TOSHIBA

EBV Elektronik
I An Avnet Company I

MOTOR CONTROL

# 30V Brushless Motor Controller Pre-Driver

## TC78B009FTG
## TC78B011FTG


## Sensorless Closed Loop Speed Control for Brushless DC Motor

This feature-rich device incorporates the complete controller and pre-driver for a three-phase BLDC motor. Its sensor less design saves the space and cost of a Hall sensor. The built-in closed loop speed control regulates and maintains the motor's rotational speed during dynamic power supply fluctuations and load variations. Precise setting of a speed profile can be programmed into the built-in non-volatile memory (NVM). The TC78B011FTG uses sine-wave drive method, reducing vibration and noise.

### Applications

- Server Fans
- Pumps
- Blowers
- Suction motor for vacuum cleaners
- Robot cleaners

### Features

- Sine-wave drive (TC78B011FTG)
- Trapezoidal drive (TC78B009FTG)
- Sensorless PWM drive
- Wide range of operating voltage VM=5.5 to 27V
- Charge pump and adjustable gate drive current up to 200mA
- Built-in error detection

### Advantages

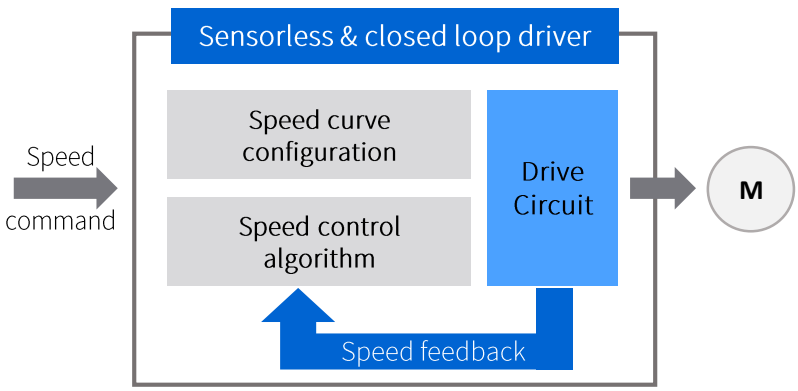
- Sinusoidal motor drive
- No additional sensors required
- Rotor position is detected by induced voltage
- Regulates motor speed during torque load changes
- External N-ch MOSFETs for a scalable inverter stage choice

### Benefits

- High comfort due to less vibration and less noise
- No Hall sensors needed
- Reduced cabling effort
- Constant rotational speed during load variations without the need of a microcontroller
- Error detection functions improve system reliability

### Advanced BLDC motor control

After parameterization of the device via $I^2C$ bus or using a pre-programmed configuration from the NVM, the device can operate independently from a microcontroller. The target speed can be set either by analog voltage, PWM duty or by setting a register through the $I^2C$ bus. The device provides several internal feedback signals to ensure proper operation.



## TC78B009FTG / TC78B011FTG functions

### Configurable pre-driver
Separately selectable level of drive current for high side and low side N-ch MOSFETs.

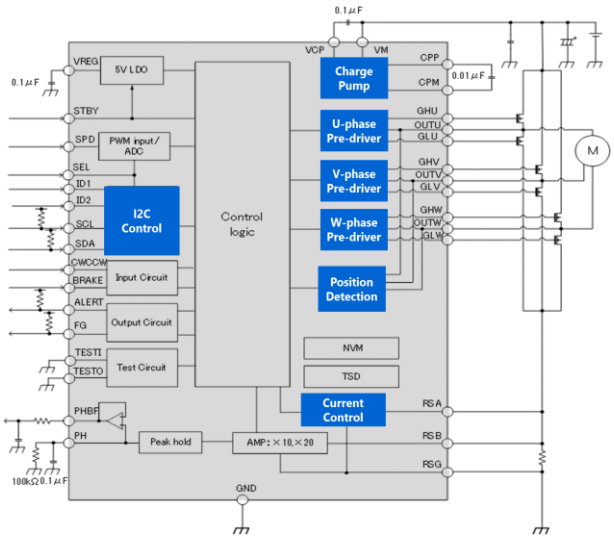
### I²C bus with configurable device address
Internal configuration and status registers can be easily accessed through this standard bus. All parameters changeable on the fly.

### Current monitor output
Amplified voltage over shunt resistor, converting it to a DC level with peak hold circuit.

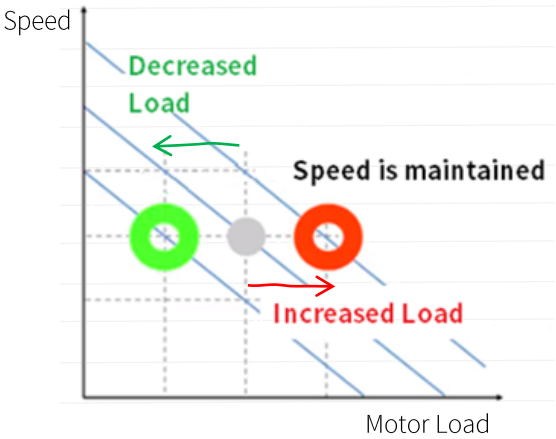
### Integrated LDO regulator
5V available for pull-up resistors or voltage reference.

### Safety features
Thermal shutdown function (TSD)
Under voltage lockout function (UVLO)
Charge pump low voltage detection (CPVSD)
Over current detection function (ISD)

### Built-in closed loop speed control
Provides adjustable speed curve functionality.

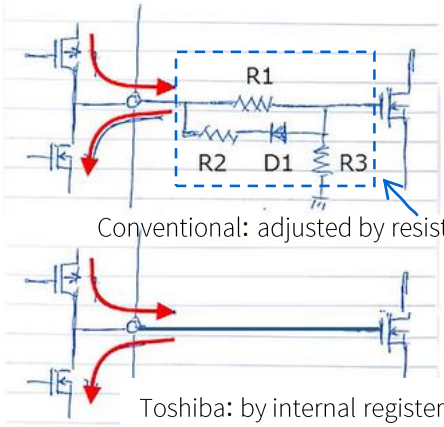



### Closed loop control




The device maintains constant rotation speed during load variation

### EMC noise suppression




The source & sink currents can be set individually per gate by registers

## Low cost evaluations boards
The Mikroelektronika Click boards™ allow quick and easy device evaluation and prototyping.

Mikroe Brushless-7-click

Mikroe Brushless-23-click
Click board launch in Q2/2022


N-ch MOSFETs


## Toshiba brushless DC motor drivers

Further information on website