Two-channel Motor Driver Module

BM22D1221-1

Revision: V1.00 Date: March 27, 2024

www.bestmodulescorp.com

Table of Contents

Features

- Motor operating voltage range: 5V~24V
- Logic level control voltage: -0.3V~(V_{DD}+0.3V)
- Standby current: <3.3mA @ 24V
- Protection functions
  - Over current protection
  - Over temperature protection
  - Output short circuit protection
- Motor driver
  - Driver device: HT7K1411
  - PWM maximum driving frequency up to 200kHz
  - Single-channel maximum opeating current: 1.2A (Ta=25°C, $Ta_{(MAX)}$=64°C)
  - Two-channel maximum opeating current: 2.4A (Ta=25°C, $Ta_{(MAX)}$=75°C)
- Size: 46mm(L)×40.6mm(W)×14.41mm(H)

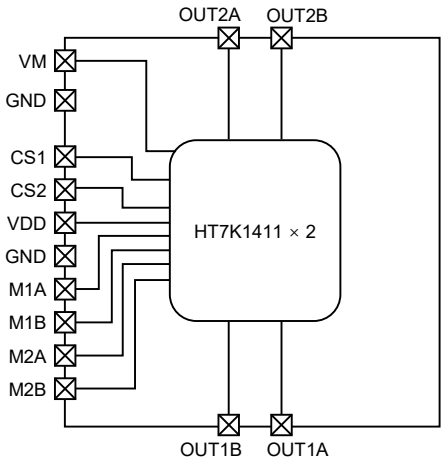
General Description

The BM22D1221-1 is a two-channel motor driver module, which uses a Holtek motor driver device, the HT7K1411, as the driver IC. Users can control the motor forward, reverse, brake and standby opreations using the controller output control signals. The module can control two DC motors, a two-phase four-wire stepper motors or a four-phase five-wire stepper motors simultaneously, implementing accurate control.

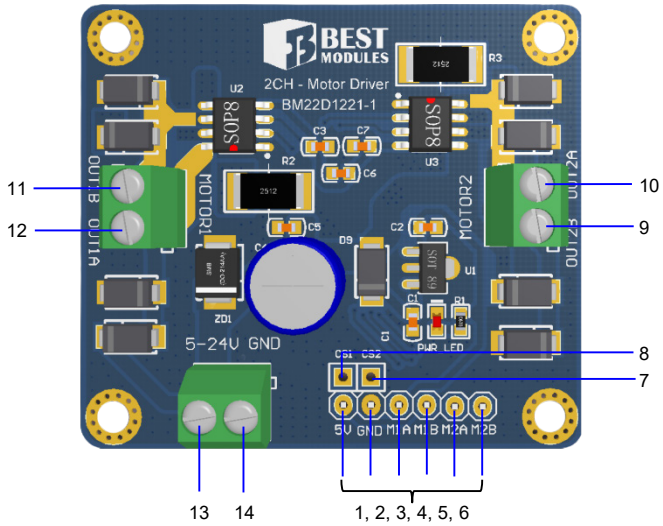
Applications

- Smart cars
- Balancing cars
- DIY robotic arms
- Other DIY products

Block Diagram



Pin Assignment



Pin Description

Pin	Function	Type	Description
1	VDD	PWR	Logical positive power supply
2	GND	PWR	Logical negative power supply
3	M1A	I	Motor control signal input
4	M1B	I	Motor control signal input
5	M2A	I	Motor control signal input
6	M2B	I	Motor control signal input
7	CS2	O	MOTOR2 current sensing point
8	CS1	O	MOTOR1 current sensing point
9	OUT2B	O	Motor output
10	OUT2A	O	Motor output
11	OUT1B	O	Motor output
12	OUT1A	O	Motor output
13	VM	PWR	Motor operating positive power supply
14	GND	PWR	Motor operating negative power supply

Legend: PWR: Power; I: Input; O: Output

Technical Specifications

Absolute Maximum Ratings

Parameter	Numerical	Uint
V_M, OUT1A~OUT4B	-0.3~32	V
V_{DD}	-0.3~+6.0	V
M1A~M2B	-0.3~(V_{DD}+0.3)	A
Storage Temperature	-40~100	°C
Storage Relative Humidity	20%~60%	RH
Operating Temperature	-40~85	°C
Ambient Humidity	10%~95%	RH

Recommended Operating Conditions

Parameter	Numerical	Uint
V_{DD}	2.5~5.5	V
V_M	5~24	V
Single-channel Continuous Current $I_{OUT(CONT)}$	1.2	A
Single-channel Peak Current $I_{OUT(PEAK)}$	3.2	A
Two-channel Total Current I_{TOTAL}	2.4	A

Note: The Absolute Maximum Ratings indicate limitations beyond which damage to the device may occur. Recommended Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specified performance limits.

D.C. Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Uint
V_{DD}	Logical Power Supply	—	2.5	—	5.5	V
V_{IL}	Input Logic Low Voltage	V_{DD}=5V	—	—	0.8	V
		V_{DD}=2.5V	—	—	0.4	
V_{IH}	Input Logic High Voltage	V_{DD}=5V	2	—	—	V
		V_{DD}=2.5V	1.25	—	—	
V_M	Motor Operating Voltage	—	5	—	24	V
I_{SINGLE}	Single-channel Operating Current	—	—	—	1.2	A
I_{TOTAL}	Two-channel Operating Current	—	—	—	2.4	A
I_{STB}	Standby Current	V_M=24V	—	—	3.3	mA
I_O	LDO Output Current	LDO V_I<40V	250	—	—	mA

A.C. Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Uint
f_{PWM}	Input PWM Frequency	—	—	—	200	kHz

Functional Description

System Description

The BM22D1221-1 is a two-channel motor driver module, which can drive two DC motors, a two-phase four-wire stepper motors or a four-phase five-wire stepper motors simultaneously. The module has a single-channel maximum operating current of 1.2A and a two-channel maximum operating current of 2.4A. In addition, there is an LDO voltage regulator circuit on the driver module, which can provide 5V operating voltage for the external circuits.

Motor Driver

- DC motor

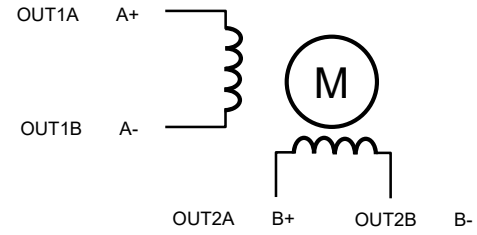
  Function modes: Forward, Reverse, Standby, Brake.

Motor1 Operation Mode Truth Table			
M1A	M1B	Operation Mode	Current Direction
H	L	Reverse	OUT1A to OUT1B
L	H	Forward	OUT1B to OUT1A
L	L	Standby	—
H	H	Brake	—

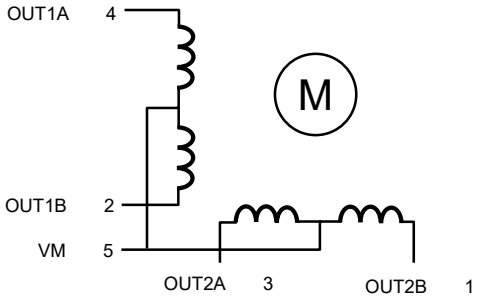
Motor2 Operation Mode Truth Table			
M2A	M2B	Operation Mode	Current Direction
H	L	Reverse	OUT2A to OUT2B
L	H	Forward	OUT2B to OUT2A
L	L	Standby	—
H	H	Brake	—

- Stepper Motor

  Stepper motor drive modes: Full-step drive, Half-step drive, Micro-step drive.



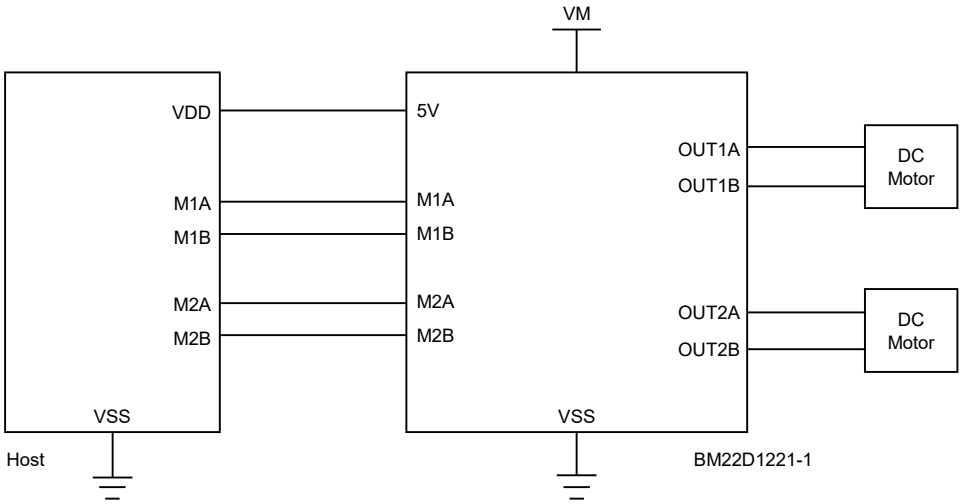
Two-phase Four-wire Stepper Motor Connection



Four-phase Five-wire Stepper Motor Connection

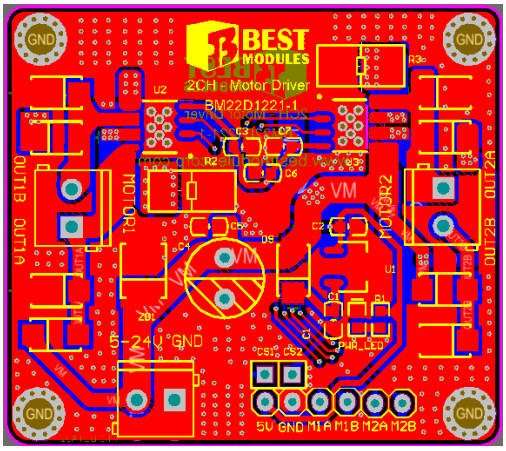
Note: 1 stands for winding A; 2 stands for winding B; 3 stands for winding C; 4 stands for winding D.

Application Circuits



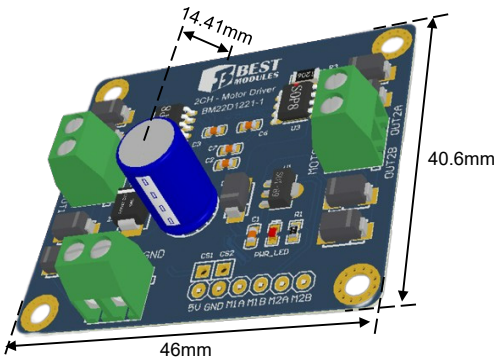
Layout Description

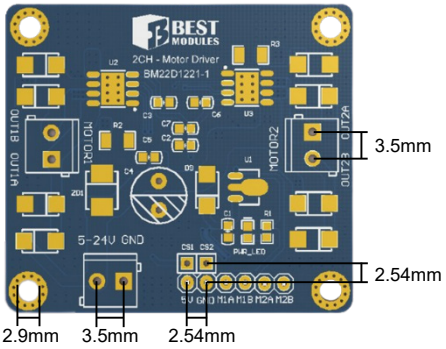
Layout Example



Note: The logic control trace and the driver output high current trace should not be crossed and the distance from the logic level trace should not be too close. In addition, the driver output wire width should not be less than 50mil.

Dimensions





Reference Information

Revision History

Data	Author	Issue	Modification Information
2023.12.22	容昭濱	V1.00	First Version

Buy Online

Best Modules