

# AMIS-3910XGEVB



## AMIS-3910XGEVB Evaluation Board User's Manual

ON Semiconductor®

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### Eval Board User's Manual

#### Introduction

The AMIS-3910XGEVB evaluation board demonstrates the AMIS-39101 high side driver in SOIC package. The evaluation board includes all external components needed for operating AMIS-39101 and to demonstrate the small PCB surface area such an implementation requires.

#### Overview

The AMIS-39101 is a robust high side driver featuring eight independent high current output drive channels along with a number of integrated fault protection circuits. This highly integrated product is designed for controlled delivery of power to a large variety of loads in industrial applications including motors, relays and LED arrays, among others. With all driver output channels in the conducting state, each channel can source up to 350 mA of continuous current (resistive load). In cases where all output drivers are not active, higher output current per channel can be achieved provided that the thermal limits of the device are not exceeded.

The device can be interfaced to a variety of microcontrollers via the serial interface link, in turn allowing for monitoring and controlling the state of each of the output drivers individually. In this case, at the onset of a potential hazardous situation the drivers are switched off and the diagnostic state of the drivers can be extracted via the serial interface.

#### Features

- Eight High Side Output Drivers
- Up to 830 mA Continuous Current per Driver Pair (Resistive Load)
- Charge Pump with One External Capacitor

- Serial Interface
- Short-circuit Protection
- Diagnostic Features
- Power-down Mode
- Internal Thermal Shutdown
- 3.3 V and 5 V Microcontroller Compliant
- Excellent System ESD
- Automotive Compliant
- Temperature Range of -40°C to +150°C
- Available in 28-pin SOIC
- These are Pb-Free Devices

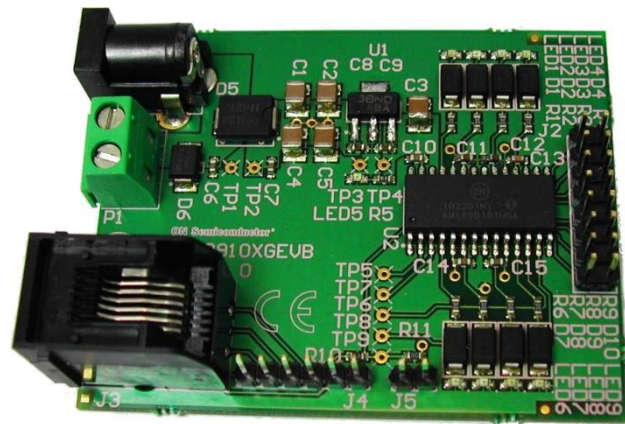


Figure 1. The AMIS-3910XGEVB Evaluation Board

### ELECTRICAL CHARACTERISTICS

Table 1. ELECTRICAL CHARACTERISTICS OF THE AMIS-3910XGEVB BOARD

| Symbol                          | Parameter / Condition     | Value |      |        |
|---------------------------------|---------------------------|-------|------|--------|
|                                 |                           | Min   | Typ  | Max    |
| <b>V_BAT Voltage</b>            |                           |       |      |        |
| V <sub>BAT</sub>                | V <sub>BAT</sub> Voltage  | 5.5 V | 24 V | 35 V   |
| <b>Current Drawn from V_BAT</b> |                           |       |      |        |
| I <sub>BAT</sub>                | Total Current Consumption | 4 mA  |      | 3.75 A |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# AMIS-3910XGEVB

## AMIS-39101 DESCRIPTION

The AMIS-39101 is a robust high side driver featuring eight independent high current output drive channels along with a number of integrated fault protection circuits. This highly integrated product is designed for controlled delivery of power to a large variety of loads in industrial applications including motors, relays and LED arrays, among others. With all driver output channels in the conducting state, each channel can source up to 350 mA of continuous current (resistive load). In cases where all output drivers are not active, higher output current per channel can be achieved provided that the thermal limits of the device are not exceeded.

Furthermore, in order to minimize system cost each output driver has built-in fly-back diodes. The device withstands short circuits to ground and supply, respectively.

It is designed with an array of integrated protection features including overtemperature and overcurrent detection and shutdown. The integrated charge pump requires only one external capacitor and provides for operation of the critical fault protection circuitry even in case of low supply voltages. The device can be interfaced to a variety of microcontrollers via the serial interface link, in turn allowing for monitoring and controlling the state of each of the output drivers individually. In this case, at the onset of a potential hazardous situation the drivers are switched off and the diagnostic state of the drivers can be extracted via the serial interface. The device also features a power down mode for reduced power consumption and has high built-in electrostatic discharge (ESD) protection capability for robust operation.

## AMIS-3910XGEVB DESCRIPTION

### BOM List

Table 2. AMIS-3910XGEVB BILL OF MATERIALS

| Quantity | Reference  | Part            | Footprint | Comments       | Manufacturer      | Product Code       |
|----------|--|-----------------|-----------|----------------|-------------------|--------------------|
| 5        | C1, C2, C3, C4, C5                                   | 10 $\mu$ F      | C1210     | 50 V           | Murata            | GRM32DF51H106ZA01L |
| 9        | C6, C7, C8, C9, C10, C11, C12, C14, C15              | 100 nF          | C0603     | 50 V           | Murata            | GRM188F51H104ZA01D |
| 1        | C13  | 22 nF           | C0603     | 50 V           | Murata            | GRM188R71H223KA01D |
| 8        | D1, D2, D3, D4, D7, D8, D9, D10                      | MURA140T3G      | SMA       |                | ON Semiconductor  | MURA140T3G         |
| 1        | D5   | MBRS4201T3G     | SMC       |                | ON Semiconductor  | MBRS4201T3G        |
| 1        | D6   | P6SMB30CAT3G    | SMB       |                | ON Semiconductor  | P6SMB30CAT3G       |
| 1        | J1   | NEB 21 R        |           | DC Jack        | Lumberg           | NEB 21 R           |
| 1        | J3   |                 |           | Terminal block | Molex             | 95009-2661         |
| 1        | J2   |                 |           | Header, 16P    | Wuerth Elektronik | 613 016 211 21     |
| 1        | J5   |                 |           | Header, 2P     | Wuerth Elektronik | 613 002 111 21     |
| 1        | J4   |                 |           | Header, 6P     | Wuerth Elektronik | 613 006 111 21     |
| 1        | P1   |                 |           |                | Wuerth Elektronik | 691 216 510 002    |
| 9        | LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9 |                 | LED0603   | Green          | Wuerth Elektronik | 150060GS75000      |
| 2        | R5, R10  | 1 k $\Omega$    | R0603     | 100 mW         | Multicomp         | MCMR06X1001FTL     |
| 9        | R1, R2, R3, R4, R6, R7, R8, R9, R11                  | 10 k $\Omega$   | R0603     | 100 mW         | Multicomp         | MCMR06X1002FTL     |
| 1        | U1   | NCV4274AST33T3G | SOT-223   | LDO, 3.3 V     | ON Semiconductor  | NCV4274AST33T3G    |
| 1        | U2   | AMIS-39101      | SOIC28    |                | ON Semiconductor  | AMIS39101PNPB4RG   |

# AMIS-3910XGEVB

## Schematic Diagram

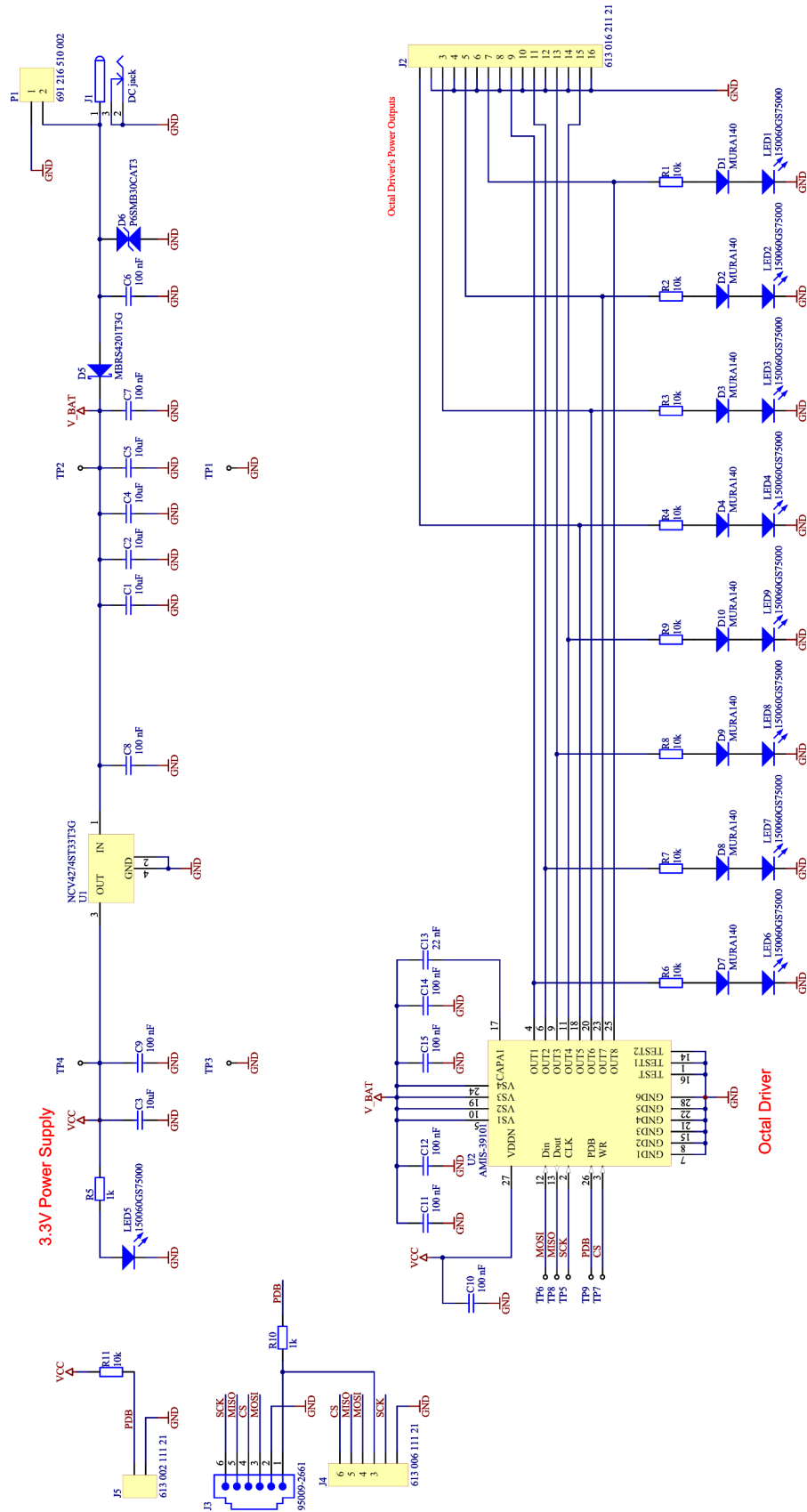


Figure 2. Schematic of AMIS-3910XGEVB

# AMIS-3910XGEVB

## APPENDIX

### Evaluation Board Layout

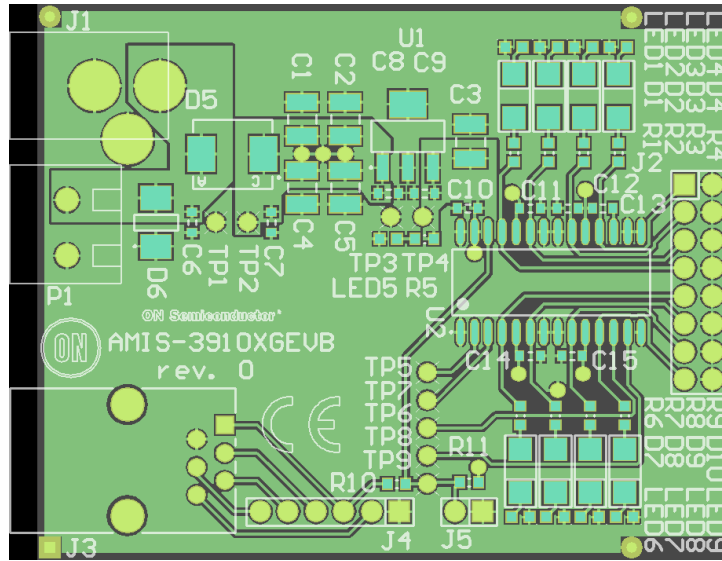


Figure 3. Top Layer Layout

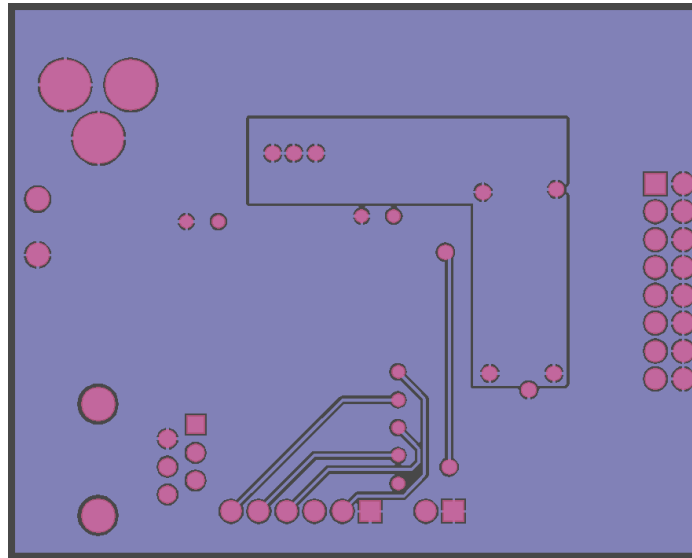



Figure 4. Bottom Layer Layout

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