

## Overview Surface Finishing



Short description	ENIG	ENEPIG	EPIG	DIG	Galv. Ni/Hartgold	Galv. Ni/Softgold	HAL lead free	HAL bleihaltig	iAg	iSn	OSP
<b>Description</b>	Electroless nickel immersion gold	Electroless nickel electroless palladium immersion gold	Electroless Palladium / Immersion Gold	Direct Immersion Gold	Electroplated nickel / hard gold	Electroplated nickel / soft gold	Hot Air Leveling lead free	Hot Air Leveling lead containing	Immersion silver	Immersion tin	Organic solderability Preservative
<b>Technology</b>	Reductive nickel / immersion gold	Reductive nickel / reductive palladium / immersion gold	Reductive palladium / partially reductive gold	Semi-reductive gold	Electrolytic nickel / gold	Electrolytic nickel / gold	dipping into a bath of liquid tin	dipping into a bath of liquid tin containing lead	Immersion silver	Immersion tin	coating selectively bond to copper
<b>Remarks</b>	Phosphorous nickel	Phosphorous nickel and palladium; using semi-reductive Au-deposition, higher Au-thickness is possible	nickel-free; thin layer of palladium and gold	Gold deposition directly on copper, nickel-free surface	cobalt- or iron-doped Gold; hardness Ni: 400-450HV; hardness Au: 140-170HV	Fine gold; suitable for bonding and soldering applications; hardness Ni: 400-450HV, hardness Au: 80-110HV	also known as HASL; RoHS compliant	also known as HASL; NOT-compliant according to RoHS			
<b>Layer and thickness</b>	Ni 4-7µm Au 0.05-0.125µm	Ni 4-7µm Pd 0.1-0.3µm Au 0.03-0.3µm	Pd 0.1-0.3µm Au 0.1-0.3µm	Au 0.1-0.3µm	Ni >4µm Au 0.8-3µm	Ni >4µm Au 0.2-0.5µm	SnCuNi-Leg. 1-50µm	SnPb-Leg. 1-50µm	Ag 0.2-0.4µm	Sn 0.8-1.3µm	Coating 0.2-0.6µm
<b>Soldering</b>	+	○	++	++	○	+	+	++	++	++	+
<b>Multiple solderability</b>	3x	3x	3x	3x	no	no	3x	3x	3x	3x	1-2x
<b>Bonding: aluminium wire</b>	++	++	++	++	--	+	--	--	+	--	--
<b>Bonding: gold wire</b>	-	++	++	++	--	++	--	--	--	--	--
<b>Fine Pitch (pad-to-pad spacing &lt;75µm)</b>	○	○	++	++	-	-	-	-	++	++	++
<b>High frequency application</b>	○	○	++	++	○	○	○	○	++	○	+
<b>Pressfit</b>	○	○	+	+	○	○	++	++	○	++	--
<b>Key Press</b>	+	++	++	-	++	++	--	--	--	--	○
<b>Corrosion resistance</b>	○	+	+	○	++	++	++	++	○	++	-
<b>Shelf life</b>	12	12	12	3 - 6	12	12	12	12	6	6	6
<b>Refreshable</b>	no	no	no	no	no	no	yes	yes	no	yes	yes

Legende:

++	+	○	-	--
recommended	suitable	limited suitability	not recommended	unsuitable