JEDEC STANDARD

Mechanical Shock – Device and Subassembly

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TEST METHOD B110B.01
MECHANICAL SHOCK –DEVICE AND SUBASSEMBLY

(From JEDEC Board Ballot JCB-13-27, formulated under the cognizance of the JC-14.1 Subcommittee on Reliability Test Methods for Packaged Devices.)

1 Scope

Device and Subassembly Mechanical Shock Test Method is intended to evaluate devices in the free state and assembled to printed wiring boards for use in electrical equipment. The method is intended to determine the compatibility of devices and subassemblies to withstand moderately severe shocks. The use of subassemblies is a means to test devices in usage conditions as assembled to printed wiring boards. Mechanical Shock due to suddenly applied forces, or abrupt change in motion produced by handling, transportation or field operation may disturb operating characteristics, particularly if the shock pulses are repetitive. This is a destructive test intended for device qualification.

2 Apparatus

The shock-testing apparatus shall be capable of providing shock pulses with a peak acceleration of up to 2900 multiples of gravity (g), a velocity change of 100 to 544 centimeters per second (39 to 214 inches per second), and a pulse duration between 0.3 and 8.0 milliseconds to the body of the device. For free-state testing, a velocity change of 125 to 544 centimeters per second (49 to 214 inches per second), and a pulse duration between 0.3 and 2.0 milliseconds is sufficient. Conversely, for mounted-state testing, apparatus capable of a velocity change of 100 to 544 centimeters per second (39 to 214 inches per second), and a pulse duration between 5.0 and 8.0 milliseconds to the body of the device is sufficient.

The acceleration pulse shall be a half-sine waveform with an allowable deviation from specified peak acceleration not greater than ±10%. The test velocity change shall be ±10% of the specified level. The pulse duration shall be measured between the points at 10% of the peak acceleration during rise time and 10% of the peak acceleration during decay time. Absolute tolerances of the pulse duration shall be ±15% of the specified duration. The test equipment transducer shall have a natural frequency greater than 5 times the frequency of the shock pulse being established, and measured through a low-pass filter having a bandwidth greater than 5 times the frequency of the shock pulse being established. Filtering should not be used in lieu of good measurement setup and procedure practices.

Appropriate equipment calibration should be considered prior to any testing to ensure conformance to the specified targets and acceptable tolerances. Reserving a set of known good units is recommended for pre-test calibration exercise whenever new samples are to be tested. If calibration tests are conducted regularly, then following periodical preventive maintenance should suffice for the equipment to meet the target and tolerance limits.