Double Motor Current with TMC5062

Valid for TMC5062

The TMC5062 supports driving a single 2 phase of three phase stepper motor with double motor current. This application note describes the additional register setting and the required schematics.
An sample board layout plus performance data will be added later on.

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1 Double Current Motor Operation

The TMC5062 is prepared to drive a motor with double current. It requires setting a flag in *GCONF* as well as modifying the board layout to match the single motor configuration. As the TMC5062 offers up to 1.5A peak per motor, this way it can drive up to three Amperes into each motor coil (i.e. up to 2A RMS) while offering the same feature set as for a single motor.

1.1 Register setting

In order to drive higher current motors, a parallel mode allows double current for a single driver, by paralleling both output power stages. This is especially useful for higher current three phase motors. The TMC5062 supports double motor current for a single driver by paralleling both power stages. In order to operate in this mode, activate the flag *single_driver* in the global configuration register *GCONF*. This register can be locked for subsequent write accesses to prevent reverting to a wrong configuration.

GENERAL CONFIGURATION REGISTERS (0X00…0X1F)					
R/W	**Addr**	**n**	***Register***	**Description */ bit names***	
				Bit	***GCONF* – Global configuration flags**
RW	0x00	11	*GCONF*	0	*single_driver* 0: Two motors can be operated. 1: Single motor, double current operation - driver 2 outputs are identical to driver 1, all driver 2 related controls are unused in this mode. *Attention: Set correctly before driver enable!*

1.2 Schematic

In a parallel connection setup, where the TMC5062 drives one motor with double current, take into account, that driver 1 takes over the complete control. Thus, the driver 1 layout should be optimized concerning sense resistor placement, etc. Connect driver 2 bridge outputs and BR pins in parallel to the corresponding driver 1 pins. Especially for the BR pins of driver 2, it is important to use low inductivity interconnection lines to the driver 1 pin BR pins. A straight routing should be preferred. As the output pins Oxxx are also paralleled, the PCB routing can access the outputs from one or the other side of the driver, or even mixed.

Pay special attention to provide enough cooling area and vias to transfer heat into the GND plane. A 70µm GND plane will bring additional enhancements, leading to a higher motor current capability.

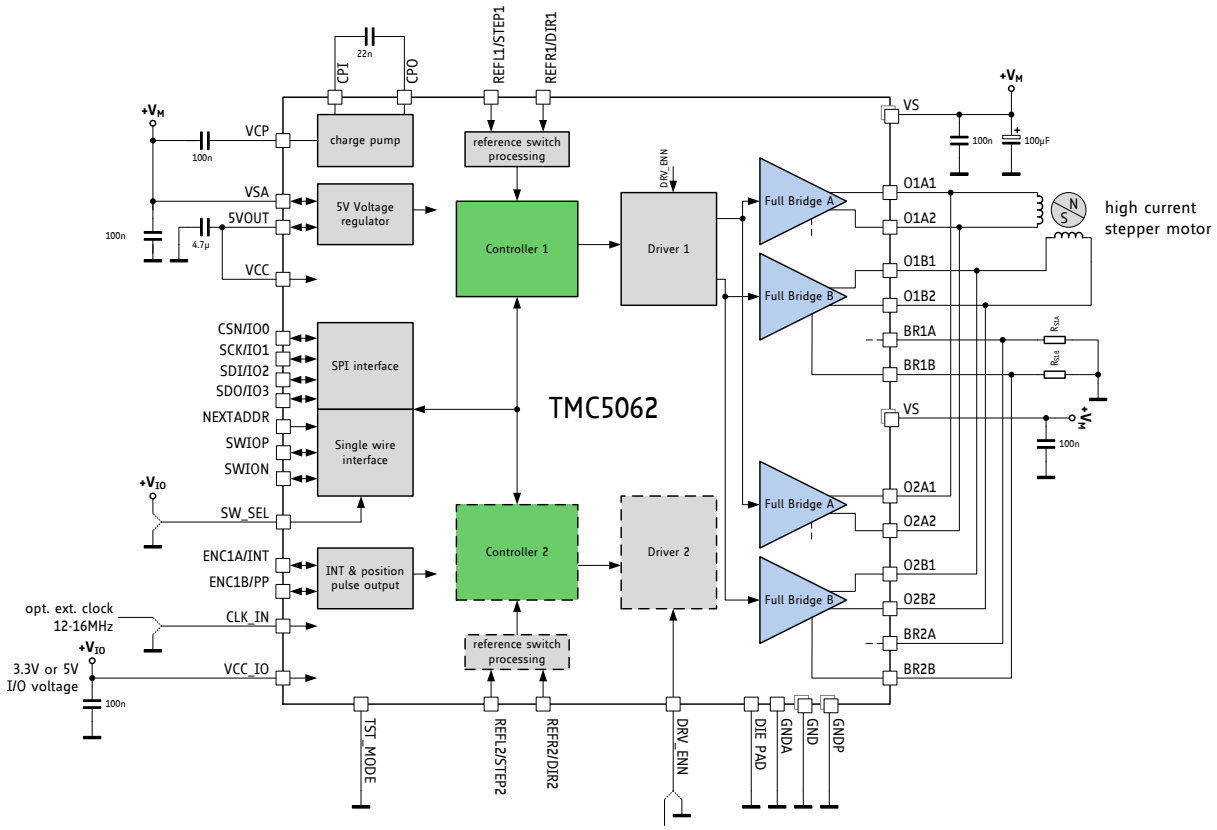

Figure 1.1 Driving a single motor with high current

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3 Revision History

Document Revision

Version	Date	Author BD – Bernhard Dwersteg	Description
1.00	2014-NOV-25	BD	Initial version copied from datasheet version 1.08

4 References

TMC5062 datasheet, www.trinamic.com
Appnote spreadCycle, www.trinamic.com