

Environmental Management and Materials Information

Product Content Information for: DG413FEUE+T

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Qualifications [Top](#)

| | |
|--|--|
| Lead-Free Qualified | No |
| REACH | Under Assessment |
| RoHS Qualified | No |
| Green | No |
| Moisture Sensitivity Level | Not Available - Contact Us |
| Flammability Meets UL-94 (V-0 Rating) | No |

Package Description [Top](#)

Package Code

Package Type

Package Option

Footprint Area (mm²)

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 ₂ O ₃) | 1309-64-4 | | |

| | |
|-------------------------------|-------------|
| BCB Resin | |
| Bromine (Br) | 7726-95-6 |
| Carbon (C) | 7440-44-0 |
| Carbon Black | 1333-86-4 |
| Ceramic (BaTiO ₃) | 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 ₂ | 12411-15-36 |
| Lead (Pb) | 7439-92-1 |
| Magnesium (Mg) | 7439-95-4 |
| Manganese (Mn) | 7439-96-5 |
| MnO ₃ | |
| Nickel (Ni) | 7440-02-0 |
| NiPdAu | |
| Nickel-V (NiV) | |
| Palladium (Pd) | 7440-05-3 |
| Phosphorus (P) | 7723-14-0 |
| Silica (SiO ₂) | 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 (grams) | % of Component Weight | % of Unit Weight |
|---------------------|-------------------|--------------------------|---------------------|
| Epoxy/Acrylic Resin | | | |

Base/Lid Components**Summary**

Base Material

Lid/Cap Material

Component Weight

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

Bond Wire Components**Summary**

Component Weight

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

Bump Components**Summary**

Bump Assembler

Bump Material

Component Weight

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

Copper

Die Attach Epoxy Components

Summary

Die Attach Material

Component Weight

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

BCB Resin

Heat Slug Components

Summary

Component Weight

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

Heat Slug

Epoxy

Copper (Cu)

Other

Laminate Components

Summary

Component Weight

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

Lead (Pb)

Tin (Sn)

NiPdAu

Gold (Au)

Nickel (Ni)

Lead Frame Components

Summary

Lead Frame Material

Component Weight

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

Maxfilm

Mold Compound Components

Summary

Mold Material

Resin Type

Component Weight

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

Silicon Chip Components

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

Spheron Polymer Passivation Components

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

Insulator Film Components

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

Solder Ball Components

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

Silver (Ag)

Tin (Sn)

Solder Paste Components

Summary

Component Weight

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

Substrate Components

Summary

Substrate Weight

Substrate Material

Substrate Core Material

Bromine-Free

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

UBM Components

Summary

Component Weight

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

Passive Component 1

Passive Component 2

Summary

Material Type / PN Codes

Component Weight

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

Passive Component 2

Passive Component 3

Summary

Material Type / PN Codes

Component Weight

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

Passive Component 3

Passive Component 4

Summary

Material Type / PN Codes

Component Weight

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

Passive Component 4

Capacitor Components

Summary

Component Weight

| Substance | Amount (grams) | % of Component Weight | % of Unit Weight |
|-------------------------------|-------------------|--------------------------|---------------------|
| Ceramic (BaTiO ₃) | | | |
| Copper (Electrode) | | | |

Crystal Components

Summary

Component Weight

| Substance | Amount (grams) | % of Component Weight | % of 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 ₂) | | | |

Diode Components

Summary

Component Weight

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

Pellet (Chip)
Terminal (SnAgCu)

Optocoupler Components

Summary

Component Weight

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

Component Weight

Transformer Components

Summary

Component Weight

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

Copper
FeO₂
MnO₃
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 2024-08-07. For additional information, please visit the Maxim/Dallas Environmental Management and Materials Information website located at:

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