	-	3.9 - 4.0
Dissipation Factor (@ 1 MHz)	-	0.005