

Surface Finish Comparison

Finish	Type	Description	Process	RoHS	Thickness range	Pro	Con
HASL	Tin/Lead	Conventional Sn/Pb 63-37	Vertical/ Batchwise	No	100-800 uin	Low Cost Reworkable Most commom process	Uneven surface No for key contacts Solder bridging Cause plugged vias
	Lead free	99.2%Sn,0.7%Cu,0.03%Ni	Vertical/ Batchwise	Yes	100-800 uin	Low Cost Reworkable Very high reliability	Uneven surface No for key contacts Solder bridging Cause plugged vias
Immersion Silver	Immersion Silver	Silver deposit on exposed copper	Horizontal/ Continuous	Yes	6-18 uin	Low Cost Ideal for PTH Flat surface Durable for key contacts Reworkable	Sensitive to finger print Sensitive to the environment Tarnishing with sulphur containing substance
OSP	OSP	Anti-tarish in form of a bonding on copper surface	Horizontal/ Continuous	Yes	Not applicable	Simple Process Flat surface Reworkable	Sensitive to temperature during storage Cannot measure coating thickness Exposed copper after thermal treatment Not common for PTH process
Gold	ENIG	No electric current; chemical displacement reaction and deposit in metal surface	Vertical/ Batchwise	Yes	Ni: 100-200 uin Au: 1-4 uin	Flat surface Good for key contacts Suitable for PTH	Expensive Sensitive to humidity Solderability sensitive to gold thickness
	Electro-plated	Plated with electric current with relatively rigid packing of particles	Vertical/ Batchwise	Yes	Ni: 100-200 uin Au: 1-3 uin	Long shelf life Simple Process Durable surface	Very Expensive Difficult to control surface evenness Side edge copper leave uncovered