

CIRCUIT BOARD ASSEMBLY TORSION TESTER AND METHOD

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ABSTRACT

A mechanical deflection system (MDS) includes a torsion tester for circuit boards which imposes controlled repeatable sheer stress to a test board and components mounted thereon by cyclicly twisting the board about a center line. A self centering twisting clamp holds one edge of the board and a rotating clamp connected to a backlash free motor and servo mechanism, holds the opposite edge with a limited clamping force. A computer regulates the motor to apply either a specified maximum twist angle or maximum torque, and receives signals from an optical meter which measures the angle, and from a load cell which measures the torque. The computer is connected to detect failures by measuring the electrical resistance of critical joints during testing and it records the location and number of cycles for each failure. The MDS includes a test method which continues until a large number of fatigue failures have occurred, then the locations and cycles till failure are compared to the data for a similar circuit board produced by a base attachment process. For attachment process development another process is the base, and for attachment process quality monitoring the same process at earlier times is the base. Then the reliability of the circuit board and/or production process is statistically determined.

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