

Product Brief

Highlights

- Four types of motor controller and driver ICs for a range of applications
- Leading-edge BiCMOS and BiCD (Bipolar+CMOS+DMOS) processes
- Broad range of package sizes and a selection of small package sizes
- Wide operating supply voltage range
- The combination motor driver ICs feature high-speed pulse width modulation (PWM)
- The brushless DC motor controller and driver ICs include a sine wave PWM drive controller and a high-voltage driver integrated in a single package
- The TB6586FG/AFG motor controller IC employs a lead angle control function that enables highly efficient driving of three-phase brushless motors

Description

Toshiba develops its motor controller and driver ICs in its leading-edge BiCMOS and BiCD (Bipolar+CMOS+DMOS) processes. The BiCD process combines the analog advantages of bipolar devices, with the digital and low-power consumption benefits of MOSFETs, as well as the high-power capabilities of DMOS devices. The family consists of brushed DC motor driver ICs, brushless DC motor controller/driver ICs, stepping motor driver ICs, and combination motor driver ICs.

Brushed DC Motor Driver ICs (Bridge Drivers)

- Highly efficient driver
- Used for switching or as an interface driver

Toshiba provides low-cost brushed DC motor driver ICs as a cost-effective way to control motion in a range of products including home and office appliances, pumps, robotics, electronic and radio-controlled toys, computer numerical control (CNC) machines, and many other rotary applications. Toshiba bridge drivers (H-Switch) for brushed DC motors are used for switching between forward and reverse rotation (stop and braking operations are also available).

Brushed DC Motor Driver ICs (Bridge Drivers)

Part Number	Function	Vm*	Io (peak)	Channel	PWM Drive	Package	Lead Free
TA7267BP(5)	Driver	25V	1A(3A)	1-ch	n/a	HSIP7	yes
TA7288P(5)	Driver	25V	1A(2A)	2-ch	n/a	HSIP10	yes
TA7291FG(5,EL)	Driver	25V	0.4A(1.2A)	1-ch	n/a	HSOP16	yes
TA7291P(5)	Driver	25V	1A(2A)	1-ch	n/a	HSIP10	yes
TA7291SG(5,J)	Driver	25V	0.4A(1.2A)	1-ch	n/a	SIP9	yes
TA8409FG(5,EL)	Driver	25V	0.4A(1.0A)	1-ch	n/a	SSOP10	yes
TA8409SG(5,J)	Driver	25V	0.4A(1.0A)	1-ch	n/a	SIP9	yes
TA8428FG(5,EL)	Driver	30V	0.8A(2.4A)	1-ch	n/a	HSOP20	yes
TA8428K(5,S)	Driver	30V	1.5A(3A)	1-ch	n/a	HZIP7	yes (inside only)
TA8429HQ(5)	Driver	30V	3A(4.5A)	1-ch	n/a	HZIP12	yes (inside only)
TA8440HQ(5)	Driver	50V	1.5A(3A)	1-ch	direct PWM	HZIP12	yes (inside only)
TB6549FG(EL)	Driver	30V	2A(3.5A)	1-ch	direct PWM	HSOP20	yes
TB6549HQ	Driver	30V	3.5A(4.5A)	1-ch	direct PWM	HZIP25	yes (inside only)
TB6549PG	Driver	30V	2A(3.5A)	1-ch	direct PWM	DIP16	yes
TB6552FLG(EL)	Driver	15V	1A	2-ch	direct PWM	QON24	yes
TB6552FNG(EL)	Driver	15V	1A	2-ch	direct PWM	SSOP16	yes
TB6555FLG(EL)	Driver	15V	0.8A	4-ch	direct PWM	QON36	yes
TB6557FLG(EL)	Driver	15V	0.8A	6-ch	direct PWM & constant current PWM	QON36	yes
TB6559FG(O,EL)	Driver	50V	1A(2.5A)	1-ch	direct PWM & constant current PWM	HSOP16	yes
TB6561FG(EL)	Driver	40V	1.5A	2-ch	direct PWM	SSOP30	yes
TB6561NG	Driver	40V	1.5A	2-ch	direct PWM	NDIP24	yes
TB6593FNG(O,EL)	Driver	15V	1.2A(3.2A)	1-ch	direct PWM	SSOP20	yes
TB6596FLG(O,EL)	Driver	6V	0.8A	6-ch	direct PWM & constant current PWM	QON36	yes
TB6612FNG(O,EL)	Driver	15V	1.2A	2-ch	direct PWM	SSOP24	yes

*Absolute maximum ratings (T_A = 25°C)

Brushed DC Motor Driver ICs (Bridge Drivers) —continued

Part Number	Function	V _m *	I _o (peak)	Channel	PWM Drive	Package	Lead Free
TB6613FTG(O,EL)	Driver	6V	0.8A	8-ch	direct PWM & constant current PWM	VQON44	yes
TA84007PQ	Driver	27V	1A(2A)	1-ch	n/a	HSIP10	yes (inside only)
TA84007FG(EL)	Driver	27V	0.4A(1.2A)	1-ch	n/a	HSOP16	yes
TA84007SG	Driver	27V	0.4A(1.2A)	1-ch	n/a	SIP9	yes
TB6558FLG(EL)	Driver	15V	0.8A	2-ch	constant current PWM	QON24	yes
TB6590FTG(UM,O,EL)	Driver	6V	0.5A	2-ch	direct PWM	VQON16	yes
TB6591FLG(EL)	Driver	6V	0.8A	7-ch	direct PWM & constant current PWM	QON48	yes
TB6592FLG(EL)	Driver	6V	0.8A	2-ch	direct PWM	QON24	yes
TB6594FLG(EL)	Driver	6V	0.8A	2-ch	direct PWM	QON24	yes
TB6595FLG(EL)	Driver	6V	0.8A	4-ch	direct PWM	QON36	yes
TB6607FLG(O,EL)	Driver	6V	0.8A	5-ch	direct PWM & constant current PWM	QON36	yes

*Absolute maximum ratings (T_A = 25°C)

Brushless DC Motor Controller/Driver ICs

- Sine wave PWM
- Contains three bi-directional drivers to drive high-current DC power
- Built-in bootstrap control circuit

Toshiba three-phase brushless DC (BLDC) motor driver ICs provide excellent performance characteristics with or without position sensors. Sensor-based BLDCs are

used when the initial load is unknown or it varies, or when high initial torque is required. Sensor-less BLDC motors are typically used in fans where they save Hall sensors and wiring. Typical applications include power tools, refrigerator/cooling (compressors) and HVAC (e.g. fan).

Brushless DC Motor Controller/Driver ICs

Part Number	Function	V _m *	I _o	Sinusoidal Current Wave	Sensor-less	Speed Feedback loop	Package	Lead Free
TB6537FG(EL)	Controller	5.5V	20mA	no	yes	no	SSOP24	yes
TB6537PG(J)	Controller	5.5V	20mA	no	yes	no	DIP18	yes
TB6539FG(EL)	Controller	18V	20mA	yes	no	no	SSOP30	yes
TB6539NG	Controller	18V	20mA	yes	no	no	NDIP24	yes
TB6548FG	Controller	5.5V	20mA	no	yes	no	SSOP24	yes
TB6551FG(EL,DRY)	Controller	12V	2mA	yes	no	no	SSOP24	yes
TB6556FG(EL,DRY)	Controller	12V	2mA	yes	no	no	SSOP24	yes
TB6571FG(O,EL)	Controller	30V	20mA	yes	no	yes	QFP52	yes
TB6575FNG(O,EL)	Controller	5.5V	20mA	no	yes	no	SSOP24	yes
TB6582FG (**)	Controller	18V	±2mA	yes	yes	no	QFP52	yes
TB6586AFG(O,EL,DRY)	Controller	18V	2mA	150 degree drive	no	no	SSOP24	yes
TB6586FG(O,EL,DRY)	Controller	18V	2mA	150 degree drive	no	no	SSOP24	yes
TB6581HG	Controller & Driver	500V	1A	yes	no	no	HZIP25	yes
TB6588FG	Controller & Driver	50V	2.5A	no	yes	no	HSOP36	yes
TA84006FG(ER,DRY)	Driver	25V	1A	no	no	no	SSOP30	yes

*Absolute maximum ratings (T_A = 25°C)

(**) Under Development

Stepping Motor Driver ICs

- Low output ON resistances
- Forward and reverse rotation control available

Toshiba offers a wide selection of stepper motor driver ICs to meet automation and budget requirements, including high-precision/high-speed devices that generate sine-wave currents by using

micro-stepping to enable high-speed and low-noise motor drive. These bipolar motor driver ICs generate more power without increasing motor weight compared to unipolar motor driver ICs. The devices are available with reset and enable pins, internal PWM current control, and an internal thermal-shutdown circuit.

Stepping Motor Driver ICs

Part Number	Function	V _m *	I _o	Excitation	I/F	Mixed Decay Mode	Package	Lead Free
TA7774FG(5,EL)	Driver	17V	±100mA	Full step	phase input (2-bit/phase)	no	HSOP16	yes
TA7774PG(5,J)	Driver	17V	±100mA	Full step	phase input (2-bit/phase)	no	DIP16	yes
TB6613FTG(O,EL)	Driver	6V	0.8A	6 bit u-step	serial input	no	VQON44	yes
TA84002FG(5,EL)	Driver	35V	1A	1/2 step	phase input (2-bit/phase)	no	HSOP20	yes
TA8435HQ(5)	Driver	40V	2.5A	1/8 step	CLK input	no	HZIP25	yes (inside only)
TB62206FG(EL)	Driver	40V	1.8A	1/2 step	phase input (2-bit/phase)	included	HSOP20	yes
TB62209FG(EL)	Driver	40V	1.8A	1/16 step	CLK input	included	HSOP36	yes
TB6562AFG(EL)	Driver	40V	1.5A	1/4 step	phase input (3-bit/phase)	no	SSOP30	yes
TB6562ANG	Driver	40V	1.5A	1/4 step	phase input (3-bit/phase)	no	NDIP24	yes
TB6598FNG(EL)	Driver	15V	0.8A	1/2 step	phase input (2-bit/phase)	no	SSOP16	yes
TB6560AHQ	Driver	40V	3.5A	1/16 step	CLK input	included	HZIP25	yes (inside only)
TB6560AFG	Driver	40V	2.5A	1/16 step	CLK input	included	THQFP64	yes (inside only)
TB6608FNG(O,EL)	Driver	15V	0.8A	1/8 step	CLK input	no	SSOP24	yes

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TAEC Regional Sales Offices

NORTHWEST

San Jose, CA

TEL: (408) 526-2400

FAX: (408) 526-2410

Portland, OR

TEL: (503) 784-8879

FAX: (503) 466-9729

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Irvine, CA

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FAX: (949) 474-1330

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FAX: (972) 235-4114

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Buffalo Grove, IL

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TEL: (508) 481-0034

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FAX: (973) 541-4716

SOUTHEAST

Duluth, GA

TEL: (770) 931-3363

FAX: (770) 931-7602

www.Toshiba.com/taec

Combination Motor Driver ICs

- Low output ON resistances
- Forward and reverse rotation control
- High breakdown voltage and large current output

The Toshiba next-generation combination motor driver ICs feature low noise, high-speed and high-accuracy control for general purpose and battery-powered applications. Using proprietary production and circuit technologies, the ICs are designed for different drive modes, can support DC motors as well as stepper motors and can be used to drive several

motors with one chip. High-speed and efficient power control is achieved with PWM, constant-current or direct PWM, on the order of several hundred kHz.

The devices are available with an independent, power-saving, standby-mode control function, a through current prevention function for the output driver section by dead time control (Typ.= 300 ns), a built-in thermal shutdown (TSD) circuit, and a V_{CC} power supply under voltage detection (UVLO) circuit.

Combination Motor Driver ICs

Part Number	Function	V _m *	I _o	Channel	I/F	Option	Package	Lead Free
TB6557FLG(EL)	Driver	15V	0.8A	6-ch	serial input	Const current x2	QON36	yes
TB6596FLG(O,EL)	Driver	6V	0.8A	6-ch	serial input	Const current x2 FLL Speed Control	QON36	yes
TB6613FTG(O,EL)	Driver	6V	0.8A	8-ch	serial input	6-bit u-Step STM drive x2 Const current x1	VQON44	yes
TB6591FLG(EL)	Driver	6V	0.8A	7-ch	phase input	Const current x1	QON48	yes
TB6594FLG(EL)	Driver	6V	0.8A	2-ch	phase input	DC/DC Converter	QON24	yes
TB6595FLG(EL)	Driver	6V	0.8A	4-ch	phase input		QON36	yes
TB6607FLG(O,EL)	Driver	6V	0.8A	5-ch	serial input	Const current x2	QON36	yes

*Absolute maximum ratings (T_A = 25°C)

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