Webinar Wire Bonding 2016

Würth Elektronik Circuit Board Technology
Your Speaker

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At Würth Elektronik CBT since 2008

Product Manager Wire Bonding

Cooperation with B&F Bonding since 2010
Agenda

Wirebonding

Quality Control

Applications
Wirebonding Process

Bare Die Pickup

Bare Die Placement

Wirebonding (25µm Diameter)
Wirebonding
Design Rules

ENIG
- Au: 0.05 – 0.1 µm
- Ni: 4 – 7 µm
- Cu:

ENEPIG
- Au: 0.04 – 0.08 µm
- Pd: 0.1 – 0.2 µm
- Ni: 4 – 7 µm
- Cu:
Gold Wire Bonding

Source: B&F Bonding
Protection of Die and Wire Bonds

Substrate

Globtop

Lensholder

Substrate
Wirebonding
Advantages of „wirebonded“ components?

- Miniaturization
  - Package replacement
  - Space savings
  - High Precision Positioning

- Performance/Function
  - Thermal Management
  - Short signal paths (HF)

- Reliability
  - Wirebond Tester
  - Over 25 years Experience
  - WE know HOW
Advantages XYZTec Wirebond-Tester (since 02/2016)

- Automated Process
- Standardized Test Process
- Continuous Surface Quality Control
- Online Test
Agenda

Wirebonding

Quality Control

Applications
Applications
Internal Study: “WE LED”

- Replacement for E10 Socket
- PCB: Double Sided FR4, 2.4mm Core, Edge Plating
- Bare die is glued to the edge of the PCB, wire bonded and encapsulated
SMD LEDs

Advantages:

- Good availability
- Large range of various types and manufacturers available
- Tried and tested standard assembly process

But:

Thermal resistance
Junction layer → Solder pad 6.5 - 11 K/W
(Datasheet OSRAM Golden DRAGON Plus)

Decision made on thermal considerations:

Use of bare dies
(Thermal resistance casing eliminated)
Applications
LED High Power Module

- PCB production
- Thermal management
- Sourcing bare die LED diodes in small quantities
- Placement and wire bonding of the diodes
- Encapsulation and protection of the diodes
- System solution
Applications
LED High Power Module

How will the assembly and connection technology be realised

- Double sided PCB or multilayer with individual bare die assembled and wire bonded
- Individual heatsinks glued
- Miniaturisation through reduction of the overall height
- Optimized thermal management
- Adjustment of the projection angle
Referencen

Testboard
Applications

- 4-Layer Flex with bare die directly wire bonded on a copper heatsink 0.8 mm with ENIG-surface
- 2 Chips in Cavity
- AlSi-wire bonding

Source: UNI Heidelberg/CERN
Summary

High accuracy placement compared to SMD solder process

High accuracy placement of the bare die in following sectors:
- Optoelectronics (3D Camera Systems)
- Sensor Applications
- Medical Applications

Flexible design

Advantages of Wire Bonding
- Miniaturisation
- Very good electrical connection
- Good mechanical and thermal stability
Now it’s your turn!

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