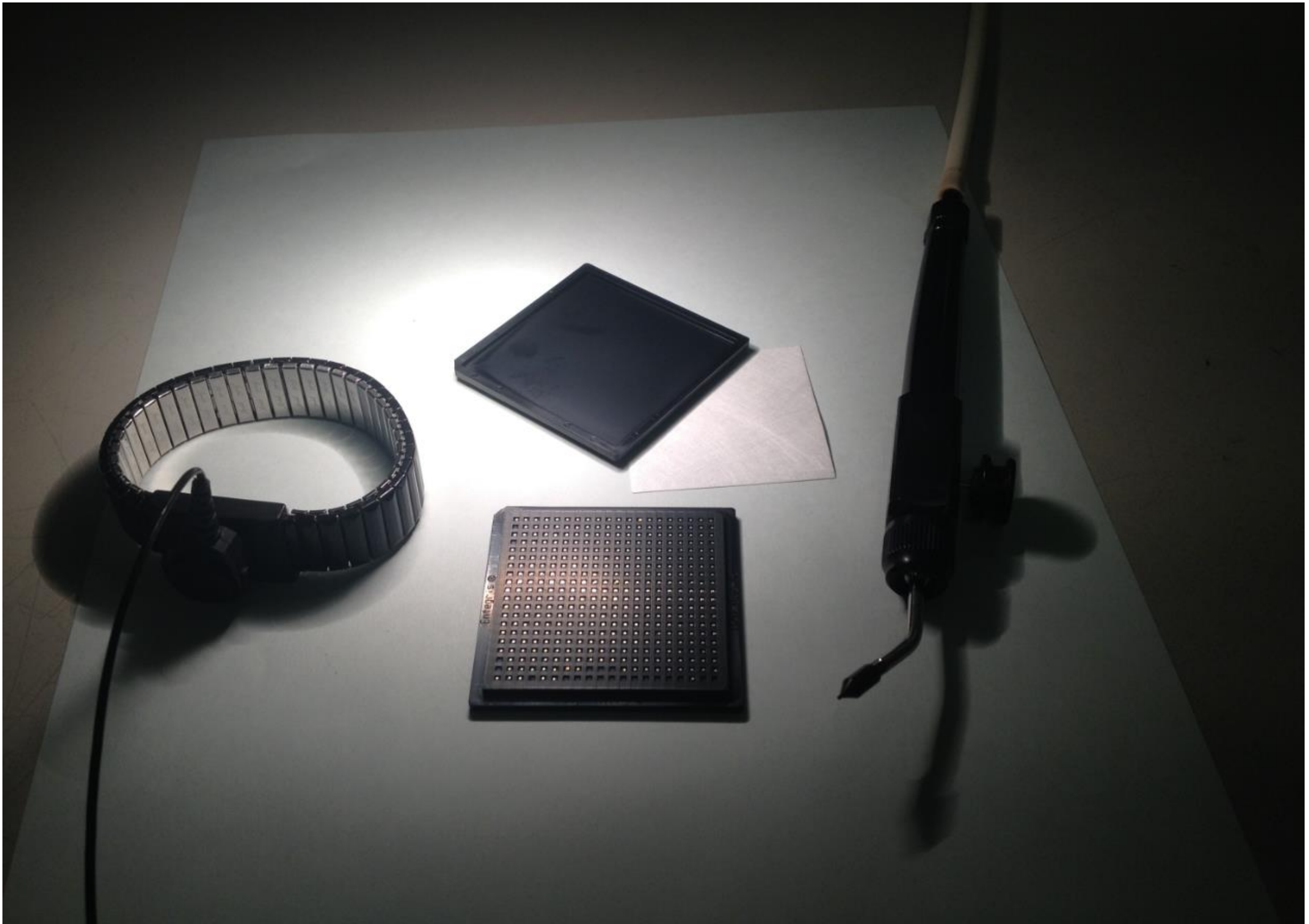
Table of Contents

Introduction 2
Delivery forms 2
Die handling 4
Revision 6



A dedicated vacuum pick up tool is used to manually move the die.

Figure 1: Vacuum pick up tool and wrist-strap for ESD protection

muRata
INNOVATOR IN ELECTRONICS

Introduction

This application note gives recommendations on how to handle bare dies* in Chip On Board (COB), Chip On Glass (COG) and flip chip technologies. Bare dies should not be handled as chips in a package.

This document highlights some specific effects which could harm the quality and yield of the production.

*separated piece(s) of semiconductor wafer that constitute(s) a discrete semiconductor or whole integrated circuit. International Electrotechnical Commission, IEC 62258-1, ed. 1.0 (2005-08).

Delivery forms

Bare dies are delivered in the following forms:

Fig 2. Unsawn wafer

Fig 3. Unsawn wafer in open wafer box for multi-wafer or single wafer

Fig 4. Wafer on Film Frame Carrier (FFC)

The wafer is sawn. So please refer to the E-mapping file from wafer test (format: SINF, eg4k …) for good dies information, especially when it is picked from metal Film Frame Carrier (FFC).

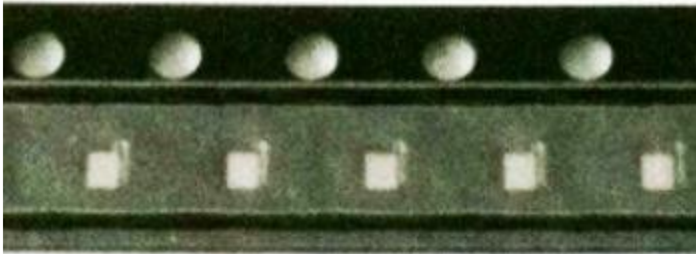


Fig 5. Die on tape reel

Fig 6. Waffle pack for bare die

Die handling

Bare die must be handled always in a class 1000 (ISO 6) clean room environment: unpacking and inspection, die bonding, wire bonding, molding, sealing. Handling must be reduced to the absolute minimum, un-necessary inspections or repacking tasks have to be avoided (assembled devices do not need to be handled in a clean room environment since the product is already well packed)
Use of complete packing units (waffle pack, FFC, tape and reel) is recommended and remaining quantities have to be repacked immediately after any process (e.g. picking) step.
To avoid contaminations and damages (scratches, cracks):

- Die or wafers must never be handled with bare fingers;
- The active side of a die should never be touched;
- The mechanical pressure has to be limited;
- Do not store and transport die outside protective bags, tubes or boxes;
- Work only in ESD save clean room environments.

Special tweezers are suitable for grabbing die and wafers on its edge (see Figure 9). Vacuum tweezers are used to move die from the packing to the target (see figures 1,7 and 8).

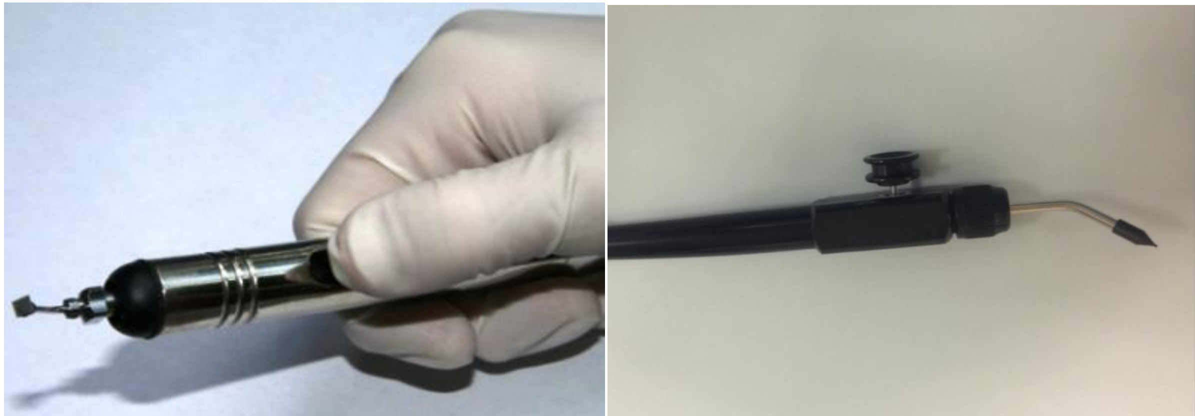


Fig 7. Die on a vacuum pick up tool

Fig 8. Nozzle of vacuum pick up tool

The nozzles of the vacuum pick up must be in teflon, peek or conductor nylon and their size must be chosen according to the die size.

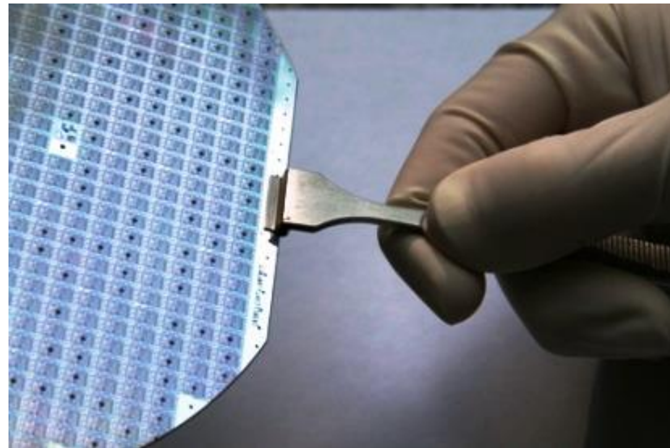


Fig 9. Special tweezers for grabbing a wafer

Examples of tools which are formally forbidden for handling of the bare dies.

Fig 10. Example of tweezers unsuitable for picking up a die

Revision

Version	Author	Date	Description
Release 1.0	O. GABORIEAU	28/08/14	Creation
Release 1.1	PLE, BPO, OGA	29/08/14	validation
Release 1.2	C. GUEZENNEC	18/05/17	Visual Identity Murata update

Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

For more information, please visit: http://www.ipdia.com
To contact us, e-mail: mis@murata.com

Release date: May 18th, 2017
Document identifier: AN