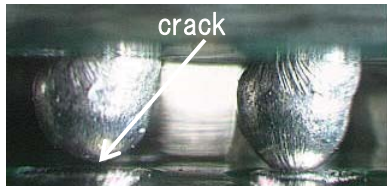


(a) Assembled printed circuit boards



(b) Open defect occurring in soldering process

Fig.1 Targeted defects

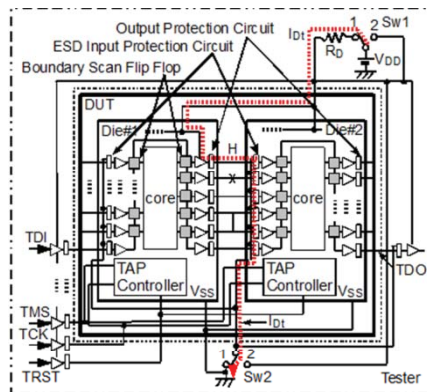


Fig.2 Electrical test of assembled PCB

### Content:

BGA ICs have been often used for realizing electric circuits of smaller size. The ICs are soldered on a fine pitched PCB. Open defects may occur at interconnects between the ICs and the PCB in the soldering process. An example of the defects is shown in Fig.1. The interconnects are impossible to be observed by visual inspection. Also, logic signals of the interconnects can not be measured with a test probe. Thus, IEEE 1149.1 test circuit has been implemented inside the ICs.

However, open defects may not be detected, even if the circuit is implemented inside an IC. Also, it is difficult to generate test input vectors for detecting open defects and locating defective interconnects. Thus, we are developing electrical test methods and DfT(Design-for-Testability) methods for open defects in the interconnects.

One of our test methods is shown in Fig.2. Our methods are based on supply current that is made flow in our tests. Soft open defects that generate only additional delay time can be detected and the defective interconnects can be located together with hard open defects that generate logical errors with our test methods.

Keywords : electrical test, printed circuit board, soldering error , open defect

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