

Application Note

Mechanical Handling of PCB-Based CONCEPT Drivers

Introduction

PCBs are rugged media widely used to connect electronics components. However, several measures must be considered in order to avoid applying excessive mechanical stress that could damage the PCB itself or the assembled components.

This Application Note describes the correct mechanical handling of PCB-based CONCEPT drivers. It particularly points out that no excessive mechanical force must be applied to transformers and that excessive PCB bending must be avoided to prevent cracks in ceramic capacitors.

Mechanical Handling of CONCEPT Drivers

Insertion of gate driver cores into the destination PCB

CONCEPT recommends that no mechanical force be applied to the transformers of gate drivers. This could happen, for example, when the transformers of CONCEPT drivers are used as a mechanical hand-hold, particularly to remove or insert the driver from/into the packaging or destination/carrier PCB (as needed for driver cores) during assembly.

Applying excessive mechanical force to the transformers bends the PCB and considerably stresses the transformer solder joints, leading to potential pre-damages. This increases the probability of cracks at the transformer solder points, which could lead to loss of functionality of the driver under worst case conditions. PCB bending may also lead to cracks in assembled ceramic capacitors that typically produce a short circuit within the ceramic body of the capacitor.

Fig. 1 shows a standard CONCEPT gate driver core. It illustrates that the force required to insert/remove the driver into/from the packaging or destination PCB must be applied directly to the corresponding terminals of the driver PCB, but not to the transformer.

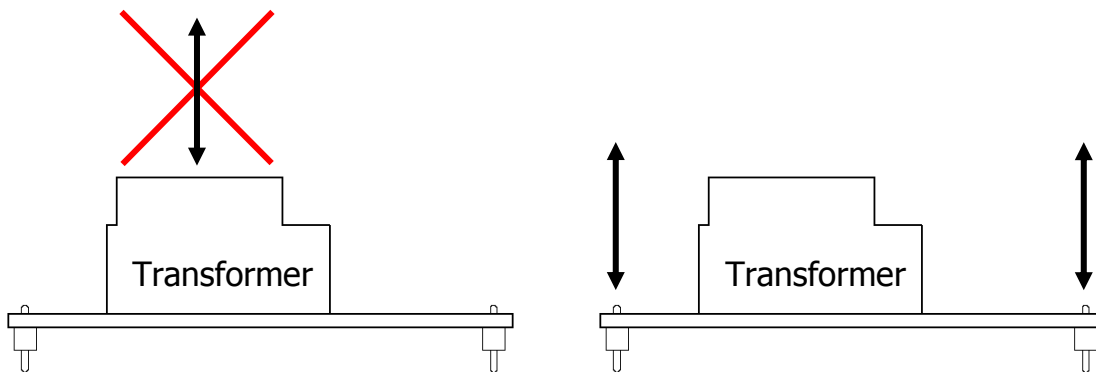


Fig. 1 Not recommended (left) and recommended (right) ways of handling CONCEPT gate driver cores during assembly (body plan of a driver)

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PCB bending

PCB bending due to an externally applied force must be kept to an absolute minimum to limit the risk of ceramic capacitor cracks. This must be considered during general PCB handling. It is therefore recommended not to expose PCBs with surface mount components to bending or twisting of more the 0.5% in relation to their length and width. Fig. 2 shows the CONCEPT gate driver core 2SC0435T as an example. It has dimensions (length and width) of 57.15mm by 51.56mm. The maximum permissible bending due to forces applied to the PCB would be 0.29mm and 0.26mm respectively.

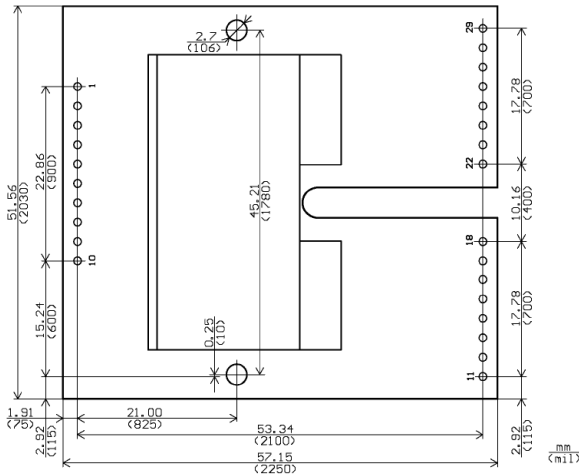


Fig. 2 Dimensions of a standard CONCEPT gate driver core

When the gate drivers are additionally screw-fitted to the carrier board or other mechanical parts (e.g. converter cooler) to increase their vibration withstand capability, it is important to adjust the height of the distance bolts properly to avoid PCB bending. Fig. 3 illustrates this fact when using a Plug-and-Play driver.

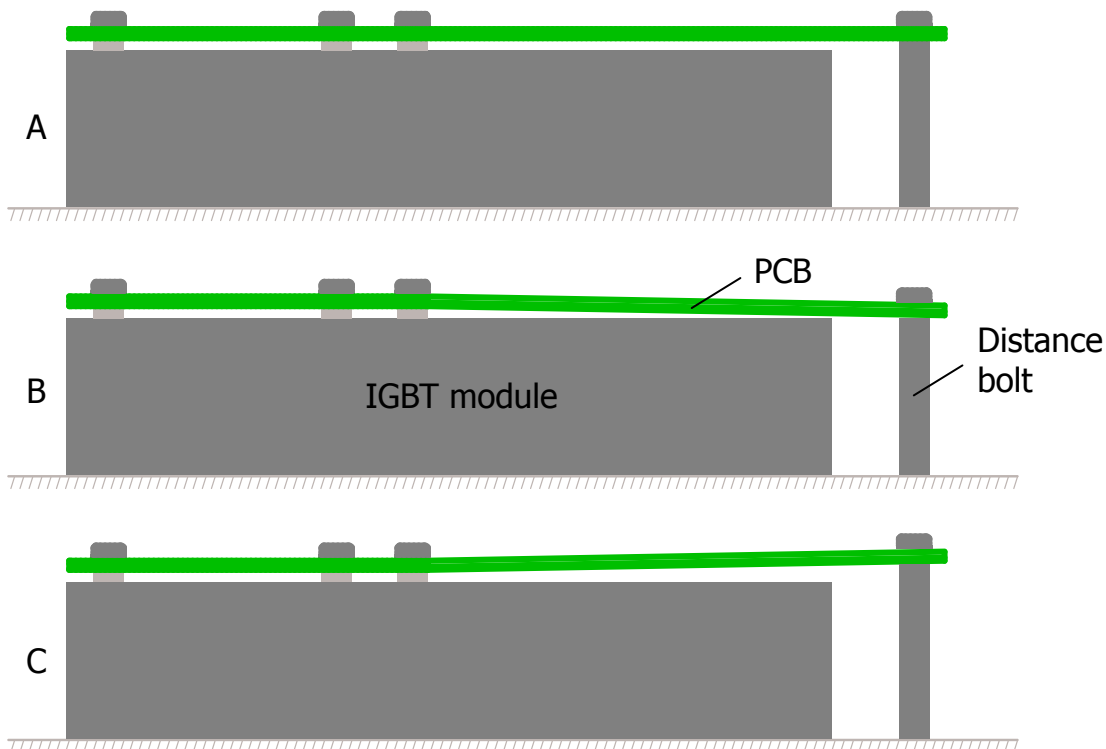


Fig. 3 Correct (A) and wrong (B and C) fixing of CONCEPT gate drivers

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Manufacturer

CT-Concept Technologie GmbH
A Power Integrations Company
Johann-Renfer-Strasse 15
2504 Biel-Bienne
Switzerland

Phone +41 - 32 - 344 47 47
Fax +41 - 32 - 344 47 40

E-mail Info@IGBT-Driver.com
Internet www.IGBT-Driver.com

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