

EFFECT OF ULTRASONIC ENERGY AND FORCE ON INTERMETALLIC GROWTH PATTERNS FOR 2N GOLD WIRE

A. Jalar and M. F. Rosle

Advanced Semiconductor Packaging (ASPAC) Research Laboratory

Universiti Kebangsaan Malaysia

43600 UKM Bangi, Selangor, Malaysia

ABSTRACT

Intermetallic formation between gold wire and Al pad is well documented to represent mechanical strength of ballbond. Bonding achieved when these two metals come into intimate contact between each other by interactions of ultrasonic energy, force, temperature and time. Under elevated temperature and time, theoretically the intermetallic phase can thicken and growth due reactive diffusion activated by temperature. This paper presents effects on ultrasonic energy and force to the intermetallic growth patterns for gold wire with 99% composition of Au. Samples were prepared by different variables of ultrasonic energy and force with constants bonding temperature at 240°C. Investigation was carried out by baking the samples in the high thermal storage (HTS) chamber at 175 °C. Measurements for ballbond mechanical strength and observations on intermetallic growth patterns were carried out using ball shear and ball pull tester, optical microscope and scanning electron microscope (SEM). The results showed that, variables of ultrasonic energy and force at elevated time of HTS play significant influence to the intermetallic growth patterns and bonding strength.

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