

Optoi Capability

Silicon Sensors and Microsystems Microelectronic Packaging Production

PRODUCTS AND ACTIVITIES

Optoi can develop and produce custom and standard microelectronic devices. More than 15 years experience is based on silicon sensors and microsystems. The main products, technologies and activity lines are introduced in the annexed Optoi Company Profile. More information are constantly updated in the company web site: www.optoi.com

DESIGN FOR MICROELECTRONICS

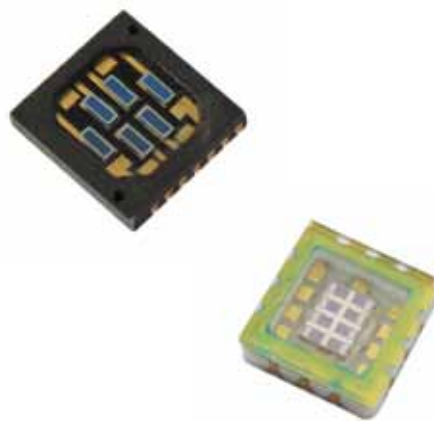
- Silicon sensors and microsystems design based on planar and/or MEMS technology
- Microelectronic package design based on plastic, metallic, ceramic and composites materials
- COB PCB design from single to multi-layers boards
- Design output formats: .dwg, .dxf, .pcbdoc



MATERIALS FOR PACKAGES

As far as the microsystems and microelectronic package materials are concerned, Optoi is working from more than 18 years, based on internal know-how, on the main materials used in Microelectronics, such as:

- Semiconductors (wafers and die: Silicon, EPI, SOI, Gallium Arsenide, Germanium, etc.)
- Plastics (epoxy resins, silicone resins, polyurethane, etc.)
- Metals (kovar, aluminum, stainless steel, etc.)
- Ceramics (White Alumina, Glass, Quartz, Zirconia, Black Alumina, etc.)
- Composites (glass fiber reinforced G200, FR4, Kapton, Polyamide, Teflon, etc.)



PACKAGES FOR MICROELECTRONICS

As far as the microsystems and microelectronic packages are concerned, Optoi is competitive and well focused to design and to produce custom packages, but it is currently working on several standard solutions. The main package solutions are listed in the followings:

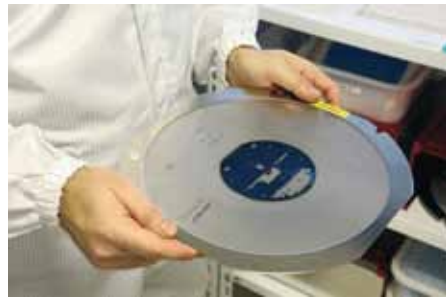
- Plastic SMD packages (Surface Mount Device)
- Metal Can packages (ex. TO-18, TO-46, TO-5, TO-8, etc.)
- Ceramic packages (DIL, CLCC, LTCC, etc.)
- COB (Chip On Board)
- CSP (Chip Scale Package)
- POP (Precision Optical Package)
- MCM (Multi Chip Module)
- Stack 3D (Module with 3D Stacked Multi Chip)
- Microsystems (for sensors and/or actuators and/or microelectronics and/or other integrated functions)



MICROELECTRONIC PACKAGING CLEANROOM

- 75 m² ISO6 cleanliness cleanroom class
- ISO7 gowning room class
- 20.000 m³/h Heating, Ventilation and Air Conditioning Systems (HVAC) with 100 air changes per hour
- 17 HEPA H14 ceiling filter/fan units (FFU's)
- Vertical flow cleanroom architecture type
- Humidity and temperature control





MICROELECTRONIC PACKAGING PRODUCTION TECHNOLOGY

- **DIE BONDING** (accurate die positioning and bonding onto the package)
 - non-eutectic die attach
 - die position accuracy: $\pm 30 \mu\text{m}$ (standard)
 - min. die size: $200 \mu\text{m} \times 200 \mu\text{m}$ (standard)
 - max. wafer size: 8"
 - productivity: 1000 die/h
- **WIRE BONDING** (gold ball wire bonding from die pads to package pads)
 - thermosonic gold ball bond bonding
 - standard gold wire diameter $25 \mu\text{m}$ (max. $50 \mu\text{m}$)
 - wire position accuracy: $\pm 1 \mu\text{m}$
 - min. pad pitch: $70 \mu\text{m}$ with wire diameter $25 \mu\text{m}$
 - max. wire length: 7 mm
 - productivity: 5 wires/sec.
- **DISPENSING** (dot or line precision resin dispensing)
 - position accuracy: $\pm 50 \mu\text{m}$
 - working area: $200 \times 200 \text{ mm}^2$
 - min. needle size: 0.15 mm
 - fully programmable
- **HERMETIC WELDING** (projection hermetic welding of caps onto headers)
 - package types: TO-18 and TO5 with or without optical window caps
 - hermetic encapsulation gas: standard air, dry air, nitrogen 99.998%
- **OVEN POLYMERIZATION** (oven curing and resin polymerization for microelectronics)
 - programmable cycle time: 24 h
 - max. temperature: 300°C
 - temperature accuracy: $\pm 2^\circ\text{C}$
 - internal chamber volume: 107 l
 - max. input size (L x W x H): $35 \times 55 \times 50 \text{ cm}^3$
- **METALLOGRAPHIC MICROSCOPE** (quality visual inspection)
 - up to 1000x magnification
 - 1.3 Mpixel digital camera
- **DIE AND PACKAGE LEVEL SAWING** (sawing for custom SMD and MCM package)
 - Formal name: Automatic Dicing Saw, Model number DAD3350
 - Outline: The DAD3350 dices a workpiece up to 250 mm-square using a high-output low-oscillation spindle with a diamond blade attached after manual chucking and automatic alignment.
 - Cutting range: 260 mm, 130 mm to the left and 130 mm from the spindle center
 - Workpiece size setting range: Up to 250 mm, step 0.001 mm
 - Package materials: Silicon, Compound semiconductor wafers, various types of glass
 - Advanced Dicing saw for ceramic, plastic, metal and composite materials
 - position accuracy: 0.003 mm or less / 260 mm
 - working area: from 2" x 2.5" to 6" x 8"

TEST EQUIPMENT

- Die shear tester for die bonding quality check based on MIL 883, method 2019.5
- Pull-up tester for wire bonding quality check based on MIL 883, method 2019.5
- SMD packaged sensors automatic testing system
- Optical bench 120 cm x 90 cm and optical track 100 cm equipped with micro-positioning actuators
- Precision micro-balance with 1 mg accuracy and 410 g full measurement scale

USED OUTSOURCING CAPABILITY

- Rapid prototyping
- Precision mechanic parts by micro-working CNC tool machines
- Optical lens design and production by injection molding
- Wafer thinning
- Wafer bumping for flip chip
- Materials and Surface Characterization with well equipped facility in Material Engineering Department
- Electronics Characterization with well equipped facility in Electronic Department
- Microelectronics Characterization with well equipped facility in Microelectronic Institute ITC-irst
- Mixed Analogue and Digital CMOS ASIC design and production
- Reliability Tests with Certified Test Laboratories