

NUMONYX MATERIAL DECLARATION



BGA Single Die SnAgCu or SnAgCuNi Balls Lead Free and Halogen Free

PACKAGE EXAMPLE: VFBGA 9x11 63 with SnAgCuNi Balls
AVERAGE WEIGHT: 159 mg



JIG 101 LEVEL A COMPLIANT				YES		
JIG 101 LEVEL B COMPLIANT				YES		
Component	Material Name	Substance Name	CAS No.	Substance Mass. (mg)	% per homogeneous substance	Comments
Chip	silicon die	Silicon (Si)	7440-21-3	18.01	99.70	
		Aluminium(Al)	7429-90-5	0.04	0.20	
		Copper (Cu)	7440-50-8	0.01	0.05	
		Titanium (Ti)	7440-32-6	0.01	0.05	
Substrate	core+ fiber glass	Fiber glass	65997-17-3	9.25	44.00	
		Epoxy resin	Trade Secret	5.26	25.00	
		metal hydroxide	Trade Secret	0.21	1.00	
		Bismaleimide (B)	105391-33-1	3.16	15.00	
		Triazine (T)	25722-66-1	3.16	15.00	
	solder mask	Baryum sulfate	7727-43-7	0.29	10.00	
		Dipropylene glycol monomethyl	34590-94-8	0.03	1.00	
		Talc containing no asbestiform fibers	14807-96-6	0.09	3.15	
		Silica crystalline	14808-60-7	0.01	0.45	
		2-(2-Ethoxyethoxy)ethyl Acetate	112-15-2	1.23	42.00	
coating	Acrylates derivative	407-47-6	1.26	43.00		
	Ammine compound	Trade Secret	0.01	0.40		
	Copper (Cu)	7440-50-8	20.31	98.50		
Die Attach	glue	Nickel (Ni)	7440-02-0	0.21	1.00	
		Gold (Au)	7440-57-5	0.10	0.50	
		Epoxy resin	trade secret	0.71	40.00	
		Polybutadiene polymer	25655-35-0	0.21	12.00	
Wire	Bonding Wire	maleic anhydride	108-31-6	0.02	1.00	
		Silane	7803-62-5	0.05	3.00	
		PTFE	9002-84-0	0.78	44.00	
Encapsulation	Moulding Compound	Gold (Au)	7440-57-5	0.28	100.00	
		Epoxy Resin	85954-11-6	5.77	8.00	

		Phenol Resin	Trade Secret	3.61	5.00	
		Fused Silica	Trade Secret	61.65	85.50	
		Carbon Black	1333-86-4	0.36	0.50	
		Metal Hydroxide	Trade Secret	0.72	1.00	
Balls	Soldering Balls	Tin (Sn)	7440-31-5	21.65	98.27	
		Silver (Ag)	7440-22-4	0.26	1.20	
		Copper (Cu)	7440-50-8	0.11	0.50	
		Nickel (Ni)	7440-02-0	0.004	0.02	
		Lead (Pb)	7439-92-1	0.002	0.01	Impurity

Notes: This MDF is applicable only to products with the same material characteristics:

Certain BGAs are assembled in house with conductive epoxies silver based and may contain 0.2% of Dibutyl phthalate CAS 84-74-2 (declarable as per JIG 101 table B).

Subcontracted BGAs are assembled with non conductive epoxies PTFE free or with silver conductive epoxies. In case, ask your sales representative for details.

Subcontracted BGAs may use alloy SAC 105 or SAC405 depending on the application.

BGA Single Die SnAgCuNi Balls Lead Free



PACKAGE EXAMPLE: TBGA 10x13 64 Balls
ASSEMBLY SITE: IN HOUSE PLANT
AVERAGE WEIGHT: 232 mg

JIG 101 LEVEL A COMPLIANT				YES				
JIG 101 LEVEL B COMPLIANT				NO				
Component	Material Name	Substance Name	CAS No.	Substance Mass. (mg)	% per homogeneous substance	Comments		
Chip	silicon die	Silicon (Si)	7440-21-3	13.049	99.70			
		Aluminium(Al)	7429-90-5	0.026	0.20			
		Copper (Cu)	7440-50-8	0.007	0.05			
		Titanium (Ti)	7440-32-6	0.007	0.05			
Substrate	core+ fiber glass	Fiber glass	65997-17-3	13.73	43.00			
		Epoxy Cresol Novolak	29690-82-2	3.19	10.00			
		4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane	25068-38-6	3.19	10.00			
		Brominated compound	68541-56-0	2.24	7.00	JIG 101 LEVEL B		
		Bismaleimide (B)	13676-54-5	4.63	14.50			
		Triazine (T)	25722-66-1	4.63	14.50			
		Magnesium silicate	13776-74-4	0.16	0.50			
		Amorphous Silica	7631-86-9	0.16	0.50			
		solder mask		Baryum sulfate	7727-43-7	0.52	10.00	
				Dipropylene glycol monomethyl	34590-94-8	0.05	1.00	
Talc containing no asbestiform fibers	14807-96-6			0.16	3.15			
Silica crystalline	14808-60-7			0.02	0.45			
2-(2-Ethoxyethoxy)ethyl Acetate	112-15-2			2.19	42.00			
Acrylates derivative	407-47-6			2.24	43.00			
Amine compound	trade secret			0.02	0.40			
coating		Copper (Cu)	7440-50-8	18.59	98.68			
		Nickel (Ni)	7440-02-0	0.15	0.82			
		Gold (Au)	7440-57-5	0.09	0.50			
Die Attach	glue	Silver (Ag)	7440-22-4	0.76	75.00			
		Epoxy Cresol Novolak	trade secret	0.25	24.80			
		Dibutyl phthalate	84-74-2	0.002	0.20	JIG 101 LEVEL B		
Wires	Bonding	Gold (Au)	7440-57-5	0.84	100.00			

	wire					
Encapsulation	Moulding Compound	Biphenyl epoxy resin	85954-11-6	17.34	12.00	
		Phenol resin	trade secret	10.11	7.00	
		Quartz	14808-60-7	3.61	2.50	
		Silica, vitreous	60676-86-0	111.26	77.00	
		Carbon Black	1333-86-4	0.72	0.50	
		Antimony Trioxide	1309-64-4	0.72	0.50	JIG 101 LEVEL B
		Brominated epoxy resin	68541-56-0	0.72	0.50	JIG 101 LEVEL B
Solder Balls	solder	Tin (Sn)	7440-31-5	16.30	98.27	
		Silver (Ag)	7440-22-4	0.20	1.20	
		Copper (Cu)	7440-50-8	0.08	0.50	
		Nickel (Ni)	7440-02-0	0.003	0.02	
		Lead (Pb)	7439-92-1	0.002	0.01	Impurity

Notes: This MDF is applicable only to products with the same material characteristics:
Certain VFBGAs are assembled with non conductive epoxies containing PTFE CAS 9002-84-0 filler and phthalates free.
All no HF VFBGAs are assembled with a moulding compound containing 1% of Bismuth CAS 7440-69-9 (declarable as per JIG 101 table B).

BGA Single Die SnAgCu or SnAgCuNi Balls Lead Free



numonyx™



PACKAGE EXAMPLE: TBGA 10x13 64 Balls

ASSEMBLY SITE: Subcontractor

AVERAGE WEIGHT: 226 mg

JIG 101 LEVEL A COMPLIANT				YES				
JIG 101 LEVEL B COMPLIANT				NO				
Component	Material Name	Substance Name	CAS No.	Substance Mass. (mg)	% per homogeneous substance	Comments		
Chip	silicon die	Silicium (Si)	7440-21-3	20.69	99.70			
		Aluminium(Al)	7429-90-5	0.04	0.20			
		Copper (Cu)	7440-50-8	0.01	0.05			
		Titanium (Ti)	7440-32-6	0.01	0.05			
Substrate	core+ fiber glass	Fiber glass	65997-17-3	12.31	43.00			
		Epoxy Cresol Novolak	29690-82-2	2.86	10.00			
		4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane	25068-38-6	2.86	10.00			
		Brominated compound	68541-56-0	2.00	7.00	JIG 101 LEVEL B		
		Bismaleimide (B)	13676-54-5	4.15	14.50			
		Triazine (T)	25722-66-1	4.15	14.50			
		Magnesium silicate	13776-74-4	0.14	0.50			
		Amorphous Silica	7631-86-9	0.14	0.50			
		solder mask		Baryum sulfate	7727-43-7	0.59	10.00	
				Dipropylene glycol monomethyl	34590-94-8	0.06	1.00	
Talc containing no asbestiform fibers	14807-96-6			0.19	3.15			
Silica crystalline	14808-60-7			0.03	0.45			
2-(2-Ethoxyethoxy)ethyl Acetate	112-15-2			2.48	42.00			
Acrylates derivative	407-47-6			2.54	43.00			
Ammine compound	trade secret			0.02	0.40			
coating				Copper (Cu)	7440-50-8	14.92	97.00	
				Nickel (Ni)	7440-02-0	0.31	2.00	
				Gold (Au)	7440-57-5	0.15	1.00	
Die Attach	Glue	Neopentyl glycol dimethacrylate	1985-51-9	0.12	8.00			
		2,6-Diglycidyl phenyl allyl ether	EC 417-470-1	0.12	7.50			
		4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane	25068-38-6	0.01	0.40			
		epoxy resin	trade secret	0.38	24.10			
		Silicon Dioxide	60676-86-0	0.94	60.00			
Wire	Bonding	Gold (Au)	7440-57-5	0.42	100.00			

	Wire					
Encapsulation	Moulding Compound	Biphenyl epoxy resin	85954-11-6	16.51	12.00	
		Phenol resin	Trade Secret	9.63	7.00	
		Silica, vitreous	60676-86-0	108.02	78.50	
		Carbon Black	1333-86-4	0.69	0.50	
		Antimony Trioxide	1309-64-4	0.69	0.50	JIG 101 LEVEL B
		Brominated epoxy resin	40039-93-8	0.69	0.50	JIG 101 LEVEL B
		Bismuth (Bi)	7440-69-9	1.38	1.00	JIG 101 LEVEL B
Balls	Soldering Balls	Tin (Sn)	7440-31-5	15.01	95.50	
		Silver (Ag)	7440-22-4	0.63	4.00	
		Copper (Cu)	7440-50-8	0.08	0.50	

Notes: This MDF is applicable only to products with the same material characteristics: Certain BGAs are assembled with conductive epoxies silver based and/or with a moulding compound Antimony and Bismuth free (both declarable as per JIG 101 table B).

SAC 105 or SACN (LF35) may be used depending on the application.



BGA Single Die SnPb

PACKAGE EXAMPLE: TBGA 10x13 64 Balls
ASSEMBLY SITE: IN HOUSE PLANT
AVERAGE WEIGHT: 233 mg

JIG 101 LEVEL A COMPLIANT				NO				
JIG 101 LEVEL B COMPLIANT				NO				
Component	Material Name	Substance Name	CAS No.	Substance Mass. (mg)	% per homogeneous substance	Comments		
Chip	silicon die	Silicon (Si)	7440-21-3	13.049	99.70			
		Aluminium(Al)	7429-90-5	0.026	0.20			
		Copper (Cu)	7440-50-8	0.007	0.05			
		Titanium (Ti)	7440-32-6	0.007	0.05			
Substrate	core+ fiber glass	Fiber glass	65997-17-3	13.73	43.00			
		Epoxy Cresol Novolak	29690-82-2	3.19	10.00			
		4,4'-Isopropylidene diphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane	25068-38-6	3.19	10.00			
		Brominated compound	68541-56-0	2.24	7.00	JIG 101 LEVEL B		
		Bismaleimide (B)	13676-54-5	4.63	14.50			
		Triazine (T)	25722-66-1	4.63	14.50			
		Magnesium silicate	13776-74-4	0.16	0.50			
		Amorphous Silica	7631-86-9	0.16	0.50			
		solder mask		Baryum sulfate	7727-43-7	0.52	10.00	
				Dipropylene glycol monomethyl	34590-94-8	0.05	1.00	
Talc containing no asbestiform fibers	14807-96-6			0.16	3.15			
Silica crystalline	14808-60-7			0.02	0.45			
2-(2-Ethoxyethoxy)ethyl Acetate	112-15-2			2.19	42.00			
Acrylates derivative	407-47-6			2.24	43.00			
Amine compound	trade secret			0.02	0.40			
coating		Copper (Cu)	7440-50-8	18.59	98.68			
		Nickel (Ni)	7440-02-0	0.15	0.82			
		Gold (Au)	7440-57-5	0.09	0.50			
Die Attach	glue	Silver (Ag)	7440-22-4	0.76	75.00			
		Epoxy Cresol Novolak	trade secret	0.25	24.80			
		Dibutyl phthalate	84-74-2	0.002	0.20	JIG 101 LEVEL B		

Wires	Bonding wire	Gold (Au)	7440-57-5	0.84	100.00	
Encapsulation	Moulding Compound	Biphenyl epoxy resin	85954-11-6	17.34	12.00	
		Phenol resin	trade secret	10.11	7.00	
		Quartz	14808-60-7	3.61	2.50	
		Silica, vitreous	60676-86-0	111.26	77.00	
		Carbon Black	1333-86-4	0.72	0.50	
		Antimony Trioxide	1309-64-4	0.72	0.50	JIG 101 LEVEL B
		Brominated epoxy resin	68541-56-0	0.72	0.50	JIG 101 LEVEL B
Solder Balls	solder	Tin (Sn)	7440-31-5	11.08	63.00	
		Lead (Pb)	7439-92-1	6.51	37.00	JIG 101 LEVEL A

Note: This MDF is applicable only to products with the same package, material characteristics and assembly site.

This solution cannot be used for new products.

BGA Single Die SnPb



PACKAGE EXAMPLE: TBGA 10x13 64 Balls

ASSEMBLY SITE: Subcontractor

AVERAGE WEIGHT: 227 mg

JIG 101 LEVEL A COMPLIANT				NO				
JIG 101 LEVEL B COMPLIANT				NO				
Component	Material Name	Substance Name	CAS No.	Substance Mass. (mg)	% per homogeneous substance	Comments		
Chip	silicon die	Silicium (Si)	7440-21-3	20.69	99.70			
		Aluminium(Al)	7429-90-5	0.04	0.20			
		Copper (Cu)	7440-50-8	0.01	0.05			
		Titanium (Ti)	7440-32-6	0.01	0.05			
Substrate	core+ fiber glass	Fiber glass	65997-17-3	12.31	43.00			
		Epoxy Cresol Novolak epoxy resin	29690-82-2 25068-38-6	2.86 2.86	10.00 10.00			
		Brominated compound	68541-56-0	2.00	7.00	JIG 101 LEVEL B		
		Bismaleimide (B)	13676-54-5	4.15	14.50			
		Triazine (T)	25722-66-1	4.15	14.50			
		Magnesium silicate	13776-74-4	0.14	0.50			
		Amorphous Silica	7631-86-9	0.14	0.50			
		solder mask		Baryum sulfate	7727-43-7	0.59	10.00	
				Dipropylene glycol monomethyl	34590-94-8	0.06	1.00	
				Talc containing no asbestiform fibers	14807-96-6	0.19	3.15	
Silica crystalline	14808-60-7			0.03	0.45			
2-(2-Ethoxyethoxy) ethyl Acetate	112-15-2			2.48	42.00			
Acrylates derivative	407-47-6			2.54	43.00			
Ammine compound	trade secret			0.02	0.40			
coating		Copper (Cu)	7440-50-8	14.92	97.00			
		Nickel (Ni)	7440-02-0	0.31	2.00			
		Gold (Au)	7440-57-5	0.15	1.00			
Die Attach	Glue	Neopentyl glycol dimethacrylate	1985-51-9	0.12	8.00			
		2,6-Diglycidyl phenyl allyl ether	EC 417-470-1	0.12	7.50			
		4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane	25068-38-6	0.01	0.40			
		epoxy resin	trade secret	0.38	24.10			
		Silicon Dioxide	60676-86-0	0.94	60.00			
Wire	Bonding Wire	Gold (Au)	7440-57-5	0.42	100.00			
Encapsulation	Moulding Compound	Biphenyl epoxy resin	85954-11-6	16.51	12.00			
		Phenol resin	Trade Secret	9.63	7.00			
		Silica, vitreous	60676-86-0	108.02	78.50			
		Carbon Black	1333-86-4	0.69	0.50			
		Antimony Trioxide	1309-64-4	0.69	0.50	JIG 101 LEVEL B		

		Brominated epoxy resin	40039-93-8	0.69	0.50	JIG 101 LEVEL B
		Bismuth (Bi)	7440-69-9	1.38	1.00	JIG 101 LEVEL B
Solder Balls	solder	Tin (Sn)	7440-31-5	11.08	63.00	
		Lead (Pb)	7439-92-1	6.51	37.00	JIG 101 LEVEL A

Note: This MDF is applicable only to products with the same package, material characteristics and assembly site.

Certain BGAs are assembled with conductive epoxies silver based.

This solution cannot be used for new products.

If only one of the options is preferred, please contact your sales representative

This document is based on the best knowledge of Numonyx based on updated information from suppliers. Numonyx believes that this document is correct but cannot warrant the completeness or accuracy of these data. This document is only for guidance and is not validated by analytical measurements.