Esec Programmable Ultrasonic Module (PUM)

Superior Process, Drastically Reduced Tooling Costs

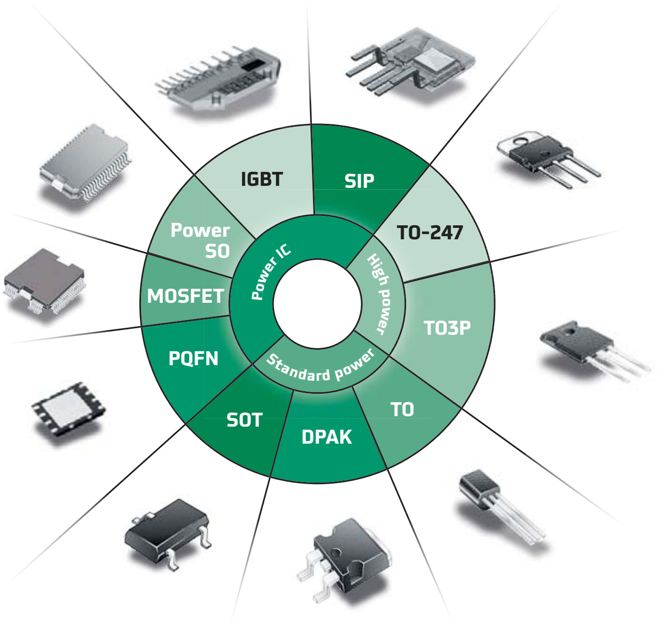
The dimensions of the solder pattern are crucial for good process quality. Good control of bond line thickness (BLT) and solder distribution, minimum die to pad and die to die distance are difficult to achieve. Besides that, some new Zn based high temperature Pb-free solder materials are more difficult to dispense properly due to their wetting behavior.

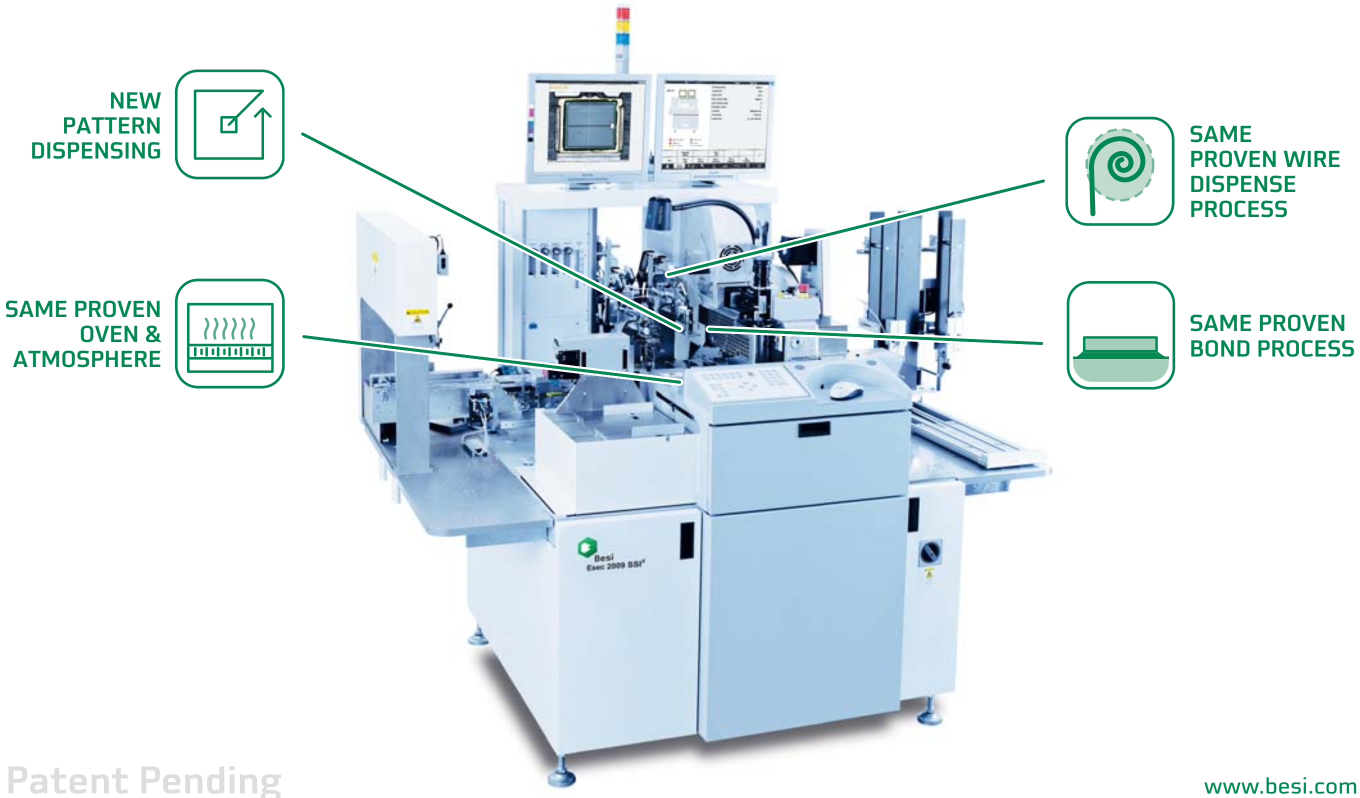
The new Programmable Ultrasonic Module (PUM) meets these challenges, combining solder pattern writing with enhanced wetting by applying ultrasonic energy to the liquid solder. While the amount of solder is precisely controlled with the dual wire dispenser, the geometry of the final solder pattern is the result of a writing movement of the ultrasonic transducer tip. Both are part of the product recipe, making the solder pattern easily reproducible.

Advantages in Your Production

- Solder pattern size and target BLT adjusted without tool change
- Full pad coverage, no geometrical limitations
- Superior wetting with US power
- Small and well distributed voids
- Upgradeable on Esec 2009 SSI^{E} and Esec 2009 fS^{E}

Future Proof Equipment





Patent Pending

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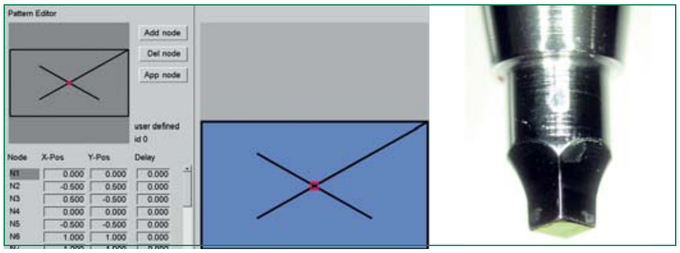
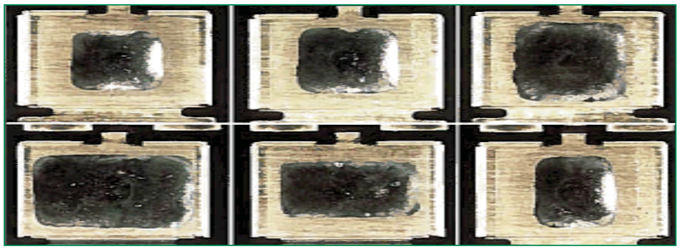


Node	X-Pos	Y-Pos	Delay
N1	0.000	0.000	0.000
N2	-0.500	0.500	0.000
N3	0.500	-0.500	0.000
N4	0.000	0.000	0.000
N5	-0.500	-0.500	0.000
N6	1.000	1.000	0.000

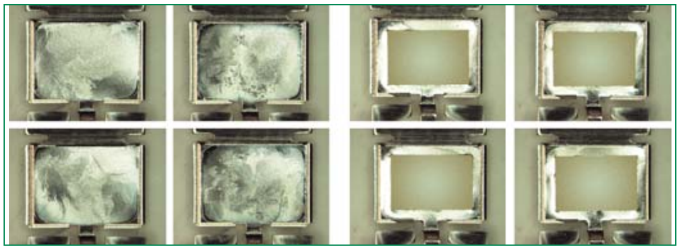
Pattern Definition

- Programmable pattern geometry with versatile pattern editor
- Predefined patterns available
- One transducer tip size for a wide range of chip dimensions



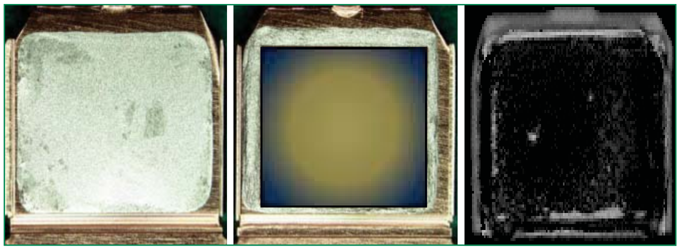
Solder Dispersing

- Precisely dispersing the solder to the perimeter of the pad
- BLT is mainly controlled by amount of wire dispensed
- Samples shown were made with same transducer tip
- Example: PbSn2Ag2.5 on bare Cu DPAK TO251



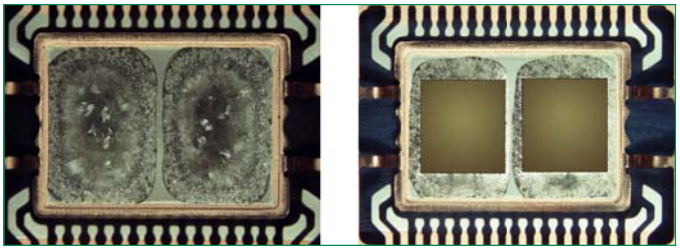
Pb-free Solder

- Die size 3.88 x 2.52 mm
- Works for all common Pb-free solders
- Example: SnSb5Ni0.6P0.05 on Ni DPAK TO251



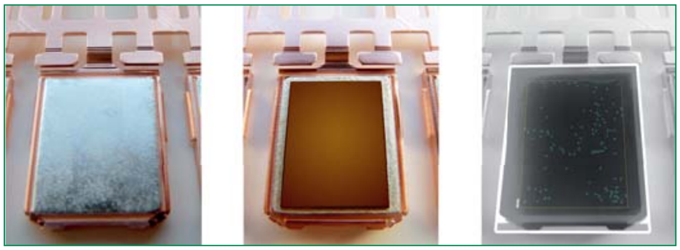
Hi-temp Pb-free Zn Solder

- Die size 6.90 x 4.95 mm
- TO250
- Typical void rate 1% (single void < 0.3%)



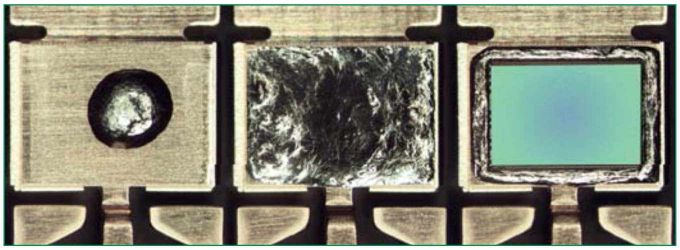
Pb Solder, Dual Die

- Die size 2.75 x 3.13 mm
- Solder to solder clearance ≤ 0.25 mm
- Works for all common Pb-based solders
- Example: PbSn1Ag1.5 on Ag PSSO 36L



Large Die Application

- Up to 10.5 x 13.5 mm die size
- Nicely dispersed voids < 5% (single void < 0.5%)
- Example: J-Alloy on Cu TO247 3L



Indium Solder

- Die size 3.86 x 2.77 mm
- Typical void rate 4% (single void < 0.3%)
- Example: PbIn5Ag5 on Cu DPAK TO251