

FRAUNHOFER-INSTITUT FÜR SILIZIUMTECHNOLOGIE ISIT

# MODULE SERVICES: APPLICATION CENTER

MANUFACTURING OF ELECTRONIC ASSEMBLIES, INNOVATIVE MANUFACTURING TECHNOLOGIES AND TECHNOLOGY TRANSFER





### Jetprint of solder paste deposits

3D-solder paste inspection

Resistors sized 01005 to 0402

# ISIT APPLICATION CENTER FOR MANUFACTURING OF ELECTRONIC ASSEMBLIES, IN

### **ISIT SMD-Line**

### Stencil printing, screen printing, jet printing, dispensing

- Application of solder pastes, solder flux, adhesives and underfill materials
- Automated and manual processes
- Pin-In-Paste-manufactuing, Pump-Print- and Step-printing processes
- Printing of glass frit paste on waferlevel
- Processing of 8"-wafers (incl. Taiko-geometry)

# Inspection of solder pastes (manually, automated 2D-, 3D), 3D-Inline SPI

 Closed-Loop high resolution 3D solder paste inspection system

### **SMD-Placement**

- Automatic, semi-automatic and manual SMD-placement
- Handling of Components sized
  0,2 x 0,4 mm<sup>2</sup> to > 40 mm edge length
- FlipChip-Mounting from wafflepack as well as from diced wafer

### **Reflow soldering**

- Convection reflow soldering under defined nitrogen and air atmosphere
- Multiple soldering processes by step soldering technology

### Cleaning

 Automated semi-aqueous cleaning of stencils, screens, misprinted PCBs, soldering frames and assembled PCBs

# Inspection, non-destructive and destructive quality control and evaluation of assemblies

- Assembly assessment according to industrial standards (e.g. IPC-A-610)
- Manual optical inspection by Ersascope, Stereo Magnifier, Microscope
- 2D- and 3D-X-ray inspection
- Scanning electron microscopy (SEM) and EDX material analysis
- Scanning acoustic microscopy (SAM)
- Topographic measurement by laser profilometer
- Electrical testing
- Mechanical testing
- Metallographic cross-section analysis
- Project related image documentation

### **ISIT Balling Center**

- Manufacturing of all current substrates and single components incl. Taikowafer up to 8"
- Chemical NiAu UBM on wafer level
- Printing of adhesive flux
- Solder Balling
- Finepitch-solder paste printing of discrete and integrated circuits on wafer level
- Powerballing
- Convection reflow soldering



THT-solder joint with fatigue crack

Training in the application center

Testwafer

# NOVATIVE MANUFACTURING TECHNOLOGIES AND TECHNOLOGY TRANSFER

### **ISIT Rework Center**

# Rework, repair and modification considering valid industrial standards

Manual and semi-automatic processes for manufacturing of THT- and SMD-components by infrared-, hot gas- and combined rework stations

- Standardized handling of components and assemblies
- System selection for an optimized soldering process
- Rework, repair and modification of complex assemblies
- Selective soldering for completion of assemblies
- Gentle rework and repair soldering processes for electronic assemblies
- Quality control by optical and X-ray inspection as well as cross-section analysis
- Process training
- SMD- and THT- repair services
- Video documentation

### **ISIT Testwafer and Substrates**

- 200 mm test wafers from silicon or glass for material screening, process development and machine demonstration
- Customized wafer designs as well as standard designs for typical applications
- Daisy Chain structures for automated measurement
- Glass wafers with precise alignment marks and Vernier structures for verification of placement accuracy
- Delivery as undiced wafers or diced wafers on tape
- Corresponding FR4 test substrates
- Measuring station for semi-automated measurement of daisy chain resistance and short detection

### **ISIT Workshops and In-House Offers**

Periodically offered theoretical and practical workshops for manufacturing, quality evaluation and reliability of electronic assemblies

#### **Controllable Manufacturing of Electronic Assemblies**

Manufacturing quality, failure analysis, processes optimization

### **Solder Paste Application**

Technologies, processes optimization, error prevention

#### **Temperature measurement techniques**

How to perform correct temperature measurements

### **Optimization of Reflow Profiles**

From heat flow in the soldering equipment to the optimized soldering profile

### **The Optimized Rework Process**

How to control the repair process safely

### **Customer and Application Specific Offers**

- Theoretical and practical customized In-House workshops
- Technology days
- Manual soldering



Cross section of a reflow loaded IC

### **ISIT Application Center Service Offers**

- Evaluation, assessment, optimization, testing, and implementation of (innovative) technologies for manufacturing of electronic assemblies
- Processing of rigid and flexible substrates
- Enhancement of processes and process techniques, manufacturing machines, tools and auxiliary materials
- Technical certification of manufacturing equipment
- Benchmark tests
- Lead-free and leaded SMD- processes
- Design for Manufacturing, approval of manufacturing specific design
- Qualification and optimization of soldering profiles for in-line, selective and repair soldering processes
- Generation of application notes (footprint design, recommendation of soldering profiles)
- Assembling and development of prototypes, functional samples and pre-series
- Delivery of 200mm test wafers from silicon or glass for material screening, process development and machine demonstration (undiced wafers or diced wafers on tape)
- Delivery of corresponding FR4 test substrates



Temperature profile measurement

- Neutral validation of manufacturing processes
- Assistance to implementation of novel products and manufacturing processes
- Technology and process transfer to customized manufacturing processes
- Support in the conversion of manufacturing processes
- Testing of manufacturing parameters for RoHS conformity
- Qualification of components and materials, e.g. soldering heat resistance
- Moisture Sensitivity Level (MSL)-tests according to J-STD-020
- Validation of soldering pastes considering valid industrial standards
- Assistance to evaluation of suppliers performance
- Audit assistance
- Employee training

Fraunhofer ISIT is participant of the





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