Improved PCB-Layout with Flow Through Power Modules

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Power Applications are used in many new applications. A key prerequisite to be able to integrate electronics in those applications is a compact outline. Following are some factors to improve the system design trough intelligent structure of the power module.

Introduction

Power modules are key components in power applications. The basic features of power modules are:

⇨ Integration of the power dissipating semiconductors in a compact package
⇨ Isolation of high voltage
⇨ Electrical, mechanical and thermal contact to heat sink and PCB
⇨ Protection of the semiconductor in harsh environment
⇨ Technical standard (e.g. UL)

These basic features are easy to understand and to compare but there are additional advanced requirements for modules, which are important to the usage of the module in customers´applications.

A driving aspect, but not limited, to achieve a compact and cost effective solution for power applications is the size of the components used. However, even more important is the arrangement of the in- and outputs of those components. The key component for this approach in most instances is the power module. The following structure has to be incorporated into a module to achieve the advanced requirements into PCB routing:

⇨ Power flow through the module
⇨ Concentration of high voltage in voltage islands to minimize isolation distances on the PCB
⇨ Standoff between module and PCB for the placing of components.
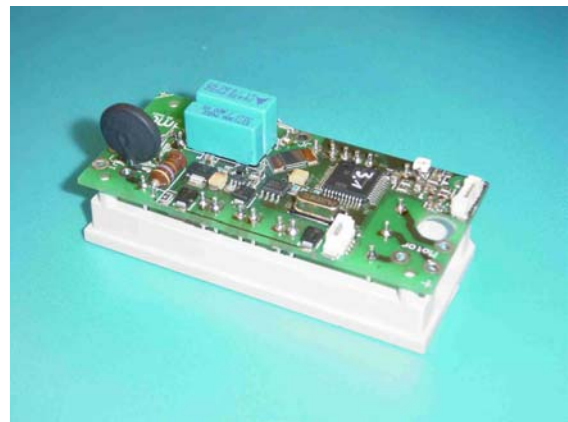
The Flow Through Concept
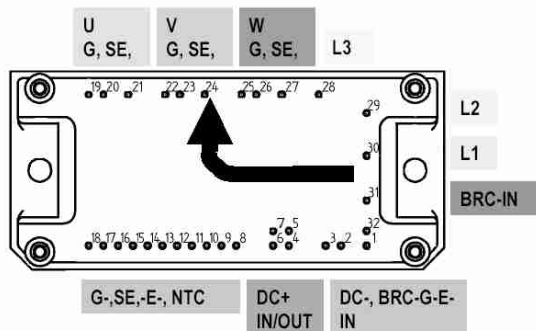
The power flow and the pinning of the *flow-*modules offer the following advantages for power applications:

⇨ Minimal power tracking for easy routing
⇨ Only double sided board needed
⇨ No Input – Output X-ing (EMC)
⇨ Short gate connection
⇨ Meeting of UL-requirements
⇨ Extreme compact application possible

Application Examples

Shown is a complete frequency converter including the Gate Driver Circuit, the current sensing and the logic Power Supply and the Micro Controller with a interface for remote control. The power module used for this application is the Vincotech *flow*PIM 1

Conclusion

In the selection of the components for power applications the main parameters to decide are voltage, current and price, but this is only true if the solutions are comparable in the mechanical setup and in the advanced features introduced in this report.