

## Environmental Management and Materials Information

Product Content Information for: MAX13051ESA+

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### Qualifications [Top](#)

|  |  |
|--|--|
| <b>Lead-Free Qualified</b>                   | No   |
| <b>REACH</b>                                 | Under Assessment                           |
| <b>RoHS Qualified</b>                        | No   |
| <b>Green</b>                                 | No   |
| <b>Moisture Sensitivity Level</b>            | <a href="#">Not Available - Contact Us</a> |
| <b>Flammability Meets UL-94 (V-0 Rating)</b> | No   |

### Package Description [Top](#)

**Package Code**

**Package Type**

**Package Option**

**Footprint Area (mm<sup>2</sup>)**

**Pin Count**

**Unit Weight in Grams**

### Chemical Composition Summary [Top](#)

#### [Maxim NIA/NIU Substance List \(PDF, 24k\)](#)

| Substance                                  | CAS Number | Amount (grams) | % of Unit Weight |
|--|------------|----------------|------------------|
| Aluminum (Al)                              | 7429-90-5  |                |                  |
| Antimony (Sb <sub>2</sub> O <sub>3</sub> ) | 1309-64-4  |                |                  |

|                               |             |
|-------------------------------|-------------|
| BCB Resin                     |             |
| Bromine (Br)                  | 7726-95-6   |
| Carbon (C)                    | 7440-44-0   |
| Carbon Black                  | 1333-86-4   |
| Ceramic (BaTiO <sub>3</sub> ) | 12047-27-7  |
| Chromium (Cr)                 | 7440-47-3   |
| Cobalt (Co)                   | 7440-48-4   |
| Copper (Cu)                   | 7440-50-8   |
| Gold (Au)                     | 7440-57-5   |
| Indium (In)                   | 7440-74-6   |
| Insulator (Polyimide)         |             |
| Insulator Film                |             |
| Iron (Fe)                     | 7439-89-6   |
| FeO <sub>2</sub>              | 12411-15-36 |
| Lead (Pb)                     | 7439-92-1   |
| Magnesium (Mg)                | 7439-95-4   |
| Manganese (Mn)                | 7439-96-5   |
| MnO <sub>3</sub>              |             |
| Nickel (Ni)                   | 7440-02-0   |
| NiPdAu                        |             |
| Nickel-V (NiV)                |             |
| Palladium (Pd)                | 7440-05-3   |
| Phosphorus (P)                | 7723-14-0   |
| Silica (SiO <sub>2</sub> )    | 11126-22-0  |
| Silicon (Si)                  | 7440-21-3   |
| Silver (Ag)                   | 7440-22-4   |
| Solder Mask                   |             |
| Solder Paste                  |             |
| Spheron Polymer Passivation   |             |
| Sulfur (S)                    | 7704-34-9   |
| Tin (Sn)                      | 7440-31-5   |
| Titanium (Ti)                 | 7440-32-6   |
| Titanium-W (TiW)              |             |
| Tungsten (W)                  | 7440-33-7   |
| Vanadium (V)                  | 7440-62-2   |
| Zinc (Zn)                     | 7440-66-6   |
| ZnO                           | 1314-13-2   |

**Detailed Package Component Data** [Top](#)**Backside Laminate****Summary**

Component Weight

| Substance           | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|---------------------|-------------------|--------------------------|---------------------|
| Epoxy/Acrylic Resin |                   |                          |                     |

**Base/Lid Components****Summary**

Base Material

Lid/Cap Material

Component Weight

| Substance   | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-------------|-------------------|--------------------------|---------------------|
| Base Weight |                   |                          |                     |
| Lid Weight  |                   |                          |                     |

**Bond Wire Components****Summary**

Component Weight

| Substance     | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|---------------|-------------------|--------------------------|---------------------|
| Gold (Au)     |                   |                          |                     |
| Aluminum (Al) |                   |                          |                     |

**Bump Components****Summary**

Bump Assembler

Bump Material

Component Weight

| Substance   | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-------------|-------------------|--------------------------|---------------------|
| Lead (Pb)   |                   |                          |                     |
| Tin (Sn)    |                   |                          |                     |
| Copper (Cu) |                   |                          |                     |

Insulator (Polyimide)  
 Silver (Ag)  
 UBM (Ti)  
 RDL (Cu)  
 Nickel (Ni)

**Copper Post**

**Summary**

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Copper

**Die Attach Epoxy Components**

**Summary**

Die Attach Material

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Aromatic Amine

Copper (Cu)

Diester

Epoxy

Functionalized Ester

Functionalized Urethane

Indium (In)

Lactone

Lead (Pb)

Polymeric

Polyoxypropylenediamine

Resin

Silver Filler (Ag)

Tin (Sn)

Other

**Die Coat Components**

**Summary**

### Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

BCB Resin

### Heat Slug Components

#### Summary

#### Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Heat Slug

Epoxy

Copper (Cu)

Other

### Laminate Components

#### Summary

#### Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Copper (Cu)

Gold (Au)

Nickel (Ni)

Solder Mask

### Lead Finish/Plating Components

#### Summary

Lead Finish Plating

Assembly Lead Finish Process

#### Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Lead (Pb)

Tin (Sn)

NiPdAu

Gold (Au)

Nickel (Ni)

## Lead Frame Components

### Summary

Lead Frame Material

Component Weight

| Substance      | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|----------------|-------------------|--------------------------|---------------------|
| Aluminum (Al)  |                   |                          |                     |
| Carbon (C)     |                   |                          |                     |
| Chromium (Cr)  |                   |                          |                     |
| Cobalt (Co)    |                   |                          |                     |
| Copper (Cu)    |                   |                          |                     |
| Gold (Au)      |                   |                          |                     |
| Iron (Fe)      |                   |                          |                     |
| Lead (Pb)      |                   |                          |                     |
| Magnesium (Mg) |                   |                          |                     |
| Manganese (Mn) |                   |                          |                     |
| Nickel (Ni)    |                   |                          |                     |
| Palladium (Pd) |                   |                          |                     |
| Phosphorus (P) |                   |                          |                     |
| Silicon (Si)   |                   |                          |                     |
| Silver (Ag)    |                   |                          |                     |
| Sulfur (S)     |                   |                          |                     |
| Tin (Sn)       |                   |                          |                     |
| Zinc (Zn)      |                   |                          |                     |
| Zirconium (Zr) |                   |                          |                     |

## Maxfilm

### Summary

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
| Maxfilm   |                   |                          |                     |

## Mold Compound Components

### Summary

Mold Material

Resin Type

### Component Weight

| Substance                                  | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|--|-------------------|--------------------------|---------------------|
| Antimony (Sb <sub>2</sub> O <sub>3</sub> ) |                   |                          |                     |
| Bromine (Br)                               |                   |                          |                     |
| Carbon Black                               |                   |                          |                     |
| Epoxy                                      |                   |                          |                     |
| Epoxy Cresol Novolac                       |                   |                          |                     |
| Metal Hydroxide                            |                   |                          |                     |
| Phenol Novolac                             |                   |                          |                     |
| Silica (SiO <sub>2</sub> )                 |                   |                          |                     |
| Resin                                      |                   |                          |                     |
| Other                                      |                   |                          |                     |

### Silicon Chip Components

| Substance    | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|--------------|-------------------|--------------------------|---------------------|
| Silicon Chip |                   | 100                      |                     |

### Spheron Polymer Passivation Components

| Summary                     |                   |                          |                     |
|-----------------------------|-------------------|--------------------------|---------------------|
| Substance                   | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
| Spheron Polymer Passivation |                   | 100                      |                     |

### Insulator Film Components

| Substance      | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|----------------|-------------------|--------------------------|---------------------|
| Insulator Film |                   |                          |                     |

### Solder Ball Components

| Summary          |                   |                          |                     |
|------------------|-------------------|--------------------------|---------------------|
| Component Weight |                   |                          |                     |
| Substance        | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
| Copper (Cu)      |                   |                          |                     |
| Lead (Pb)        |                   |                          |                     |
| Nickel (Ni)      |                   |                          |                     |

Silver (Ag)

Tin (Sn)

### Solder Paste Components

#### Summary

Component Weight

| Substance                                  | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|--|-------------------|--------------------------|---------------------|
| Antimony (Sb <sub>2</sub> O <sub>3</sub> ) |                   |                          |                     |
| Copper (Cu)                                |                   |                          |                     |
| Indium (In)                                |                   |                          |                     |
| Lead (Pb)                                  |                   |                          |                     |
| Silver (Ag)                                |                   |                          |                     |
| Tin (Sn)                                   |                   |                          |                     |

### Substrate Components

#### Summary

Substrate Weight

Substrate Material

Substrate Core Material

Bromine-Free

| Substance               | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-------------------------|-------------------|--------------------------|---------------------|
| Copper                  |                   |                          |                     |
| Gold                    |                   |                          |                     |
| Nickel                  |                   |                          |                     |
| Substrate Core Material |                   |                          |                     |
| Solder Mask             |                   |                          |                     |
| Triazol                 |                   |                          |                     |
| Other                   |                   |                          |                     |

### UBM Components

#### Summary

Component Weight

| Substance     | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|---------------|-------------------|--------------------------|---------------------|
| Chromium (Cr) |                   |                          |                     |
| Copper (Cu)   |                   |                          |                     |



Nickel (Ni)

Nickel-V (NiV)

Titanium (Ti)

Titanium-W (TiW)

Tungsten (W)

Vanadium (V)

**Other Component Data** [Top](#)

**Passive Component 1**

**Summary**

Material Type / PN Codes

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Passive Component 1

**Passive Component 2**

**Summary**

Material Type / PN Codes

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Passive Component 2

**Passive Component 3**

**Summary**

Material Type / PN Codes

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Passive Component 3

**Passive Component 4**

**Summary**

Material Type / PN Codes

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

## Passive Component 4

### Capacitor Components

#### Summary

#### Component Weight

| Substance                     | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-------------------------------|-------------------|--------------------------|---------------------|
| Ceramic (BaTiO <sub>3</sub> ) |                   |                          |                     |
| Copper (Electrode)            |                   |                          |                     |

### Crystal Components

#### Summary

#### Component Weight

| Substance                  | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|----------------------------|-------------------|--------------------------|---------------------|
| Silver (Ag)                |                   |                          |                     |
| Aluminum (Al)              |                   |                          |                     |
| Gold (Au)                  |                   |                          |                     |
| Chromium (Cr)              |                   |                          |                     |
| Lead (Pb)                  |                   |                          |                     |
| Manganese (Mn)             |                   |                          |                     |
| Nickel (Ni)                |                   |                          |                     |
| Cobalt (Co)                |                   |                          |                     |
| Copper (Cu)                |                   |                          |                     |
| Iron (Fe)                  |                   |                          |                     |
| Silicon (Si)               |                   |                          |                     |
| Tin (Sn)                   |                   |                          |                     |
| Zinc (Zn)                  |                   |                          |                     |
| Silica (SiO <sub>2</sub> ) |                   |                          |                     |

### Diode Components

#### Summary

#### Component Weight

| Substance                    | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|------------------------------|-------------------|--------------------------|---------------------|
| Encapsulant (Phenolic Resin) |                   |                          |                     |
| Gold Wire                    |                   |                          |                     |
| Leadframe (Copper 194)       |                   |                          |                     |

Pellet (Chip)  
Terminal (SnAgCu)

### Optocoupler Components

#### Summary

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Die (Chip)  
Encapsulant (Phenolic Resin)  
Epoxy (Ag)  
Gold Wire  
Leadframe (Alloy 42)  
Potting Resin (Silicone)  
Terminal Plating (Sn)

### Resistor Components

#### Summary

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Component Weight

### Transformer Components

#### Summary

Component Weight

| Substance | Amount<br>(grams) | % of<br>Component Weight | % of<br>Unit Weight |
|-----------|-------------------|--------------------------|---------------------|
|-----------|-------------------|--------------------------|---------------------|

Copper  
FeO<sub>2</sub>  
MnO<sub>3</sub>  
ZnO

Notes:

1. Lead Form: GW - Gull Wing, TH - Through Hole.
2. Refer to product data sheet to confirm actual wire diameter.
3. 'ND' means None Detected, negligible amount present.

This part is qualified as lead-free.

Parts qualified as lead-free can be manufactured and supplied as lead-free, if and only if, the customer makes such requests to the Maxim Business Units for approval. The navigation bar on the EMMI website contains information regarding the lead-free process (e.g. MSL's, Peak reflow Temperatures, JEDEC methods, frequently asked questions and answers, lead-free package tables, and status/qualification plans for particular package types qualified as lead-free or in the qualification process).

This report was generated on 2023-06-06. For additional information, please visit the Maxim/Dallas Environmental Management and Materials Information website located at:

**<https://www.maximintegrated.com/en/emmi>**