# EV6601-U-00A

**35V, 2.5A**
**Bipolar Stepper Motor Driver**
**Evaluation Board**

The Future of Analog IC Technology

## DESCRIPTION

The EV6601-U-00A is an evaluation board for the MP6601, a stepper motor driver with parallel inputs and current regulation.

The EV6601-U-00A operates from a supply voltage of up to 35V and can deliver motor current up to 2.5A. It can operate a bipolar stepper motor in full-, half- and quarter- step modes by setting corresponding inputs. The input control signals for the MP6601 are applied through the connectors or generated on board.

## ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 4.5 - 35 | V |
| Maximum Output Current | $I_{OUT-L}$ | 2.5 | A |
| Decay Mode | Automatic Decay | | |

## FEATURES

- Wide 4.5V to 35V Input Voltage Range
- Up to 2.5A Programmable Output Current
- Two Internal Full-bridge Drivers
- Internal Current Sensing and Regulator
- No Control Power Supply Required
- Operates from Full-step to 1/4-step
- Automatic Current Decay
- Over-current Protection
- Input OVP, UVLO Function
- Thermal Shutdown Protection
- Fault Indication Output

## APPLICATIONS

- Bipolar Stepper Motors
- Printers

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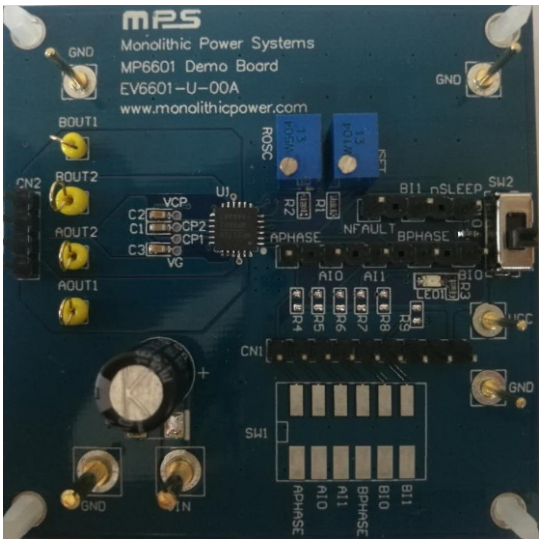
## MP6601 EVALUATION BOARD




**(L x W x H) 2.54" x 2.54" x 0.4"**
**(6.35cm x 6.35cm x 1cm)**

| Board Number | MPS IC Number |
|---|---|
| EV6601-U-00A | MP6601GU |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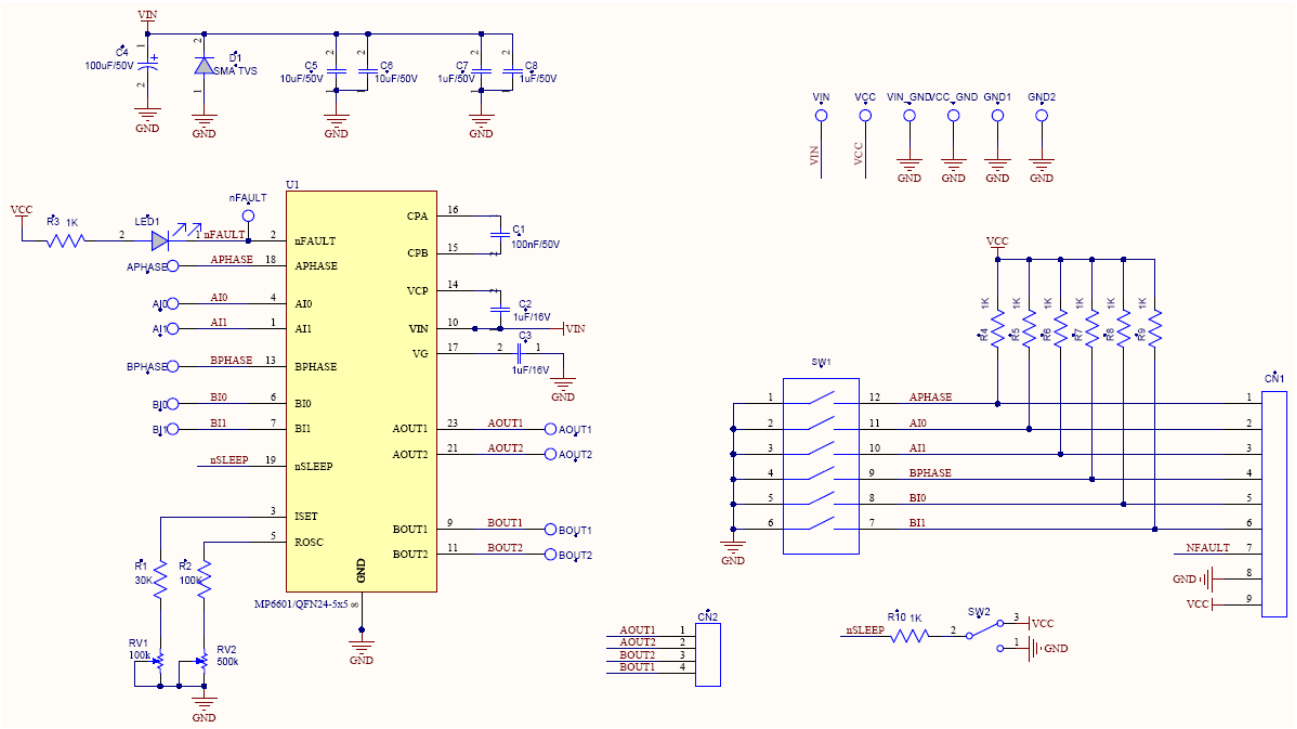
# MP6601 EVALUATION BOARD SCHEMATIC





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# MP6601 EVALUATION BOARD BILL OF MATERIALS

| Qty | RefDes | Value | Description | Package | Manufacturer | Manufacturer P/N |
|---|---|---|---|---|---|---|
| 1 | C1 | 100nF/50V | Ceramic Capacitor;50V;X7R | 0603 | muRata | GRM188R71H104KA93D |
| 2 | C2, C3 | 1μF/16V | Ceramic Capacitor;16V;X7R; | 0603 | muRata | GRM188R71C105KA12D |
| 1 | C4 | 100μF/50V | Electrolytic Capacitor;50V;Electrolytic | DIP | Rubycon | 50YXF100MEFC |
| 2 | C5, C6 | 10μF/50V | Ceramic Capacitor;50V;X7R | 1210 | muRata | GRM32ER71H106KA12L |
| 2 | C7, C8 | 1μF/50V | Ceramic Capacitor;50V;X7R | 0805 | muRata | GRM21BR71H105KA12L |
| 1 | R1 | 30K | Film Resistor;1% | 0603 | Yageo | RC0603FR-0730KL |
| 1 | R2 | 100K | Film Resistor;1% | 0603 | Yageo | RC0603FR-07100KL |
| 2 | R3, R10 | 1K | Film Resistor;1% | 0603 | Yageo | RC0603FR-071KL |
| 0 | R4, R5, R6, R7, R8, R9 | NS | | | | |
| 1 | RV1 | 100k | Adjustable Resistor | DIP | | 3266W-1-104F |
| 1 | RV2 | 500k | Adjustable Resistor | DIP | | 3266W-1-504LF |
| 1 | LED1 | | LED;红光; | 0805 | 佰鸿 | BL-HUE35A-AV-TRB |
| 0 | SW1 | NS | 6-Bits Dial Switch | SMD | Wurth | 418121270806 |
| 1 | SW2 | | Button | | | SS-12D01EG4 |
| 1 | CN1 | | 9PIN. 2.54MM Connector | | | |
| 1 | CN2 | | 4PIN. 2.54MM Connector | | | |
| 0 | D1 | NS | | | | |
| 8 | nSLEEP, nFAULT, APHASE, AI0, AI1, BPHASE, BI0. BI1 | | Test Point | | | |
| 2 | VIN, VIN_GND | | 2.0 公针 | | | |
| 8 | VCC, VCC_GND, AOUT1, AOUT2, BOUT1, BOUT2, GND1, GND2 | | 1.0 公针 | | | |
| 1 | U1 | | Stepper Motor Driver | QFN24 (5mmx5mm) | MPS | MP6601GU |


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# EV6601-U-00A PRINTED CIRCUIT BOARD LAYOUT

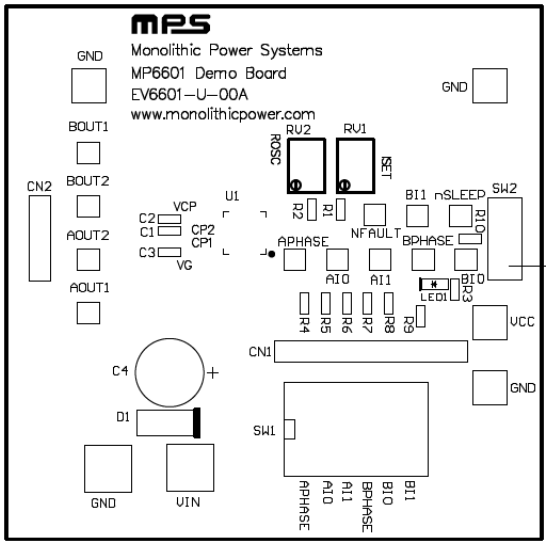


**Figure 1—Top Silk Layer**

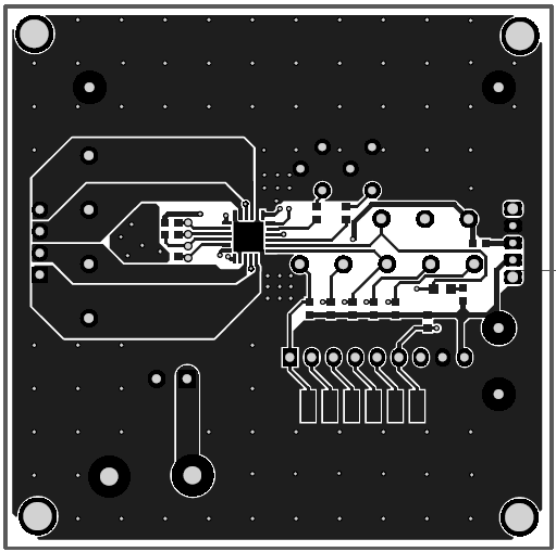

**Figure 2—Top Layer**

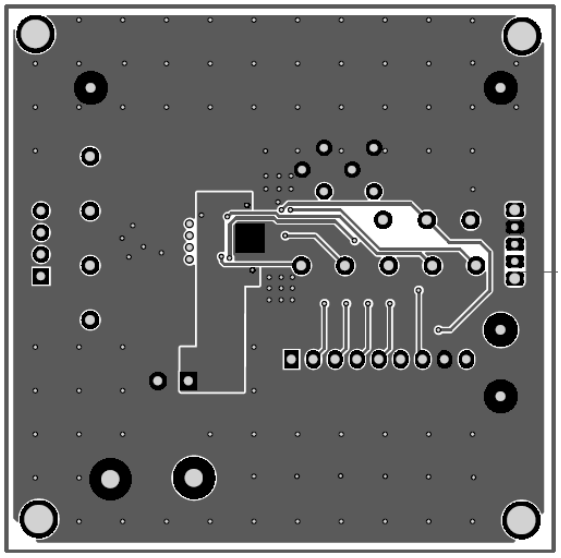

**Figure 3—Bottom Layer**


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## QUICK START GUIDE

1. Attach the input voltage (4.5V ≤ $V_{IN}$ ≤ 35V) and input ground to the VIN and GND connectors respectively.
2. Attach the Vcc voltage (3.3V or 5V) and input ground to the Vcc and GND connectors respectively.
3. Switch the SW2 to the position 3 (downwards) to enable the part.
4. Input control and logic signals can be set either through the CN1 connector by external MCU inputs or through the SW1 by manual action. Manual action requires R4-R9 pull-up resistors.

The MP6601 contains two full H-bridges that operate independently. Each H-bridge has an input signal that controls the current flow direction in the H-bridge, as described in the table below:

| xPHASE | xOUT1 | xOUT2 |
|---|---|---|
| 0 | L | H |
| 1 | H | L |

In addition, each H-bridge has two input pins that are used to scale the current regulation point in the bridge. These pins function as follows:

| xI1 | xI0 | Current |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 71% |
| 1 | 0 | 38% |
| 1 | 1 | 0% (High impedance) |

5. Adjust RV1 to program the full scale (100%) regulation current, it can be calculated with equation: $I_{Max}$=71kΩ/$R_{ISET}$
6. Adjust RV2 to program the constant off-time, it is approximated by: $T_{off}$ (ns)=190 x $R_t$ (kΩ)

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