2ED020I12-FI

General design rules for EiceDRIVER™ 2ED020I12-FI

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Power Management & Drives

Never stop thinking.

2ED020I12-FI

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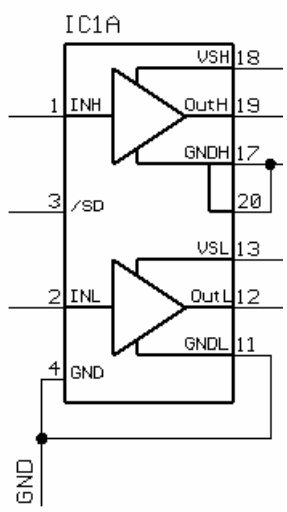
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1 General design rules for EiceDRIVER™ 2ED020I12-FI

The IGBT/MOSFET gate driver IC 2ED020I12-FI from the Infineon EiceDRIVER™ family is based on the “Coreless Transformer Technology” and shows high ruggedness against EMI, i.e. high immunity against dV/dt and dH/dt. Nevertheless, the developer should always consider basic rules to avoid EMI in his design. This application note provides – based on example schematics – hints to improve the overall EMI ruggedness of the driver stage.

The 2ED020I12-FI is equipped with a low voltage level shifter between terminals GND and GNDL in order to be immune against ground bounces between microcontroller and power switches. Thus, to reduce the bounces the ground pins GND and GNDL of the driver IC have to be connected through the shortest possible way as shown in Figure 1.



- **Figure 1** GND and GNDL Pins

Due to the nature of the power inverter application some undefined voltage spikes are always induced in PCB circuit tracks. These spikes can appear for instance in the circuit paths as well as in the ground path between microcontroller and driver IC. Depended on the PCB layout the spikes can cause incorrect control of the driver stage due to activation of the implemented interlocking function. Hence, small RC-filters are recommended at the driver IC control inputs to reduce the spike levels. The inputs InL, InH and /SD of the driver IC should have a low pass filter as shown in an example of a driver stage in Figure 2. Suitable values are for example R1, R2, R3 = 50…330 Ω and C1, C2, C3 = 20…470 pF. The values depend on:

- PCB layout
- Distance between microcontroller and driver IC
- Expansion of the ground plain
- Switching times for turn-on and turn-off

The filters have to be located close to the driver IC inputs and be attached at the shortest possible way to pin 4 (GND).

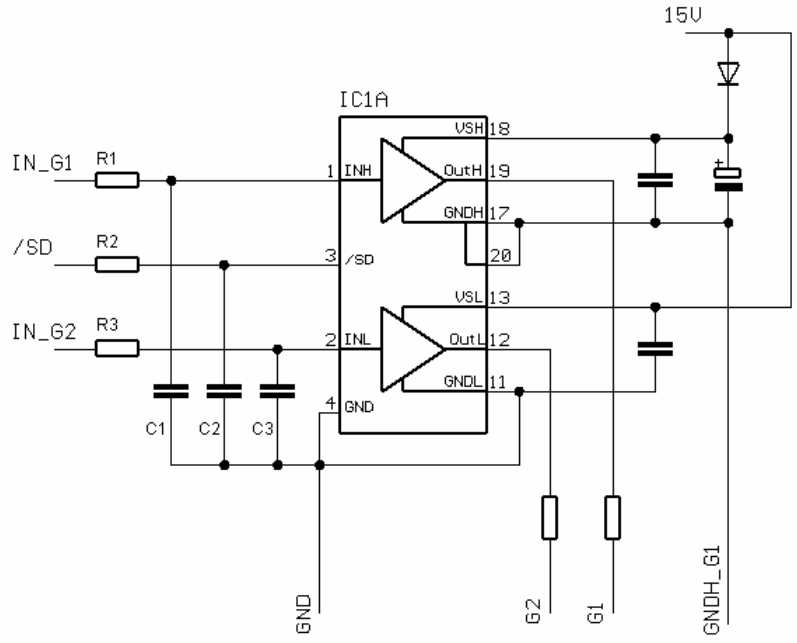


Figure 2 Six-Pack and Brake Chopper driver stage

The ground tracks of each driver IC should be laid out in a way that they meet at the low side emitter of the corresponding half-bridge for open emitter modules (Figure 3), or building a star point of the ground at the common low side emitter of modules with only one accessible (combined) emitter pin (Figure 4).

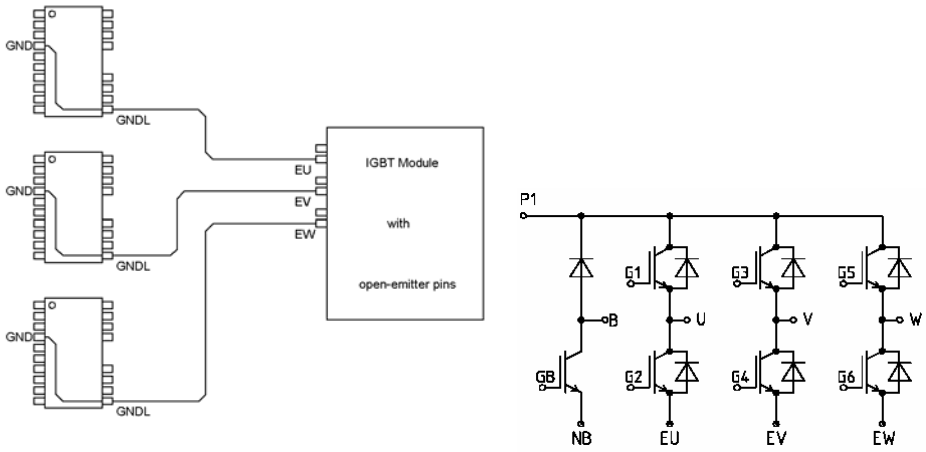
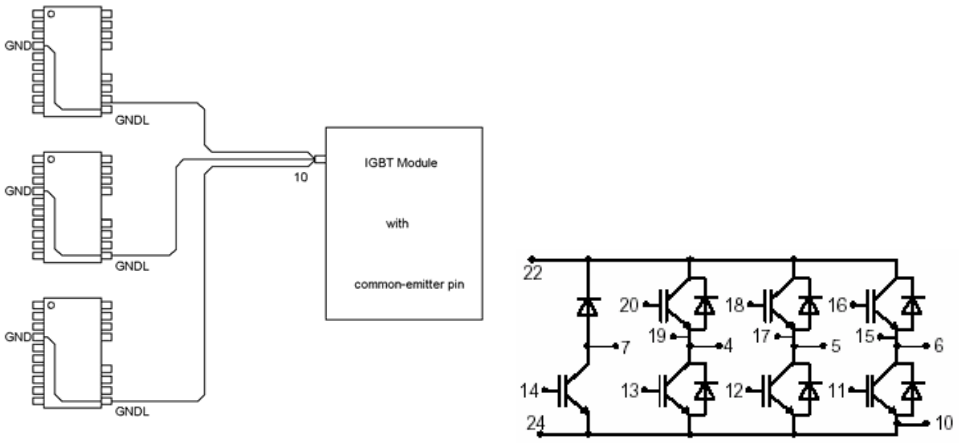


Figure 3 Open-emitter modules



- **Figure 4** Common-emitter modules