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Accelerated Testing of Lead-Free Solder Joints

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Abstract
In order to diminish the test duration, accelerated tests, in harsher conditions than the real life, were designed: (i) Thermal cycling at -55°C / +125°C / 30 minutes at each step and (ii) Cycling damp heat at -40°C / 85°C and 85%RH. The tests were employed for studying the reliability of lead-free SnAgCu solder joints on test structures achieved for three variants of PCB surface finishing: Copper, Gold and HASL (Hot Air Solder Levelling), in an industrial process and for research conditions, respectively. It seems for both industrial process and research conditions the HASL variant ensures the best reliability.

Keywords: lead free, solder joints, reliability, accelerated tests, failure mechanisms

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