LP5910YKA EVM User Guide

1 Introduction

The Texas Instruments LP5910YKA evaluation module (EVM) helps designers evaluate the operation and performance of the LP5910 LDO voltage regulator. The LP5910YKA EVM contains one LP5910 LDO voltage regulator in the DSBGA / YKA package (see Table 1).

Table 1. Device Information

EVM ORDERABLE NUMBER	OUTPUT VOLTAGE	PART NAME	PACKAGE
LP5910YK18AEVM	1.8 V	LP5910-1.8YKAR	4-pin YKA (DSBGA)

2 Setup

This section describes the jumpers and connectors on the EVM as well and how to properly connect, set up and use the LP5910YKA EVM.

The device has been designed to work with 1-µF input and output ceramic capacitors down to 0402 component size.

2.1 Input/Output Connector Descriptions

VIN and **GNDIN** are the connection terminals for the input supply. The VIN terminal is the positive connection, and the GNDIN terminal is the negative (ground) connection.

VOUT and **GNDOUT** are the connection terminals for the output load. The VOUT terminal is the positive connection, and the GNDOUT terminal is the negative (ground) connection.

GND_EN_IN is a 3-pin terminal used to enable, or disable, the LP5910.

When the shunt is across EN_IN terminal pins the the Enable (EN) pin is directly connected to VIN. The LP5910 will be enabled when VIN is applied.

When the shunt is across the GND_IN terminal pins the EN pin is connected directly to GND. The LP5910 will be disabled.

The shunt must be in place, or the EN terminal pin must be driven by an off-board supply, otherwise the LP5910 EN pin is floating, and the EN status my be undefined. The default, and recommended, shunt position is across the EN_IN terminal pins (enabled).

Figure 1. EN Jumper Settings

2.2 Setup

The recommended operating input voltage range for the LP5910YKA EVM is V_{OUT} + 0.5 V (minimum) to 3.3 V (maximum).

A load should be applied between the VOUT terminal and the GNDOUT terminal for proper operation. Load current should be maintained between 1 mA and 300 mA.

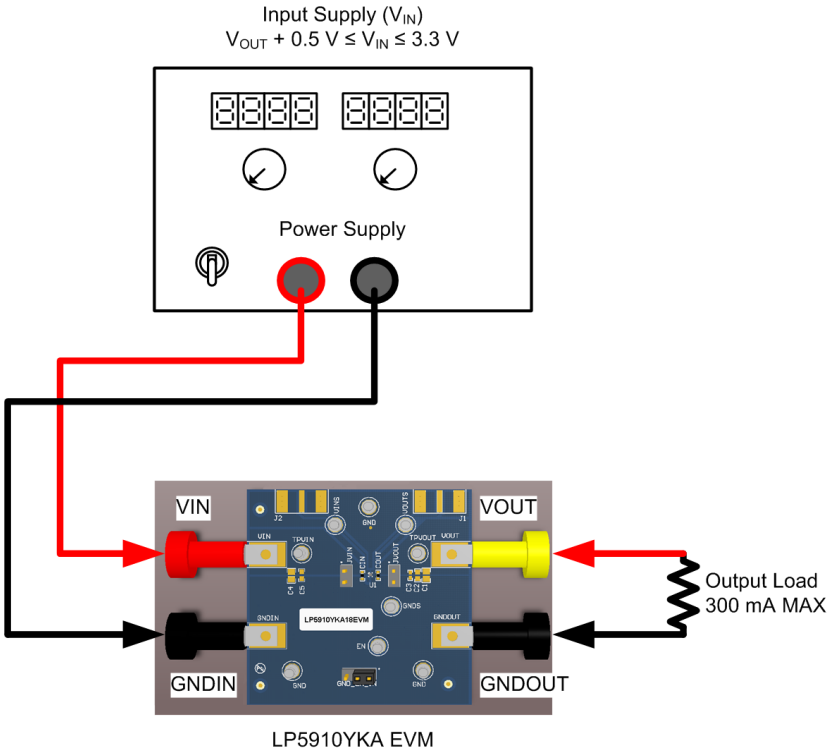


Figure 2. LP5910YKA EVM Setup

2.3 Operation

For proper operation of the LP5910YKA EVM, the jumper terminals should be properly configured. The default, and recommended, jumper setting is:

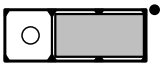


Figure 3. Jumper Settings

GND_EN_IN shunt across the EN_IN terminal pins.

In this configuration, the device will power up when power is applied at the VIN terminal.

2.4 Options

The LP5910YKA EVM has some assorted unpopulated footprints that some users may find useful:

- Footprint for optional input capacitors at C4 (0805), and C5 (0603).
- Footprints for optional output capacitors at C1 (0805), C2 (0603), and C3 (0402)
- Footprints for optional end launch SMA connectors (Emerson 142-0701-851, or equivalent) at VIN (J2) and VOUT (J1) for noise or PSRR testing.

3 Board Layout

Figure 4 through Figure 9 show the board layout for the LP5910YKA EVM PCB. The EVM offers a jumper terminal to program the EN pin status, and spare footprints for assorted capacitors for the input and output.

The LP5910 will dissipate power. The 4-pin YKA (DSBGA) package does not offer any exposed thermal pad. Careful consideration should be given to the power dissipated in the package to prevent the device temperature from exceeding the recommended operating junction temperature.

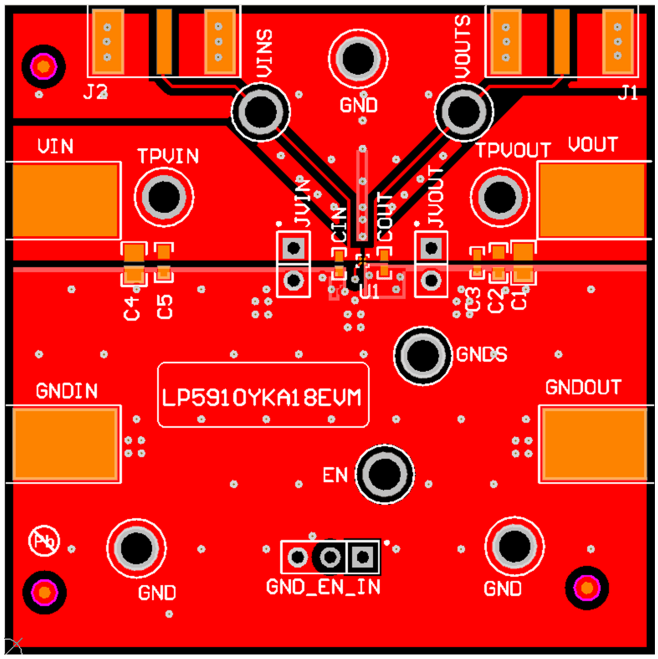


Figure 4. Top Assembly Layer and Silk-Screen

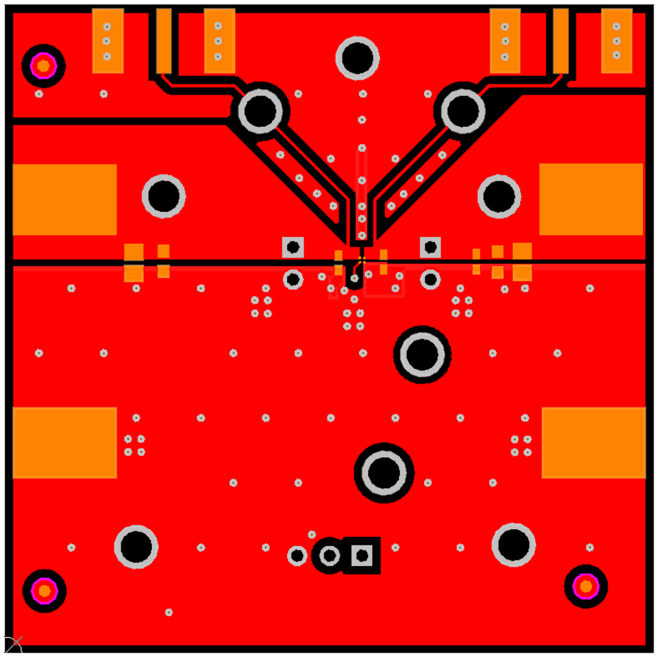


Figure 5. Top-Layer Routing

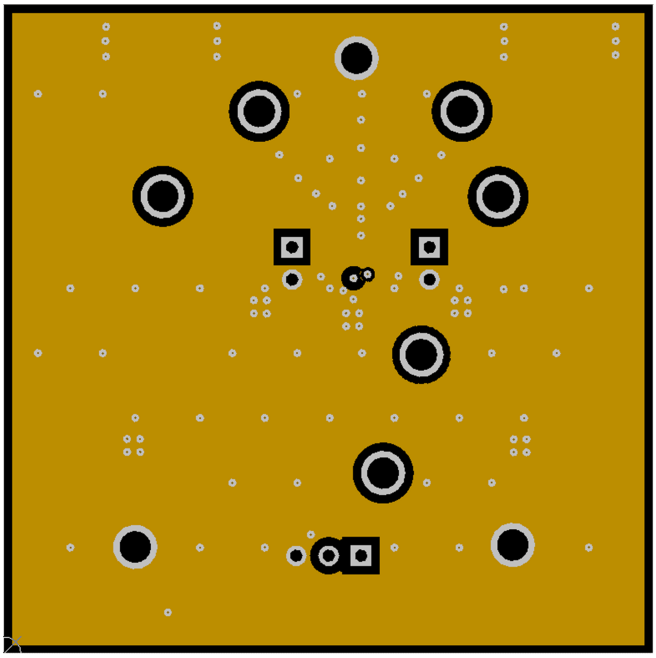


Figure 6. Layer 2: GND Plane

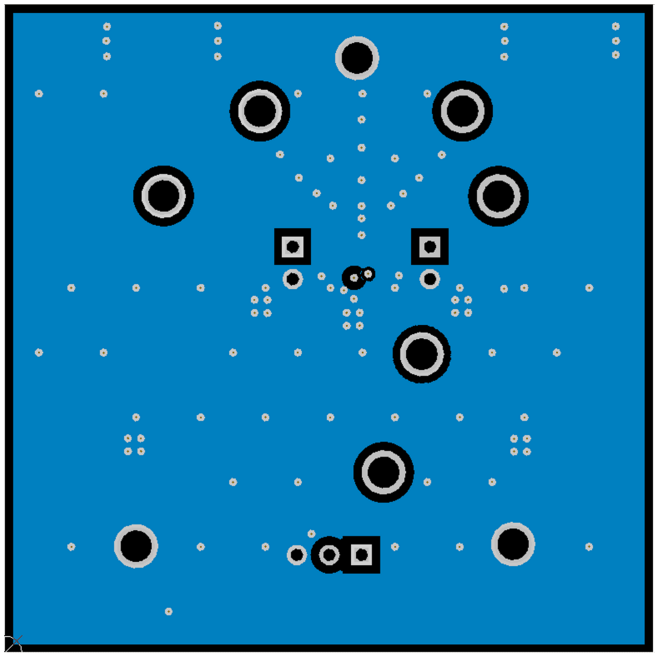


Figure 7. Layer 3: GND Plane

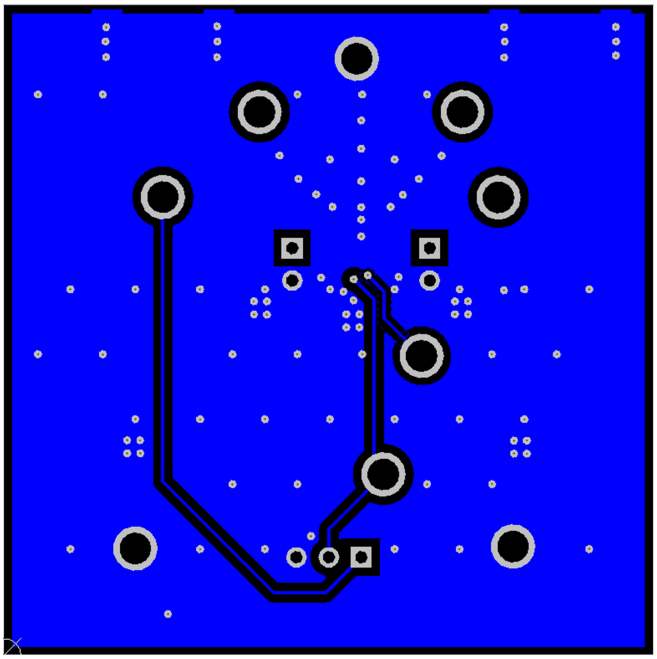


Figure 8. Bottom-Layer Routing

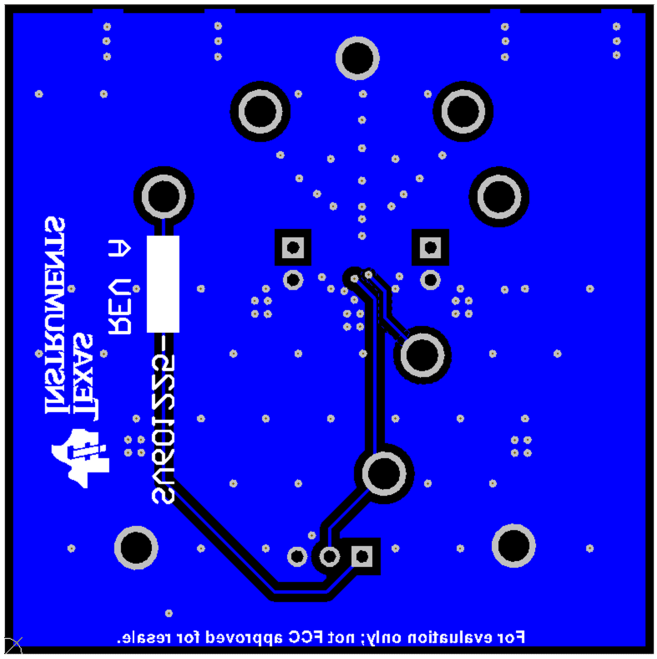
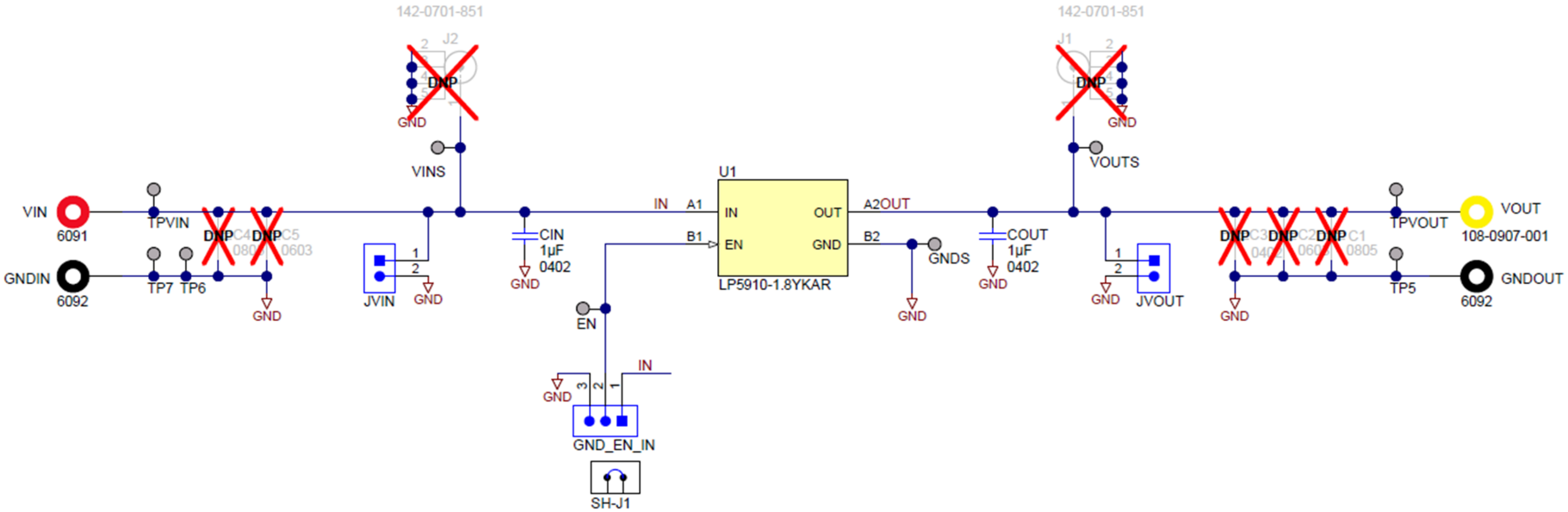


Figure 9. Bottom Assembly Layer and Silk-Screen

4 LP5910YKAEVM Schematic



5 Bill of Materials

DESCRIPTION	DESIGNATOR	PART NUMBER	MFR	QUANTITY
Capacitor: Ceramic, 1 µF, 10%, 10 V, X5R, 0402	CIN, COUT	GRM155R61A105KE15D	Murata	2
Terminal, Turret, TH, Double	EN, GNDS, TP5, TP6, TP7, TPVIN, TPVOUT, VINS, VOUTS	1502-2	Keystone	9
Standard Banana Jack, Insulated, Black	GNDIN, GNDOUT	6092	Keystone	2
Standard Banana Jack, Insulated, Red	VIN	6091	Keystone	1
Standard Banana Jack, Insulated, Yellow	VOUT	108-0907-001	Cinch	1
Header, 2-pin, 100-mil spacing	JVIN, JVOUT	HTSW-102-07-G-S	Samtec	2
Header, 3-pin, 100-mil spacing	GND_EN_IN	HTSW-103-07-G-S	Samtec	1
Shunt, 100 mil, Gold plated, Black	SH-J1	SNT-100-BK-G	Samtec	1
Ultra Low-Noise, 300-mA Linear Regulator for RF and Analog Circuits, Requires No Bypass Capacitor	U1	LP5910-1.8YKAR	TI	1
PCB, 2 inch × 2 inch × 0.062	LP5910YKA EVM PCB	SV601225A	TI	1

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

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Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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