Hybrid QA status

*Japanese SCT group*

1. Production status
2. Inspection flow
3. Results
   i) Mechanical tests
   ii) Electrical tests (I)
   iii) Electrical tests (II)
4. Conclusions
### Hybrid pre-series Production Status

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33 hybrids have been registered on the database.
Hybrid Inspection Flow

1. Flex circuit
   Visual inspection
   Integrity test
2. Carbon-Bridge Hybrid
   Visual inspection
   Mechanical tests
3. Passive-component-stuffed Hybrid
   Visual inspection
4. Hybrid with Pitch adapter
   Visual inspection
   Electrical tests
5. Temperature cycle
   -30 <-> 60 °C transition 30 min.
   5 cycles hold 30 min.
   Visual inspection
   Mechanical tests
   Electrical tests
6. Barcode and Data sheet entry
Mechanical tests

Thickness measurement
  Micrometer

Flatness measurement
  3D vision Measuring Machine
    (Mitsutoyo QUICK VISION PRO)

  bow (long)  < 75 µm
  bow (cross) < 50 µm
Electrical test (I)

Check for Soldering
C-measurement for from Ground to Vcc and Vdd
\[ C_{cc} = C_{dd} = 0.22 \mu F \times 14 + 0.33 \mu F \times 4 = 4.4 \mu F \]
\[ C_{cc} = C_{dd} = 0.1 \mu F \times 14 + 0.33 \mu F \times 4 = 2.72 \mu F \]
C1-28 (0.22 \mu F or 0.1 \mu F), C51-58 (0.33 \mu F)
R-measurement for four 100Ω termination resistances
R27, 28, 29, 30 (100Ω)
R-measurement for two thermistors
TM1, 2 (10KΩ at 25°C)
Impedance measurement for HV filter network
R33, 34 (5.1KΩ), 35 (1KΩ), 36 (0Ω)
C71, 72, 73, 74, 75 (10nF)

\[ \begin{array}{c}
5.1K\Omega \\
\uparrow \\
\downarrow \\
1K\Omega \\
\uparrow \\
\downarrow \\
6.1K\Omega \\
\uparrow \\
\downarrow \\
1K\Omega
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5.1K\Omega \\
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\downarrow \\
10nF \\
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0\Omega
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10nF \times 4
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33, 10, 6.7K\Omega \\
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1K\Omega
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\downarrow \\
0\Omega
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High f : f = 100KHz \\
f = 0.1, 1, 10KHz
Electrical test (II)

Check for Adhesion process of Carbon Bridge and Flex
R-measurement between two IC die pads
U1-U6  \(< 4\text{mΩ}\\
U7-U12 \(< 4\text{mΩ}
LV leakage check at 16V (for LV capacitor)  \(< 10\text{nA}\\
\text{Ground - Vcc}\\
\text{Ground - Vdd}
HV leakage check at 500V (for HV capacitor)  \(< 10\text{nA}\\
\text{Ground - HV line}
Conclusions

- So far produced 37 hybrids

- Applied full QA inspection:
  
  31 passed all criteria.
  --> good quality

  3 failed "bow"criteria.
  1 had bad bonding pads.
  2 had some scratches.
  --> mechanical grade (6 in total)

- So far registered 33 in database, and then delivered to;
  
  UK (12 good and 4 mechanical)
  US (4 good and 2 mechanical)
  Nordic (4 good)
  (Total; 20 good and 6 mechanical)

- Accumulating statistics and also gaining experience