# *EV1W0505B-LVH-00A*

## 5V, 1W, Regulated, 2.5kV$_{RMS}$, Isolated DC/DC Module Evaluation Board

## DESCRIPTION

The EV1W0505B-LVH-00A is an evaluation board designed to demonstrate the capabilities of the MIE1W0505BGLVH, an isolated, regulated, DC/DC module. The device supports 3V to 5.5V input voltage (V$_{IN}$) applications. In addition, the MIE1W0505BGLVH has excellent load regulation, line regulation, and supports up to 1W of output power (P$_{OUT}$).

The MIE1W0505BGLVH uses capacitive isolation technology for the feedback block, which can regulate output voltage (V$_{OUT}$) without traditional optocoupler and a precision-configurable reference IC. The module is a small solution that provides highly reliable operation when compared to traditional isolation power modules.

The MIE1W0505BGLVH features continuous short-circuit protection (SCP) and over-temperature protection (OTP). It is available in a small LGA-12 (4mmx5mm) package.
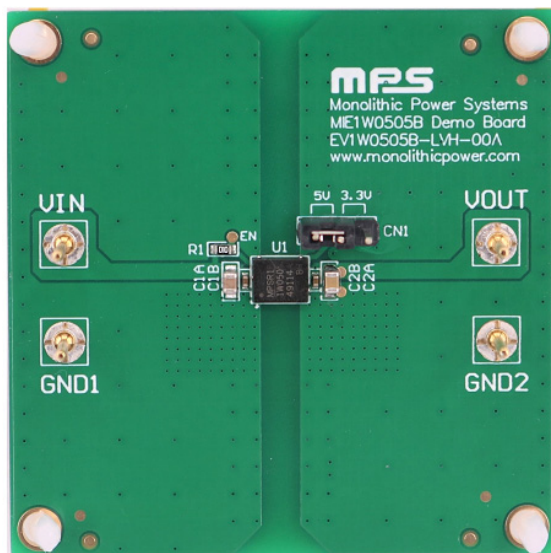
It is recommended to read the datasheet for the MIE1W0505BGLVH prior to making any changes to the EV1W0505B-LVH-00A.

## PERFORMANCE SUMMARY

Specifications are at T$_A$ = 25°C, unless otherwise noted.

| Parameters | Conditions | Value |
|---|---|---|
| Input voltage (V$_{IN}$) range | | 4.5V to 5.5V |
| Output voltage (V$_{OUT}$) | I$_{OUT}$ = 0A to 0.2A | 5V |
| Maximum output current (I$_{OUT}$) | V$_{IN}$ = 4.5V to 5.5V | 0.2A |
| Typical efficiency | V$_{IN}$ = 5V, V$_{OUT}$ = 5V, I$_{OUT}$ = 0.2A | 50.5% |

## EVALUATION BOARD
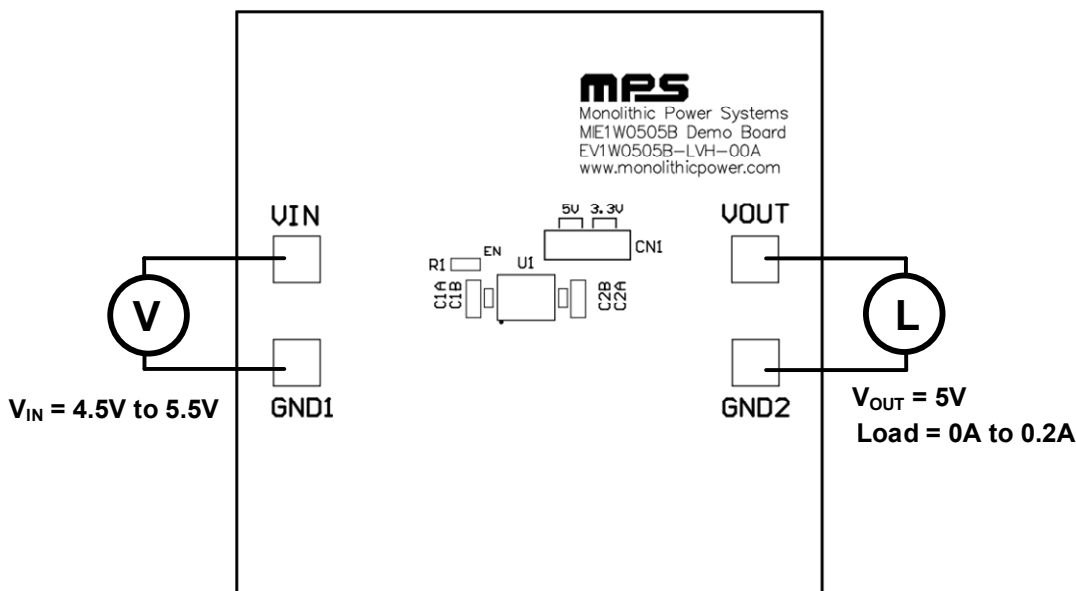


**LxWxH (5.1cmx5.1cmx0.2cm)**

| Board Number | MPS IC Number |
|---|---|
| EV1W0505B-LVH-00A | MIE1W0505BGLVH |

# QUICK START GUIDE

This board's output voltage is set to 5V by default. To quick start the EV1W0505B-LVH-00A, refer to Figure 1 and follow the steps below:

1. Preset the power supply ($V_{IN}$) to be 4.5V ≤ $V_{IN}$ ≤ 5.5V.

2. Turn off the power supply.

3. Connect the power supply terminals to:

    a. Positive (+): VIN

    b. Negative (-): GND1

4. Connect the load terminals to:

    a. Positive (+): VOUT

    b. Negative (-): GND2

5. After making the connections, turn on the power supply. The board should automatically start up.

6. To use the enable function, apply a digital input to the EN pin. Drive EN above 2V to turn on the EV1W0505B-LVH-00A; drive EN below 0.4V to turn it off.

7. Set the output voltage ($V_{OUT}$) to 3.3V.

8. Set the output voltage to 3.3V by moving the jumper from the 5V selection to the 3.3V selection on CN1. VIN should start up.

    Figure 1 shows the measurement equipment set-up.



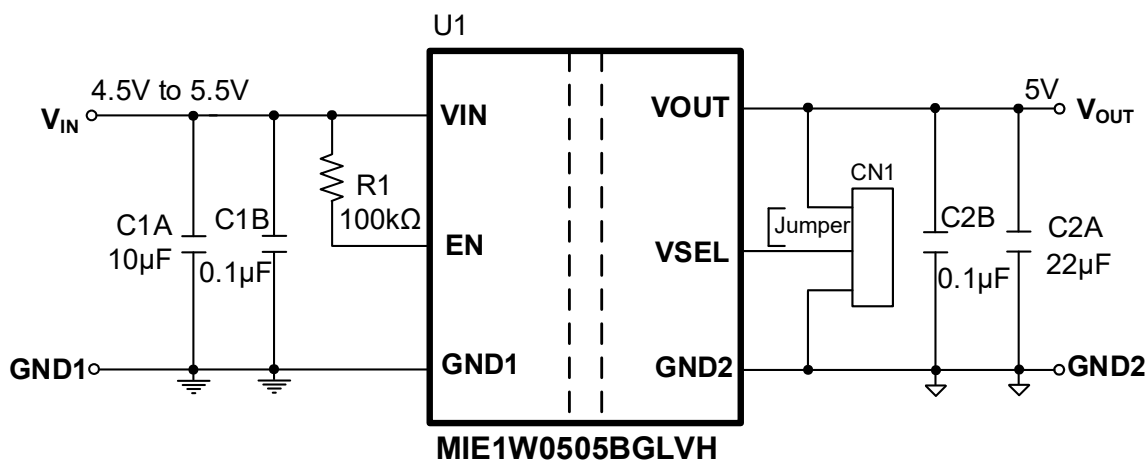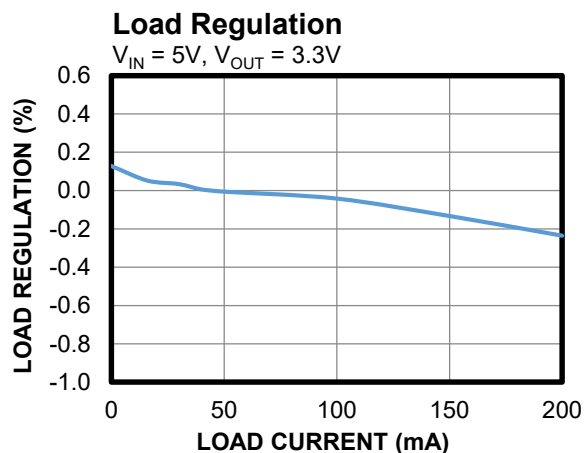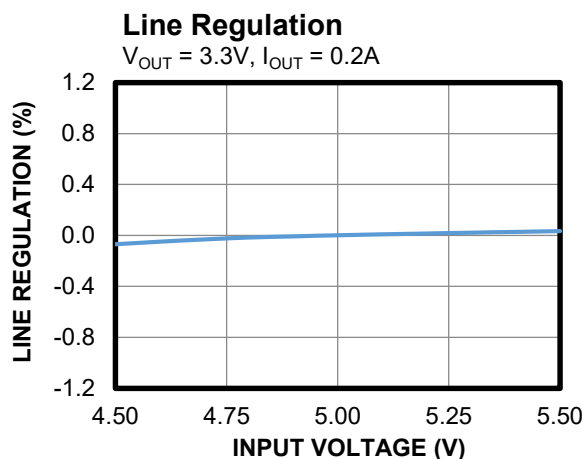**Figure 1: Measurement Equipment Set-Up**
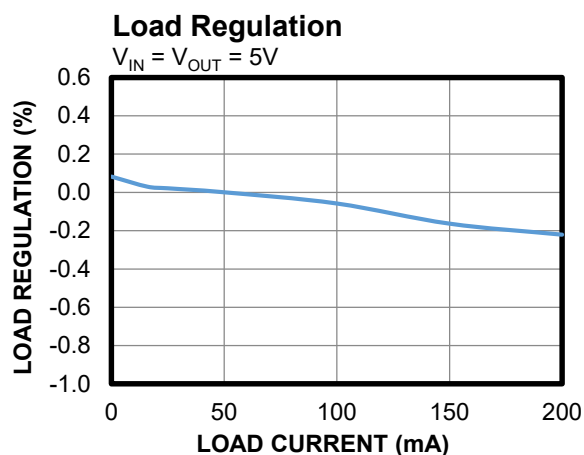
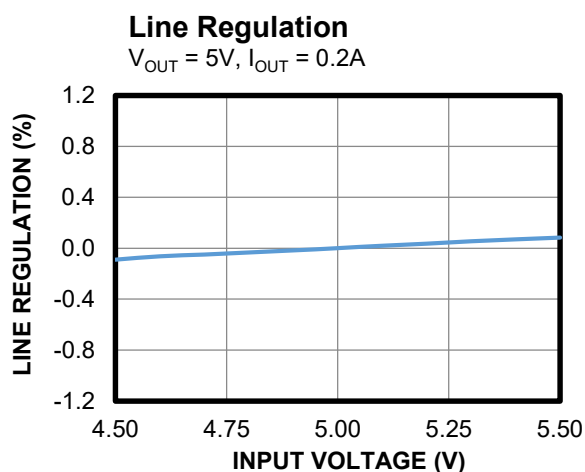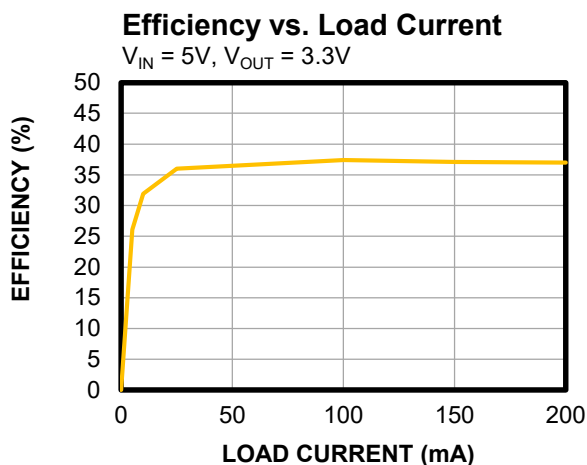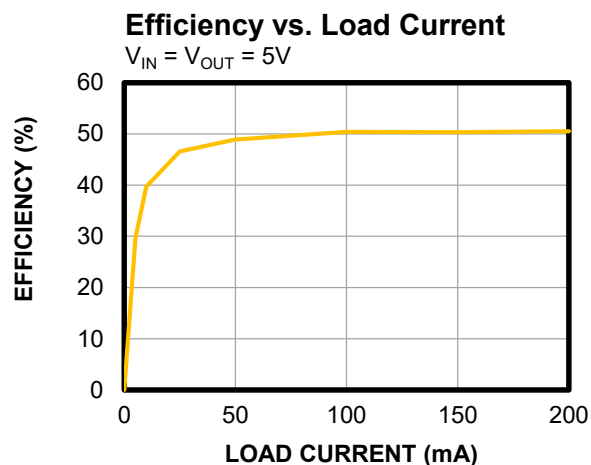# EVALUATION BOARD SCHEMATIC



**Figure 2: Evaluation Board Schematic**

## EV1W0505B-LVH-00A BILL OF MATERIALS

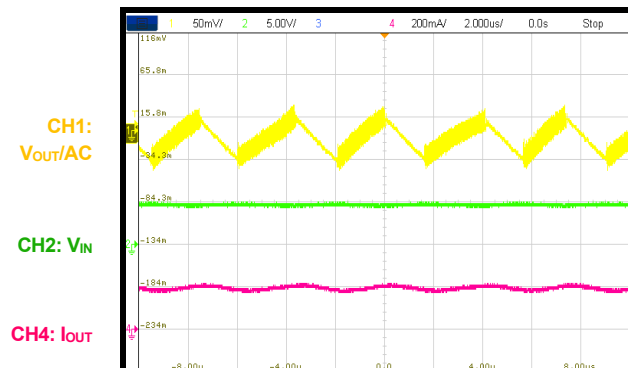| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer PN |
|---|---|---|---|---|---|---|
| 1 | C1A | 10µF | Ceramic capacitor, 10V, X7R | 0805 | Murata | GRM21BR71A106KA73L |
| 1 | C2A | 22µF | Ceramic capacitor, 10V, X5R | 0805 | Wurth | 885012107011 |
| 2 | C1B, C2B | 0.1µF | Ceramic capacitor, 16V, X7R | 0402 | Murata | GRM155R71C104KA88D |
| 1 | R1 | 100kΩ | Film resistor, 1%, 0603, 100kΩ | 0603 | Yageo | RC0603FR-07100KL |
| 1 | CN1 | 3 pins | 3 pins, 1 row, straight | DIP-3 | Wurth | 61300311121 |
| 1 | Jumper | 2.54mm | 2.54mm, jumper, 1 x 2 pins | DIP | Wurth | 60900213421 |
| 1 | U1 | MIE1W0505BGLVH | 1W, 2.5kV$_{RMS}$ isolated DC/DC module | LGA-12 (4mmx 5mm) | MPS | MIE1W0505BGLVH-3R-Z |

## EVB TEST RESULTS

**Performance curves and waveforms are tested on the evaluation board. V$_{IN}$ = 5V, V$_{OUT}$ = 5V/3.3V, C$_{IN}$ = 10μF, C$_{OUT}$ = 0.1μF + 22μF, T$_A$ = 25°C, unless otherwise noted.**

**Efficiency vs. Load Current**
V$_{IN}$ = V$_{OUT}$ = 5V

**Efficiency vs. Load Current**
V$_{IN}$ = 5V, V$_{OUT}$ = 3.3V

**Line Regulation**
V$_{OUT}$ = 5V, I$_{OUT}$ = 0.2A

**Load Regulation**
V$_{IN}$ = V$_{OUT}$ = 5V

**Line Regulation**
V$_{OUT}$ = 3.3V, I$_{OUT}$ = 0.2A

**Load Regulation**
V$_{IN}$ = 5V, V$_{OUT}$ = 3.3V

# EVB TEST RESULTS *(continued)*

**Performance curves and waveforms are tested on the evaluation board. V$_{IN}$ = 5V, V$_{OUT}$ = 5V, C$_{IN}$ = 10µF, C$_{OUT}$ = 0.1µF + 22µF, T$_A$ = 25°C, unless otherwise noted.**

### Output Voltage Ripple
I$_{OUT}$ = 0.2A



### Load Transient Response
I$_{OUT}$ = 0A to 0.2A



### Start-Up through VIN
I$_{OUT}$ = 0.2A



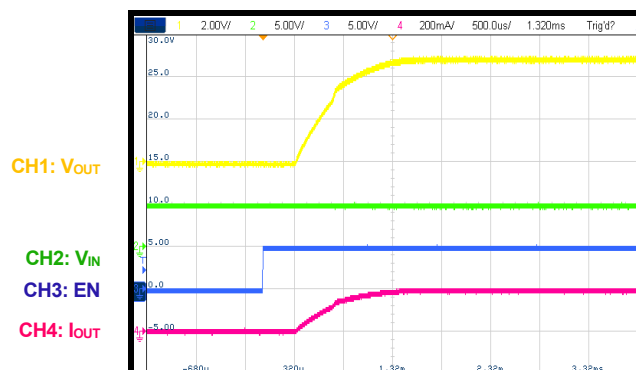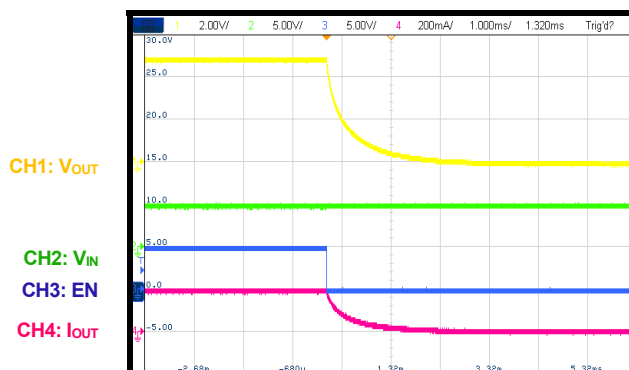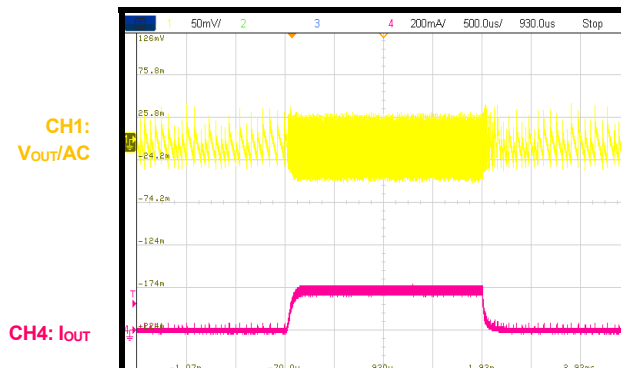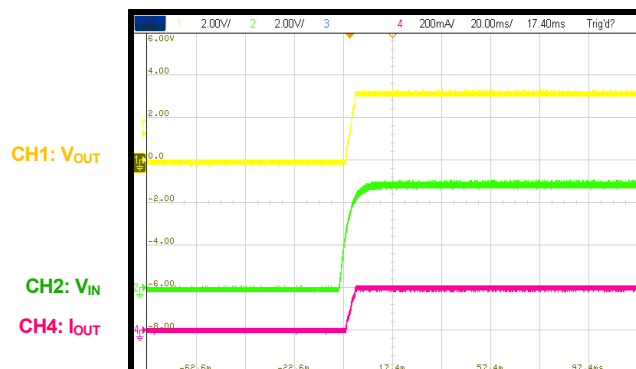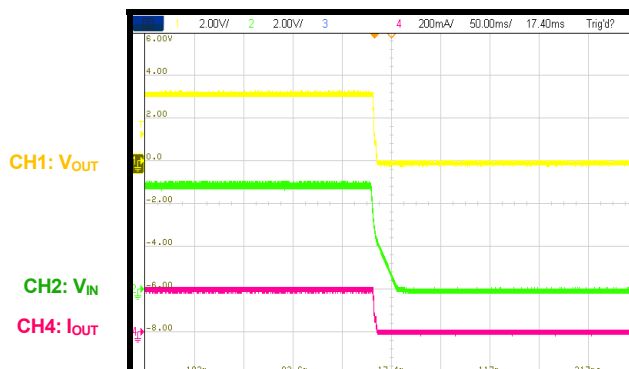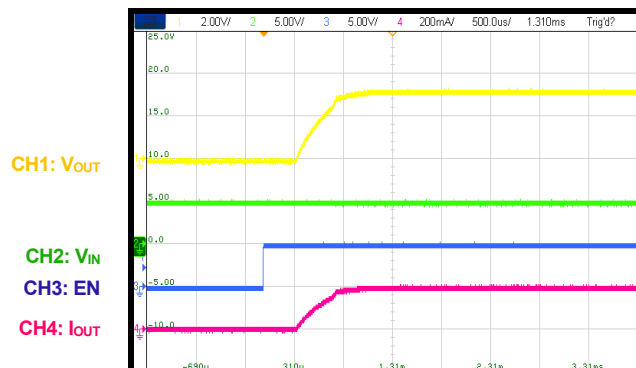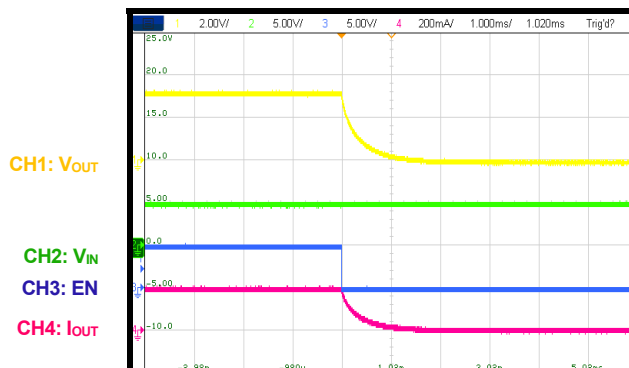### Shutdown through VIN
I$_{OUT}$ = 0.2A



### Start-Up through EN
I$_{OUT}$ = 0.2A



### Shutdown through EN
I$_{OUT}$ = 0.2A

# EVB TEST RESULTS *(continued)*

Performance curves and waveforms are tested on the evaluation board. V$_{IN}$ = 5V, V$_{OUT}$ = 3.3V, C$_{IN}$ = 10µF, C$_{OUT}$ = 0.1µF + 22µF, T$_A$ = 25°C, unless otherwise noted.

### Output Voltage Ripple
I$_{OUT}$ = 0.2A



### Load Transient Response
I$_{OUT}$ = 0A to 0.2A



### Start-Up through VIN
I$_{OUT}$ = 0.2A



### Shutdown through VIN
I$_{OUT}$ = 0.2A



### Start-Up through EN
I$_{OUT}$ = 0.2A



### Shutdown through EN
I$_{OUT}$ = 0.2A

## PCB LAYOUT
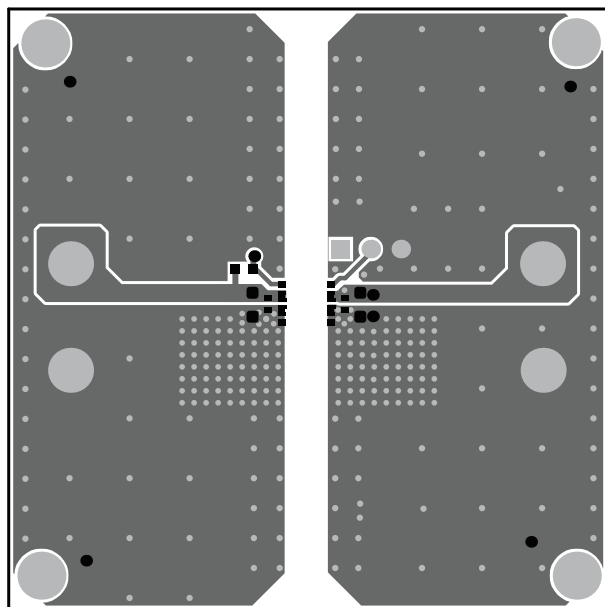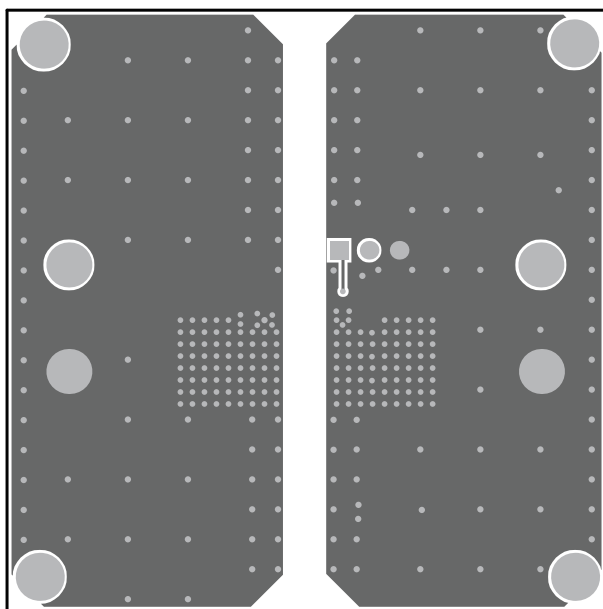


Figure 3: Top Silk



Figure 4: Top Layer



Figure 5: Bottom Layer

# REVISION HISTORY

| Revision # | Revision Date | Description | Pages Updated |
|---|---|---|---|
| 1.0 | 5/21/2024 | Initial Release | - |