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ELECTRONIC COMPONENTS
AND PACKAGING

# DATA SHEET: 88 Gold-12 Germanium

## Physical Property Information:

| | |
|---|---|
| Solder Alloy Composition | 88Au-12Ge (weight per cent) |
| Eutectic melting point | 361°C |
| Density | 14.67 Mg $m^{-3}$ |
| Coefficient of Thermal Expansion (CTE) | 13.4 ppm/°C |
| Thermal Conductivity | 44.4 W $m^{-1}K^{-1}$ |
| Electrical Resistivity | 14.4 μΩ cm |

## Mechanical Properties:

| **Ultimate Tensile Strength:** | MPa | (kpsi) |
|---|---|---|
| 23°C | 185 | (26.8) |
| 100°C | 177 | (25.7) |
| 150°C | 170 | (24.7) |

| **Young's Modulus:** | GPA | ($10^6$ psi) |
|---|---|---|
| 23°C | 59.2 | (8.58) |

Typical impurity levels for the min. 99.99%-purity electronic grade alloy are less then:
Sb: 0.005, Pb: 0.005, Ni: 0.003, Al: 0.005, Bi: 0.005, Fe: 0.005, Zn: 0.005, As: 0.002, Cd: 0.001 and In: 0.005

## Application information:

The alloy is generally used for flux-less, high-temperature, die-attach soldering, for which the soldering substrates materials are free of oxides and/or oily residues. Common practice for flux-free soldering is:
Nickel-plated substrates (1.5-2.5μm) protected with an Au-flash (0.2-0.5μm) and soldering in vacuum, inert or N2/H2 atmosphere.

Soldering temperature for reflow (measured in the joint), should be minimal at or above 375-380ºC for 20 seconds, depending the mass of the assembly and the type of furnace used. This assumes either very clean, soldering surfaces or the presence of a reducing agent (flux) or reducing atmosphere during the soldering cycle. If and when the components are slightly oxidized, a combination with flux or reducing atmosphere and higher temperatures and/or longer soldering temperatures is required.