



## ESL ELECTROSCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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## CERMET SILVER CONDUCTOR

## 9912-K Thick Print

**RoHS Compliant\***

ESL 9912-K Thick Print silver is a very smooth, screen-printable conductor for use in power and heat spreading applications. The 9912-K Thick Print may be considered as a possible replacement for Direct Bonded Copper (DBC). Specific applications include heat transfer for high intensity light emitting diodes (LEDs), automotive power modules where large diameter (>200µm) wire bonds are used, and any circuitry requiring high-current carrying capacity and/or excellent thermal management. Smoothness is a function of the screen mesh that is used but even low mesh count screens produce good, smooth deposits. To achieve a total fired print thickness of 200 µm, 2 layers printed with a 165 mesh and 4 layers printed with a 105 mesh are recommended. Each layer should be printed, dried and fired separately. It is also recommended to slightly reduce the dimensions of the overprinted layers to maintain the surface flatness.

### PASTE DATA

**Rheology:** Thixotropic, screen-printable paste

**Viscosity:**  
(Brookfield RVT, 10rpm,  
ABZ Spindle, 25.5 ± 0.5 °C) 80 ± 15 Pa.s

**Bonding Mechanism:** Mixed-bonded

**Shelf Life (20 - 25 °C):** 6 months

### PROCESSING

**Screen Mesh, Emulsion:** 80 - 200 S/S, 0 µm

**Levelling Time (at 20°C):** 5 - 10 min

**Drying Time (at 125°C):** 10 - 15 min

**Firing Temperature Range:** 850 - 930°C in air  
**Time at peak:** 10 min

**Total Firing Cycle:** 1 hour

**Substrate for Calibration:** 96% alumina

**Thinner:** ESL 401

ESL Europe 9912-K Thick Print 1107-C

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

<b>Fired Thickness:</b> (using 6 layers - 2x 165 screen mesh & 4x 105 screen mesh)		200 ± 10 µm
<b>Approximate Coverage:</b>		5 cm <sup>2</sup> /g
<b>Resistivity:</b> (measured at 200 µm thickness)		<0.15 mΩ/□
<b>Solder Wettability:</b> (RMA Flux, 5 sec. dip, 95.5Sn/3.8Ag/0.7Cu at 250°C)	96% alumina	100 %
<b>Adhesion:</b> (90° pull, 2 mm x 2 mm pads, 62Sn/36Pb/2Ag)		
	Initial pull strength: (on most ceramic substrates)	> 7.0 kg
	Aged 48 hours at 150°C:	> 6.0 kg
<b>Ultrasonic Al Wire Bond:</b> (250 µm wire; bond length 4 mm)		> 600 g
<b>Aged Al Wire Bond:</b> (48 hour at 150°C)		> 600 g

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\*None of the six substances referred to in the RoHS Directive (2002/95/EC) are used in the formulation of this product.

**CAUTION:** Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapours emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate MSDS sheet.

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