

User Manual

DA7280 Daughterboard 359-06-X

UM-HA-003

Abstract

This document describes the functionality of DA7280 haptic driver daughterboard. This board can be used standalone or attached to a DA728X motherboard for evaluation.

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DA7280 Daughterboard 359-06-X

1 Terms and Definitions

NOTE: "X" can denote different version of boards such as A and B variants

| | |
|------------------|--|
| 359-05-x | DA728x Motherboard, containing LRA as well as the digital and analogue accelerometer circuitry |
| 359-06-x | DA7280 Daughterboard |
| 359-07-x | DA7281 Daughterboard |
| 359-08-x | DA7282 Daughterboard |
| 359-09-x | DA7283 Daughterboard |
| DA7280 | Dialog Semiconductor's haptic driver integrated circuit |
| DA7281 | DA7280 variant with I2C address select |
| DA7282 | DA7280 variant with ultra-low power shutdown |
| DA7283 | DA7280 variant without I2C control and with ultra-low power shutdown |
| DUT | Device under test |
| ERM | Eccentric Rotating Mass |
| GUI | Graphical User Interface |
| I ² C | Inter-Integrated Circuit Communication Standard |
| LRA | Linear Resonant Actuator |
| PCB | Printed Circuit Board |
| PWM | Pulse Width Modulation |
| BEMF | Back Electro-Motive Force |
| GPI | General purpose input |
| PCB | Printed circuit board |
| DCDC | Direct current to direct current convertor |
| IRQ | Interrupt request |

2 References

- [1] DA7280, Datasheet, Dialog Semiconductor.
- [2] DA7281, Datasheet, Dialog Semiconductor.
- [3] DA7282, Datasheet, Dialog Semiconductor.
- [4] DA7283, Datasheet, Dialog Semiconductor.
- [5] UM-HA-003, DA7280 Daughterboard User Manual, User Manual, Dialog Semiconductor.
- [6] UM-HA-004, DA7281 Daughterboard User Manual, User Manual, Dialog Semiconductor.
- [7] UM-HA-005, DA7282 Daughterboard User Manual, User Manual, Dialog Semiconductor.
- [8] UM-HA-006, DA7283 Daughterboard User Manual, User Manual, Dialog Semiconductor.
- [9] DA728x GUI software
- [10] UM-HA-001, DA728x Motherboard 359-05-A User Manual, User Manual, Dialog Semiconductor.
- [11] UM-HA-002, DA728x Generating LRA configuration script

DA7280 Daughterboard 359-06-X

3 Introduction

This document describes the use and connections of 359-06-X DA7280 daughterboard to allow evaluation of the DA7280 device. A layout is shown in Figure 1 and details of all jumper connections are listed in Table 1.

4 359-06-X PCB Layout and Connections

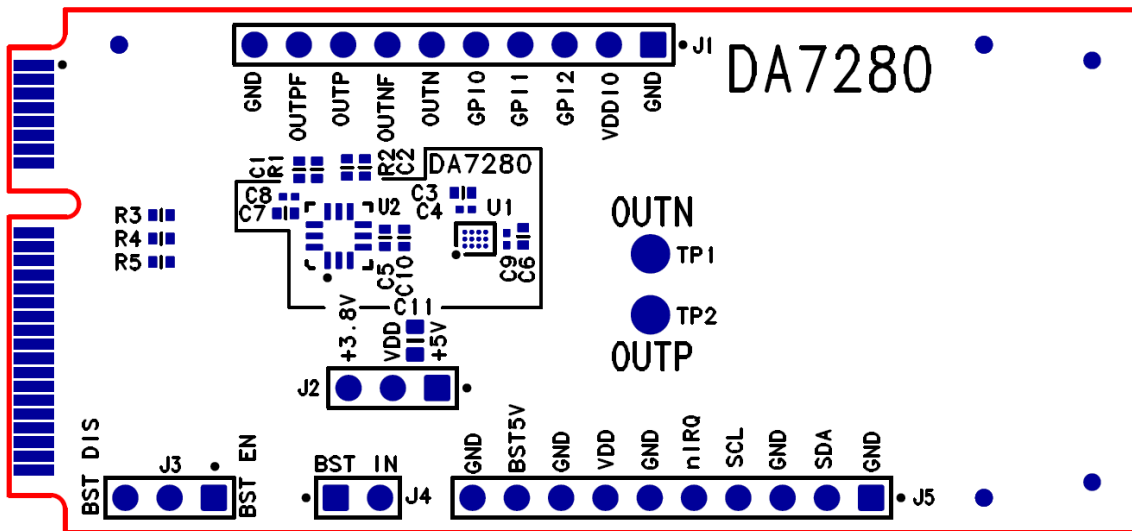


Figure 1: 359-06-X PCB

DA7280 Daughterboard 359-06-X

Table 1: Jumper Connections and Descriptions

| Jumper/ Test Point | Pin/Connection | Description |
|-----------------------|---------------------------|--|
| J1 | GND | Ground connection |
| | VDDIO | VDDIO supply for digital logic Supply range = 1.35 V to 5.5 V, 1.8 V typical |
| | GPI2 | General purpose input pin 2 |
| | GPI1 | General purpose input pin 1 |
| | GPI0 | General purpose input pin 0 |
| | OUTN | Negative output for LRA connection - TP1 can also be used |
| | OUTNF | Filtered version of negative output Bandwidth limited to 3.38 kHz for output waveform analysis via an oscilloscope |
| | OUTP | Positive output for LRA connection - TP2 can also be used |
| | OUTPF | Filtered version of positive output Bandwidth limited to 3.38 kHz for output waveform analysis via an oscilloscope |
| | GND | Ground connection |
| J2 | SHORT 1 to 2 (default) | Selects VDD supply to device to be from the boost output at 5 V |
| | SHORT 2 to 3 | Selects VDD supply to device to be from J5-VDD or J4-pin 2 |
| J3 | SHORT 1 to 2 (default) | Selects on board boost DCDC to be enabled |
| | SHORT 2 to 3 | Selects on board boost DCDC to be disabled |
| J4 | SHORT (default) | Selects on board boost DCDC input supply to be driven from main motherboard (3V8) when the daughter board is inserted |
| | OPEN | Removes power to the on-board DCDC from motherboard Pin 1 can be used for direct supply of the DCDC if standalone operation is required |
| J5 | GND | Ground connection |
| | SDA | I2C Data line, pullup (R3) fitted with a 2K2 resistor as default |
| | GND | Ground connection |
| | SCL | I2C Clock line, pullup (R4) fitted with a 2K2 resistor as default |
| | nIRQ | Interrupt request output, 5K6 (R5) pullup fitted, driven low when IRQ triggered |
| | GND | Ground connection |
| | VDD | VDD supply line to device Supply range = 2.8 V to 5.5 V input |
| | GND | Ground connection |
| | BST5V | On board DCDC output voltage for monitoring, set to 5V as default |
| | GND | Ground connection |

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| Jumper/ Test Point | Pin/Connection | Description |
|--------------------|----------------|---------------------|
| TP1 | TP1 | Test point for OUTN |
| TP2 | TP2 | Test point for OUTP |

5 Board Setup for VDD Supply to Device

5.1 Standalone Operation

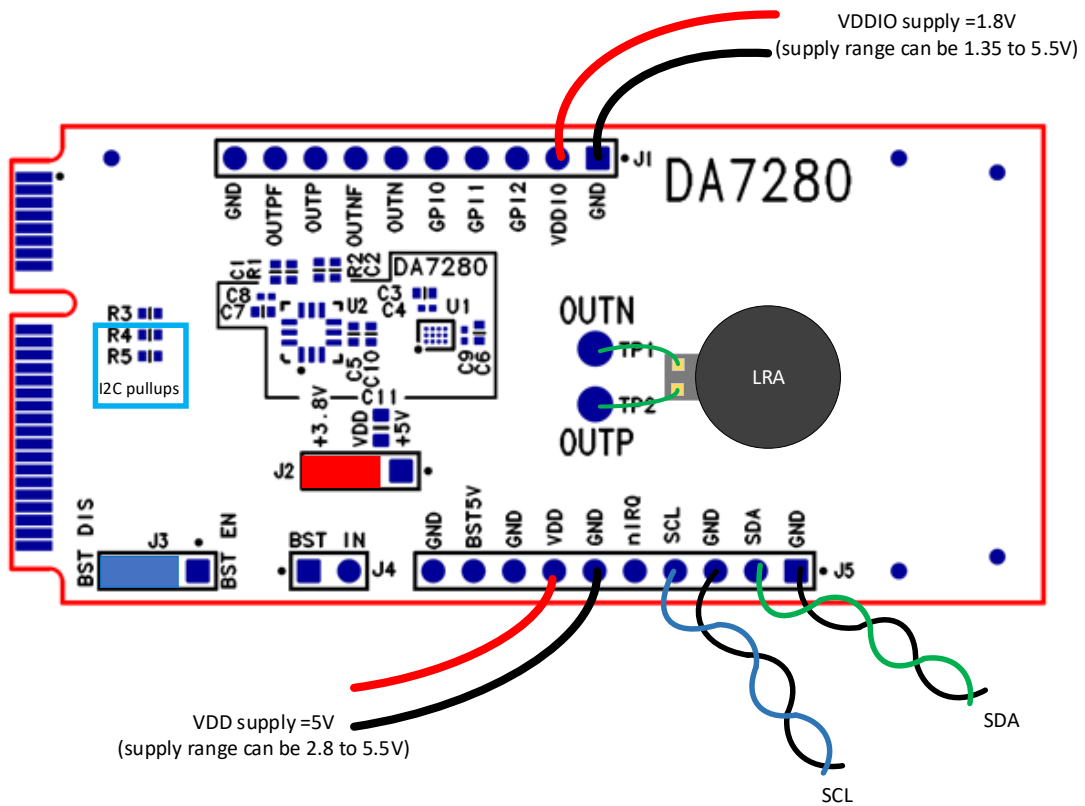


Figure 2: Standalone Operation from VDD Supply

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5.2 Motherboard Setup

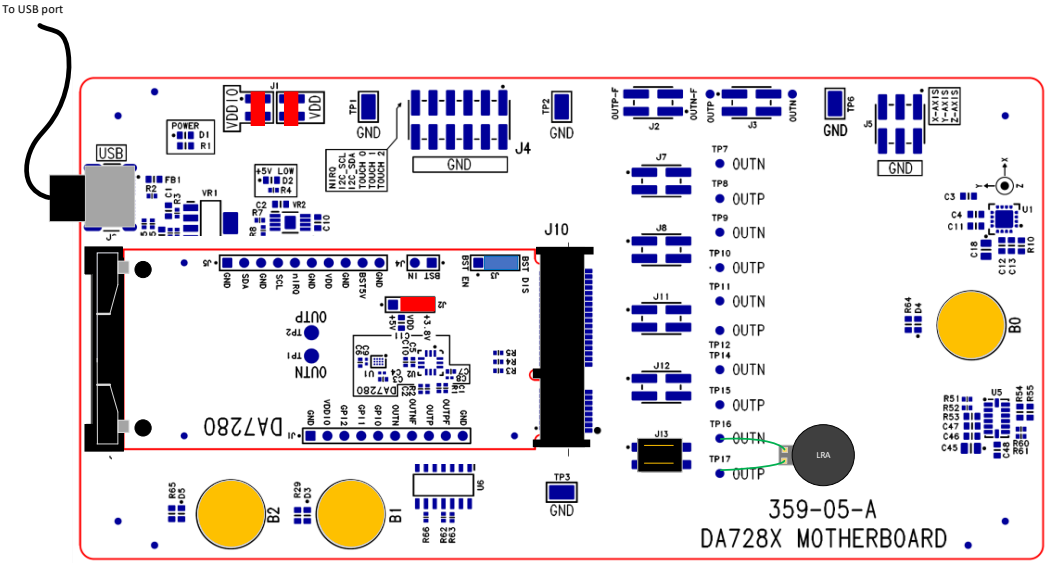


Figure 3: Motherboard Operation with VDD Supply

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6 Board Setup for BOOST Supply to Device

6.1 Standalone Operation

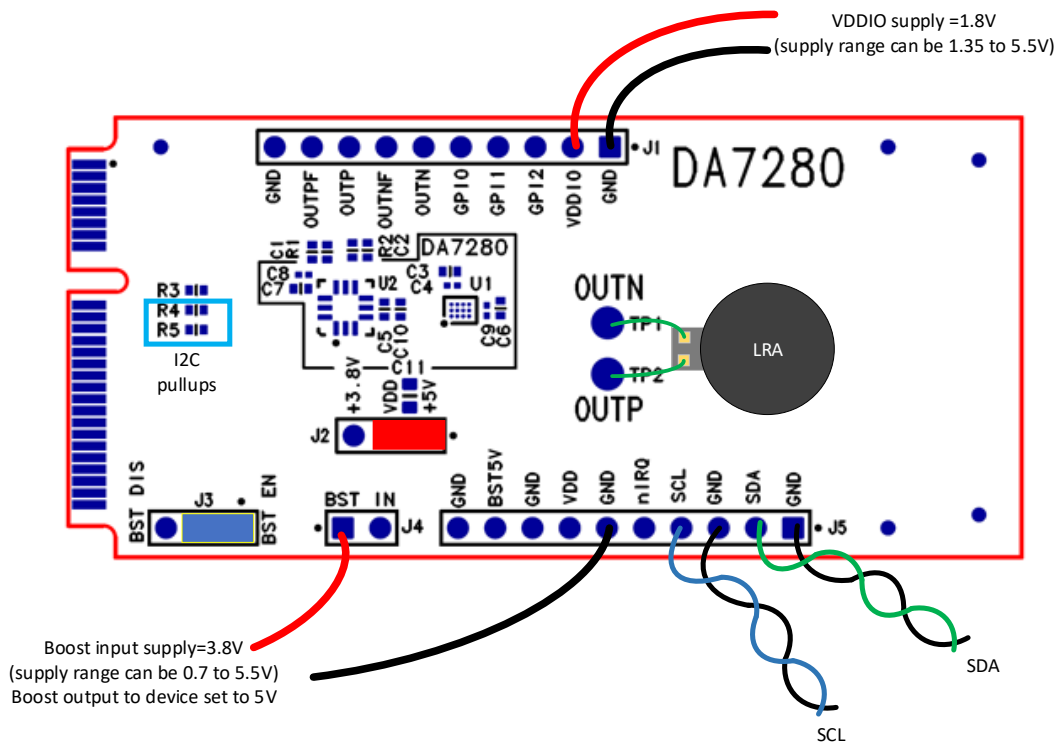


Figure 4: Standalone Operation from BOOST Supply

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6.2 Motherboard Setup

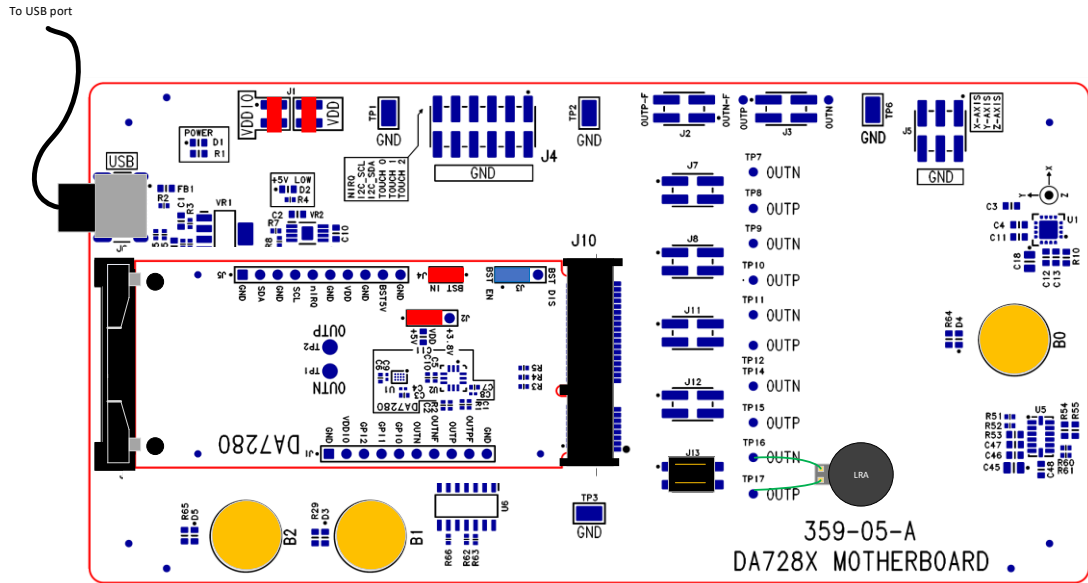


Figure 5: Motherboard Operation from BOOST Supply

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7 359-06-X Schematic

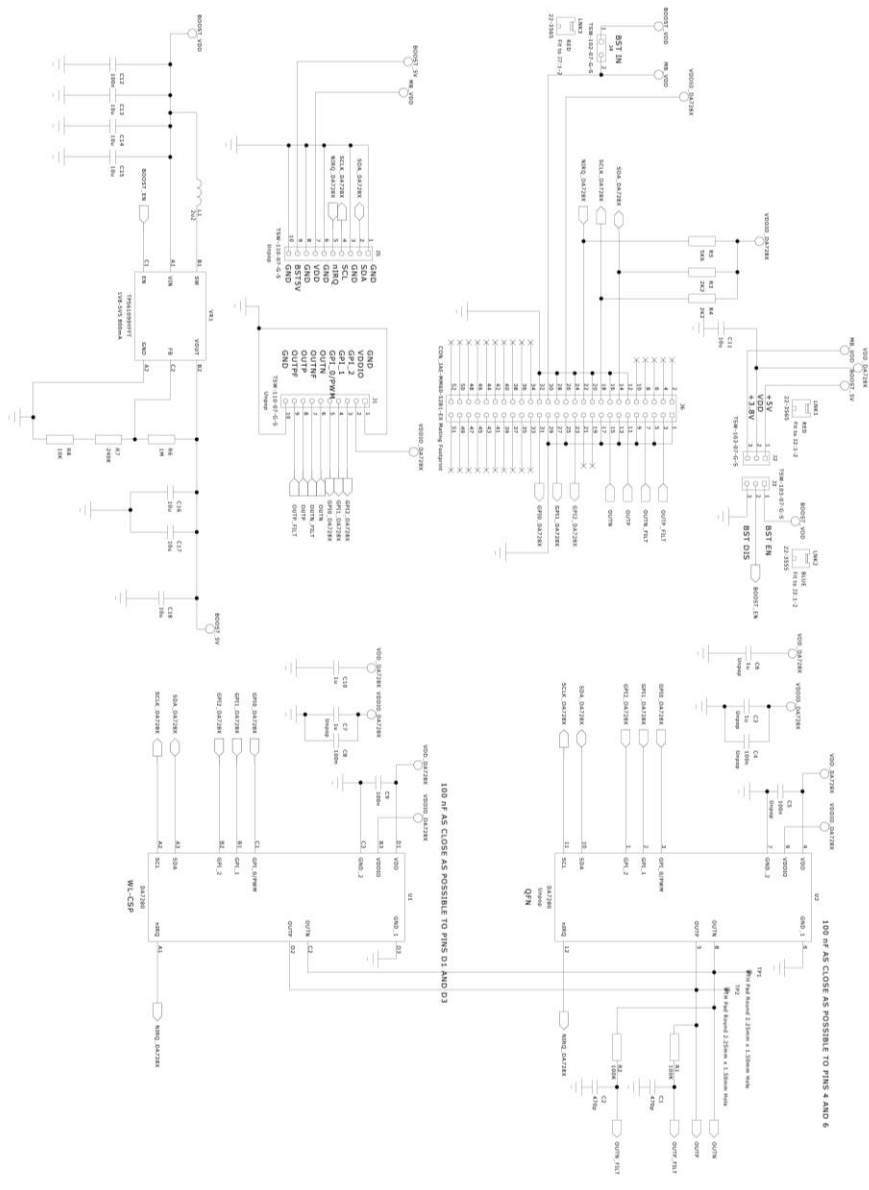


Figure 6: 359-06-X Schematic

8 359-06-X Layout

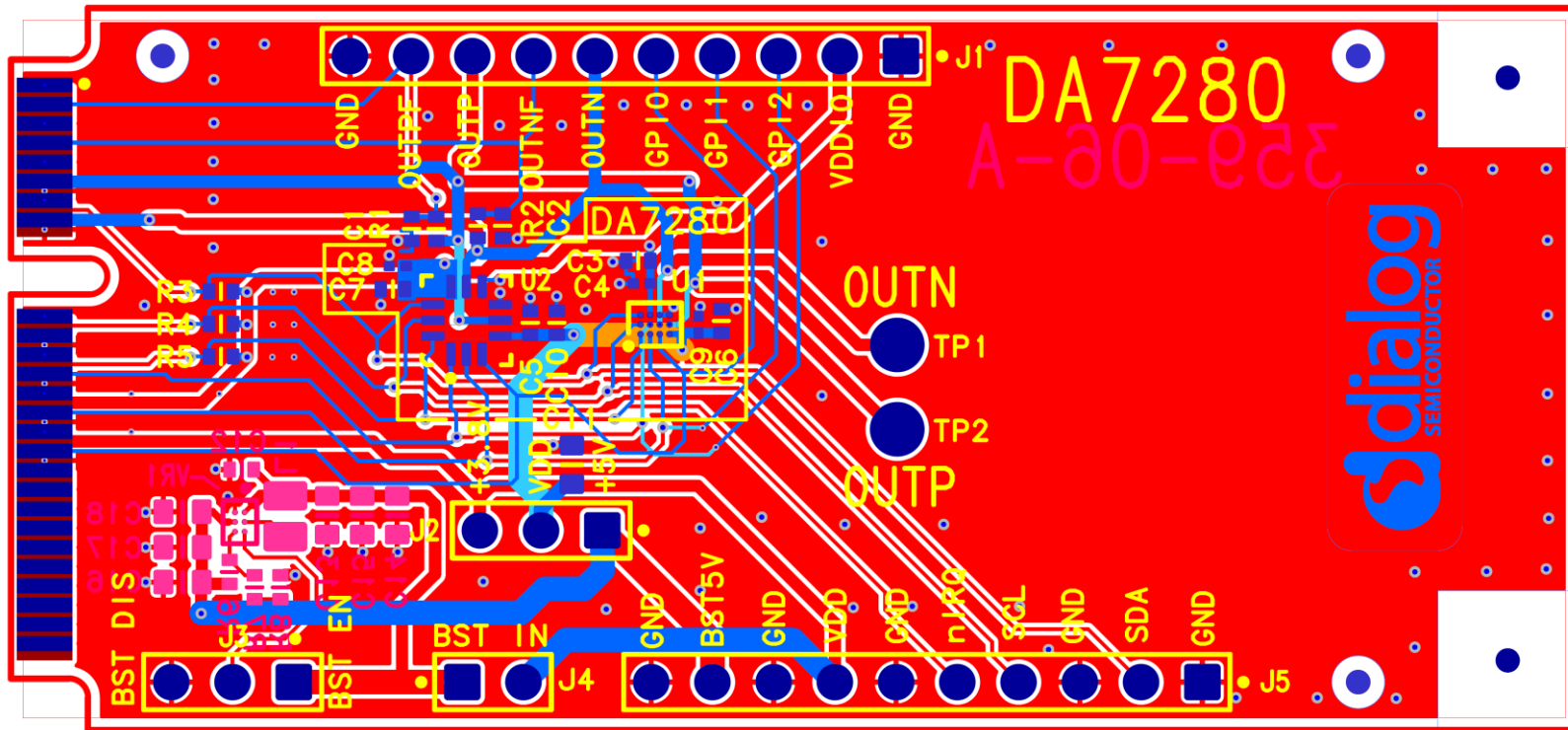


Figure 7: 359-06-X Composite View

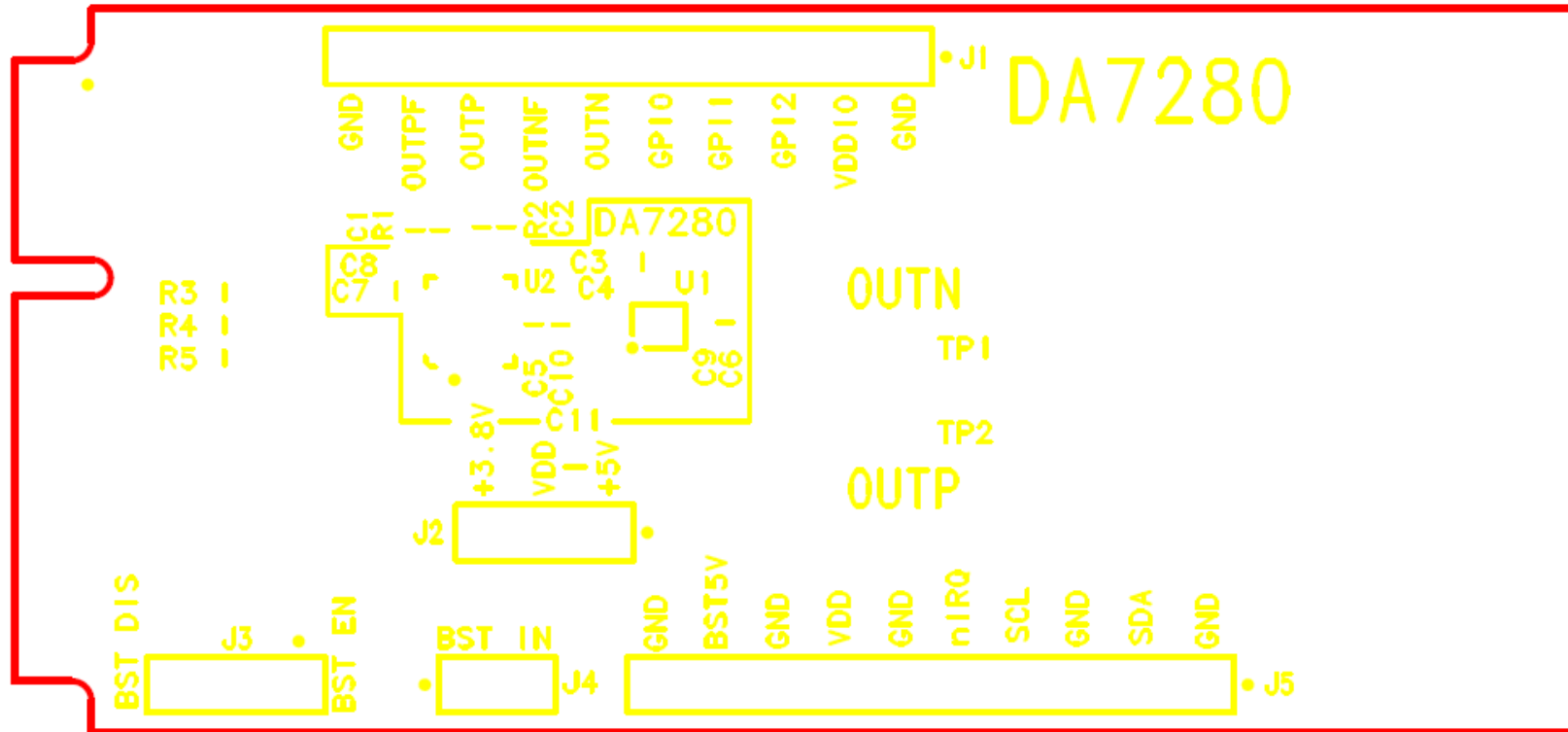


Figure 8: 359-06-X Top Layer Silkscreen

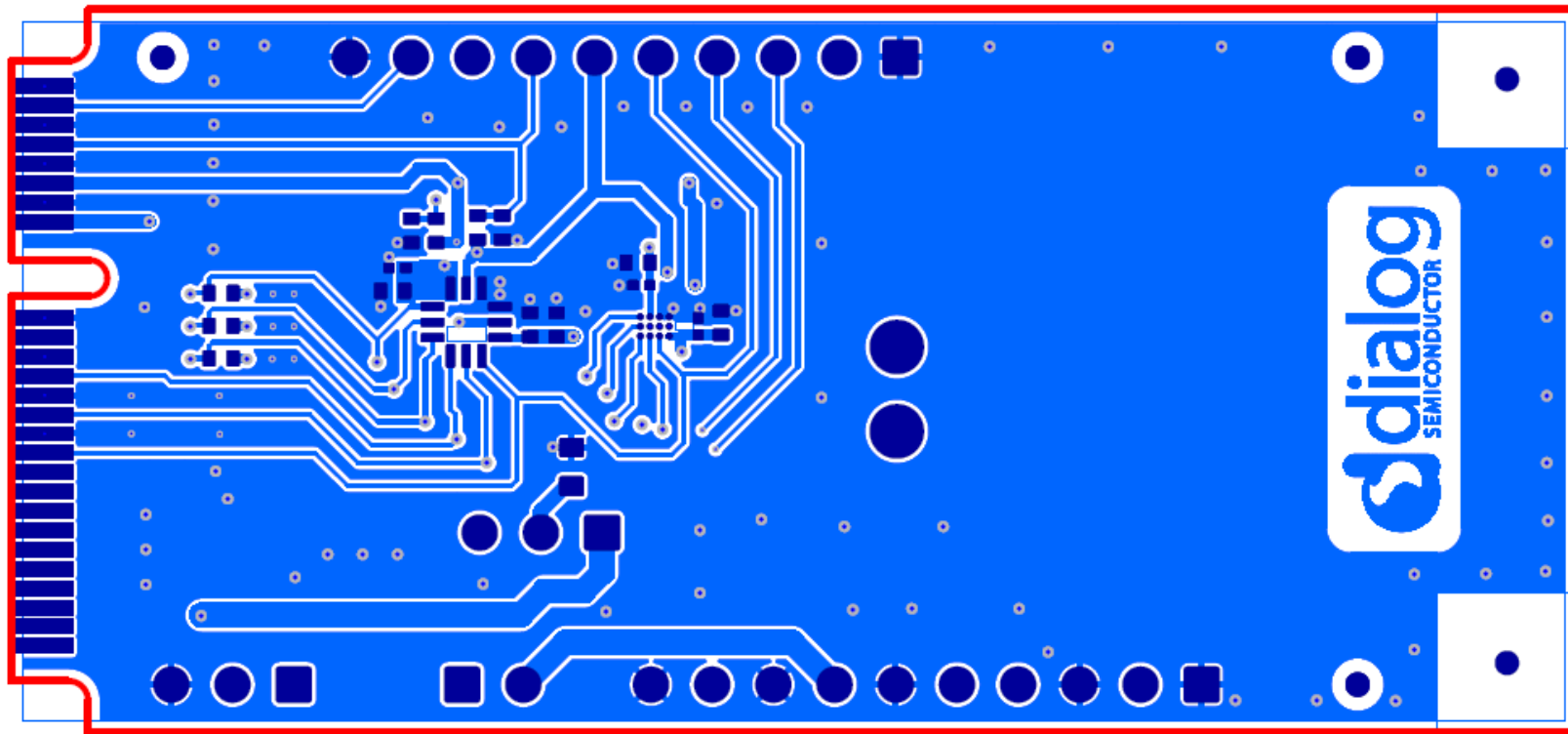


Figure 9: 359-06-X Top Layer Routing

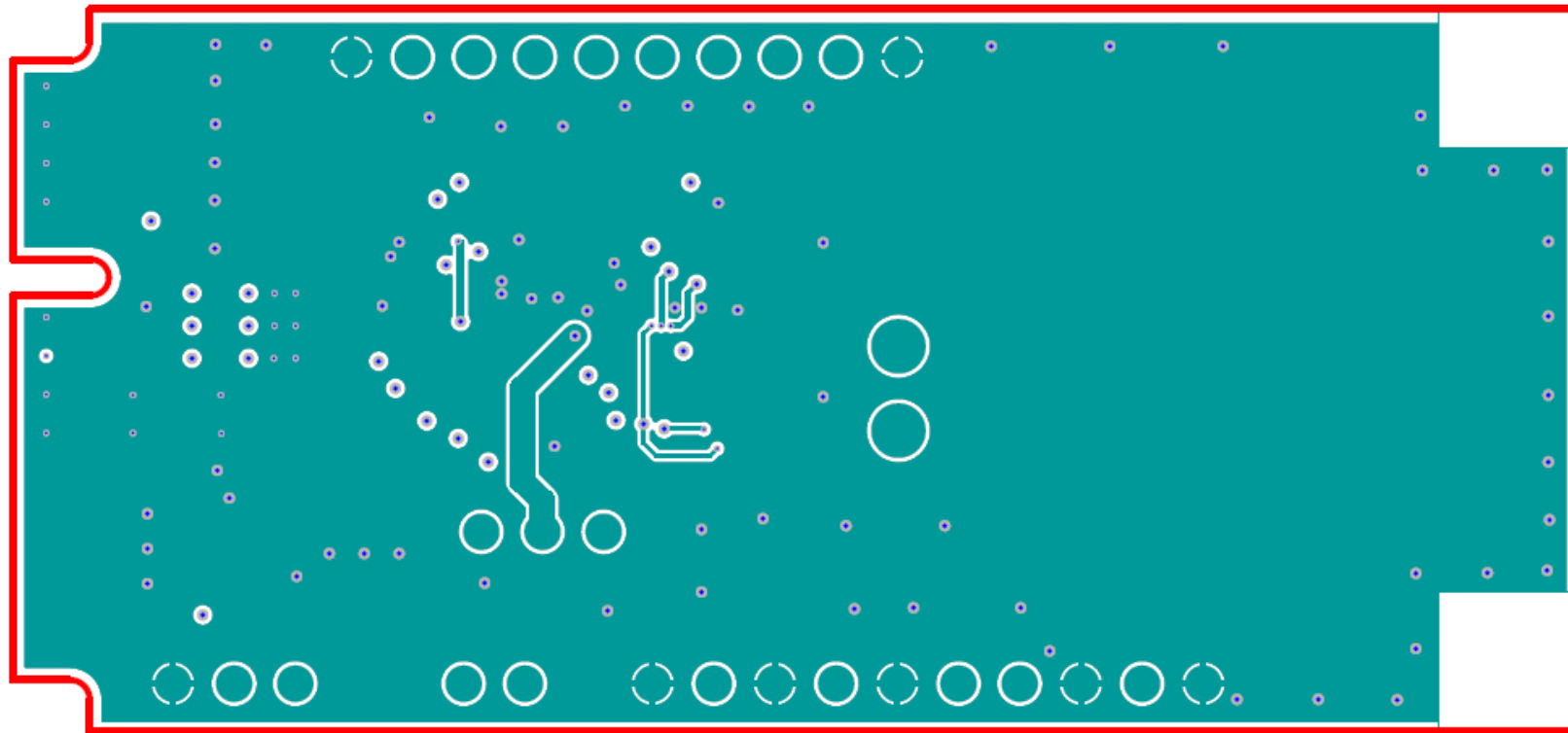


Figure 10: 359-06-X Inner Layer 2

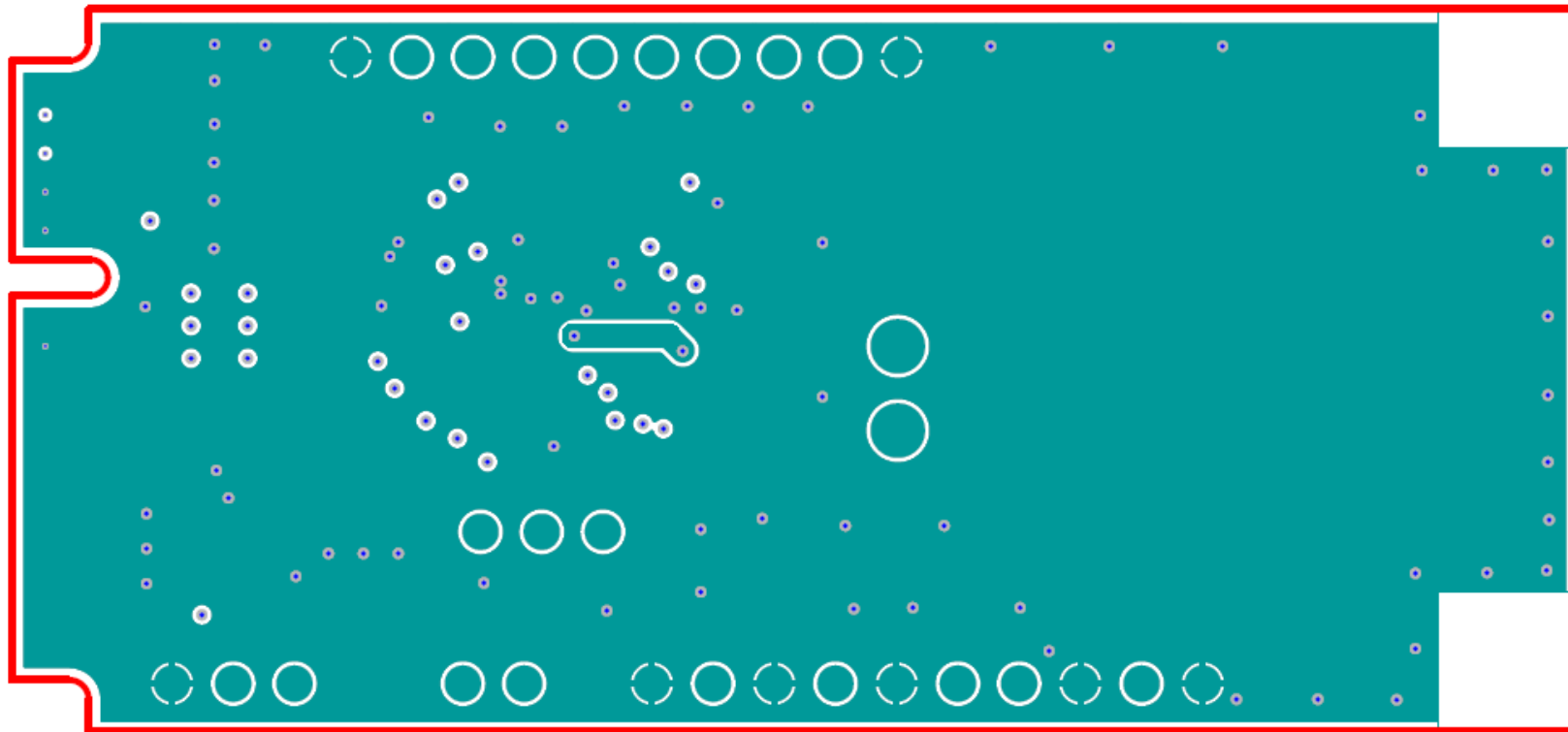


Figure 11: 359-06-X Inner Layer 3

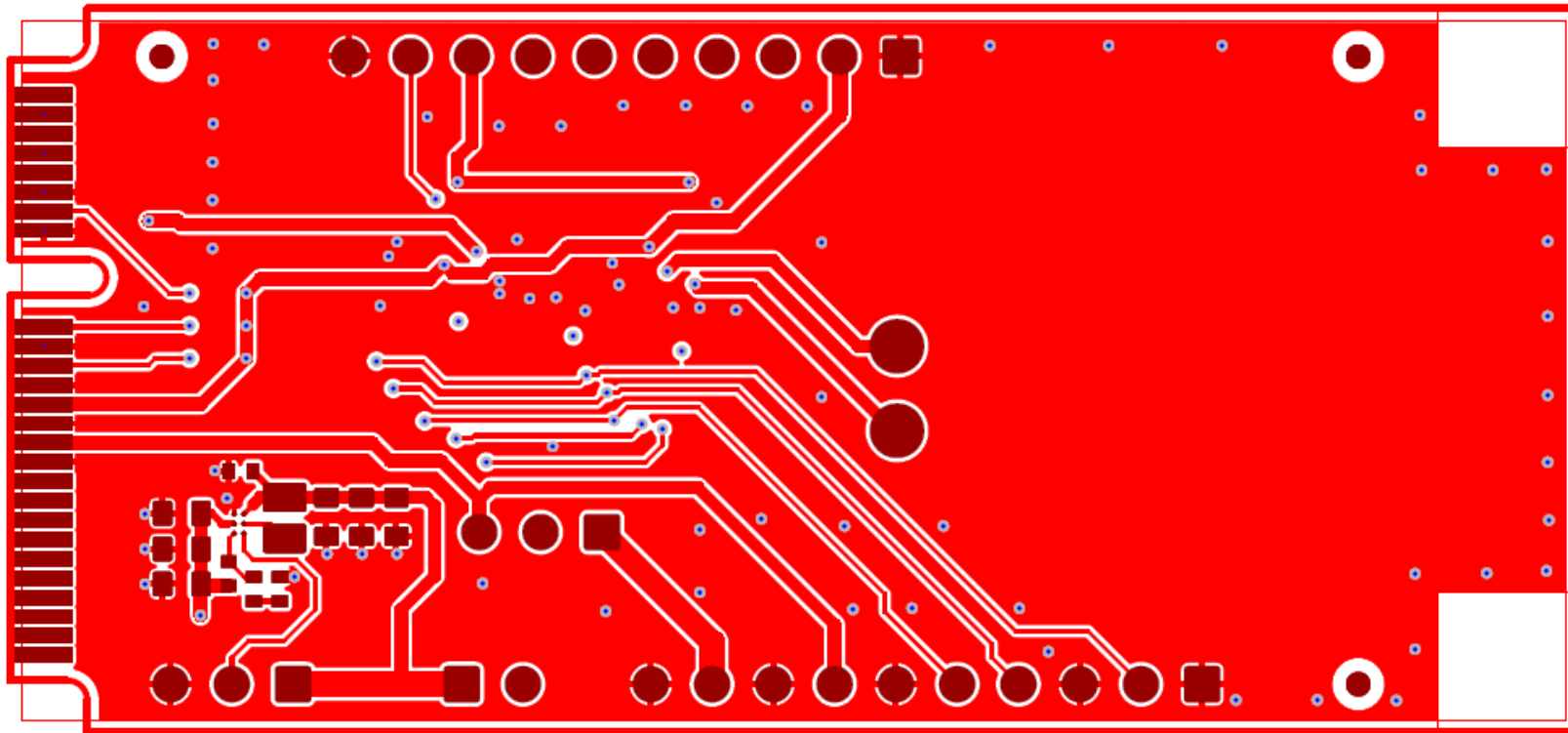


Figure 12: 359-06-X Bottom Layer Routing

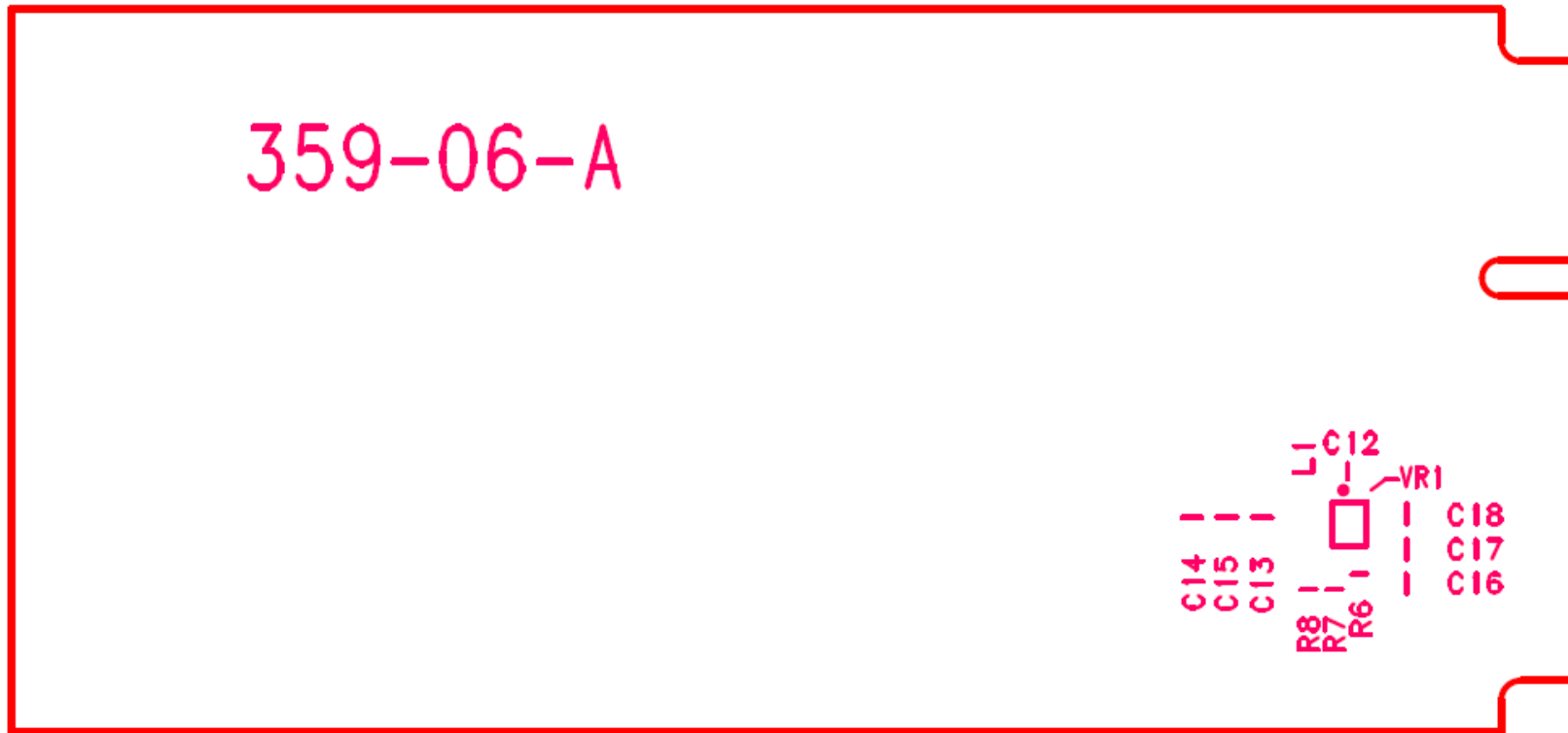


Figure 13: 359-06-X Bottom Layer Silkscreen

Revision History

| Revision | Date | Description |
|----------|-------------|------------------|
| 1.0 | 15-Apr-2020 | Initial version. |

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Status Definitions

| Status | Definition |
|-------------------------|--|
| DRAFT | The content of this document is under review and subject to formal approval, which may result in modifications or additions. |
| APPROVED or unmarked | The content of this document has been approved for publication. |