

# **Instruction manual for Evaluation Board of TB67B008FNG**

July 2<sup>nd</sup>, 2019

Rev.1.1

## 【Outline】

The TB67B008FNG is a three-phase PWM chopper driver for sensorless brushless motors. It controls motor rotation speed by changing the PWM duty cycle, based on the speed control input.

BiCD process are adopted, and Rating of 40V and 3.0A is realized.

Necessary external parts are mounted on this board. So, it is possible to control the motor by connecting a motor.

Please sense the controllability of 3 phase brushless DC motor using TB67B008FNG.

## 【Note】

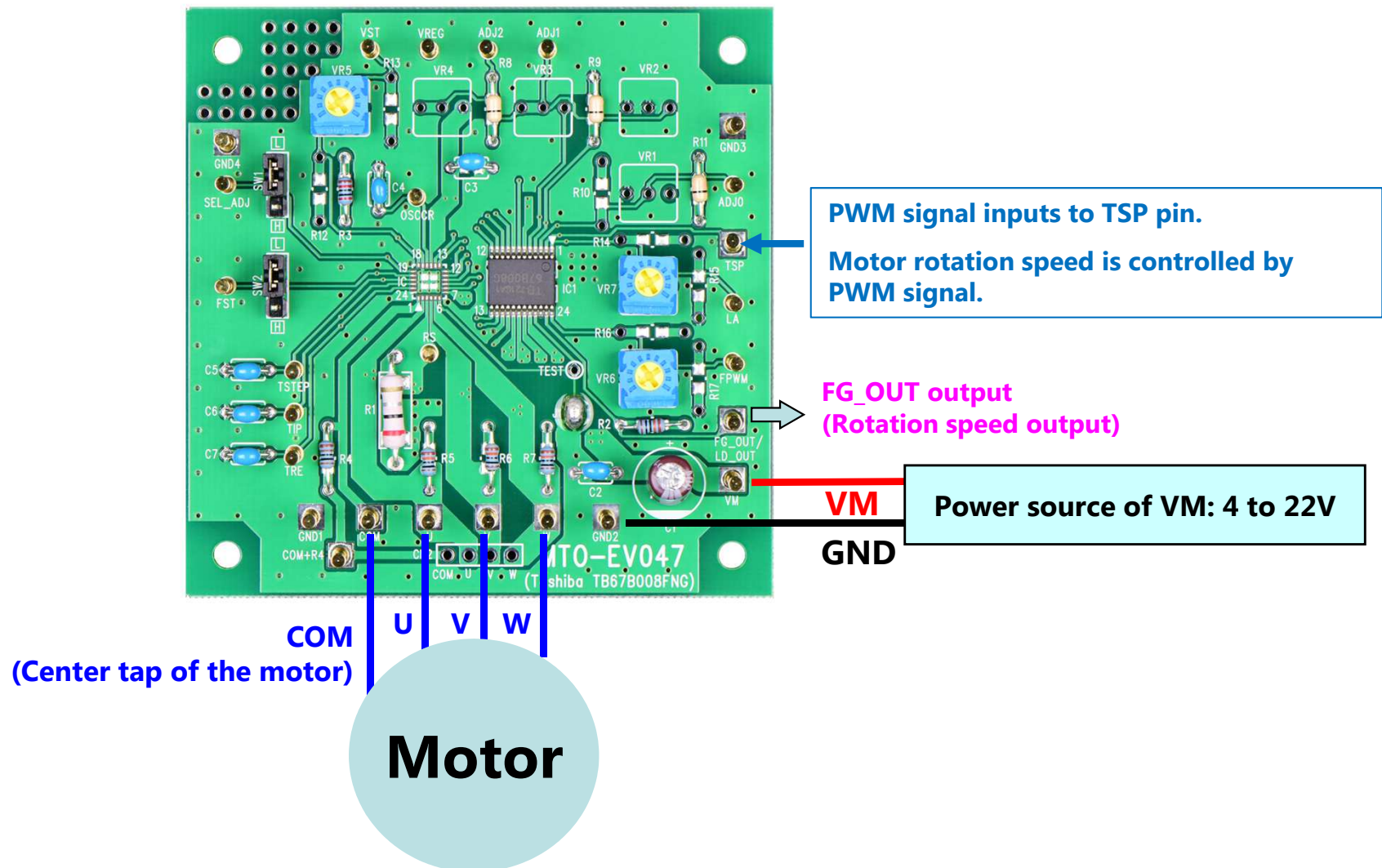
In using, please be careful about thermal condition sufficiently.

As for each control signal, please refer to the IC specification by accessing to the below URL.

<https://toshiba.semicon-storage.com/us/product/linear/motordriver/detail.TB67B008FNG.html>

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



# Operation sequence

## **【Startup sequence】**

- 1. Connect a motor to evaluation board**
- 2. Confirm the each conditions. And perform reconfiguration according to usage conditions.**
- 3. Turn on VM power supply: VM = 4 to 22V**  
→When used in initial settings, a motor rotates at full speed.

## **【Stop sequence】**

- 1. When stopping a motor rotation, set VR9 (TSP / VSP) voltage to 0V.**
- 2. Turn off VM power supply.**

## **【Notes】**

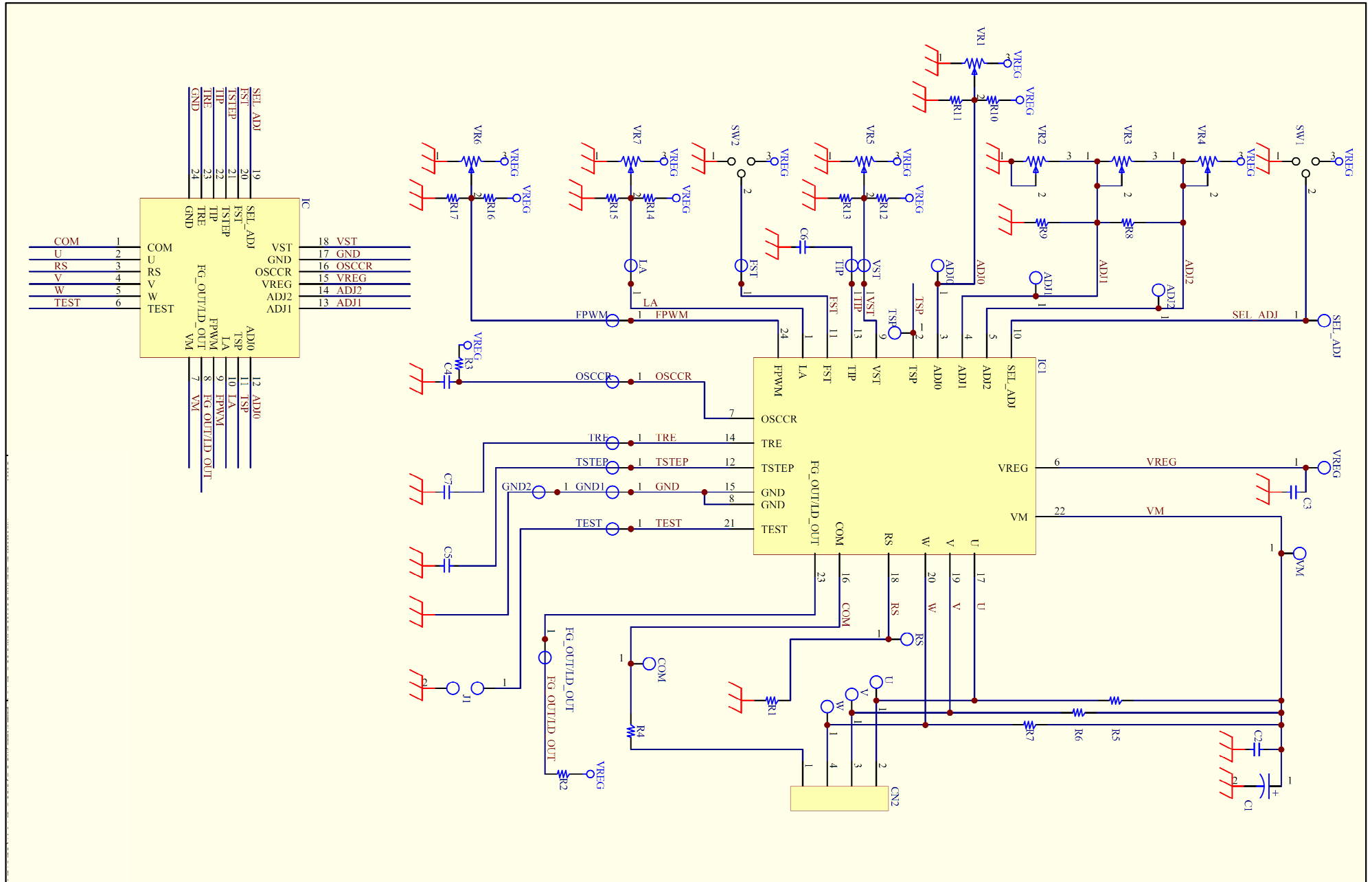
- Note 1 : When does not rotate correctly at startup, please adjust SW2, VR5, and C6 (FST, VST, TIP terminals).**

# Settings

Parts name	Pin name	H/L	Initial settings	Description
SW1	SEL_ADJ	H	-	Input duty and output duty are set to same settings. When uses ADJ terminal, please set it.
		M	-	
		L	↳	
SW2	FST	H	-	Forced commutation frequency 1.6 Hz Please change when adjusting forced commutation frequency setting at startup.
		M	-	
		L	↳	

Parts name	Pin name	Initial settings	Description
VR5	VST	Short to VREG	Startup with full duty mode. Please change this value when adjusting start setting.
VR6	FPWM	Short to VREG	8 steps is set. When adjusts output PWM frequency, please change by VR6.
VR7	LA	Short to VREG	Lead angle is set to 30° When sets lead angle, please adjust by VR7.
C5	TSTEP	1nF	Approximately, 0.01s is set. When adjusts acceleration time, please change this value.
C6	TIP	0.1μF	Approximately, 1s is set. When adjusts DC resolution term at startup, please change this value.
C7	TRE	0.1μF	Approximately, 1s is set. When adjusts recovery time at abnormal detection, please change this value.
R1	RS	0.2Ω	Limit value of output current = $0.25V / 0.2\Omega = 1.25A$
R8/9/11	ADJ0/1/2	Shorts to GND	Input duty and output duty are same settings. When uses ADJ terminals, please set this value.

# Circuit diagram of evaluation board



# BOM List

	Parts number	Parts type number	Supplier	Products type	Value	Mount /No mount		Parts number	Parts type number	Supplier	Products type	Value	Mount /No mount
1	R1	MOSX1CR20J	KOA	Resistor	0.2Ω	実装	25	SW1	2130S1*3GSE	Linkman	Jumper		実装
		CSR1206FKR200	Stackpole	Resistor (SMD type)	0.2Ω	未実装			2180BBA	Linkman	Short pin		実装
2	R2	MFS1/4CC1003F	KOA	Resistor	100kΩ	実装	26	SW2	2130S1*3GSE	Linkman	Jumper		実装
		RK73B2BTDD104J		Resistor (SMD type)	100kΩ	未実装			2180BBA	Linkman	Short pon		実装
3	R3	MFS1/4CC2002F	KOA	Resistor	20kΩ	実装	27	VR1	PVG3A104C01R00		Potentiometer	100kΩ	未実装
		RK73B2BTDD203J		Resistor (SMD type)	20kΩ	未実装	28	VR2	PVG3A104C01R00		Potentiometer	100kΩ	未実装
4	R4	MFS1/4CC1001F	KOA	Resistor	1kΩ	実装	29	VR3	PVG3A104C01R00		Potentiometer	100kΩ	未実装
		RK73B2BTDD102J		Resistor (SMD type)	1kΩ	未実装	30	VR4	PVG3A104C01R00		Potentiometer	100kΩ	未実装
5	R5	MFS1/4CC1003F	KOA	Resistor	100kΩ	実装	31	VR5	PVG3A104C01R00		Potentiometer	100kΩ	実装
		RK73B2BTDD104J		Resistor (SMD type)	100kΩ	未実装	32	VR6	PVG3A104C01R00		Potentiometer	100kΩ	実装
6	R6	MFS1/4CC1003F	KOA	Resistor	100kΩ	実装	33	VR7	PVG3A104C01R00		Potentiometer	100kΩ	実装
		RK73B2BTDD104J		Resistor (SMD type)	100kΩ	未実装	34	J1			Round for short	GND	実装
7	R7	MFS1/4CC1003F	KOA	Resistor	100kΩ	実装	35	COM	型番:ST-1-3		Check pin	-	実装
		RK73B2BTDD104J		Resistor (SMD type)	100kΩ	未実装	36	U	型番:ST-1-3		Check pin	-	実装
8	R8	Z16C	KOA	Resistor	Short	実装	37	V	型番:ST-1-3		Check pin	-	実装
		RK73Z2ETTD	KOA	Resistor (SMD type)	Short	未実装	38	W	型番:ST-1-3		Check pin	-	実装
9	R9	Z16C	KOA	Resistor	Short	実装	39	GND	型番:ST-1-3		Check pin	-	実装
		RK73Z2ETTD	KOA	Resistor (SMD type)	Short	未実装	40	VM	型番:ST-1-3		Check pin	-	実装
10	R10			Resistor		未実装	41	FG_OUT/LD_OUT	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	42	TSP	型番:ST-1-3		Check pin	-	実装
11	R11	Z16C	KOA	Resistor	Short	実装	43	VREG	型番:ST-1-3		Check pin	-	実装
		RK73Z2ETTD	KOA	Resistor (SMD type)	Short	未実装	44	SEL_ADJ	型番:ST-1-3		Check pin	-	実装
12	R12			Resistor		未実装	45	ADJ0	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	46	ADJ1	型番:ST-1-3		Check pin	-	実装
13	R13			Resistor		未実装	47	ADJ2	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	48	VST	型番:ST-1-3		Check pin	-	実装
14	R14			Resistor		未実装	49	TIP	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	50	LA	型番:ST-1-3		Check pin	-	実装
15	R15			Resistor		未実装	51	FPWM	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	52	OSCCR	型番:ST-1-3		Check pin	-	実装
16	R16			Resistor		未実装	53	TRE	型番:ST-1-3		Check pin	-	実装
				Resistor (SMD type)	-	未実装	54	TSTEP	型番:ST-1-3		Check pin	-	実装
17	R17			Resistor		未実装	55	TEST	型番:ST-1-3		Check pin	-	未実装
				Resistor (SMD type)	-	未実装	56	RS	型番:ST-1-3		Check pin	-	実装
18	C1	KMG50VB10M		Capacitor	10μF	実装	57	FST	型番:ST-1-3		Check pin	-	実装
				Capacitor (SMD type)	10μF	未実装	58	COM+R4	型番:ST-1-3		Check pin	-	実装
19	C2	RDER71H104K0K1H03B	murata	Capacitor	0.1μF	実装	59	CN2					未実装
		GRM319R72A104KA01D		Capacitor (SMD type)	0.1μF	未実装	60	IC	TB67B008FNG		Motor Driver x IC	TB67B008FNG	実装
20	C3	RDER71H104K0K1H03B	murata	Capacitor	0.1μF	実装							
		GRM319R72A104KA01D		Capacitor (SMD type)	0.1μF	未実装							
21	C4	RDE5C1H181J0K1H03B	murata	Capacitor	180pF	実装							
		12061A181JAT2A	AVX	Capacitor (SMD type)	180pF	未実装							
22	C5	RDE5C1H102J0K1H03B	murata	Capacitor	1 n F	実装							
		12065C102JAZ2A	AVX	Capacitor (SMD type)	1 n F	未実装							
23	C6	RDER71H104K0K1H03B	murata	Capacitor	0.1μF	実装							
		GRM319R72A104KA01D		Capacitor (SMD type)	0.1μF	未実装							
24	C7	RDER71H104K0K1H03B	murata	Capacitor	0.1μF	実装							
		GRM319R72A104KA01D		Capacitor (SMD type)	0.1μF	未実装							

◆ Important Note ◆

● This product was not designed for use with devices which could cause personal injury in the event of failure or malfunction, including devices for use in areas including medical, military, aviation, aerospace, nuclear control, other types of safety mechanisms, etc., or for use in devices which require a high standard of safety. Do not use this product for such applications. This company assumes no liability for damages which may result from use of the product.

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