



# EVCS1806-S-X-Y-00A

## 3kV<sub>RMS</sub> Isolated Hall-Effect Current Sensor Evaluation Board

### DESCRIPTION

The EVCS1806-S-X-Y-00A is an evaluation board designed to demonstrate the capabilities of the MCS1806GS-X-Y series, which are high-accuracy, linear Hall-effect current sensors for AC or DC current sensing. The Hall array is differential, which cancels out stray magnetic field. The MCS1806GS-X-Y series provides two power supply options (3.3V or 5V) and six full current ranges of 5A to 50A to optimize accuracy in different applications.

The output voltage ( $V_{OUT}$ ) is proportional to the applied current flowing through the primary conductor. The galvanic isolation between the primary conductive path pins and the sensor leads allows the MCS1806GS-X-Y to replace optoisolators or other expensive isolation devices.

### PERFORMANCE SUMMARY

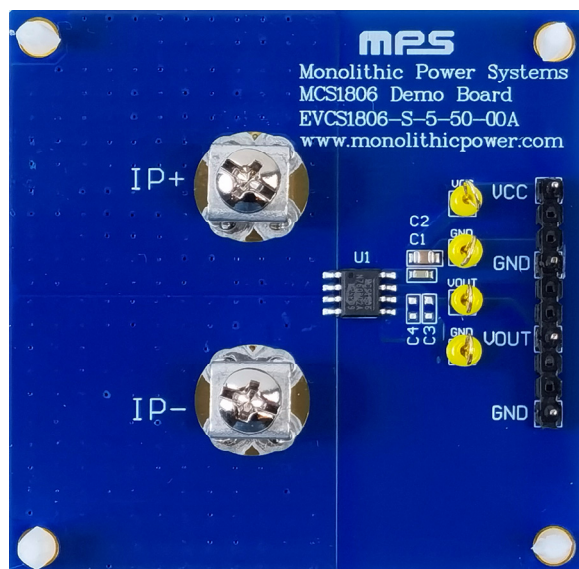
Specifications are at  $T_A = 25^\circ\text{C}$ , unless otherwise noted.

| Parameters                                       | Conditions                                         | Value                                                      |
|--------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|
| Supply voltage ( $V_{CC}$ )                      |                                                    | 3.3V or 5V                                                 |
| Maximum primary applied current ( $I_{P\_MAX}$ ) |                                                    | Six options:<br>$\pm 5\text{A}$ to $\pm 50\text{A}$        |
| Output voltage ( $V_{OUT}$ )                     |                                                    | $0.5 \times V_{CC} + \text{Sens}_{(TYP)} \times I_P^{(1)}$ |
| Total accuracy                                   | $I_P$ from 10% $\times I_{P\_MAX}$ to $I_{P\_MAX}$ | $<2.5\%$                                                   |

Note:

1)  $\text{Sens}_{(TYP)}$  is the symbol for “typical sensitivity.”

### EVCS1806-S-X-Y-00A EVALUATION BOARD



LxWxH (58mmx58.5mmx12mm)  
2 Layers

| Board Number       | MPS IC Number |
|--------------------|---------------|
| EVCS1806-S-X-Y-00A | MCS1806GS-X-Y |

**EVALUATION BOARD BASIC INFORMATION**

| Evaluation Board PN | Typical VCC Supply Voltage (V) | Rated Primary Current Range (A) | Typical Sensitivity (mV/A) |
|---------------------|--------------------------------|---------------------------------|----------------------------|
| EVCS1806-S-3-05-00A | 3.3                            | ±5                              | 264                        |
| EVCS1806-S-3-10-00A |                                | ±10                             | 132                        |
| EVCS1806-S-3-20-00A |                                | ±20                             | 66                         |
| EVCS1806-S-3-30-00A |                                | ±30                             | 44                         |
| EVCS1806-S-3-40-00A |                                | ±40                             | 33                         |
| EVCS1806-S-3-50-00A |                                | ±50                             | 26.4                       |
| EVCS1806-S-5-05-00A | 5                              | ±5                              | 400                        |
| EVCS1806-S-5-10-00A |                                | ±10                             | 200                        |
| EVCS1806-S-5-20-00A |                                | ±20                             | 100                        |
| EVCS1806-S-5-30-00A |                                | ±30                             | 66                         |
| EVCS1806-S-5-40-00A |                                | ±40                             | 50                         |
| EVCS1806-S-5-50-00A |                                | ±50                             | 40                         |

## QUICK START GUIDE

1. Preset DC power supply to 3.3V or 5V.
2. Turn off the power supply.
3. Connect the DC power supply terminals to:
  - a. Positive (+): VCC
  - b. Negative (-): GND
4. Connect the current source terminals to:
  - a. Positive (+): IP+
  - b. Negative (-): IP-
5. Turn on the DC power supply and current source, then measure the output result via the VOUT pin.
6. C4 determines the sensor's bandwidth. A lower bandwidth results in reduced output voltage ripple noise.

## EVALUATION BOARD SCHEMATIC

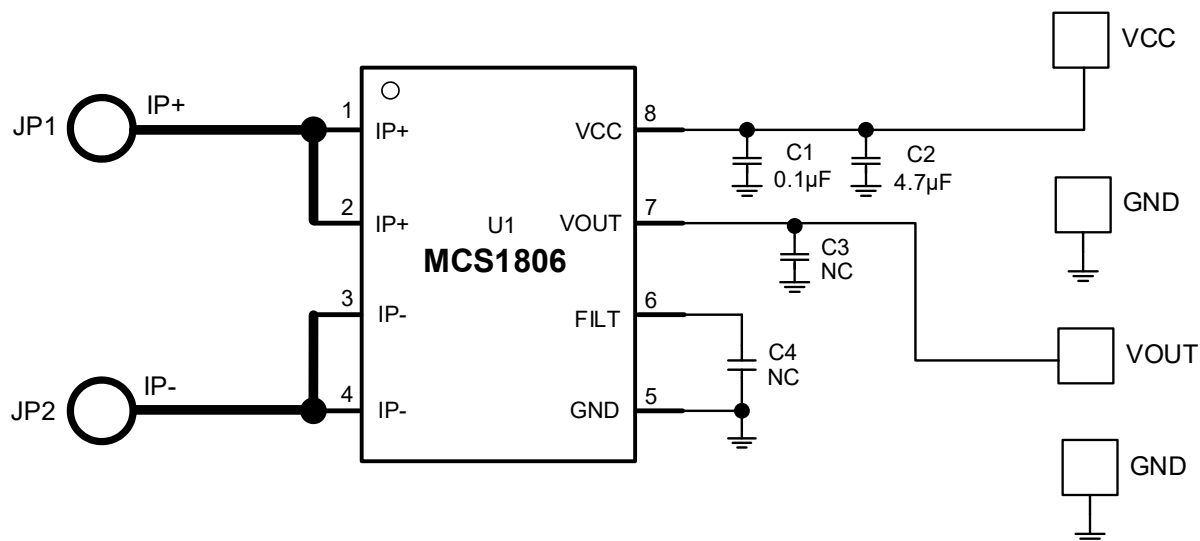


Figure 1: Evaluation Board Schematic

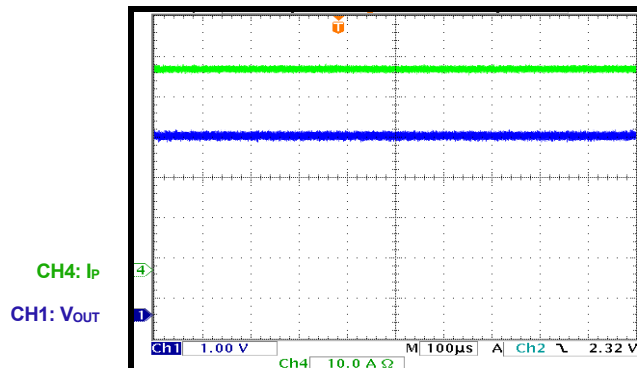
**EVCS1806-S-X-Y-00A BILL OF MATERIALS**

| Qty | Ref      | Value         | Description                                           | Package | Manufacturer         | Manufacturer PN    |
|-----|----------|---------------|-------------------------------------------------------|---------|----------------------|--------------------|
| 1   | C1       | 0.1μF         | Ceramic capacitor, 16V, X7R                           | 0603    | Murata               | GRM188R71C104KA01D |
| 1   | C2       | 4.7μF         | Ceramic capacitor, 16V, X7R                           | 0805    | Murata               | GCM21BR71C475KA73L |
| 1   | C3       | NC            |                                                       |         |                      |                    |
| 1   | C4       | NC            |                                                       |         |                      |                    |
| 2   | IP+, IP- | 4 pins        | Screw terminal                                        | DIP     | Keystone Electronics | 8191K-ND           |
| 1   | U1       | MCS1806GS-X-Y | Linear Hall-effect current sensor with ±2.5% accuracy | SOIC-8  | MPS                  | MCS1806GS-X-Y      |

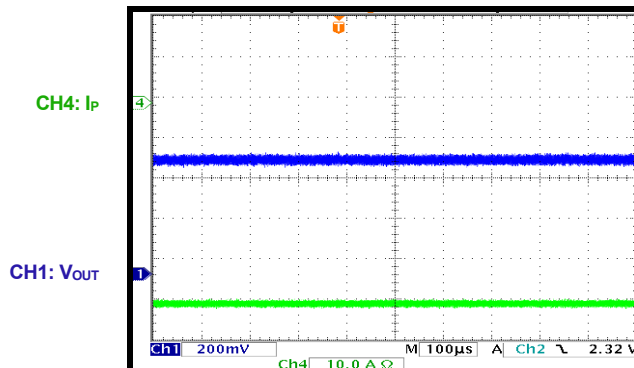
## EVB TEST RESULTS

Performance waveforms are tested on the EVCS1806-S-5-50-00A evaluation board.  $V_{CC} = 5V$ , C3 open, C4 open,  $T_A = 25^{\circ}C$ , unless otherwise noted.

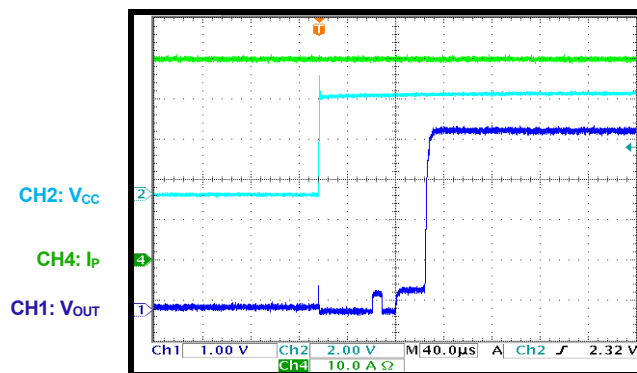
### DC Current Status

 $I_P = 50A$ 


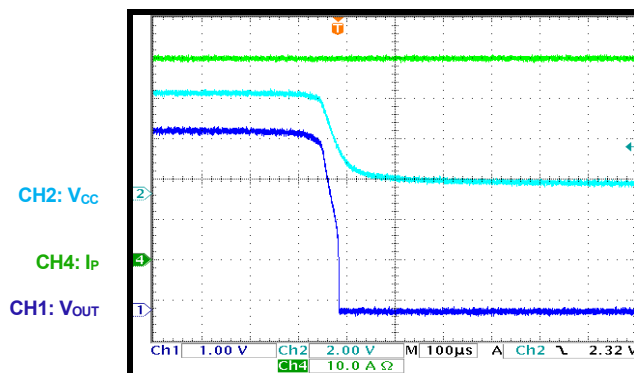
### DC Current Status

 $I_P = -50A$ 


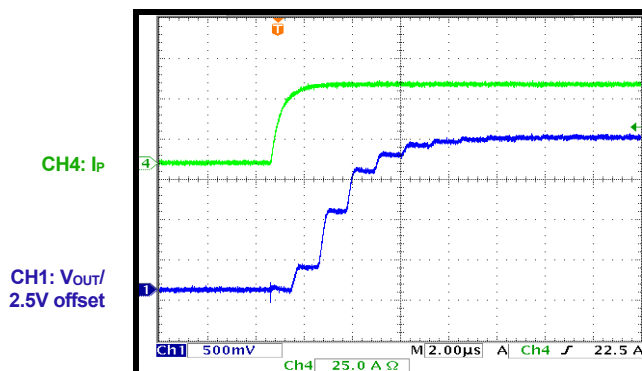
### Start-Up through VCC

 $I_P = 50A$ 


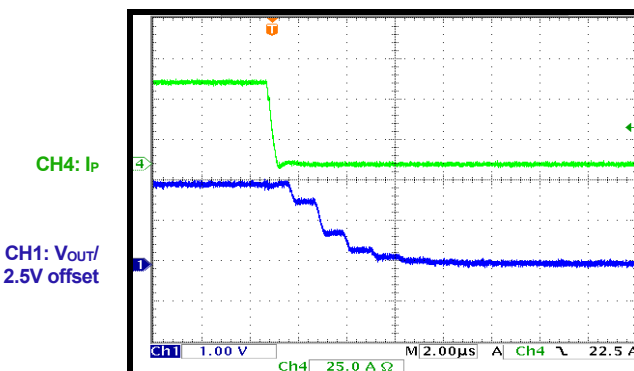
### Shutdown through VCC

 $I_P = 50A$ 


### Step-Up Current



### Step-Down Current

 $I_P = 50A$ 


## PCB LAYOUT

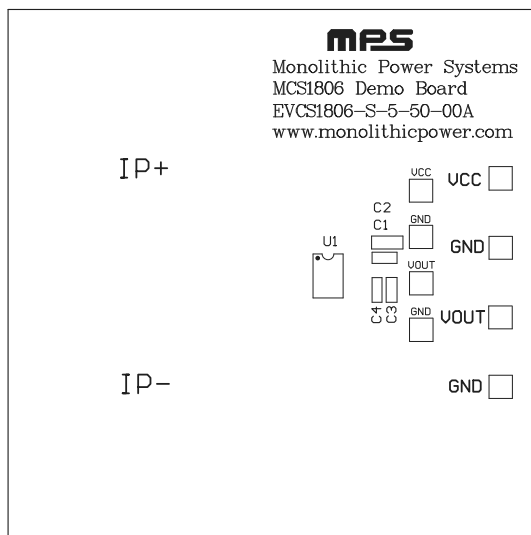


Figure 2: Top Silk

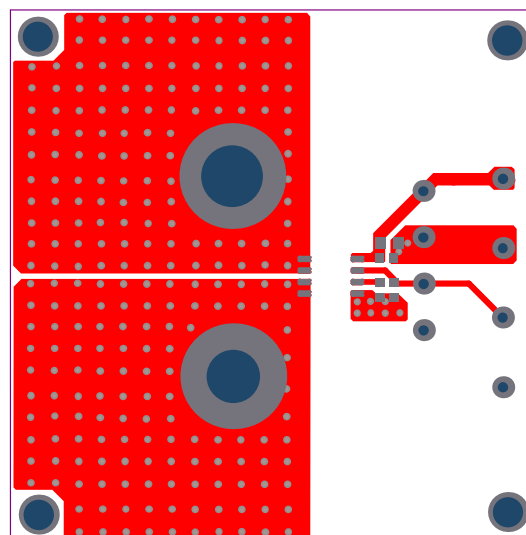


Figure 3: Top Layer

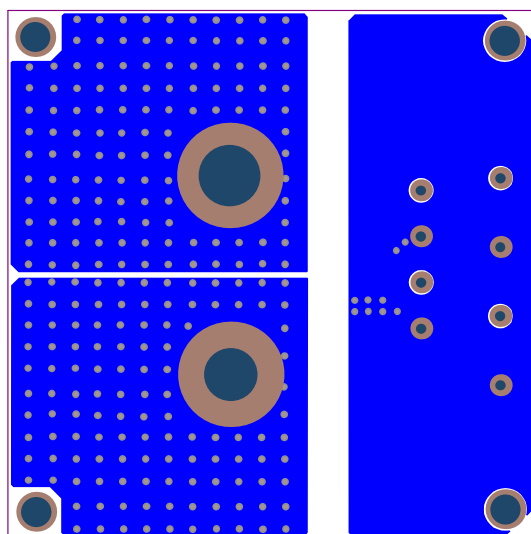


Figure 4: Bottom Layer



## REVISION HISTORY

| Revision # | Revision Date | Description     | Pages Updated |
|------------|---------------|-----------------|---------------|
| 1.0        | 12/8/2022     | Initial Release | -             |

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