

## DC Brushed Motor Driver

# 36V 1 Channel (1A/2A/3A)

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# BD621x0AEFJ Evaluation Board

### Introduction

This user's guide will provide the necessary steps to operate the Evaluation Board of ROHM's BD621x0AEFJ DC Brushed Motor Driver. This document includes the external parts, operating procedures and application data.

### Description

This Evaluation Board was developed for ROHM's family of DC Brushed Motor Driver: BD62130AEFJ (3A), BD62120AEFJ (2A) and BD62110AEFJ (1A).

BD621x0AEFJ are built-in 1 channel H bridge motor drivers for DC brushed motors. This family of driver can drive high efficiency by a PWM signal directly to input pins. There are built in protection circuits in this IC. Each protection circuit operation contributes to set high reliability.

### Application

Small appliances (Vacuum cleaners), Factory Automation, Robotics, Point of Sales (POS) machines, Gaming Machines, Scanners, Printers (Multi-function Printer, Laser Printer, Inkjet Printer, Photo Printer, FAX, Mini Printer), Plain Paper Copier (PPC), and any application that requires motor drivers for DC Brushed Motor.

### Evaluation board operating condition (default setting)

Table 1. Evaluation board operating condition (default setting)

| Parameter   | Power supply voltage *1 |     |     | Unit | Output current | Peak output current | Unit |
|-------------|-------------------------|-----|-----|------|----------------|---------------------|------|
|             | Min                     | Typ | Max |      | Max            | Max                 |      |
| BD62110AEFJ | 8                       | -   | 28  | V    | 1              | 2                   | A    |
| BD62120AEFJ | 8                       | -   | 28  | V    | 2              | 3                   | A    |
| BD62130AEFJ | 8                       | -   | 28  | V    | 3              | 4                   | A    |

\*1 This indicates the voltage near the VCC pin. Be careful of voltage drop by the impedance of power line.

## Evaluation board

The name shown on the PCB denotes which variant of the ROHM motor driver chip is mounted.

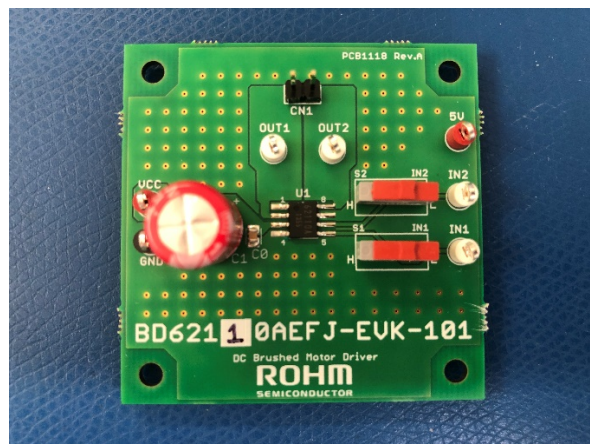


Figure 1. Top view of BD62110AEFJ-EVK-101

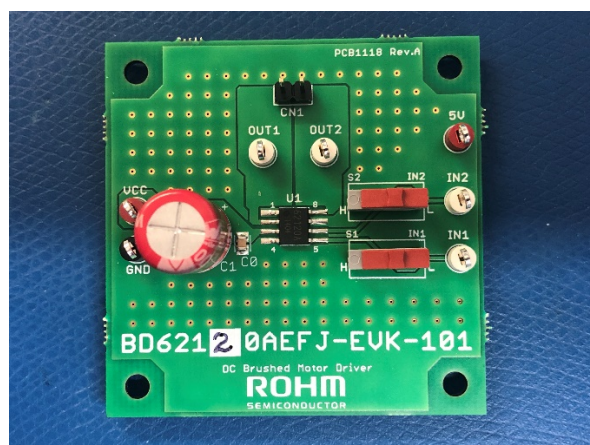


Figure 2. Top view of BD62120AEFJ-EVK-101

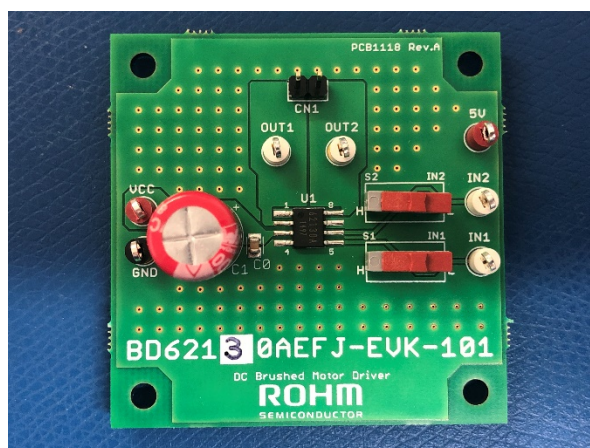


Figure 3. Top view of BD62130AEFJ-EVK-101

## Evaluation board setup

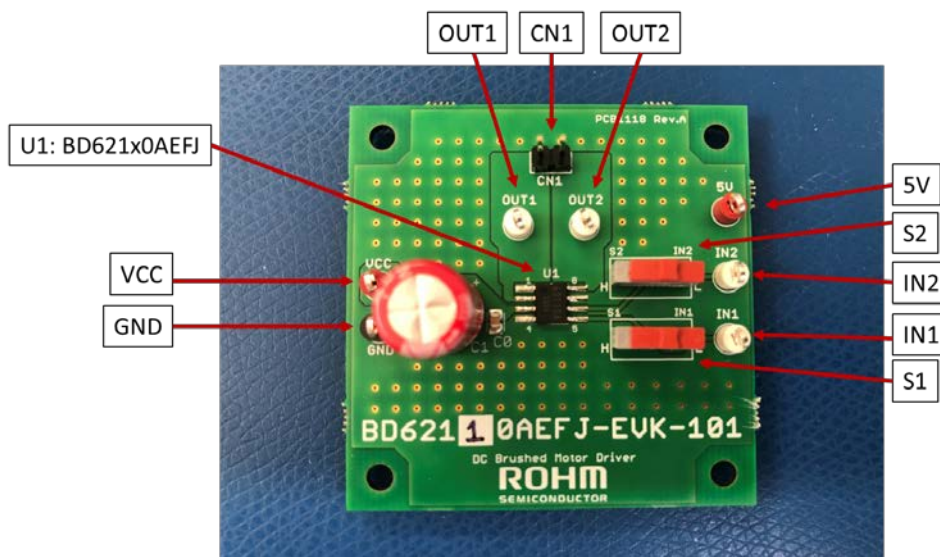


Figure 4. Evaluation board setup – test points, connectors, and switches S1 and S2

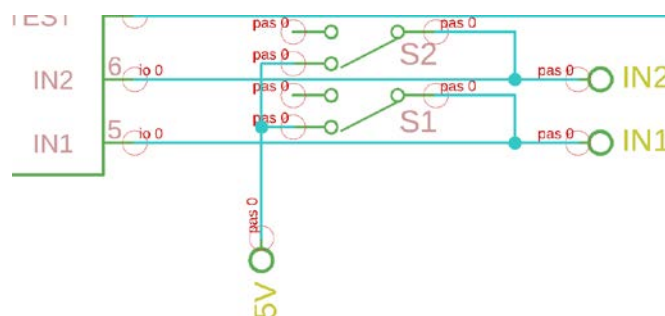


Figure 5. Evaluation board setup – Switches S1 and S2 are used to connect IN1 and IN2 pin to either 5V ("H") or as open ("L"). When connected as open ("L") and internal pulldown resistor will pull IN1 and IN2 to ground if nothing is connected to IN1 and IN2 test points.

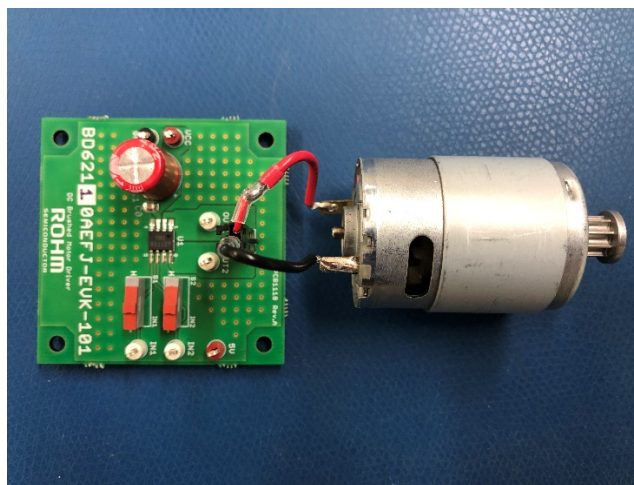


Figure 6. Evaluation board setup – connection to a DC brushed motor via connector CN1

Function explanation: Input and Output Table

Table 2. Input and Output operation table

| Input |     | Output |      | State   |
|-------|-----|--------|------|---------|
| IN1   | IN2 | OUT1   | OUT2 |         |
| L     | L   | OPEN   | OPEN | STOP    |
| H     | L   | H      | L    | FORWARD |
| L     | H   | L      | H    | REVERSE |
| H     | H   | L      | L    | BRAKE   |

Function explanation: Slow and Fast Decay external PWM operation

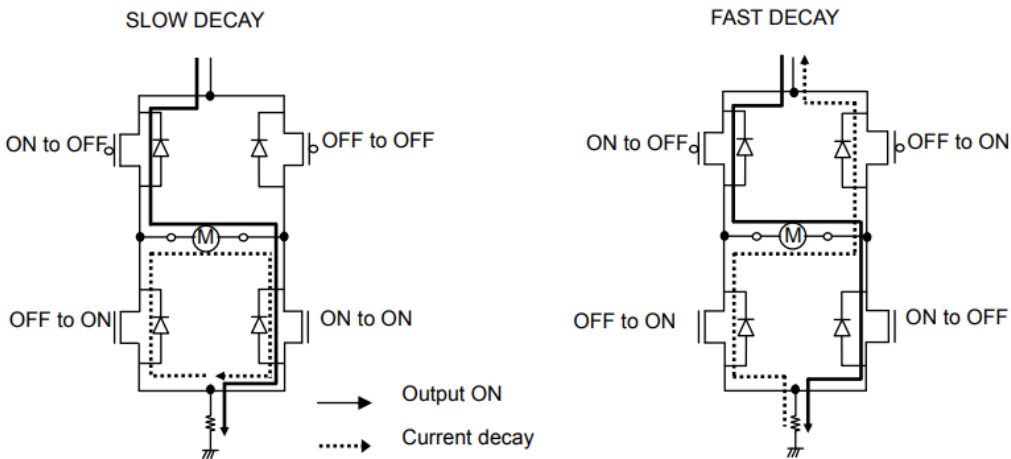
Table 3. Slow and Fast Decay

SLOW DECAY (forward rotation)

| Input |     | Output |      | State      |
|-------|-----|--------|------|------------|
| IN1   | IN2 | OUT1   | OUT2 |            |
| H     | L   | H      | L    | ON         |
| H     | H   | L      | L    | SLOW DECAY |
| H     | L   | H      | L    | ON         |
| H     | H   | L      | L    | SLOW DECAY |
| H     | L   | H      | L    | ON         |

FAST DECAY (synchronous rectification, forward rotation)

| Input |     | Output |      | State      |
|-------|-----|--------|------|------------|
| IN1   | IN2 | OUT1   | OUT2 |            |
| H     | L   | H      | L    | ON         |
| L     | H   | L      | H    | FAST DECAY |
| H     | L   | H      | L    | ON         |
| L     | H   | L      | H    | FAST DECAY |
| H     | L   | H      | L    | ON         |



## Operating procedure: Using Switches to control IN1 and IN2

1. Connect a DC brushed motor to connector CN1 (or to OUT1 and OUT2 test points) using wires.
2. Connect power supply between VCC and GND test points.
3. Connect a separate 5V to 5V test point.
4. Operate the switches "S1" and "S2" based on Input and Output operation shown in Table 2.

## Operating procedure: Using external PWM signal to control IN1 and IN2

1. Connect a DC brushed motor to connector CN1 (or to OUT1 and OUT2 test points) using wires.
2. Connect power supply between VCC and GND test points.
3. Ensure that the switches S1 and S2 are pointed towards the "L" position (right side) so that IN1 and IN2 are not connected to 5V. See Figure 5 for description.
4. Connect an external microcontroller to IN1 and IN2 test points.
5. Operate the DC brushed motor based on Table 3 suggestion.

## Pin configuration

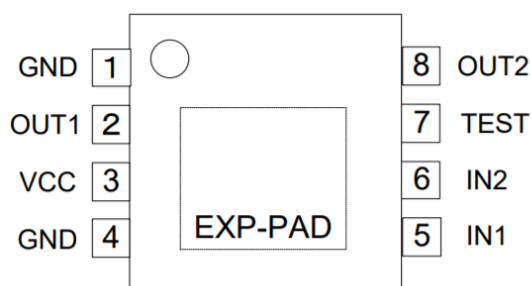


Figure 7. Pin configuration

Table 4. Pin Descriptions

| Pin No. | Pin Name | Function                 | Pin No. | Pin name | Function                         |
|---------|----------|--------------------------|---------|----------|----------------------------------|
| 1       | GND      | Ground terminal          | 5       | IN1      | H bridge control terminal        |
| 2       | OUT1     | H bridge output terminal | 6       | IN2      | H bridge control terminal        |
| 3       | VCC      | Power supply terminal    | 7       | TEST     | Test terminal (Connected to GND) |
| 4       | GND      | Ground terminal          | 8       | OUT2     | H bridge output terminal         |

## Evaluation board schematic

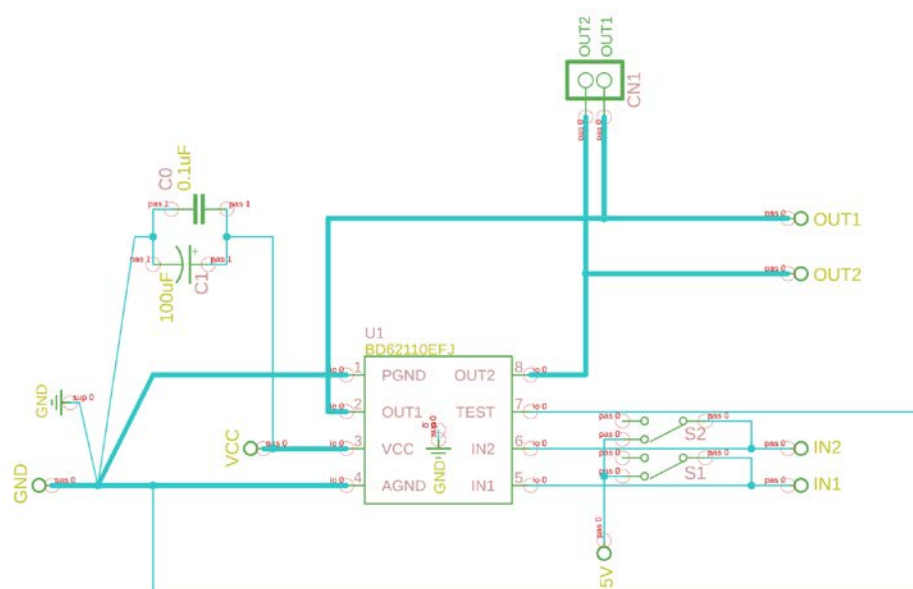


Figure 8. Evaluation board schematic

## Parts list

Table 5. Parts list

| Reference                        | Value                                              | Description                             | Package Reference                     | MFG      | PART NUMBER                                        |
|----------------------------------|----------------------------------------------------|-----------------------------------------|---------------------------------------|----------|----------------------------------------------------|
| C0                               | 0.1μF                                              | CAP CER 0.1UF 50V X7R 0805              | 0805 (2012 Metric)                    | WURTH    | 885012207098                                       |
| C1                               | 100uF 63V 20%                                      | CAP ALUM 100UF 20% 63V RADIAL           | 5.0mm lead spacing, 10mm diameter     | WURTH    | 860010775014                                       |
| CN1                              | JUMPER                                             | CONN HEADER VERT 2POS 2.54MM            | 2 position 0.100" (2.54mm)            | WURTH    | 61300211121                                        |
| S1, S2                           | SPDT On-On                                         | SWITCH SLIDE SPDT 500MA 12V             | 2.54mm lead spacing, 10mm body length | WURTH    | 450301014042                                       |
| TP_VCC, TP_5V                    | Test_Pad                                           | Test_Pad_Compact_Red                    | 1.6mm hole                            | KEYSTONE | 5005                                               |
| TP_GND                           | Test_Pad                                           | Test_Pad_Compact_Black                  | 1.6mm hole                            | KEYSTONE | 5006                                               |
| TP_OUT1, TP_OUT2, TP_IN1, TP_IN2 | Test_Pad                                           | Test_Pad_Compact_White                  | 1.6mm hole                            | KEYSTONE | 5007                                               |
| U1                               | BD62110AEFJ-E2<br>BD62120AEFJ-E2<br>BD62130AEFJ-E2 | 36V, DC Brushed Motor Driver (1A/2A/3A) | HTTSOP-8J                             | ROHM     | BD62110AEFJ-E2<br>BD62120AEFJ-E2<br>BD62130AEFJ-E2 |

## Board layout

Evaluation board PCB information

|                      |         |
|----------------------|---------|
| Material             | FR-4    |
| Board thickness      | 1.575mm |
| Copper thickness     | 1 oz    |
| Number of layers     | 2       |
| Board size           | 50X50mm |
| Minimum copper width | 0.300mm |
| Minimum air gap      | 0.350mm |
| Minimum hole size    | 0.300mm |

The layout of BD621x0AEFJ-EVK-101 is shown below.

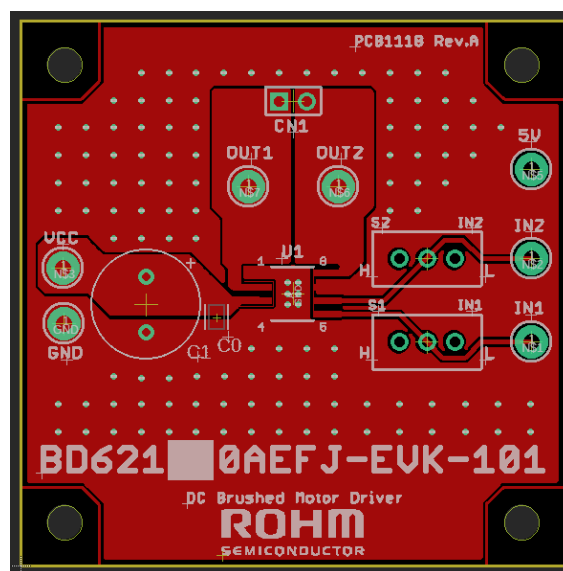


Figure 9. Top Layer and Top Silk Screen

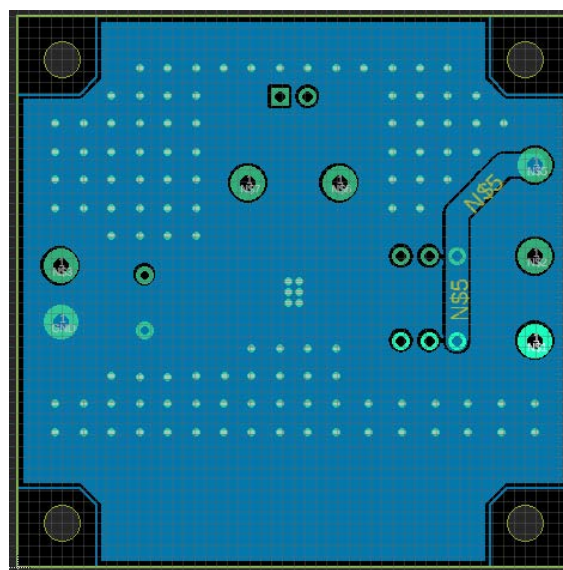


Figure 10. Bottom Layer

**Revision history**

| Date        | Revision number | Description     |
|-------------|-----------------|-----------------|
| May 1, 2022 | 001             | Initial release |
|             |                 |                 |
|             |                 |                 |

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