FAGOR ELECTRONICA SEMICONTUCTORS RECOMMENDED THDs MOUNTING INSTRUCTIONS.

TO PACKAGES ASSEMBLY

1- PRE-MOUNTING PROCESSES

1.1- Lead Cutting

The leads of THDs can be cut before mounting or after mounting and soldering.

When cutting after soldering, the leads are attached by the solder joint. Severe mechanical mishandling during cutting process could cause solder joint failure, but generally does not harm the component body.

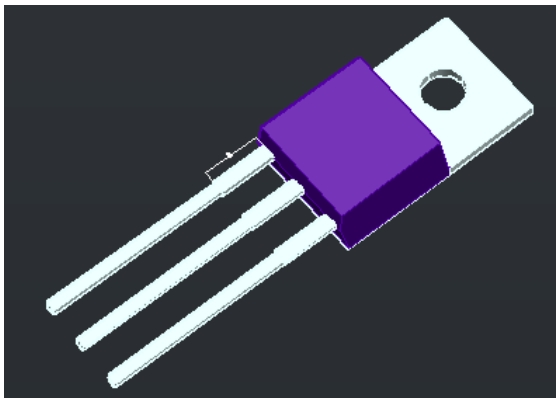
When cutting prior to mounting, the leads have to be fixed by a clamp that should be similar to a clamp used for lead bending.

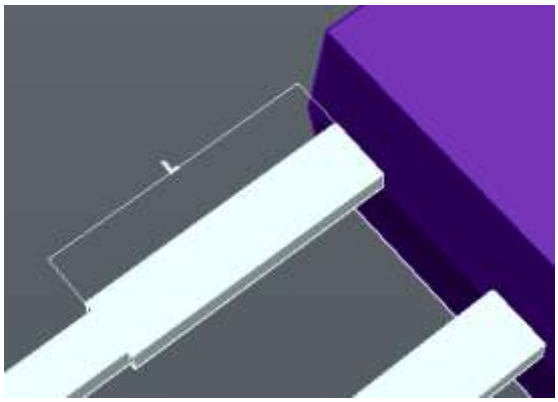
1.2- Lead Bending

To insert the terminals of THDs in the holes of the PCB, the terminals may have to be bent to a certain pitch of the solder pads.

The following guidelines should be observed:

- These packages have wider leads near the package body. The bending distance has to be no less than the distance between the narrow lead part to the package body “L”.





- The leads must not be bent directly at the edge of the package.

RIGHT

WRONG

•The minimum bend radius must be 0.5 mm

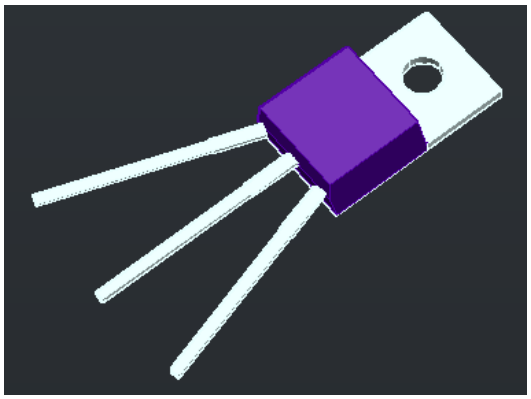
•For bending, a clamping tool should be used that ensures that mechanical forces such as pulling and shearing do not occur between the leads and the package body. The part of the lead between the point of bending and the package must be relieved of tensile stress during the bending process. Therefore, it is necessary to avoid slippage due to weak clamping, or weakening of the lead due to overly strong clamping.

•A properly designed clamping tool helps to ensure that the shape of the bend leads are consistently reproducible.

•The tensile strength of the leads from the clamping to the point where the bending force is applied should not be exceeded by using too much force. This maximum force is mainly dependent on the cross-sectional area of the lead. A typical maximum force is 20 N.

•Bending the leads parallel to the lead plane is not allowed.

WRONG



•Bending the leads manually is acceptable when the guidelines above are followed.

2- MOUNTING OF THROUGH-HOLE TOs

2.1- Main Influences on Through-hole TO Assembly Quality

The following factors have to be taken into account to achieve the best assembly quality for a given application:

- Insulating material (e.g. washer or spacer)
- Screws
- Thermal grease
- Mounting torque
- PCB and heatsink
- Attachment holes for heatsink screw mounting
- Soldering method / soldering profile
- Solderability of package

2.2- Placement of Through-hole TOs

The insertion of THDs is either done with special automatic equipment or manually. Special care has to be taken during this insertion to avoid deformation or violent bending. The diameter of the drill holes in the PCB must be take into account the tolerances of component leads, drill-hole positions, and placement accuracy.

Normally after insertion, the leads are slightly bent to fasten the component to the PCB until soldering. Please take care that this does not lead to stress that can cause defects at the interconnect between leads and package body.

2.3- Heatsink Mounting

For special packages with high power dissipation, the heatsink can be mounted before or after soldering of the leads.

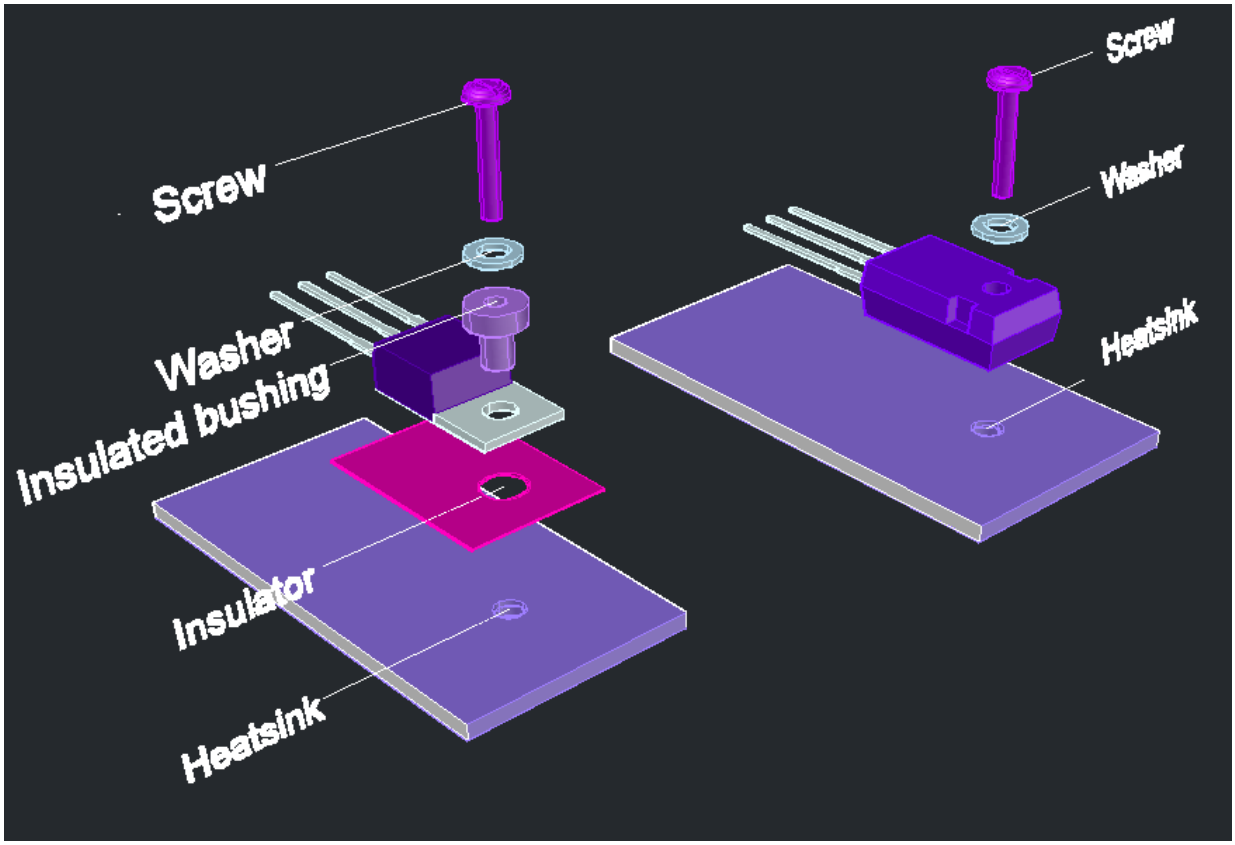
2.3.1- Heatsink Screw Mounting

Screw mounting is a traditional assembly method accomplished by fastening a screw, nut and washer together.

- Self-tapping screws should not be used.
- A washer should be inserted between the screw head and the mounting tab. Care must be taken to ensure that the washer does not damage the plastic body of the package during the mounting process.

The screw should be tightened properly to ensure that the package makes good contact with the heatsink.

Below figure illustrates proper mounting methods for a TO220 and TO 3P.



Screw-mounted TO220 (left) and TO 3P (right)

Typical and Maximum Mounting Torque Values

Package	Typ. Torque (Nm)	Max. Torque (Nm)	Comment
INSULATED TO-220AB	0.6	0.8	M.3
INSULATED TO-3P	0.6	0.8	M.4
TO-220	0.6	0.8	M.3
TO-220F	0.5	0.8	M.2.5
TO-3P/TO-247AD	0.5	0.8	M.3 / M.4
TO-3P FP	0.5	0.8	M.3 / M.4

2.3.2- Heatsink Clip Mounting

There are a number of proprietary clip solutions where the clip is anchored in a feature in an extruded heatsink. Contact forces between 25 N and 50 N can be achieved.

If clips are used, the contact area between the plastic case and the clip must be treated carefully. The maximum pressure allowed on plastic is 150 N/mm2. Above this value, cracks in the molded body may appear.

Therefore, clips have to be round or smooth in the contact area to avoid concentrated loads on the plastic body of the package.