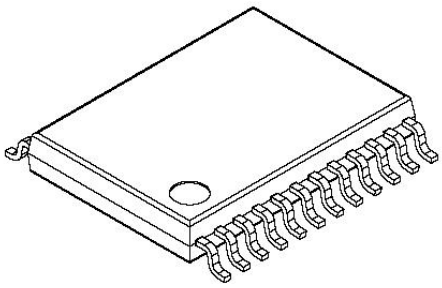
TOSHIBA Bi-CMOS Integrated Circuit Silicon Monolithic

TB9061FNG

3-Phase Sensorless Brushless Motor Pre-driver



SSOP24-P-300-0.65A

Weight: 0.14 g (typ.)

The TB9061FNG is an automotive pre-driver IC that incorporates a sensorless controller for driving a 3-phase full-wave brushless DC motor.

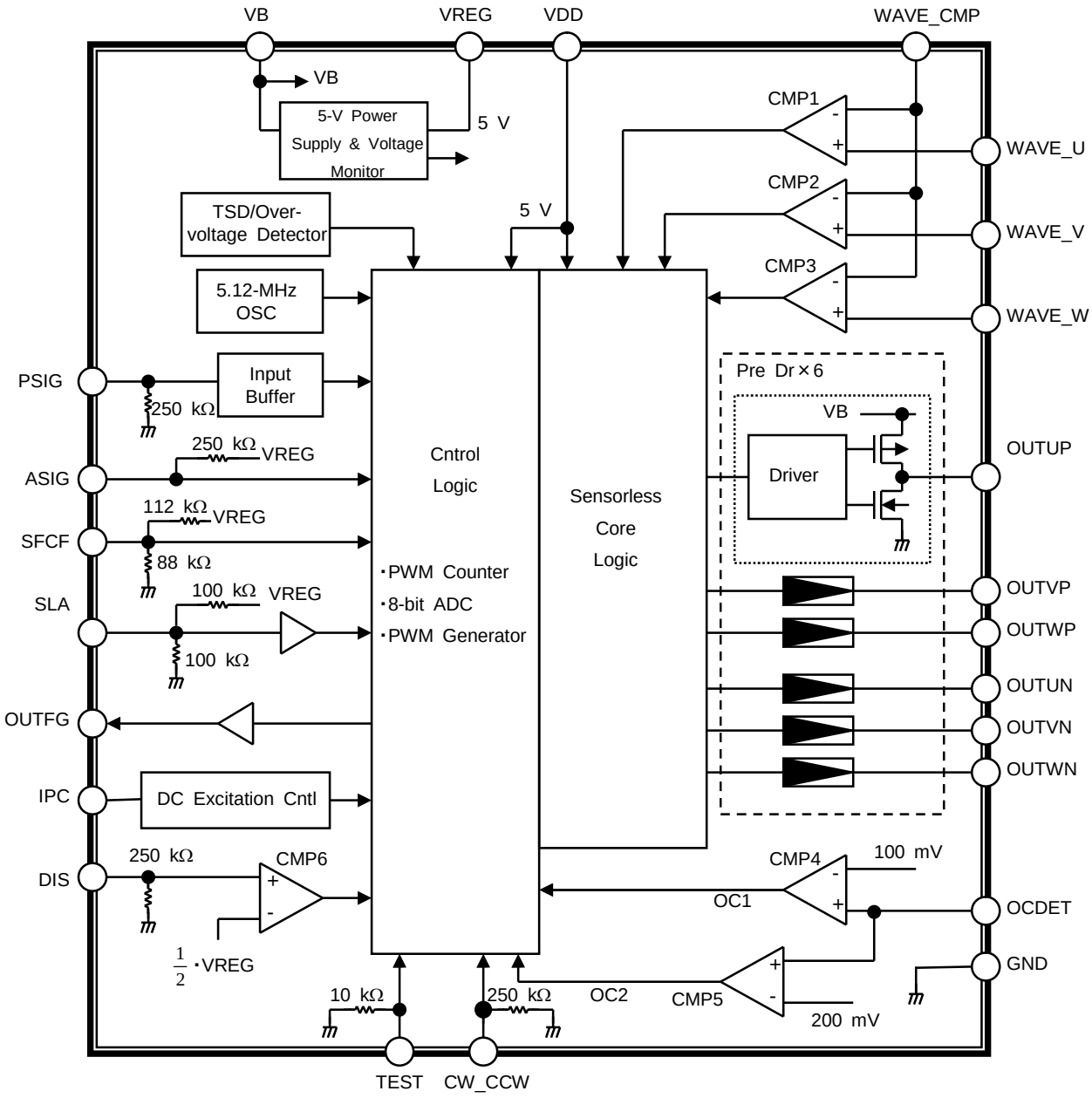
Feature

- 3-phase full-wave sensorless drive
- PWM chopper drive
- Outputs for external P-ch/N-ch MOSFETs drive (3-phase 6 outputs)
- Suited for both PWM input and DC input control
- Rotating Direction: CW/CCW
- PWM control on lower driver outputs (external N-ch MOSFETs)
- Built-in 8-bit AD converter
- Built-in 3-ch comparators to detect induced voltage (Independent 3-phase inputs)
- Built-in overcurrent detector: Detect two values (Current limiter/Overcurrent detection)
- Built-in loss-of-synchronism detection and automatic restart control
- 5.12-MHz oscillator for reference clock
- Built-in 5-V constant voltage circuit
- Operating temperature range: -40 to125 °C
- Mini flat package: SSOP-24pin(pin pitch:0.65 mm)
- The product(s) is/are compatible with RoHS regulations (EU directive 2002 / 95 / EC) as indicated, if any, on the packaging label ("[[G]]/RoHS COMPATIBLE", "[[G]]/RoHS [[Chemical symbol(s) of controlled substance(s)]]", "RoHS COMPATIBLE" or "RoHS COMPATIBLE, [[Chemical symbol(s) of controlled substance(s)]]>MCV").

About solderability, following conditions were confirmed

- Solderability
  - (1)Use of Sn-37Pb solder Bath
    - solder bath temperature=230℃
    - dipping time=5seconds
    - the number of times=once
    - use of R-type flux
  - (2)Use of Sn-3.0Ag-0.5Cu solder Bath
    - solder bath temperature=245℃
    - dipping time=5seconds
    - the number of times=once
    - use of R-type flux

Block Diagram

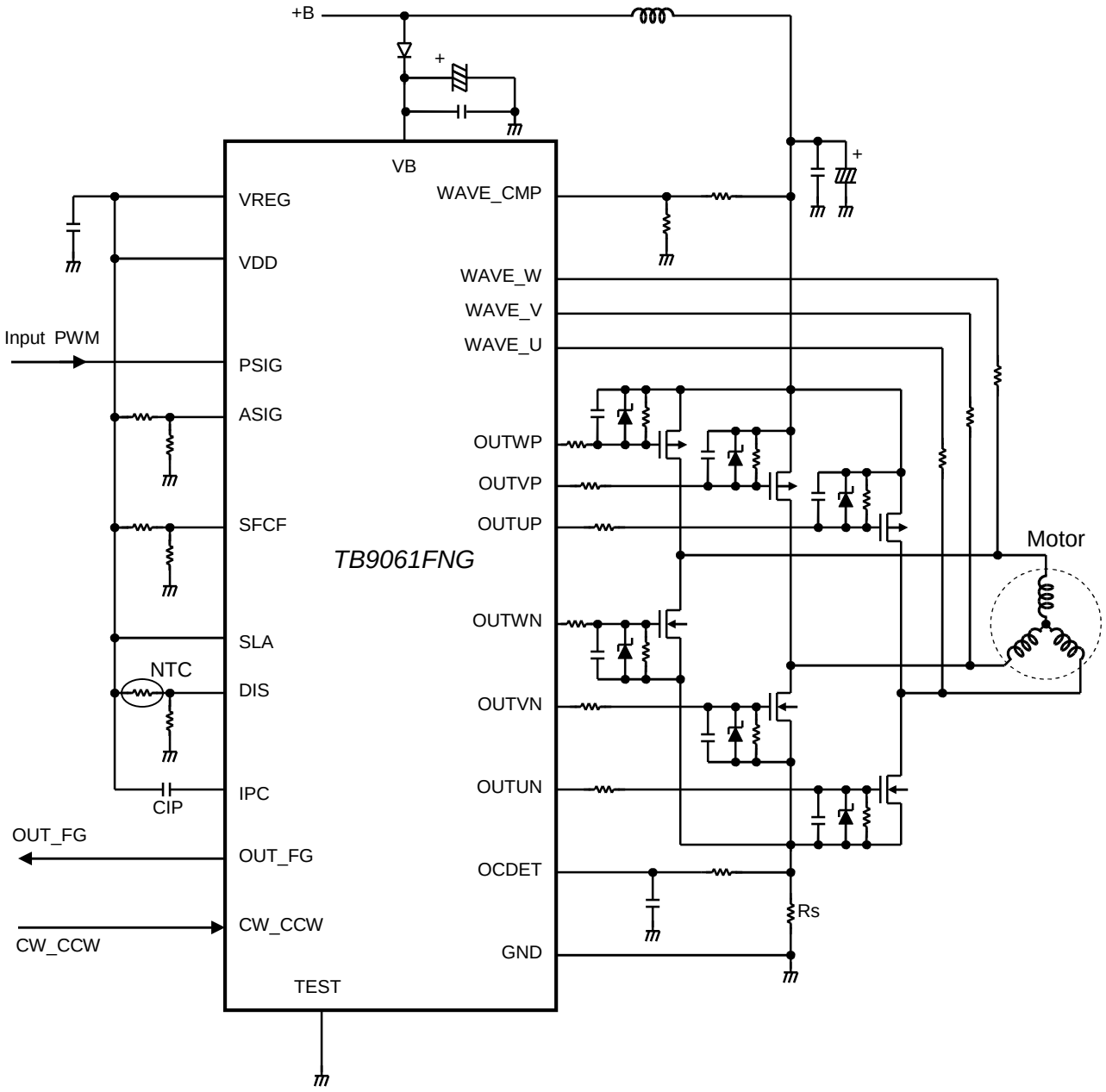


Note: Some of the functional blocks, circuits, or constants in the block diagram are omitted or simplified to clarify the descriptions of the relevant features.

Application Examples

Example of the entire PWM input control circuit

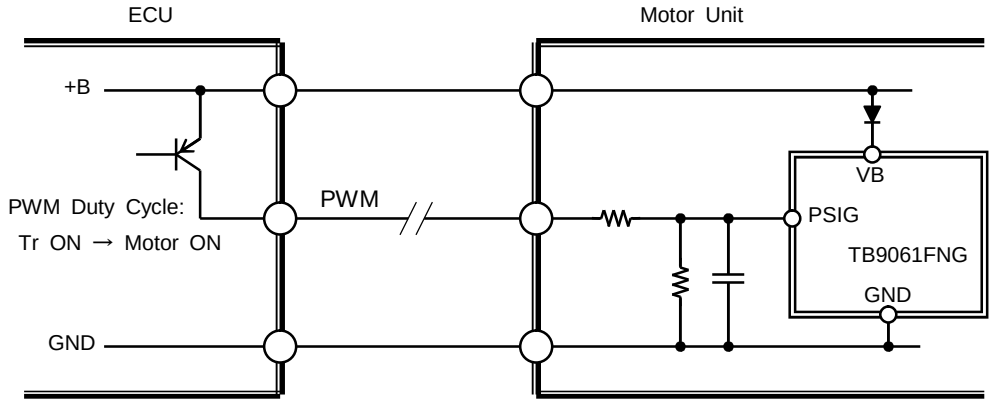
- Output PWM duty cycle: Determined by the PSIG PWM duty cycle
- Lead angle: 15°
- With DC excitation control



Application examples

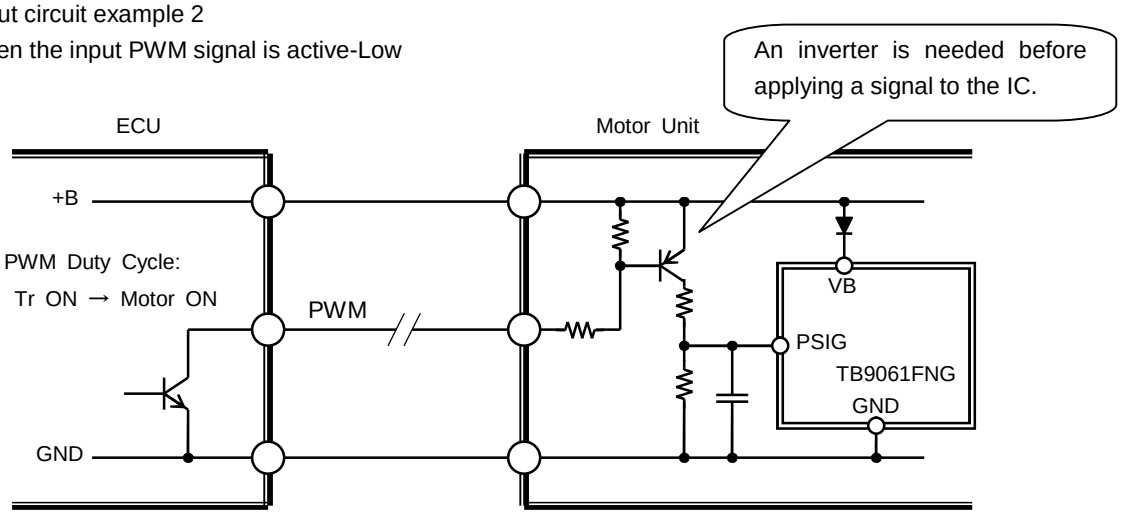
PWM input circuit example 1

When the input PWM signal is active-High



PWM input circuit example 2

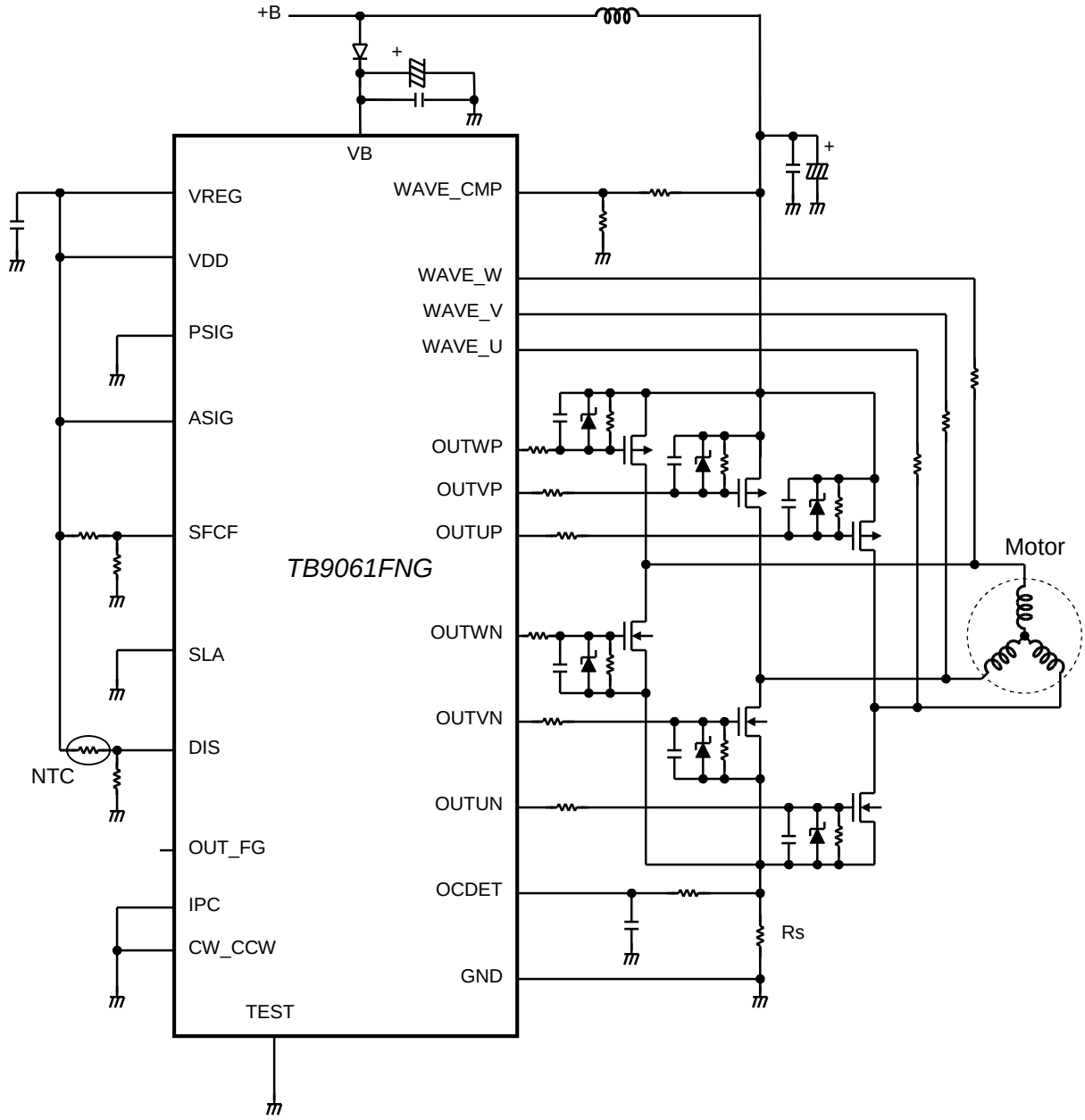
When the input PWM signal is active-Low



Application Examples

Circuit example with fixed PWM duty cycle (for high-speed rotation)

- Output PWM duty cycle: Determined by the ASIG rate (100%)
- Lead angle: 7.5°
- Without DC excitation control
- Fixed to CW mode



Notes

Note 1: Some of the functional blocks, circuits, or constants in the block diagram may be omitted or simplified for explanatory purposes.

Note 2: The equivalent circuit diagrams may be simplified or some parts of them may be omitted for explanatory purposes.

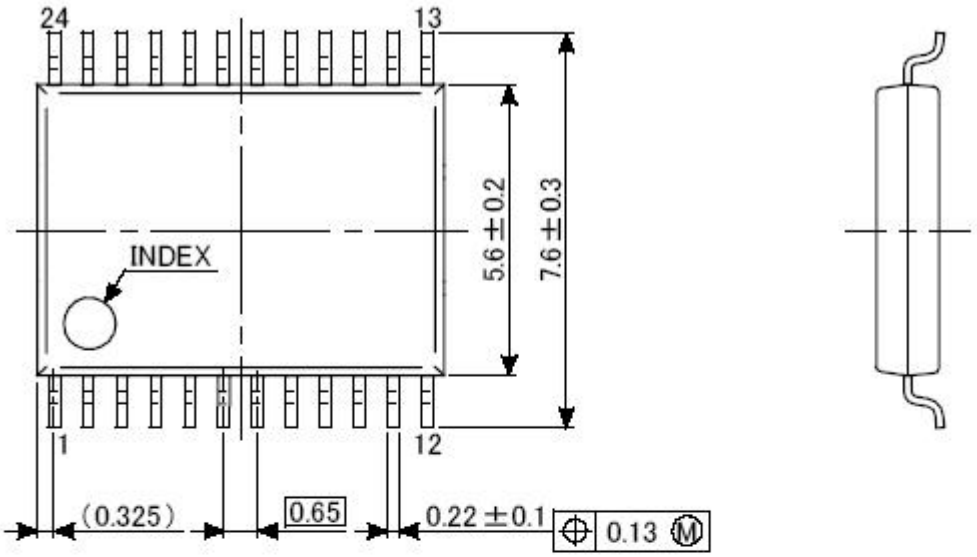
Note 3: Timing charts may be simplified for explanatory purposes..

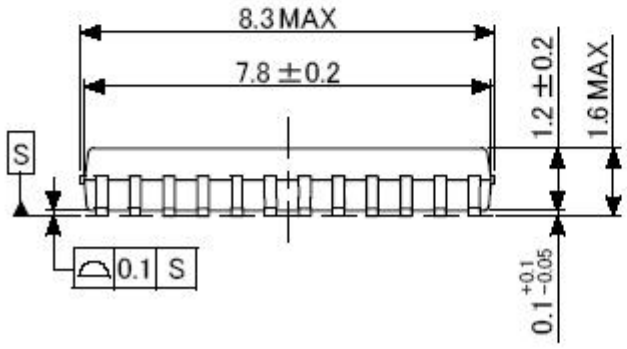
Note 4: Ensure that the IC is mounted correctly as specified. Failing to observe the correct mounting procedure or requirements may damage the IC or target equipment.

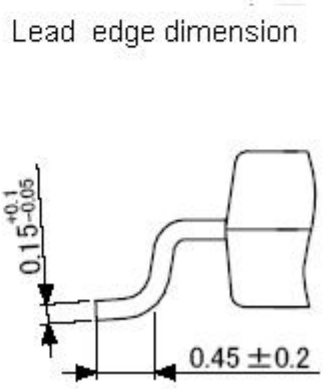
Note 5: The application circuits shown in this document are provided for reference purposes only. Thorough evaluation is required, especially at the mass production design stage.Toshiba does not grant any license to any industrial property rights by providing these examples of application circuits.

Package Dimensions

Unit:mm







Weight: 0.14 g (typ.)

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