

**PART INFORMATION**

Mfg Item Number	MK20DN512VMD10
Mfg Item Name	MAPBGA 144 13*13*1.7 P1

**SUPPLIER**

Company Name	Freescale Semiconductor Inc
Company Unique ID	14-141-7928
Response Date	2017-06-24
Response Document ID	007BK00169D011A1.19
Contact Name	Freescale Semiconductor Inc
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**DECLARATION**

EU RoHS	Yes
Pb Free	Yes
HalogenFree	Yes
Plating Indicator	e1
EU RoHS Exemption(s)	

**MANUFACTURING**

Mfg Item Number	MK20DN512VMD10
Mfg Item Name	MAPBGA 144 13*13*1.7 P1
Version	ALL
Weight	0.441000
UoM	g
Unit Volume	EACH
J-STD-020 MSL Rating	3
Peak Processing Temperature	260 C
Max Time at Peak Temperature	40 seconds
Number of Processing Cycles	3

RoHS	
RoHS Directive	2011/65/EU
RoHS Definition	RoHS Definition: Quantity limit of 0.1% by mass (1000 PPM) of homogeneous material for: Lead (Pb), Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE) and quantity limit of 0.01% by mass (100 PPM) of homogeneous material of Cadmium
RoHS Legal Definition	Please indicate whether any homogeneous material (as defined by the RoHS Directive, EU 2011/65/EU and implemented by the laws of the European Union member states) of the part(s) identified on this form contains lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and/or polybrominated diphenyl ethers (each a RoHS restricted substance) in excess of the applicable quantity limit identified below. If a homogeneous material within the part(s) contains a RoHS restricted substance in excess of an applicable quantity limit, please indicate below which, if any, RoHS exemption you believe may apply. If the part is an assembly with lower level components, the declaration shall encompass all such components. Supplier certifies that it gathered the information it provides in this form using appropriate methods to ensure its accuracy and that such information is true and correct to the best of its knowledge and belief, as of the date that Supplier completes this form. Supplier acknowledges that Company will rely on this certification in determining the compliance of its products with European Union member state laws that implement the RoHS Directive. Company acknowledges that Supplier may have relied on information provided by others in completing this form, and that Supplier may not have independently verified such information. However, in situations where Supplier has not independently verified information provided by others, Supplier agrees that, at a minimum, its suppliers have provided certifications regarding their contributions to the part(s), and those certifications are at least as comprehensive as the certification in this paragraph. If the Company and the Supplier enter into a written agreement with respect to the identified part(s), the terms and conditions of that agreement, including any warranty rights and/or remedies provided as part of that agreement, will be the sole and exclusive source of the Suppliers liability and the Companys remedies for issues that arise regarding information the Supplier provides in this form. In the absence of such written agreement, the warranty rights and/or remedies of Suppliers Standard Terms and Conditions of Sale applicable to such part(s) shall apply.
RoHS Declaration	1 - Item(s) do not contain RoHS restricted substances per the definition above
Supplier Acceptance	Accepted
Signature	Daniel Binyon
Exemption List Version	2012/51/EU
List of Freescale Accepted Exemptions	<p>6(a) : Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight</p> <p>6(b) : Lead as an alloying element in aluminium containing up to 0.4% lead by weight</p> <p>6(c) : Copper alloy containing up to 4% lead by weight</p> <p>7(a) : Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)</p> <p>7(b) : Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications</p> <p>7(c)-I : Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound</p> <p>7(c)-II : Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher</p> <p>7(c)-III : Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC</p> <p>7(c)-IV : Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors</p> <p>15 : Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages</p>

MATERIAL COMPOSITION

Homogeneous Material	Weight	SubstanceClass	Substance	CAS	Exemption	SubstanceWeight	UoM	SubPart PPM	SubPart%	ARTICLEPPM	ARTICLE%
Solder Balls - Lead Free	0.0734						g				
Solder Balls - Lead Free		Metals	Aluminum, metal	7429-90-5		0.0000228	g	31	0.0031	5	0.0005
Solder Balls - Lead Free		Antimony/Antimony Compounds	Antimony (metallic)	7440-36-0		0.00000918	g	125	0.0125	20	0.002
Solder Balls - Lead Free		Arsenic/Arsenic Compounds	Arsenic	7440-38-2		0.00000543	g	74	0.0074	12	0.0012
Solder Balls - Lead Free		Bismuth/Bismuth Compounds	Bismuth	7440-69-9		0.00001373	g	187	0.0187	31	0.0031
Solder Balls - Lead Free		Cadmium/Cadmium Compounds	Cadmium	7440-43-9		0.00000088	g	12	0.0012	1	0.0001
Solder Balls - Lead Free		Metals	Copper, metal	7440-50-8		0.00036556	g	4994	0.4994	831	0.0831
Solder Balls - Lead Free		Metals	Gold, metal	7440-57-5		0.00000455	g	62	0.0062	10	0.001
Solder Balls - Lead Free		Metals	Indium, metal	7440-74-6		0.00000455	g	62	0.0062	10	0.001
Solder Balls - Lead Free		Solvents, additives, and other materials	Sulfur	7704-34-9		0.00000044	g	6	0.0006	0	0
Solder Balls - Lead Free		Solvents, additives, and other materials	Phosphorus, elemental (not containing red allotrope)	7723-14-0		0.00000455	g	62	0.0062	10	0.001
Solder Balls - Lead Free		Metals	Iron, metal	7439-89-6		0.00000918	g	125	0.0125	20	0.002
Solder Balls - Lead Free		Lead/Lead Compounds	Lead	7439-92-1		0.00002753	g	375	0.0375	62	0.0062
Solder Balls - Lead Free		Nickel (external applications only)	Nickel	7440-02-0		0.00000228	g	31	0.0031	5	0.0005
Solder Balls - Lead Free		Metals	Silver, metal	7440-22-4		0.00293255	g	3953	3.953	6649	0.6649
Solder Balls - Lead Free		Metals	Tin, metal	7440-31-5		0.07001492	g	953882	95.3882	158763	15.8763
Solder Balls - Lead Free		Metals	Zinc, metal	7440-66-6		0.00000139	g	19	0.0019	3	0.0003
Non-Conductive Epoxy/Adhesive	0.0015						g				
Non-Conductive Epoxy/Adhesive		Plastics/polymers	Proprietary Material-Other Epoxy resins	-		0.0001125	g	75000	7.5	255	0.0255
Non-Conductive Epoxy/Adhesive		Plastics/polymers	Crosslinked acrylate polymer	25767-43-5		0.0003	g	200000	20	680	0.068
Non-Conductive Epoxy/Adhesive		Plastics/polymers	Other polymers	-		0.0001125	g	75000	7.5	255	0.0255
Non-Conductive Epoxy/Adhesive		Plastics/polymers	Proprietary Material-Other polymers	-		0.0003	g	200000	20	680	0.068
Non-Conductive Epoxy/Adhesive		Glass	Silica, vitreous	80676-86-0		0.000675	g	450000	45	1530	0.153
Bonding Wire, Copper	0.0037						g				
Bonding Wire, Copper		Metals	Copper, metal	7440-50-8		0.003589	g	970000	97	8138	0.8138
Bonding Wire, Copper		Solvents, additives, and other materials	Other miscellaneous substances (less than 5%)	-		0.000111	g	30000	3	251	0.0251
Die Encapsulant, Halogen-free	0.2362						g				
Die Encapsulant, Halogen-free		Metals	Other aluminum compounds	-		0.007086	g	30000	3	16068	1.6068
Die Encapsulant, Halogen-free		Solvents, additives, and other materials	Carbon Black	1333-86-4		0.002362	g	10000	1	5356	0.5356
Die Encapsulant, Halogen-free		Plastics/polymers	Phenol, polymer with formaldehyde	9003-35-4		0.007086	g	30000	3	16068	1.6068
Die Encapsulant, Halogen-free		Plastics/polymers	Other phenolic resins	-		0.007086	g	30000	3	16068	1.6068
Die Encapsulant, Halogen-free		Glass	Silica, vitreous	80676-86-0		0.20077	g	850000	85	455283	45.5283
Die Encapsulant, Halogen-free		Plastics/polymers	Other Non-halogenated Epoxy resins	-		0.01181	g	50000	5	26780	2.678
Organic Substrate, Halogen-free	0.112						g				
Organic Substrate, Halogen-free		Solvents, additives, and other materials	Other aromatic amines and their salts	-		0.00001893	g	169	0.0169	42	0.0042
Organic Substrate, Halogen-free		Metals	Barium sulfate	7727-43-7		0.00063974	g	5712	0.5712	1450	0.145
Organic Substrate, Halogen-free		Metals	Copper, metal	7440-50-8		0.05093348	g	454763	45.4763	115495	11.5495
Organic Substrate, Halogen-free		Plastics/polymers	Phenolic Polymer Resin, Epikote 155	9003-36-5		0.00170811	g	15251	1.5251	3873	0.3873
Organic Substrate, Halogen-free		Plastics/polymers	Other Epoxy resins	-		0.00475798	g	42482	4.2482	10789	1.0789
Organic Substrate, Halogen-free		Metals	Gold, metal	7440-57-5		0.0015148	g	13525	1.3525	3434	0.3434
Organic Substrate, Halogen-free		Metals	Talc	14807-96-6		0.00032222	g	2877	0.2877	730	0.073
Organic Substrate, Halogen-free		Nickel (external applications only)	Nickel	7440-02-0		0.01182059	g	105541	10.5541	26804	2.6804
Organic Substrate, Halogen-free		Glass	Fibrous-glass-wool	65997-17-3		0.02624182	g	234302	23.4302	59505	5.9505
Organic Substrate, Halogen-free		Glass	Silicon dioxide	7631-86-9		0.00349418	g	31198	3.1198	7923	0.7923
Organic Substrate, Halogen-free		Solvents, additives, and other materials	Other Aromatic carbonyl compounds	-		0.00011984	g	1070	0.107	271	0.0271
Organic Substrate, Halogen-free		Plastics/polymers	Triazine	25722-86-1		0.00170811	g	15251	1.5251	3873	0.3873
Organic Substrate, Halogen-free		Metals	Aluminum Hydroxide	21645-51-2		0.00425578	g	37998	3.7998	9650	0.965
Organic Substrate, Halogen-free		Metals	Copper phthalocyanine	147-14-8		0.00000571	g	51	0.0051	12	0.0012
Organic Substrate, Halogen-free		Solvents, additives, and other materials	Quinacridone pigment	1047-16-1		0.00000571	g	51	0.0051	12	0.0012
Organic Substrate, Halogen-free		Solvents, additives, and other materials	3-methoxy-3-methyl-1-butyl acetate	103429-90-9		0.00070134	g	6262	0.6262	1590	0.159
Organic Substrate, Halogen-free		Solvents, additives, and other materials	Bis(3-ethyl-5-methyl-4-maleimidophenyl)methane	105391-33-1		0.00170811	g	15251	1.5251	3873	0.3873
Organic Substrate, Halogen-free		Plastics/polymers	Epoxy Resin	115254-47-2		0.0203784	g	18195	1.8195	4620	0.462
Organic Substrate, Halogen-free		Solvents, additives, and other materials	1,2,4-Trimethylbenzene	95-63-6		0.00000571	g	51	0.0051	12	0.0012
Silicon Semiconductor Die	0.0142						g				
Silicon Semiconductor Die		Solvents, additives, and other materials	Other miscellaneous substances (less than 5%)	-		0.000284	g	20000	2	643	0.0643
Silicon Semiconductor Die		Glass	Silicon, doped	-		0.013916	g	980000	98	31555	3.1555

## LINKS

MCD LINK	
NXP website	<a href="http://www.nxp.com">http://www.nxp.com</a>
GENERAL ENVIRONMENTAL COMPLIANCE LINKS	
RoHS signed letter	<a href="http://www.nxp.com/files/corporate/doc/support_info/NXP-ROHS-DECLARATION.pdf">http://www.nxp.com/files/corporate/doc/support_info/NXP-ROHS-DECLARATION.pdf</a>
China RoHS	<a href="http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization/china-rohs:ENV_CHINA_ROHS_STRATEGY">http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization/china-rohs:ENV_CHINA_ROHS_STRATEGY</a>
REACH signed letter	<a href="http://www.nxp.com/files/corporate/doc/support_info/NXP-REACH-STATEMENT.pdf">http://www.nxp.com/files/corporate/doc/support_info/NXP-REACH-STATEMENT.pdf</a>
ELV signed letter	<a href="http://www.nxp.com/files/corporate/doc/support_info/NXP-ELV-STATEMENT.pdf">http://www.nxp.com/files/corporate/doc/support_info/NXP-ELV-STATEMENT.pdf</a>
Conflict Minerals statement	<a href="http://www.nxp.com/files/corporate/doc/support_info/NXP-STATEMENT-CONFLICT-MINERALS.pdf">http://www.nxp.com/files/corporate/doc/support_info/NXP-STATEMENT-CONFLICT-MINERALS.pdf</a>
NXP ENVIRONMENTAL INFORMATION	
Environmental Compliance website	<a href="http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization:ABUENVPRFPRDX">http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization:ABUENVPRFPRDX</a>
FAQ	<a href="http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization/eco-product-faqs:ENVIRON_FAQ">http://www.nxp.com/about/corporate-responsibility/environmental-compliance-organization/eco-product-faqs:ENVIRON_FAQ</a>
Technical Service Request	<a href="http://www.nxp.com/support/sales-and-support:SUPPORTHOME">http://www.nxp.com/support/sales-and-support:SUPPORTHOME</a>
LINKS TO BLANK IPC1752 FORMS	
Blank IPC1752 v1.1 Form	<a href="http://www.NXP.com/files/abstract/corporate/ehs_epp/IPC-1752-2_v1.1_MCD_Template.pdf">http://www.NXP.com/files/abstract/corporate/ehs_epp/IPC-1752-2_v1.1_MCD_Template.pdf</a>

IPC1752 XML LINKS

[http://www.freescale.com/mcdfs/MK20DN512VMD10\\_IPC1752\\_v11.xml](http://www.freescale.com/mcdfs/MK20DN512VMD10_IPC1752_v11.xml)

[http://www.freescale.com/mcdfs/MK20DN512VMD10\\_IPC1752A.xml](http://www.freescale.com/mcdfs/MK20DN512VMD10_IPC1752A.xml)