

JEDEC STANDARD

Highly Accelerated Temperature and Humidity Stress Test (HAST)

JESD22-A110E

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JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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TEST METHOD A110E

HIGHLY-ACCELERATED TEMPERATURE AND HUMIDITY STRESS TEST (HAST)

(From JEDEC Board Ballot JCB-15-24, formulated under the cognizance of JC-14.1 Committee on Reliability Test Methods for Packaged Devices.)

1 Scope

The Highly-Accelerated Temperature and Humidity Stress Test is performed for the purpose of evaluating the reliability of non-hermetic packaged solid-state devices in humid environments. It employs severe conditions of temperature, humidity, and bias which accelerate the penetration of moisture through the external protective material (encapsulant or seal) or along the interface between the external protective material and the metallic conductors which pass through it. The stress usually activates the same failure mechanisms as the “85/85” Steady-State Humidity Life Test (JEDEC Standard No. 22-A101).

2 Apparatus

The test requires a pressure chamber capable of maintaining a specified temperature and relative humidity continuously, while providing electrical connections to the devices under test in a specified biasing configuration.

2.1 Controlled conditions

The chamber must be capable of providing controlled conditions of pressure, temperature and relative humidity during ramp-up to, and ramp-down from the specified test conditions. Calibration records shall verify that the equipment avoids condensation on devices under test (DUTs) hotter than 50 °C during ramp-up and ramp-down for conditions of maximum thermal mass loading and minimum (zero) DUT power dissipation. Calibration records shall verify that, for steady state conditions and maximum thermal mass loading, test conditions are maintained within the tolerances specified in 3.1.

2.2 Temperature profile

A permanent record of the temperature profile for each test cycle is recommended, so that the validity of the stress can be verified.

2.3 Devices under stress

Devices under stress must be physically located to minimize temperature gradients. Devices under stress shall be no closer than 3 cm from internal chamber surfaces, and must not be subjected to direct radiant heat from heaters. Boards on which devices are mounted should be oriented to minimize interference with vapor circulation.