

1 Precautions when using semiconductor products

Please avoid impacts such as drops to the floor when the product is handled.

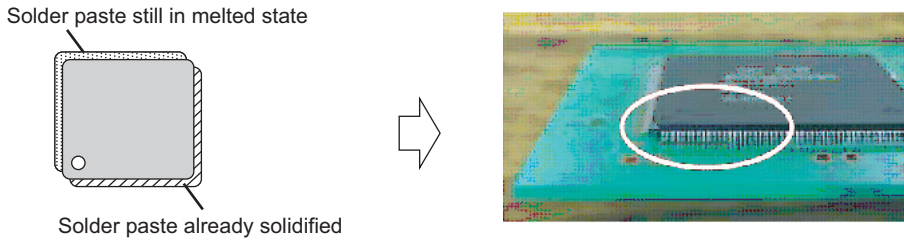
The radical material might crack and be lacked.

Further, be careful that strong mechanical stress is not applied to the package. For thin packages, since the mold is thin, if strong stress is applied the package or elements may be damaged.

In addition, since electrostatic discharge damage, deterioration of solderability, corrosion between electrode wiring, etc. may occur if products are touched with bare hands, be sure to be sufficiently careful when handling products.

Read the following items and handle the products with caution.

- ◆ Static electricity may cause incidence of break down, dysfunction, or malfunction to the product.
- ◆ Rough handling such as scratching, cracking, or breaking the product may lead to dysfunction and malfunction.
- ◆ Handling the product with your bare hands or saliva or perspiration from human body may result malfunction of the outer electrodes and wires.
- ◆ Environments containing high humidity, dust, or harmful gases (hydrogen chloride, sulfurous acid gas, or hydrogen sulfide) may cause deterioration of the soldering characteristics of the external electrodes.



2 Handling precautions

a) Precautions for LGA (C-CSP/L-CSP) and BGA (P-BGA)

1) Precautions regarding use conditions

◆ Influence of light

The CSP type is highly affected by light because this semiconductor chip is an exposed type (front surface, rear surface, side surface).

If a chip receives light from the outside, the chip may generate electromotive force due to the photoelectric effect, and this may cause abnormal operation. When designing, be sure to check that external light cannot reach any chips. At the inspection process and in practical use, also check that chips can be kept away from light.

◆ Influence of temperature and humidity

There are some devices whose electrode terminal is exposed to the outside. If such a type of device is stored in extremely humid air or extremely dry air, or if such a type of device is stored for a long time, the electrode surface may be oxidized, and the solderability may be deteriorated. Handle this type of device carefully.

◆ Influence of vibration and other mechanical stresses

- The CSP type semiconductor chip is an exposed type (front surface, rear surface, side surface). So, if metallic tweezers are used carelessly, or if a chip falls to the floor or a shock is applied to a chip, the chip may be chipped or broken.
- There are some devices whose electrode terminal is exposed to the outside. If you directly touch such a type of device with your bare hand, electrostatic damage may occur, solderability may be deteriorated, or corrosion may occur between the electrode and the wire. In addition, if contaminant is transferred from a contaminated jig or tool to a device, or if saliva or sweat of a human being touches a device, the external electrode or the external wiring may be damaged.
- The BGA type semiconductor device has solder balls on the rear terminal. If this type of device is handled carelessly, balls may be removed, ball surfaces may be flawed or distorted, or the base material may be broken or chipped. Even if devices are in a magazine or a tray, carefully handle the devices so that devices cannot fall to the floor, and shocks or vibration cannot be applied to the devices.

2) Precautions regarding mounting

◆ Influence of vibration and other mechanical stresses

- After mounting BGA or CSP on a board, carefully handle the board. For example, during the in-circuit test, be careful not to apply a shock to the board. The board may warp greatly, and the product or the soldered area may be broken.
- The CSP type semiconductor chip is an exposed type (front surface, rear surface, side surface). If the under-fill is used after mounting this type of chip, a stress may be generated due to difference in the shapes or the wire expansion factors between the under-fill and the fillet. This stress may delaminate the semiconductor chip from the re-wired layer, or break the semiconductor chip.

◆ Influence of temperature and humidity

- If heat stress is applied such as when removing products for repairs, etc., be careful not to overheat the product. Do not reuse our product if it is once removed. We cannot guarantee the quality of such a product.
- After mounting BGA or CSP, if you carry out double-surface mounting using the flow soldering method, carefully check the temperature of the flow solder in the soldering bath. If the flow temperature is too high, the printed wiring board may warp due to the heat applied from one side of the board, and the ball electrodes of the mounted device may be delaminated from the warped board. In addition, if the balls are melted again by the heat, more ball electrodes may be delaminated from the board. Figure 6.20 shows the mechanism of delamination. Figure 6.21 shows an example (analysis photo of cross section) of delamination caused by re-melting.

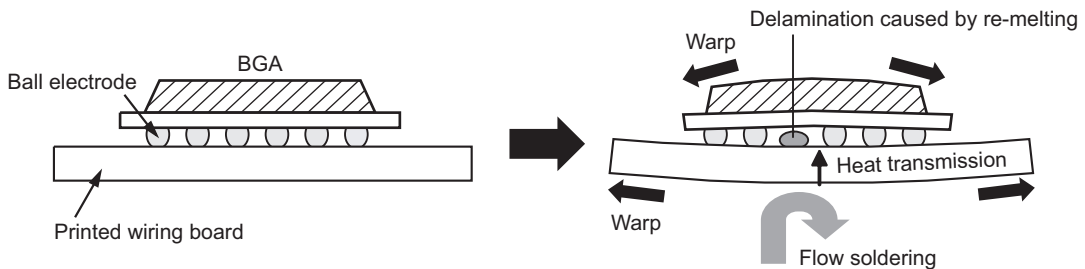


Figure 6.20 Mechanism of Delamination

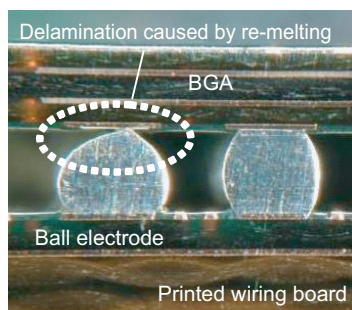


Figure 6.21 Example of Delamination Caused By Re-melting (Cross Section Analysis Photo)

Precautions on Use of Semiconductor Devices

◆ Inspection method after mounting

After mounting BGA or CSP, you cannot visually check a soldering error. It is, therefore, recommended that the X-ray examination should be performed to check soldering errors.

While observing the above precautions, carefully handle our products.

For detailed precautions of product handling, refer to Sec. “6.2.2 Precautions on use environment” and Sec. “6.5.2.3 Precautions when using semiconductor products”.

b) Precautions for TCP

◆ Since the substrates of TCP use polyimide film, this structure easily generates static electricity. When handling products, be careful to use an ion blower and attach an earth strap so that charge does not build up in the film.

c) Precautions for CCD image sensors

1) Cautions regarding the cover glass surface

Since the glass surface is cleaned thoroughly at the time of shipment of the image sensors, be extremely careful of the following points so that the glass surface does not become scratched or dirty:

- ◆ Perform work in a clean environment such as a clean booth (Clean class: Around 1000).
- ◆ Be careful not to touch the product directly, since touching the glass surface with your hands may cause dirt, etc. to adhere. If dirt or stains are on the glass surface, use an air blower in a charge-free environment to blow off the dirt or stains. For dirt adhering to the product due to static electricity, use of an ionized air blower is recommended. However, when using an air blower on the image sensors, be sure to connect all terminals to ground as a countermeasure against static electricity.
- ◆ For stains such as oily dirt, etc. which still cannot be removed, use a cleaning swab or lens-cleaning paper soaked with isopropyl alcohol to wipe off the stain gently, being careful not to scratch the glass surface. Further, even when using a soft cloth or swab, if the cloth or swab is dry, the cloth or swab itself may generate dust, and that dust may scratch the glass.
- ◆ Do not subject the glass surface to strong impact or strong scratching. Doing so may cause impact gouges, cracks, etc., and such damage or scratching may result in inferior characteristics.
- ◆ As a countermeasure against dirt or stains, it is necessary to store the products in the packing case.
- ◆ To prevent condensation, when transferring products between rooms with a drastic temperature change, be careful in eliminating the temperature differences.

2) Cautions regarding storage environment

- ◆ Do not store products in areas where they will be subject to strong light or infrared radiation, such as in direct sunlight. If strong light is incident on the image sensor for a long time, the transparency of the filter or lens material will be reduced.

3) Cautions regarding image sensors as optical elements

- ◆ Microlenses to focus the light on the photodiodes and color filters to discriminate color information are integrated on-chip in the photoelectric converter section of the image sensor. Since the integrated on-chip structure is formed of plastic, the transparency of the filter or lens material will decrease depending on the intensity and wavelength of the light incident on the image sensor and the amount of time the light is incident.

Because of this, be careful not to expose the image sensor to infrared radiation or sunlight even when it is not being used (during storage, transportation, and manufacturing).

- ◆ When the same pattern is imaged for a long time, depending on the intensity of the incident light and the exposed time, abnormalities such as burning in of the pattern on the image sensor pixels or harshness may occur, regardless of whether or not power is being supplied to the image sensor.

When not using the image sensor, be sure to shade it from light and switch off the power.

- ◆ For image sensors, as time passes white marks may appear due to cosmic radiation. Please use white-mark compensation circuits to compensate for these white marks.