



Device Material Content

5555 NE Moore Ct. Hillsboro OR 97124 custreq@latticesemi.com November, 2020		Package: 256 csfBGA Total Device Weight 148.2 Milligrams		Package Code: MG256 Products: XO3L/LF		Assembly: ASEK Size (mm): 9 x 9 Lead pitch (mm): 0.5 MSL: 3 Reflow max (°C): 260		
	% of Total Pkg. Wt.	Weight (mg)	% of Total Pkg. Wt.	Weight (mg)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	5.88%	8.711	5.88%	8.711	Silicon chip	7440-21-3	100.00%	Die size: 4.452 x 4.364
Mold Compound	45.24%	67.044	5.43%	8.045	Epoxy Resins	-	12.00%	Sumitomo EME-G311SAC
			2.26%	3.352	Phenol Resins	-	5.00%	
			33.93%	50.283	Silica(Amorphous)	7631-86-9	75.00%	
			3.39%	5.028	Aluminum Hydroxide	21645-51-2	7.50%	
			0.23%	0.335	Carbon Black	1333-86-4	0.50%	
Substrate	16.40%	24.300	5.25%	7.776	BT Resins	-	32.00%	CCL-HL832NS
			11.15%	16.524	Glass fiber	65997-17-3	68.00%	
Foil	12.02%	17.810	12.014%	17.805	Copper (Cu)	7440-50-8	99.97%	
			0.003%	0.005	OSP	-	0.03%	
Solder Mask	1.08%	1.594	0.25%	0.375	Solvent naphtha (petroleum)	64742-94-5	23.52%	Solder mask PSR4000 AUS 320
			0.06%	0.094	Naphthalene	91-20-3	5.87%	
			0.16%	0.234	Phosphin oxide derivative	-	14.70%	
			0.16%	0.234	Talc	14807-96-6	14.70%	
			0.19%	0.281	Dipropylene glycol monomethyl Ether	34590-94-8	17.63%	
			0.16%	0.234	Epoxy Resin	85954-11-6	14.70%	
			0.10%	0.142	Barium Sulfate	7727-43-7	8.88%	
Bump	0.48%	0.706	0.067%	0.100	Tin (Sn)	7440-31-5	14.16%	
			0.001%	0.002	Silver (Ag)	7440-22-4	0.28%	
			0.388%	0.575	Nickel (Ni)	7440-02-0	81.44%	
			0.020%	0.029	Copper (Cu)	7440-50-8	4.11%	
Polyamic Ester	0.10%	0.142	0.048%	0.071	4-Butyrolactone	96-48-0	50.00%	HD8820
			0.034%	0.050	Polyamide	-	35.00%	
			0.005%	0.007	1-Methoxy-2-propyl acetate	108-65-6	5.00%	
			0.005%	0.007	Photo Active Compound	-	5.00%	
			0.005%	0.007	Proprietary Additives	-	5.00%	
RDL 1	0.007%	0.010	0.007%	0.010	Titanium (Ti)	7440-32-6	100.00%	
RDL 2	0.55%	0.811	0.55%	0.811	Copper (Cu)	7440-50-8	100.00%	
UBM	0.03%	0.049	0.007%	0.010	Titanium (Ti)	7440-32-6	20.41%	
			0.026%	0.039	Copper (Cu)	7440-50-8	79.59%	
Solder Balls	18.23%	27.020	17.594%	26.074	Tin (Sn)	7440-31-5	96.50%	SAC305
			0.547%	0.811	Silver (Ag)	7440-22-4	3.00%	
			0.091%	0.135	Copper (Cu)	7440-50-8	0.50%	

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Rev. E



Device Material Content

5555 NE Moore Ct. Hillsboro OR 97124 custreq@latticesemi.com November, 2020		Package: 256 csFBGA Total Device Weight: 0.137 Grams			Package Code: <div style="border: 1px solid black; padding: 2px; display: inline-block;">MG256</div> Products: <div style="border: 1px solid black; padding: 2px; display: inline-block;">XO3</div>	Assembly: ATP Size (mm): 9 x 9 Lead pitch (mm): 0.5 MSL: 3 Reflow max (°C): 260		
	% of Total Pkg. Wt.	Weight (g)	% of Total Pkg. Wt.	Weight (g)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	6.14%	0.0084	6.14%	0.0084	Silicon chip	7440-21-3	100.00%	Die size: 4.5 x 4.4 x 0.177mm
Mold Compound	43.87%	0.0601	7.90% 35.97%	0.01082 0.04928	Epoxy Resin Silica filler	Trade secret 60676-86-0	18.00% 82.00%	Hitachi(Nitto) GE-110BH83-FC
Cu Pillar	0.250%	0.00034	0.150% 0.098% 0.002%	0.00021 0.0001343 0.0000025	Pillar: Cap: Copper (Cu) Tin (Sn) Silver (Ag)	7440-50-8 7440-31-5 7440-22-4	60.09% 39.21% 0.73%	Oval Type
Sputter 1	0.002%	0.000003	0.000% 0.001% 0.001%	0.0000001 0.0000012 0.0000014	Titanium (Ti) Tungsten (W) Copper (Cu)	7440-32-6 7440-33-7 7440-50-8	4.98% 44.84% 50.18%	
Sputter 2	0.028%	0.000038	0.002% 0.026%	0.000003 0.000035	Titanium (Ti) Copper (Cu)	7440-32-6 7440-50-8	7.74% 92.26%	
RDL	0.259%	0.00035	0.26%	0.0004	Copper (Cu)	7440-50-8	100.00%	
Polyimide & PBO	0.160%	0.00022	0.144% 0.016%	0.000197 0.000022	Proprietary Polymer Additives	Trade secret Trade secret	90.00% 10.00%	
Solder Balls	19.58%	0.0268	18.895% 0.587% 0.098%	0.02589 0.00080 0.00013	Tin (Sn) Silver (Ag) Copper (Cu)	7440-31-5 7440-22-4 7440-50-8	96.50% 3.00% 0.50%	SAC305
Substrate	14.42%	0.0198	4.61% 9.80%	0.0063 0.0134	BT Resins Glass fiber	- 65997-17-3	32.00% 68.00%	BT Resin CCL-HL832NS
Foil	10.28%	0.0141	7.09% 2.59% 0.60%	0.0097 0.0036 0.0008	Copper Nickel plating Gold plating	7440-50-8 7440-02-0 7440-57-5	68.91% 25.22% 5.87%	
Solder Mask	4.74%	0.0065	2.66% 0.76% 1.04% 0.14% 0.02% 0.11%	0.00365 0.00104 0.00143 0.00019 0.00003 0.00015	Quartz 3-methoxy-3-methylbutylacetate Barium Sulfate Talc (containing no asbestiform fibers) Naphthalene Trade secret ingredients	14808-60-7 103429-90-9 7727-43-7 14807-96-6 91-20-3 -	56.20% 16.00% 22.00% 3.00% 0.50% 2.30%	Solder mask PSR4000 AUS 308

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Device Material Content

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Hillsboro OR 97124
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Package: 256 csfBGA
Total Device Weight 146.58 Milligrams

Package Code:

MG256

Products:

XO3

Assembly: ATK
Size (mm): 9 x 9
Lead pitch (mm): 0.5
MSL: 3
Reflow max (°C): 260

November, 2020

	% of Total Pkg. Wt.	Weight (Mg)	% of Total Pkg. Wt.	Weight (Mg)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	3.98%	5.835	3.98%	5.8350	Silicon chip	7440-21-3	100.00%	Die size: 3.7 x 3.8 x 0.177 mm
Bumping (Cu Pillar)	0.324%	0.474	0.194% 0.127% 0.003%	0.2840 0.1860 0.0044	Copper Tin Silver	7440-50-8 7440-31-5 7440-22-4	59.86% 39.21% 0.92%	
Mold Compound	45.487%	66.677	2.27% 0.45% 0.45% 0.45% 0.45% 36.39% 4.55% 0.45%	3.3338 0.6668 0.6668 0.6668 0.6668 53.3414 6.6677 0.6668	Epoxy Resin A Epoxy Resin B Epoxy Resin C Phenol Resin A Phenol Resin B Silicon dioxide Aluminium hydroxide Carbon Black	Proprietary Proprietary Proprietary Proprietary Proprietary 7631-86-9 21645-51-2 1333-86-4	5.00% 1.00% 1.00% 1.00% 1.00% 80.00% 10.00% 1.00%	Sumitomo EME-G311SQ TYPE B
Solder Balls	18.283%	26.800	17.643% 0.548% 0.091%	25.8621 0.8040 0.1340	Tin Silver Copper	7440-31-5 7440-22-4 7440-50-8	96.50% 3.00% 0.50%	SAC305
Substrate (Core)	18.624%	27.300	9.312% 9.312%	13.6498 13.6498	BT Resins Glass fiber	- 65997-17-3	32.00% 68.00%	MGC CCL-HL832NS
Substrate (Solder Mask)	2.183%	3.200	1.57% 0.46% 0.09% 0.00% 0.01% 0.03% 0.02%	2.3073 0.6688 0.1344 0.0064 0.0128 0.0416 0.0288	Solvent naphtha (petroleum) Naphthalene Phosphin oxide derivative Talc Dipropylene glycol monomethyl Ether Epoxy Resin Barium Sulfate	64742-94-5 91-20-3 - 14807-96-6 34590-94-8 85954-11-6 7727-43-7	23.52% 5.87% 14.70% 14.70% 17.63% 14.70% 8.88%	Taiyo Ink AUS320
Substrate (Cu plating)	11.119%	16.298	11.12%	16.2982	Copper (Cu)	7440-50-8	100.00%	

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Rev. E