

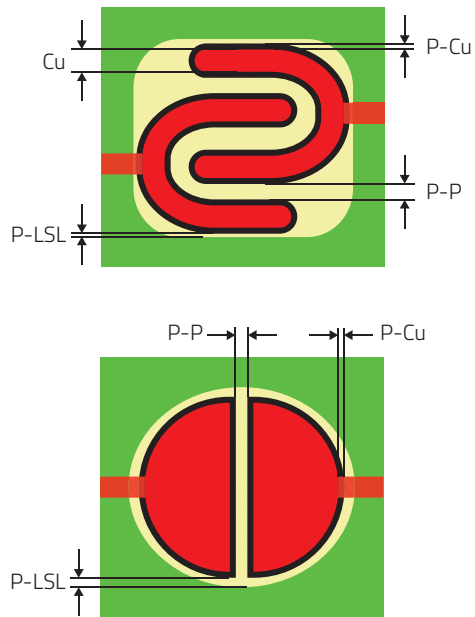
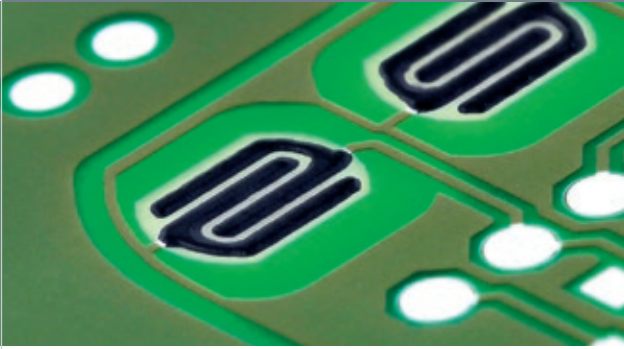


PRINTED POLYMER DESIGN GUIDE

EN

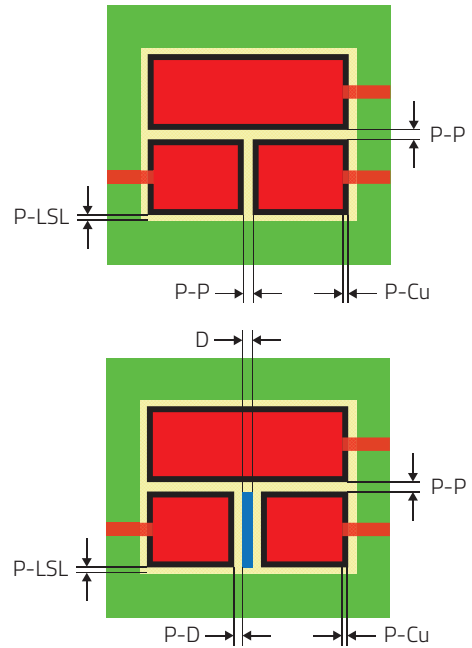
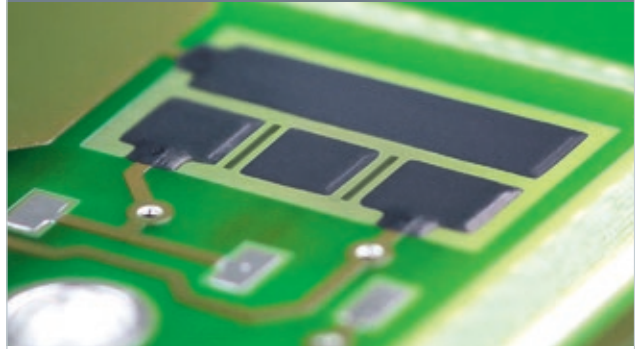
WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

Keypads



Copper width	Cu	$\geq 0.20 \text{ mm}$
Overlap polymer to copper	P-Cu	$\geq 0.15 \text{ mm}$
Distance to other electrical potential	P-P	$\geq 0.50 \text{ mm}$
Solder mask clearance	P-LSL	$\geq 0.25 \text{ mm}$
Copper thickness (total)		$\leq 50 \mu\text{m}$
Contact resistance		$\leq 20 \Omega$

Switches

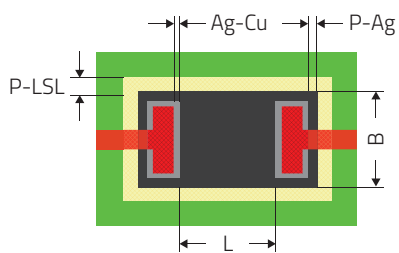
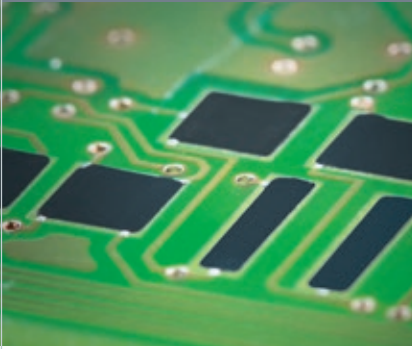


Overlap polymer to copper	P-Cu	$\geq 0.15 \text{ mm}$
Distance to other electrical potential	P-P	$\geq 0.5 \text{ mm}$
Solder mask clearance	P-LSL	$\geq 0.25 \text{ mm}$
Distance between carbon and dielectric	P-D	$\geq 0.15 \text{ mm}$
Dielectric width	D	$\geq 0.3 \text{ mm}$
Copper thickness (total)		$\leq 50 \mu\text{m}$
Contact resistance		$\leq 20 \Omega$

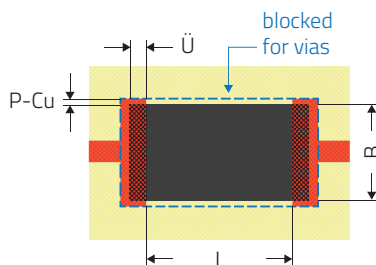
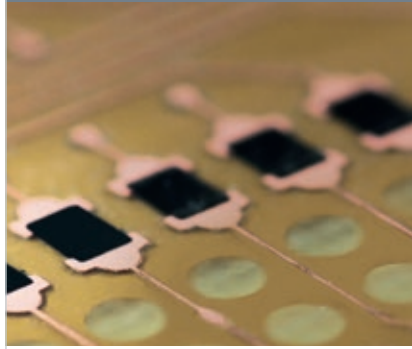
Basics

- The print is used as a passivation of the copper to prevent from oxidization and to achieve a constant contact resistance during the lifetime.
- The contact resistance is influenced by the contact material and the contact pressure and is normally $< 20 \Omega$.
- Two areas with a different electrical potential are shorted by conductive rubber mats or metal contact springs.
- Switches are used with sliding contacts; two contact areas of different electrical potentials are shorted by the slider.

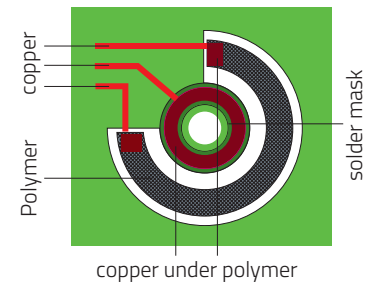
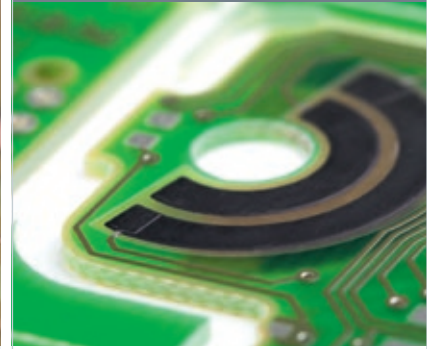
Resistors Outer Layers



Resistors Inner Layers



Potentiometer

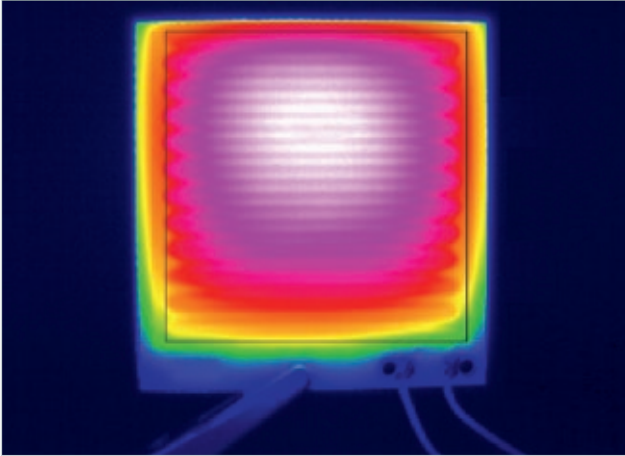


Resistor length	L	≥ 2 mm
Resistor width	B	≥ 1.5 mm
Overlap silver to copper	Ag-Cu	≥ 0.25 mm
Overlap resistor to silver	P-Ag	≥ 0.15 mm
Solder mask clearance	P-LSL	≥ 0.25 mm
Overlap polymer to copper	Ü	0.20 mm
Overlap copper to polymer	P-Cu	≥ 0.15 mm
Copper thickness (total)		≤ 50 µm
Distance to other electrical potential		≥ 0.5 mm
Resistor values, typical		100 Ω – 750 kΩ*
Resistor tolerance		+/- 30 %**
Dissipation at environmental temperature: ≤ 40 °C		≤ 50 mW/mm ²

Basics

- Printed resistors are built by printing a polymer ink with a specific conductivity between to copper pads.
- The thickness of the resistors is 20 µm in standard.
- * Resistance values outside the typical values can also be implemented in agreement.
- ** With an adjustment of the resistors by laser trimming a lower tolerance can be reached.

Heating Resistor



Surface Finishing

Application	HAL	HAL lead-free	ENIG	Immersion Tin
Keypad	■	■	■	–
Switches	■	■	■	–
Resistor on outer layer	■	■	■	–
Resistor on inner layer	■	■	■	■
Potentiometer	–	–	■	–
Heating resistor on outer layer	–	–	■	–
Heating resistor on inner layer	■	■	■	■
Contact plug	■	■	■	–
Shielding print	–	–	■	–



Non-standard layout configuration can be checked for feasibility by our product management. Feasibility is possible in many cases. Contact us!