Device Material Content

5555 NE Moore Ct.
Hillsboro OR 97124
custreq@latticesemi.com

January, 2020

Package: 256 ftBGA (option 2)
Total Device Weight 1.234 Grams

Package Code: FTN256
Products: FE3

Assembly: ASEM
Size (mm): 17 x 17
Lead pitch (mm): 1.0
MSL: 3
Reflow max (^oC): 260

	% of Total Pkg. Wt.	Weight (g)	% of Total Pkg. Wt.	Weight (g)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	1.22%	0.0151	1.22%	0.0151	Silicon chip	7440-21-3	100.00%	Die size: 4.64 x 5.16 mm
Mold Compound	37.10%	0.4578	2.60%	0.0320	Epoxy Resin	-	7.00%	Mold Compound: Sumitomo G750SE (ULA)
			1.86%	0.0229	Phenol Novolac	9003-35-4	5.00%	
			1.86%	0.0229	Metal Hydroxide	-	5.00%	
			0.19%	0.0023	Carbon Black	1333-86-4	0.50%	
			30.61%	0.3777	Silica Fused	60676-86-0	82.50%	
D/A Epoxy	0.17%	0.0021	0.14%	0.00168	Silver	7440-22-4	80.00%	Die attach epoxy: Henkel (Ablebond) 2100A
			0.03%	0.00042	Esters & resins	-	20.00%	
Wire	0.33%	0.0041	0.33%	0.0040	Copper	7440-50-8	98.50%	0.8 mil diameter; 1 wire per solder ball
			0.00%	0.0001	Palladium	7440-05-3	1.50%	
Solder Balls	20.18%	0.2490	19.47%	0.2403	Tin (Sn)	7440-31-5	96.50%	SAC305
			0.61%	0.0075	Silver (Ag)	7440-22-4	3.00%	
			0.10%	0.0012	Copper (Cu)	7440-50-8	0.50%	
Substrate	24.19%	0.2985	7.74%	0.0955	BT Resins	-	32.00%	BT Resin CCL-HL832NX-A*
			16.45%	0.2030	Glass fiber	65997-17-3	68.00%	
Foil	11.00%	0.1357	9.02%	0.1113	Copper	7440-50-8	82.00%	
			1.66%	0.0205	Nickel plating	7440-02-0	15.10%	
			0.32%	0.0039	Gold plating	7440-57-5	2.91%	
Solder Mask	5.81%	0.0717	3.16%	0.0390	Quartz	14808-60-7	54.37%	Solder mask PSR4000 AUS 308
			0.43%	0.0053	Dipropylene glycol monomethyl ether	34590-94-8	7.33%	
			0.19%	0.0024	Morpholine derivative**	71868-10-5	3.32%	
			0.17%	0.0022	Silicon dioxide	7631-86-9	3.00%	
			0.17%	0.0022	Silica, amorphous	112945-52-5	3.00%	
			0.01%	0.0002	Carbon black	1333-86-4	0.24%	
			1.67%	0.0206	Trade secret ingredients	-	28.74%	

Notes: SVHC:

* 0.24% max. concentration of Bisphenol A (CAS# 80-05-7), contained in substrate laminate material as impurity - not intentionally added.

** 0.19% max. concentration of Morpholine derivative (CAS# 71868-10-5), contained in solder mask material.

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Rev. O

Device Material Content

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January, 2020

Package: 256 ftBGA (option 2)
Total Device Weight 1.234 Grams

Package Code: FTN256
Products: FE3

Assembly: ASEK
Size (mm): 17 x 17
Lead pitch (mm): 1.0
MSL: 3
Reflow max (^{o}C): 260

	% of Total Pkg. Wt.	Weight (g)	% of Total Pkg. Wt.	Weight (g)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	1.22%	0.0151						Die size: 4.64 x 5.16 mm
			1.22%	0.0151	Silicon chip	7440-21-3	100.00%	
Mold Compound	37.10%	0.4578						Mold Compound: Kyocera KE-G2250 series (ULA)
			2.23%	0.0275	Epoxy Resin	-	6.00%	
			1.86%	0.0229	Phenol Resin	-	5.00%	
			0.07%	0.0009	Carbon Black	1333-86-4	0.20%	
			31.61%	0.3901	Silica	60676-86-0	85.20%	
			1.34%	0.0165	Others	-	3.60%	
D/A Epoxy	0.17%	0.0021						Die attach epoxy: Henkel (Ablebond) 2100A
			0.14%	0.00168	Silver	7440-22-4	80.00%	
			0.03%	0.00042	Esters & resins	-	20.00%	
Wire	0.33%	0.0041						0.8 mil diameter; 1 wire per solder ball
			0.33%	0.0040	Copper	7440-50-8	98.50%	
			0.00%	0.0001	Palladium	7440-05-3	1.50%	
Solder Balls	20.18%	0.2490						SAC105
			19.88%	0.2453	Tin (Sn)	7440-31-5	98.50%	
			0.20%	0.0025	Silver (Ag)	7440-22-4	1.00%	
			0.10%	0.0012	Copper (Cu)	7440-50-8	0.50%	
Substrate	24.19%	0.2985						BT Resin CCL-HL832NX-A*
			7.74%	0.0955	BT Resins	-	32.00%	
			16.45%	0.2030	Glass fiber	65997-17-3	68.00%	
Foil	11.00%	0.1357						
			9.02%	0.1113	Copper	7440-50-8	82.00%	
			1.66%	0.0205	Nickel plating	7440-02-0	15.10%	
			0.32%	0.0039	Gold plating	7440-57-5	2.91%	
Solder Mask	5.81%	0.0717						Solder mask PSR4000 AUS 308
			3.16%	0.0390	Quartz	14808-60-7	54.37%	
			0.43%	0.0053	Dipropylene glycol monomethyl ether	34590-94-8	7.33%	
			0.19%	0.0024	Morpholine derivative**	71868-10-5	3.32%	
			0.17%	0.0022	Silicon dioxide	7631-86-9	3.00%	

Device Material Content

LATTICE SEMICONDUCTOR

5555 NE Moore Ct.
Hillsboro OR 97124
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January, 2020

Package: 256 ftBGA (option 2)
Total Device Weight 1.234 **Grams**

Package Code: FTN256
Products: FE3

Assembly: ATP
Size (mm): 17 x 17
Lead pitch (mm): 1.0
MSL: 3
Reflow max (^{o}C): 260

	% of Total Pkg. Wt.	Weight (g)	% of Total Pkg. Wt.	Weight (g)	Substance	CAS #	% of Subst.	Notes / Assumptions:
Die	1.22%	0.0151						Die size: 4.64 x 5.16 mm
			1.22%	0.0151	Silicon chip	7440-21-3	100.00%	
Mold Compound	37.10%	0.4578						Mold Compound: Hitachi GE-110LS-V (ULA)
			2.60%	0.0320	Solid Epoxy Resin	-	7.00%	
			1.86%	0.0229	Phenol Resin	-	5.00%	
			31.54%	0.3891	Silica	60676-86-0	85.00%	
			0.93%	0.0114	Metal Hydroxide	-	2.50%	
			0.19%	0.0023	Carbon Black	1333-86-4	0.50%	
D/A Epoxy	0.17%	0.0021						Die attach epoxy: Henkel (Ablebond) 2300
			0.14%	0.00168	Silver	7440-22-4	80.00%	
			0.03%	0.00042	Esters & resins	-	20.00%	
Wire	0.33%	0.0041						0.8 mil diameter; 1 wire per solder ball
			0.33%	0.0040	Copper	7440-50-8	98.50%	
			0.00%	0.0001	Palladium	7440-05-3	1.50%	
Solder Balls	20.18%	0.2490						SAC405
			19.27%	0.2378	Tin (Sn)	7440-31-5	95.50%	
			0.81%	0.0100	Silver (Ag)	7440-22-4	4.00%	
			0.10%	0.0012	Copper (Cu)	7440-50-8	0.50%	
Substrate	24.19%	0.2985						BT Resin CCL-HL832NX-A*
			7.74%	0.0955	BT Resins	-	32.00%	
			16.45%	0.2030	Glass fiber	65997-17-3	68.00%	
Foil	11.00%	0.1357						
			9.02%	0.1113	Copper	7440-50-8	82.00%	
			1.66%	0.0205	Nickel plating	7440-02-0	15.10%	
			0.32%	0.0039	Gold plating	7440-57-5	2.91%	
Solder Mask	5.81%	0.0717						Solder mask PSR4000 AUS 308
			3.16%	0.0390	Quartz	14808-60-7	54.37%	
			0.43%	0.0053	Dipropylene glycol monomethyl ether	34590-94-8	7.33%	
			0.19%	0.0024	Morpholine derivative**	71868-10-5	3.32%	
			0.17%	0.0022	Silicon dioxide	7631-86-9	3.00%	