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For a successful space program : Quality and Safety! (1)

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RESEARCH ON MECHANICAL ENVIRONMENT ADAPTABILITY OF HIGH RELIABILITY  
BONDING SYSTEM FOR SPACECRAFT COMPONENTS

**Abstract**

With the development of electronic components for spacecraft towards high integration, as one of the main packaging forms of high-density packaging, the number of bonding wires inside lead bonded electronic components is increasing and the bonding distance is getting shorter. In the process of rocket ignition, inter-stage separation, satellite re-entry, etc., the spacecraft will produce a high intensity continuous mechanical impact due to the impact of aerodynamic forces. This causes the risk of bonding wires breakage, short circuit, etc. Typical failure cases of reliability problems in recent years due to random vibration in aerospace applications were analyzed in this paper, such as bonding wire breakage and bonding wire short circuit. Typical mechanical shock environments and the mechanism of common failure of bonding wires were summarized. The requirements of bonding wire length, wire diameter and bonding process parameters in relevant domestic and international standards were studied, Finally, recommendations are given for the application of bonding wires in mechanical shock environments for high-density packaging components for spacecraft.