Heraeus

Electronics

PowerCu SOFT Bonding Ribbons

Thick Copper Bonding Ribbons of Superior Softness

PowerCu SOFT bonding ribbons are designed for the next generation of power devices, targeting operating temperatures up to 250 °C. At Heraeus Electronics, special processing steps achieve the very soft copper material. It offers superior electrical conductivity, increased fusing current values, and provides 10 – 30 times higher cycle numbers in lifetime tests for wedge/wedge applications compared to standard aluminum bonding ribbons. This makes it the ideal choice for advanced packaging of modules in high-temperature and high-robustness applications.

In addition, cost optimization within production (UPH improvement) can be achieved by upgrading wires to ribbons. One **PowerCu SOFT** ribbon (0.3 x 2mm) is able to replace up to three 500µm Cu wires.

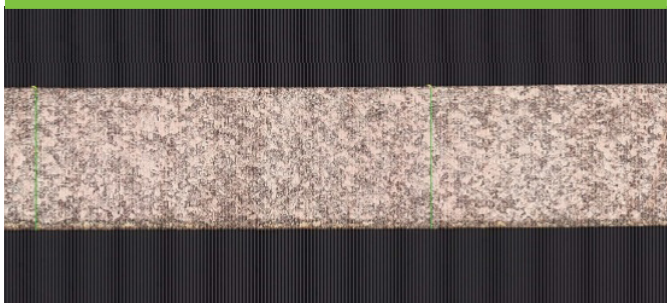
As the industry shifts towards silicon carbide (SiC) and gallium nitride (GaN) technologies, **PowerCu SOFT** bonding ribbons support larger currents and higher temperatures in electronic system modules. Copper wire paves the way for advancements in hybrid and electric vehicle technologies.

Key Features

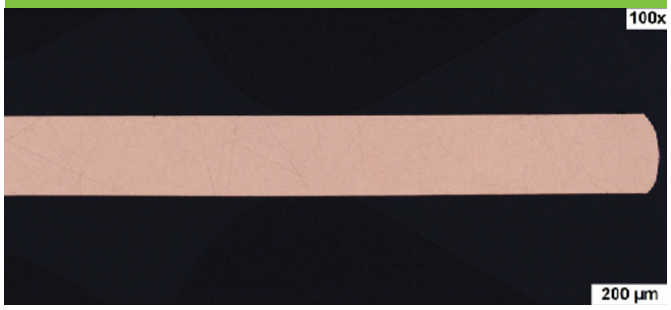
- Superior softness
- Excellent bondability
- Low deformation resistance
- Extended lifespan
- High thermal stability
- Low electrical resistance
- Replaces up to 3 single Cu wires

Heraeus Electronics' Die Top System (DTS®) offers a solution for customers' latest requirements for high performance. DTS® enables copper wire bonding on today's standard chips.

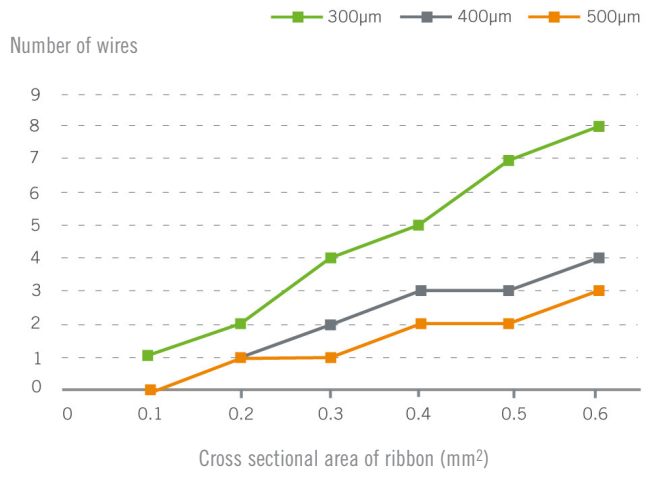
Fine grained and homogeneous texture of Cu ribbons



Cross section of PowerCu SOFT ribbon with natural rounded and burr-free edge



Substituition Matrix: Wires By Ribbons



Material Characteristics (*)

Melting point	1083 °C
Modulus of rigidity	48 GPa
Thermal conductivity at 20 °C	399 W/m * K
Linear expansion coefficient (20 °C – 30 °C)	116.8 * 10^{-6} K^{-1}
Electrical Resistivity at 20 °C	1.8 µΩ * cm
Temperature coefficient of electrical resistance (0 °C – 300 °C)	3.9 * 10^{-3} * K^{-1}
Density	8.933 kg/dm^3

* Theoretical bulk material properties

Technical Parameters (*)

Diameter / Type		Elongation	Breaking Load
mm	mil	(%)	(cN)
0.1 x 1	4 x 40	> 10	2100 – 2700
0.2 x 1	8 x 40	> 10	4200 – 5400
0.3 x 1	12 x 40	> 10	6300 – 8100
0.1 x 1.5	4 x 60	> 10	3100 – 4100
0.2 x 1.5	8 x 60	> 10	6300 – 8100
0.3 x 1.5	12 x 60	> 10	9500 – 12100
0.1 x 2	4 x 80	> 10	4200 – 5400
0.2 x 2	8 x 80	> 10	8400 – 10800
0.3 x 2	12 x 80	> 10	12600 – 16200

For other diameters, please contact Heraeus Electronics Product Management.
* 1mil ≈ 25µm
  1cN ≈ 1g

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