TOSHIBA

March 2021

Motor control drivers

SEMICONDUCTOR & STORAGE PRODUCTS

https://toshiba.semicon-storage.com/

Toshiba motor drivers

Over 40 years of experience in motor driver solutions

1 Accumulated technology and quality

based on experience in the HA, fan and industrial equipment fields

2 Extensive product selections

for BDC, Stepper, and BLDC motors

3 Evolved analog Si technology

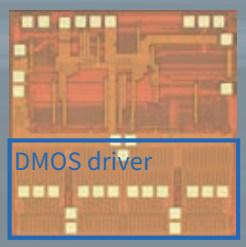
BiCD-0.13 µm, to achieve efficient drive and PCB size reduction

Seven points

Common technologies - Functionality and efficiency

1. BiCD-0.13µm, evolved analog Si technology

Equipped with low on-resistance power MOSFETs for highly efficient motor drive.

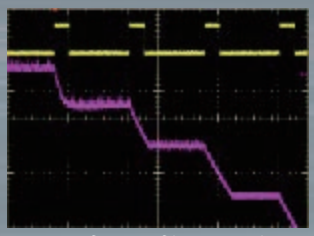


BiCD-0.13 µm motor driver product

Stepper motor control technology - Silence and parts reduction

2. Advanced Dynamic Mixed Decay (ADMD)

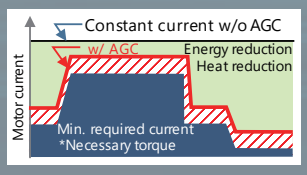
Toshiba's unique high-efficiency constant current control technology. Compared to the conventional mixed decay, the current followability is improved, thus realizing high-speed rotation and highly efficient motor control.



Waveform of low ripples

3. Active Gain Control (AGC)

Toshiba's unique real-time drive current optimization technology according to load torque. Since the excess current is reduced by AGC, power saving and low heat generation are realized.



Active Gain Control (AGC)

- Contents -

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2. **Selection guide**
   - Brushed DC motor driver 4
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   - Brushless DC motor driver 9
3. **Applications** **12**
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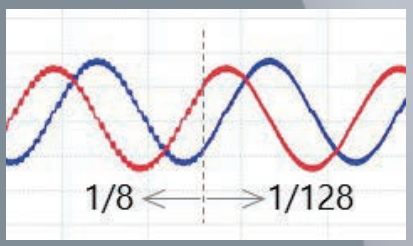
4. Advanced Current Detection System (ACDS)

Resistor-less technology for motor current detection. Highly accurate constant current motor driving is possible while reducing the number of parts and PCB area. This is Toshiba's proprietary technology.

Ex. Resistor-less PCB layout

5. High-resolution microstepping

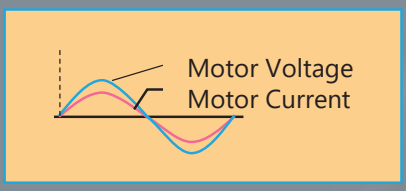
Up to 1/128 microstep decoding and driving technology controlled by CLK pulses. Sine wave drive reduces unnecessary current and excessive heat generation, and realizes silent and low-vibration rotation.



Brushless DC motor control technology – Efficient and precise control

6. Intelligent phase control

Autonomous lead angle control technology that realizes highly efficient motor drive regardless of motor rotation speed, load torque, and power supply voltage. In addition, it eliminates the necessity for complex adjustments during development.

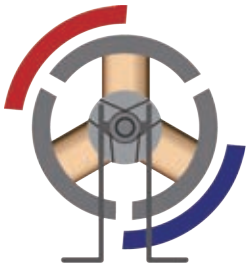


Intelligent Phase Control

7. Closed loop speed control

Constant speed rotation technology. The speed feedback control realizes constant speed rotation regardless of voltage or load fluctuation.

Brushed DC motor drivers



Toshiba provides brushed DC motor drivers with various supply voltages and output currents and different numbers of channels. You can select the motor driver ICs that best suit your target motors.

Features

1. Two-way rotation speed control

- Direct PWM input controlled by the duty width of pulses
- Linear voltage input to control the motor current accordingly

2. Various current ranges, multi-channel line-up

- Multi-channel drivers, as 1 to 4 channel outputs in a package
- 0.8 to 10 A of maximum current range

3. Support Battery or USB power

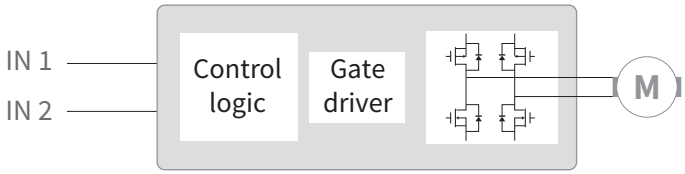
- Achieves a minimum power supply voltage of 1.8 to 2.7 V
- Maximum voltage, 15 to 47 V

4. Various package selections

- ZIP for high power packages
- QFN and HSSOP for high power surface mounting packages

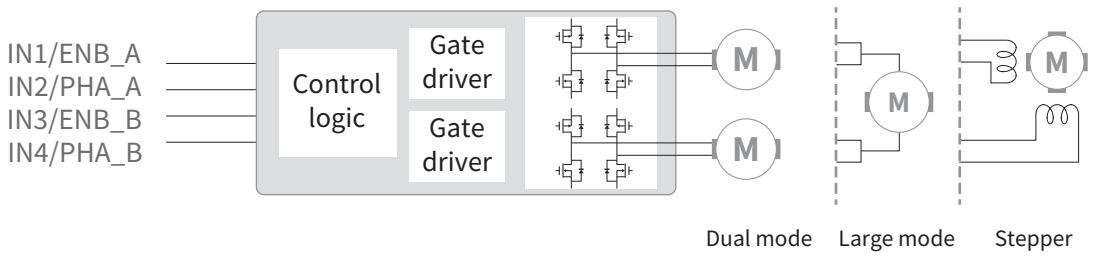
- System configurations

1ch Full Bridge Driver

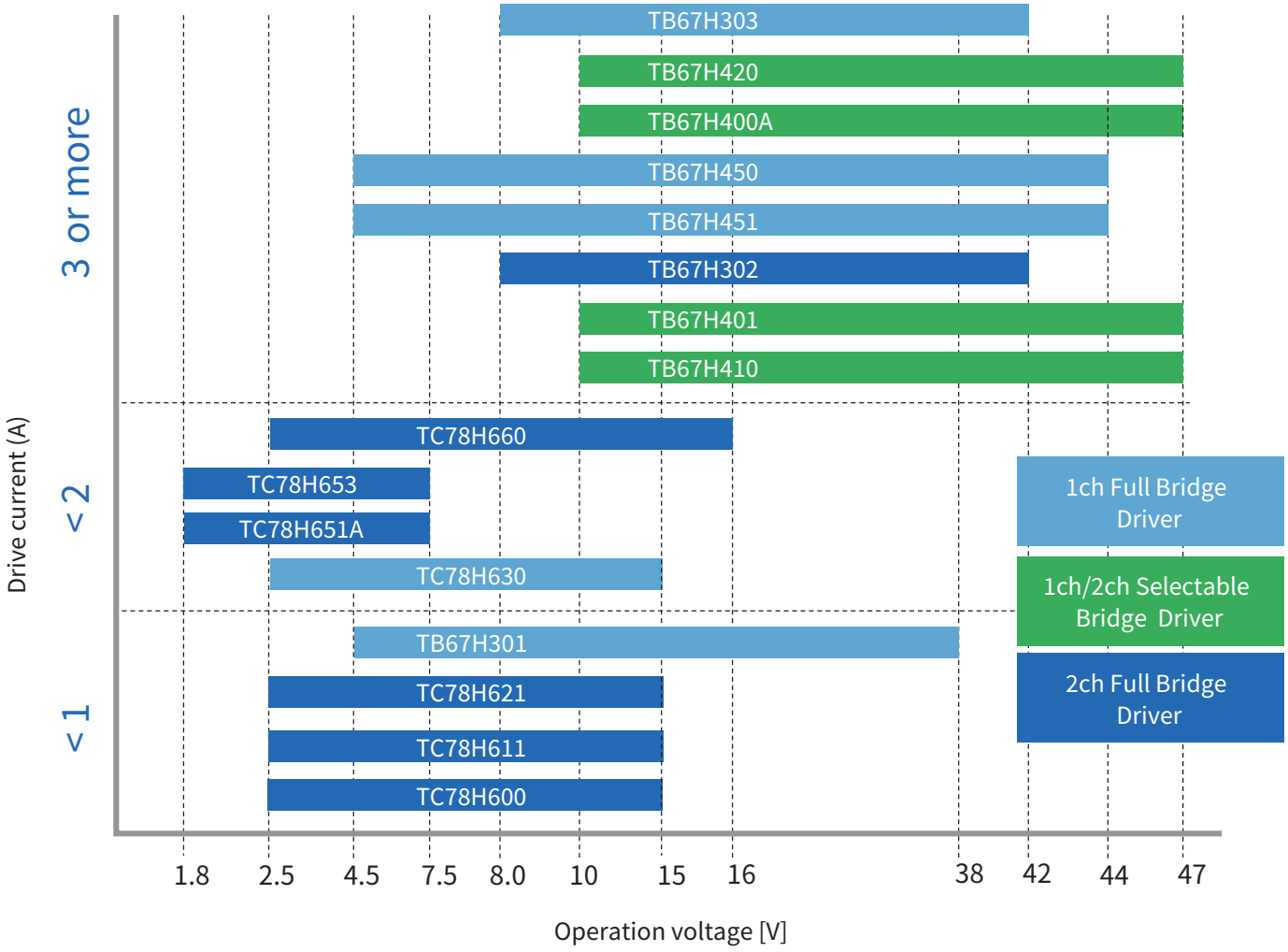


1ch/2ch Selectable Bridge Driver

2ch Full Bridge Driver

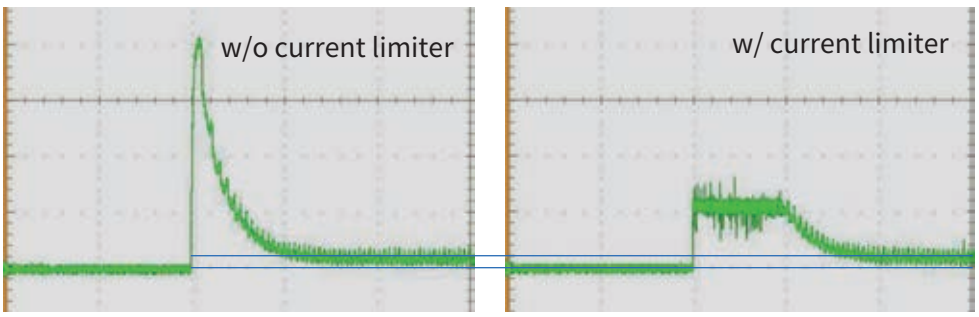


● Brushed DC motor drivers



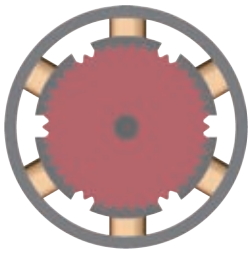
Constant current control

- It suppresses inrush current and reduces power loss.
- The constant current value is set by Vref and RS.



Inrush current waveform, TB67H450FNG

Stepper motor drivers



Toshiba develops high-speed, high-precision control technology required for FA/OA equipment and reduces the number of external parts to minimize PCB size. Toshiba provides stepper motor driver products with various supply voltages and output currents and different numbers of channels. You can select the motor driver ICs that best suit your target motors.

Features

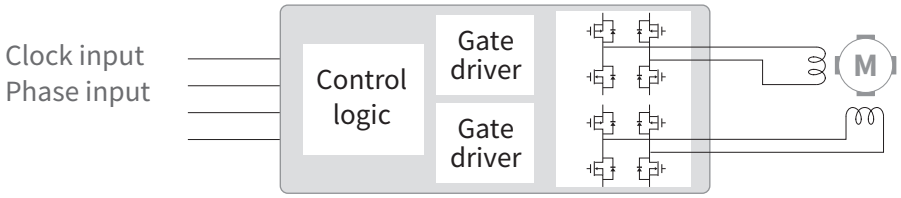
1. Selectable control interface to suit many applications
- Clock/phase/serial input control

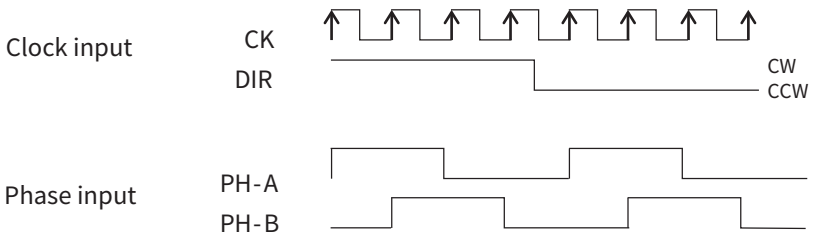
2. Current capacity corresponding to required torques
- Output current range of 0.4 to 5.0 A
- On-resistance of 0.25 to 2.0 Ω (H-bridge top and bottom sum)

3. Wide operating voltage range
- V(op) of 1.8 to 10 V at low side, and 15 to 60 V at up side

4. Solutions matching various needs and applications
- Current controls (constant current PWM/torque/active gain), high-resolution microstep, current sense resistance-less, etc.

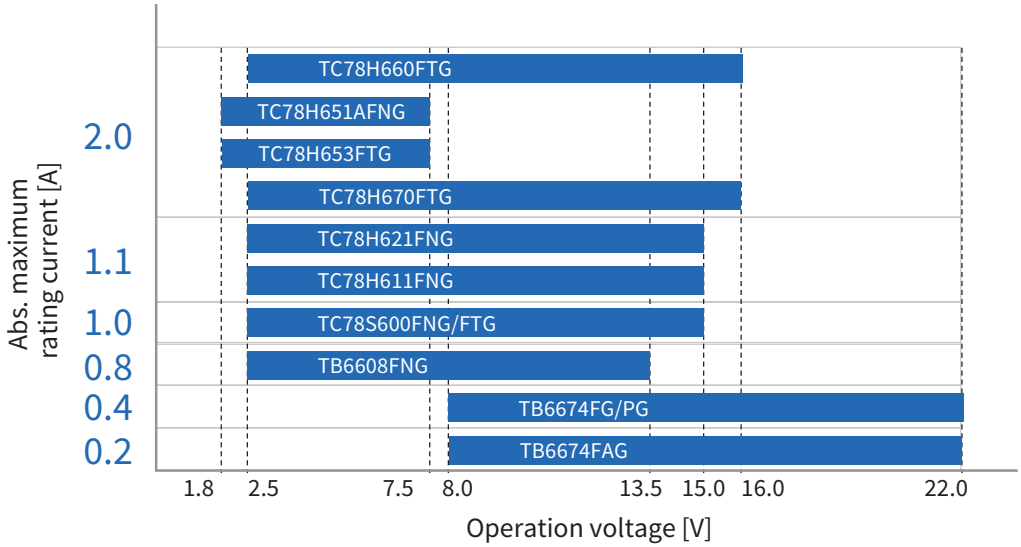
- System configurations





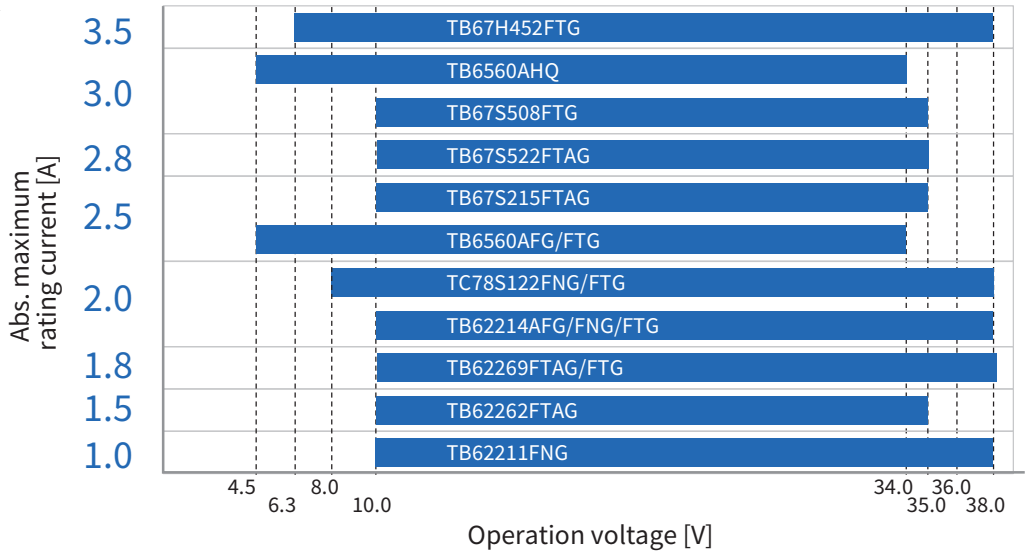
Low-voltage stepper motor drivers

● Phase input

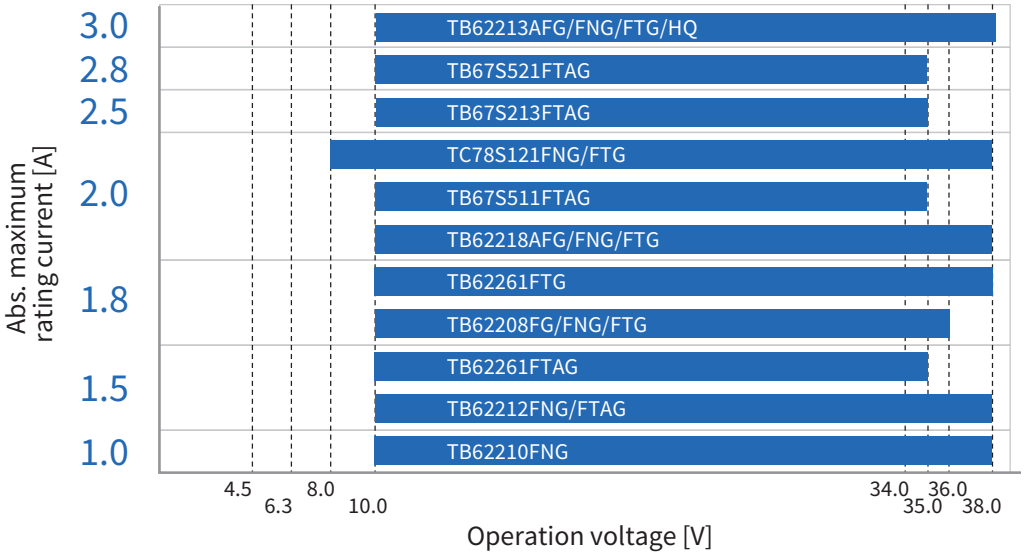


Mid-voltage stepper motor drivers

● Clock input



● Phase input

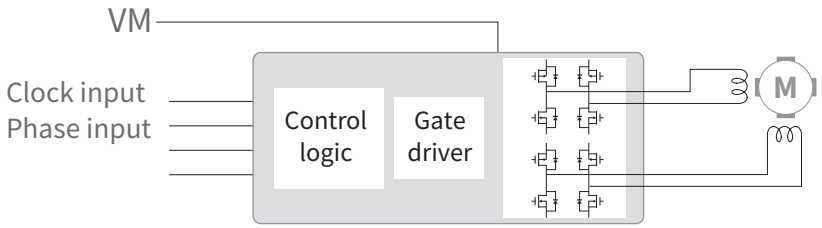


Selection guide

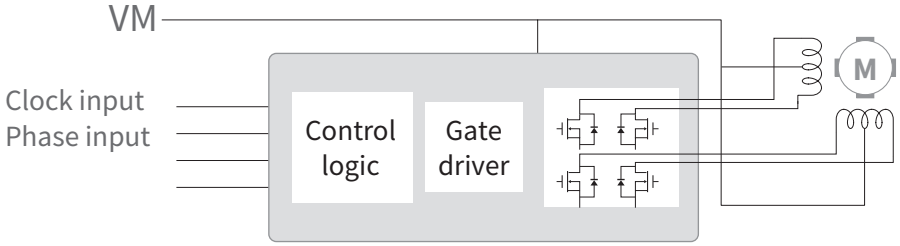
for stepper motors

- System configurations - Unipolar/Bipolar

Bipolar type

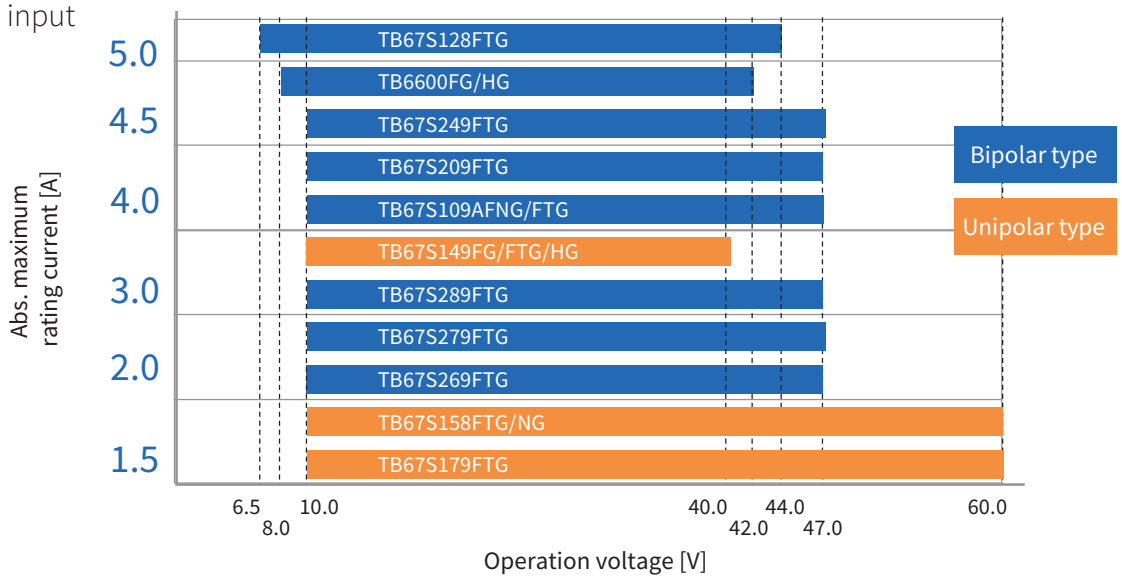


Unipolar type

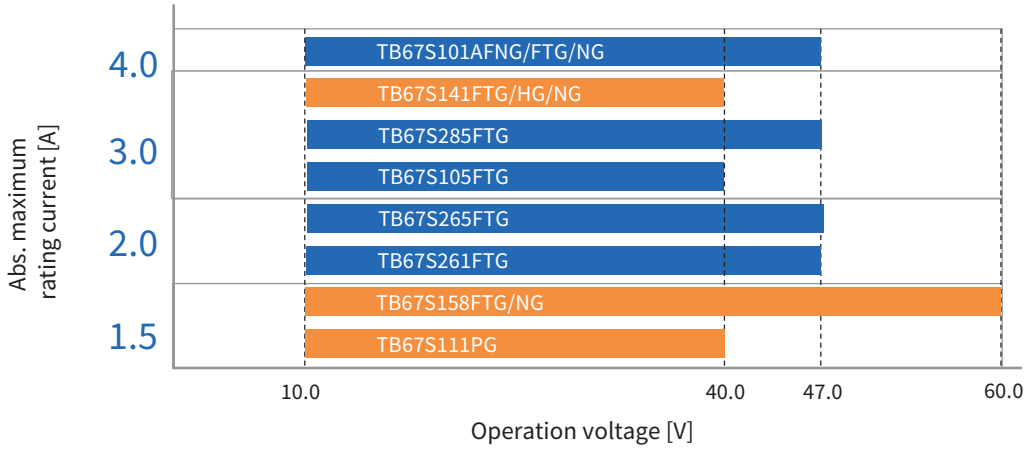


High-voltage stepper motor drivers

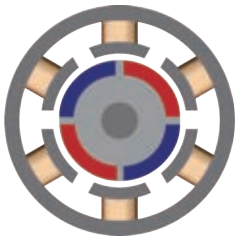
- Clock input



- Phase input



Brushless DC motor drivers



Toshiba has brushless DC motor driver products for fan motors, blowers, pumps, suction motors, etc. Our compact packaging and unique control technology meet the latest needs for improved motor efficiency, reduced noise, and low heat generation.

Features

1. Wide range of solutions for various purposes

- Motor type (single-phase/three-phase)
- Energization method (square wave/sine wave)
- Drive type (controller/pre-driver/driver)
- Hall input (3 holes/1 hole/sensorless)
- Speed control (open loop/closed loop)
- Advance angle control (External control/Intelligent Phase Control)

2. Current variations corresponding to required torques

- Driver: Output current range of 1.0 to 3.5 A
- Pre-driver: External MOSFETs can be selected

3. Wide operating voltage range

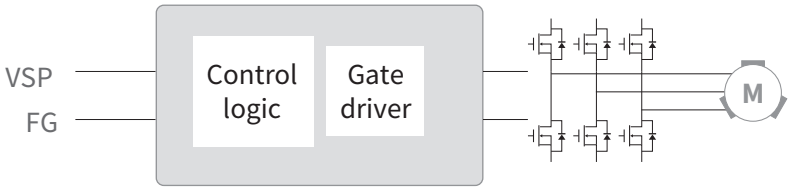
- Drivers: 4.5 V (min) to 45 V (max)
- Pre-drivers: 4.5 V (min) to 40 V (max)

4. System in a package: SIP for high-voltage products

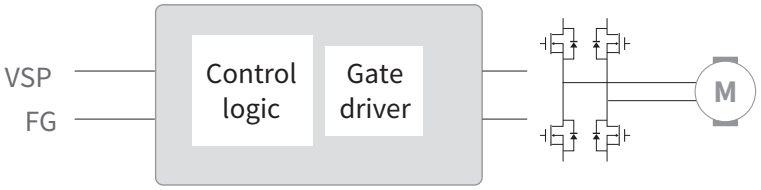
- Controller and driver SIP solution for 600 V withstand voltage of AC plug inverter motor system.

- System configurations - pre-drivers -

3 phases



Single phase

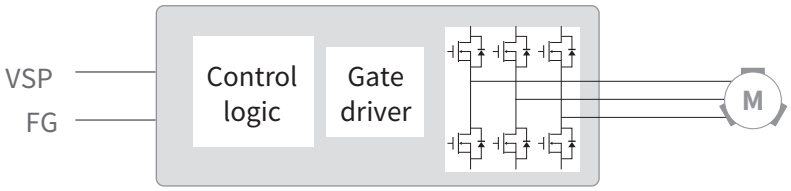


Selection guide

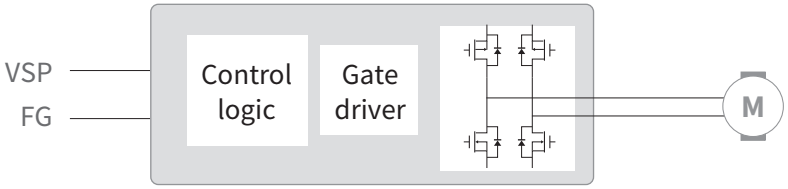
for brushless DC motors

● System configurations -built-in MOSFET drivers -

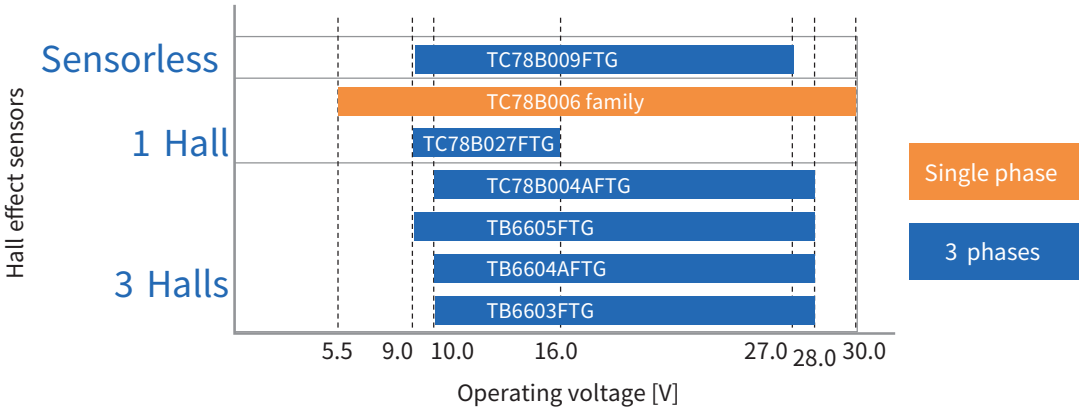
3 phases



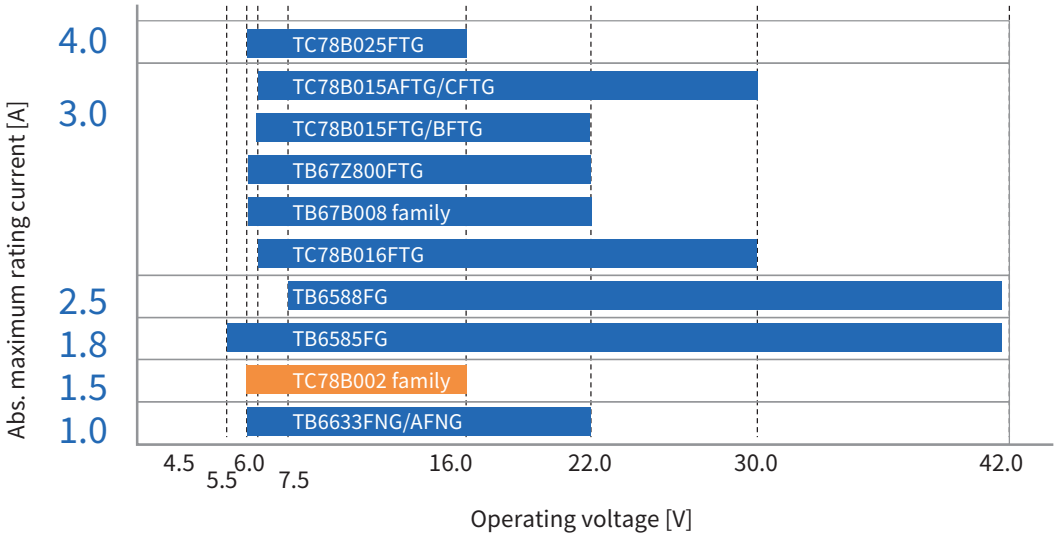
Single phase



● Pre-drivers for external MOSFETs



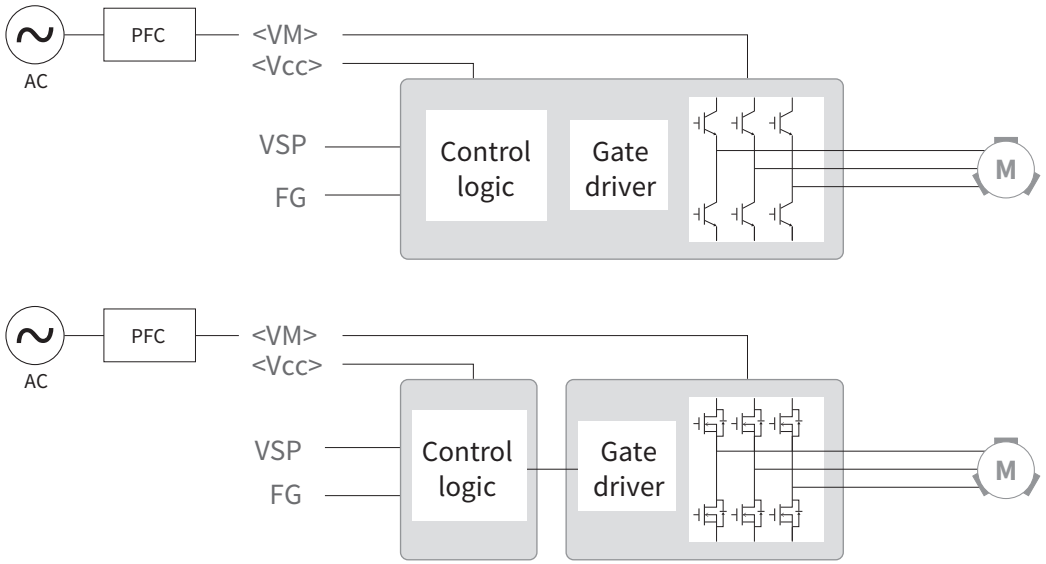
● Drivers



HA inverter motor driver ICs

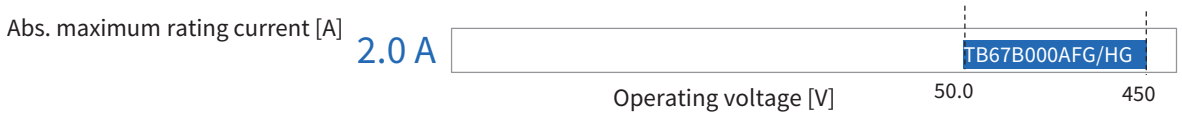
- Product lineup of SIP solutions with built-in IGBTs and multi-chip modules
- Various configurations combined with IPD

- System configurations -for mid-high voltage

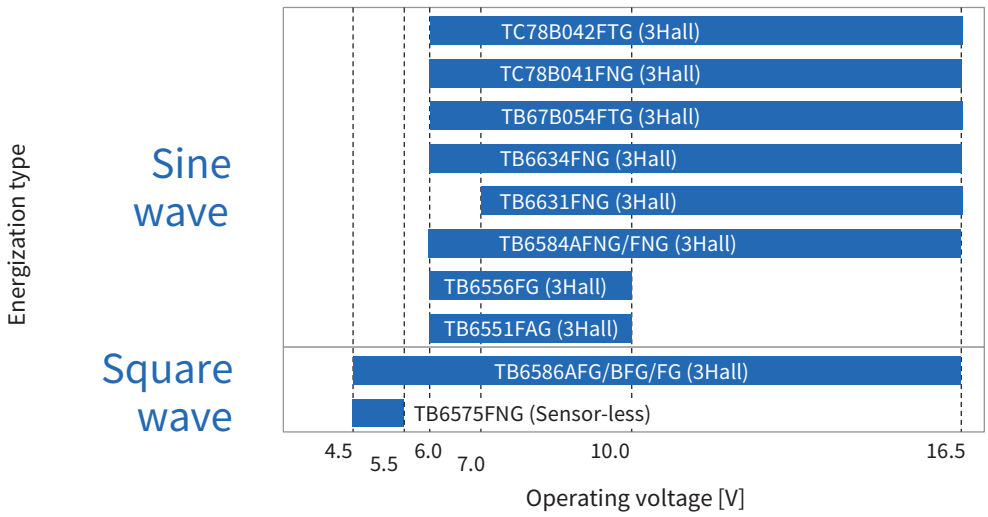


Ex. TPD4204F: IPD configuration

- Motor controller and driver SIP

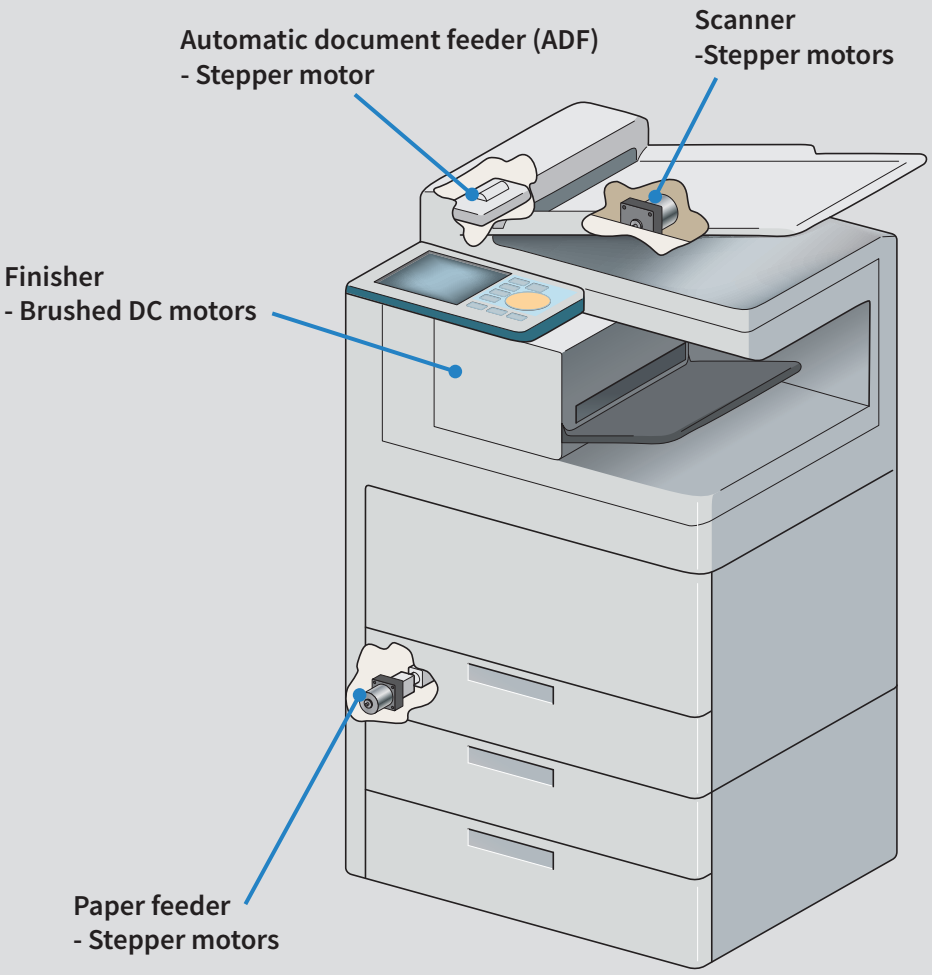


- Motor controllers for external drivers

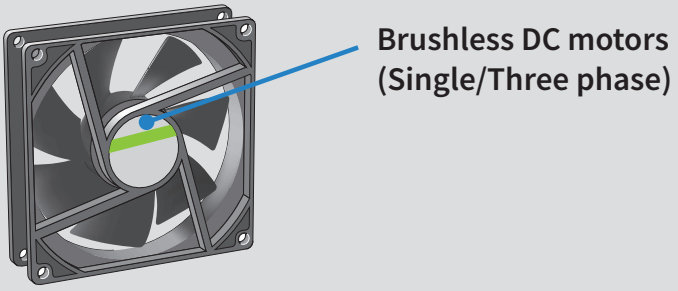


Applications

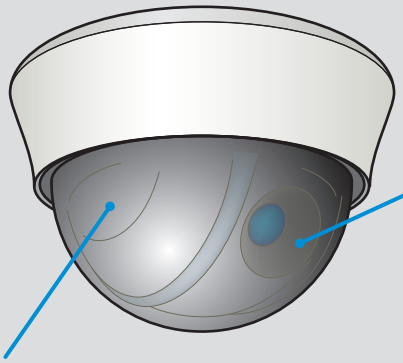
For multi-function printers



For fans (cooling fan, blower, etc.)



For surveillance cameras and digital cameras

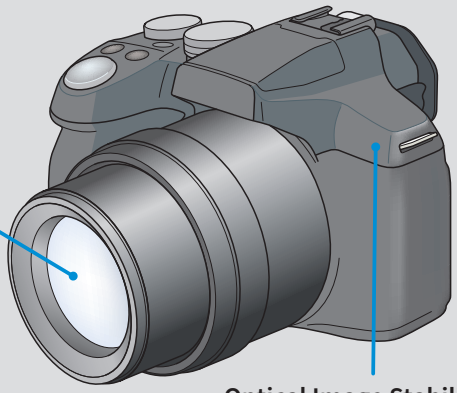


Optical Image Stabilizer
- Voice coil motors
- Stepper motors

Lens
- Stepper motors

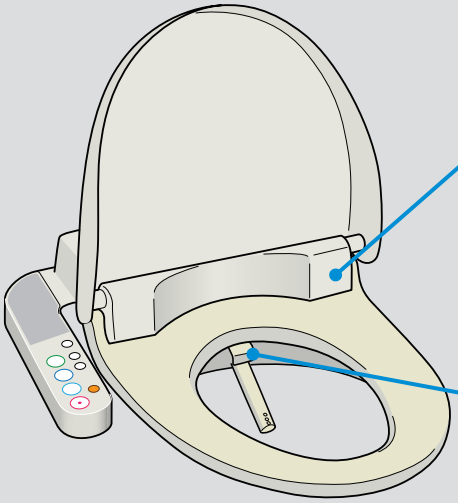
Pan/Tilt
- Stepper motors

Lens
- Stepper motors
- Brushed DC motors



Optical Image Stabilizer
- Voice coil motors
- Stepper motors

For automatic toilets etc.

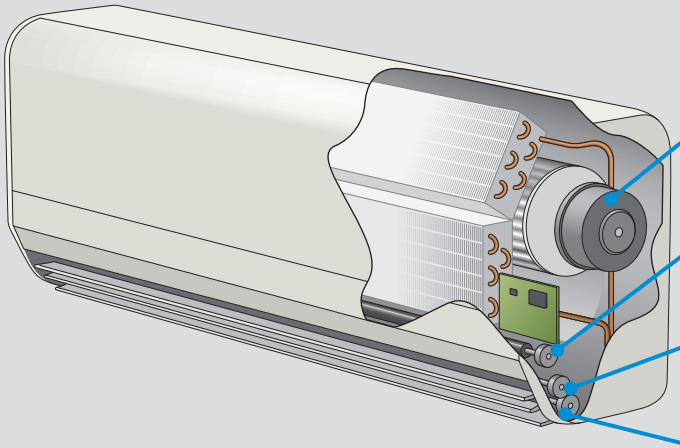


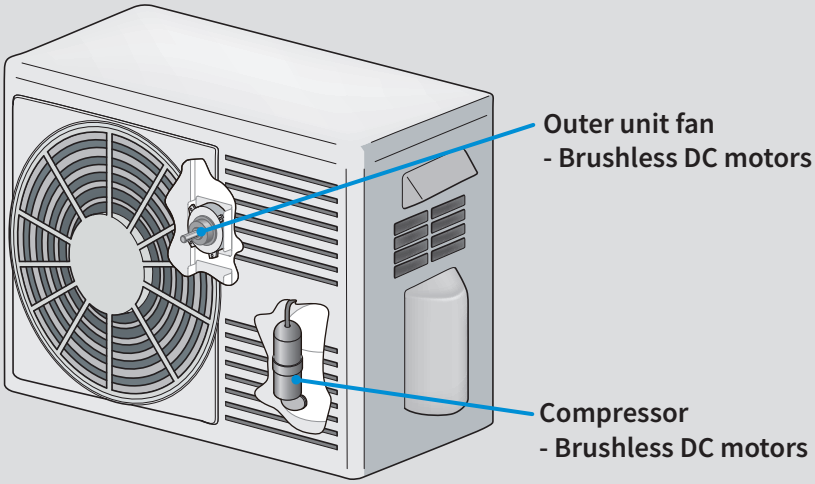
Toilet lid lifter
- Brushed DC motors
- Stepper motors

Nozzle in/out
- Brushed DC motors
- Stepper motors

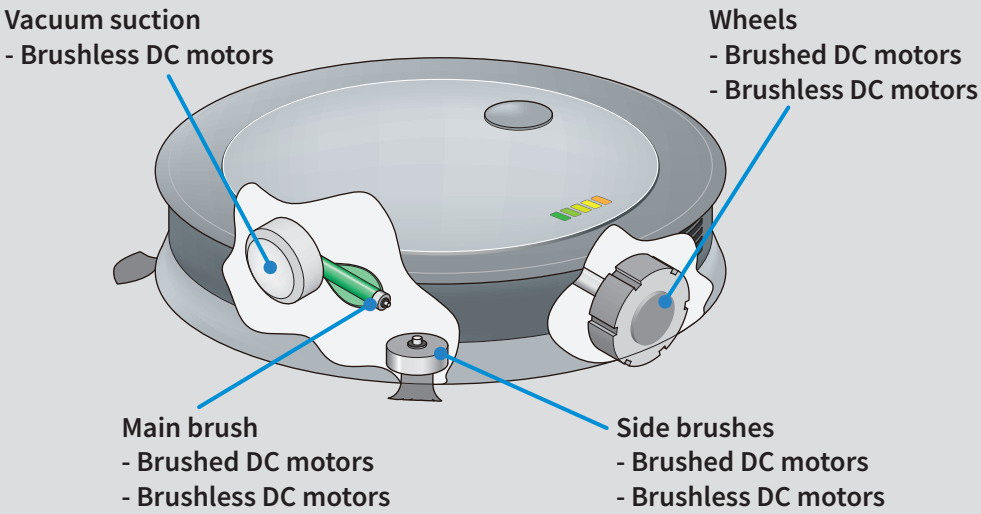
Applications

For air conditioners

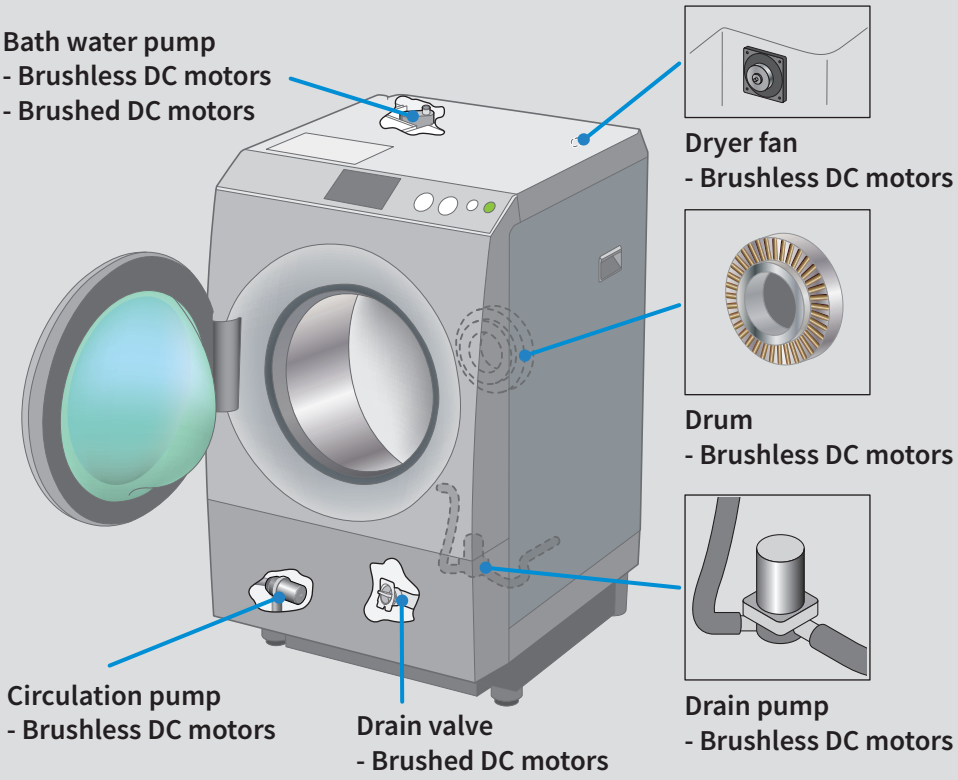




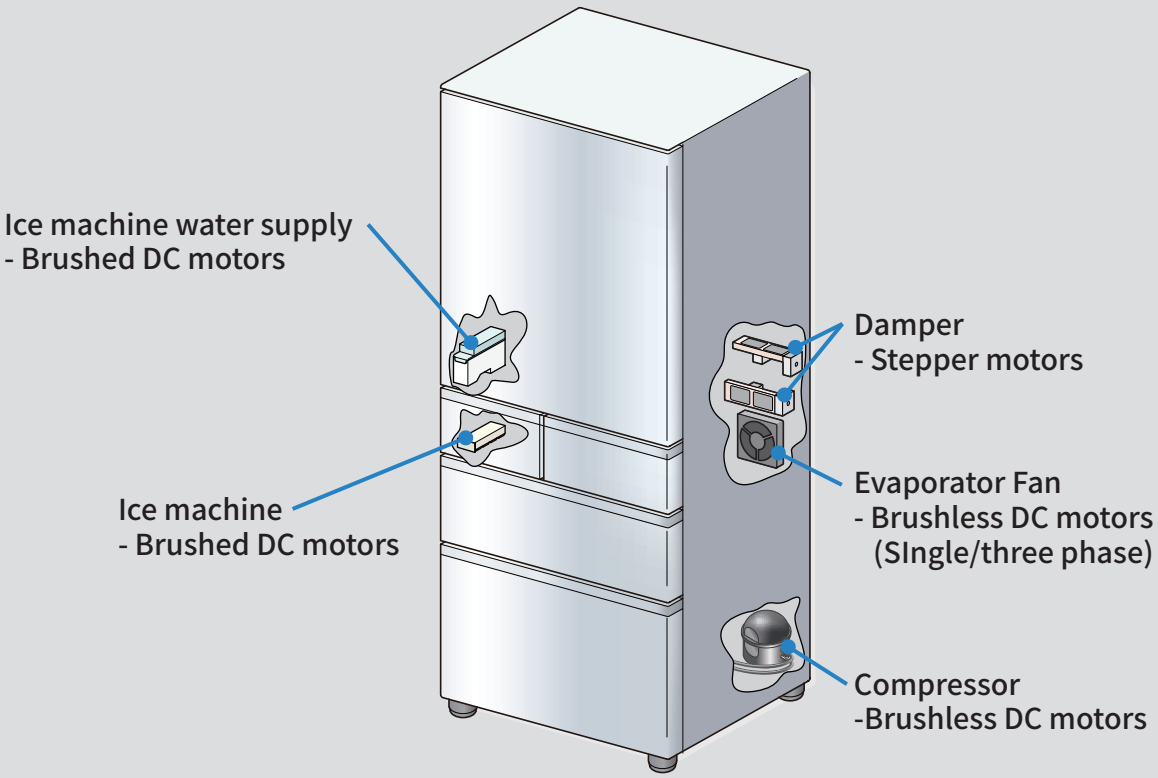
For vacuum cleaners and robot vacuums



For washing machines



For refrigerators



Product list

Brushed DC motor drivers

Products			Large mode	Maximum ratings		Output Ron	Circuits (Ch)	C.C. PWM	Single power supply	Protection			Temp. range T_A	Package
				Voltage (V)	Current (A)					UVLO (1)	ISD (2)	TSD (3)		
TB6613FTG		☆		6	0.8	1.50	8	●		●		◊	-20 to +85°C	QON44
TC78H651AFNG		☆		8	2.0	0.22	2		●	●	○	◊	-40 to +105°C	TSSOP16
TC78H653FTG		☆	●	8	2.0 / 4.0(4)	0.22 / 0.11(4)	2 / 1(4)		●	●	○	◊	-40 to +105°C	QFN16
TB6552FNG		☆		15	1.0	1.50	2					◊	-20 to +85°C	SSOP16
TB6552FTG		☆		15	1.0	1.50	2					◊	-20 to +85°C	QFN16
TB6612FNG		☆		15	3.2	0.50	2			●		◊	-20 to +85°C	SSOP24
TC78H600FNG		☆		18	1.0	1.20	2	●		●	○	◊	-20 to +85°C	SSOP20
TC78H600FTG		-		18	1.0	1.20	2	●		●	○	◊	-20 to +85°C	QFN24
TC78H610FNG		☆		18	1.0	1.20	2			●	○	◊	-20 to +85°C	SSOP16
TC78H611FNG		☆		18	1.1	0.80	2			●	○	◊	-30 to +85°C	TSSOP16
TC78H620FNG		☆		18	1.0	1.20	2			●	○	◊	-20 to +85°C	SSOP16
TC78H621FNG		☆		18	1.1	0.80	2			●	○	◊	-30 to +85°C	TSSOP16
TC78H630FNG		☆		18	2.1	0.40	1			●	○	◊	-30 to +85°C	TSSOP16
TC78H660FNG	*	☆		18	2.0	0.48	2	●	●	●	○	○	-40 to +85°C	TSSOP16
TC78H660FTG	*	☆		18	2.0	0.48	2	●	●	●	○	○	-40 to +85°C	QFN16
TB62212FNG		☆	●	40	2.0 / 4.0(4)	2.20 / 1.10(4)	4 / 2(4)	●	●	●	○	○	-40 to +85°C	HTSSOP48
TB62212FTAG		☆	●	40	2.0 / 4.0(4)	2.20 / 1.10(4)	4 / 2(4)	●	●	●	○	○	-40 to +85°C	QFN48
TB62216FG		☆		40	2.5	1.00	2	●	●	●	○	○	-20 to +85°C	HSOP28
TB62216FNG		☆		40	2.5	1.00	2	●	●	●	○	○	-20 to +85°C	HTSSOP48
TB62216FTG		☆		40	2.5	1.00	2	●	●	●	○	○	-20 to +85°C	QFN48
TB6561FG		-		40	1.5	1.50	2		●		◊	◊	-20 to +85°C	SSOP30
TB6561NG		-		40	1.5	1.50	2		●		◊	◊	-20 to +85°C	SDIP24
TB6640AFTG		☆		40	3.0	1.00	1	●		●	○/◊	○/◊	-40 to +85°C	QFN48
TB6640FTG		☆		40	3.0	1.00	1	●		●	○/◊	○/◊	-40 to +85°C	QFN48
TB67H301FTG		-		40	3.0	1.00	1	●		●	○/◊	○/◊	-40 to +85°C	QFN24
TB67H452FTG		☆	●	40	3.5 / 5.0(4)	0.60 / 0.30(4)	4 / 2(4)	●	●	●	○	○	-20 to +85°C	QFN48
TC78S121FNG		☆	●	40	3.5 / 5.0(1)	0.60 / 0.30(4)	4 / 2(4)	●	●	●	○	○	-20 to +85°C	HTSSOP48
TC78S121FTG		☆	●	40	3.5 / 5.0(1)	0.60 / 0.30(4)	4 / 2(4)	●	●	●	○	○	-20 to +85°C	QFN48
TC78S122FNG		☆	●	40	3.5 / 5.0(1)	0.60 / 0.30(4)	4 / 2(4)	●	●	●	○	○	-20 to +85°C	HTSSOP48
TC78S122FTG		☆	●	40	3.5 / 5.0(1)	0.60 / 0.30(4)	4 / 2(4)	●	●	●	○	○	-20 to +85°C	QFN48
TB6559FG		-		50	2.5	1.30	1	●	●		◊	◊	-30 to +85°C	HSOP16
TB6568KQ		-		50	3.0	0.55	1		●	●	○	○	-40 to +85°C	HSIP7
TB6569FG		-		50	4.5	0.55	1	●	●	●	○	○	-40 to +85°C	HSOP16
TB6569FTG		☆		50	4.5	0.55	1	●	●	●	○	○	-40 to +85°C	QFN32
TB6641FG		-		50	4.5	0.55	1	●	●	●	○	○	-40 to +85°C	HSOP16
TB6641FTG		☆		50	4.5	0.55	1	●	●	●	○	○	-40 to +85°C	QFN32
TB6642FG		-		50	4.5	0.55	1		●	●	○/◊	○/◊	-40 to +85°C	HSOP16
TB6642FTG		☆		50	4.5	0.55	1		●	●	○/◊	○/◊	-40 to +85°C	QFN32
TB6643KQ		-		50	4.5	0.55	1		●	●	○	○	-40 to +85°C	HSIP7
TB67H302HG		-		50	5.0	0.40	2	●	●	●	○	○	-30 to +85°C	HZIP25
TB67H303HG		-		50	10.0	0.20	1	●	●	●	○	○	-30 to +85°C	HZIP25
TB67H400AFNG		☆	●	50	4.0 / 8.0(4)	0.49 / 0.25(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	HTSSOP48
TB67H400AFTG		☆	●	50	4.0 / 8.0(4)	0.49 / 0.25(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	QFN48
TB67H400AHG		-	●	50	4.0 / 8.0(4)	0.49 / 0.25(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	HZIP25
TB67H400ANG		-	●	50	4.0 / 8.0(4)	0.49 / 0.25(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	SDIP24
TB67H401FTG		☆	●	50	3.0 / 6.0(4)	0.49 / 0.25(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	QFN48
TB67H410FTG		☆	●	50	2.5 / 5.0(4)	0.80 / 0.40(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	QFN48
TB67H410NG		☆	●	50	2.5 / 5.0(4)	0.80 / 0.40(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	SDIP24
TB67H420FTG		☆	●	50	4.5 / 9.0(4)	0.33 / 0.17(4)	2 / 1(4)	●	●	●	○	○	-20 to +85°C	QFN48
TB67H450FNG	*	☆		50	3.5	0.60	1	●	●	●	○	◊	-40 to +85°C	SSOP8
TB67H451FNG	*	☆		50	3.5	0.60	1	●	●	●	◊	◊	-40 to +85°C	SSOP8
TB67H48xFNG(1)	**	☆		50	2.5	0.40	2	●	●	●	○	◊	-40 to +85°C	HTSSOP28
TB67H48xFNG(2)	**	☆		50	2.5	0.40	2	●	●	●	○	◊	-40 to +85°C	HTSSOP28

++ Under planning ** Under development * New item ☆ Moisture-proof packed product
Note (1): Low voltage detection (2): Over current detection (3): Heat detection (4): Large mode ○: Latch type ◊ : Non-latch type

Stepper motor drivers - Clock inputs

Products			Motor type		Interface			Maximum ratings		Constant current control	Stepping mode								Active gain control	Single power supply	Protection			Temp. range T_A	Package
			Bipolar	Unipolar	Clock	Phase	Serial	[V] Voltage	[A] Current		Full	Half	1/4	1/8	1/16	1/32	1/64	1/128			UVLO (1)	ISD (2)	TSD (3)		
TB6613FTG		☆	●		●		●	6	0.8	●		●					●				●		●	-20 to +85°C	QON44
TB6608FNG		-	●		●			15	0.8	●	●	●	●	●							●		●	-20 to +85°C	SSOP20
TC78H670FTG	*	☆	●		●		●	18	2.0	●	●	●	●	●	●	●	●	●		●		●	●	-40 to +85°C	QFN16
TC78S600FNG		-	●		●			18	1.0	●		●	●	●	●						●	●	●	-20 to +85°C	SSOP20
TC78S600FTG		-	●		●			18	1.0	●		●	●	●	●						●	●	●	-20 to +85°C	QFN24
TB6615PG		-		●	●			28	0.4		●	●												-30 to +85°C	DIP16
TB62211FNG		☆	●		●			40	1.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP24
TB62214AFG		☆	●		●			40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	HSOP28
TB62214AFNG		☆	●		●			40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB62214AFTG		☆	●		●			40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB62215AFG		☆	●		●			40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HSOP28
TB62215AFNG		☆	●		●			40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB62215AFTG		☆	●		●			40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB62215AHQ		-	●		●			40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HZIP25
TB62262FTAG		☆	●		●			40	1.5	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB62262FTG		☆	●		●			40	1.8	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB62269FTAG		☆	●		●			40	1.8	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN32
TB62269FTG		☆	●		●			40	1.8	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB6560AFG		-	●		●			40	2.5	●	●	●		●	●								●	-30 to +85°C	HQFP64
TB6560AFTG		-	●		●			40	2.5	●	●	●		●	●								●	-30 to +85°C	QFN48
TB6560AHQ		-	●		●			40	3.5	●	●	●		●	●								●	-30 to +85°C	HZIP25
TB67H452FTG		☆	●		●			40	3.5×2ch	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S215FTAG		☆	●		●			40	2.5	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB67S508FTG		☆	●		●	●		40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB67S512FTAG		☆	●		●			40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB67S522FTAG		☆	●		●			40	2.8	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TC78S122FNG		☆	●		●			40	2.0×2ch	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TC78S122FTG		☆	●		●			40	2.0×2ch	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB6600FG		-	●		●			50	4.5 / 5.0	●	●	●	●	●	●					●	●	●	●	-30 to +85°C	HQFP64
TB6600HG		-	●		●			50	4.5 / 5.0	●	●	●	●	●	●					●	●	●	●	-30 to +85°C	HZIP25
TB67S102AFNG		☆	●		●			50	4.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB67S102AFTG		☆	●		●			50	4.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S103AFTG		☆	●		●		●	50	4.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S109AFNG		☆	●		●			50	4.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	HTSSOP48
TB67S109AFTG		☆	●		●			50	4.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S128FTG		☆	●		●			50	5.0	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-40 to +85°C	QFN48
TB67S209FTG		☆	●		●			50	4.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S249FTG		☆	●		●			50	4.5	●	●	●	●	●	●	●			●	●	●	●	●	-20 to +85°C	QFN48
TB67S269FTG		☆	●		●			50	2.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S279FTG		☆	●		●			50	2.0	●	●	●	●	●	●	●			●	●	●	●	●	-20 to +85°C	QFN48
TB67S289FTG		☆	●		●			50	3.0	●	●	●	●	●	●	●			●	●	●	●	●	-20 to +85°C	QFN48
TB67S58xFNG(1)	**	☆	●		●			50	1.6	●	●	●	●	●	●	●				●	●	●	●	-40 to +85°C	HTSSOP28
TB67S58xFNG(2)	**	☆	●		●			50	2.5	●	●	●	●	●	●	●				●	●	●	●	-40 to +85°C	HTSSOP28
TB67S158FTG		☆		●	●			80	3.0×1ch		●	●								●	●	●	●	-20 to +85°C	QFN48
TB67S158FTG		☆		●	●	●	●	80	1.5×2ch		●	●								●	●	●	●	-20 to +85°C	QFN48
TB67S158NG		☆		●	●	●	●	80	1.5×2ch		●	●								●	●	●	●	-20 to +85°C	SDIP24
TB67S179FTG		☆		●	●			80	1.5	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S142FTG		☆		●	●			84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S142HG		-		●	●			84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HZIP25
TB67S142NG		☆		●	●			84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	SDIP24
TB67S149FG		☆		●	●			84	3.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	HSSOP28
TB67S149FTG		☆		●	●			84	3.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	QFN48
TB67S149HG		-		●	●			84	3.0	●	●	●	●	●	●	●				●	●	●	●	-20 to +85°C	HZIP25

++ Under planning ** Under development * New item ☆ Moisture-proof packed product
Note (1): Low voltage detection (2): Over current detection (3): Heat detection

Product list

Stepper motor drivers - Phase input

Products		Motor type		Interface			Maximum ratings		Constant current control	Stepping mode								Active gain control	Single power supply	Protection			Temp. range T_A	Package
		Bipolar	Unipolar	Clock	Phase	Serial	[V] Voltage	[A] Current		Full	Half	1/4	1/8	1/16	1/32	1/64	1/128			UVLO (1)	ISD (2)	TSD (3)		
TC78H651AFNG	☆	●			●		8	2.0		●	●								●	●	●	●	-40 to +105°C	TSSOP16
TC78H653FTG	☆	●			●		8	2.0		●	●								●	●	●	●	-40 to +105°C	QFN16
TC78H611FNG	☆	●			●		18	1.1		●	●									●	●	●	-30 to +85°C	TSSOP16
TC78H621FNG	☆	●			●		18	1.1		●	●									●	●	●	-30 to +85°C	TSSOP16
TC78H660FNG	* ☆	●			●		18	2.0	●	●	●								●	●	●	●	-40 to +85°C	TSSOP16
TC78H660FTG	* ☆	●			●		18	2.0	●	●	●								●	●	●	●	-40 to +85°C	QFN16
TB6674FAG	-	●			●		24	0.2		●										●	●	●	-30 to +85°C	SSOP16
TB6674FG	-	●			●		24	0.4		●										●	●	●	-30 to +85°C	HSOP16
TB6674PG	-	●			●		24	0.4		●										●	●	●	-30 to +85°C	DIP16
TB62208FG	☆	●			●		40	1.8	●	●	●								●	●	●	●	-20 to +85°C	HSOP28
TB62208FNG	☆	●			●		40	1.8	●	●	●								●	●	●	●	-20 to +85°C	HTSSOP48
TB62208FTG	☆	●			●		40	1.8	●	●	●								●	●	●	●	-20 to +85°C	QFN48
TB62210FNG	☆	●			●		40	1.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP24
TB62212FNG	☆	●			●		40	1.5×2ch	●	●	●								●	●	●	●	-40 to +85°C	HTSSOP48
TB62212FTAG	☆	●			●		40	1.5×2ch	●	●	●								●	●	●	●	-40 to +85°C	QFN48
TB62213AFG	☆	●			●		40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HSOP28
TB62213AFNG	☆	●			●		40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB62213AFTG	☆	●			●		40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB62213AHQ	-	●			●		40	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HZIP25
TB62218AFG	☆	●			●		40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	HSOP28
TB62218AFNG	☆	●			●		40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB62218AFTG	☆	●			●		40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB62261FTAG	☆	●			●		40	1.5	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB62261FTG	☆	●			●		40	1.8	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB6562AFG	-	●			●		40	1.5	●	●	●	●							●		●	●	-20 to +85°C	SSOP30
TB6562ANG	-	●			●		40	1.5	●	●	●	●							●		●	●	-20 to +85°C	SDIP24
TB67S213FTAG	☆	●			●		40	2.5	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB67S511FTAG	☆	●			●		40	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TB67S521FTAG	☆	●			●		40	2.8	●	●	●	●							●	●	●	●	-20 to +85°C	QFN36
TC78S121FNG	☆	●			●		40	2.0×2ch	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TC78S121FTG	☆	●			●		40	2.0×2ch	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S101AFNG	☆	●			●		50	4.0	●	●	●	●							●	●	●	●	-20 to +85°C	HTSSOP48
TB67S101AFTG	☆	●			●		50	4.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S101ANG	-	●			●		50	4.0	●	●	●	●							●	●	●	●	-20 to +85°C	SDIP24
TB67S105FTG	☆	●				●	50	3.0	●	●	●								●	●	●	●	-20 to +85°C	QFN48
TB67S261FTG	☆	●			●		50	2.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S265FTG	☆	●				●	50	2.0	●	●	●								●	●	●	●	-20 to +85°C	QFN48
TB67S285FTG	☆	●				●	50	3.0	●	●	●							●	●	●	●	●	-20 to +85°C	QFN48
TB67S111PG	☆		●				80	1.5		●	●								●	●	●	●	-20 to +85°C	DIP16
TB67S158NG	-		●		●	●	80	1.5×2ch		●	●								●	●	●	●	-20 to +85°C	SDIP24
TB67S141FTG	☆		●		●		84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	QFN48
TB67S141HG	-		●		●		84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	HZIP25
TB67S141NG	☆		●		●		84	3.0	●	●	●	●							●	●	●	●	-20 to +85°C	SDIP24
TB67S145FTG	☆		●			●	84	3.0	●	●	●								●	●	●	●	-20 to +85°C	QFN48

++ Under planning ** Under development * New item ☆ Moisture-proof packed product
Note (1): Low voltage detection (2): Over current detection (3): Heat detection

Brushless DC motor drivers

Products			Phases					Maximum ratings				Commutation		Lead angle control					Temp. range T_A	Package
			3-Phase	1-Phase	Controller	Pre Driver	Driver	[V] Voltage	[A] Current	Sensorless	Hall sensor inputs (Numbers)	Square	Sine	External input	Auto (current FB)	Auto (rpm FB)	Auto (Intelligent phase control)	Closed Loop		
Controller – Pre-driver																				
TB6575FNG		☆	●		●			5.5	0.020	●		●		●					-30 to +105°C	SSOP24
TB6551FAG		☆	●		●			12	0.002		3		●	●					-30 to +115°C	SSOP24
TB6556FG		☆	●		●			12	0.002		3		●	●	●				-30 to +115°C	SSOP30
TB6584AFNG		☆	●		●			18	0.002		3		●	●	●				-30 to +115°C	SSOP30
TB6584FNG		☆	●		●			18	0.002		3		●	●	●				-30 to +115°C	SSOP30
TB6586AFG		☆	●		●			18	0.002		3	●		●					-30 to +115°C	SSOP24
TB6586BFG		☆	●		●			18	0.002		3	●		●					-30 to +115°C	SSOP24
TB6586FG		☆	●		●			18	0.002		3	●		●					-30 to +115°C	SSOP24
TB6631FNG		☆	●		●			18	0.002		3		●	●		●			-30 to +115°C	SSOP30
TB6634FNG		☆	●		●			18	0.002		3		●	●	●				-30 to +115°C	SSOP30
TB67B054FTG		☆	●		●			18	0.002		3		●	●	●				-30 to +115°C	QFN32
TC78B041FNG	*	☆	●		●			18	0.002		3		●	●			●		-40 to +115°C	SSOP30
TC78B042FTG	*	☆	●		●			18	0.002		3		●	●			●		-40 to +115°C	QFN32
Controller - Driver																				
TC78B002FNG		☆		●			●	18	1.5		1	●	●	●					-40 to +105°C	SSOP16
TC78B002FTG		☆		●			●	18	1.5		1	●	●	●					-40 to +105°C	QFN16
TC78B025FTG	*	☆	●				●	18	4.0		1	●	●	●		●	●	●	-40 to +105°C	QFN24
TC78B027FTG	*	☆	●			●		18	0.200		1	●	●	●		●	●	●	-40 to +105°C	QFN24
TB6633AFNG		☆	●				●	25	1.0	●		●		●					-30 to +105°C	SSOP24
TB6633FNG		☆	●				●	25	1.0	●		●		●					-30 to +105°C	SSOP24
TB67B001AFTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN36
TB67B001FTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN36
TB67B008AFNG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	SSOP24
TB67B008AFTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN24
TB67B008BFNG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	SSOP24
TB67B008BFTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN24
TB67B008CFNG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	SSOP24
TB67B008CFTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN24
TB67B008FNG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	SSOP24
TB67B008FTG		☆	●				●	25	3.0	●		●		●		●			-40 to +105°C	QFN24
TB67Z800FTG		☆	●				●	25	3.0										-40 to +105°C	QFN36
TC78B015FTG		☆	●				●	25	3.0		1	●		●		●			-40 to +85°C	QFN36
TB6603FTG		☆	●			●		30	0.020		3		●	●					-30 to +85°C	QFN36
TB6604FTG		☆	●			●		30	0.020		3		●		●				-30 to +85°C	QFN48
TB6605FTG		☆	●			●		30	0.020		3		●	●		●			-30 to +85°C	QFN36
TC78B009FTG	*	☆	●			●		30	0.240	●		●		●		●		●	-40 to +105°C	QFN36
TC78B004AFTG		☆	●			●		31	0.100		3		●		●				-30 to +85°C	QFN40
TC78B015AFTG		☆	●				●	36	3.0		1	●		●		●			-40 to +85°C	QFN36
TC78B006AFNG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	SSOP16
TC78B006AFTG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	QFN16
TC78B006BFNG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	SSOP16
TC78B006BFTG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	QFN16
TC78B006CFNG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	SSOP16
TC78B006CFTG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	QFN16
TC78B006FNG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	SSOP16
TC78B006FTG		☆		●		●		40	0.020		1	●	●						-40 to +105°C	QFN16
TC78B016FTG		☆	●				●	40	3.0		3		●	●		●	●		-40 to +105°C	QFN36
TB6585AFTG		☆	●				●	45	1.8		3		●	●	●				-30 to +85°C	QFN48
TB6585FG		☆	●				●	45	1.8		3		●	●	●				-30 to +85°C	HSOP36
TB6588FG		☆	●				●	50	2.5	●		●		●					-30 to +105°C	HSOP36
TB67B000FG		☆	●				●	500	2.0		3	●	●	●					-30 to +115°C	HSSOP34
TB67B000HG		-	●				●	500	2.0		3	●	●	●					-30 to +115°C	HDIP30
TB67B000AFG	*	☆	●				●	600	2.0		3	●	●	●					-30 to +115°C	HSSOP34
TB67B000AHG	*	-	●				●	600	2.0		3	●	●	●					-30 to +115°C	HDIP30

++ Under planning ** Under development * New item ☆ Moisture-proof packed product

Motor control drivers

Mar. 2021
SMCG210322EN

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