Mold Compound and Die Attach Epoxy Material Conversion For Military Products

XCN05019 (v1.0) October 24, 2005

Product/Process Change Notice

Overview

This notification describes a material set consolidation of mold compound and die-attach adhesive across various packages in all Xilinx device families. The new material set is already used in Xilinx ROHS-compliant products. There is no change to the current lead finish or solder balls.

Description

To consolidate material sets, Xilinx is changing the package assembly materials at all manufacturing locations for several packages. The mold compound and die-attach materials are moving to the same material set as used in our ROHS-compliant product. The ROHS-compliant material set is halogen-free, meets moisture sensitivity level (MSL) 3 per JEDEC standard J-STD-020C, and meets UL94 V-0 flammability requirements. The change in assembly materials does not affect the fit or function of the devices.

Products Affected

All Xilinx Military products (“XQ” and “XQR” products) offered in the packages in Table 1 will convert to this ROHS-compliant material set.

Table 1: **Products Affected**

Package Type	Current Material Set		ROHS-Compliant Material Set	
	Die Attach	Mold Compound	Die Attach	Mold Compound
BG 256 / 575 / 728	8510	SMT-B1 Series	2300 Series	G770 Series
FG 456	8510	SMT-B1 Series	2300 Series	G770 Series
PQ 240	8361 Series	MP8000CH4	3230	G700 Series
SO 20	84-1LMI Series	MP8000CH4	8290 Series	G600 Series
BG 352 / 432 / 560	EN4900	FP4450	EN4900 (No Change)	CBO260 Series
HQ 208 / 240	8361 84-1LMIS Series	MP8000CH4 7304 Series	1076DJ	G700 Series

Qualification Data

Table 2: **Qualification Data**

		Qualification Data			
Package Type	**Package/Pin Count**	**Qualified Package**	**TCB 1000 Cycles**	**TH 1000 Hrs**	**PP 96 Hrs**
BGA Cavity Up	BG 256 / 575 / 728 FG 456	BG256	0/21	0/45	
		FG456	0/21		
		FG456	0/43		
		FG456	0/22	0/22	
		FG456	0/45	0/45	
		FG456	0/38		
		BG575	0/45		
		BG728	0/45		
BGA Cavity Down	BG 352 / 432 / 560	BG560	0/45	0/22	
PQFP	PQ 240	PQ240	0/76	0/76	0/76
		PQ240	0/39		
		PQ240	0/37		
		PQ240	0/76	0/77	
HQFP	HQ 208 / 240	HQ240	0/77		
SOIC	SO20	SO20	0/75		

Traceability

Devices using the ROHS-compliant material set are distinguished by the 4-digit date code located at the end of the second line of the package topmark. Devices with a date code that is equal to or later than date code 0609 will use the ROHS-compliant material set.

Figure 1: **Package Topmark Showing 4-Digit Date Code**

Key Dates and Ordering

Products marked beginning with date code 0609 (February 2006) will use the ROHS-compliant material set. Products marked with date codes prior to 0609 will continue to ship until this inventory is depleted.

Recommendation

For any questions regarding this change, please contact your local Xilinx Sales Representative.

Important Notice: Xilinx Customer Notifications (PCN, PDN, and Quality Alerts) can be delivered via e-mail alerts sent by the MySupport web site (http://www.xilinx.com/support). Register today and personalize your "MyAlerts" to include Customer Notifications. This change provides many benefits, including the ability to receive alerts for new and updated information about specific products, as well as alerts for other publications such as data sheets, errata, application notes, and so forth. For instructions on how to sign up, refer to Xilinx Answer Record 18683.

Additional Information

Table 3: **Current Mold Compound Technical Data**

		CURRENT			
Compound		**SMTB1 Series**	**FP4450**	**MP8000CH4**	**7304 Series**
Package Types		**BG 256 / 575 / 728, FG 456**	**BG 352 / 432 / 560**	**PQ 240 / SO 20 / HQ208 / 240**	**HQ208 / 240**
Vendor	--	Cookson	Loctite	Nitto	Sumitomo
Compound type	Green / Regular	Regular	Green	Regular	Regular
Ash Content	wt (%)	77.0	73.2	82.0	80.0
Resin Type	--	Multifunctional	Bisphenol	OCN	Bi-Phenyl
Filler Shape	--	Spherical & Flake	Spherical	Spherical & Flake	Spherical (20%) & Flake (80%)
Filler Size	µm	Spherical (Max:65, Avg:25) Flake (Max:80, Avg:17)	16 / 25	Spherical (Max:128, Avg:25) Flake (Max:96, Avg:5)	--
Spiral Flow (after thawing time 0 hrs)	cm	78.14~104.14	--	87	80
Gel Time	sec	6~16	12 min. @ 121°C	21	30
Melting Viscosity (after thawing time 0 hrs)	Pa s	--	32	11.6	--
CTE - Alpha1	X 10 -5/°C	1.25~1.85	19	1.2	1.3
- Alpha2	X 10 -5/°C	Max. 7.0	71	1.4	5.8
Tg	°C	Min. 200	160	150	155
Flexural Strength 25°C	Kgf/mm^2	10 (at 22°C)	10.9	147	17
260°C	Kgf/mm^2	4 (at 215°C), 260°C->N/A	--	--	--
Flexural Modulus 25°C	Kgf/mm^2	1300 (at 22°C)	1140	1890	1800
260°C	Kgf/mm^2	600 (at 215°C), 260°C ->N/A	--	--	--
Hot Hardness (175°C-120s)	Barcol	--	--	--	85
Specific Gravity	--	1.83-1.87	1.79	1.93	1.92
Water Absorption (PCT)	%	0.7	--	--	0.21
Flammability UL-94	--	V-0	HB	V-0	--
Thermal Conductivity	W / m K	0.7	0.8	--	--

Table 3: **Current Mold Compound Technical Data *(Continued)***

		CURRENT			
Compound		**SMTB1 Series**	**FP4450**	**MP8000CH4**	**7304 Series**
Package Types		**BG 256 / 575 / 728, FG 456**	**BG 352 / 432 / 560**	**PQ 240 / SO 20 / HQ208 / 240**	**HQ208 / 240**
Cl-	PPM	--	3	--	--
Br-	PPM	<1.0%	None	0.63%	--

Table 4: **ROHS-Compliant Mold Compound Technical Data**

		ROHS COMPLIANT			
Compound		**G770 Series**	**G700 Series**	**G600 Series**	**CBO260 Series**
Package Types		**BG 256 / 575 / 728, FG 456**	**PQ 240 / HQ208 / 240**	**SO 20**	**BG 352 / 432 / 560**
Vendor	--	Sumitomo	Sumitomo	Sumitomo	Loctite
Compound type	Green / Regular	Green	Green	Green	Green & Pb-free
Ash Content	wt (%)	88.0	84.0	86.0	75
Resin Type	--	Multi-Aromatic	Multi-Aromatic	Multi-Aromatic+a	Naphthalene
Filler Shape	--	Spherical	Spherical	Spherical	Spherical
Filler Size	µm	Max:75, Avg:16	Max:75, Avg:20	Max:75, Avg:20	10 / 45
Spiral Flow (after thawing time 0 hrs)	cm	105	100	85	--
Gel Time	sec	30	30	25	12min @121°C
Melting Viscosity (after thawing time 0 hrs)	Pa s	10	10	--	44
CTE - Alpha1	X 10 -5/°C	0.9	1.2	1.0	18
- Alpha2	X 10 -5/°C	4.3	4.6	4.0	65
Tg	°C	145	135	135	149
Flexural Strength 25°C	Kgf/mm^2	17.5	17	18.5	14
260°C	Kgf/mm^2	1.5	2	2.1	1.7 @ 240°C
Flexural Modulus 25°C	Kgf/mm^2	2600	1900	2400	1290
260°C	Kgf/mm^2	60	60	72	60 @ 240°C
Hot Hardness (175°C-120s)	Barcol	--	--	--	--
Specific Gravity	--	2.01	1.95	1.99	1.8
Water Absorption (PCT)	%	0.15	0.15	0.13	--
Flammability UL-94	--	V-0	V-0	V-0	HB
Thermal Conductivity	W / m K	0.9	0.88	0.87	0.7
Cl-	PPM	--	--	--	2
Br-	PPM	None	None	None	None

Table 5: **Current Die Attach Adhesive Technical Data**

		CURRENT			
Adhesive	**Unit**	**814-1LMI Series**	**8361 Series**	**8510**	**EN4900**
Package Types		**SO 20 / HQ 208 / 240**	**PQ 240 / HQ 208 / 240**	**BG 256 / 575 / 728 / FG 456**	**BG 352 / 432 / 560**
Vendor	--	Ablestik	Ablestik	Ablestik	Hitachi
Filler	--	Silver	Silver	Silver	Silver
Viscosity (5 rpm @ 25°C)	cps	8000	9400	8800	7800/1480
Thixotropic Index (5 rpm vs. 0.5 rpm)	--	5.6	5.2	6	5.3
Max Ionics : Chloride	PPM	5	10	7	3
: Sodium	PPM	3	5	3	1
: Potassium	PPM	1	1	ND	1
Glass Transition Temperature	°C	120	40	38	26
CTE: Below Tg	PPM / °C	40	85	75	69
CTE: Above Tg	PPM / °C	150	200	182	141
Modulus @ -65°C	Mpa	--	--	--	--
@ 25°C	Mpa	3930	2895	2757	3447
@ 150°C	Mpa	--	--	--	--
@ 250°C	Mpa	44	8	21	--
Thermal Conductivity	W / m K	2.5	2.5	1.2	3.5

Table 6: **ROHS-Compliant Die Attach Adhesive Technical Data**

		ROHS COMPLIANT				
Adhesive	**Unit**	**8290 Series**	**3230**	**2300 Series**	**EN4900**	**1076DJ**
Package Types		**SO 20**	**PQ 240**	**BG 256 / 575 / 728 / FG 456**	**BG 352 / 432 / 560**	**HQ 208 / 240**
Vendor	--	Ablestik	Ablestik	Ablestik	Hitachi	Sumitomo
Filler	--	Silver	Silver	Silver	Silver	Silver
Viscosity (5 rpm @ 25°C)	cps	9000	9000	9000	7800/1480	9100
Thixotropic Index (5 rpm vs. 0.5 rpm)	--	5.3	5.6	5.9	5.3	5
Max Ionics : Chloride	PPM	19	5	1	3	≤ 20
: Sodium	PPM	12	5	1	1	≤ 10
: Potassium	PPM	1	1	ND	1	≤ 10
Glass Transition Temperature	°C	38	37	0.8	26	110
CTE: Below Tg	PPM / °C	81	80	60	69	50
CTE: Above Tg	PPM / °C	181	205	129	141	80
Modulus @ -65°C	Mpa	--	--	--	--	--
@ 25°C	Mpa	3061	2964	1792	3447	1230
@ 150°C	Mpa	--	--	--	--	--
@ 250°C	Mpa	17	13	34	--	45
Thermal Conductivity	W / m K	1.1	1.4	0.6	3.5	15

Revision History

The following table shows the revision history for this document.

Date	Version	Revision
10/24/05	1.0	Initial release.