



# EV6500A-U-00A

## 35V, 2.5A, Bipolar Stepper Motor Driver with Current Setting via VSET in QFN-24 Package Evaluation Board

### DESCRIPTION

The EV6500A-U-00A is an evaluation board designed to demonstrate the capabilities of the MP6500A, a stepper motor driver with a built-in, microstepping translator.

The MP6500A operates from a supply voltage of up to 35V and can deliver a motor current up to 2.5A. It can operate a bipolar stepper motor in full-, half-, quarter-, and eighth-step modes

by setting the MS2 and MS1 pins. The input control signals for the MP6500A are applied through the connector or generated on the board.

The MP6500A is available in a QFN-24 (5mmx5mm) package. It is recommended to read the MP6500A datasheet prior to making any changes to the EV6500A-U-00A.

### PERFORMANCE SUMMARY

| Parameters                                | Conditions | Value       |
|-------------------------------------------|------------|-------------|
| Input voltage ( $V_{IN}$ ) range          |            | 4.5V to 35V |
| Maximum output current ( $I_{OUT\_MAX}$ ) |            | 2.5A        |
| VCC voltage ( $V_{CC}$ )                  |            | 3.3V or 5V  |

### EV6500A-U-00A EVALUATION BOARD



LxW (6.35cmx6.35cm)

| Board Number  | MPS IC Number |
|---------------|---------------|
| EV6500A-U-00A | MP6500AGU     |

## QUICK START GUIDE

1. Connect the input voltage ( $4.5V \leq V_{IN} \leq 35V$ ) and input ground to the VIN and GND connectors, respectively.
2. To configure the output current limit ( $I_{OUT\_LIM}$ ) via the VSET pin, follow the steps below:
  - a. Remove the JP1 jumper and connect an external 0V to 2V voltage to the VSET connector.
  - b. Add the JP1 jumper and manually adjust RV1. Manual action requires an external 3.3V or 5V VCC voltage ( $V_{CC}$ ) as a pull-up power supply.
3. Switch SW2 to the top side (Terminal 3 in Figure 1 on page 3) to enable the external step signal input from the EXT\_STEP connector.
4. Connect the step signal to the EXT\_STEP connector.
5. Set the input control and logic signal through the CN1 connector via the external MCU, or manually through SW1. Manual action requires an external 3.3V or 5V  $V_{CC}$  as a pull-up power supply.

## EVALUATION BOARD SCHEMATIC

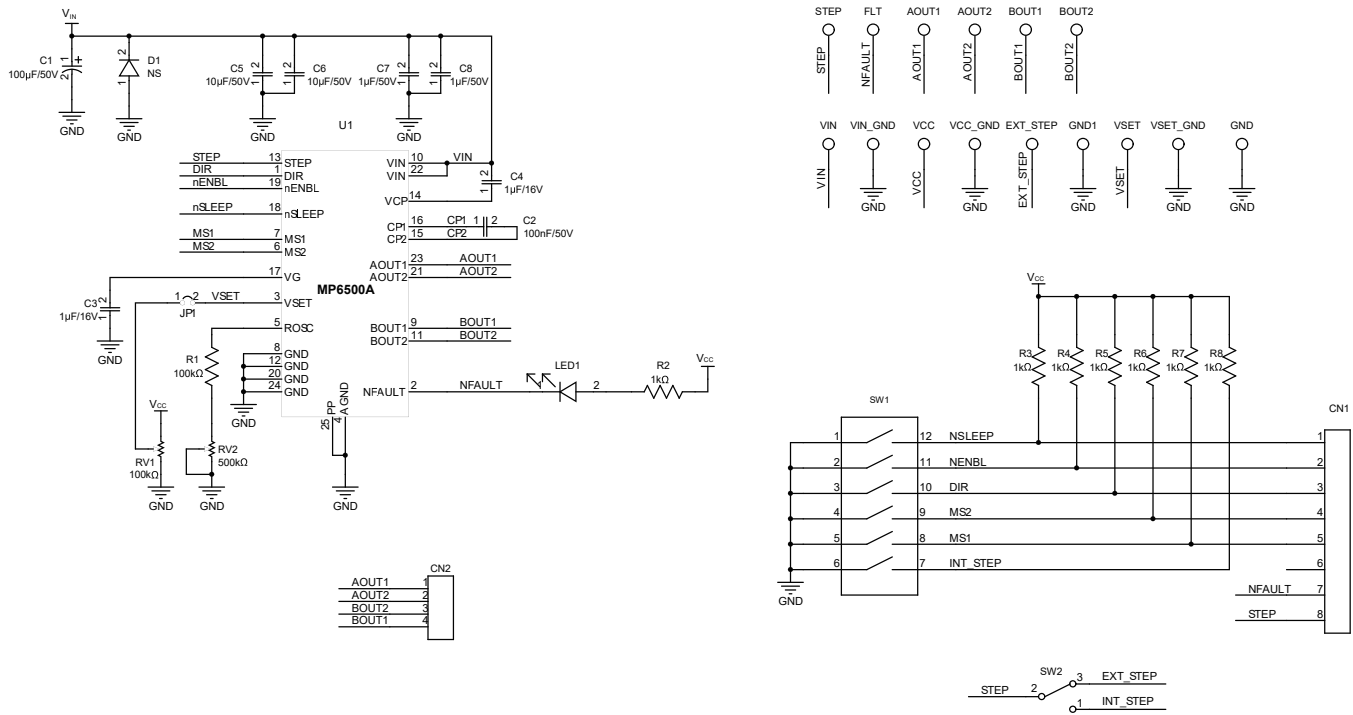


Figure 1: Evaluation Board Schematic

## EV6500A-U-00A BILL OF MATERIALS

| Qty | Ref                                                                     | Value   | Description                     | Package          | Manufacturer | Manufacturer PN    |
|-----|-------------------------------------------------------------------------|---------|---------------------------------|------------------|--------------|--------------------|
| 1   | C1                                                                      | 100μF   | Electrolytic capacitor, 50V     | DIP              | Rubycon      | 50YXF100MEPA       |
| 1   | C2                                                                      | 100nF   | Ceramic capacitor, 50V, X7R     | 0603             | Murata       | GRM188R71H104KA93D |
| 2   | C3, C4                                                                  | 1μF     | Ceramic capacitor, 16V, X7R     | 0603             | Murata       | GRM188R71C105KA12D |
| 2   | C5, C6                                                                  | 10μF    | Ceramic capacitor, 50V, X7R     | 1210             | Murata       | GRM32ER71H106KA12L |
| 2   | C7, C8                                                                  | 1μF     | Ceramic capacitor, 50V, X7R     | 0805             | Würth        | 885012207103       |
| 1   | R1                                                                      | 100kΩ   | Film resistor, 1%               | 0603             | Yageo        | RC0603FR-07100KL   |
| 7   | R2, R3, R4, R5, R6, R7, R8                                              | 1kΩ     | Film resistor, 1%               | 0603             | Yageo        | RC0603FR-071KL     |
| 1   | RV1                                                                     | 100kΩ   | Square trimming potentiometer   | DIP              | Bourns       | 3266W-1-104LF      |
| 1   | RV2                                                                     | 500kΩ   | Square trimming potentiometer   | DIP              | Bourns       | 3266W-1-504LF      |
| 1   | LED1                                                                    | 50mW    | Red LED                         | 0805             | Baihong      | BL-HUE35A-AV-TRB   |
| 1   | SW1                                                                     | 25mA    | 6-bit dial switch               | SMD              | Würth        | 416131160806       |
| 1   | SW2                                                                     | 500mA   | Switch slide SPDT               | DIP              | Any          |                    |
| 1   | CN1                                                                     | 2.54mm  | 8-bit connector                 | DIP              | Any          |                    |
| 1   | CN2                                                                     | 2.54mm  | 4-bit connector                 | DIP              | Any          |                    |
| 1   | JP1                                                                     | 2.54mm  | 2-bit connector                 | DIP              | Any          |                    |
| 1   | JP1                                                                     | 2.54mm  | Short jumper                    | DIP              | Any          |                    |
| 1   | D1                                                                      | NS      |                                 |                  |              |                    |
| 2   | STEP, FLT                                                               | Yellow  | Test point                      | DIP              | Any          |                    |
| 2   | VIN, VIN_GND                                                            | 2mm     | Connector, φ = 2mm              | DIP              | Any          |                    |
| 11  | VCC, EXT_STEP, VSET, AOUT1, AOUT2, BOUT1, BOUT2, GND1, GND2, GND3, GND4 | 1mm     | Connector, φ = 1mm              | DIP              | Any          |                    |
| 1   | U1                                                                      | MP6500A | 35V, 2.5A, stepper motor driver | QFN-24 (5mmx5mm) | MPS          | MP6500AGU          |

## PCB LAYOUT

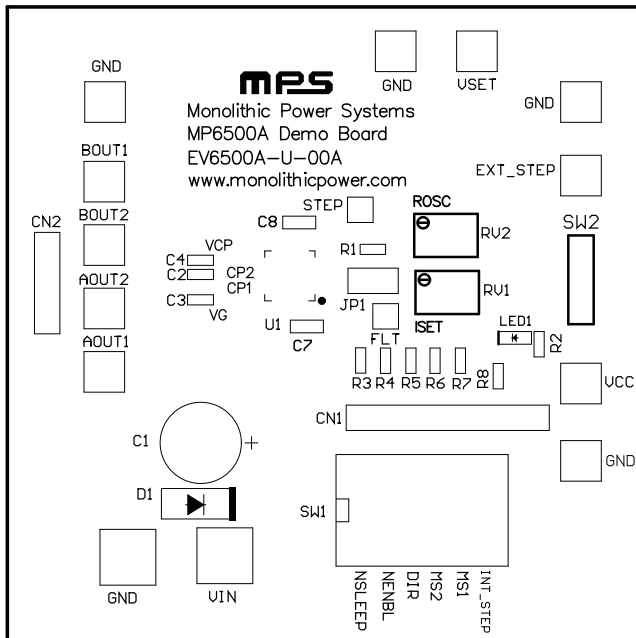


Figure 2: Top Silk

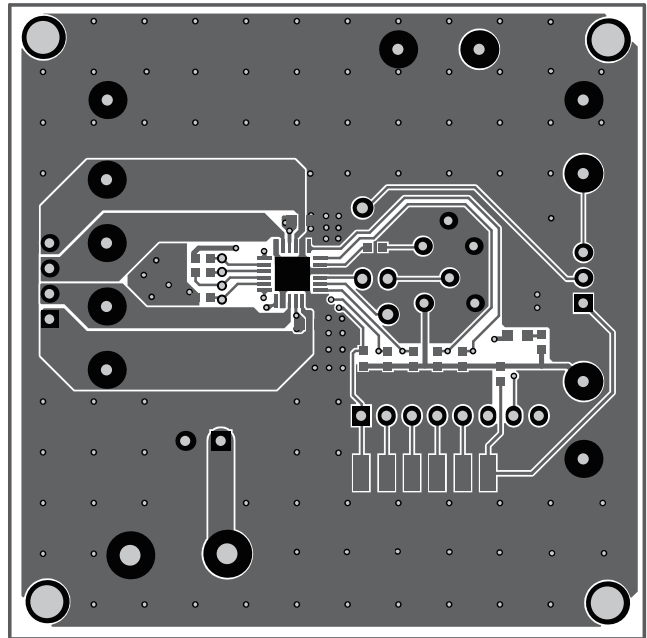


Figure 3: Top Layer

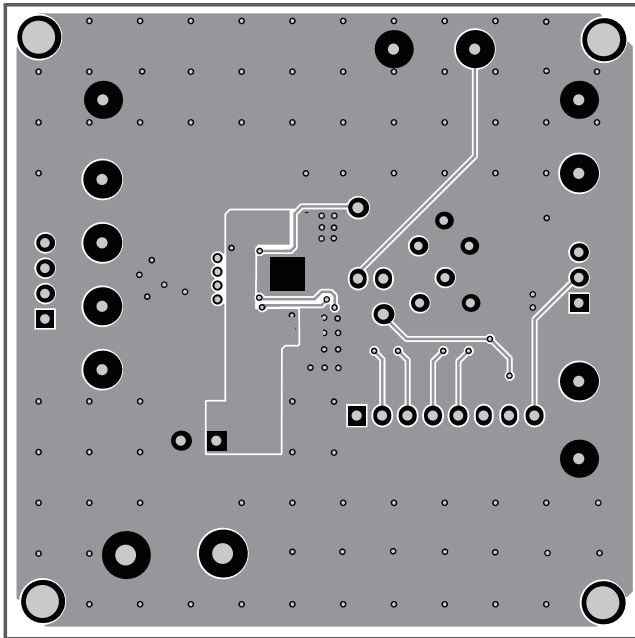


Figure 4: Bottom Layer

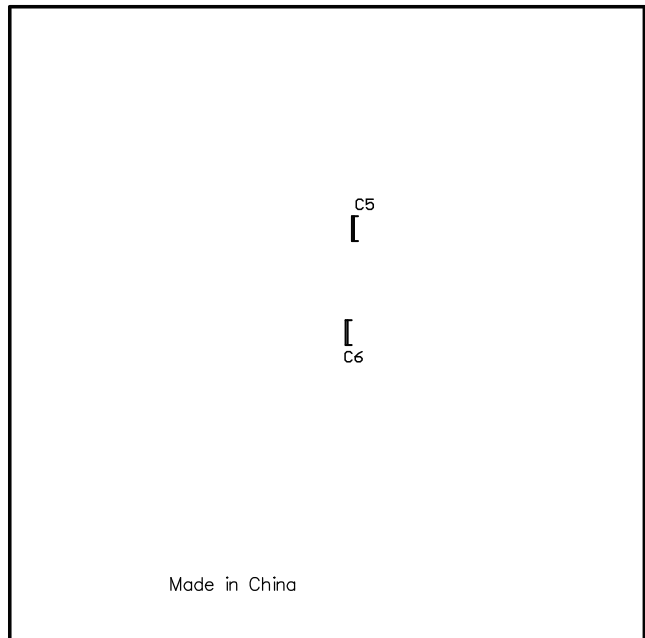


Figure 5: Bottom Silk

## REVISION HISTORY

| Revision # | Revision Date | Description     | Pages Updated |
|------------|---------------|-----------------|---------------|
| 1.0        | 5/12/2022     | Initial Release | -             |

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