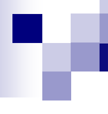
Packages for IoT

菱生精密工業股份有限公司
Lingsen Precision Industries., Ltd.

2016



Company Information

- Capital : US$ 126 M
- Total factory floor area : 119,000 sq.meter
  - Taiwan : 100,000 sq.meter
  - China :   19,000 sq.meter

- Plant site
  - Taichung, Taiwan
  - Ningbo, China
- History
  - 1970 -Founded By Dahsen and a Joint Venture with Mitsubishi Electric
  - 1973 Apr. -Repositioned as a Subcontract Company
  - 1998 Apr. -Publicly Listed
  - 2001 -Established a subsidiary company in Ningbo, China

Production Site

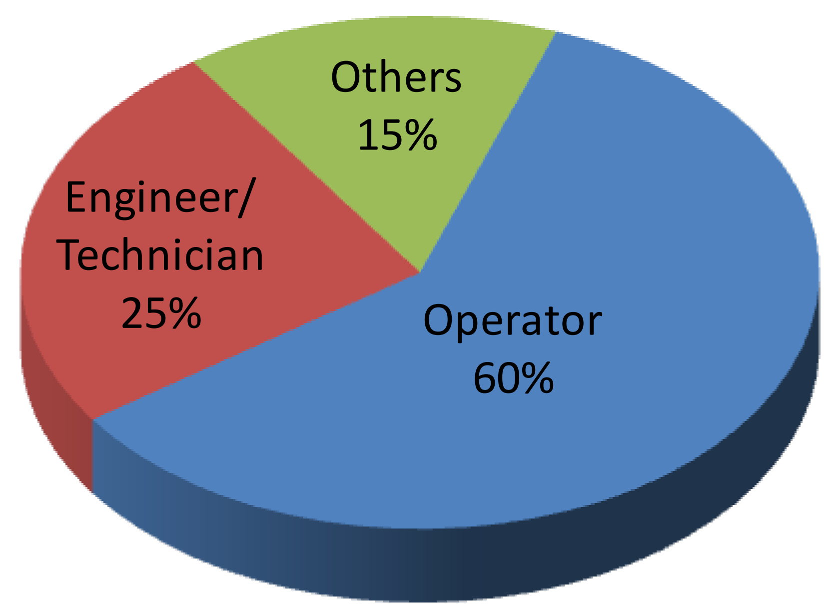
- Taichung, Taiwan
- Ningbo, China

China

中国

Taiwan

Lingsen – Highly Technical



Position	Operator	Engineer/Technician	Others
Total	1416	595	360

2,371 employees- as of Dec-31, 2015

Diversified Portfolio

- **Optical: 10.8%** (AIO, COB, D/SMA, PDIC, OPLGA...)
- **MEMS: 8.8%** (MEMS Accelerometer/Gyro/Pressure, MMIC and etc.,)

Revenue by Region

Revenue by Product Type

Sales Contacts

- **Europe (Taichung)**
  No. 5-1, South 2nd Road, T.E.P.Z. Taichung, Taiwan 42701, Republic of China
  Telephone : 886-4-25335120 ext. 5177
  Fax : 886-4-2535-0183
  Attn : Peter Chiou
  peterchiou@lingsen.com.tw

- **China/Japan (Taichung)**
  No. 5-1, South 2nd Road, T.E.P.Z. Taichung, Taiwan 42701, Republic of China
  Telephone:886-4-25335120 ext. 5115
  Fax : 886-4-2535-0183
  Attn : J.T. Chen
  jtchen@lingsen.com.tw

- **US (Milpitas)**
  Lingsen America, Inc.
  1525 McCarthy Blvd. Suite 1000
  Milpitas, CA95035, USA
  Telephone : 408-456-6943
  Fax : 408-456-6942
  Attn : Lucille Lau
  lucillelau@lingsen.com.tw

- **Taiwan (Taichung)**
  No. 5-1, South 2nd Road, T.E.P.Z. Taichung, Taiwan 42701, Republic of China
  Telephone : 886-4-25335120 ext. 5170
  Fax : 886-4-2535-0183
  Attn : Gary Shu
  garyshu@lingsen.com.tw

Quality Certifications

CERTIFICATE

This is to certify that

Lingsen Precision Industries Ltd.
5-1, Nan 2nd Road
T.E.P.Z., Tantzu, Taichung, Taiwan

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System.**

Scope:
The design and manufacture of integrated circuits assembly and discrete semiconductors assembly.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2008

Certificate registration no.	20001772 QM08
Main certification no.	20001772 QM08
Date of original certification	1999-08-16
Date of revision	2014-01-15
Date of certification	2014-01-15
Valid until	2017-01-14

UL DQS Inc.

Ganesh Rao
Managing Director

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA
Administrative Office: UL DQS Taiwan Inc., 8F, 25, Yuan Huan West Road, Feng Yuan Dist., Taichung City, Taiwan 420

1 / 2

IQNet

CERTIFICATE

This is to certify that

Lingsen Precision Industries Ltd.
5-1, Nan 2nd Road
T.E.P.Z., Tantzu, Taichung, Taiwan

has implemented and maintains a **Quality Management System.**

Scope:
The design and manufacture of integrated circuits assembly and discrete semiconductors assembly.

An audit, conducted and documented in a report, has verified that this quality management system fulfills the requirements of the following ISO Technical Specification:

ISO/TS 16949 : 2009
(with product design)

Certification decision	2014-01-15
This certificate is valid until	2017-01-14
Certificate Registration No.	20001772 TS09
IATF No.	0177836
Buffalo Grove, IL, USA	2014-01-15

IATF
2-IAO-OMC-01001

UL DQS Inc.

Ganesh Rao
Managing Director

IATF Contract Office: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany
Issuing Office: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA

1 / 2

Environmental Certification

CERTIFICATE

This is to certify that

Lingsen Precision Industries Ltd.
5-1, Nan 2nd Road, T.E.P.Z. Tantzu, Taichung, Taiwan
with the organizational units/sites as listed in the annex

has implemented and maintains an **Environmental Management System**.

Scope:
The design and manufacture of integrated circuits assembly and discrete semiconductors assembly.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

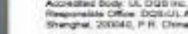
ISO 14001 : 2004

Certificate registration no.	20001772 UM
Date of original certification	1998-10-29
Date of revision	2011-10-14
Date of certification	2011-10-14
Valid until	2014-10-13

UL DQS Inc.

Ganesh Rao
President

Accredited Body: UL DQS Inc., 1130 West Lake Cook Road, Suite 340, Buffalo Grove, IL 60089 USA
Responsible Office: DQS-UL AP, DOCL Plaza, Room 1702, No. 841, Yan An Middle Road, Shanghai, 200040, P.R. China



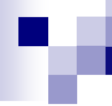
LEED

LINGSEN PRECISION INDUSTRIES, LTD.
Taichung, Taiwan

GOLD

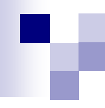
January 2015

Major Customers



Package Photos

TO-92	SOT	SIP	PDIP	PLCC
SOP 300 mil	SOP 150 mil	SSOP	MSOP	TSSOP
TSOP I	QFP	TQFP	LQFP	PD-IC
Mini BGA	QFN	SON	COB	OPLGA



Package Photos

ITO-220	TO-220	TO-251	TO-252	TO-262
TO-263	TO-277	TOLL	IPM	TO-46 & TO-5
MEMS Microphone	MEMS Gyroscope	MEMS Accelerometer	MEMS Pressure Sensor	MEMS Scanning Minor Sensor
Light Sensor	Mouse Sensor	CO2 Sensor	Temperature Sensor	IGBT Module

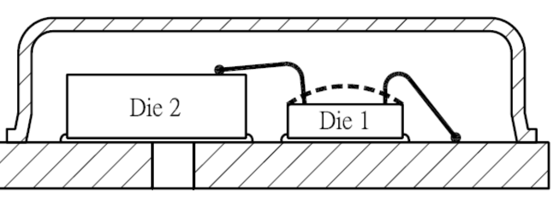
Content

- MEMS Sensor Package
- RF Package
- Optical Sensor Package

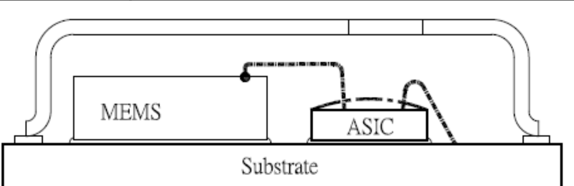
MEMS Microphone Sensor Package

Application Cellular phone /NB/tablet application			
	3.35x2.5x0.98mm 3L(Analog)	3.76x2.24x1.1mm 4L(Analog)	3x1.9x0.9mm 4L(Analog)
	4.0x3.0x1.0mm 5L(Digital)	3.5x2.65x0.98mm 5L(Analog)	2.75x1.85x1mm 4L(Analog)
	3.76x2.95x1.1mm 6L(Analog)	3.35x2.5x1mm 6L(Analog)	3.1x2.5x1.1mm 4L(Analog)
		Lamination	

Bottom Port



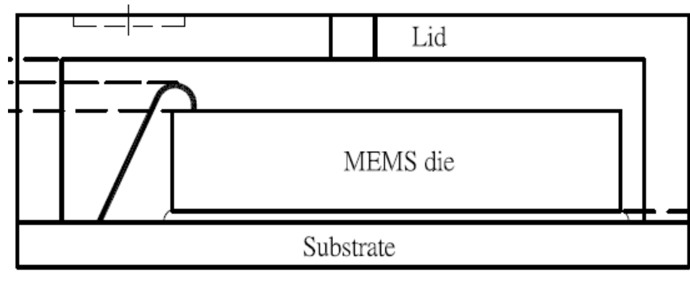
Top Port



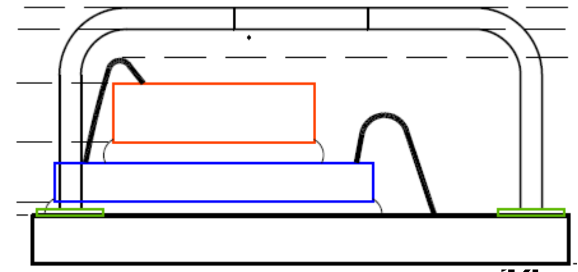
MEMS Pressure Sensor Package

	4.0x4.0x1.0mm 24L	2.3x2.6x0.85mm 8L 2.0x2.0x0.8mm 12L
Application **Barometer for consumer product.**		

LGA with LCP lid



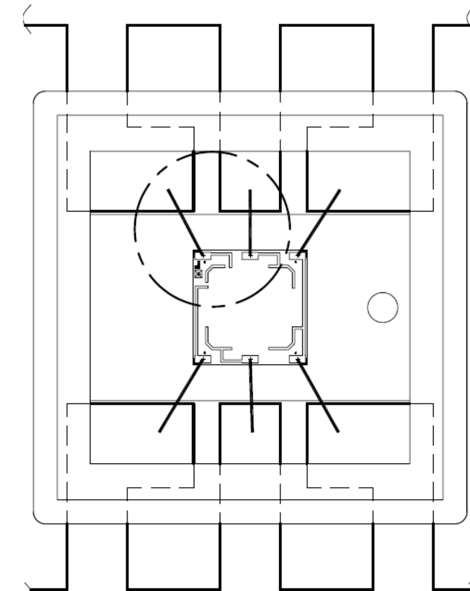
LGA with metal lid



MEMS Pressure Sensor Package

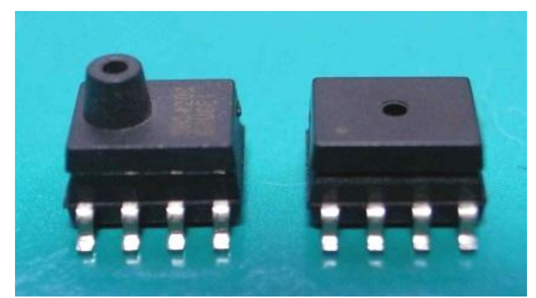
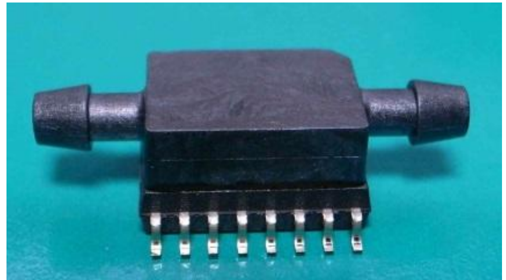
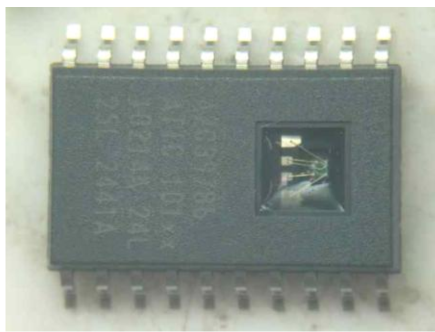
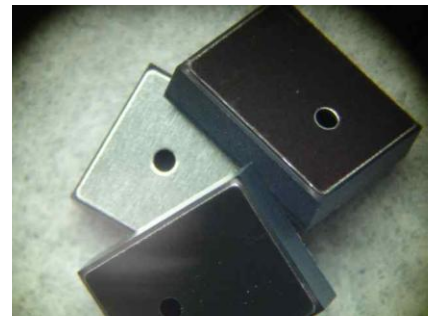
Application Household product	7.2x7.2x8.5mm 6L 7.0x7.0x9.5mm 6L 7.0x7.0x3.5mm 8L

Pre-mold with LCP lid

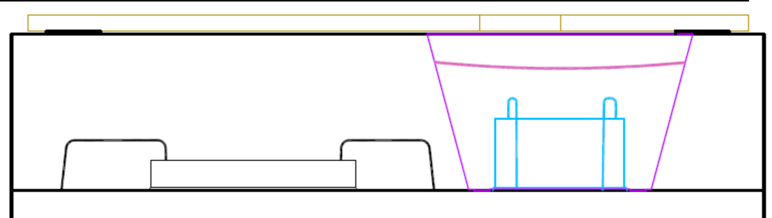


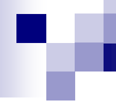
MEMS Pressure Sensor Package

<table>
<tr><td rowspan="2">Application

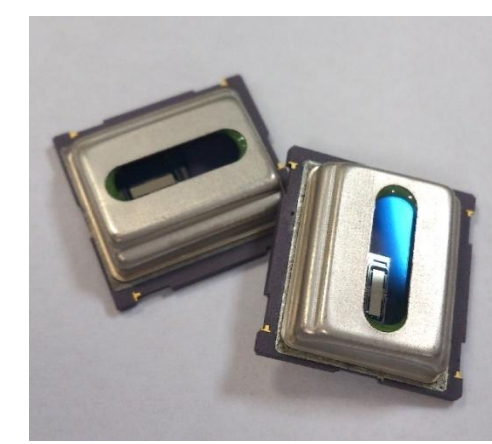
Automotive product</td><td>5.08x4.064x2.54mm 8L
4.95x3.95x4.29mm 16L
4.95x3.95x4.29mm 20L
7.0x5.5x1.95mm 28L</td></tr>
<tr><td>   </td></tr>
</table>

Pre-molded with metal lid or LCP lid

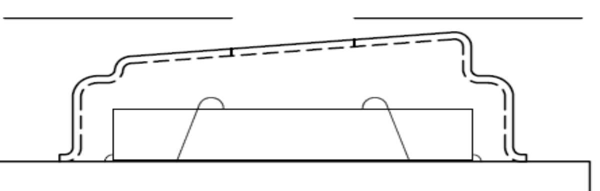




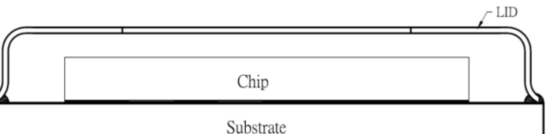
MEMS Mirror Sensor Package

	14.5x15.35x5mm 12L (Hermetic package)	9.6*4.7*2mm 10L
Application Laser printer/Pico-projector		

Ceramic with metal lid

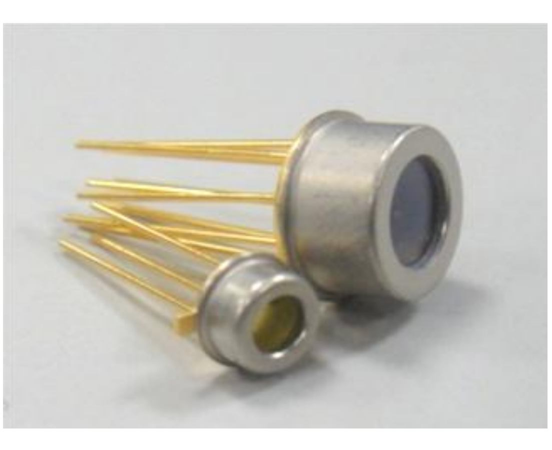


LGA with metal lid



MEMS Transmission Sensor Package

<table>
<tr><td rowspan="2">Application

Data communication transmission product</td><td>TO-46 2P3L
TO-5 8P9L</td></tr>
<tr><td></td></tr>
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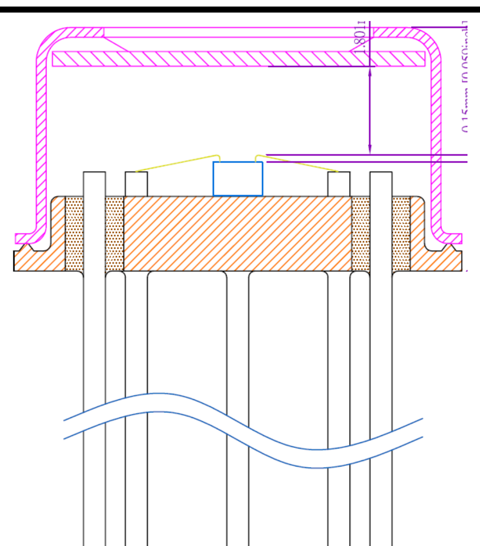
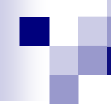
Metal header with cap





MEMS Gas Sensor Package

MEMS Gas Sensor

(LGA with metal/plastic cap)

Suitable for some gas detection(CO, alcohol , H2S(Hydrogen sulfide)…..etc.)

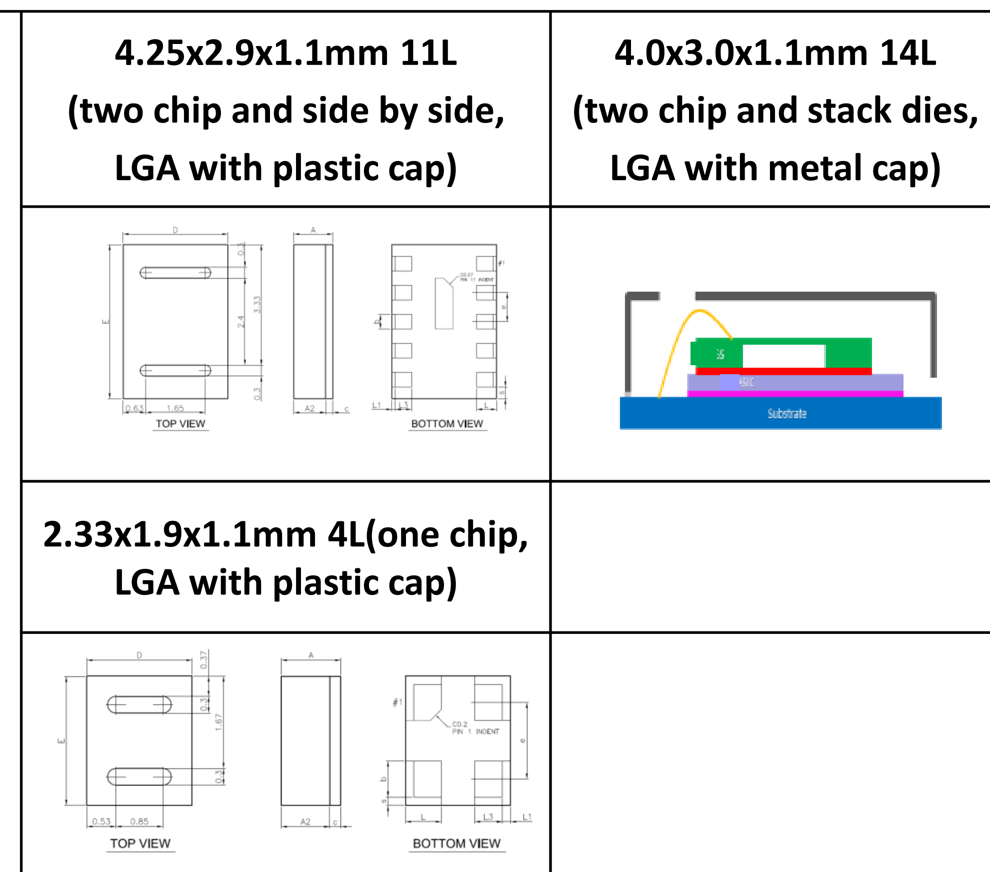
1.Home-based Environmental Monitoring

2.Biomedical gas monitoring

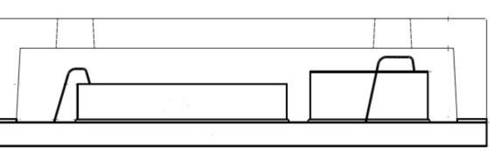
3.Wearable electronics

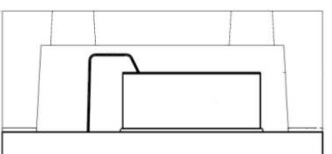
4.Smart phone

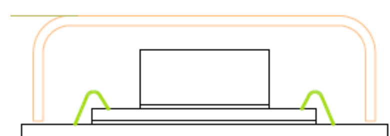
5.IOT environment sense node application

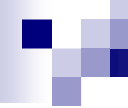


Cross-section



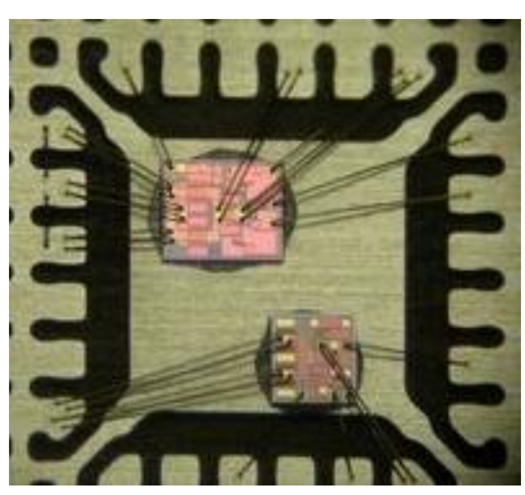






RF Package

- Package :QFN / LGA / Ceramic
- Application: WIFI/Blue tooth/NFC/Converter/switch..
- Special process: Wire loop mode control , wire length, module

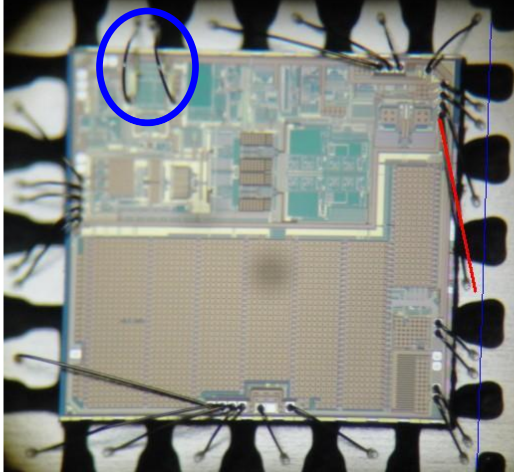


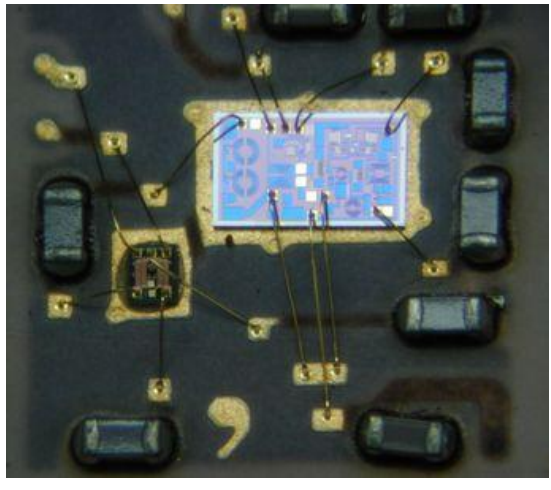
RF Package

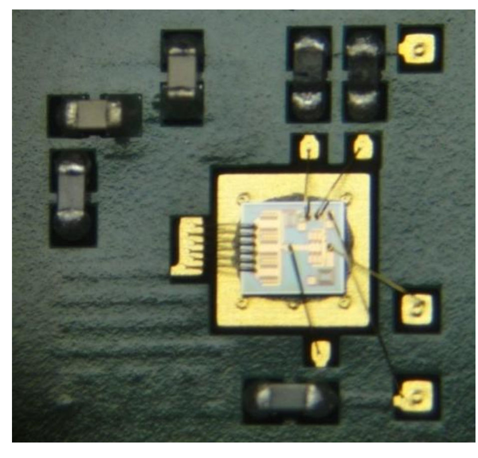
QFN

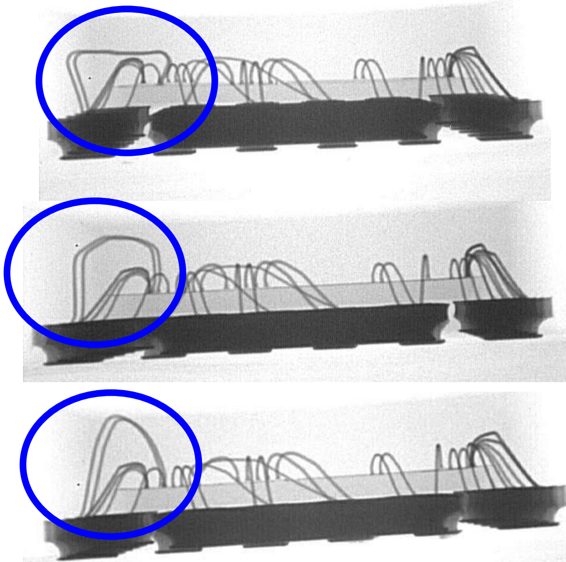
Ceramic

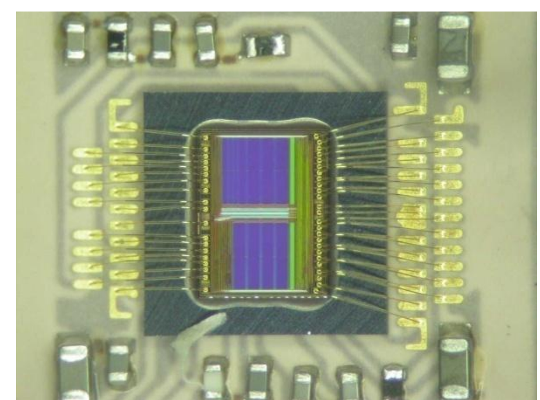
LGA

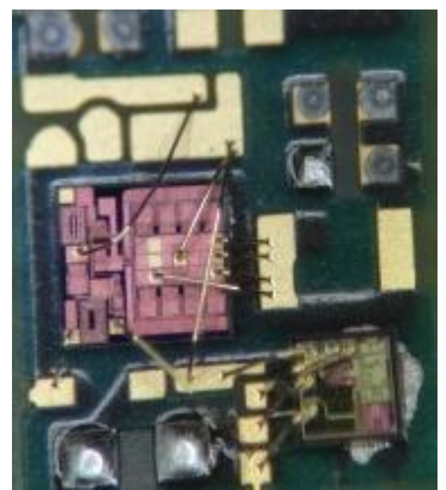






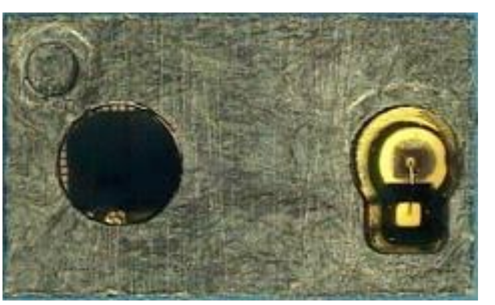




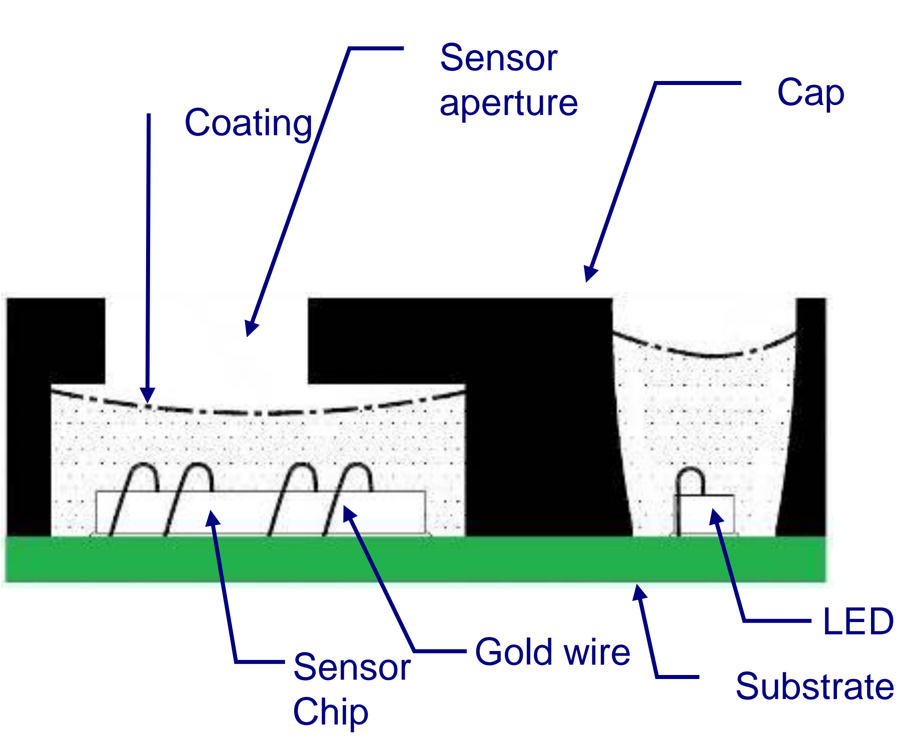


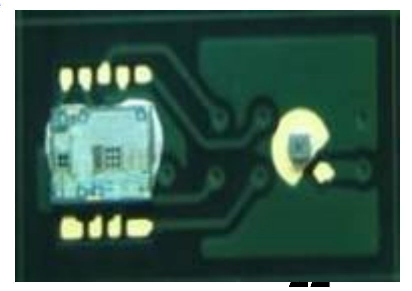
SIP sensor Structure - Coating+Cap _ 【I】

■ Top View



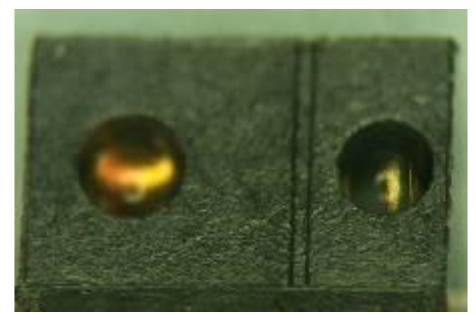
■Cross -section





SIP sensor Structure - Single Mold+Cap【II】

■ Top View



■ Cross -section

Cap

Sensor aperture

Sensor lens

LED lens

1st Mold

LED

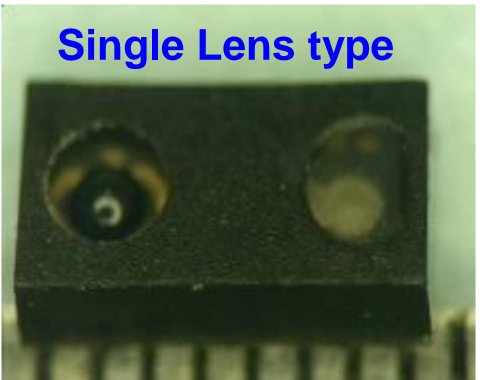
Sensor Chip

Gold wire

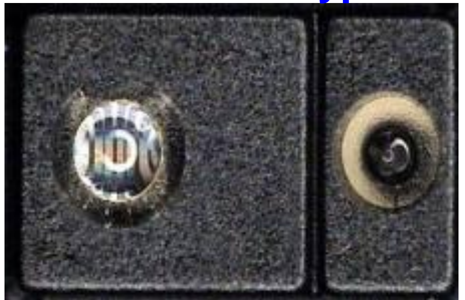
Substrate

Package Structure - Double Mold【 Ⅲ 】

■ Top View



Dual Lens type



■Cross -section

Sensor aperture

2ND MOLD

Sensor lens
(1st Mold)

LED lens
(1st Mold)

1st
Mold

LED

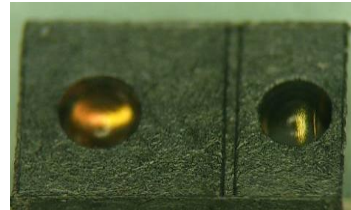
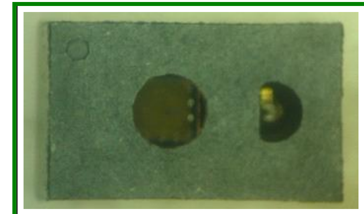
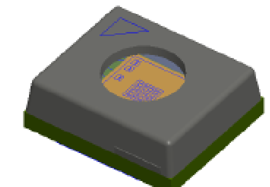
Sensor
chip

Substrate

Optical Sensor Package-SIP Sensor

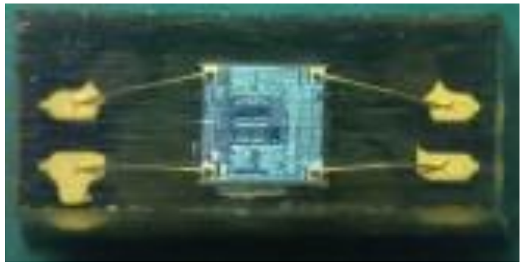
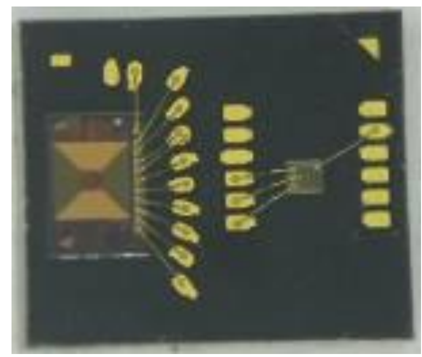
<table>
<tr><th></th><th>Coating with cap
(IC+LED, IC+LD, IC+multi LEDs+filter)</th><th>Single mold with cap
(IC+LD, IC+LED)</th><th>Double mold
(IC+LED, IC+capacitor+LD+filter)</th></tr>
<tr><td>SIP Sensor
(integrated multi functions in one package)

Applicable for mobile phone and portable device</td><td>


Application: Ambient light & proximity sensor, Oximeter</td><td>


Application: Ambient light gesture, proximity sensor, Oximeter</td><td>

Application: Ambient light , gesture, proximity, TOF sensor</td></tr>
</table>

Optical Sensor Package

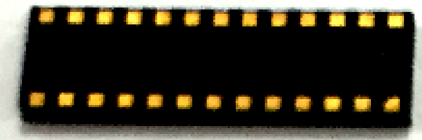
<table>
<tr>
<td>Optical
Land
Grid
Package
(OPLGA)</td>
<td>  

Application: Ambient light & RGB sensor</td>
</tr>
</table>

Optical Sensor Package-others

	Cap + coating	Overmold +molding
UV sensor	ASIC Die 1 1.12mm; SENSOR Die 2 0.5mm; Silicone gel coating; Black molding com	Silicone Gel
		Pre-mold +coating
		Silicone Gel Coating; Black Molding Compound

Fingerprint Sensor Package

<table>
<tr><td rowspan="2">Fingerprint Sensor</td><td>Capacitive Type
Thickness: 0.5mm
(The distance between die to package surface is 50um Min.,
based on customers' chip demand)
 </td></tr>
<tr><td>Optical Type
Thickness: 0.7 mm
Add LED/component
(System in Package)
</td></tr>
</table>

Thank You !