

Thermal Conductivity

| METALS | | (Watts cm °C) |
|------------|-----------------|---------------|
| Silver | (Ag) | 4.08 |
| Copper | (Cu) | 3.94 |
| Gold | (Au) | 2.96 |
| Aluminum | (Al) | 2.18 |
| Beryllium | (Be) | 2.00 |
| Tungsten | (W) | 1.74 |
| Rhodium | (Rh) | 1.50 |
| Molybdenum | (Mo) | 1.46 |
| Brass | (66%Cu, 34% Zn) | 1.110 |
| Chromium | (Cr) | 0.937 |
| Nickel | (Ni) | 0.920 |
| Platinum | (Pt) | 0.716 |
| Tin | (Sn) | 0.666 |
| Tantalum | (Ta) | 0.575 |
| Lead | (Pb) | 0.353 |
| Titanium | (Ti) | 0.219 |
| Manganese | (Mn) | 0.078 |

| INSULATORS | | (Watts cm °C) |
|-----------------------|------------|---------------|
| Diamond | (CVD) | 10.0-16.0 |
| Beryllium Oxide 99.5% | (BeO) | 2.61 |
| Aluminum Nitride | (AlN) | 1.70 |
| Boron Nitride | (HBN 500°) | 0.59 |
| Sapphire | | 0.46 |
| Alumina Oxide 99.6% | (Al2O3) | 0.36 |
| Alumina Oxide 96% | (Al2O3) | 0.26 |
| Alumina Oxide 91% | (Al2O3) | 0.13 |
| Glass | | 0.015 |
| Mica | | 0.0043-0.0062 |
| Air | | 0.00026 |

| BONDING | | (Watts cm °C) |
|------------------------|--|---------------|
| Gold Germanium 88/12 | | 0.8834 |
| Gold Tin 80/20 | | 0.6824 |
| Tin Lead Solder (Sn62) | | 0.4921 |
| Indium 100% | | 0.2386 |
| Silver Filled Epoxy | | 0.0156 |
| Epoxy | | 0.0099 |

Material Properties

| MATERIAL | ELECTRICAL CONDUCTIVITY (Siemens/m) |
|----------------------|--|
| Aluminum | 3.538E+07 |
| Beryllium | 2.256E+07 |
| Brass (66%Cu, 34%Zn) | 2.564E+07 (converted from resistivity) |
| Carbon (graphite) | 1.276E+05 |
| Chrome | 5.104E+06 |
| Copper | 5.800E+07 |
| Gold | 4.257E+07 |
| Indium | 1.392E+07 |
| Lead | 4.872E+06 |

Solders

| COMPOSITION | MELTING RANGE | |
|-------------|---------------|----------|
| | SOLIDUS | LIQUIDUS |
| Sn96 | 221°C | 221°C |
| Sn70 | 182°C | 193°C |
| Sn63 | 182°C | 182°C |
| Sn62 | 176°C | 189°C |
| Sn60 | 182°C | 190°C |
| Sn50 | 182°C | 215°C |
| Sn40 | 182°C | 238°C |
| Sn35 | 182°C | 246°C |
| Sn30 | 182°C | 254°C |
| Sn20 | 182°C | 276°C |
| Sn10 | 267°C | 299°C |
| Sn5 | 308°C | 312°C |
| Sb5 | 232°C | 240°C |
| Pb80 | 182°C | 276°C |
| Pb70 | 182°C | 254°C |
| Pb65 | 182°C | 246°C |
| Ag1.5 | 309°C | 309°C |
| Ag2.5 | 304°C | 304°C |
| Ag5.5 | 304°C | 365°C |

Other Solders

| COMPOSITION | MELTING RANGE | |
|----------------------|---------------|----------|
| | SOLIDUS | LIQUIDUS |
| Gold Germanium 88/12 | 356°C | 356°C |
| Gold Tin 80/20 | 280°C | 280°C |
| Indium 100% | 157°C | 157°C |

| MATERIAL | ELECTRICAL CONDUCTIVITY (Siemens/m) |
|-------------------------|-------------------------------------|
| Nickel | 1.462E+07 |
| Palladium | 9.280E+06 |
| Platinum | 9.442E+06 |
| Rhodium | 2.227E+07 |
| Silver | 6.090E+07 |
| Tin | 8.700E+06 |
| Tin Lead Solder (63/37) | 7.284E+06 (estimated) |
| Titanium | 1.276E+06 |
| Titanium Tungsten (TiW) | 1.652E+07 (estimated) |
| Tungsten | 1.821E+07 |

Conversion Chart

| EQUIVALENTS | |
|-------------------|--------------------------------------|
| 1 Micron | = 39.37 Microinches |
| 1 Micron | = 10,000 Angstroms |
| 1 Micron | = 1,000 Nanometers |
| 25.4 Microns | = 1 Mil |
| 1 Angstrom | = 0.003937 Microinches |
| 1 Angstrom | = 0.0001 Microns |
| 10 Angstroms | = 0.03937 Microinches = 1 Nanometer |
| 50 Angstroms | = 0.1968 Microinches = 60/40 Optical |
| 254 Angstroms | = 1 Microinch |
| 100 Nanometers | = 3.937 Microinches |
| 100 Nanometers | = 1,000 Angstroms |
| 1 Nanometer | = 10 Angstroms |
| 1 Microinch | = 254 Angstroms |
| 1 Microinch | = 2.54 Nanometers |
| 39.37 Microinches | = 1 Micron |
| 1 Mil | = 25.4 Microns |

| TO GET | MULTIPLY | BY |
|-----------------|----------|---------------------------|
| Angstroms | = | Microns x 10,000 |
| Angstroms | = | Microinches x 254 |
| Angstroms | = | Mils x 25,400 |
| Angstroms | = | Nanometers x 10 |
| Microns | = | Nanometers x 0.001 |
| Microns | = | Angstroms x 0.0001 |
| Microns | = | Microinches x 0.0254 |
| Microns | = | Mils x 25.4 |
| Microns | = | Millimeters x 0.01 |
| Nanometers | = | Microns x 1000 |
| Nanometers | = | Mils x 0.03937 |
| Nanometers | = | Microinches x 25.4 |
| Nanometers | = | Angstroms x 0.10 |
| Millimeters | = | Microns x 0.001 |
| Millimeters | = | Mils x 0.0254 |
| Millimeters | = | Microinches x 0.000254 |
| Millimeters | = | Inches x 25.4 |
| Centimeters | = | Inches x 2.54 |
| Centimeters | = | Millimeters x 10 |
| Microinches | = | Microns x 39.37 |
| Microinches | = | Mils x 1000 |
| Microinches | = | Angstroms x 0.003937 |
| Microinches | = | Nanometers x 0.03937 |
| Microinches | = | Millimeters x 39.373 |
| Mils | = | Microns x 0.03937 |
| Mils | = | Microinches x 0.001 |
| Mils | = | Angstroms x 254,000 |
| Mils | = | Millimeters x 39.37 |
| Inches | = | Millimeters x 0.03937 |
| Inches | = | Centimeters x 0.3937 |
| Sq. Inches | = | Sq. Centimeters x 0.15499 |
| Sq. Centimeters | = | Sq. Inches x 6.45 |
| Cu. Inches | = | Cu. Centimeters x 0.06102 |
| Cu. Centimeters | = | Cu. Inches x 16.39 |
| Ounces | = | Grams x 0.03527 |
| Pounds | = | Kilograms x 2.2046 |
| Grams | = | Ounces x 28.349 |
| Kilograms | = | Pounds x 0.4536 |

TEMPERATURE

| | | |
|-----------|---|----------------------|
| Degrees F | = | 9/5 (Degrees C) + 32 |
| Degrees C | = | 5/9 (Degrees F) - 32 |