# Device Material Content

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

**January, 2020**

**Package:** 400 caBGA
**Total Device Weight** 0.747 Grams

**Package Code:** BG400
**Products:** XO3

Assembly: ASEM
Size (mm): 17 x 17
Lead pitch (mm): 0.8
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** | 1.39% | 0.0104 | 1.39% | 0.0104 | Silicon chip | 7440-21-3 | 100.00% | Die size: 4.4 x 4.3 mm |
| **Mold Compound** | 51.80% | 0.3871 | 3.63% | 0.0271 | Epoxy Resin | - | 7.00% | Mold Compound: Sumitomo G750SE (ULA) |
| | | | 2.59% | 0.0194 | Phenol Novolac | 9003-35-4 | 5.00% | |
| | | | 2.59% | 0.0194 | Metal Hydroxide | - | 5.00% | |
| | | | 0.26% | 0.0019 | Carbon Black | 1333-86-4 | 0.50% | |
| | | | 42.74% | 0.3194 | Silica Fused | 60676-86-0 | 82.50% | |
| **D/A Epoxy** | 0.21% | 0.0016 | 0.17% | 0.00126 | Silver | 7440-22-4 | 80.00% | Die attach epoxy: Henkel (Ablebond) 2100A |
| | | | 0.04% | 0.00031 | Esters & resins | - | 20.00% | |
| **Wire** | 0.72% | 0.0054 | 0.70% | 0.0053 | Copper | 7440-50-8 | 97.90% | 0.8 mil diameter; 1 wire per solder ball |
| | | | 0.02% | 0.0001 | Palladium | 7440-05-3 | 2.10% | |
| **Solder Balls** | 20.03% | 0.1497 | 19.33% | 0.1444 | Tin (Sn) | 7440-31-5 | 96.50% | SAC305 |
| | | | 0.60% | 0.0045 | Silver (Ag) | 7440-22-4 | 3.00% | |
| | | | 0.10% | 0.0007 | Copper (Cu) | 7440-50-8 | 0.50% | |
| **Substrate** | 16.80% | 0.1256 | 0.00% | 0.0000 | BT Resins | - | 32.00% | BT Resin CCL-HL832NX-A* |
| | | | 0.00% | 0.0000 | Glass fiber | 65997-17-3 | 68.00% | |
| **Foil** | 6.28% | 0.0469 | 5.31% | 0.0397 | Copper | 7440-50-8 | 84.56% | |
| | | | 0.92% | 0.0069 | Nickel plating | 7440-02-0 | 14.70% | |
| | | | 0.05% | 0.0003 | Gold plating | 7440-57-5 | 0.74% | |
| **Solder Mask** | 2.77% | 0.0207 | 1.51% | 0.0112 | Quartz | 14808-60-7 | 54.37% | Solder mask PSR4000 AUS 308 |
| | | | 0.20% | 0.0015 | Dipropylene glycol monomethyl ether | 34590-94-8 | 7.33% | |
| | | | 0.09% | 0.0007 | Morpholine derivative** | 71868-10-5 | 3.32% | |
| | | | 0.08% | 0.0006 | Silicon dioxide | 7631-86-9 | 3.00% | |
| | | | 0.08% | 0.0006 | Silica, amorphous | 112945-52-5 | 3.00% | |
| | | | 0.01% | 0.00005 | Carbon black | 1333-86-4 | 0.24% | |
| | | | 0.80% | 0.0059 | Trade secret ingredients | - | 28.74% | |

**Notes:** SVHC:
* 0.17% max. concentration of Bisphenol A (CAS# 80-05-7), contained in substrate laminate material as impurity - not intentionally added.
** 0.09% max. concentration of Morpholine derivative (CAS# 71868-10-5), contained in solder mask material.

Lattice regards this materials information to be correct but makes no guarantee as to its accuracy or completeness, including, but not limited to, with respect to its compliance with applicable environmental laws and regulations. Lattice subcontracts the production, test and assembly of hardware devices to independent third-party vendors and materials suppliers ("Contractors"). All data provided hereunder is based on information received from Contractors. Lattice has not independently verified the accuracy or completeness of this information which is provided solely for your reference in connection with the use of Lattice products.

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Rev. F

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|---|---|---|---|---|---|---|---|---|
| **Die** | 1.39% | 0.0104 | 1.39% | 0.0104 | Silicon chip | 7440-21-3 | 100.00% | Die size: 4.4 x 4.3 mm |
| **Mold Compound** | 51.80% | 0.3871 | 3.63% | 0.0271 | Solid Epoxy Resin | - | 7.00% | Mold Compound: Hitachi GE-110LS-V (ULA) |
| | | | 2.59% | 0.0194 | Phenol Resin | - | 5.00% | |
| | | | 44.03% | 0.3290 | Silica | 60676-86-0 | 85.00% | |
| | | | 1.30% | 0.0097 | Metal Hydroxide | - | 2.50% | |
| | | | 0.26% | 0.0019 | Carbon Black | 1333-86-4 | 0.50% | |
| **D/A Epoxy** | 0.21% | 0.0016 | 0.17% | 0.00126 | Silver | 7440-22-4 | 80.00% | Die attach epoxy: Ablebond 2300 |
| | | | 0.04% | 0.00031 | Esters & resins | - | 20.00% | |
| **Wire** | 0.72% | 0.0054 | 0.70% | 0.0053 | Copper | 7440-50-8 | 97.90% | 0.8 mil diameter; 1 wire per solder ball |
| | | | 0.02% | 0.0001 | Palladium | 7440-05-3 | 2.10% | |
| **Solder Balls** | 20.03% | 0.1497 | 19.73% | 0.1474 | Tin (Sn) | 7440-31-5 | 98.50% | SAC105 |
| | | | 0.20% | 0.0015 | Silver (Ag) | 7440-22-4 | 1.00% | |
| | | | 0.10% | 0.0007 | Copper (Cu) | 7440-50-8 | 0.50% | |
| **Substrate** | 16.80% | 0.1256 | 5.38% | 0.0402 | BT Resins | - | 32.00% | BT Resin CCL-HL832NX-A* |
| | | | 11.43% | 0.0854 | Glass fiber | 65997-17-3 | 68.00% | |
| **Foil** | 6.28% | 0.0469 | 5.31% | 0.0397 | Copper | 7440-50-8 | 84.56% | |
| | | | 0.92% | 0.0069 | Nickel plating | 7440-02-0 | 14.70% | |
| | | | 0.05% | 0.0003 | Gold plating | 7440-57-5 | 0.74% | |
| **Solder Mask** | 2.77% | 0.0207 | 1.51% | 0.0112 | Quartz | 14808-60-7 | 54.37% | Solder mask PSR4000 AUS 308 |
| | | | 0.20% | 0.0015 | Dipropylene glycol monomethyl ether | 34590-94-8 | 7.33% | |
| | | | 0.09% | 0.0007 | Morpholine derivative** | 71868-10-5 | 3.32% | |
| | | | 0.08% | 0.00062 | Silicon dioxide | 7631-86-9 | 3.00% | |
| | | | 0.08% | 0.00062 | Silica, amorphous | 112945-52-5 | 3.00% | |
| | | | 0.01% | 0.00005 | Carbon black | 1333-86-4 | 0.24% | |
| | | | 0.80% | 0.0059 | Trade secret ingredients | - | 28.74% | |

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