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Instruction manual for Evaluation Board of TB67S101AFNG

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Re v.1.0

【Outline】

The TB67S101A is a two-phase bipolar stepping motor driver using a PWM chopper. PHASE control system and BiCD process are adopted. Rating of 50V and 4.0A is realized.

This evaluation board mounts necessary components to evaluate the IC. Each excitation drive of full step, half step, and quarter step can be run with PWM constant current drive. Please sense low noise and low vibration of the stepping motor.

【Note】

In using, please be careful about thermal condition sufficiently. As for each control signal, please refer to the IC specification by accessing to the below URL.

<http://toshiba.semicon-storage.com/info/lookup.jsp?pid=TB67S101AFNG&lang=en®ion=apc&sug=1>

Further, the application of this evaluation board is limited to the purpose of evaluating and learning the motor control. Please do not ship them to a market.

Connection to Evaluation board

Corresponding table

(Silk name vs. Signal name)

(Note) Silk name and signal name on the board are different because the series products have the common board.

Silk name	Signal name
GND7	NC
GND6	NC
LO	NC
VREFB	VREFB
45	NC
VREFA	VREFA
OSCM	OSCM
3	IN_A1
4	IN_A2
5	PHASE_A
7	PGASE_B
8	IN_B1
9	IN_B2
10	/STANDBY

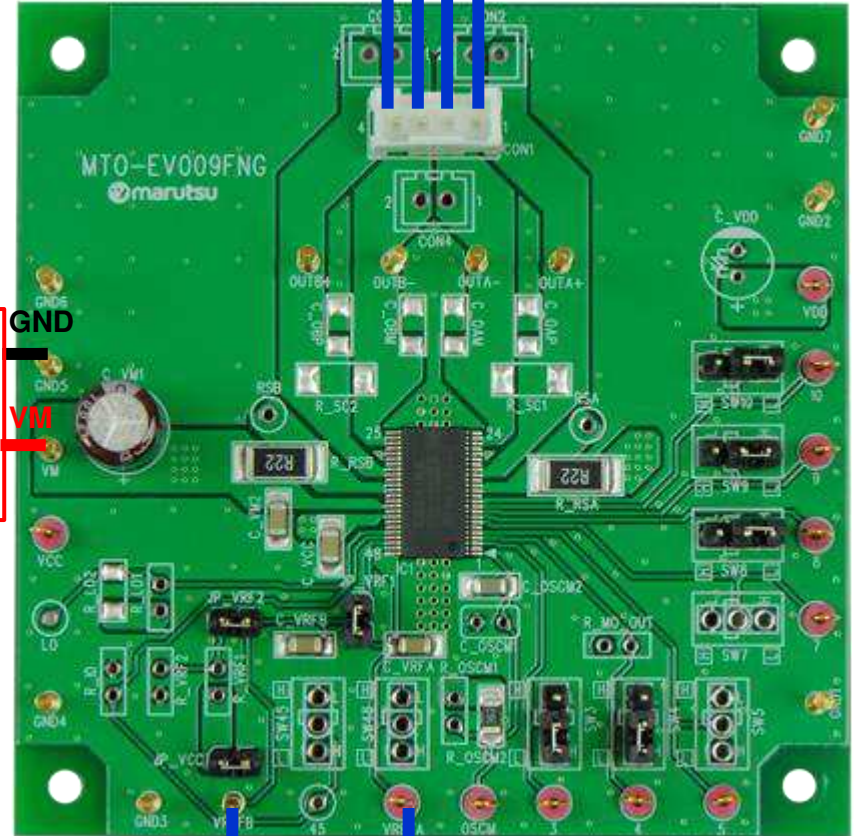
Two-phase bipolar
type
Stepping motor

Power
source of
VM
(10V to 47V)

VrefB(for B-axis)

VrefA(for A-axis)

Reference voltage for
motor current set
Vref (0V to 3.6V)



Setting evaluation board 1

Setting motor current

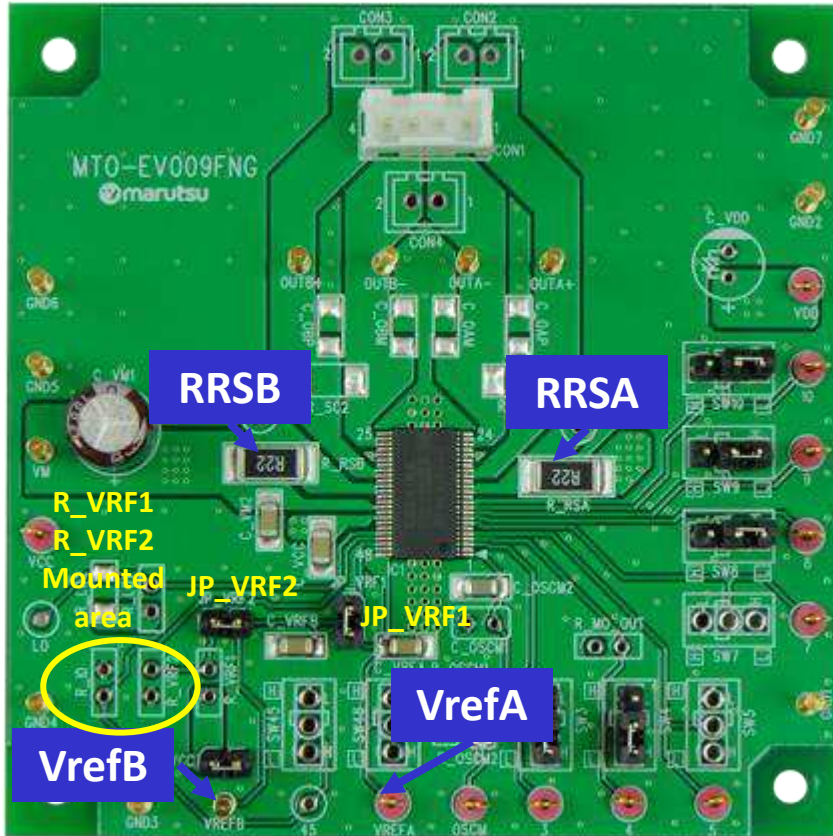
Setting motor current

$$I_{out(max)} = VREF(gain) \times \frac{Vref(V)}{RRS(\Omega)}$$

VREF(gain): Decay ratio of VREF: 1/5.0 (typ.)

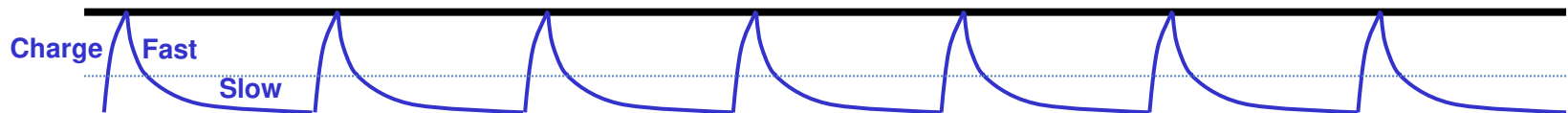
RRS=0.22Ω

VREF of A-axis and B-axis are made common by short the jumper (JP_VRF1) and the both voltages are possible to input from VREFA pin. And Vref can be generated from the internal regulator (VCC) by mounting the divider resistance to R_VRF1 and R_VRF2 and short-circuiting JP_VRF2.



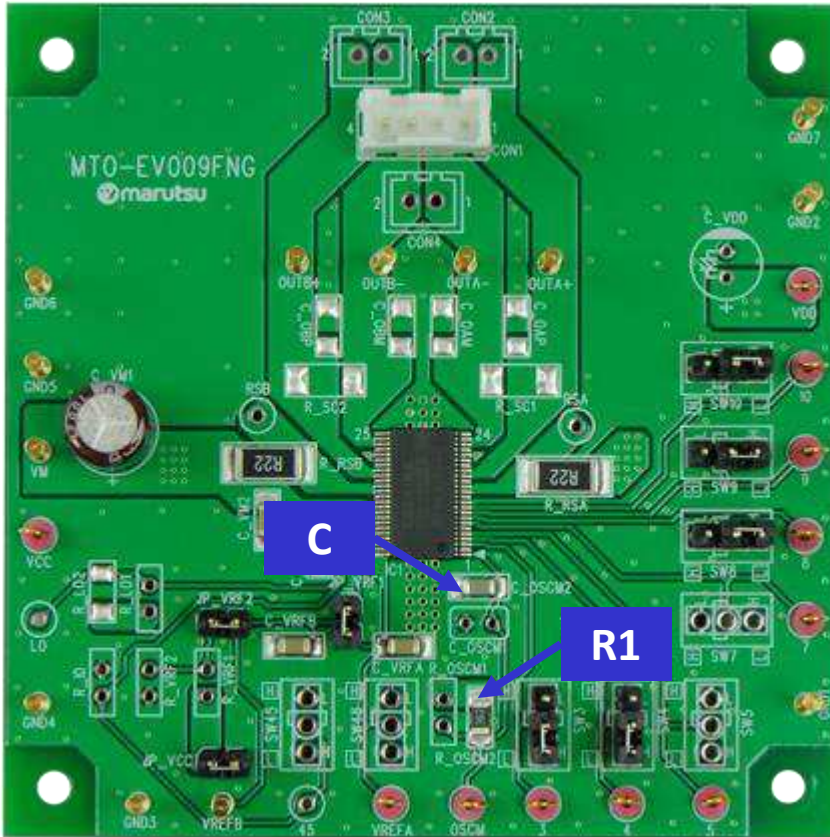
Waveform of motor current

Current value of setting motor



Setting evaluation board2

Setting chopping frequency of the constant current of the motor



Formula of setting chopping frequency

$$f_{OSCM} = 1 / [0.56 \times \{C \times (R1 + 500)\}]$$

$$f_{chop} = f_{OSCM} / 16$$

Recommended frequency range:

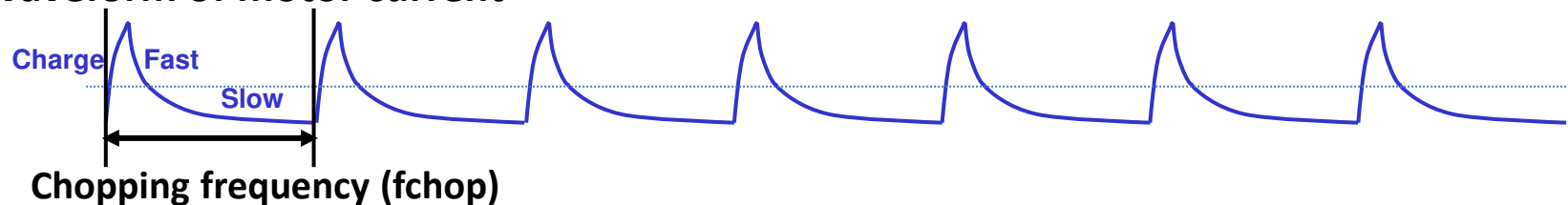
f_{chop} =40kHz to 150kHz

100kHz configuration

Mounted parts are as follows;

Capacitor ($C=270\text{pF}$), Resistance ($R1=3.6\text{k}\Omega$)

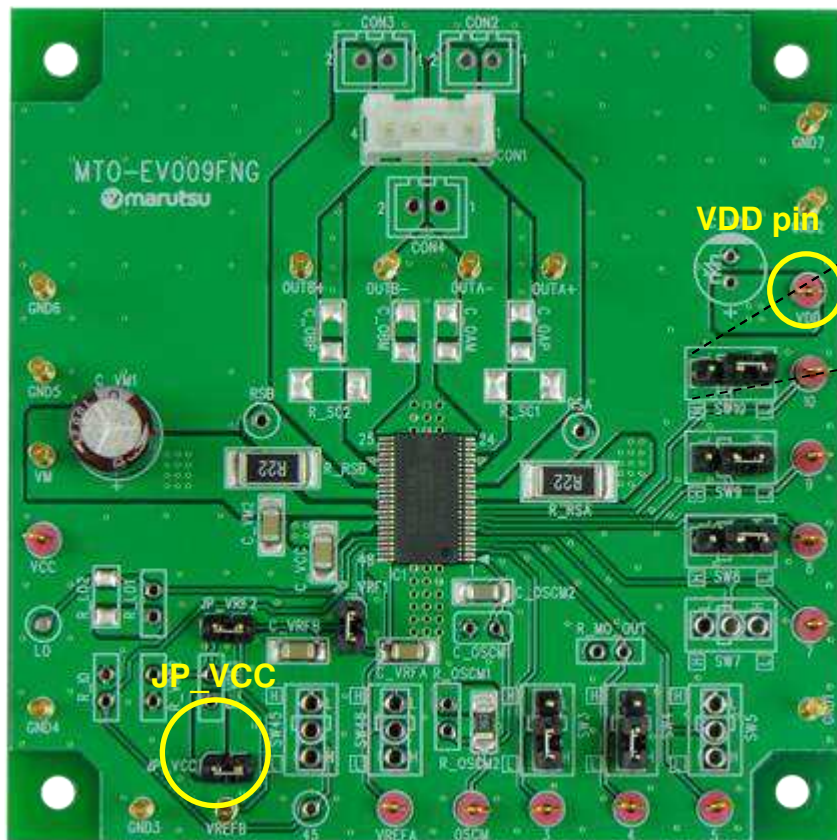
Waveform of motor current



Setting evaluation board3

Setting motor operation

【Enhanced figure of jumper part】



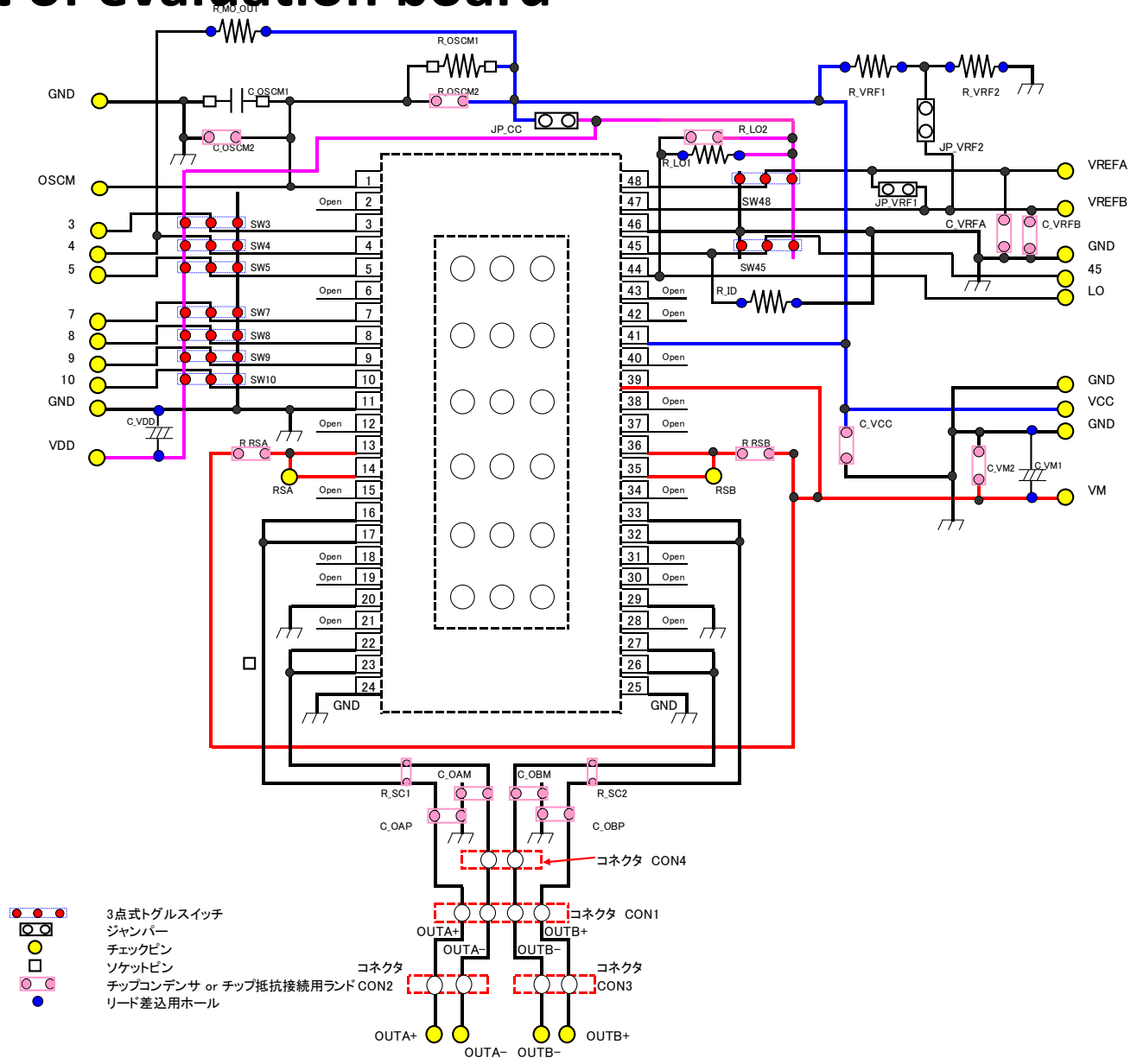
Jumper indicated above is adopted on this evaluation board to set operation of the TB67S101AFNG.

To select the function by the jumper, short-circuit JP_VCC or supply the voltage of high level by VDD pin.

In above, fixed level of the silk near the jumper is indicated inside the white frame. Please change the short position according to the configuration of the usage function.

In case of inputting the signal externally, please remove the short pin.

Circuit of evaluation board



- 3点式トグルスイッチ
- ジャンパー
- チェックピン
- ソケットピン
- チップコンデンサ or チップ抵抗接続用ランド
- リード差込用ホール

コネクタ CON4

コネクタ CON1

コネクタ CON2

コネクタ CON3

コネクタ
OUTA+ OUTA- OUTB+ OUTB-