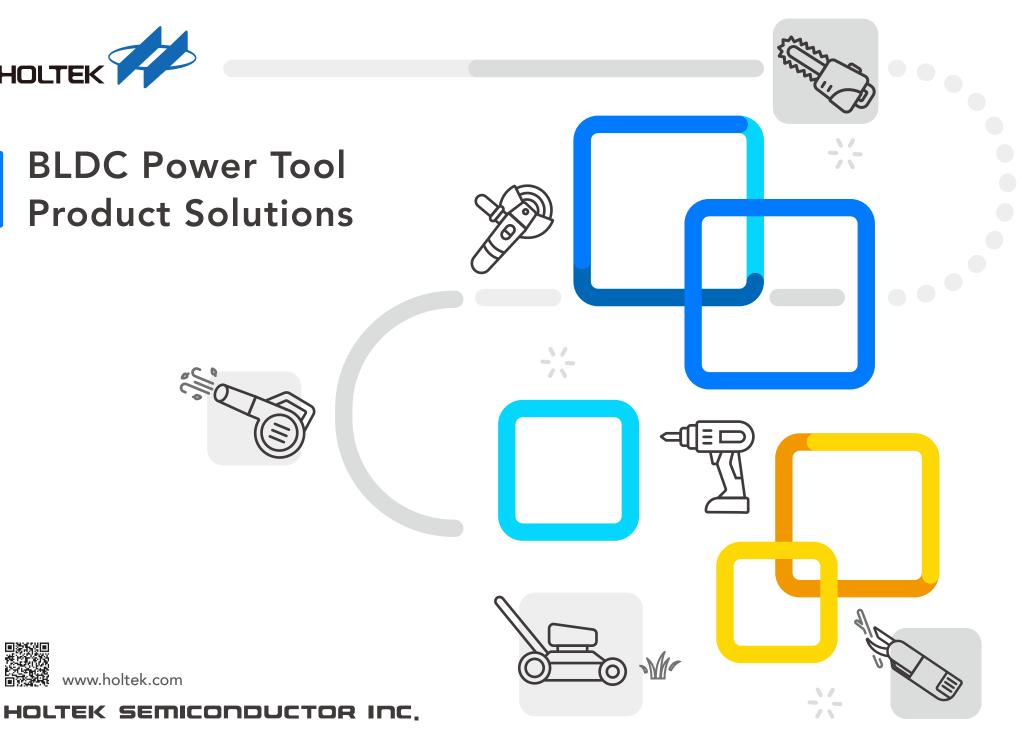


www.holtek.com

BLDC Power Tool Product Solutions





Introduction

In recent years, with the Li-battery technology mature and cost reduction, cordless power tools with lithium battery and DC motor are convenient to use. Cordless power tools have gradually replaced traditional AC plug-in corded power tools and become MCU mainstream solutions.

BLDC power tools are mainly divided into power tools and garden tools, which are briefly introduced below.



Power Tool

3S/5S Li-battery is the mainstream The general power tool includes electric drills, impact wrenches, angle grinders, electric saws, sanders, etc.

- Used in building decoration, home decoration, landscaping, forestry, animal husbandry, railway construction, factory processing, etc.
- Household power tools (such as electric drills), cost reduction requirement, there is a new product with 1S Li-battery.



Electric drills



Impact wrenches

Angle grinders



10S/14S Li-battery is the mainstream The general garden tool includes lawn mowers, leaf blowers, electric scissors, etc.

- Rich application scenarios, such as family courtyards, city parks, city greening, various courts, etc.
- Household power tools (such as electric drills), cost reduction requirement, there is a new product with 1S Li-battery.





Lawn mowers

Leaf blowers



Chainsaws



Sanders

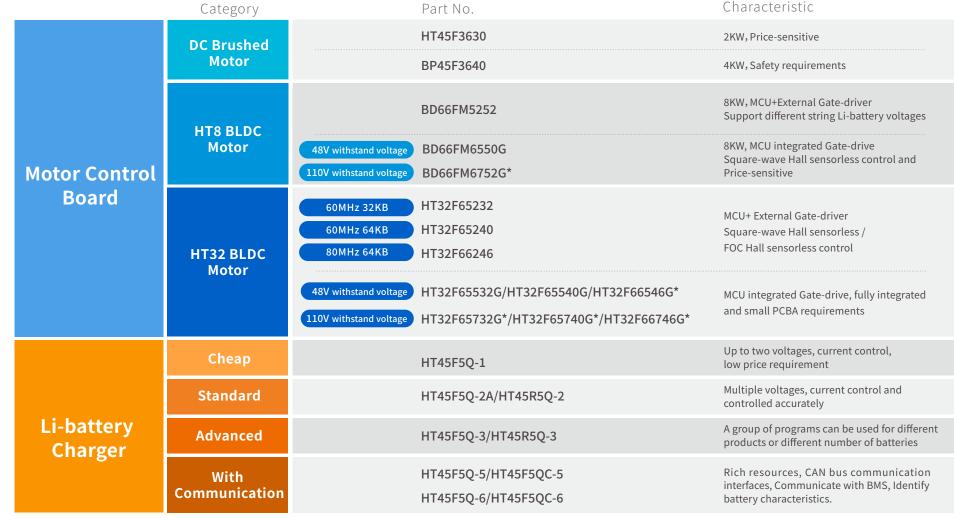


Electric scissors

BLDC Power Tool Products – HOLTEK Solution Reference

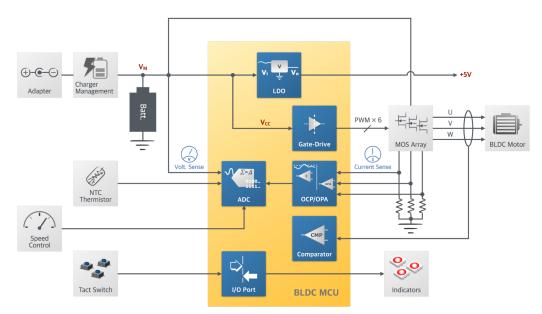
Motor control and charger are the core components of BLDC power tool products. Holtek provides the corresponding MCU series for customers to choose. In addition, Holtek also provides application solutions and application notes for users' reference, which is convenient for users to quickly introduce development and mass production.

The Holtek BLDC power tool solutions are summarised in the following table, refer to the Demo Solution section for more solution details.



*: Not released

BLDC Power Tool – Application Block Diagram



Section about Core Components BLDC Power Tool – Product Description about Core Components

BLDC power tool products are mainly composed of three core components: BLDC motor/control board, Li-battery and charger.

BLDC Motor/Control Board Motors are mainly divided into two categories: DC brush motor (low price requirement) and BLDC motor (large torque and long service life). MCU selection is different for different motors. A motor control board is also used to implement motor speed and torque controlling, in addition to implement motor protection functions, including locked-rotor, over-current, short-circuit, over-temperature and over-voltage.

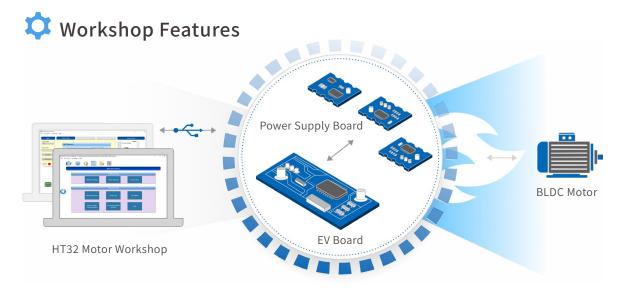
Li-Battery

A Li-Battery protection board is required to ensure the safety of battery use. There are two methods to measure the battery level, the resistive voltage division method is suitable for low cost requirements and the OPA voltage division method meets the high accuracy requirements. A **battery protection board** is also used to implement battery charging/discharging in addition to battery charging/discharging protection, functions, including over charging protection, over discharging protection, output over-current protection, short-circuit protection, disconnection protection and charging over-current protection.

Charger

There are two types of power tool chargers. The cheap charger is charged by constant voltage and the dedicated charger is charged in three stages by trickle/constant current/constant voltage. A charger control board is required to control and output accurate charging voltage and charging current to meet the Li-battery charging curve and extend the service life.

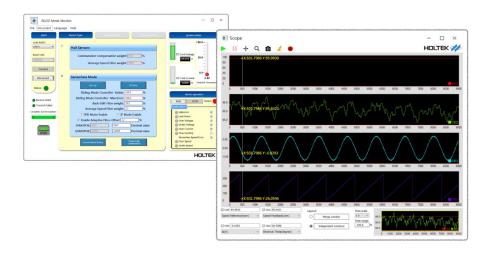
BLDC Motor Control – HT32 Workshop



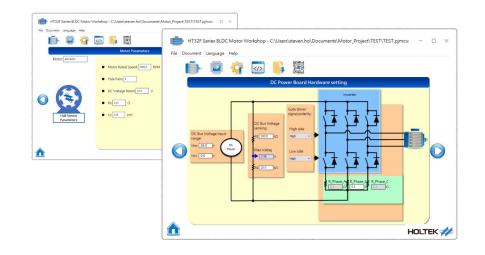
HT32 motor workshop (EVB+High/Medium/Low power supply board), which supports FOC Hall sensor detection / FOC Hall sensorless detection. It has a variety of features to assist users with a more rapid product development and evaluation process.

The workshop can adjust various parameters in real time. After confirming that the motor control parameters are optimised, a software project will be generated and provided to users for secondary development. The workshop has an internal virtual oscilloscope, which can monitor the motor rotation data and waveform in real time. The AP can assist users in remote monitoring and adjustment.

Real-time Control



Parameter Adjustment



🗘 Official Website Link

HT32 BLDC Motor Workshop

Workshop Kit Online Shop **>>>**



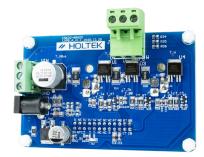
■ <u>BLDC_EVB with HT32F65232</u> ₩

1-shunt FOC | 32KB Flash | 4KB SRAM | On-board e-Link32 Lite function



■ FOC_EVB with HT32F65240 ₩

2-shunt FOC | 64KB Flash | 8KB SRAM | On-board e-Link32 Lite function



Low Voltage Power Board (LVPB) Input voltage: DC 9V to 26V Maximum DC bus current: 2.5A



Medium Voltage Power Board (MVPB) Input voltage: DC 17V to 60V Maximum DC bus current: 20A



High Voltage Power Board (HVPB) Input voltage: AC 90V to 264V Maximum DC bus current: 2.5A

Demo Solutions

There are several 32-bit MCU Demo solutions as examples, which are 5S li-battery, 10S li-battery and 3S/4S li-battery applications.

Solution 1 5S li-battery BLDC Impact Wrench

Solution Description

Holtek is delighted to announce the release of its MCU, the HT32F65532G, which is suitable for use in 5S li-battery BLDC impact wrench applications. The device integrate a 12V/5V LDO and a 48V withstand voltage gate-driver to reduce the external drive circuit. The device has an operating frequency of up to 60MHz. The square-wave Hall sensorless control is using the A/D converter commutation method, the control accuracy can be effectively improved, it is better for applications with large loads. The combination of the square-wave Hall sensorless A/D converter control/comparator method will support higher rotational speeds and higher efficiency, which is suitable for high-quality applications.



Feature Description

Power specification: 5S li-battery@Max. 15.4A

Motor control: Square-wave Hall sensorless control, VSP speed control, Forward/backward

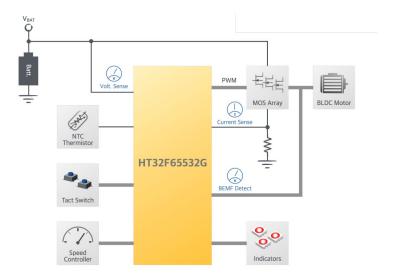
rotation switching

Protection mechanism: Low-voltage, over-voltage, over-current, over-temperature, locked-rotor, etc.

Reference Circuit

It needs to be applied by the company's business

Application Block Diagram



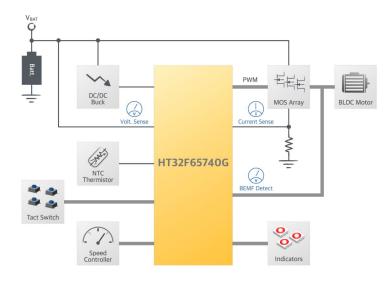
Solution 2 10S Li-battery BLDC Leaf Blowers

Solution Description

Holtek is delighted to announce the release of its MCU, the HT32F65740G, which is suitable for 10S Li-battery BLDC Leaf Blowers application. The solution uses a brushless motor with an axial fan that rotates at up to 20,000 revolutions per minute. Compared with engine leaf blowers, it has the advantages of zero waste smoke, weight light and easy maintenance.



Application Block Diagram



Feature Description

Power specification: 10S Li-battery@Max. 22.2A

Motor control: FOC Hall sensorless control, VSP speed control

Protection mechanism: Low-voltage, over-voltage, over-current, over-temperature, locked-rotor, etc.

Operating mode: Turbocharged mode

Reference Circuit

It needs to be applied by the company's business

Solution 3 BLDC Li-battery Electric Scissor

Solution Description

The 3S/4S BLDC li-battery electric scissor solution is developed using the HT32 BLDC motor development platform kit (FOC_EVB+MVPB), the EVB has an integrated MCU, the HT32F65240. By generating software projects through the parameter platform and transplanting them to the actual board, customers can quickly enter the product software secondary development and avoid starting research and development from the basic schematic drawing/PCBA hardware production stage. Therefore, it can shorten the product development time and reduce the difficulty of project debugging.

Feature Description

Motor control: FOC Hall sensorless, Forward/backward rotation switching, trigger control

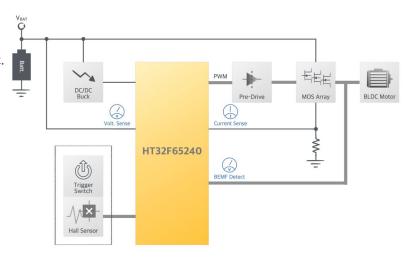
Communication interface: Serial interface communication (receiving only)

Protection mechanism: Low-voltage, over-voltage, over-current, over-temperature, locked-rotor, etc. Competitive advantage: HT32 BLDC motor development platform kit is provided to shorten the product development time

Reference Circuit

It needs to be applied by the company's business

Application Block Diagram



Please refer to	the official	website for the	latest selection	information.

	Part No.	Max. Freq.	VDD	Fla	sh S	RAM	PDMA	ADC	СМР	OPA / PGA	Timer ^{•1}	Cap. ^{⁺2} or PWM	Cpm. PWM ^{*3}	RTC	Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F65232	60MHz	2.5V~	324	КВ	4KB	6CH	2Msps×1 12-bit×12	2	1/0	BFTM×2 SCTM×4 GPTM×1 MCTM×1 LSTM×1	12	3	_	USART×1 UART×1	CRC	20 28 44	24SSOP 32QFN 48LQFP
BLDC Motor MCU	HT32F65230 HT32F65240	-	5.5V	64	кв	8KB		1Msps×2 12-bit×8	3	2/0	BFTM×2 SCTM×4 GPTM×1 MCTM×1			1	SPI×1, I²C×1	DIV	40	48LQFP
		nput Captur	e.		•			PTM: Genera		Timer, MC		Control Time	I er, LSTM: L	ow Speed	l Timer.			
	Part No.	Max. Freq.	VDD	Fla	sh S	RAM	PDMA	ADC	СМР	OPA / PGA	Timer ^{⁺1}	Cap. ^{°2} or PWM	Cpm. PWM ^{'3}	RTC	Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F66242		0.51/					0.5Малания			BFTM×2 SCTM×4				USART×1 UART×1 SPI×1, I²C×1	CRC	20	24SSOP
BLDC Motor MCU (CORDIC + PID Engine)	HT32F66246	80MHz	2.5V~ 5.5V	64	(B	8KB	6CH	2.5Msps×1 12-bit×12	2	0 / 4	GPTM×1 MCTM×1 LSTM×1	12	3	-	CAN Bus x1 USART×1 UART×1 SPI×1, I ² C×1	DIV	28 44	32QFN 48LQFP
		nput Captur	e.		0		-	PTM: Genera or inverter ap		Timer, MC	CTM: Motor	Control Time	er, LSTM: L	ow Speed	l Timer.			
	Part No.	Max. Freq.	vcc	LDO	Flash	SRAM	PDMA	ADC	CMF	OPA / PGA	Timer	² Cap or PV			Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F65532G	60MHz	6V~ 40V	5V	32KB	4KB	6CH	2Msps× 12-bit×1		1/0	BFTM×2 SCTM×4 GPTM×	4	3	_	USART×1 UART×1	CRC	12 28 34	32QFN 48LQFP-EP 64LQFP-EP
BLDC Motor MCU	HT32F65540G		400		64KB	8KB		1Msps×2 12-bit×8		2/0	MCTM× LSTM×				SPI×1, I ² C×		26 34	48LQFP-EP 64LQFP-EP
with 48V N/N Gate-Driver	3. Cap.: I	Basic Func nput Captur	tion Time e.	er, SCTN	: 1: Single	e-Channe	el Timer, G	power functio PTM: Genera pr inverter ap	al-Purpose	Timer, MC	CTM: Motor	Control Time	er, LSTM: L	ow Speed	l Timer.			
	Part No.	Max. Freq.	vcc	LDO	Flash	SRAM	PDMA	ADC	CMF	OPA / PGA	Timer	2 Cap or PV	. ^{°3} Cpm VM PWM		Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F66542G										BFTM×2 SCTM×4				USART×1 UART×1 SPI×1, I²C×7		12 28 36	32QFN 48LQFP-EP 64LQFP-EP
BLDC Motor MCU with 48V N/N Gate-Driver	HT32F66546G	80MHz	6V~ 40V	5V	64KB	8КВ	6CH	2.5Msps> 12-bit×1		0 / 4	GPTM× MCTM× LSTM×	1 12 1	3	-	CAN Bus x1 USART×1 UART×1 SPI×1, I ² C×1	- CRC DIV	12 28 36	32QFN 48LQFP-EP 64LQFP-EP
(CORDIC + PID Engine)	3. Cap.: I		tion Time e.	er, SCTN	I: Single	e-Channe	el Timer, G	PTM: Genera	al-Purpose	Timer, MC	CTM: Motor	Control Time	er, LSTM: L	ow Speed	l Timer.			

DLDC MCU – HT32 MCU Selection Guide

Please refer to the official website for the latest selection information.

	Part No.	Max. Freq.	vcc	LDO	Flash	SRAM	PDMA	ADC	СМР	OPA / PGA	Timer ^{*2}	Cap. ^{⁺3} or PWM	Cpm. PWM ^{·₄}	RTC	Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F65732G	60MHz	6V~ 20V	5V	32KB	4KB	6CH	2Msps×1 12-bit×12	2	1/0	BFTM×2 SCTM×4 GPTM×1	12	3	_	USART×1 UART×1	CRC		46QFN 48LQFP-EP 64LQFP-EP
BLDC Motor MCU	HT32F65740G		200		64KB	8KB		1Msps×2 12-bit×8	3	2/0	MCTM×1 LSTM×1				SPI×1, I ² C×1	DIV		48LQFP-EP 64LQFP-EP
with 110V N/N Gate-Driver	3. Cap.: Inpu	sic Functi Ut Capture	ion Time	er, SCTI	V: Single	-Channel	Timer, GF	ower function PTM: General-Pu r inverter applica		ïmer, MC	TM: Motor Con	trol Timer, L	STM: Low	Speed 1	Гіmer.			

	Part No.	Max. Freq.	vcc	LDO	Flash	SRAM	PDMA	ADC	СМР	OPA / PGA	Timer ^{*2}	Cap. ^{∙3} or PWM	Cpm. PWM ^{·4}	RTC	Interface	Others	I/O	Package
Cortex [®] -M0+ 32-Bit	HT32F66742G		0.4					414-1-1-0			BFTM×2 SCTM×4				USART×1 UART×1 SPI×1, I²C×1	0.50		46QFN 48LQFP-EP 64LQFP-EP
BLDC Motor MCU 110V N/N Gate-Driver	HT32F66746G	80MHz	6V~ 20V	5V	64KB	8KB	6CH	1Msps×2 12-bit×12	3	0 / 4	GPTM×1 MCTM×1 LSTM×1	12	3	_	CAN Bus x1 USART×1 UART×1 SPI×1, I ² C×1	CRC DIV		46QFN 48LQFP-EP 64LQFP-EP
(CORDIC + PID Engine)	3. Cap.: Inpu	isic Funct it Capture	ion Time	er, SCT	M: Single	-Channel	Timer, GF	ower function PTM: General-Pu r inverter applica		īmer, MC	TM: Motor Con	rol Timer, L	STM: Low	Speed 1	Timer.			

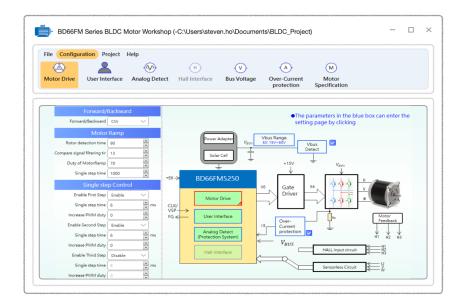
BLDC Motor Control – HT8 Workshop

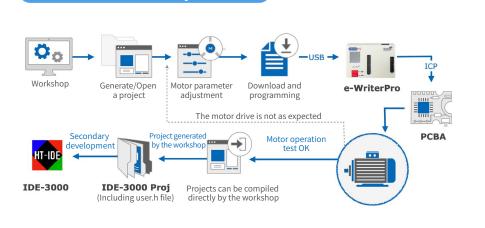
Workshop Features

Motor Parameter Adjustment

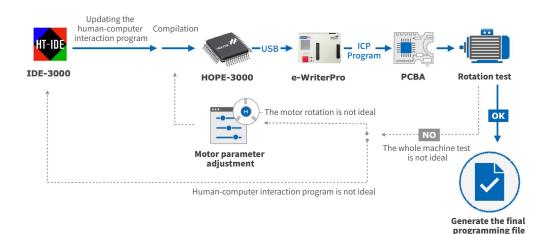
HT8 motor workshop (MCU Board + High/Medium/Low power board), which has excellent scalability and supports MCUs, the HT66FM5242/BD66FM5252/HT66FM5440/BD66FM5245/BD66FM5246*. The workshop supports the square-wave Hall, square-wave Hall sensorless and sine wave with Hall algorithms.

HT8 motor workshop can be operated via a graphical interface for parameter adjustment, including motor drive, user interface, analog detection, Hall interface, Bus voltage detection and over-current protection parameters adjustment, etc. The projects generated by the workshop can be used for secondary development, reducing the difficulty of product development and shortening the product development time.





Secondary Development



🗘 Official Website Link

Workshop Kit Online Shop



Low Voltage Power Board (LVPD with integrated MCU) Input voltage: DC 9V to 26V Maximum DC bus current: 2.5A



Medium Voltage Power Board (MVPD with integrated MCU) Input voltage: DC 15V to 60V Maximum DC bus current: 20A



High Voltage Power Board (HVPD with integrated MCU)
Input voltage: AC 85V to 265V
Maximum DC bus current: 2.5A



Demo Solutions

There are several 8-bit MCU Demo solutions as examples, which are 5S li-battery and 10S li-battery applications.

Solution 1

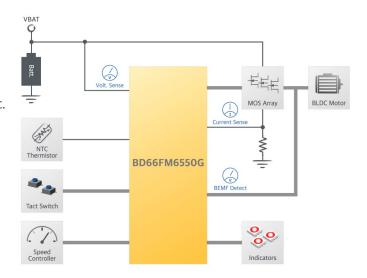
5S li-battery BLDC Impact Wrench

Solution Description

Holtek is delighted to announce the release of its MCU, the **BD66FM6550G**, which is suitable for use in 5S li-battery BLDC impact wrench applications. The square-wave Hall sensorless control is using the comparator method. In addition, the device contains a back EMF noise suppression filter circuit which can be used for square-wave Hall sensorless start-up and provide improved low speed stability for applications. This solution is suitable for low cost applications. Compared with impact wrenches that use mains, they have the advantages of high portability and rich use scenarios. In addition, the used BLDC motor has the characteristics of long service life, low noise and high torque.



Application Block Diagram



Feature Description

Power specification: 5S li-battery@Max. 27A

Motor control: Square-wave Hall sensorless control, VSP speed control, Forward/backward

rotation switching

Protection mechanism: Low-voltage, over-voltage, over-current, over-temperature, locked-rotor, etc.

Reference Circuit

It needs to be applied by the company's business

Solution 2 10S li-battery BLDC Lawn Mower

Solution Description

Holtek is delighted to announce the release of its MCU, the BD66FM5252, which is suitable for use in 10S li-battery BLDC lawn mower applications. The device supports a square-waveform control and includes an enhanced sensorless filter to ensure more stable control of the ramp during startup and low speed conditions. When used together with related UL functions, it meets the export market requirements for UL certification. Compared with gasoline lawn mowers, it has the advantages of energy saving and environmental protection.



Feature Description

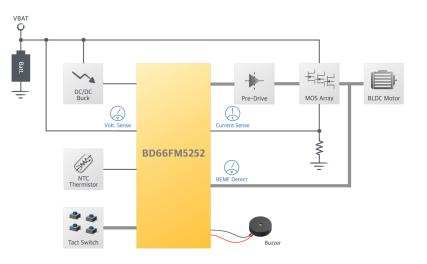
Power specification: 10S li-battery@Max. 20A

Motor control: Square-wave Hall sensorless control, Software adaptive speed Protection mechanism: Low-voltage, over-voltage, over-current, current limiting, over-temperature, locked-rotor, etc.

Reference Circuit

It needs to be applied by the company's business

Application Block Diagram



DLDC MCU - HT8 MCU Selection Guide

Please refer to the official website for the latest selection information.

	Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Data EEPROM	Stack	IAP	I/O	Timer	ADC	MDU	ОСР	Р₩М	СМР	Inter- face	Package
8-Bit BLDC Motor	BD66FM5245					—				10-bit PTM×2 16-bit PTM×2 16-bit CAPTM×1	12-bit					UART×1	16NSOP 24SSOP
Flash MCU	BD66FM5246	20MHz	4.5V~ 5.5V	4K×16	512×8	512×8	8	V	22	10-bit PTM×2 16-bit PTM×2 16-bit CTM×2 16-bit CAPTM×1	×14	V	\checkmark	10-bit ×3	3	UART×1 I²C×1	16NSOP 24SSOP
	BD66FM5252			8K×16	2048×8				30	10-bit PTM×2 16-bit PTM×2 16-bit CAPTM×1	12-bit ×11					1-0×1	24/28SSOP 32QFN

8-Bit BLDC Motor	Part No.	Max. Freq.	vcc	LDO	Program Memory	Data Memory	Data EEPROM	I/O	Timer	ADC	MDU	ОСР	Р₩М	СМР	Inter- face	Package
Flash MCU	BD66FM6545G	20MHz	6V~	5V	4K×16	512×8	-	15	10-bit PTM×2 16-bit PTM×2	12-bit ×12			10-bit	2	UART×1	32QFN
	BD66FM6550G	20101112	40V	57	8K×16	2048×8	512×8	24	16-bit CAPTM×1	12-bit ×10	Ň	Ň	×3	3	UART×1 I ² C×1	32QFN 48LQFP-EP
with 48V N/N Gate-Driver	Note: LDO: Suppo	ort external	signal wak	eup to real	ize zero standb	y power function										

	Part No.	Max. Freq.	vcc	LDO	Program Memory	Data Memory	Data EEPROM	I/O	Timer	ADC	MDU	ОСР	PWM	СМР	Inter- face	Package
8-Bit BLDC Motor Flash MCU	BD66FM6746G	20MHz	6V~ 20V	5V	4K×16	512×8	512×8	16	10-bit PTM×2 16-bit PTM×2 16-bit CTM×1 16-bit CAPTM×1	12-bit ×13	~	V	10-bit ×3	3	UART×1 I ² C×1	32QFN 48LQFP-EP
with 110V N/N Gate-Driver	BD66FM6752G		200		8K×16	2048×8		24	10-bit PTM×2 16-bit PTM×2 16-bit CAPTM×1	12-bit ×10			*3		TUXT	40LQFP-EP
	Note: LDO: Suppo	ort external	signal wak	eup to real	ize zero standby	power function	L.									

DC Brushed Power Tool Product Solutions

C Brushed Power Tool Speed Controller

For DC brush motors, only a speed controller is required to implement motor control. Power tools usually need some basic speed control and motor protection functions, including short-circuit, over-current, locked-rotor, over-voltage, under voltage and other protections. Holtek device series includes a power tool controller MCU, the HT45F4630, which is especially designed for motor speed control products, such as electric drills, electric screwdrivers, lawn mowers and other similar products. Holtek also provides useful application solution to help developers develop products in the similar products more easily.

Solution Description HT45F3630/BP45F3640 Speed Controller Solution

In traditional motor speed control applications, an external gate-driver and operational amplifier are required for most solutions. With regard to the Holtek dedicated MCUs, the HT45F3630/BP45F3640, the devices integrate an OPA, a CMP and a gate-driver.

The current signal is amplified by the OPA, the amplified signal will be measured by the A/D converter or be compared with a preset value using the comparator to achieve S/W current detection or H/W over-current protection. The internal gate-drive provides a group of PWM high voltage and large current outputs for directly driving Power MOS transistors for motor speed control. The I/O pins with their programmable current output function can be used to directly drive illuminating LEDs without requiring external current-limiting resistors. The solution is suitable for use in products which have small PCBA requirements, the board is as follows.



PCBA Size: 25 x 22mm



Feature Description

Competitive advantage:

Save on external MOS driving circuits and reduced number of required external components and costs.

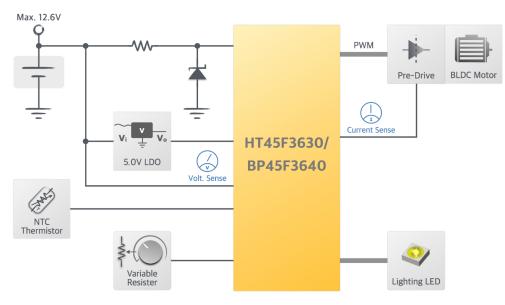
Multiple protections:

The devices include integrated over-current protection and detection functions and an amplifier which allows the input signal to be amplified by 51 times, requiring a lower value current sense resistance value which will increase the overall efficiency and extend the operating time.

When an over-current event occurs, the PWM switching will be shut off by hardware to achieve immediate protection.

High Voltage Output: The internal gate-driver can provide 100mA or larger currents for directly driving external power MOS transistors.

Application Block Diagram



🗘 Official Website Link

Applications

«Power Tool Speed Controller»

https://www.holtek.com/page/applications/detail/WAS-1631

Application Note 《HT45F3630 Power Tool Speed Control Switch Application Example》 https://www.holtek.com/page/applicationNotes/AN0427

🗘 DC Brushed Motor – HT8 MCU Selection Guide

Please refer to the official website for the latest selection information.

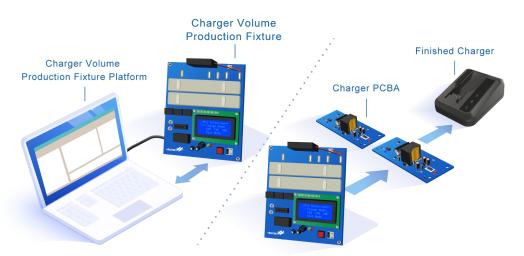
	Part No.	Max. Freq.	VCC (HV)	VDD	Program Memory	Data Memory	Data EEPROM	Stack	I/O	Timer	ADC	VREF	ОСР	нуо	нию	CRC	IAP	Inter- face	Package
Tool Power Controller	HT45F3630	8MHz	12V	2.2V~ 5.5V	2K×16	64×8	32×8	6	12	10-bit PTM×2	12-bit ×8	_	1	1	0	0	0	l ² C×1	16SSOP
Flash MCU	BP45F3640	8MHz	12V	2.2V~ 5.5V	4K×16	256×8	32×8	8	15	10-bit PTM×2	12-bit ×8	2.4V	1	0	2	1	1	l ² C×1	16/20SSOP
	Note: The BF	45F3640 d	evice co	nforms to	the Europear	n standard IE0	C 60730 and t	he U.S. st	andard	UL 60730 certifie	ed.								

Charger Development Workshop

The traditional charger manufacturers have the ability to design the AC/DC circuit, but the F/W development ability is relatively insufficient. Therefore, Holtek has developed the "Charger development platform" to help users quickly develop charger applications through graphical interface operations without program programming.

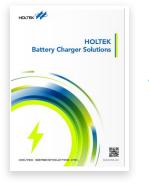


Charger Volume Production Fixture Platform



Manufacturers had to make the entire PCBA calibration before leaving the factory to ensure that the charger output voltage and current values meet the product specifications. The traditional calibration method to obtain the required resistance is to parallel the resistor or rotate the variable resistor. In these methods, the resistance may not match the required output voltage and current or the resistance value may change due to the wrong touch when setting the variable resistance and sealing the sealant. In addition, at least two workers need to arrange for the production line.

To solve the above problems, the Holtek charger volume production fixture is provided. It can not only improve the production speed of the production line, but also effectively reduce the labor cost.



Brochure 《HOLTEK Charger Solutions》

Battery Charger Solutions Brochure

Please refer to the official website for the latest selection information.

	Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Data EEPROM	Stack	I/O	Timer	ADC	DAC	ОРА	CRC	IAP	Interface	Package
	HT45F5Q-1	8MHz	2.2V~ 5.5V	1K×14	32×8	32×14	4	9	_	10-bit ×5	8-bit×1 12-bit×1	2	Ι	—	—	16NSOP
	HT45F5Q-2A	8MHz	2.2V~ 5.5V	2K×15	128×8	32×15	6	15	10-bit CTM×1	12-bit ×7	14-bit×1 12-bit×1	3	_	_	UART×1	16NSOP 20NSOP
Battery Charger Flash N	HT45F5Q-3	8MHz	2.2V~ 5.5V	4K×15	256×8	32×15	6	23	10-bit CTM×1 10-bit STM×1	12-bit ×11	14-bit×1 12-bit×1	3	\checkmark	_	UARTx1 SPI/I ² C×1	24SSOP 28SSOP
	HT45F5Q-5	8MHz	2.2V~ 5.5V	8K×16	512×8	512×8	8	27	10-bit CTM×1 10-bit STM×1, 16-bit STM×1	12-bit ×12	14-bit×2	3	V	\checkmark	UARTx1 SPI/I ² C×1	24/28SSOP 32QFN
	HT45F5Q-6	20MHz	2.2V~ 5.5V	16K×16	1024×8	1024×8	16	27	10-bit PTM×2, 10-bit CTM×1 10-bit STM×1, 16-bit STM×1	12-bit ×12	14-bit×2	3	\checkmark	\checkmark	UARTx1 SPI/I2C×1	24/28SSOP 32QFN

Detters Charger Flack MCU	Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Data EEPROM	Stack	I/O	Timer	ADC	DAC	ОРА	CRC	IAP	CAN	Interface	Package
Battery Charger Flash MCU	HT45F5QC-5	8MHz	2.2V~ 5.5V	8K×16	512×8	512×8	8	16	10-bit CTM×1 10-bit STM×1, 16-bit STM×1	12-bit ×9	14-bit ×2	3	\checkmark	\checkmark	\checkmark	—	28SSOP 32QFN
with CAN Bus	HT45F5QC-6	20MHz	2.2V~ 5.5V	16K×16	1024×8	1024×8	16	16	10-bit PTM×2, 10-bit CTM×1 10-bit STM×1, 16-bit STM×1	12-bit ×9	14-bit ×2	3	\checkmark	\checkmark	V	UART×1	28SSOP 32QFN

	Part No.	Max. Freq.	VDD	Program Memory	Data Memory	Stack	I/O	Timer	ADC	DAC	OPA	CRC	HVIAP	Interface	Package
Battery Charger OTP MCU	HT45R5Q-2	8MHz	2.2V~ 5.5V	2K×16	128×8	6	11	8-bit×1	12-bit ×5	12-bit ×2	3	_	\checkmark	—	16NSOP
	HT45R5Q-3	8MHz	2.2V~ 5.5V	4K×16	256×8	8	23	10-bit CTM×1 10-bit STM×1	12-bit ×10	14-bit ×2	3	V		UART×1 SPI/I²C×1	24SSOP 28SSOP

Development Resources

Online Debug Adaptor

The e-Link is an online debug adaptor for Holtek's OCDS architecture Flash MCUs. Together with the HT-IDE3000 software it allows users to program and debug programs on their target boards. It provides debug operations such as

single step, full speed, stop, breakpoints during the debug process.

Hardware: <u>e-Link</u> Software: HT-IDE3000

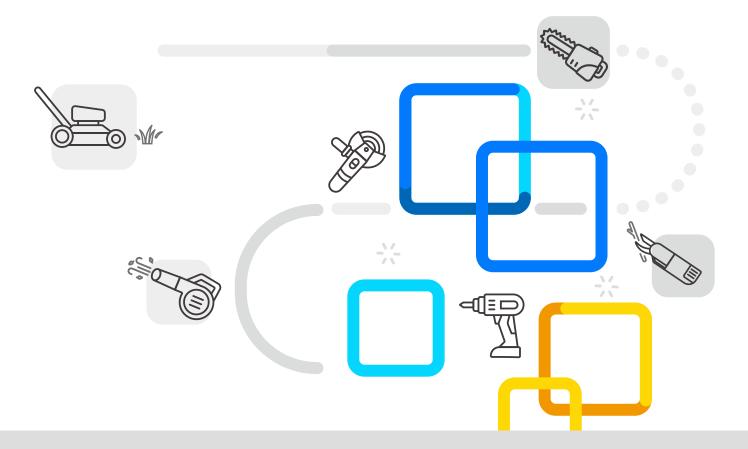


Programmer

The e-WriterPro can be used as a programming tool for all of Holtek MCUs, supports both online and offline programming modes and can also be used for small to medium volume production purposes.



Holtek MCU	ICE	Programmer	Compatible Software
HT8	e-link	e-WritePro	HT-IDE3000/HOPE3000
HT32	e-link32Pro	e-Write32	Keil/HOPE3200





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