EVCS1805-S-00A



Linear Hall-Effect Current Sensor with OCD, 3kV_{RMS} Isolation, 580V_{RMS} Working Voltage Evaluation Board

DESCRIPTION

The EVCS1805-S-00A is an evaluation board designed to demonstrate the capabilities of the MCS1805 series, which are linear Hall-effect current sensors for AC or DC current sensing with integrated over-current detection (OCD). The differential Hall array cancels out stray magnetic field. The MCS1805 series provides two power supply options (3.3V or 5V) and 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 allow the MCS1805 to replace optoisolators or other expensive isolation devices.

The MCS1805 is available in an SOIC-8 package.

PERFORMANCE SUMMARY

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

| Parameters | Conditions | Value |
|--|--------------------------------|---|
| Supply voltage (V _{CC}) | | 3.3V or 5V |
| Maximum primary applied current (I _{P_MAX}) | | ±5A to ±50A |
| Output voltage (V _{OUT}) for bidirectional options | | 0.5 x V _{CC} + Sens _(TYP) x I _P ⁽¹⁾ |
| V _{OUT} for unidirectional options | | 0.1 x V _{CC} + Sens _(TYP) x I _P ⁽¹⁾ |
| Total accuracy | IP from 10% x IP_MAX to IP_MAX | <2.5% |
| /OCD error | | <10% |

Note:

EVCS1805-S-00A EVALUATION BOARD



LxWxH (176mmx60mmx17mm) 2 Layers

| Board Number | MPS IC Number | |
|-------------------------|--------------------|--|
| EVCS1805-S-ABB-CDDD-00A | MCS1805GS-ABB-CDDD | |

¹⁾ Sens_(TYP) is the symbol for typical sensitivity.



EVALUATION BOARD BASIC INFORMATION (2)

| Evaluation Board PN | Typical VCC Supply Voltage (V) | Rated Primary Current (A) | Typical Sensitivity (mV/A) | /OCD Trigger Point (A) |
|----------------------|--------------------------------------|------------------------------|----------------------------|---------------------------|
| EVCS1805-S-305-B-00A | 3.3 | ±5 | 264 | ±5 |
| EVCS1805-S-320-B-00A | 3.3 | ±20 | 66 | ±20 |
| EVCS1805-S-330-B-00A | 3.3 | ±30 | 44 | ±30 |
| EVCS1805-S-340-B-00A | 3.3 | ±40 | 33 | ±40 |
| EVCS1805-S-350-B-00A | 3.3 | ±50 | 26.4 | ±50 |
| EVCS1805-S-510-B-00A | 5 | ±10 | 200 | ±10 |
| EVCS1805-S-520-B-00A | 5 | ±20 | 100 | ±20 |
| EVCS1805-S-540-B-00A | 5 | ±40 | 50 | ±40 |

Note:

²⁾ Contact an MPS FAE for additional variants.



QUICK START GUIDE

- 1. Preset the DC power supply to 3.3V or 5V, then turn the power supply off.
- 2. Connect the DC power supply terminals to:
 - a. Positive (+): VCC
 - b. Negative (-): GND
- 3. Connect the current source load terminals to:
 - a. Positive (+): IP+
 - b. Negative (-): IP-
- 4. Turn on the DC power supply and current source, then measure the output result via the VOUT pin.
- 5. If over-current detection (OCD) is required, measure the /OCD signal via the /OCD pin.



EVALUATION BOARD SCHEMATIC

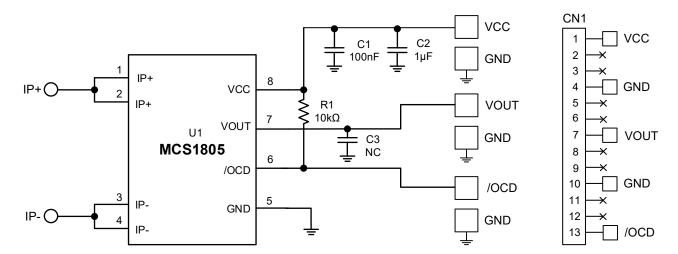


Figure 1: Evaluation Board Schematic



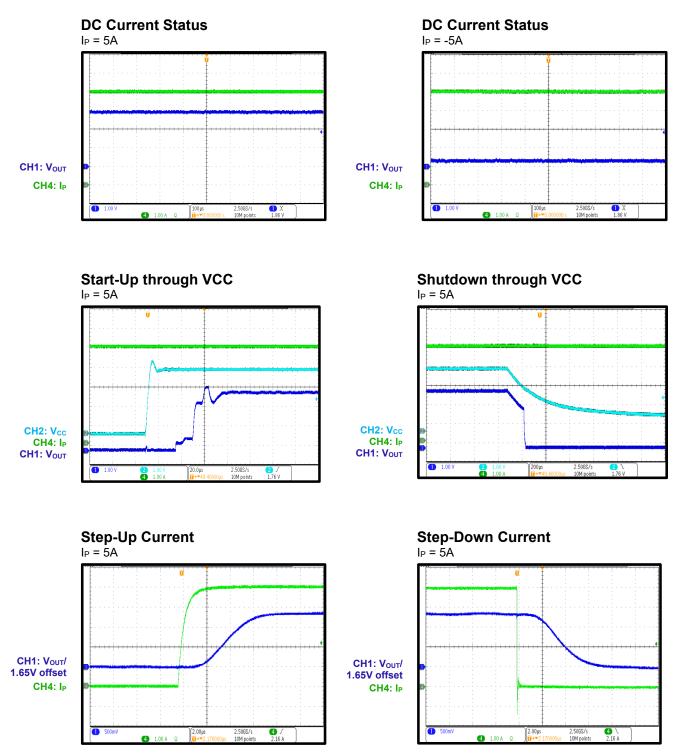
EVCS1805-S-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer PN |
|-----|-----|---------|--|---------|--------------|------------------------|
| 1 | C1 | 100nF | VCC ceramic decoupling capacitor, 16V, X7R | 0603 | Murata | GRM188R71C104KA01D |
| 1 | C2 | 1µF | VCC ceramic decoupling capacitor, 16V, X7R | 0805 | Murata | GRM21BR71C105KA01L |
| 1 | C3 | NC | | | | |
| 1 | R1 | 10kΩ | /OCD pull-up resistor | 0603 | Yageo | RC0603FR-0710KL |
| 1 | CN1 | 2.54mm | Male pin header, 13-pin | DIP | Custom | |
| 1 | U1 | MCS1805 | Linear Hall-effect current sensor with OCD | SOIC-8 | MPS | MCS1805GS-ABB- CDDD |



EVB TEST RESULTS

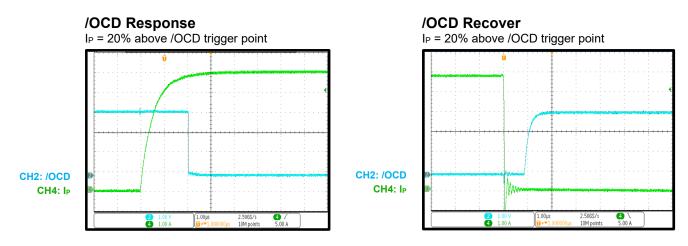
Performance waveforms are tested on the EVCS1805-S-305-B-00A evaluation board (see the Evaluation Board Basic Information section on page 2) with an /OCD trigger point at 5A. $V_{CC} = 3.3V$, C3 is open, $T_A = 25$ °C, unless otherwise noted.





EVB TEST RESULTS (continued)

Performance waveforms are tested on the EVCS1805-S-305-B-00A evaluation board (see the Evaluation Board Basic Information section on page 2) with an /OCD trigger point at 5A. V_{CC} = 3.3V, C3 is open, T_A = 25°C, unless otherwise noted.





PCB LAYOUT

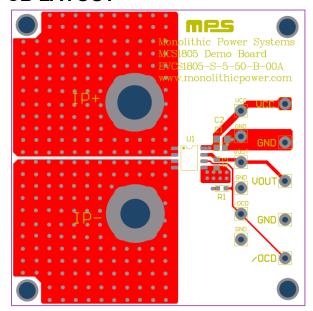


Figure 2: Top Silk and Top Layer

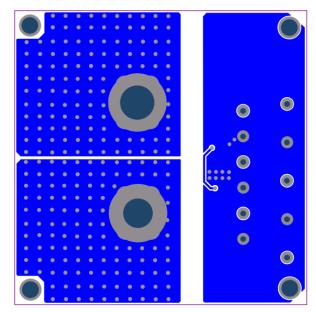


Figure 3: Bottom Layer



REVISION HISTORY

| Revision # | Revision Date | Description | Pages Updated |
|------------|---------------|-----------------|---------------|
| 1.0 | 7/8/2024 | Initial Release | - |

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