Handling instructions for SMD emitter

Transportation and Electrostatic Discharge Protection

Our products comply with the normal requirements for electronic components regarding transportation and storage. Protect the components especially against exceptional mechanical loads or harmful, particularly corrosive gases or vapors.

Infrasolid's emitters are shipped in ESD-safe waffle-packs (**Fig. 1 and 2)**. We recommend transporting and storing the emitters in the original box until processing

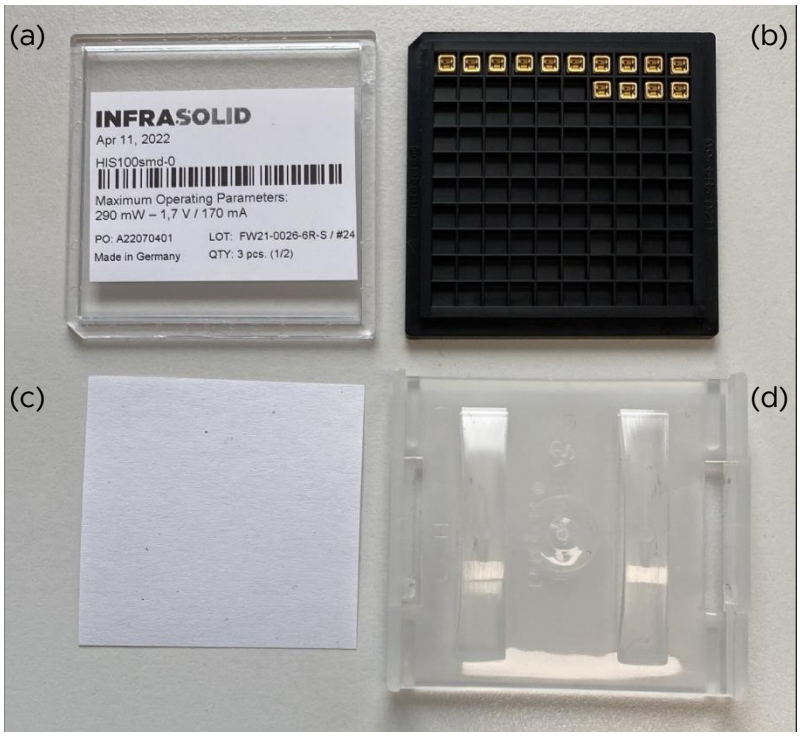


Fig. 1: 2-inch waffle-pack packaging of SMD-emitters consisting of a tray with SMD-emitters (b), a paper insert (c), a cover (a) and a clip (d).

Fig. 2: Delivery state of SMD-emitters in 2-inch waffle pack.

Handling

Note the following when handling the product and also after installing into a device.

(1) Basic precautions

- Protective gloves, e.g. made of nitrile rubber, are required. Use of a laboratory coat is suggested.
- When touching the product, it is recommended to wear gloves. Touching the product with bare hands may cause degradation in characteristics, problems with solder wettability, and plating corrosion.
- Special care must be taken with open emitters to ensure that the filament is not damaged. Do not touch the heating filament with hand or tweezers.
- Perform work in a clean place.
- Protect against physical damage and avoid generating dust.

The above information is believed to be correct but does not purport to be all inclusive and must be used only as a guide.

(2) Dust, contamination and scratch countermeasures

- Optical characteristics may deteriorate if dust, stain, or scratches are on the window material. Dust, stain, or scratches on the window material can degrade light transmittance.
- To prevent scratches and cracks on the window material, do not apply strong friction, shock, or pressure. Avoid sharp or hard objects from making contact with the window material. Please use plastic tweezers, as metal tweezers cause scratching. In particular, SMD emitter windows with an anti-reflective coating (e.g. Silicon-ARC) are vulnerable to scratches, so handle them carefully.
- Emitters with window only: use an air blower to remove dust adhering to the window material. Do not use an air blower to clean open emitters.
- If oil, grease, or other substances, that cannot be removed with an air blower, adheres to the window material, gently wipe it away with a cotton swab moistened with ethyl alcohol and the like to prevent the window from being scratched. Rubbing strongly or wiping the same section over and over will cause scratches and degrade the optical characteristics or the reliability.
- Do not rub the window material with a dry cloth or cotton swab. Doing so may cause scratches resulting in malfunctions.
- Take precautions to protect the window material from stain or scratches when packing or shipping equipment, in which the product is installed.

Tel.: +49 351 8547 8031 E-mail: sales@infrasolid.com Web: www.infrasolid.com

(3) Cleaning of emitter windows

Avoid cleaning with solvent as much as possible. If you must, note the following points.

- Use alcohol solvents such as ethyl alcohol.
- Check that there is no problem with the cleaning method by experimenting in advance.
- Gently wipe stain off from the window material using a cotton swab moistened with ethyl alcohol or the like (**Fig. 3**).
- Do not use ultrasonic cleaning or steam cleaning as it may cause critical damage to the product.
- If you use non-cleaning solder to mount the product, do not clean the flux. Otherwise, leakage currents may occur between leads, which can lead to operation errors.

(4) Vibration, shock, and stress

- All SMD emitters comply with the following standards:
  - JESD22-B103 (vibration, log. sweep 20…2000 Hz, peak 20 m/s^2, X/Y/Z direction)
  - JESD22-B110 (drop test, 5000 m/s^2, 6 directions).
- If the product is subjected to prolonged vibration or frequent or severe impact beyond these standards, it may damage the emitters and the infrared window.

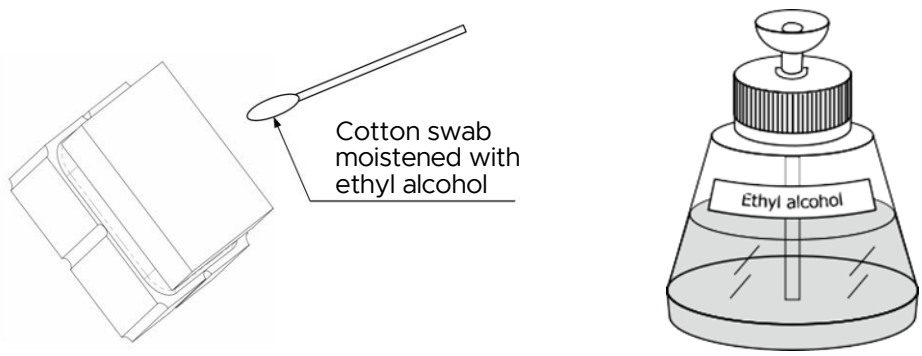
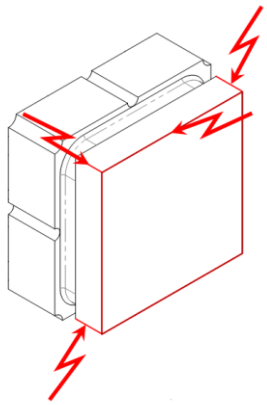
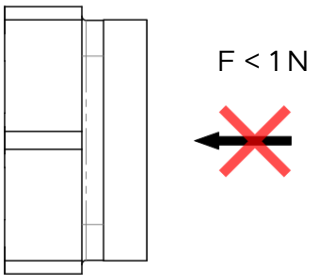
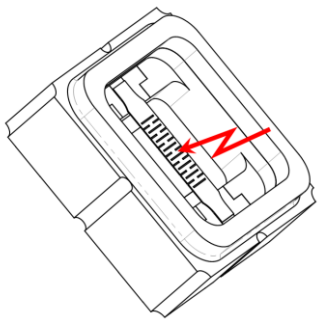


Fig. 3: Gently wipe stain off from the window material using a cotton swab moistened with ethyl alcohol or the like.

Limits of mechanical stress (see Tab. 1)

- Avoid pressure on the outer edges and corners of the window.
- Do not press the window with more than 1 N.
- Open emitters:
  - Do not touch the filament.
  - Do not use an air blower to remove dust.

Tab. 1: What to avoid in handling of SMD emitters.

	Avoid pressure on the outer edges and corners of the window.
	Do not press the window with more than 1 N.
	Open emitters: • Do not touch the filament. • Do not use an air blower to remove dust.

Storage

Be sure to strictly comply with the storage conditions described in the delivery specification sheet, instruction manual, or the like.

- STORAGE PRECAUTIONS: Keep away from foodstuffs. Keep away from acids and strong bases.
- Avoid wetting, harmful gas, or dirt, or storage in a place with sudden temperature changes.
- Do not lay a heavy object or load on the product or the package.
- When storing the products after transferring them into another case, use a case that is difficult to be charged with static electricity.
- If the product is stored in a poor environment (conditions exceeding the recommended storage conditions in **Tab. 2**), the solderability may lower or electrical characteristics may decrease. When the storage conditions are described in the datasheet, delivery specification sheet, or the like, be sure to comply with them.
- High humidity damages electronic components. For this reason, our products should not be exposed to any extreme humidity, particularly in combination with high temperatures. Store the emitters dry and at normal room temperature. Provided that our products are delivered in moisture protected packaging, they should not get damaged.

Tab. 2: Recommended storage conditions

Parameter	Storage conditions
Product not packed in moisture- proof bag	Temperature: 15 °C to 35 °C Humidity: 30% to 75%

Soldering instructions

1. Dehumidification (Bake-Out)

Most reflow soldering problems are due to moisture absorption by the sealing resin between the SMD package and the infrared window/filter. Since the entire package is heated during reflow soldering, the moisture absorbed by the sealing resin expands dramatically due to the soldering heat. This can cause the infrared window/filter to detach from the housing. To avoid such problems, the following points must be observed.

If the storage conditions (**Tab. 2**) are not complied with, a bake-out is recommended to dehumidify the sealing resin and prevent the infrared window/filter from detaching during soldering. Observe the following points when performing the bake-out:

- In general, to prepare a product for reflow soldering, bake-out must be performed using a clean dryer for a duration of (3...5) hours at 150 °C or (12...15) hours at 120 °C.
- The trays for product packing generally are not heat resistant. Place the product in another heat-resistant container when baking it out.
- When using a dryer for bake-out, make sure the inside of the dryer is clean to prevent the product from being contaminated during heating.
- To prevent oxidation of the soldering pads during bake-out, we recommend that you fill the dryer with nitrogen gas.

2. Soldering

a. Reflow soldering

The recommended temperature profile for reflow soldering is shown in **Fig. 4**. When setting the reflow soldering conditions, check if there are any problems by testing the reflow soldering methods in advance. We recommend tin-silver-copper solders, e.g. SAC305.

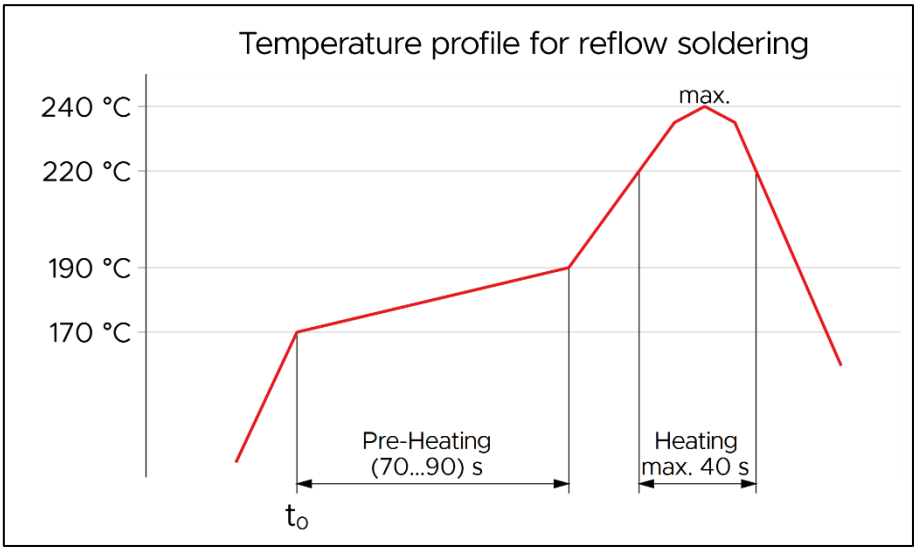


Fig. 4: Suggested temperature profile for reflow soldering.

b. Soldering with soldering iron

Overheating and inadequate heat sinking during soldering can damage the emitter!

Use manual soldering only in compliance with the following instructions:

- A grounded soldering iron with an insulation resistance of 10 MΩ or more is recommended to avoid electrostatic charges.
- Use temperature-controlled soldering irons.
- Set the temperature of the soldering iron tip according to the recommended conditions for soldering temperature and time.
- Do not allow the soldering iron to come into direct contact with parts other than the electrodes of the product. Direct contact of the SMD package or the infrared window/filter with the soldering iron may cause mechanical or optical damage.
- Perform soldering in such a way that no pressure is applied to the SMD package. This avoids residual stresses after soldering, which can otherwise lead to mechanical or optical damage.

c. Soldering of bump connection products

Use a solder paste suitable for components with fine pitch pads.

Before making bump connections, design a process that takes into account factors such as the solder paste, underfill resin, temperature conditions, and warping of the board due to heating.

3. Flux

Use non-cleaning solder or rosin type flux. The use of fluxes with relatively high acid or alkali content or inorganic fluxes can lead to corrosion at the connections.