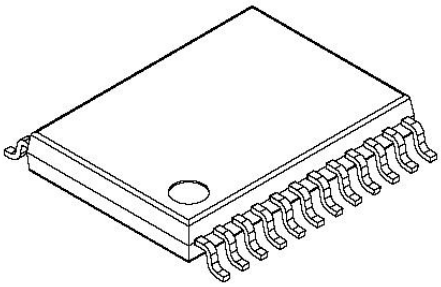
TOSHIBA Bi-CMOS Integrated Circuit Silicon Monolithic

TB9061AFNG

3-Phase Sensorless Brushless Motor Pre-driver



SSOP24-P-300-0.65A

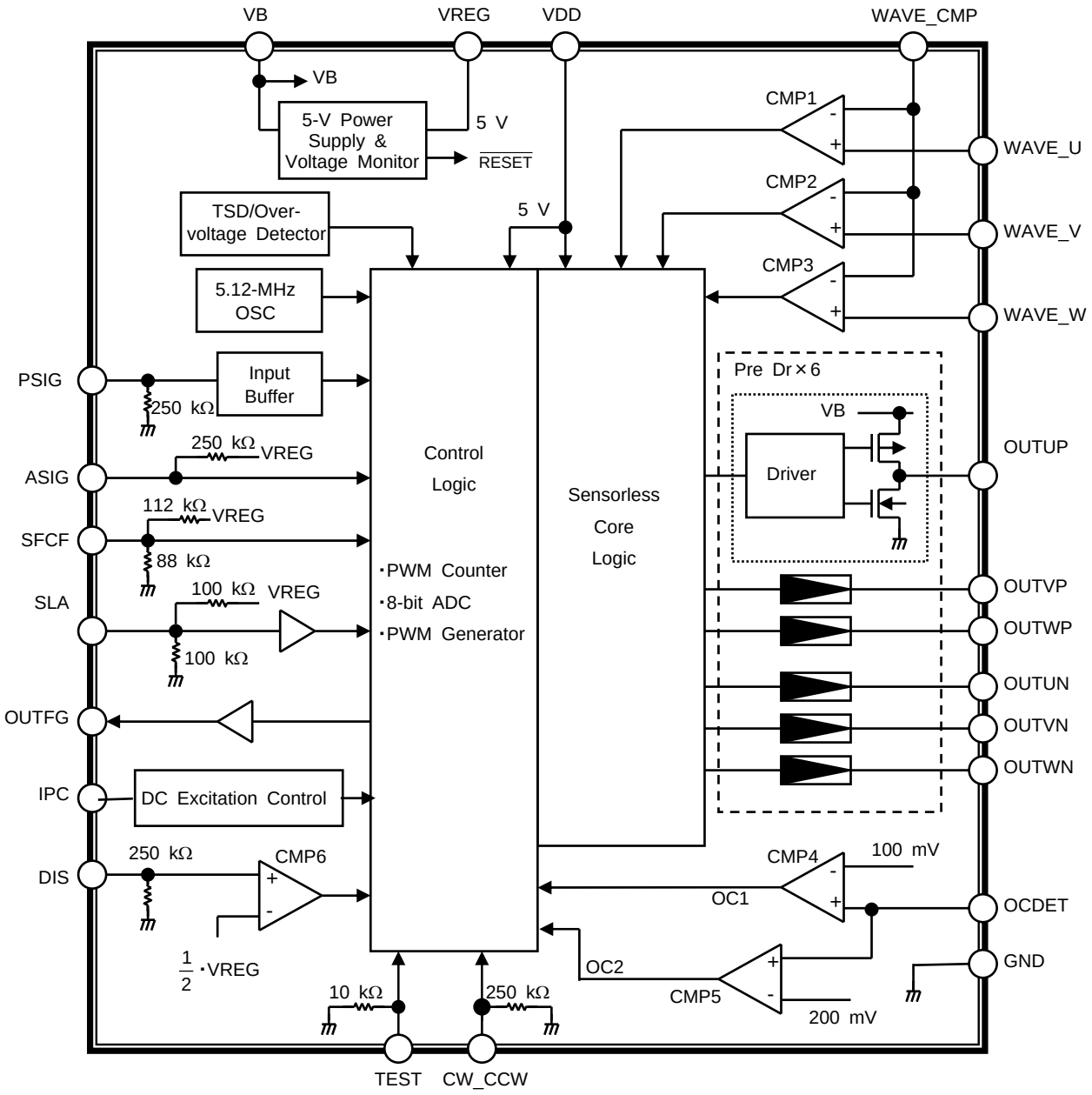
Weight: 0.14 g (typ.)

The TB9061AFNG 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)
  (Output PWM Dynamic range expansion)
- Suited for both PWM input and DC input control
- Rotating Direction: CW/CCW
- PWM control on lower driver outputs
- 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 (Improved Start up)
- 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)
- TB9061FNG Pin-compatible
- The product(s) is/are compatible with RoHS regulations (EU directive 2011 / 65 / EU) 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").

Block Diagram

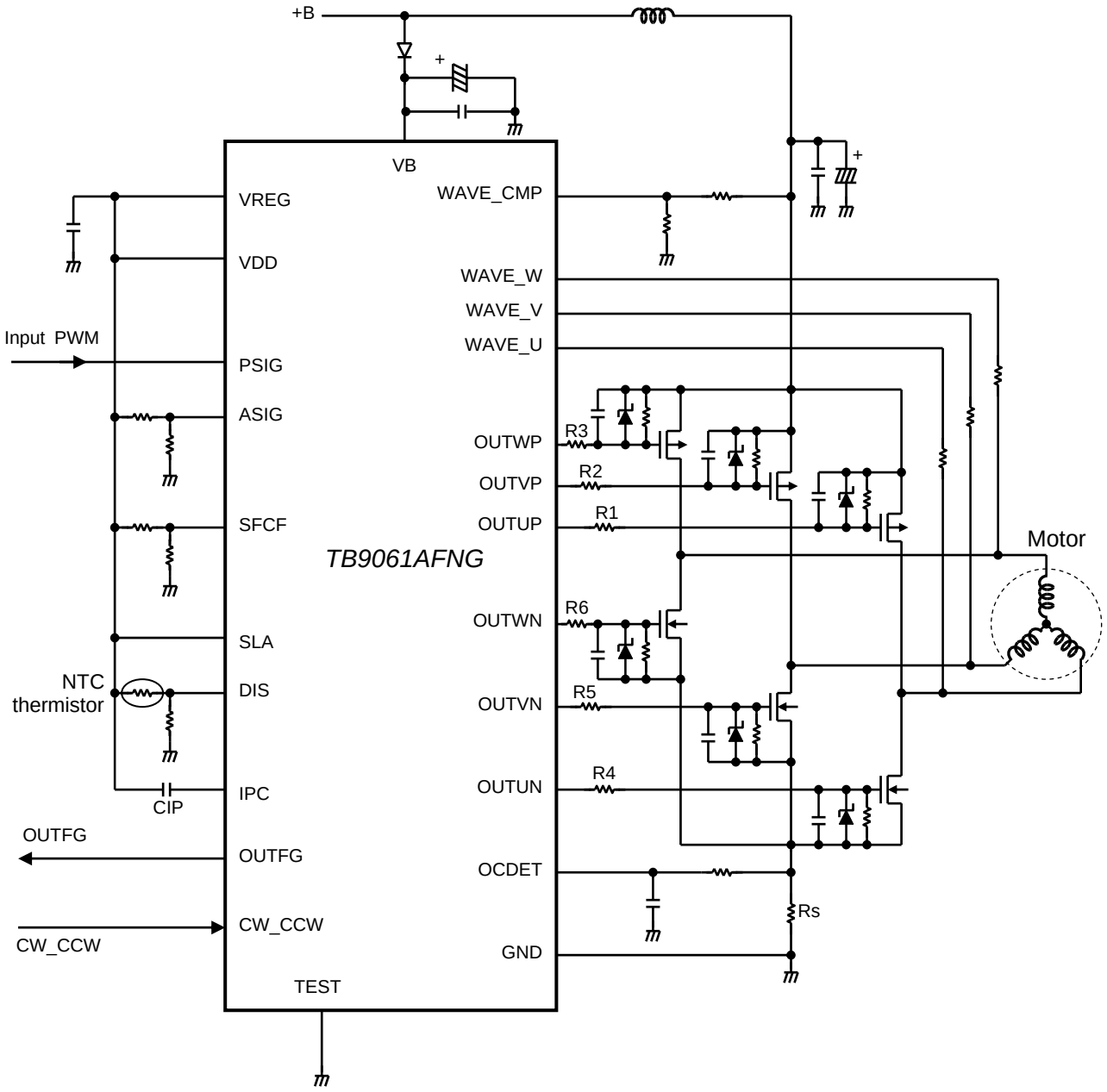


Note: Some of the functional blocks, circuits, or constants in the block diagram are omitted or simplified to clarify the descriptions of the relevant features.

Application Examples1

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

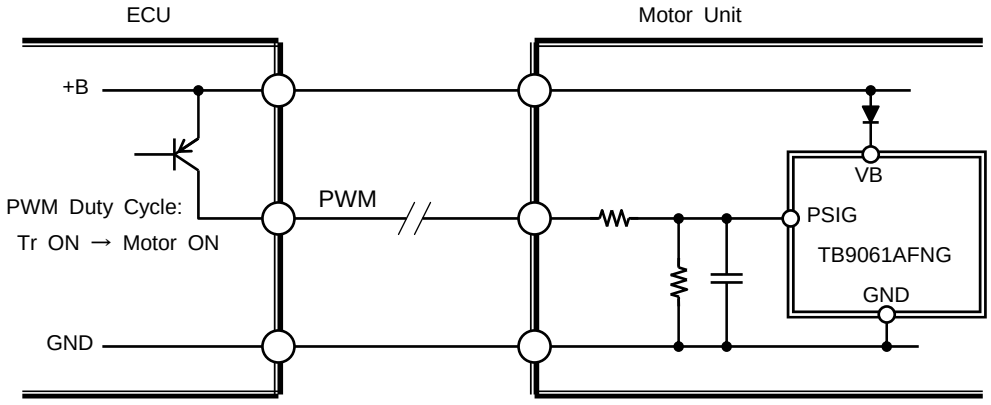


Note1:The capacitor connected to the Source pin of the Pch FET is for absorbing disturbance noise, voltage fluctuation by load change, etc. Connect it as close to the Source pin of the Pch FET as possible.
Note2: We recommend more than 100 Ω from R1 to R6 as the external resistance of pre-driver output pin.

Application examples1

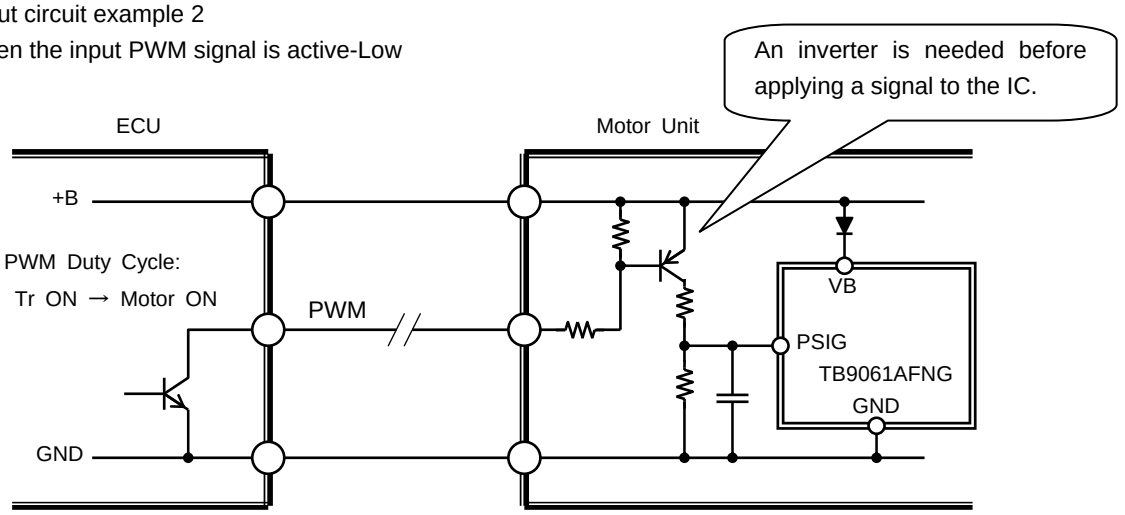
PWM input circuit example 1

When the input PWM signal is active-High



PWM input circuit example 2

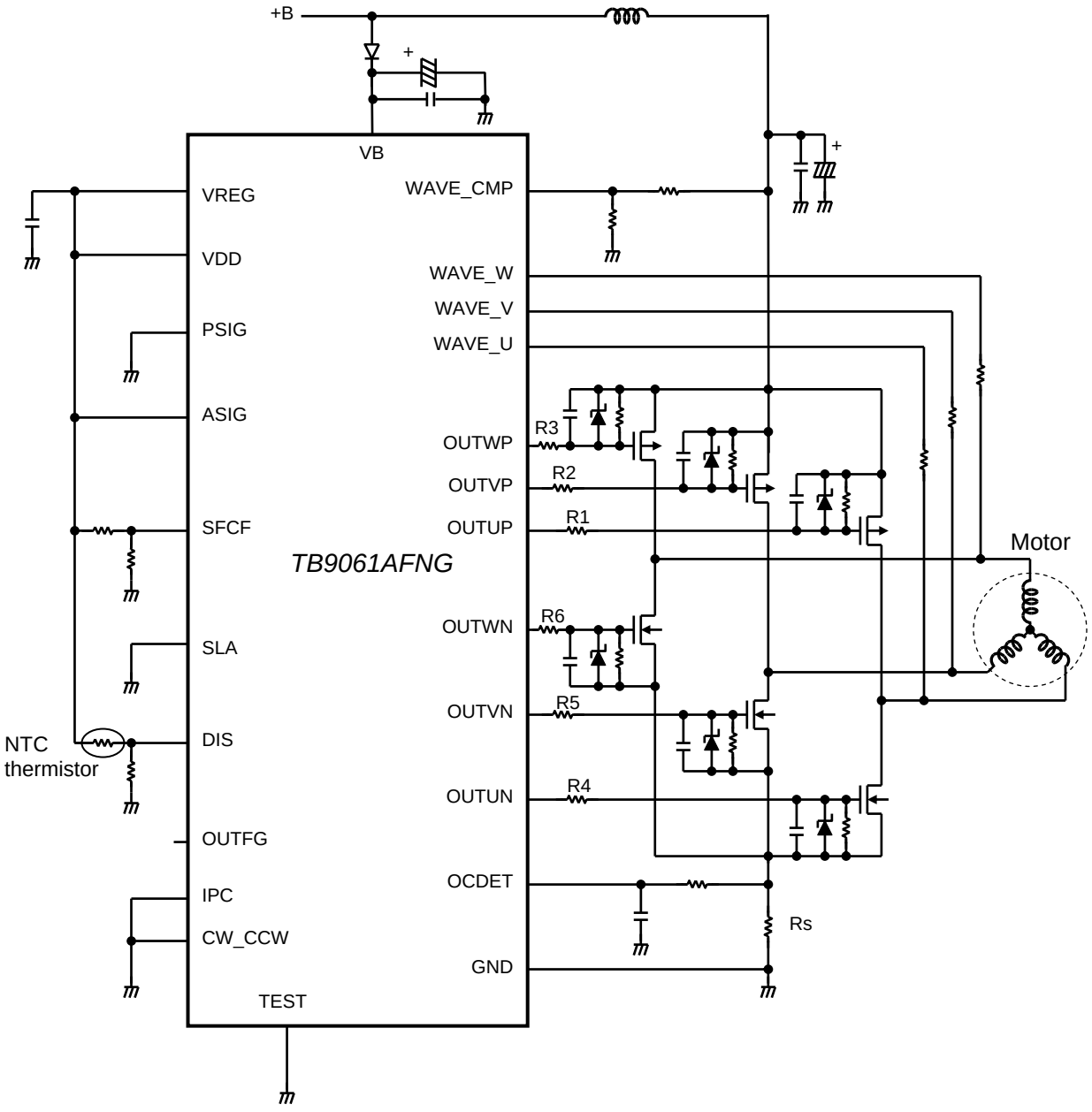
When the input PWM signal is active-Low



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

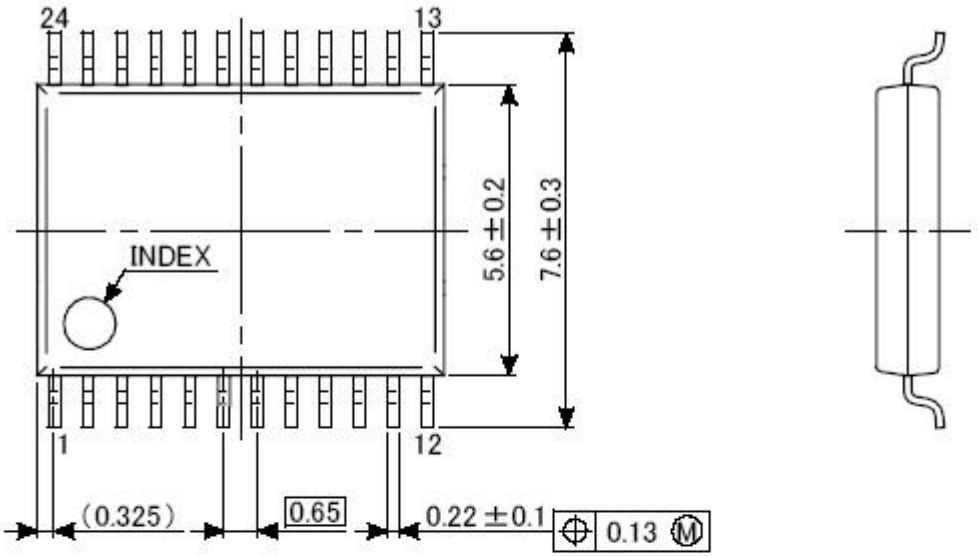


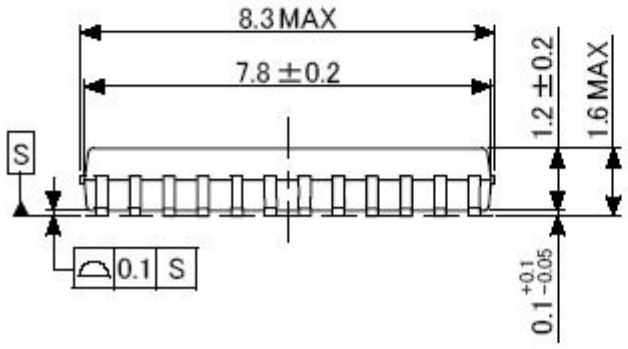
Note1: The capacitor connected to the Source pin of the Pch FET is for absorbing disturbance noise, voltage fluctuation by load change, etc. Connect it as close to the Source pin of the Pch FET as possible.

Note2: We recommend more than 100Ω from R1 to R6 as the external resistance of pre-driver output pin.

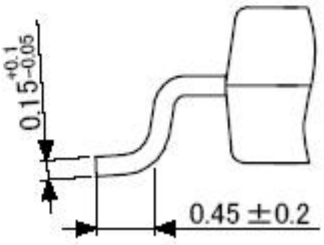
Package Dimensions

Unit:mm





Lead edge dimension



Weight: 0.14 g (typ.)

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.

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