Plan for Hybrid/Module electrical tests

(Skeleton, draft, ...)

There are 3 steps for electrical tests of hybrid/module:

A. For each fabrication process, possible damages brought by the process is need to be tested

B. Burn-in tests in order to screen out initial failures and to eliminate marginal products. However, a very important thing is not to over-stress the products and not to shorten the life time.

C. Specimen test in order to ensure the reliability of the products over an extended time period

Test results will be logged into datasheet/data file and finally into the database.

Before shipping:

1. For Cu/Polyimide Flex circuits, to be done in the vendor

1-1) electrical continuity and neighbour short of all lines

1-2) electrical resistivity of bus lines (under negotiation)

2. For Cu/Polyimide/Carbon-bridge hybrids

Process: silver-epoxy adhesion between flex and Carbon-bridge

Aim: check of the silver-epoxy adhesion process

2-1) Resistance of ground plane reinforced by Carbon-bridge is measured with a few milli-ohm sensitivity

3. For passive-component-stuffed hybrids

Process: soldering passive component parts and washing flux

Aim: Damage in the components and circuit

(All test should be carried on less than 80 degree C, the glass-transition temperature of he silver-epoxy adhesive.)

3-1) Resistance measurement of resisters, and thermistors

3-2) Total capacitance measurement of Vcc-ground, Vdd-ground and HV-ground

3-3) Leakage current measurement of HV at 500V

3-4) Burn-in test of 24 hours at 40 degree, repeat tests from 3-1) to 3-3).

3-5) Neighbour short of all lines

3-6) For specimens, Burn-in test of 352 hours at 60 degree, repeat test sfrom 3-1) to 3-4)

After reception:

4. After reception of the passive-component-stuffed hybrids,

4-1) the cluster repeats tests of 2-1) and from 3-1) to 3-3)

We don’t think that electrical continuity and neighbour short of lines changes in shipping. We also think the silver-epoxy adhesion is not damaged, however, independent measurements for the ground plane resistance would be desirable.

5. For ASIC-stuffed hybrid

Process: silver-epoxy adhesion between flex and ASIC, wire bonding between flex and ASIC

Aim: check damage in ASICs and hybrid

5-1) Icc, Idd measurement: avery quick test to find out trivial failures.

5-2) Check all wire bonding between flex and ASIC with DAQ diagnostic tests

5-3) Check all functionality of ASICwith DAQ diagnostic tests

5-4) Burn-in test of 24 hours at 20 degree, with turning on the electricity. After burn-in, repeat from 5-1) to 5-3).

6. For Complete Module

Process: epoxy adhesion between ASIC-stuffed hybrid and sensor: , wire-bonding between flex and pitch-adaptor, wire-bonding between pitch-adaptor and sensor, wire-bonding between sensors

Aim: check damage in sensors and hybrid, proper functioning of module

6-1) I-V of sensors

6-2) Electrical scans with DAQ at the bias voltage of 150V

Noise values of channels would tell the proper connection of the input: 12 cm load, disconnected (0 cm), neighbour-shorted (~40% increase of noise over 12 cm), etc.

6-3) Burn-in test of 24 hours at -10 degree C, with turning on the electricity. After the burn-in, repeat tests from 6-1) to 6-2).

6-4) Laser scan: more direct strip response and higher sensitivity than the noise scan, neighbour-short (response in two neighbour strips), Implant/metal strip break (no response over the break), etc.