# Device Material Content

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**December, 2019**

**Package:** **16 ucfBGA**
**Total Device Weight** **2.368** **Milligrams**

**Package Code:** **SWG16**
**Products:** ICE40LP

Assembly: ASET
Size (mm): Die size: 1.37 x 1.45
Lead pitch (mm): 0.35
MSL: 1
Reflow max (ºC): 260

| | **% of Total Pkg. Wt.** | **Weight (mg)** | **% of Total Pkg. Wt.** | **Weight (mg)** | **Substance** | **CAS #** | **% of Subst.** | **Notes / Assumptions:** |
|---|---|---|---|---|---|---|---|---|
| **Die** | 53.74% | 1.2726 | 53.74% | 1.2726 | Silicon chip | 7440-21-3 | 100.00% | Die size: 1.37 x 1.45 x 0.275 mm |
| **Polymide (RDL) Repassivation** | 1.72% | 0.0408 | 0.60% | 0.01429 | Polyamide | - | 35.00% | HD-8820 |
| | | | 0.86% | 0.02041 | Gamma-butyrolactone | 96-48-0 | 50.00% | |
| | | | 0.07% | 0.00163 | Propylene Glycol Monomethyl Ether Acetate | 108-65-6 | 4.00% | |
| | | | 0.05% | 0.00122 | Organosilan Compound(s) | - | 3.00% | |
| | | | 0.07% | 0.00163 | Photoinitiator | - | 4.00% | |
| | | | 0.07% | 0.00163 | Proprietary Ingredient(s) | - | 4.00% | |
| **RDL metalization** | 15.58% | 0.3688 | 0.19% | 0.00438 | Titanium (Ti) | 7440-32-6 | 1.19% | |
| | | | 15.39% | 0.36446 | Copper (Cu) | 7440-50-8 | 98.81% | |
| **UBM metalization** | 4.40% | 0.1043 | 0.03% | 0.00064 | Titanium (Ti) | 7440-32-6 | 0.61% | |
| | | | 4.38% | 0.10367 | Copper (Cu) | 7440-50-8 | 99.39% | |
| **Solder Balls** | 21.07% | 0.4990 | 20.12% | 0.47651 | Tin (Sn) | 7440-31-5 | 95.50% | SAC405 |
| | | | 0.84% | 0.01996 | Silver (Ag) | 7440-22-4 | 4.00% | |
| | | | 0.11% | 0.00249 | Copper (Cu) | 7440-50-8 | 0.50% | |
| **BSL** | 3.48% | 0.0824 | 0.14% | 0.00330 | Bisphenol A diglycidyl ether | 1675-54-3 | 4.00% | Adwill LC 2850 |
| | | | 3.34% | 0.07913 | Silica, Epoxy resin, Acrylic polymer | - | 96.00% | |

**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.
The information provided above is representative of the package as of the date listed, and is subject to change at any time.
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Br/Cl/Sb
Pb lead-free
RoHS

Rev. D

LATTICE SEMICONDUCTOR

# Device Material Content

5555 NE Moore Ct.
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**December, 2019**

**Package:** **16 WLCSP**
**Total Device Weight** **3.586** **Milligrams**

**Package Code:** **SWG16**
**Products:** ICE40UL

Assembly: ASET
Size (mm): 1.4 x 1.4
Lead pitch (mm): 0.35
MSL: 1
Reflow max (ºC): 260

| | % of Total Pkg. Wt. | Weight (mg) | % of Total Pkg. Wt. | Weight (mg) | Substance | CAS # | % of Subst. | Notes / Assumptions: |
|---|---|---|---|---|---|---|---|---|
| **Die** | 37.20% | 1.3338 | 37.20% | 1.3338 | Silicon chip | 7440-21-3 | 100.00% | Die size: 1.38 x 1.38 x 0.275 mm |
| **Polymide (RDL) Repassivation** | 1.09% | 0.0392 | 0.38% | 0.01372 | Polyamide | - | 35.00% | HD-8820 |
| | | | 0.55% | 0.01961 | Gamma-butyrolactone | 96-48-0 | 50.00% | |
| | | | 0.04% | 0.00157 | Propylene Glycol Monomethyl Ether Acetate | 108-65-6 | 4.00% | |
| | | | 0.03% | 0.00118 | Organosilan Compound(s) | - | 3.00% | |
| | | | 0.04% | 0.00157 | Photoinitiator | - | 4.00% | |
| | | | 0.04% | 0.00157 | Proprietary Ingredient(s) | - | 4.00% | |
| **RDL metalization** | 19.15% | 0.6869 | 0.23% | 0.00816 | Titanium (Ti) | 7440-32-6 | 1.19% | |
| | | | 18.93% | 0.67872 | Copper (Cu) | 7440-50-8 | 98.81% | |
| **UBM metalization** | 26.05% | 0.9341 | 0.16% | 0.00572 | Titanium (Ti) | 7440-32-6 | 0.61% | |
| | | | 25.89% | 0.92833 | Copper (Cu) | 7440-50-8 | 99.39% | |
| **Solder Balls** | 14.30% | 0.5128 | 13.66% | 0.48975 | Tin (Sn) | 7440-31-5 | 95.50% | SAC405 |
| | | | 0.57% | 0.02051 | Silver (Ag) | 7440-22-4 | 4.00% | |
| | | | 0.07% | 0.00256 | Copper (Cu) | 7440-50-8 | 0.50% | |
| **BSL** | 2.21% | 0.0792 | 0.09% | 0.00317 | Bisphenol A diglycidyl ether | 1675-54-3 | 4.00% | Adwill LC 2850 |
| | | | 2.12% | 0.07602 | Silica, Epoxy resin, Acrylic polymer | - | 96.00% | |

**Notes:**

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Rev. D