

Technical Note

Micron® Wire-Bonding Techniques

Overview

Bond-pads on Micron die may be either nickel-palladium (NiPd) or aluminum (Al), depending on product. This technical note provides guidance on wire bonding techniques for both types of bond pads.

Manufacturing Guidelines

Conventional wire-bonding equipment and techniques can be used with Ni-Pd and Al bond pads. While the bonding process is similar for the two pad types, Micron recommends different ultrasonic generator (USG) and force parameters, as shown in Table 1.

Table 1: Example of Bonding Parameters

Parameter	Ni-Pd	Al	Unit
Wire type	Au	Au	
Platform	K&S	K&S	
Tip offset	5	5	mils
C/V	0.3	0.3	mils/ms
USG profile	Burst	Square or ramp	
USG current	130	90	mA
USG time	10	7	ms
Force	8	20	g
USG pre-bleed	10-25	0-10	%

Wire size and ball diameter should be selected so the ball-bond remains entirely within the area of the bond pad.

For any wire-bond interconnect system, the quality of the bond pad surface is key to achieving an acceptable non-stick-on-pad (NSOP) rate. Even small amounts of bond pad contamination can significantly impair the bonding process. To maintain bond pad integrity and to remove upstream assembly process contamination, Micron recommends a direct argon (Ar) gas flow without oxygen (O₂) be used; and whenever possible, only bond once on a given pad.

Studies indicate that an Ar plasma with O₂ can cause bonding surfaces to oxidize, so O₂ use is not recommended. Studies also indicate that prolonged exposure to plasma is unnecessary, and may even be detrimental due to redepositing of metals and organic material inside the plasma chamber. Micron recommends an Ar plasma preclean for 30 seconds or less (see Table 2).

Table 2: Example of Plasma Clean Parameters

Parameter	FBGA	TSOP	Unit
Power	550	550	W
Time	30	30	s
Pressure	160	160	mTorr
Gas: Ar (O ₂ is not recommended)	40	40	sccm

Conclusion

Micron's NiPd or Al bond pads can be bonded with conventional wire bond equipment and techniques, but the process should be optimized to account for bond pad metallization and size.

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Revision History

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<ul style="list-style-type: none">• Initial release.	