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IN-DEPTH STUDY AND CHARACTERIZATION OF INSULATED CU WIRE BALL BONDING

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Abstract: The increasing market demand for higher pin counts and more chips functionality poses challenges in conventional wire bonding process. The novel insulated Cu wire technology offer potential solution for fine and ultra fine pitch wire bonding as the insulator coating on the bare wire prevents wires shorting problem. Most previous studies focused on insulated Au ball bonding. This paper presents in-depth process characterization study on 0.8 mil insulated Cu wire ball bonding on thermally enhanced BGA package with 29 x 29 mm body size via existing available wire bonder to understand the Free Air Ball (FAB) and ball formation characteristics. The study shows that insulated Cu bonding demonstrated comparable performances to bare Cu wire bonding at T0 and after subjected to isothermal aging 175 ºC up to 1008 hours. The effect of Electric Flame Off (EFO) setting and ball bonding key responses (ball shear, wire pull, intermetallic formation, Al splash and Al remnant) are presented in this paper.