TMC6300-EVAL Evaluation Board

Document Revision V1.0 • 2020-APR-02

The TMC6300-EVAL allows evaluation of the TMC6300 in combination with the TRINAMIC evaluation board system, or as stand-alone-board. It uses the standard schematic and offers several options in order to test different modes of operation.

Features

(typ)



Applications

- IoT & Handheld devices
- Battery operated equipment
- Printers, POS

- Miniature 3D Printers
- Toys
- Office and home automation
- CCTV, Security

TMC6300 low voltage three-phase

• Supply voltage 2-11V DC, 2.0A coil

• Direct Bridge control for BLDC or

Standby <50nA typ. current draw
Low RDSon LS 170mΩ & HS 170mΩ

• Full protection & diagnostic output

• Tiny QFN 3*3mm 20 pin package

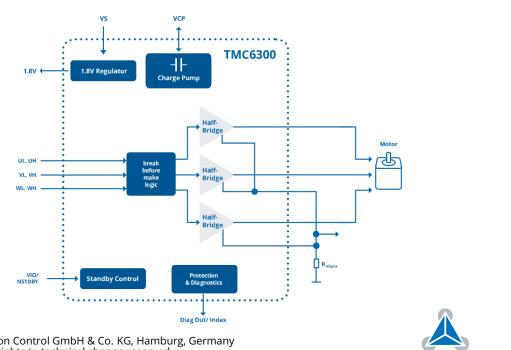
BLDC/PMSM motor driver

PMSM sine-commutation

current (peak)

- HVAC
- Mobile medical devices

Simplified Block Diagram



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1 Getting Started

You need

- TMC6300-EVAL
- Landungsbruecke with latest firmware. (The Startrampe does not support the UART interface.)
- Eselsbruecke bridge board
- BLDC motor (e.g. QMot line)
- USB interface
- Power Supply
- Latest TMCL-IDE V3.0 and PC
- Cables for interface, motors and power

Precautions

- Do not mix up connections or short-circuit pins.
- Avoid bundling I/O wires with motor wires.
- Do not exceed the maximum rated supply voltage!
- Do not connect or disconnect the motor while powered!

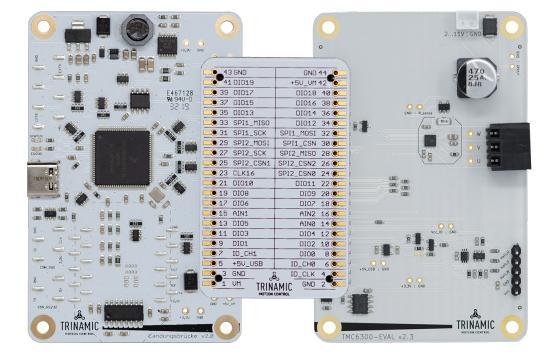


Figure 1: Getting started



1.1 First Start-Up

- 1. Make sure that the latest version of the TMCL-IDE 3.0 is installed. The TMCL-IDE can be downloaded from www.trinamic.com/support/software/tmcl-ide/.
- Open the TMCL-IDE and connect the Landungsbruecke via USB to the computer. For Windows 8 and higher is no driver needed, on Windows 7 machines the TMCL-IDE is installing the driver automatically.
- 3. Verify that the Landungsbruecke is using the latest firmware version. The firmware version is shown in the connected device tree.

👗 TMCL-IDE 3.0						
<u>File T</u> ools <u>O</u> ptions Views <u>H</u> elp						
Connected devices ×						
Device						
✓ 🛶 USB						
🗸 🟹 COM6: USB port						
🗸 📥 ID1: Landungsbruecke [V 3.01]						
🕛 Direct mode						

Figure 2: Firmware Version

- 4. The TMCL-IDE 3.0 needs room to show all important information and to provide a good overview. Therefore, arrange the main window related to your needs. We recommend using full screen. For evaluation boards it is essential to have access to the registers. Therefore open up the Register Browser (left side). For a better view click top right on the normal icon to get a maximized register browser window.
- 5. The TMCL-IDE includes a dialogue for diagnostic tasks. Further, the dialogue provides an overview of the connected motion controller and driver chips. A window pops up immediately after connecting the evaluation kit the first time. The window shows the actual status of the connections. The second tab of the dialogue offers the possibility to choose basic settings or to reset the module to factory defaults.

0	: VC1-Id 1	📥 Landungsbruecke : VC1-Id 1 🔤
Board Assignment	Settings	Board Assignment Settings
Automated board	detection	Reset
	tomated detection of connected boards. Please ion board firmware up to date.	You can reset the board settings to defaults here. Form most Trinamic chips It's a matter of firmware to restore defaults.
Scanning.	Scan	Please note that the default settings are not neccessarily the chip reset settings. The default
		O Motion controller board only
Manual board ass	ignment	Power driver board only Reset boards to defaults
	boards manually. This is only recommended if ction fails somehow. Please keep the evaluation	Both
board firmware u	up to date. Choosing a wrong combination nexpected behaviour.	Driver Enable
Motion controlle	er Driver	Please disable drivers before plug/unplug a motor to a driver board. Otherwhise the driver may be damaged!
none	+ none +	Enable drivers
Diagnostics		Diagnostics
	to be fine. Have Fun!	Diagnostics Everything seems to be fine. Have Fun!
	to be fine. Have Funt	
Everything seems t	to be fine. Have Fun!	Everything seems to be fine. Have Fun!
Everything seems t		Everything seems to be fine. Have Funt
Everything seems t	0.0V on Controller): none	Everything seems to be fine. Have Funt information Motor Supply: 0.0V

Figure 3: Landungsbruecke Dialogue

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2 Hardware Information

All design files for our evaluation boards are available for free. We offer the original ECAD files (Eagle, Altium, or PADS), Gerber data, the BOM, and PDF copies. Please check schematics for Jumper settings and input/output connector description.

The files can be downloaded from the evaluation boards' website directly at out homepage: TRINAMIC Eval Kit homepage.

Note If files are missing on the website or something is wrong please send us a note.



3 Evaluation Features in the TMCL-IDE

This chapter gives some hints and tips on using the functionality of the TMCL-IDE, e.g., how to use the velocity mode or using the wizards.

Note In order to achieve good settings please refer to descriptions and flowcharts in the TMC6300-LA data sheet. The register browser of the TMCL-IDE provides help-ful information about any currently selected parameter. Beyond that, the data sheet explains concepts and ideas which are essential for understanding how the registers are linked together and which setting will fit for which kind of application. For getting more familiar with the evaluation kit in the beginning of your examinations, drive the motor using velocity mode and/or positioning mode first. Beyond this, the direct mode function can be used. This way, TMCL commands can be sent to the evaluation board system.

3.1 Standby

To control the standby feature for the TMC6300-EVAL, open the Standby tool and press the standby button. Pay attention to any hints given by the tool.

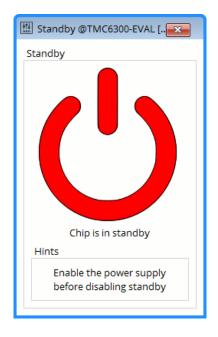


Figure 4: Control the Standby of the TMC6300 (similar for other ICs).



4 Revision History

4.1 Document Revision

Version	Date	Author	Description
1.0	2020-APR-02	LH	Initial release.

Table 1: Document Revision

