

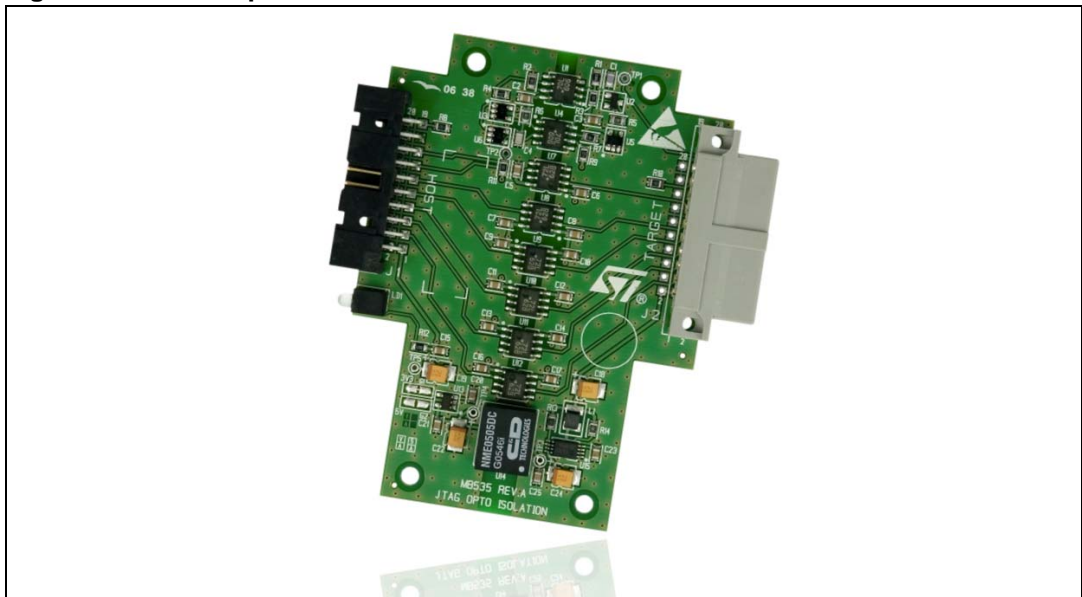
JTAG opto-isolation board

Introduction

The JTAG opto-isolation (AI-JTAG/OPTO-1) board can be connected between development tools and an application board to provide electrical isolation. This is essential when the development tools are not connected to the same ground as the application. It is also useful to protect the development tools from electrical spikes that often occur in some applications, such as motor control applications.

The JTAG opto-isolation board can be used with any tools that use the 20-pin JTAG standard connection for in-circuit debugging and programming of ST ARM core-based microcontrollers.

Figure 1. JTAG opto-isolation board



Features

- 1kV DC isolation
- Supports 3.3V or 5V operation, configurable by solder bridge
- Powered from target application using DC/DC converter powered by 3.3V or 5V
- JTAG standard 20-pin connection supporting TRST, TDI, TMS, TCK, RTCK, TDO, RESET signals
- 3.3V or 5V CMOS level compatibility
- 40nS maximum propagation delay for all unidirectional signals
- Power consumption on target application power supply less than 200mA

1 Hardware layout and configuration

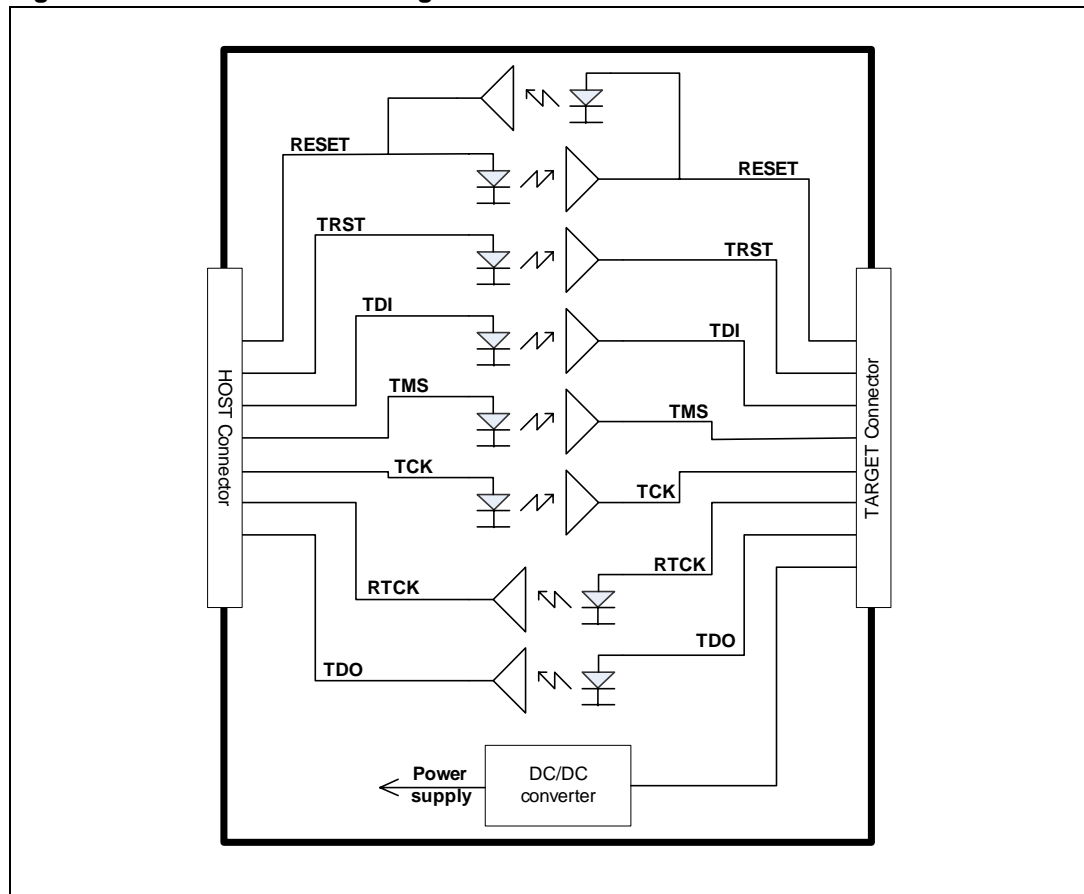
The JTAG opto-isolation board uses high speed optocouplers that allow a very low propagation time between input and output (typically 30nS). The board includes:

- a JTAG standard 20-pin female HOST connector (J1) that allows direct connection of the development tool,
- a JTAG standard 20-pin male TARGET connector (J2) for connection of the application board.

The opto-isolation board is delivered with a 7cm, 20-pin flat cable with JTAG standard connectors to facilitate the connection to the application board.

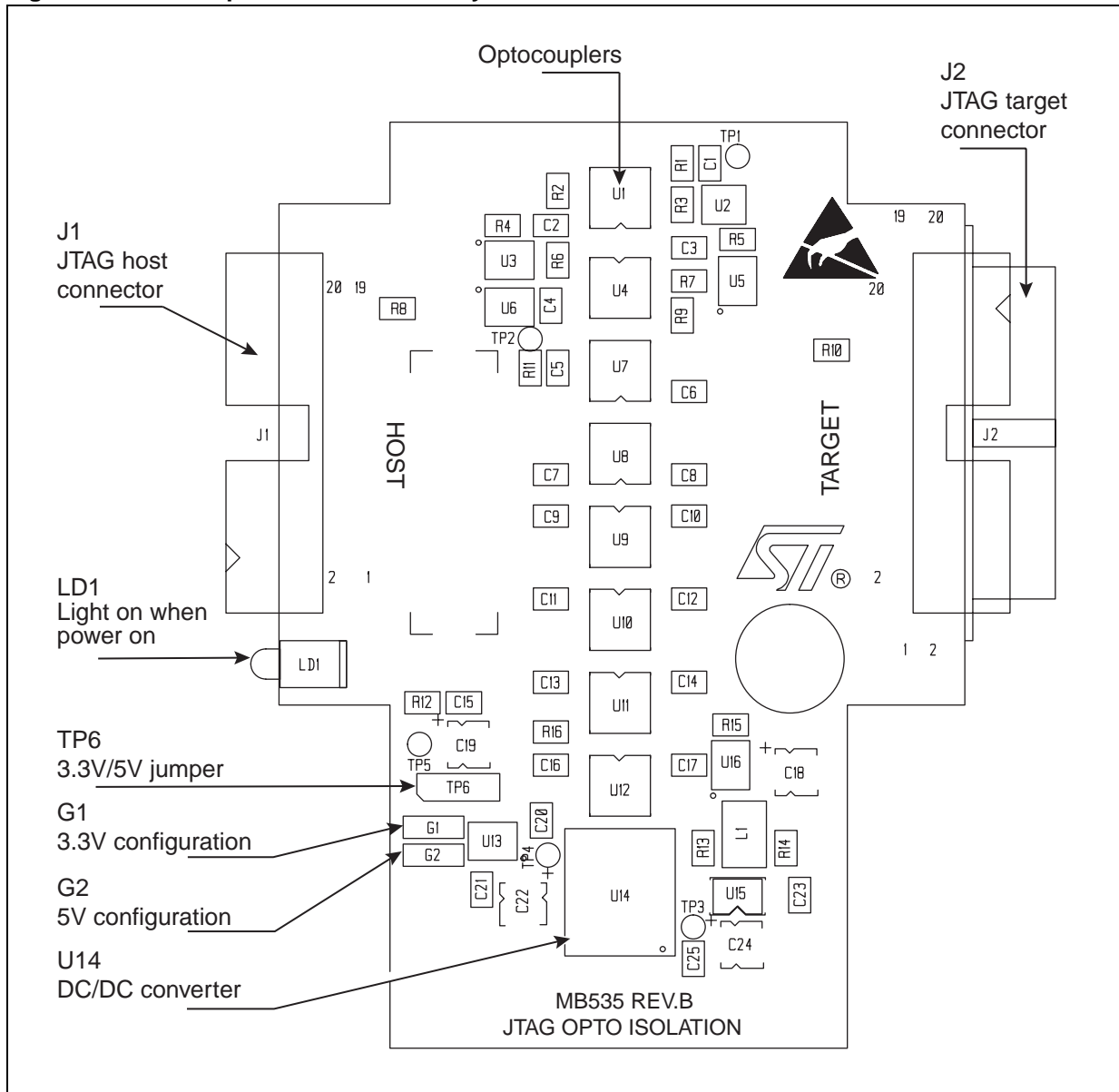
The hardware block diagram shown in [Figure 2](#) illustrates the functional connections between the development tool (HOST) and the application (TARGET). [Figure 3](#) will help you locate main features on the JTAG opto-isolation board.

Figure 2. Functional block diagram



For more detailed information on functional connections on the board, refer to [Figure 5 on page 6](#), and to [Figure 6 on page 7](#).

Figure 3. JTAG opto-isolation board layout



2 Power supply configuration

The JTAG opto-isolation board is powered by the target application power supply available on pin 1 and pin 2 of the J2 target connector. An isolated DC/DC converter on the board provides the power supply for components on the host side of the board. When host and target power supplies are present on board the LD1 LED is lit.

The board needs to be configured for 3.3V or 5V operation depending on the target application voltage.

The voltage is configured using a solder bridge on G1 or G2.



- G1 bridge ON/G2 bridge OFF: 3.3V configuration (default configuration)
- G2 bridge ON/G1 bridge OFF: 5V configuration

Caution: Components may be damaged if G1 and G2 are both configured ON.

If you need to change the power supply configuration frequently, it is possible to solder a 3-position jumper in place of TP6 on the silkscreen (see [Figure 3](#)). If a jumper is implemented, the G1 and G2 bridges must be OFF.

The voltage configuration with a jumper is shown in [Table 1](#).

Table 1. Voltage configuration with jumper

| 3.3V configuration (TP6 on pins 1 & 2) | 5V configuration (TP6 on pins 2 & 3) |
|---|---|
|  |  |

3 JTAG connectors

Figure 4. JTAG debugging connector (top view)

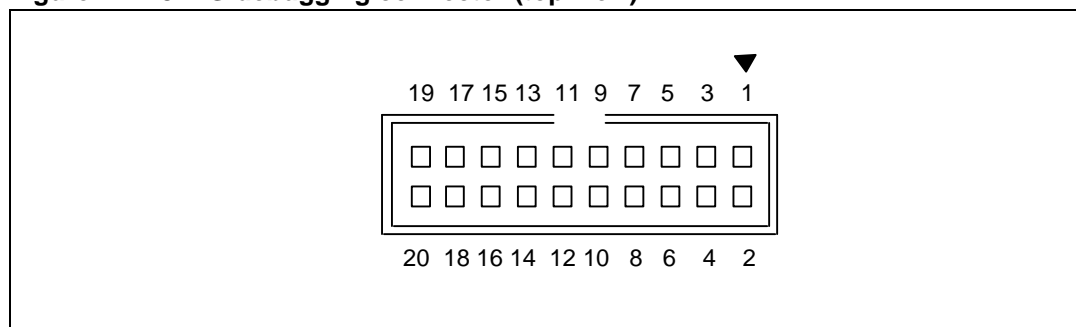


Table 2. JTAG debugging connector (CN7)

| Pin number | Description | Pin number | Description |
|------------|---------------|------------|---------------|
| 1 | 3.3V/5V power | 2 | 3.3V/5V power |
| 3 | TRST | 4 | GND |
| 5 | TDI | 6 | GND |
| 7 | TMS | 8 | GND |
| 9 | TCK | 10 | GND |
| 11 | RTCK | 12 | GND |
| 13 | TDO | 14 | GND |
| 15 | RESET# | 16 | GND |
| 17 | DBGRQ | 18 | GND |
| 19 | DBGACK | 20 | GND |

4 Schematic diagrams

Figure 5. Optocouplers

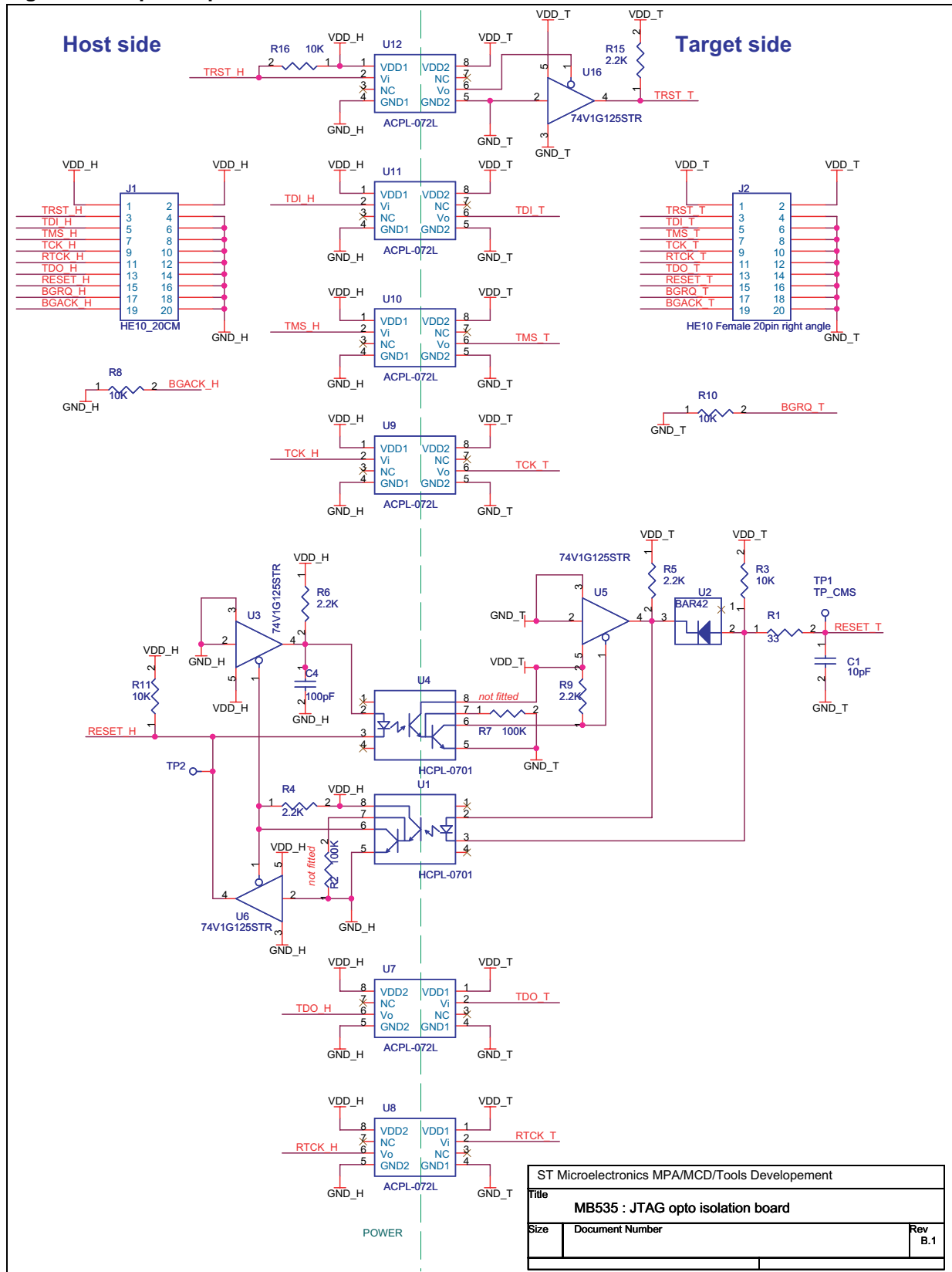
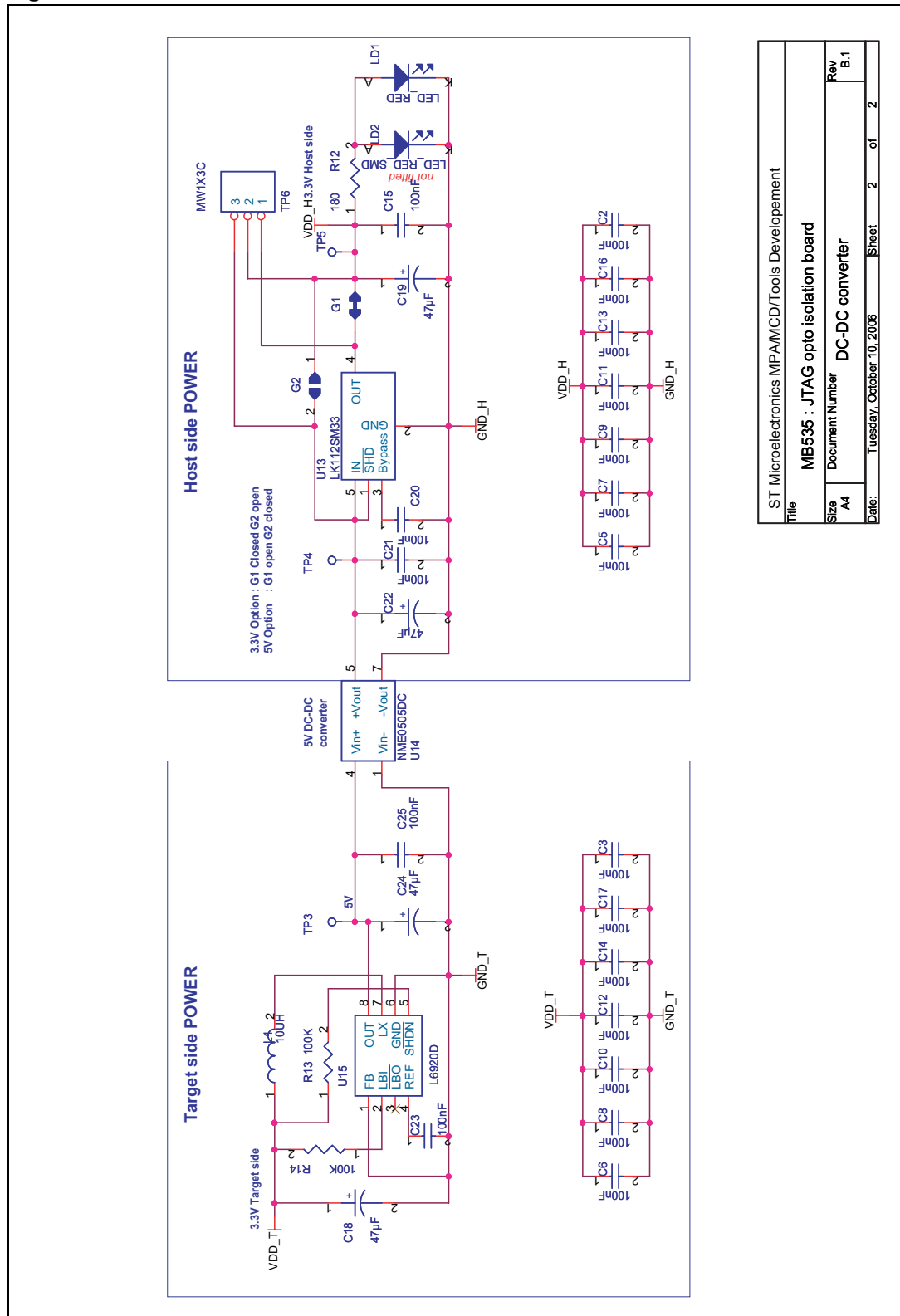


Figure 6. DC-to-DC converter



| | |
|---|---------------------------------|
| ST Microelectronics MPA/MCD/Tools Development | |
| Title MB535 : JTAG opto isolation board | |
| Size A4 | Document Number DC-DC converter |
| Rev B.1 | Date: Tuesday, October 10, 2006 |
| Sheet 2 | of 2 |

5 Revision history

| Date | Revision | Changes |
|------------|----------|------------------|
| 7-Feb-2007 | 1 | Initial release. |

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