intersema
AN508

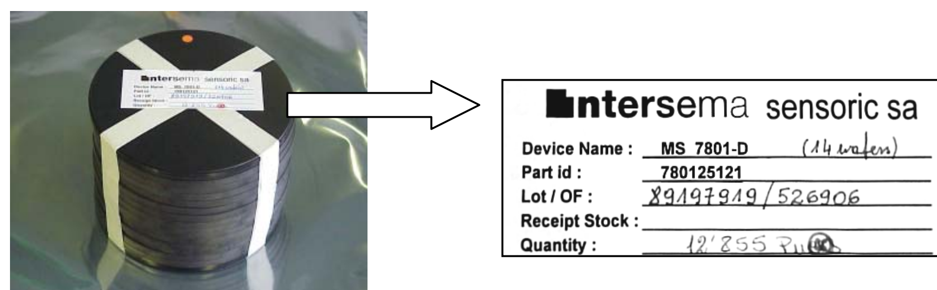
Mounting of Pressure Sensor Dice

1 Introduction

Bare Dice (Chips) are delivered as sawn 4 inch wafer on blue foil (sticky tape). Bad units are marked with a black ink dot in the center of the sensor surface. This type of delivery form is most suited for mounting on automated Die Bonders.

2 Packing, Storage

All Bare Dice are delivered in nitrogen filled antistatic bags. The nitrogen atmosphere protects the sensor against humidity and corrosion during transport and storage. The bags should be opened in clean rooms only and stored in a nitrogen filled shelf after opening.
Up to 25 wafers are stacked on the plastic wafer rings. A plastic cover plate on the top and the bottom of the stack protects the wafers from mechanical damage. A label on the cover plate contains device information as shown below.



Storage time of sawn wafers is ninety (90) days. Storage beyond this limit may result in picking problems at Die bonding (sticking Die) or unreliable wire bonds due to corrosion of the aluminum bonding pads.
Storage Temperature is 19-26 °C.

3 Wafer Handling

The sensor wafer contains 600 to 1820 sensor dice depending on the sensor type. All sensors are 100% electrically tested to comply with the datasheet limits. To guarantee optimum quality all sensors are 100% optically tested for any microscopic defects on the surface, backside, die corners or the bonding interfaces of the sensor.
With the exception of MS7212A (sealed membrane) all sensors are protected with a silicon nitride layer against humidity. Most of the Sensors consist of a Silicon/Glass stack with a total height of ~0.9mm. Some sensor types use a thinner glass which allows for a lower profile construction (total height 0.6mm).

- The wafer surface is very sensitive to damage, no cleaning is allowed without prior approval of Intersema
- No picking with tweezers (even with plastic tweezers) is allowed
- The Sensor Die has to picked with the pickup tool recommended in the datasheet. The Pickup tool has to be of soft rubber with a vacuum hole in the middle that is bigger than the membrane of the sensor. The Pickup and bonding force has to be less than 100grams. Too high mechanical stress can result in an unstable, drifting Offset. The Pickup vacuum will not damage the sensor. The tool has to be clean. Residues on the tool could transfer onto the bonding pads and initiate corrosion which could result in reliability problems in the final product.
- For Differential Sensors (hole on backside) Ejector Pins with 3 or 4 needles may be used. For absolute Sensors (no hole) on most machines a single needle ejector gives best result.
- Process temperatures above 225° should be avoided. The lower the maximum temperature, the more stable the sensor will be in a long-term.

4 Die Mounting

Intersema Pressure Sensors have been optimized for an optimum precision, highest output signal and long-term stability. In order to achieve the best performance (long-term drift, hysteresis, temperature behaviour) some aspects during mounting have to be respected.

- Sensor Dice are sensitive to mechanical stress, especially the 1 bar and 100mbar versions. For Die mounting, low hardness silicone glue (A25 or lower) with a thickness of 50-100um is recommended. Die Attach with hard silicone or epoxies will typically result in an unstable offset value and high TCO (temperature coefficient offset).
- The bond pad openings are 100x100um. The pad material is aluminum with a thickness of 1-2um. For wire bonding, best result are achieved with 30um gold wire using thermosonic gold ball bonding. The bonding temperature will be typically 150°C. Some sensors like MS7212A require special bonding capillaries (see datasheet). A good bond will result in a ball shear force of > 30 grams and a Pull Force of > 6 grams.
- After wire bonding the sensor has to be protected with a soft ion free silicone gel with a viscosity of < 1000 cps and no hardness. The type of gel is of high importance for the sensor performance. Good results can be achieved i.e. with Dow Corning Sylgard 527.The gel can be applied as drop on the surface of the sensor or if further humidity protection is required the whole area around the sensor including bonding wires can be filled.
- For the MS7212A sensor the pressure is applied from the backside. Neverthless it is recommended to protect the topside of the sensor with gel to avoid corrosion of the aluminium bonding pads.

5 Disclaimer

Intersema pressure sensor dice have been extensively tested to comply with the limits given in the datasheet. Typical values are not 100% tested or have been tested only during qualification. In case of doubt please consult the factory or the local distributor. Intersema can give no guarantee for the function after mounting and post processing at the customers site. It is the responsibility of the customer to test and to qualify the function of the pressure sensor die in the application circuit.
Intersema assumes that the customer has the required knowledge with die mounting and signal processing of pressure sensors.
Intersema assumes also no liability for consequential damages like yield loss in fabrication or damages due to field failures in the final application.

REVISION HISTORY

Date	Revision	Type of changes
Feb 25, 2004	V1.0	Initial release

FACTORY CONTACTS

Intersema Sensoric SA
Ch. Chapons-des-Prés 11
CH-2022 BEVAIX

SWITZERLAND

Tel. (032) 847 9550
Tel. Int. +41 32 847 9550
Telefax +41 32 847 9569
e-mail: sales@intersema.ch
http://www.intersema.ch

NOTICE
Intersema reserves the right to make changes to the products contained in this document in order to improve the design or performance and to supply the best possible products. Intersema assumes no responsibility for the use of any circuits shown in this document, conveys no license under any patent or other rights unless otherwise specified in this document, and makes no claim that the circuits are free from patent infringement. Applications for any devices shown in this document are for illustration only and Intersema makes no claim or warranty that such applications will be suitable for the use specified without further testing or modification.