

# ISL78205EVAL1Z Evaluation Board Setup Procedure

The ISL78205EVAL1Z board demonstrates the synchronous/asynchronous buck operation of the ISL78205. The board input voltage range is 3V to 40V.

The output voltage is set to 5V and can be changed by altering the feedback resistors R3 and R4. Note that to increase the output voltage, the output capacitors' voltage rating needs to be checked.

The board's output current is 2A typical. The board is set with default 3.6A OC threshold. The OC threshold can be programmed by R15 placed at the ILIMIT pin.

The ISL78205EVAL1Z board is configured as a synchronous buck and can be configured to an asynchronous buck. The board is set to a default switch frequency of 500kHz. The frequency can be programmed by R8 at the FS pin.

The board can be synchronized with an external clock. Multiple ISL78205EVAL1Z boards can be synchronized simply by connecting their SYNC pins together.

## Recommended Equipment

- 0V to 40V power supply with 3A source current
- Load capable of sinking 3A current
- Multimeters
- Oscilloscope

## Quick Start-up

Figure 1 shows the board image. Note N/A section shows unused circuits. The useful buck section is noted inside the block.

1. Connect the power source to inputs J1 (VIN+) and J2 (GND). Connect the load terminals to buck outputs J3 (VOUT+) and J4 (GND). Make sure the setup is correct prior to applying any power or load to the board.
2. Adjust the power source to 12V and turn it on.
3. Verify the output voltage is 5V and use oscilloscope to monitor the phase node waveforms through J28.

## Asynchronous Buck Configuration

To configure the board to asynchronous buck, remove R19 and change R20 (on bottom of the board) to 0Ω to ensure Q6 is securely off.

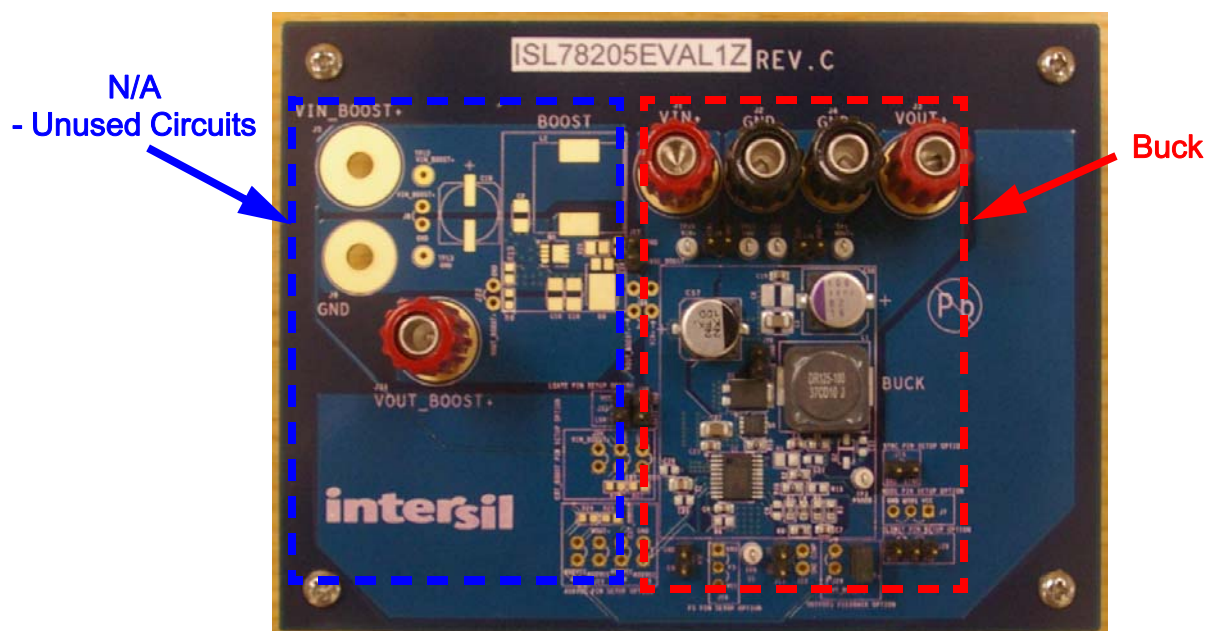


FIGURE 1. ISL78205EVAL1Z BOARD IMAGE

# Application Note 1769

**TABLE 1. CONNECTORS/TEST POINTS DESCRIPTIONS**

|          |   |
|----------|---|
| J1       | VIN+, positive terminal of buck inputs.   |
| J2       | GND, ground terminal of buck inputs.  |
| J3       | VOUT+, positive terminal of buck outputs.   |
| J4       | GND, ground terminal of buck outputs.   |
| J5       | N/A. Left open.   |
| J6       | N/A. Left open.   |
| J7       | N/A. Left open.   |
| J8       | N/A. Left open.   |
| J9       | Test points to monitor buck input. Monitoring purpose only and don't short it with jumper.  |
| J10      | N/A. Left open.   |
| J11      | N/A. Left open.   |
| J12      | N/A. Left open.   |
| J13      | N/A. Left open.   |
| J14      | Use this connector to control IC ON/OFF.  |
| J15      | Test points to monitor the FB pin. Monitoring purpose only and don't short it with jumper.  |
| J16      | Use it to set up switching frequency. With FS pin connected to VCC or GND, or left open, the IC has default 500kHz frequency. R8 is a placeholder for a resistor to program frequency.                            |
| J17      | N/A. Left open.   |
| J18      | Use it to configure synchronization.<br>Option 1: to apply external clock for the IC to be synchronized with.<br>Option 2: to synchronize multiple ISL78205, simply connect those SYNC pins together.             |
| J22      | N/A. Left open.   |
| J23      | Test points to monitor the COMP pin. Monitoring purpose only and don't short it with jumper.  |
| J24      | N/A. Left open.   |
| J25      | Must short it with jumper to provide output feedback connection.  |
| J26, J27 | N/A. Left open.   |
| J28      | Test points to monitor the buck PHASE node waveforms. For monitoring purposes only. Do Not short with jumper.   |
| J29      | Use it to set up the overcurrent limit threshold. With ILIMIT pin connected to VCC or GND or left open, the IC has default of 3.6A OC threshold. R15 is a placeholder for a resistor to program the OC threshold. |
| J30, J34 | N/A. Left open.   |
| J31      | N/A. Left open.   |
| J32      | Test points to monitor the LGATE. For monitoring purposes only. Do Not short with jumper.   |
| J33      | For asynchronous buck configuration, short with jumper before IC startup will disable the low-side driver after IC startup.   |
| J35      | N/A. Left open.   |
| J36      | Test points to monitor the buck output voltage. For monitoring purposes only. Do Not short with jumper.   |

# ISL78205EVAL1Z Schematic

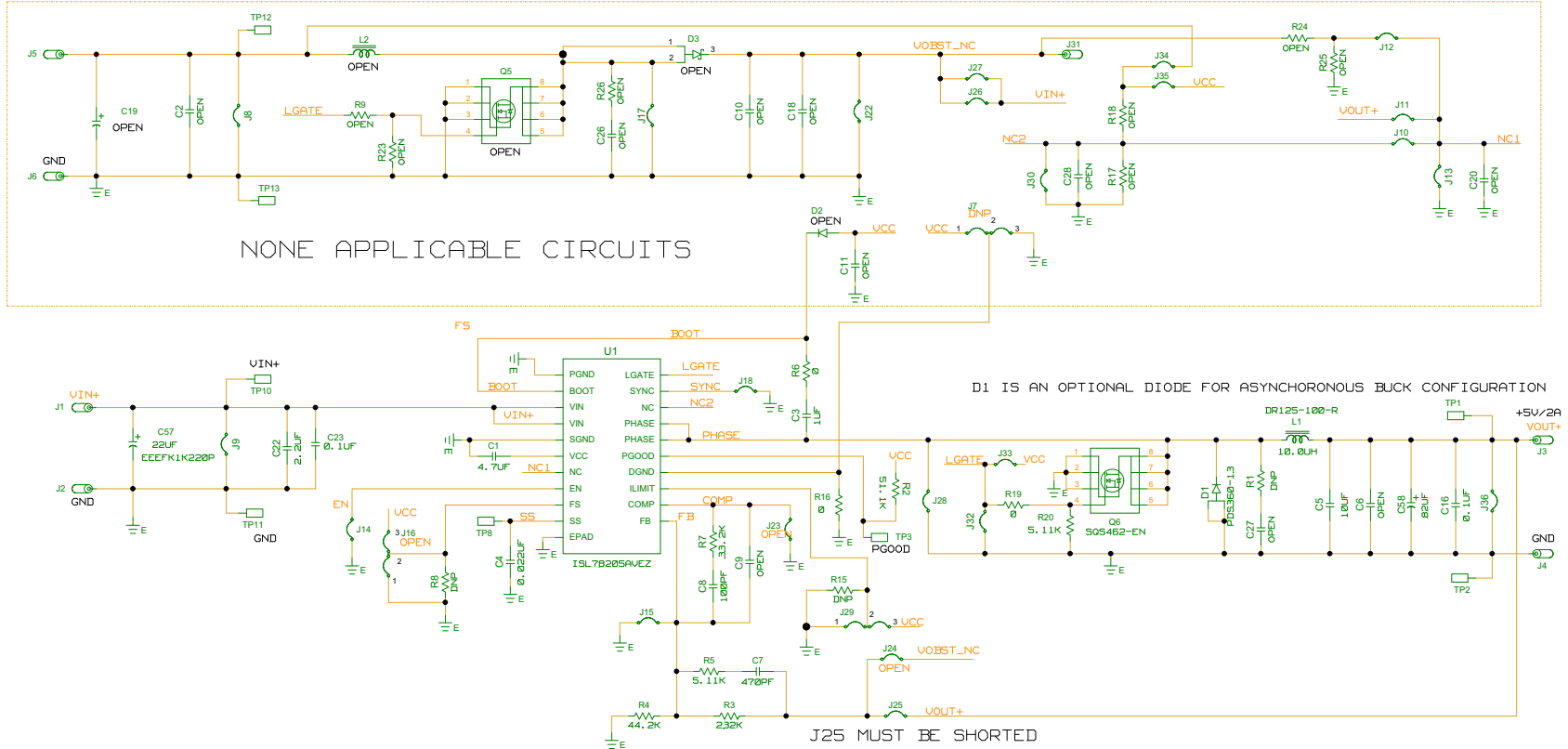


FIGURE 2. ISL78205EVAL1Z BOARD SCHEMATIC

# Application Note 1769

TABLE 1. BILL OF MATERIALS

| REF DES                                      | PART NUMBER            | QTY | DESCRIPTION  | MANUFACTURER       |
|--|------------------------|-----|--|--------------------|
| C3   | C1608X7R1C105K         | 1   | CAP, SMD, 0603, 1.0µF, 16V, 10%, X7R, ROHS             | TDK                |
| C57  | EEE-FK1K220P           | 1   | CAP, SMD, 8X10.2, 22µF, 80V, 20%, ALUM.ELEC., ROHS     | PANASONIC          |
| C1   | GRM21BR71A475KA<br>73L | 1   | CAP, SMD, 0805, 4.7µF, 10V, 10%, X7R, ROHS             | MURATA             |
| C18, C22                                     | GRM31CR71H225KA<br>88L | 2   | CAP, SMD, 1206, 2.2µF, 50V, 10%, X7R, ROHS             | MURATA             |
| C8   | VARIOUS                | 1   | CAP, SMD, 0603, 100pF, 50V, 5%, C0G, ROHS              | VARIOUS            |
| C16, C23                                     | VARIOUS                | 2   | CAP, SMD, 0603, 0.1µF, 50V, 10%, X7R, ROHS             | VARIOUS            |
| C4   | VARIOUS                | 1   | CAP, SMD, 0603, 0.022µF, 16V, 10%, X7R, ROHS           | VARIOUS            |
| C7   | C0603X7R500-<br>471KNE | 1   | CAP, SMD, 0603, 470pF, 50V, 10%, X7R, ROHS             | VENKEL             |
| C2, C9, C11, C18, C19,<br>C20, C26, C27, C28 | N/A                    | 0   | CAP, SMD, 0603, DNP-PLACE HOLDER, ROHS                 | N/A                |
| C5   | VARIOUS                | 1   | CAP, SMD, 1206, 10µF, 16V, 10%, X5R, ROHS              | VENKEL             |
| C10  | N/A                    | 0   | CAP, SMD, 1206, DNP-PLACE HOLDER, ROHS                 | N/A                |
| C6   | N/A                    | 0   | CAP, SMD, 1210, DNP-PLACE HOLDER, ROHS                 | N/A                |
| C58  | 16SVPD82M              | 1   | CAP-OSCON, SMD, 6.9x8.3, 82µF, 16V, 20%, 40mΩ, ROHS    | SANYO              |
| L1   | DR125-100-R            | 1   | COIL-PWR INDUCTOR, SMD, 12.5mm, 10µH, 20%, 5.35A, ROHS | COOPER/COILTRONICS |
| D1   | PDS360                 | 1   | DIODE-SCHOTTKY RECTIFIER, SMD, SMPC, 50V, 3A, ROHS     | DIODES             |
| U1   | ISL78205AVEZ           | 1   | IC-2.5A BUCK CONTROLLER, 20P, HTSSOP, ROHS             | INTERSIL           |
| Q6   | SQS462EN-T1-GE3        | 1   | TRANSISTOR-MOS, N-CHANNEL, 8P, PWRPAK, 60V, 8A, ROHS   | VISHAY             |
| R6, R16, R19                                 | VARIOUS                | 3   | RES, SMD, 0603, 0Ω, 1/10W, ROHS                        | VARIOUS            |
| R3   | VARIOUS                | 1   | RES, SMD, 0603, 232k, 1/10W, 1%, ROHS                  | VARIOUS            |
| R7   | VARIOUS                | 1   | RES, SMD, 0603, 33.2k, 1/10W, 1%, ROHS                 | VARIOUS            |
| R4   | VARIOUS                | 1   | RES, SMD, 0603, 44.2k, 1/10W, 1%, ROHS                 | VARIOUS            |
| R5, R20                                      | VARIOUS                | 2   | RES, SMD, 0603, 5.11k, 1/10W, 1%, ROHS                 | VARIOUS            |
| R2   | VARIOUS                | 1   | RES, SMD, 0603, 51.1k, 1/10W, 1%, ROHS                 | VARIOUS            |
| R8, R9, R15, R17, R18,<br>R23, R24, R25      | N/A                    | 0   | RES, SMD, 0603, DNP-PLACE HOLDER, ROHS                 | N/A                |
| R1, R26                                      | N/A                    | 0   | RES, SMD, 0805, DNP-PLACE HOLDER, ROHS                 | N/A                |
| D2, D3                                       | N/A                    | 0   | DO NOT POPULATE OR PURCHASE                            | N/A                |
| L2   | N/A                    | 0   | DO NOT POPULATE OR PURCHASE                            | N/A                |
| Q5   | N/A                    | 0   | DO NOT POPULATE OR PURCHASE                            | N/A                |
| C3   | C1608X7R1C105K         | 1   | CAP, SMD, 0603, 1.0µF, 16V, 10%, X7R, ROHS             | TDK                |
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# ISL78205EVAL1Z Board Layout

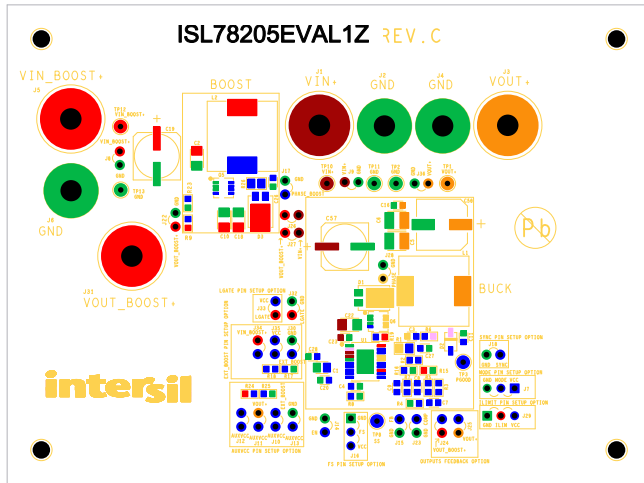


FIGURE 1. TOP COMPONENTS SILKSCREEN

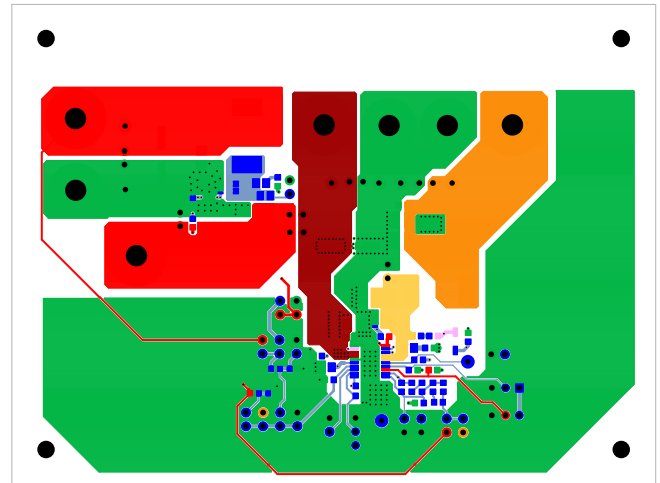


FIGURE 2. TOP LAYER

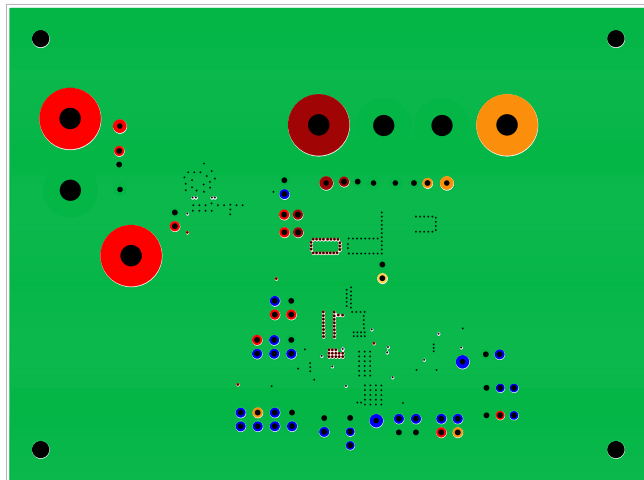


FIGURE 3. 2<sup>nd</sup> LAYER

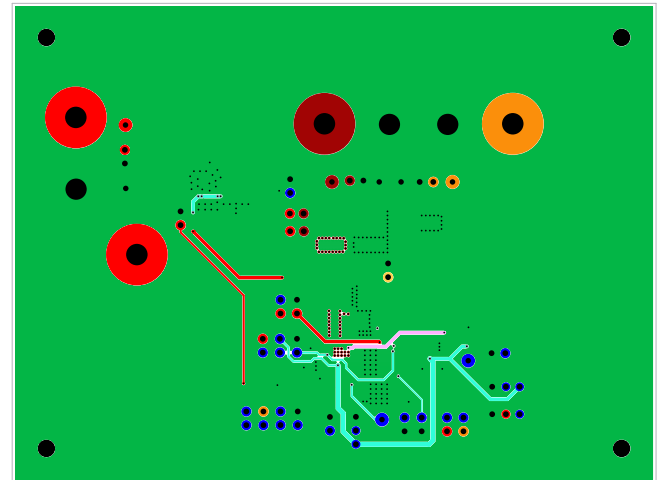


FIGURE 4. 3<sup>rd</sup> LAYER

## ISL78205EVAL1Z Board Layout (Continued)

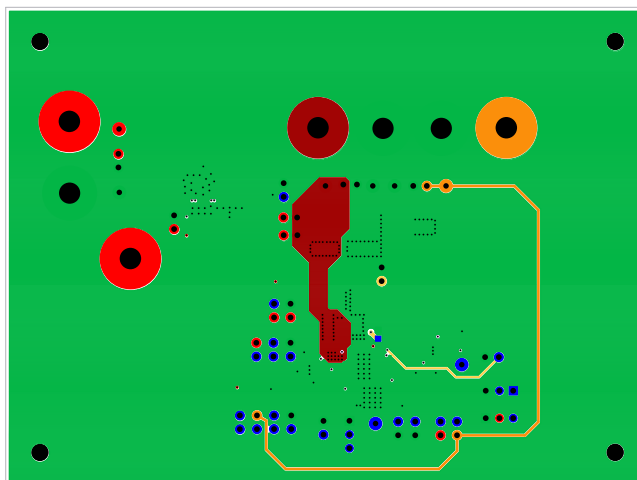


FIGURE 5. BOTTOM LAYER

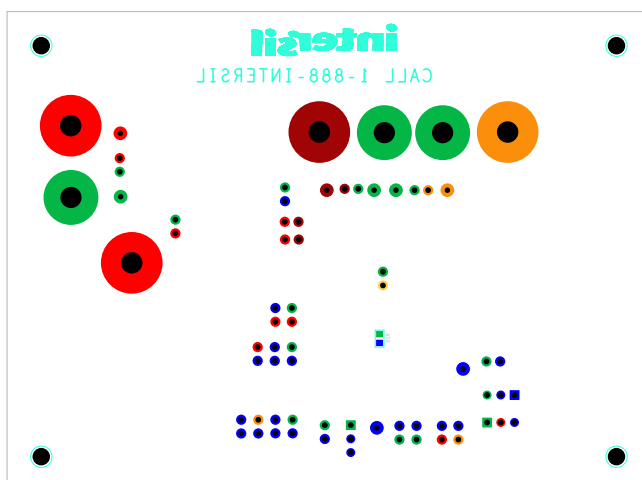


FIGURE 6. BOTTOM COMPONENTS SILKSCREEN

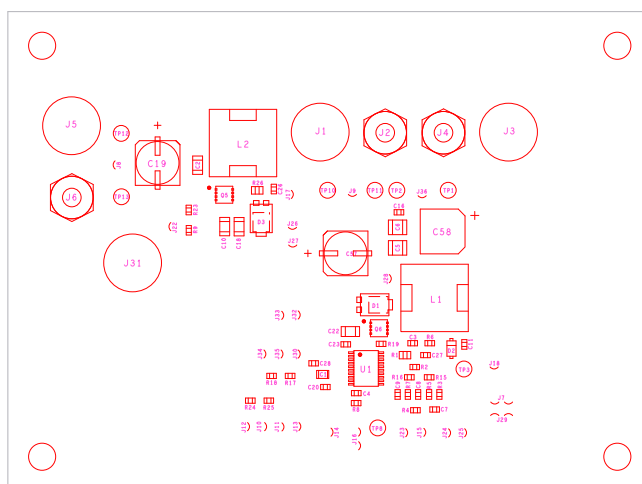


FIGURE 7. TOP COMPONENT ASSEMBLY

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