Heraeus

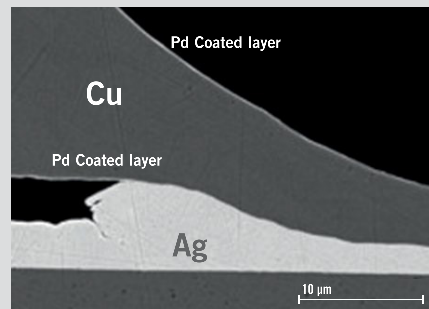
Electronics

Palladium Coated Copper Wire for IC Applications

PdSoft Benefits and Features

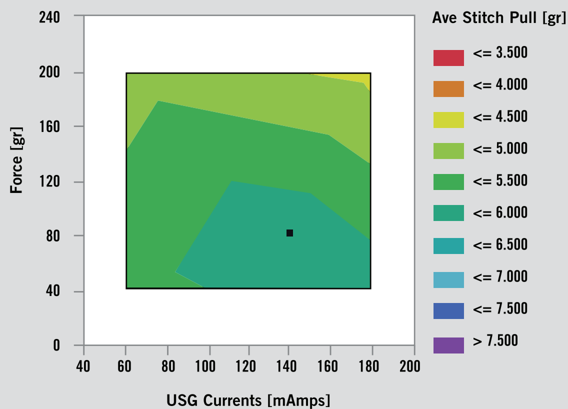
- Improved performance
  - Robust 2nd bond
  - Reliability
- Soft FAB characteristics
- Simplified handling
  - Longer floor/shelf life
  - Oxidation protection
  - Workable with N_2 gas

Robust 2nd Bond



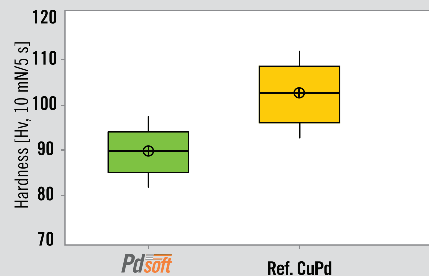
Pd Layer at the wire-substrate interface enhance ability to bond

2nd Bond Parameter Guideline for PdSoft



Fixed: Bonding time: 15 msec CV: 0.4
Device: PBGA 2x2 Test Die, Wire Diameter: 0.8 mil PdSoft, Bonder: K&S Maxum Ultra, Bonding Temp.: 175°C Capillary: K&S CU-FF-1115-P37 (T2.7)

FAB Hardness Data



Wire Diameter: 18 µm, EFO current: 60 mA, FAB Diameter: 30 µm, Bonder: K&S iConn

Recommended Technical Data of PdSoft

Diameter	**Microns (µm)**	15	18	20	23	25	28	30	33	38	50
	Mils	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.5	2
Elongation	**(%)**	8 – 14	9 – 15	11 – 17	13 – 19	13 – 21	13 – 25	13 – 25	13 – 25	13 – 25	13 – 25
Breaking Load	**(g)**	2 – 7	3 – 8	4 – 10	6 – 12	8 – 14	11 – 18	14 – 21	18 – 25	24 – 35	48 – 60

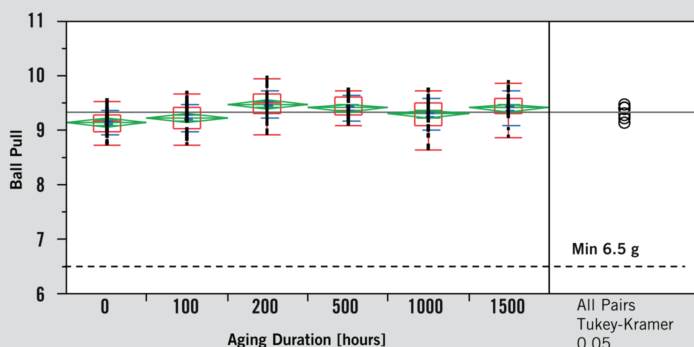
For other diameters, please contact Heraeus Bonding Wires sales representative.

PdSoft Characteristics for 0.8 mil diameter

Physical Properties	
Density	8.99 g/cm³
Melting Point *	1083 °C
Thermal Conductivity *	401 W/m.K
Specific Heat Capacity @ 25C *	385 J/kg.K
Coeff. of Thermal Expansion *	16.5 µm/m°C, (20 – 100°C)
Specific Electrical Resistivity	1.7 µΩ -cm
FAB Hardness (60 mA EFO)	90 – 105 HV (0.01 N/5 s)
Wire Hardness*	95 – 105 HV (0.01 N/5 s)
Elastic Modulus	95 – 105 GPa
Chemical Composition	
Copper	99.99 % min
Pd	1.3 % – 2.9 %
Mechanical Properties	
Elongation	11 – 17 %
Break Load	4 – 10 g
Other Guidelines	
Floor Life	60 days
Shelf Life Time	6 months
Shielding Gas	N_2 / Forming Gas

* Based on Core Material

Ball Pull Result HTS 175°C up to 1500 hrs



Bonder: K&S Maxum Ultra, Capillary: K&S CU-FF-1115-P37, Device QFP 208L / Internal Test Die Al-1 % Si-0.5 % Cu, Al10,000Å. Ball Diameter: ~ 40 µm, PdSoft 0.8 mil

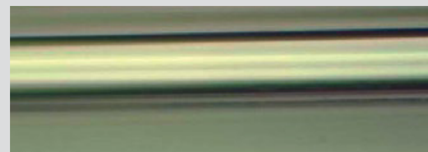
Good Reliability under Isothermal aging

Slow and stable Intermetallic growth
Passed HTS 1500 hrs 175°C (unmolded device)

Extreme Wire Corrosion Test

Condition: Corrosive fume environment at RT
Duration: 336 hrs

PdSoft Copper Wire



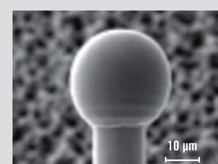
No oxidation found on wire surface

Bare Copper Wire

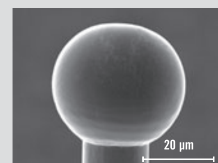
Severe oxidation found on wire surface

Consistent FAB roundness in N_2 environment

FAB Target: ~ 26um,
Wire Diameter:
0.6 mil PdSoft,
Bonder: K&S Iconn,
EFO Current: 60 mA,
N_2 Gas Flow Rate:
0.3 ~ 0.5 l/min



FAB Target: ~ 40 µm,
Wire Diameter:
0.8 mil PdSoft,
Bonder: K&S Maxum Ultra,
EFO Current: 60 mA,
N_2 Gas Flow Rate:
0.3 ~ 0.6 l/min



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