



PACKAGE MATERIAL DECLARATION DATASHEET

| | | | |
|--------------------------------|--|--------------------------------|--|
| Cypress Package Code | ZZ | Body Size (mil/mm) | 4.4 mm |
| Package Weight – Site 1 | B1: 49.6933 mg B2: 59.9998 mg B3: 59.3970 mg B4: 56.3001 mg | Package Weight – Site 2 | B1: 50.7016 mg B2: 55.3091 mg B3: 63.4832 mg |
| Package weight – Site 3 | B1: 62.0000 mg B2: 61.5421 mg | | |

SUMMARY

The 16L-TSSOP package is qualified at three assembly sites. Packages from different assembly sites are likely to have different materials composition. However, Cypress guarantees that product ordered with a part number containing an “X” (e.g. CY7C1328G-133AXI, CY2308SXC-1HT) meets all requirement of the EU RoHS directive.

**ASSEMBLY Site 1: Cypress Manufacturing Limited (CML)
Package Qualification Report # 060903, 115205, 124204 (Note 1)**

I. DECLARATION OF PACKAGED UNITS

A. BANNED SUBSTANCES

Materials from Level A of the EIA/JIG/JGPSSI/EICTA Material Composition Declaration Guide and EU RoHS. Listed in the table below are materials that are neither contained nor intentionally added to this product.

| Substances / Compounds | Weight by mg | PPM | Analysis Report (Note 2) |
|--|--------------|-------|--------------------------|
| Cadmium and Cadmium Compounds | 0 | < 5.0 | CoA-ZZ16-CML |
| Hexavalent Chromium and its Compounds | 0 | < 5.0 | |
| Lead and Lead Compounds | 0 | < 5.0 | |
| Mercury and Mercury Compounds | 0 | < 5.0 | |
| Polybrominated Biphenyls (PBB) | 0 | < 5.0 | |
| Polybrominated Diphenylethers (PBDE) | 0 | < 5.0 | |
| Asbestos | 0 | 0 | As per MSDS |
| Azo colorants | 0 | 0 | As per MSDS |
| Ozone Depleting Substances | 0 | 0 | As per MSDS |
| Polychlorinated Biphenyls (PCBs) | 0 | 0 | As per MSDS |
| Polychlorinated Napthalenes | 0 | 0 | As per MSDS |
| Radioactive Substances | 0 | 0 | As per MSDS |
| Shortchain Chlorinated Paraffins | 0 | 0 | As per MSDS |
| Tributyl Tin (TBT) and Triphenyl Tin (TPT) | 0 | 0 | As per MSDS |
| Tributyl Tin Oxide (TBTO) | 0 | 0 | As per MSDS |
| Formaldehyde | 0 | 0 | As per MSDS |

Note 1: Qualification reports are available at www.cypress.com. Access them by doing a Search on the Report #.

Note 2: Report available from Cypress Sales Offices or Distributors.

Note 3: Materials/substances not declared in Section I-A and I-B of this document are considered “non-existent in the product” or a natural impurity. In order to report exactly 100% material composition, some numbers were rounded to the nearest 0.01 percent. Cypress Semiconductor PMDD’s are calculated using MSDS, Material Analysis Reports and Cypress Assembly site information.

Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B1. MATERIAL COMPOSITION (Note 3)

NiPdAu using Standard Molding Compound

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | %Weight of Substance per package |
|---------------|------------------|--------------------------|--------------|--------------|---------------------------------------|--------|----------------------------------|
| Leadframe | Base Material | Cu | 7440-50-8 | 23.5978 | 94.4511% | 474868 | 47.4868% |
| | | Si | 7440-21-3 | 0.2981 | 1.1933% | 6000 | 0.6000% |
| | | Mg | 7439-95-4 | 0.0795 | 0.3182% | 1600 | 0.1600% |
| | | Ni | 7440-02-0 | 1.0087 | 4.0374% | 20299 | 2.0299% |
| Lead Finish | External Plating | Ni | 7440-02-0 | 0.1930 | 96.5200% | 3885 | 0.3885% |
| | | Pd | 7440-05-3 | 0.0035 | 1.7400% | 70 | 0.0070% |
| | | Au | 7440-57-5 | 0.0035 | 1.7400% | 70 | 0.0070% |
| Die Attach | Adhesive | Ag | 7440-22-4 | 0.1687 | 79.9953% | 3395 | 0.3395% |
| | | Proprietary bismaleimide | Trade Secret | 0.0211 | 9.9906% | 424 | 0.0424% |
| | | Proprietary polymer | Trade Secret | 0.0084 | 4.0057% | 170 | 0.0170% |
| | | Methacrylate | Trade Secret | 0.0042 | 2.0028% | 85 | 0.0085% |
| | | Acrylate ester | Trade Secret | 0.0042 | 2.0028% | 85 | 0.0085% |
| | | Organic peroxide | Trade Secret | 0.0042 | 2.0028% | 85 | 0.0085% |
| Die | Circuit | Si | 7440-21-3 | 2.9715 | 100.0000% | 59796 | 5.9796% |
| Wire | Interconnect | Au | 7440-57-5 | 0.6112 | 100.0000% | 12299 | 1.2299% |
| Mold Compound | Encapsulation | Epoxy resin | 85954-11-6 | 1.0385 | 5.0132% | 20899 | 2.0899% |
| | | Phenol resin | 26834-02-6 | 1.0385 | 5.0132% | 20899 | 2.0899% |
| | | Brominated epoxy resin | 68541-56-0 | 0.2087 | 1.0074% | 4200 | 0.4200% |
| | | Antimony trioxide | 1309-64-4 | 0.0994 | 0.4797% | 2000 | 0.2000% |
| | | Silica | 60676-86-0 | 18.1219 | 87.4790% | 364675 | 36.4675% |
| | | Others | Trade Secret | 0.2087 | 1.0074% | 4200 | 0.4200% |

Package Weight (mg):

49.6933

% Total:

100.0000

Note 1: Qualification reports are available at www.cypress.com. Access them by doing a Search on the Report #.

Note 2: Report available from Cypress Sales Offices or Distributors.

Note 3: Materials/substances not declared in Section I-A and I-B of this document are considered "non-existent in the product" or a natural impurity. In order to report exactly 100% material composition, some numbers were rounded to the nearest 0.01 percent. Cypress Semiconductor PMDD's are calculated using MSDS, Material Analysis Reports and Cypress Assembly site information.

Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B2. MATERIAL COMPOSITION (Note 3) NiPdAu using Green Molding Compound

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % Weight of Substance per Homogeneous Material | PPM | % Weight of Substance per package |
|---------------|------------------|--------------------------|--------------|--------------|--|---------|-----------------------------------|
| Lead frame | Base Material | Cu | 7440-50-8 | 26.3370 | 97.4100 | 438,950 | 43.8950 |
| | | Fe | 7439-89-6 | 0.6489 | 2.4000 | 10,815 | 1.0815 |
| | | P | 7723-14-0 | 0.0189 | 0.0700 | 315 | 0.0315 |
| | | Zn | 7440-66-6 | 0.0324 | 0.1200 | 541 | 0.0541 |
| Lead Finish | External Plating | Ni | 7440-02-0 | 0.5432 | 96.5203 | 9,054 | 0.9054 |
| | | Pd | 7440-05-3 | 0.0098 | 1.7370 | 163 | 0.0163 |
| | | Au | 7440-57-5 | 0.0098 | 1.7427 | 163 | 0.0163 |
| Die Attach | Adhesive | Ag | 7440-22-4 | 0.0597 | 80.0000 | 996 | 0.0996 |
| | | Proprietary bismaleimide | Trade Secret | 0.0067 | 9.0000 | 112 | 0.0112 |
| | | Proprietary polymer | Trade Secret | 0.0037 | 5.0000 | 62 | 0.0062 |
| | | Methacrylate | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| | | Acrylate ester | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| | | Organic peroxide | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| Die | Circuit | Si | 7440-21-3 | 1.0453 | 100.0000 | 17,422 | 1.7422 |
| Wire | Interconnect | Au | 7440-57-5 | 1.1295 | 100.0000 | 18,825 | 1.8825 |
| Mold Compound | Encapsulation | SiO2 | 60676-86-0 | 26.8339 | 89.0000 | 447,232 | 44.7232 |
| | | Phenol Resin | Trade Secret | 1.5075 | 5.0000 | 25,125 | 2.5125 |
| | | Epoxy Resin | Trade Secret | 1.8090 | 6.0000 | 30,150 | 3.0150 |

Package Weight (mg): **59.9998**

%Total: **100.0000**

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B3. MATERIAL COMPOSITION (Note 3) Copper Wire using NiPdAu and Kyocera Molding Compound

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % Weight of Substance per Homogeneous Material | PPM | % Weight of Substance per package |
|---------------|------------------|--------------------------|--------------|--------------|--|---------|-----------------------------------|
| Lead frame | Base Material | Cu | 7440-50-8 | 26.3370 | 97.4100 | 443,406 | 44.3406 |
| | | Fe | 7439-89-6 | 0.6489 | 2.4000 | 10,925 | 1.0925 |
| | | P | 7723-14-0 | 0.0189 | 0.0700 | 319 | 0.0319 |
| | | Zn | 7440-66-6 | 0.0324 | 0.1200 | 546 | 0.0546 |
| Lead Finish | External Plating | Ni | 7440-02-0 | 0.5432 | 96.5200 | 9,145 | 0.9145 |
| | | Pd | 7440-05-3 | 0.0098 | 1.7400 | 165 | 0.0165 |
| | | Au | 7440-57-5 | 0.0098 | 1.7400 | 165 | 0.0165 |
| Die Attach | Adhesive | Ag | 7440-22-4 | 0.0597 | 80.0000 | 1,005 | 0.1005 |
| | | Proprietary bismaleimide | Trade Secret | 0.0067 | 9.0000 | 113 | 0.0113 |
| | | Proprietary polymer | Trade Secret | 0.0037 | 5.0000 | 63 | 0.0063 |
| | | Methacrylate | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| | | Acrylate ester | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| | | Organic peroxide | Trade Secret | 0.0015 | 2.0000 | 25 | 0.0025 |
| Die | Circuit | Si | 7440-21-3 | 1.0453 | 100.0000 | 17,599 | 1.7599 |
| Wire | Interconnect | Cu | 7440-50-8 | 0.5267 | 100.0000 | 8,867 | 0.8867 |
| Mold Compound | Encapsulation | SiO2 | 60676-86-0 | 26.8339 | 89.0000 | 451,771 | 45.1771 |
| | | Phenol Resin | Trade Secret | 1.5075 | 5.0000 | 25,380 | 2.5380 |
| | | Epoxy Resin | Trade Secret | 1.7336 | 5.7500 | 29,187 | 2.9187 |
| | | Carbon Black | 1333-86-4 | 0.0754 | 0.2500 | 1,269 | 0.1269 |

Package Weight (mg): 59.3970

%Total: 100.0000

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



II. DECLARATION OF PACKAGING INDIRECT MATERIALS

| Type | Material | Lead PPM | Cadmium PPM | Cr VI PPM | Mercury PPM | PBB PPM | PBDE PPM | Analysis Report (Note2) |
|---------------|----------------------|----------|-------------|-----------|-------------|---------|------------|-------------------------|
| Tube | Plastic Tube | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-PLTB-R |
| | End Plug | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-EPLG-R |
| Tape and Reel | Carrier Tape | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CART-R |
| Others | Moisture Barrier Bag | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-MBBG-R |
| | Dessicant | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-DESS-R |
| | HIC | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-HIC-R |
| | Bubble Pack | <5.0 | <5.0 | <5.0 | <5.0 | <10.0 | <10.0 | CoA-BUBB-R |
| | Carton Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CRTN-R |
| | Inner Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-LBL-R |
| Shielding Bag | <5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | CoA-SBAG-R | |

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



ASSEMBLY Site 2: Orient Semiconductor Electronics Taiwan (OSET)
Package Qualification Report # 043102, # 111405, # 120605, #131404 (Note 1)

I. DECLARATION OF PACKAGED UNITS

A. BANNED SUBSTANCES

Materials from Level A of the EIA/JIG/JGPSSI/EICTA Material Composition Declaration Guide and EU RoHS. Listed in the table below are materials that are neither contained nor intentionally added to this product.

| Substances / Compounds | Weight by mg | PPM | Analysis Report (Note 2) |
|--|--------------|-------|--------------------------|
| Cadmium and Cadmium Compounds | 0 | < 5.0 | CoA-ZZ16-OSET |
| Hexavalent Chromium and its Compounds | 0 | < 5.0 | |
| Lead and Lead Compounds | 0 | < 5.0 | |
| Mercury and Mercury Compounds | 0 | < 5.0 | |
| Polybrominated Biphenyls (PBB) | 0 | < 5.0 | |
| Polybrominated Diphenylethers (PBDE) | 0 | < 5.0 | |
| Asbestos | 0 | 0 | As per MSDS |
| Azo colorants | 0 | 0 | As per MSDS |
| Ozone Depleting Substances | 0 | 0 | As per MSDS |
| Polychlorinated Biphenyls (PCBs) | 0 | 0 | As per MSDS |
| Polychlorinated Napthalenes | 0 | 0 | As per MSDS |
| Radioactive Substances | 0 | 0 | As per MSDS |
| Shortchain Chlorinated Paraffins | 0 | 0 | As per MSDS |
| Tributyl Tin (TBT) and Triphenyl Tin (TPT) | 0 | 0 | As per MSDS |
| Tributyl Tin Oxide (TBTO) | 0 | 0 | As per MSDS |
| Formaldehyde | 0 | 0 | As per MSDS |

Note 1: Qualification reports are available at www.cypress.com. Access them by doing a Search on the Report #.

Note 2: Report available from Cypress Sales Offices or Distributors.

Note 3: Materials/substances not declared in Section I-A and I-B of this document are considered "non-existent in the product" or a natural impurity. In order to report exactly 100% material composition, some numbers were rounded to the nearest 0.01 percent. Cypress Semiconductor PMDD's are calculated using MSDS, Material Analysis Reports and Cypress Assembly site information.

Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B1. MATERIAL COMPOSITION (Note 3) Pure Sn using Hitachi Mold Compound

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | % Weight of Substance per package |
|---------------|------------------|-----------------------|--------------|--------------|---------------------------------------|---------|-----------------------------------|
| Leadframe | Base Material | Cu | 7440-50-8 | 14.8706 | 93.8800% | 294,063 | 29.4063% |
| | | Si | 7440-21-3 | 0.1901 | 1.2000% | 3,759 | 0.3759% |
| | | Mg | 7439-95-4 | 0.0507 | 0.3200% | 1,002 | 0.1002% |
| | | Ag | 7440-22-4 | 0.0602 | 0.3800% | 1,190 | 0.1190% |
| | | Ni | 7440-02-0 | 0.6700 | 4.2300% | 13,250 | 1.3250% |
| Lead Finish | External Plating | Sn | 7440-31-5 | 1.3000 | 100.0000% | 25,707 | 2.5707% |
| Die Attach | Adhesive | Epoxy resin | Trade Secret | 0.1600 | 20.2500% | 3,163 | 0.3163% |
| | | Ag | 7440-22-4 | 0.5900 | 74.6800% | 11,667 | 1.1667% |
| | | Metal | Trade Secret | 0.0400 | 5.0600% | 790 | 0.0790% |
| Die | Circuit | Si | 7440-21-3 | 1.8700 | 100.0000% | 36,979 | 3.6979% |
| Wire | Interconnect | Au | 7440-57-5 | 0.1700 | 100.0000% | 3,362 | 0.3362% |
| Mold Compound | Encapsulation | Epoxy resin | 85954-11-6 | 1.5365 | 5.0000% | 30,323 | 3.0323% |
| | | Phenol resin | 26834-02-6 | 1.2292 | 4.0000% | 24,246 | 2.4246% |
| | | Aromatic Phosphate | Trade Secret | 0.3073 | 1.0000% | 6,077 | 0.6077% |
| | | Carbon black | 1333-86-4 | 0.0615 | 0.2000% | 1,155 | 0.1155% |
| | | Silica | 60676-86-0 | 27.5955 | 89.8000% | 543,266 | 54.3266% |

Package Weight (mg): 50.7016

% Total: 100.0000

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B2. MATERIAL COMPOSITION (Note 3) Pure Sn using Sumitomo Mold Compound

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | % Weight of Substance per package |
|---------------|------------------|-----------------------------|--------------|--------------|---------------------------------------|--------|-----------------------------------|
| Leadframe | Base Material | Copper | 7440-50-8 | 18.6173 | 95.5000% | 336605 | 33.6605% |
| | | Silicon | 7440-21-3 | 0.1413 | 0.7250% | 2555 | 0.2555% |
| | | Nickel | 7440-02-0 | 0.6238 | 3.2000% | 11279 | 1.1279% |
| | | Magnesium | 7439-95-4 | 0.0341 | 0.1750% | 617 | 0.0617% |
| | | Silver | 7440-22-4 | 0.0780 | 0.4000% | 1410 | 0.1410% |
| Lead Finish | External Plating | Sn | 7440-31-5 | 1.5280 | 100.0000% | 27627 | 2.7627% |
| Die Attach | Adhesive | Silver Flake | 7440-22-4 | 0.2175 | 79.0000% | 3932 | 0.3932% |
| | | Epoxy Acrylate | 15625-89-5 | 0.0206 | 7.5000% | 373 | 0.0373% |
| | | Substituted Polyamine | 68490-66-4 | 0.0028 | 1.0000% | 50 | 0.0050% |
| | | Bisphenol F | 28064-14-4 | 0.0206 | 7.5000% | 373 | 0.0373% |
| | | 2-Ethylhexyl Glycidyl Ether | 2461-15-6 | 0.0138 | 5.0000% | 249 | 0.0249% |
| Die | Circuit | Si | 7440-21-3 | 3.2073 | 100.0000% | 57989 | 5.7989% |
| Wire | Interconnect | Au | 7440-57-5 | 0.3322 | 100.0000% | 6006 | 0.6006% |
| Mold Compound | Encapsulation | Epoxy resin A | Trade Secret | 1.5236 | 5.0000% | 27547 | 2.7547% |
| | | Epoxy,Cresol Novolac | 29690-82-2 | 1.5236 | 5.0000% | 27547 | 2.7547% |
| | | Phenol resin | Trade Secret | 1.5236 | 5.0000% | 27547 | 2.7547% |
| | | Metal Hydroxide | Trade Secret | 1.5236 | 5.0000% | 27547 | 2.7547% |
| | | Carbon Black | 1333-86-4 | 0.0914 | 0.3000% | 1653 | 0.1653% |
| | | Silica Fused | 60676-86-0 | 21.1474 | 69.4000% | 382349 | 38.2349% |
| | | Silica Fused | 76361-86-9 | 3.0472 | 10.0000% | 55094 | 5.5094% |
| | | Silica,crystalline | 14808-60-7 | 0.0914 | 0.3000% | 1653 | 0.1653% |

Package Weight (mg): **55.3091**

% Total: **100.0000**

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B3: MATERIAL COMPOSITION (Note 3) Using Copper Wire

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | % Weight of Substance per package |
|---------------|------------------|-----------------------|--------------|--------------|---------------------------------------|---------|-----------------------------------|
| Leadframe | Base Material | Copper | 7440-50-8 | 18.7419 | 95.5000% | 295,226 | 29.5226% |
| | | Silicon | 7440-21-3 | 0.1423 | 0.7250% | 2,242 | 0.2242% |
| | | Nickel | 7440-02-0 | 0.6280 | 3.2000% | 9,892 | 0.9892% |
| | | Magnesium | 7439-95-4 | 0.0343 | 0.1750% | 540 | 0.0540% |
| | | Silver | 7440-22-4 | 0.0785 | 0.4000% | 1,237 | 0.1237% |
| Lead Finish | External Plating | Sn | 7440-31-5 | 1.4821 | 100.0000% | 23,346 | 2.3346% |
| Die Attach | Adhesive | Silver | 7440-22-4 | 0.1253 | 74.0000% | 1,974 | 0.1974% |
| | | Epoxy resin A | 9003-36-5 | 0.0068 | 4.0000% | 107 | 0.0107% |
| | | Epoxy resin B | Trade Secret | 0.0102 | 6.0000% | 161 | 0.0161% |
| | | Diluent A | Trade Secret | 0.0068 | 4.0000% | 107 | 0.0107% |
| | | Diluent B | Trade Secret | 0.0102 | 6.0000% | 161 | 0.0161% |
| | | Phenolic Hardener | Trade Secret | 0.0085 | 5.0000% | 134 | 0.0134% |
| | | Dicyandiamide | 461-58-5 | 0.0008 | 0.5000% | 13 | 0.0013% |
| | | Organic peroxide | Trade Secret | 0.0008 | 0.5000% | 13 | 0.0013% |
| Die | Circuit | Si | 7440-21-3 | 2.8922 | 100.0000% | 45,559 | 4.5559% |
| Wire | Interconnect | Copper | 7440-50-8 | 0.1106 | 100.0000% | 1,742 | 0.1742% |
| Mold Compound | Encapsulation | Epoxy resin A | Trade Secret | 1.9602 | 5.0000% | 30,877 | 3.0877% |
| | | Epoxy, Cresol Novolac | 29690-82-2 | 1.9602 | 5.0000% | 30,877 | 3.0877% |
| | | Phenol resin | Trade Secret | 1.9602 | 5.0000% | 30,877 | 3.0877% |
| | | Metal Hydroxide | Trade Secret | 1.9602 | 5.0000% | 30,877 | 3.0877% |
| | | Carbon Black | 1333-86-4 | 0.1176 | 0.3000% | 1,852 | 0.1852% |
| | | Silica Fused A | 60676-86-0 | 27.2075 | 69.4000% | 428,579 | 42.8579% |
| | | Silica Fused B | 76361-86-9 | 3.9204 | 10.0000% | 61,755 | 6.1755% |
| | | Silica, crystalline | 14808-60-7 | 0.1176 | 0.3000% | 1,852 | 0.1852% |

Package Weight (mg): **63.4832**

% Total: **100.0000**

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Note 2: Report available from Cypress Sales Offices or Distributors.

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B4: MATERIAL COMPOSITION (Note 3) Using NiPdAu

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | % Weight of Substance per package |
|---------------|------------------|-----------------------|--------------|--------------|---------------------------------------|---------|-----------------------------------|
| Leadframe | Base Material | Copper | 7440-50-8 | 14.0777 | 96.2000% | 250,047 | 25.0047% |
| | | Silicon | 7440-21-3 | 0.0951 | 0.6500% | 1,690 | 0.1690% |
| | | Nickel | 7440-02-0 | 0.4390 | 3.0000% | 7,798 | 0.7798% |
| | | Magnesium | 7439-95-4 | 0.0220 | 0.1500% | 390 | 0.0390% |
| Lead Finish | External Plating | Nickel | 7440-02-0 | 0.3535 | 96.5204% | 6,279 | 0.6279% |
| | | Palladium | 7440-05-3 | 0.0064 | 1.7370% | 113 | 0.0113% |
| | | Gold | 7440-57-5 | 0.0064 | 1.7427% | 113 | 0.0113% |
| Die Attach | Adhesive | Ag | 7440-22-4 | 0.1707 | 84.0000% | 3,032 | 0.3032% |
| | | Allyl Compound | Trade Secret | 0.0138 | 6.8000% | 245 | 0.0245% |
| | | Epoxy Resin A | 9003-36-5 | 0.0030 | 1.5000% | 54 | 0.0054% |
| | | Epoxy Resin B | Trade Secret | 0.0041 | 2.0000% | 72 | 0.0072% |
| | | Diluent A | Trade Secret | 0.0030 | 1.5000% | 54 | 0.0054% |
| | | Diluent B | Trade Secret | 0.0041 | 2.0000% | 72 | 0.0072% |
| | | Hardener | 461-58-5 | 0.0041 | 2.0000% | 72 | 0.0072% |
| | | Dicyandiamide | 461-58-5 | 0.0002 | 0.1000% | 4 | 0.0004% |
| | | Organic Peroxide | Trade Secret | 0.0002 | 0.1000% | 4 | 0.0004% |
| Die | Circuit | Si | 7440-21-3 | 2.8447 | 100.0000% | 50,528 | 5.0528% |
| Wire | Interconnect | Gold | 7440-57-5 | 0.5130 | 100.0000% | 9,112 | 0.9112% |
| Mold Compound | Encapsulation | SiO2 | 14808-60-7 | 33.8708 | 89.7500% | 601,612 | 60.1612% |
| | | Epoxy Resin A | Trade Secret | 0.9435 | 2.5000% | 16,758 | 1.6758% |
| | | Epoxy Resin B | Trade Secret | 0.9435 | 2.5000% | 16,758 | 1.6758% |
| | | Phenol Resin | Trade Secret | 1.8870 | 5.0000% | 33,516 | 3.3516% |
| | | Carbon Black | 1333-86-4 | 0.0943 | 0.2500% | 1,676 | 0.1676% |

Package Weight (mg): **56.3001**

% Total: **100.0000**

II. DECLARATION OF PACKAGING INDIRECT MATERIALS

| Type | Material | Lead PPM | Cadmium PPM | Cr VI PPM | Mercury PPM | PBB PPM | PBDE PPM | Analysis Report (Note2) |
|---------------|----------------------|----------|-------------|-----------|-------------|---------|----------|-------------------------|
| Tube | Plastic Tube | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-PLTB-R |
| | End Plug | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-EPLG-R |
| Tape and Reel | Carrier Tape | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CART-R |
| Others | Moisture Barrier Bag | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-MBBG-R |
| | Dessicant | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-DESS-R |
| | HIC | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-HIC-R |
| | Bubble Pack | <5.0 | <5.0 | <5.0 | <5.0 | <10.0 | <10.0 | CoA-BUBB-R |
| | Carton Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CRTN-R |
| | Inner Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-LBL-R |
| | Shielding Bag | <5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | CoA-SBAG-R |

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



**ASSEMBLY Site 3: Amkor Technology Philippines (P1/P2)
Package Qualification Report # 032101, 122204 (Note 1)**

I. DECLARATION OF PACKAGED UNITS

A. BANNED SUBSTANCES

Materials from Level A of the EIA/JIG/JGPSSI/EICTA Material Composition Declaration Guide and EU RoHS. Listed in the table below are materials that are neither contained nor intentionally added to this product.

| Substances / Compounds | Weight by mg | PPM | Analysis Report (Note 2) |
|--|--------------|-------|--|
| Cadmium and Cadmium Compounds | 0 | < 5.0 | CoA-ZZ16- Amkor Philippines (P1/P2) |
| Hexavalent Chromium and its Compounds | 0 | < 5.0 | |
| Lead and Lead Compounds | 0 | < 5.0 | |
| Mercury and Mercury Compounds | 0 | < 5.0 | |
| Polybrominated Biphenyls (PBB) | 0 | < 5.0 | |
| Polybrominated Diphenylethers (PBDE) | 0 | < 5.0 | |
| Asbestos | 0 | 0 | As per MSDS |
| Azo colorants | 0 | 0 | As per MSDS |
| Ozone Depleting Substances | 0 | 0 | As per MSDS |
| Polychlorinated Biphenyls (PCBs) | 0 | 0 | As per MSDS |
| Polychlorinated Napthalenes | 0 | 0 | As per MSDS |
| Radioactive Substances | 0 | 0 | As per MSDS |
| Shortchain Chlorinated Paraffins | 0 | 0 | As per MSDS |
| Tributyl Tin (TBT) and Triphenyl Tin (TPT) | 0 | 0 | As per MSDS |
| Tributyl Tin Oxide (TBTO) | 0 | 0 | As per MSDS |
| Formaldehyde | 0 | 0 | As per MSDS |

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B1. MATERIAL COMPOSITION (Note 3) Using Au Wire

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | %% Weight of Substance per package |
|---------------|------------------|-----------------------|--------------|--------------|---------------------------------------|---------|------------------------------------|
| Leadframe | Base Material | Cu | 7440-50-8 | 26.4196 | 94.0200% | 426,123 | 42.6123% |
| | | Ni | 7440-02-0 | 0.8205 | 2.9200% | 13,234 | 1.3234% |
| | | Si | 7440-21-3 | 0.1798 | 0.6400% | 2,901 | 0.2901% |
| | | Mg | 7439-95-4 | 0.0393 | 0.1400% | 635 | 0.0635% |
| | | Ag | 7440-22-4 | 0.6407 | 2.2800% | 10,334 | 1.0334% |
| Lead Finish | External Plating | Sn | 7440-31-5 | 1.5700 | 100.0000% | 25,323 | 2.5323% |
| Die Attach | Adhesive | Resin | Trade Secret | 0.2700 | 20.6100% | 4,355 | 0.4355% |
| | | Ag | 7440-22-4 | 0.9201 | 70.2400% | 14,841 | 1.4841% |
| | | Metal Oxide | Trade Secret | 0.0400 | 3.0500% | 644 | 0.0644% |
| | | Amine | Trade Secret | 0.0400 | 3.0500% | 644 | 0.0644% |
| | | Gamma Butyrolactone | Trade Secret | 0.0400 | 3.0500% | 644 | 0.0644% |
| Die | Circuit | Si | 7440-21-3 | 3.8700 | 100.0000% | 62,419 | 6.2419% |
| Wire | Interconnect | Au | 7440-57-5 | 0.4000 | 100.0000% | 6,452 | 0.6452% |
| Mold Compound | Encapsulation | Filler | Trade Secret | 22.4700 | 84.0000% | 362,419 | 36.2419% |
| | | Phenol Resin | Trade Secret | 1.8591 | 6.9500% | 29,986 | 2.9986% |
| | | Epoxy Resin | Trade Secret | 2.4209 | 9.0500% | 39,046 | 3.9046% |

Package Weight (mg): **62.0000**

% Total: **100.0000**

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



16L-TSSOP Pb-Free Package

B2. MATERIAL COMPOSITION (Note 3) Using Cu Wire

| Material | Purpose of Use | Substance Composition | CAS Number | Weight by mg | % weight of substance per Homogeneous | PPM | %% Weight of Substance per package |
|---------------|------------------|--|--------------|--------------|---------------------------------------|---------|------------------------------------|
| Leadframe | Base Material | Cu | 7440-50-8 | 26.9433 | 95.2450 | 437,803 | 43.7803% |
| | | Fe | 7439-89-6 | 0.6636 | 2.3457 | 10,782 | 1.0782% |
| | | Zn | 7440-66-6 | 0.0332 | 0.1173 | 539 | 0.0539% |
| | | P | 7723-14-0 | 0.0083 | 0.0293 | 135 | 0.0135% |
| | | Ag | 7440-22-4 | 0.6401 | 2.2627 | 10,401 | 1.0401% |
| Lead Finish | External Plating | Sn | 7440-31-5 | 1.5569 | 100.0000 | 25,297 | 2.5297% |
| Die Attach | Adhesive | Epoxy resin A | Trade Secret | 0.0769 | 7.0000 | 1,249 | 0.1249% |
| | | Epoxy Resin B | Trade Secret | 0.0439 | 4.0000 | 714 | 0.0714% |
| | | Ag | 7440-22-4 | 0.8457 | 77.0000 | 13,742 | 1.3742% |
| | | Lactone | Trade Secret | 0.0439 | 4.0000 | 714 | 0.0714% |
| | | Polyoxypropylene diamine | Trade Secret | 0.0439 | 4.0000 | 714 | 0.0714% |
| | | 2,6-Diglycidyl phenyl allyl ether oligomer | Trade Secret | 0.0439 | 4.0000 | 714 | 0.0714% |
| Die | Circuit | Silicon | 7440-21-3 | 4.1400 | 100.0000 | 67,271 | 6.7271% |
| Wire | Interconnect | Cu | 7440-50-8 | 0.1166 | 100.0000 | 1,894 | 0.1894% |
| Mold Compound | Encapsulation | Epoxy resin | Trade Secret | 2.3708 | 9.0000 | 38,523 | 3.8523% |
| | | SiO2 Filler | 60676-86-0 | 22.1272 | 84.0000 | 359,546 | 35.9546% |
| | | Phenol Resin | Trade Secret | 1.7122 | 6.5000 | 27,822 | 2.7822% |
| | | Carbon Black | 1333-86-4 | 0.1317 | 0.5000 | 2,140 | 0.2140% |

Package Weight (mg): 61.5421

% Total: 100.0000

II. DECLARATION OF PACKAGING INDIRECT MATERIALS

| Type | Material | Lead PPM | Cadmium PPM | Cr VI PPM | Mercury PPM | PBB PPM | PBDE PPM | Analysis Report (Note2) |
|---------------|----------------------|----------|-------------|-----------|-------------|---------|----------|-------------------------|
| Tube | Plastic Tube | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-PLTB-R |
| | End Plug | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-EPLG-R |
| Tape and Reel | Carrier Tape | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CART-R |
| Others | Moisture Barrier Bag | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-MBBG-R |
| | Dessicant | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-DESS-R |
| | HIC | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-HIC-R |
| | Bubble Pack | <5.0 | <5.0 | <5.0 | <5.0 | <10.0 | <10.0 | CoA-BUBB-R |
| | Carton Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-CRTN-R |
| | Inner Label | <10.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | CoA-LBL-R |
| | Shielding Bag | <5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | CoA-SBAG-R |

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Note 4: Actual testing performed on package family basis. Engineering calculations were applied to derive individual package data.



Document History Page

Document Title: 16L TSSOP PB-FREE PACKAGE MATERIAL DECLARATION DATASHEET
 Document Number: 001-04165

| Rev. | ECN No. | Orig. of Change | Description of Change |
|------|---------|-----------------|---|
| ** | 390637 | YXP | New document. |
| *A | 401531 | GFJ | Added assembly site 3. Added Package weight and word "PMDD". Change the word from two to three in summary of qualified assembly sites. Added natural impurity in note 3 and added note 4. |
| *B | 1350126 | MRB | <ol style="list-style-type: none"> Updated Cypress Logo Deleted reference QTP # 015107 and change to QTP # 060903 on Assembly site 1. Deleted CoA-SP28-T and change to CoA-ZZ16-T on Assembly site 2. Added the percent weight per homogeneous material and weight of substance on the material composition Deleted Declaration of Packaging/Indirect Materials on Assembly site 1 and 2. Updated and added Lead, Cr+VI, PBB and PBDE on the Declaration of Packaging/Indirect Materials. |
| *C | 2616718 | MAHA | <p>Deleted the following items from Table B. Material Composition of Assembly Site 2:</p> <ol style="list-style-type: none"> Antimony and its compounds Bromine organic compound Organic phosphorous compound (Catalyst) <p>Revised the following items from Table B. Material Composition of Assembly Site 2:</p> <ol style="list-style-type: none"> PPM % Weight of Substance per Package |
| *D | 2732541 | HLR | Changed the reference QTP No. 024701 to 043102 for Assembly Site 2. |
| *E | 3044455 | MAHA | Deleted Fe and Zn from the material composition of assembly site 1. Revised the % weight of substance per Homogeneous values of the lead frame of assembly site 1. Revised the PPM and %Weight of Substance per package values of assembly site 1. |
| *F | 3331862 | HLR | Recomputed material composition table of assembly site 1. |
| *G | 3377033 | EBZ | Added package weight B2 for Site 2. Added QTP#111405 for Assembly Site- 2. Added B2: Material Composition table for Site-2. |
| *H | 3615449 | HLR | <p>Added material composition using Green Mold Compound on Assembly Site 1. Reference QTP No. 115205.</p> <p>Added Table 2 for Assembly Sites 1 and 2.</p> <p>Updated the material composition of Assembly Site 2 – B1 and Assembly Site 3 to reflect 4 decimal places on values.</p> |
| *I | 3607050 | COPI | Added PMDD for Assembly Site 2-B3 – OSE Taiwan Copper Qualification under QTP # 120605. |

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 Document Number: 001-04165

| Rev. | ECN No. | Orig. of Change | Description of Change |
|------|---------|-----------------|--|
| *J | 3931592 | UDR | Added B3 for Assembly Site 1 – CML-Autoline Copper Qualification under QTP # 124204. Added QTP # 124204 at Assembly Site 1 Package Qualification Reports Added B3. Material Composition – Using Copper Wire with NiPdAu and Kyocera mold Compound. |
| *K | 4066912 | YUM | Added assembly site name in the Assembly heading in site 1, 2 and 3. Changed assembly code to assembly site name in site 1, 2 and 3. |
| *L | 4111187 | JARG | Added Material Composition for Assembly Site 3 B2 Using Cu Wire Assembled at Amkor Philippines. |
| *M | 4290995 | HLR | Added Material Composition for Assembly Site 2 – B4 using NiPdAu. Reference to QTP No. 131404. Corrected the total package weight of B2 Material Composition for Assembly Site 2. |
| *N | 4563307 | HLR | Sunset Due – No Change |
| *O | 5007155 | HLR | Changed the substances with “-----” and Proprietary “to “Trade Secret”. |
| | | DCON | Removed distribution and posting from the document history page. |

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