

## MAX17681 Evaluation Kit

## Evaluates: MAX17681 for Isolated +24V Output Configuration

### General Description

The MAX17681EVKITF is a fully assembled and tested circuit board that demonstrates the performance of the MAX17681 high-efficiency, iso-buck DC-DC Converter. The EV kit operates over a wide input-voltage range of 17V to 36V and uses primary-side feedback to regulate the output voltage. The EV kit output is programmed to +24V at 100mA, with  $\pm 8\%$  output voltage regulation.

The EV kit comes installed with the MAX17681 in a 10-pin (3mm x 2mm) TDFN package.

### Features

- 17V to 36V Input Voltage Range
- +24V, 100mA Continuous Current
- EN/UVLO Input
- 200kHz Switching Frequency
- Overcurrent Protection
- No Optocoupler
- Delivers up to 2.4W Output Power
- Overtemperature Protection
- Proven PCB Layout

Ordering Information appears at end of data sheet.

### Quick Start

#### Recommended Equipment

- One 15V–60V DC, 0.5A power supply
- One resistive load 100mA sink capacity
- Two digital multimeters (DMM)

**Caution: Do not turn on the power supply until all connections are completed.**

#### Test Procedure

The EV kit comes with the default output configuration programmed to +24V.

- 1) Verify that J1 is open.
- 2) Verify that R7 is not installed.
- 3) Set the power supply output to 24V. Disable the power supply.
- 4) Connect the positive terminal of the power supply to the  $V_{IN}$  PCB pad and the negative terminal to the nearest PGND PCB pad. Connect a 100mA resistive load across the +24V PCB pad and the GND0 PCB pad.
- 5) Connect a DMM configured in voltmeter mode across the +24V PCB pad and the nearest GND0 PCB pad.
- 6) Enable the input power supply.
- 7) Verify that output voltage is at +24V (with allowable tolerance of  $\pm 8\%$ ) with respect to GND0.
- 8) If required, vary the input voltage from 17V to 36V, and the load current from 0mA to 100mA and verify that output voltage is at +24V (with allowable tolerance of  $\pm 8\%$ ).

Detailed Description

The MAX17681EVKITF evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the performance of the MAX17681 high efficiency, iso-buck DC-DC converter designed to provide an isolated power up to 2.4W. The EV kit generates +24V, 100mA from a 17V to 36V input supply. The EV kit features a forced PWM control scheme that provides constant switching-frequency of 200kHz operation at all load and line conditions.

The EV kit includes an EN/UVLO PCB pad to monitor and program the EN/UVLO pin of the MAX17681. The  $V_{PRI}$  PCB pad helps measure the regulated primary output voltage ( $V_{PRI}$ ). An additional  $\overline{RESET}$  PCB pad is available for monitoring the health of primary output voltage ( $V_{PRI}$ ).  $\overline{RESET}$  is pulled low if FB voltage drops below 92.5% of its set value.  $\overline{RESET}$  goes high impedance 1024 clock cycles after FB voltage rises above 95.5% of its set value. The programmable soft-start feature allows users to reduce the input inrush current.

The iso-buck is a synchronous-buck-converter-based topology, useful for generating isolated outputs at low power level without using an optocoupler. The detailed procedure for setting the soft-start time, ENABLE/UVLO divider, primary output voltage ( $V_{PRI}$ ) selection, adjusting

the primary output voltage, primary inductance selection, turns-ratio selection, output capacitor selection, output diode selection and external loop compensation are given in MAX17681 IC data sheet.

Enable Control (J1)

The EN/UVLO pin on the device serves as an on/off control while also allowing the user to program the input undervoltage-lockout (UVLO) threshold. J1 configures the EV kit's output for turn-on/turn-off control. Install a shunt across J1 pins 2-3 to disable  $V_{OUT}$ . See [Table 1](#) for proper J1 configurations.

**NOTE 1:** The secondary output diodes D1 is rated to carry short-circuit current only for few 100's of ms and is not rated to carry the continuous short-circuit current.

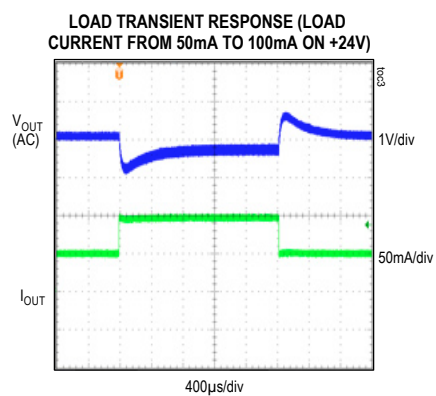
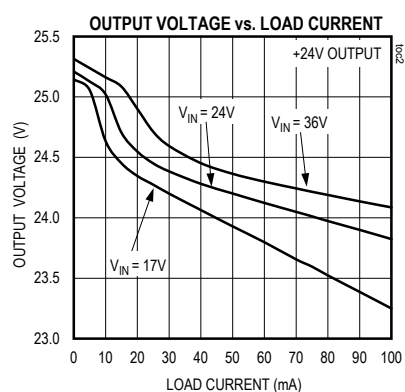
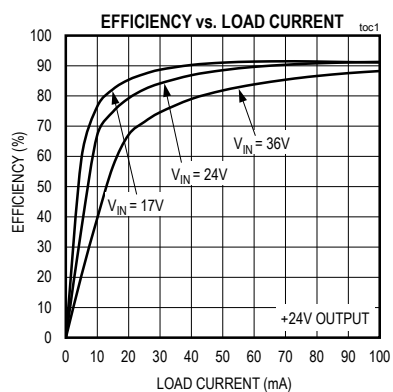
**NOTE 2:** The iso-buck converter typically needs 10% minimum load to regulate the output voltage. In this design when the +24V rail is healthy, the U2 sinks the minimum load current required to regulate the output voltages within  $\pm 8\%$  regulation.

Table 1. Enable Control (EN/UVLO) (J1) Jumper Settings

| SHUNT POSITION | EN/UVLO PIN                                      | $V_{OUT}$                      |
|----------------|--------------------------------------------------|--------------------------------|
| J1             |                                                  |                                |
| 1-2            | Connected to $V_{IN}$                            | Always Enabled                 |
| 2-3            | Connected to GND                                 | Always Disabled                |
| Open*          | Connected to midpoint of R1, R2 resistor-divider | Enabled at $V_{IN} \geq 15.5V$ |

\*Default position.

## EV Kit Performance Report



## MAX17681 Evaluation Kit

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+24V Output Configuration

### Component Suppliers

| SUPPLIER         | WEBSITE                                                  |
|------------------|----------------------------------------------------------|
| Würth Elektronik | <a href="http://www.we-online.com">www.we-online.com</a> |
| Murata Americas  | <a href="http://www.murata.com">www.murata.com</a>       |
| Panasonic Corp.  | <a href="http://www.panasonic.com">www.panasonic.com</a> |

**Note:** Indicate that you are using the MAX17681 when contacting these component suppliers.

### Component Information, PCB Layout, and Schematic

See the following links for component information, PCB layout diagrams, and schematic.

- [MAX17681F EV BOM](#)
- [MAX17681F EV PCB Layout](#)
- [MAX17681F EV Schematic](#)

### Ordering Information

| PART            | TYPE  |
|-----------------|-------|
| MAX17681EVKITF# | EVKIT |

#Denotes RoHS compliant.

## Revision History

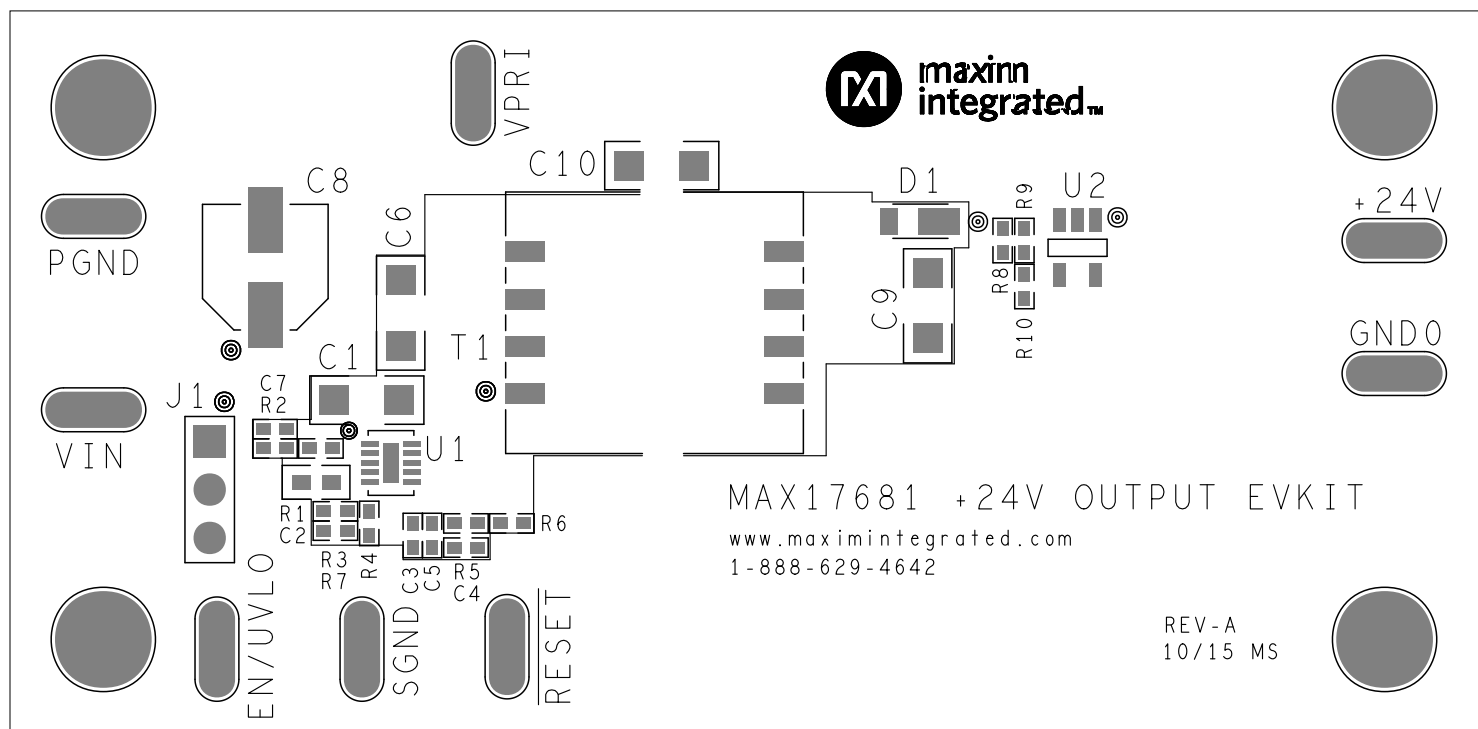
| REVISION<br>NUMBER | REVISION<br>DATE | DESCRIPTION                                                             | PAGES<br>CHANGED |
|--------------------|------------------|-------------------------------------------------------------------------|------------------|
| 0                  | 3/16             | Initial release                                                         | —                |
| 1                  | 4/16             | Updated <i>General Description</i> section and <i>Bill of Materials</i> | 1–2              |

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at [www.maximintegrated.com](http://www.maximintegrated.com).

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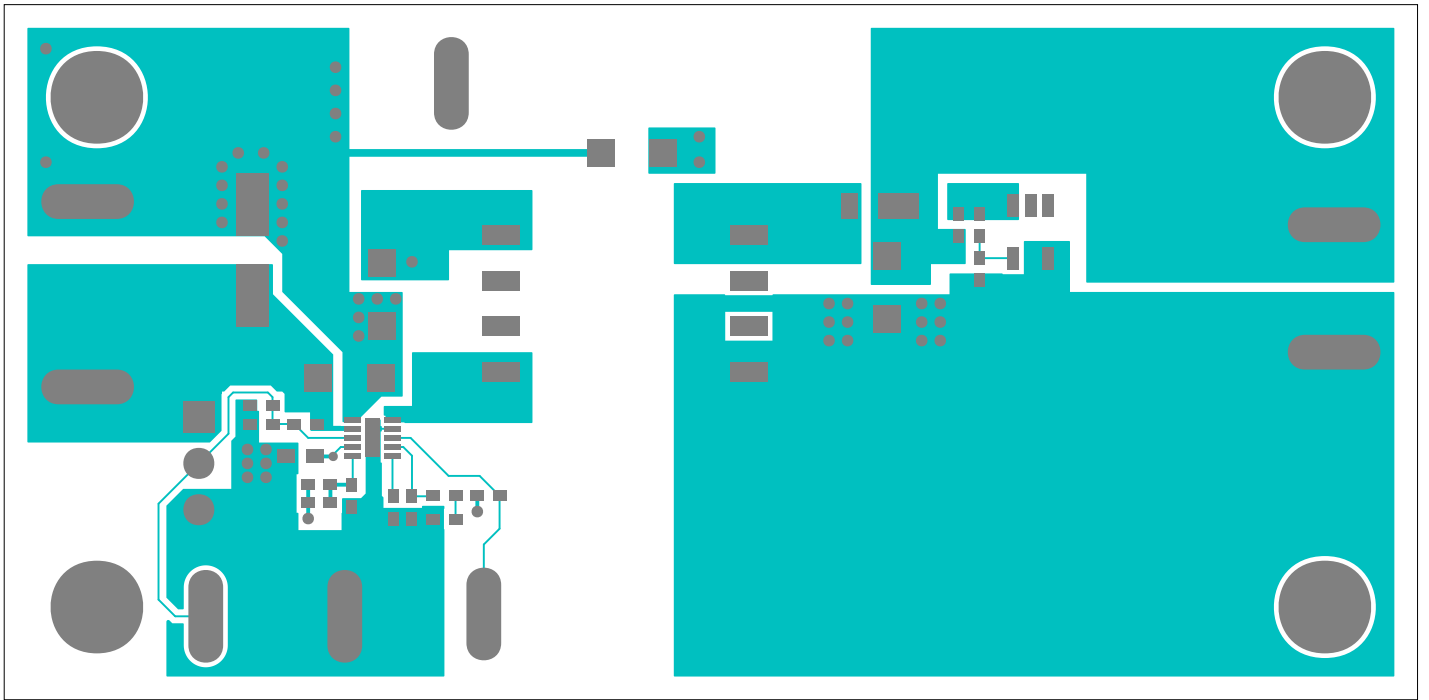
| S NO | Designation | Qty | Description                                                  | Manufacturer Partnumber-1             | Manufacturer Partnumber-2   | Manufacturer Partnumber-3 | Manufacturer Partnumber-4    |
|------|-------------|-----|--------------------------------------------------------------|---------------------------------------|-----------------------------|---------------------------|------------------------------|
| 1    | C1          | 1   | 1μF±10%, 50V,X7R Ceramic capacitor (1206)                    | Murata GRM31CR71H105KA61              | KEMET C1206C105K5RAC        | Murata GRM31MR71H105KA88  |                              |
| 2    | C2          | 1   | 1μF±10% 16V X7R Ceramic capacitor (0603)                     | Murata GRM188R71C105KA12              | KEMET C0603C105K4RAC        | TDK C1608X7R1C105K        | TAIYO YUDEN<br>EMK107B7105KA |
| 3    | C3          | 1   | 0.033UFnF±10%,25V, X7R ceramic capacitor (0402)              | Murata GRM155R71E333KA88              |                             |                           |                              |
| 4    | C4          | 1   | 0.082UFnF±10%,16V, X7R ceramic capacitor (0402)              | Murata GRM155R71C823K                 | KEMET C0402C823K4RAC        |                           |                              |
| 5    | C5          | 1   | 820pF±5%,50V,X7R ceramic capacitor (0402)                    | Murata GRM155R71H821K                 | KEMET C0402C821K5RAC        |                           |                              |
| 6    | C6          | 1   | 10uF±10%,16V, X7R ceramic capacitor (1206)                   | Murata GRM31CR71C106KAC7              |                             |                           |                              |
| 7    | C7          | 1   | 0.01uF±10%, 50V, X7R ceramic capacitor (0402)                | Murata GRM155R71H103KA88              | KEMET C0402C103K5RAC        |                           |                              |
| 8    | C8          | 1   | 22uF, 20%, 50V, ALUMINUM ELECTROLYTIC CAPACITOR 6.60*6.60mm, | Panasonic EEEFK1H220P                 |                             |                           |                              |
| 9    | C9          | 1   | 2.2uF±10%,50V, X7R ceramic capacitor (1206)                  | Murata GRM31CR71H225KA88              | TAIYO YUDEN<br>UMK316B7225K |                           |                              |
| 10   | C10         | 1   | 1000pF±10%, 1500V, X7R ceramic capacitor (1206)              | AVX 1206SC102KAT                      |                             |                           |                              |
| 11   | D1          | 1   | 100V/1A, PowerDI®123                                         | Diode Inc. DFLS1100-7                 |                             |                           |                              |
| 12   | J1          | 1   | 3-pin headers                                                | SULLINS ELECTRONICS<br>CORP PEC03SAAN |                             |                           |                              |
| 13   | R1          | 1   | 3.01M Ohm±1% resistor (0402)                                 | VISHAY DALE<br>CRCW04023M01FK         |                             |                           |                              |
| 14   | R2          | 1   | 261K Ohm±1% resistor (0402)                                  | VISHAY DALE<br>CRCW0402261KFK         |                             |                           |                              |
| 15   | R3          | 1   | 110K Ohm±1% resistor (0402)                                  | VISHAY DALE<br>CRCW0402110KFK         |                             |                           |                              |
| 16   | R4          | 1   | 10.5kΩ ±1% resistor (0402)                                   | PANASONIC ERJ-2RKF1052                |                             |                           |                              |
| 17   | R5          | 1   | 3.74kΩ ±1% resistor (0402)                                   | PANASONIC ERJ2RKF3741                 |                             |                           |                              |
| 18   | R6          | 1   | 100kΩ ±5% resistor (0402)                                    | PANASONIC ERJ-2GEJ104X                |                             |                           |                              |
| 19   | R7          | 1   | OPEN (0402)                                                  |                                       |                             |                           |                              |

|    |     |   |                                                |                                     |  |  |  |
|----|-----|---|------------------------------------------------|-------------------------------------|--|--|--|
| 20 | R8  | 1 | 22Ω ±1% resistor (0402)                        | VISHAY DALE<br>CRCW040222R0FK       |  |  |  |
| 21 | R9  | 1 | 90.9kΩ ±1% resistor (0402)                     | PANASONIC ERJ-<br>2RKF9092X         |  |  |  |
| 22 | R10 | 1 | 10kΩ ±1% resistor (0402)                       | VISHAY DALE<br>CRCW040210K0JN       |  |  |  |
| 23 | T1  | 1 | EP10, 8-pin SMT, 80μH, 1.2A, (5-8):(4-1)=2.4:1 | WURTH ELECTRONICS INC.<br>750342860 |  |  |  |
| 24 | U1  | 1 | MAX17681 TDFN10 3*2mm Iso buck DC-DC converter | MAX17681ATB+                        |  |  |  |
| 25 | U2  | 1 | Shunt regulator SOT25                          | Diode Inc. TL431BW5                 |  |  |  |

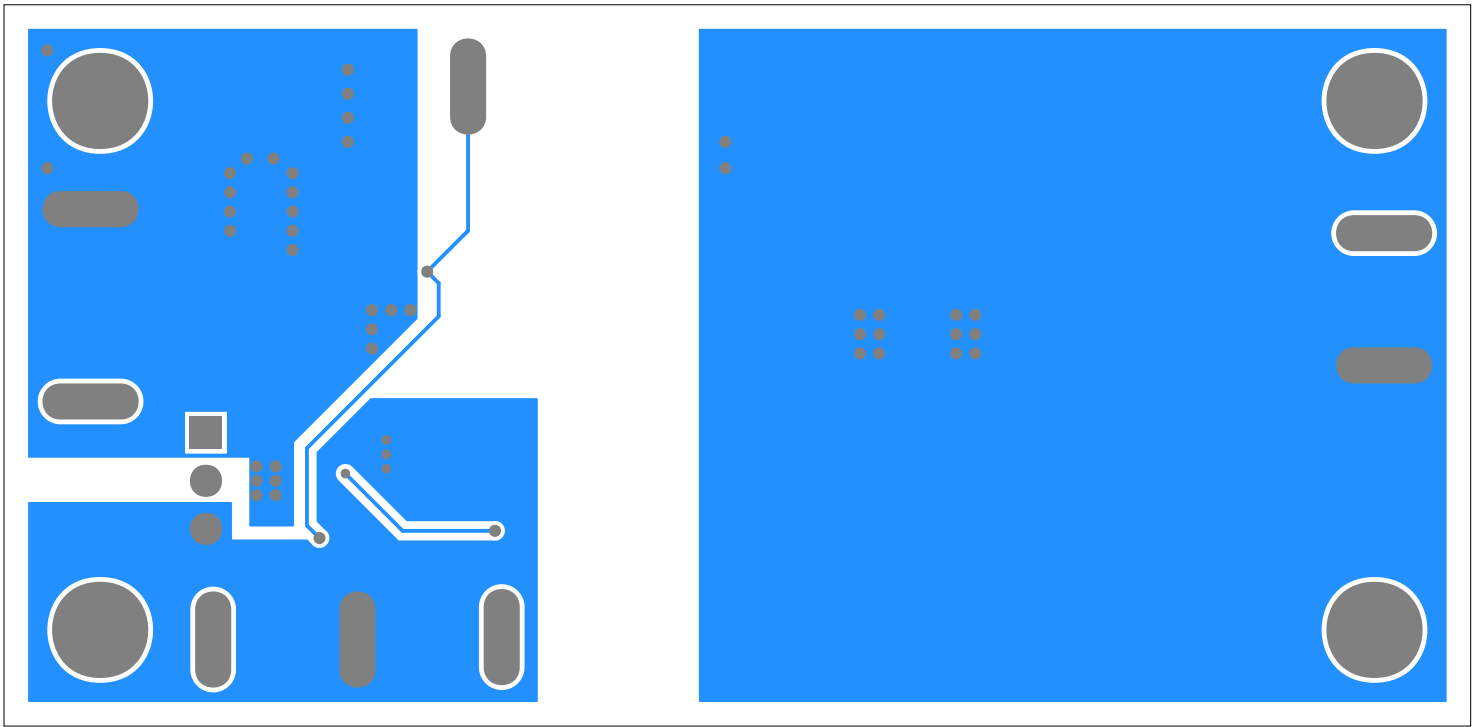


**TOP SILKSCREEN**

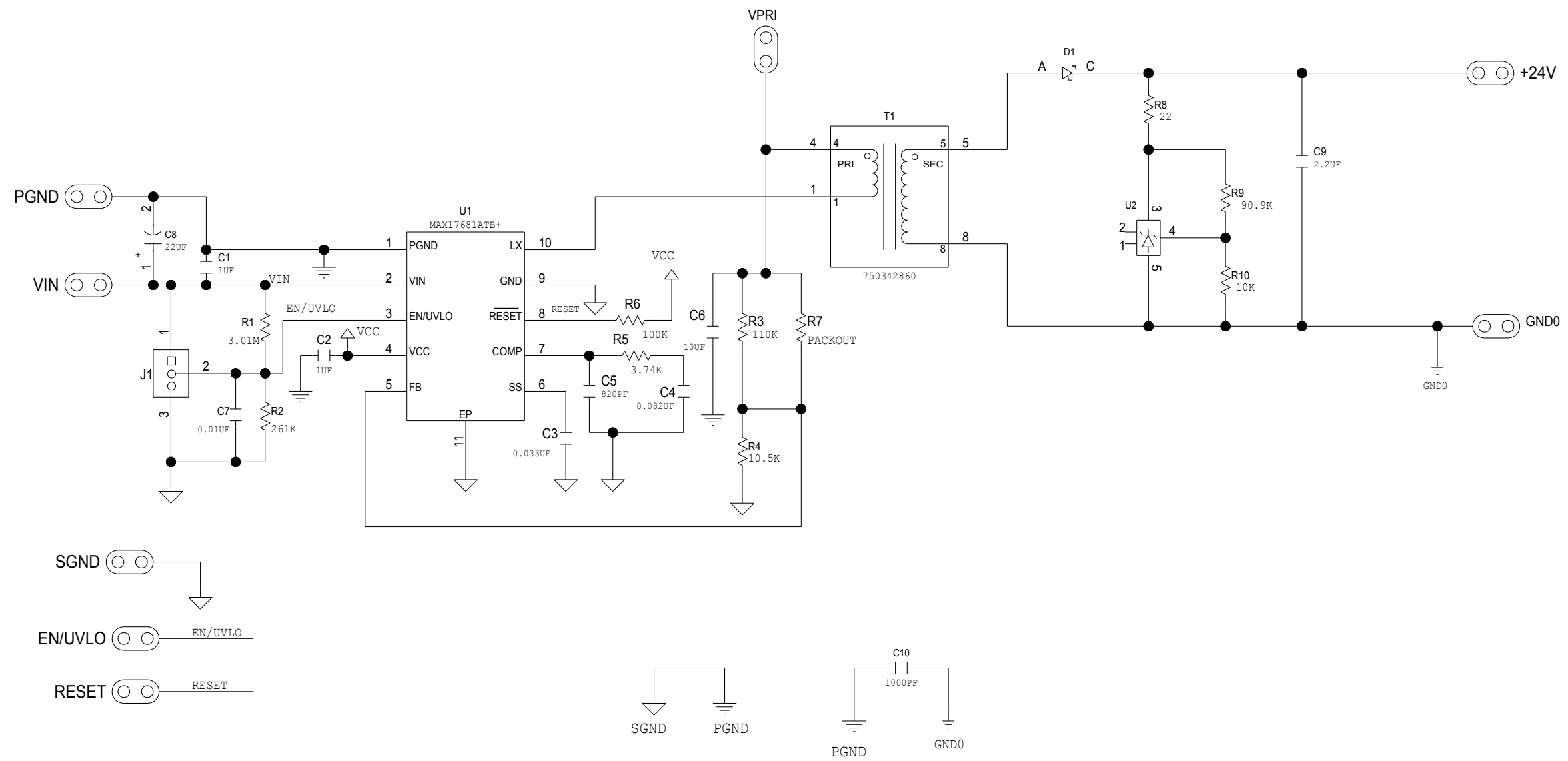




**TOP**



**BOTTOM**



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### Офис по работе с юридическими лицами:

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