Device Material Content

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

December, 2017

Package: 144 TQFP (1.4mm)
Total Device Weight 1.400 Grams

Package Code: TN144, TG144
Products: 4kZE, XO, XO2, FE2, XP2

Assembly: ASEM
Size (mm): 20 x 20 x 1.4
Lead pitch (mm): 0.5
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	0.41%	0.0058			Silicon chip	7440-21-3	100.00%	Die size: 3.15 x 3.05 mm
Mold Compound	72.30%	1.0122	5.42%	0.0759	Epoxy Resin	-	7.50%	Mold Compound: Sumitomo EME-G700SY (ULA)
			2.17%	0.0304	Phenol Resin	-	3.00%	
			49.85%	0.6979	Silica (Amorphous) A	60676-86-0	68.95%	
			14.46%	0.2024	Silica (Amorphous) B	7631-86-9	20.00%	
			0.40%	0.0056	Carbon Black	1333-86-4	0.55%	
D/A Epoxy	0.06%	0.0008	0.05%	0.00063	Silver	7440-22-4	75.50%	Die attach: Yizbond 8143
			0.00%	0.00006	Epoxy Acylate	15625-89-5	7.50%	
			0.00%	0.00002	Substituted Polyamine	68490-66-4	2.00%	
			0.01%	0.00008	Bisphenol F	28064-14-4	10.00%	
			0.00%	0.00004	2-Ethylhexyl Glycidyl Ether	2461-15-6	5.00%	
Wire	0.12%	0.0017	0.12%	0.0017	Copper (Cu)	7440-50-8	100.00%	0.8 to 1.0 mil diameter; 1 wire per package lead
Plating	0.65%	0.0091	0.65%	0.0091	Tin (Sn)	7440-31-5	100.00%	Plating is 100% Matte Sn; thickness is >10.2µm
Leadframe	26.45%	0.3703	25.58%	0.3581	Copper (Cu)	7440-50-8	96.70%	C7025
			0.80%	0.0111	Nickel (Ni)	7440-02-0	3.01%	
			0.04%	0.0006	Silicon (Si)	7440-21-3	0.17%	
			0.01%	0.0001	Magnesium (Mg)	7439-95-4	0.03%	
			0.02%	0.0003	Silver (Ag)	7440-22-4	0.09%	

Notes:

The values listed above are nominal values based on studies of representatives of this particular package type, and are believed to be as accurate as possible.

Constituent substances and proportions in epoxy materials are before curing.

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Rev. E

Device Material Content

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

December, 2017

Package: 144 TQFP (1.4mm)
Total Device Weight 1.400 Grams

Package Code: TN144, TG144
Products: 4kZE, XO, XO2, FE2, XP2

Assembly: ASET
Size (mm): 20 x 20 x 1.4
Lead pitch (mm): 0.5
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	0.41%	0.0058			Silicon chip	7440-21-3	100.00%	Die size: 3.35 x 3.35 mm
Mold Compound	72.30%	1.0122	2.89%	0.0405	Epoxy Resin A	Trade secret	4.00%	Mold Compound: Sumitomo G631SH (ULA)
			2.89%	0.0405	Epoxy Resin B	834893-60-6	4.00%	
			3.62%	0.0506	Phenol Resin	628290-34-6	5.00%	
			0.29%	0.0040	Carbon Black	1333-86-4	0.40%	
			62.61%	0.8766	Silica Fused	60676-86-0	86.60%	
D/A Epoxy	0.06%	0.0008	0.048%	0.00067	Silver (Ag)	7440-22-4	80.00%	Die attach epoxy: Sumitomo CRM-1076WA
			0.001%	0.00002	Epoxy Resin A	7440-22-4	2.00%	
			0.0001%	0.000002	Dicyandiamide	461-58-5	0.20%	
			0.011%	0.00015	Esters & resins	-	17.80%	
Wire	0.12%	0.0017	0.12%	0.00165	Copper (Cu)	7440-50-8	98.50%	0.8 to 1.0 mil diameter; 1 wire per package lead
			0.00%	0.00003	Palladium	7440-05-3	1.50%	
Plating	0.65%	0.0091	0.65%	0.0091	Tin (Sn)	7440-31-5	100.00%	Plating is 100% Matte Sn; thickness is >10.2µm
Leadframe	26.45%	0.3703	25.58%	0.3581	Copper (Cu)	7440-50-8	96.70%	C7025
			0.80%	0.0111	Nickel (Ni)	7440-02-0	3.01%	
			0.04%	0.0006	Silicon (Si)	7440-21-3	0.17%	
			0.01%	0.0001	Magnesium (Mg)	7439-95-4	0.03%	
			0.02%	0.0003	Silver (Ag)	7440-22-4	0.09%	

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Rev. E

Device Material Content

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

December, 2017

Package: 144 TQFP (1.4mm)
Total Device Weight 1.400 **Grams**

Package Code: TN144, TG144
Products: 4kZE, XO, XO2, FE2, XP2

Assembly: ATP
Size (mm): 20 x 20 x 1.4
Lead pitch (mm): 0.5
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	0.41%	0.0058			Silicon chip	7440-21-3	100.00%	Die size: 3.35 x 3.35 mm
Mold Compound	72.30%	1.0122	5.42%	0.0759	Epoxy Resin	-	7.50%	Mold Compound: Sumitomo EME-G700SY (ULA)
			2.17%	0.0304	Phenol Resin	-	3.00%	
			49.85%	0.6979	Silica (Amorphous) A	60676-86-0	68.95%	
			14.46%	0.2024	Silica (Amorphous) B	7631-86-9	20.00%	
			0.40%	0.0056	Carbon Black	1333-86-4	0.55%	
D/A Epoxy	0.06%	0.0008	0.05%	0.00067	Silver (Ag)	7440-22-4	80.00%	Die attach epoxy: Ablebond 3230
			0.01%	0.00017	Esters & resins	-	20.00%	
Wire	0.12%	0.0017	0.118%	0.00165	Copper (Cu)	7440-50-8	98.50%	0.8 mil wire diameter; 1 wire for each package lead
			0.002%	0.00003	Palladium	7440-05-3	1.50%	
Plating	0.65%	0.0091	0.65%	0.0091	Tin (Sn)	7440-31-5	100.00%	Plating is 100% Matte Sn; thickness is >10.2µm
Leadframe	26.45%	0.3703	25.58%	0.3581	Copper (Cu)	7440-50-8	96.70%	C7025
			0.80%	0.0111	Nickel (Ni)	7440-02-0	3.01%	
			0.04%	0.0006	Silicon (Si)	7440-21-3	0.17%	
			0.01%	0.0001	Magnesium (Mg)	7439-95-4	0.03%	
			0.02%	0.0003	Silver (Ag)	7440-22-4	0.09%	

Notes:
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Br/Cl/Sb Pb lead-free RoHS

Rev. E

Device Material Content

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

July-18

Package: 144 TQFP
Total Device Weight 1.329 **Grams**

Package Code: TQ144
Products: ICE40HX

Assembly: ASEM
Size (mm): 14 x 14 x 1.4
Lead pitch (mm): 0.5
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	0.11%	0.0015						Die size: 2.69 x 2.39 mm
			0.11%	0.0015	Silicon chip	7440-21-3	100.00%	
Mold Compound	69.69%	0.9263						Mold Compound: Hitachi CEL-9240HF10AK-G1
			5.92%	0.0787	Epoxy Resin	-	8.50%	
			3.83%	0.0509	Phenol Resin	-	5.50%	
			0.10%	0.0014	Carbon Black	1333-86-4	0.15%	
			58.09%	0.7721	Silica (Amorphous)	60676-86-0	83.35%	
			1.74%	0.0232	Silica (Crystal)	14808-60-7	2.50%	
D/A Tape	0.01%	0.0002						Die attach: Hitachi FH-900 HR-9004 series tape
			0.00%	0.00002	Epoxy Resin	-	13.00%	
			0.00%	0.00002	Phenol Resin	-	13.00%	
			0.00%	0.00001	SiO2 Filler	99439-28-8	5.00%	
			0.01%	0.00012	(Meta)Acrylic Copolymer	-	69.00%	
Wire	0.08%	0.0011						0.7 mil wire diameter; 1 wire for each package lead
			0.08%	0.0011	Copper (Cu)	7440-50-8	100.00%	
Plating	0.72%	0.0096						Plating is 100% Matte Sn (annealed)
			0.72%	0.0096	Tin (Sn)	7440-31-5	100.00%	
Leadframe	29.38%	0.3905						C7025
			26.43%	0.3512	Copper (Cu)	7440-50-8	89.95%	
			0.86%	0.0115	Nickel (Ni)	7440-02-0	2.94%	
			0.19%	0.0025	Silicon (Si)	7440-21-3	0.65%	
			0.05%	0.0006	Magnesium (Mg)	7439-95-4	0.16%	
			1.85%	0.0246	Silver (Ag)	7440-22-4	6.30%	

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Br/Cl/Sb
Pb lead-free
RoHS

Rev. A