User's Guide
June 2009

SN65LVCP408_418 EVM

ABSTRACT

The SN65LVCP408 is a 8x8 non-blocking crosspoint switch with each output driver including a 8:1 multiplexer allowing any input to be routed to any output. The SN65LVCP418 is a 8x8 signal conditioning buffer that does not have a multiplexer. On both parts, a flow-through pin-out allows for ease in PCB layout. VML signaling is used for the SN65LVCP408 and SN65LVCP418 to achieve a high-speed data throughput while using low power. Both parts' internal signal paths are fully differential to achieve high signaling speeds while maintaining low signal skews. The SN65LVCP408 and SN65LVCP418 incorporate 100-Ω termination resistors for applications where board space is a premium. Transmit pre-emphasis and receive equalization are built in, enabling superior signal integrity performance.

The SN65LVCP408 and SN65LVCP418 are characterized for operation from -40°C to 85°C.

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Introduction

The SN65LVCP408 is a 8x8 non-blocking crosspoint switch with a 8:1 multiplexer. The SN65LVCP418 is a 8x8 signal conditioning buffer. This guide describes the construction and usage of the EVM for the SN65LVCP408 and SN65LVCP418. The EVM is meant to serve as an evaluation tool for the SN65LVCP408 and SN65LVCP418.

SN65LVCP408_418 Evaluation Module Configuration

SN65LVCP408_418 EVM Kit Contents

This EVM kit should contain the following items:

- SN65LVCP408_418 EVM board
- This user's manual
- USB to I2C adapter

Description of EVM Board

The SN65LVCP408_418 EVM's are designed to provide easy evaluation of the SN65LVCP408_418 devices.

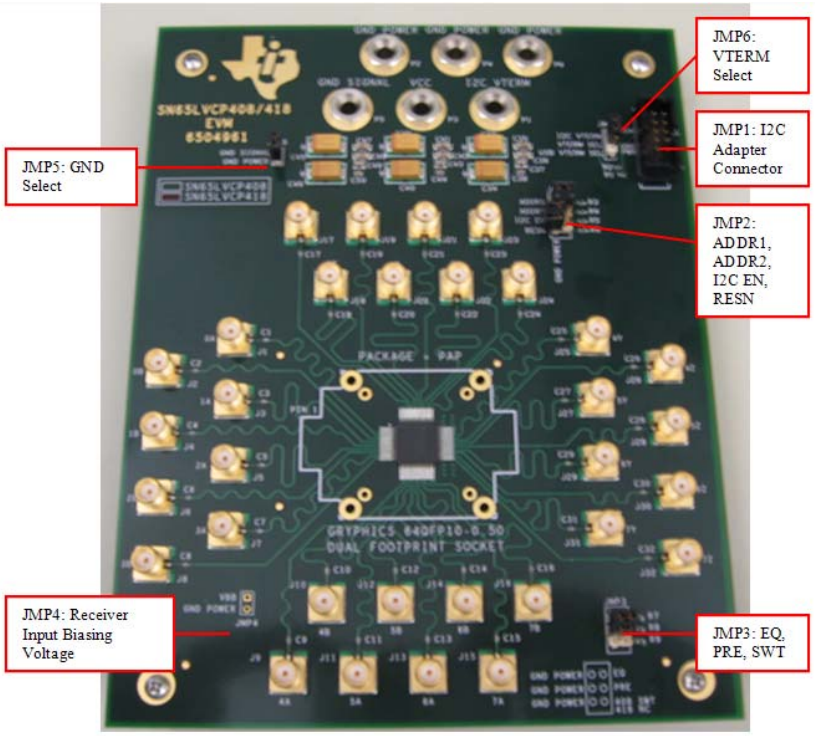

Figure 1. SN65LVCP408_418 EVM Jumper Location

Jumper Number/ Switch	Functionality
JMP1	I2C Adapter Connector
JMP2	ADDR1/2, I2C_EN, RESN (I2C_EN open for enable, RESN jumpered for I2C reset)
JMP3	EQ, PRE, SWT (EQ open for 9dB, jumpered for 13dB; PRE open for 6dB, jumpered for 0dB)
JMP4 (Not Installed)	Reciever Input Biasing Voltage
JMP5	GND Select (Jumpered for SIG_GND tied to DUT_GND)
JMP6	VTERM Select

Table 1. Jumper Functionality

The power supply required for this EVM is a +3.3V DC power supply. Banana-jack cables need to be used. The output voltage of the power supply should be within the range of +3.0V to +3.6V.

USB Interface Adapter EVM

The SN65LVCP408_418 EVM has two modes of control: GPIO control by setting jumpers on the EVM or local I2C control through the USB Interface Adapter EVM. This section gives a brief description on the operation of the USB Interface Adapter. For a detailed description of the adapter EVM, including GUI, schematics, firmware, and etc, please refer to literature number SLLU093 on TI's website.

Before using the USB Interface Adapter, please have the following item ready:

1. Download and extract the USB Interface Adapter Software from TI's website to a PC with Windows XP.
2. Connect the 10 Pin ribbon cable to the I/O port of the USB adapter, and connect the mini-B side of the USB cable to the USB port of the USB adapter. Refer to 0 or SLLU093 for detailed illustration.

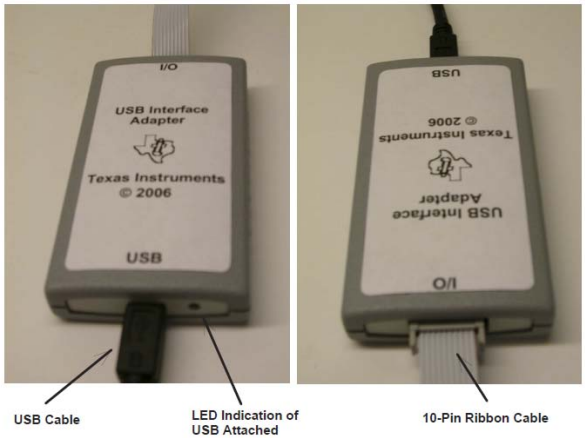

Figure 2. Connection of Adapter, USB Cable, and Ribbon Cable

In order to use local I2C to control the SN65LVCP408_418 EVM, please follow the instructions below:

1. Plug USB Adapter to the PC
2. Start USB SAA GUI.exe on the PC
3. Strap JMP6 to 1-2 to select I2C Mode
4. Connect the 10 pin ribbon cable from the USB adapter to the SN65LVCP408_418 EVM

1. *Plug USB adapter to the PC*

   The adapter is powered through PC's USB port, and the PC should recognize the USB interface adapter as a generic "Human Interface Device." To access the status, go to Start>Control Panel>System. Click on the "Hardware" tab and click on the "Device Manager" button.

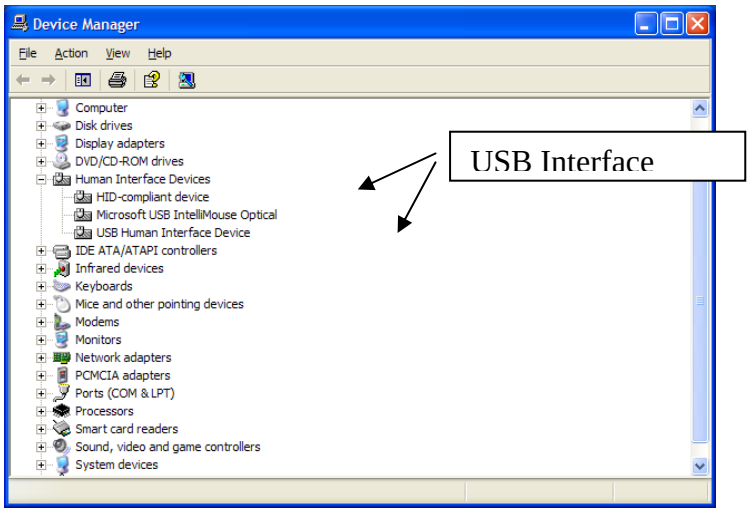

Figure 3. USB Adapter Status in Windows XP Device Manager

2. *Start "USB SAA GUI.exe" on the PC.*

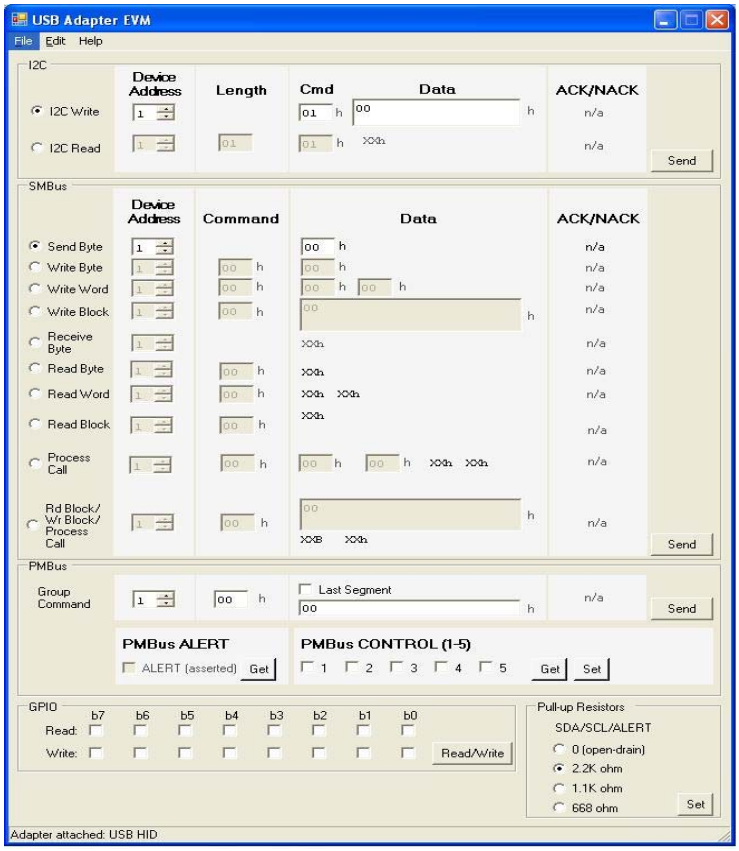

Figure 4. USB Interface Adapter GUI

3. *Strap 1-2 on JMP6 to enable local I2C control.*
4. *Connect the 10-pin ribbon cable from the USB adapter to the SN65LVCP408_418 EVM.*

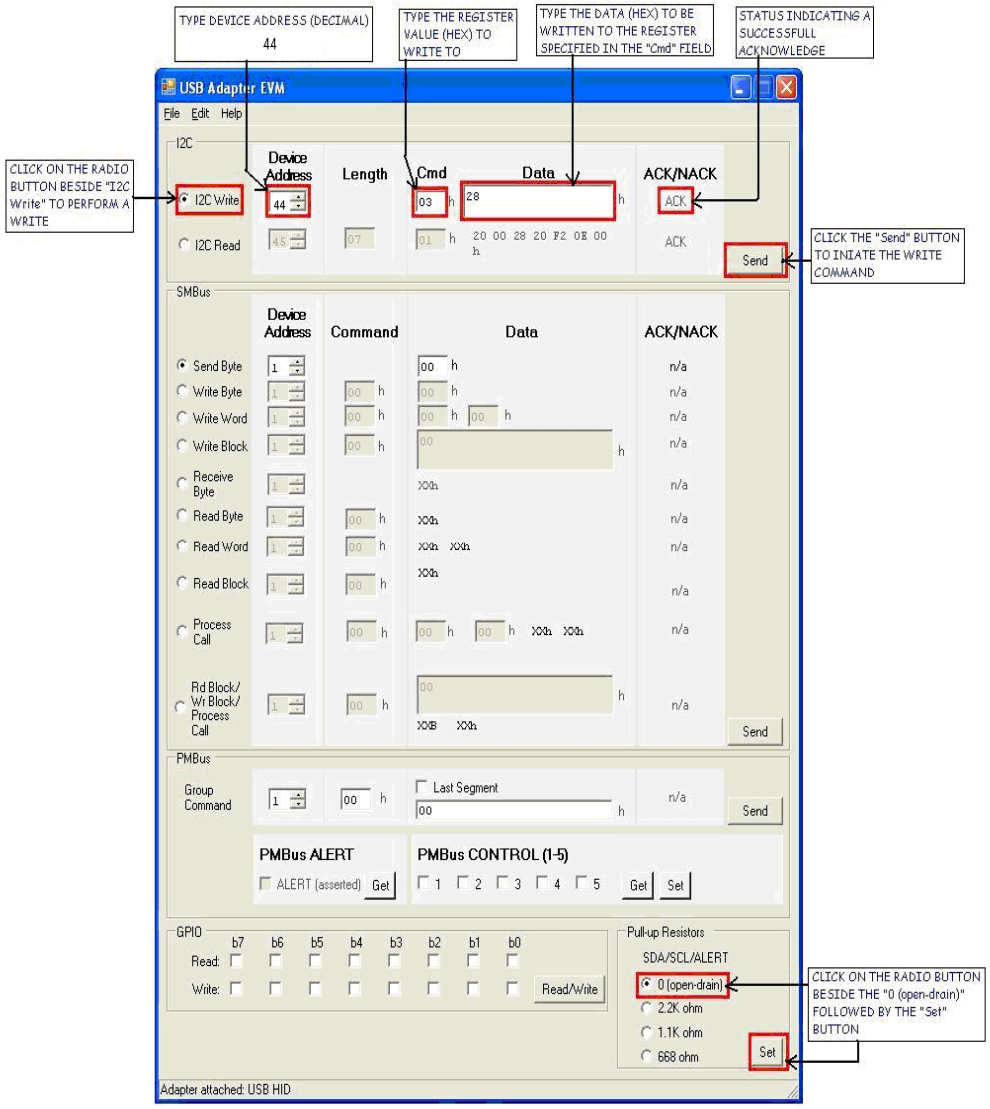

Figure 5. I2C Portion of the Adapter GUI (Write Mode)

To program SN65LVCP408_418 EVM would only require the I2C portion of the GUI (refer to Figure 5 for illustration). ***To write to one of the SN65LVCP408_18 registers***, click on "*I2C Write*". The "*Device Address*" is the Local I2C Address of the SN65LVCP408_418, which is adjustable between 44 and 47 (decimal) via jumpering the ADDR1 and ADDR2 pins. The "*Cmd*" refers to the register number to write to. Kindly refer to the register map in the SN65LVCP408 and SN65LVCP418 datasheets. Input the command you would like to write to in hexadecimal form to the "*Data*" section and click "*Send*." The GUI should show "*ACK*" to show that the command is acknowledged.

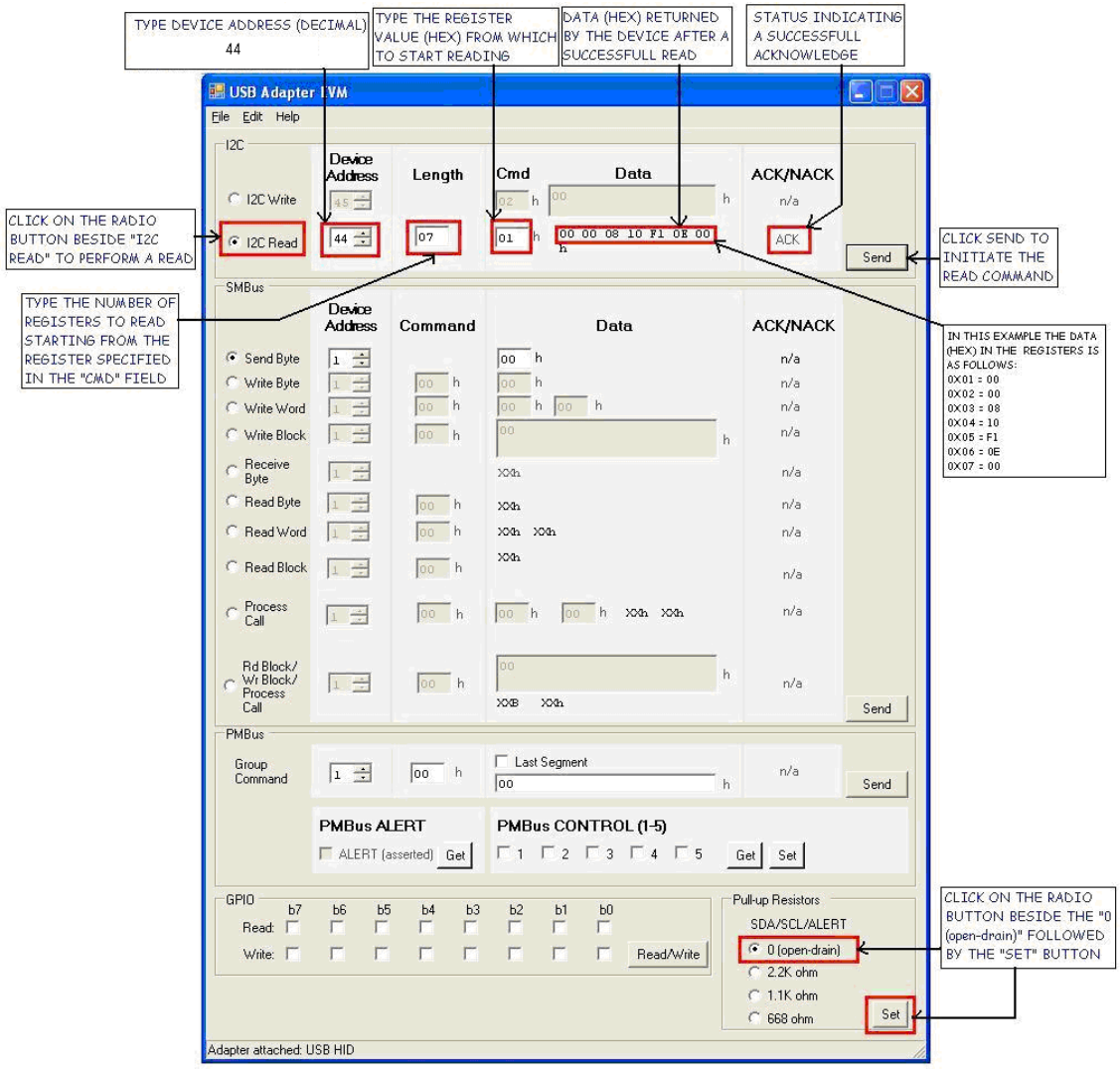

Figure 6. I2C Portion of the Adapter GUI (Read Mode)

To read one of the SN65LVCP408_418 registers, click on "*I2C Read*" and input the proper Local I2C Address (refer to 06 for illustration). The "*Length*" section will give you the number of registers to read starting from register value you input to the "*Cmd*". To read a particular register, set "*Length*" to be 1 and set "*Cmd*" to be the register you want to start the read in hexadecimal format. To read the entire 7 registers of the SN65LVCP408_418, set "*Length*" to be 7 and set "*Cmd*" to be register 0x01h.

PCB Construction

This section discusses the construction of the EVM boards. It includes the board schematics and Gerber files to show how the board was built.

SN65DPLVCP408_418 EVM Board Schematics

This section shows the board schematic sheets for the EVM.

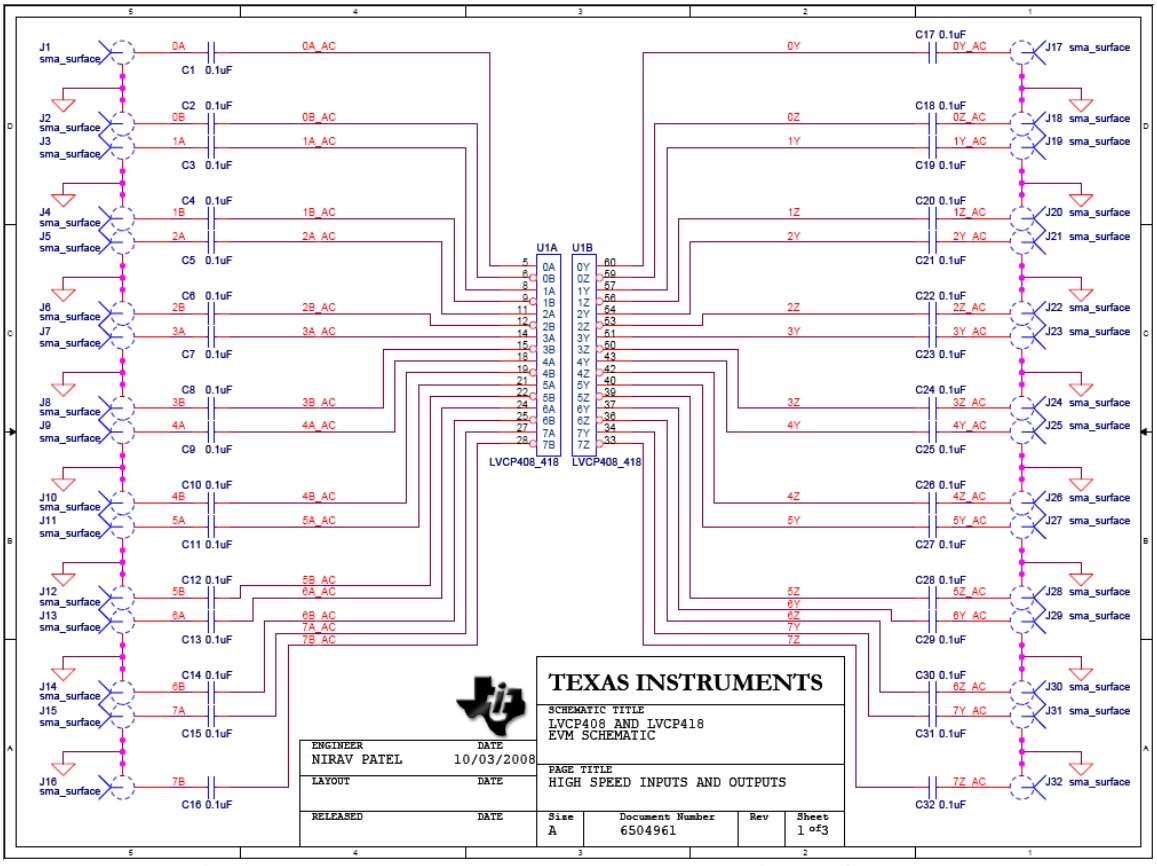

Figure 7. SN65LVCP408_418 EVM Schematic Page 1

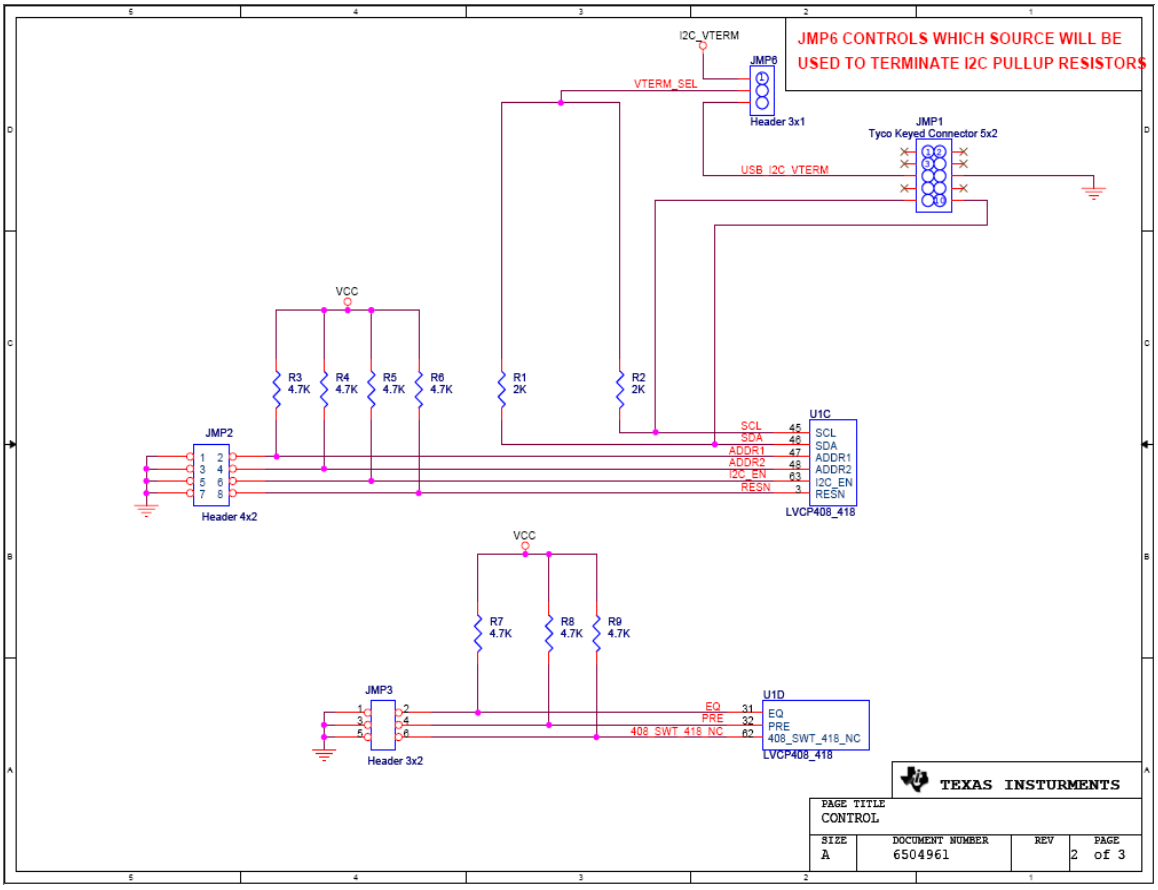

Figure 8. SN65LVCP408_418 EVM Schematic Page 2

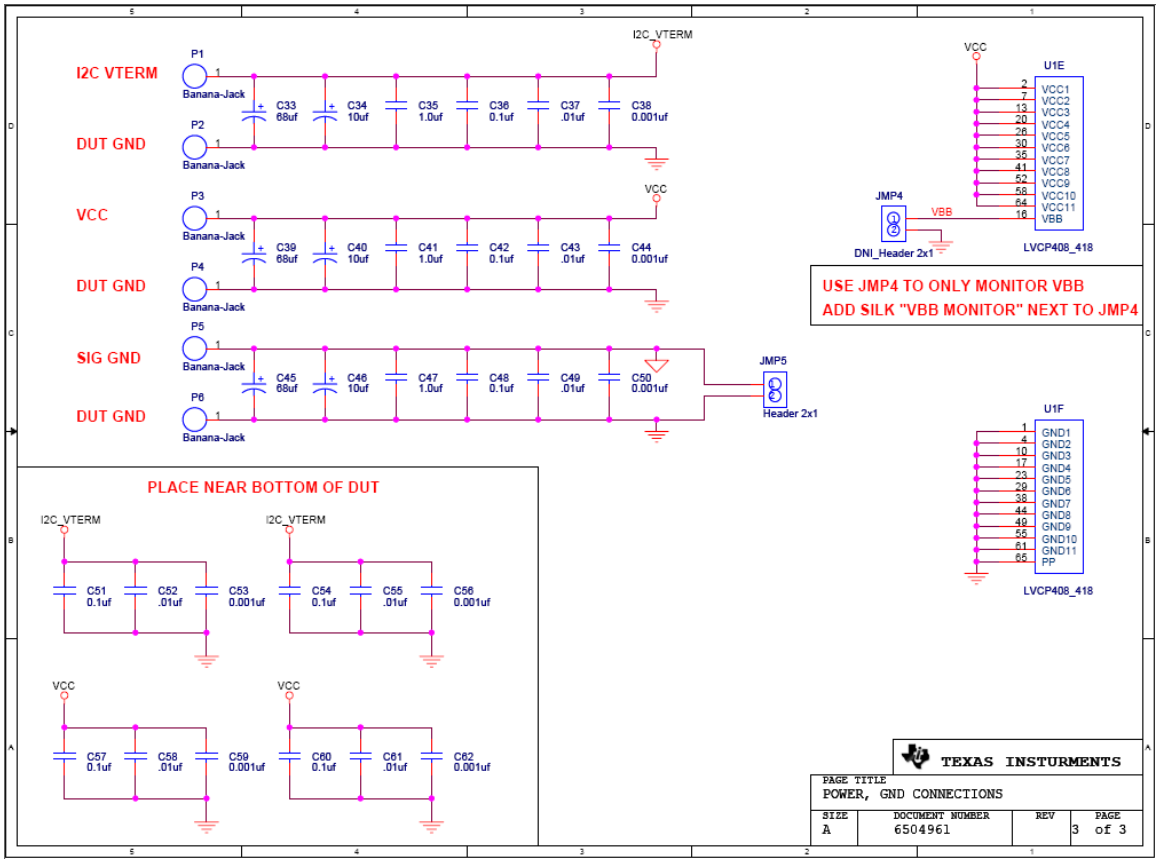

Figure 9. SN65LVCP408_418 EVM Schematic Page 3

SN65LVCP408_418 EVM Board Layout

This EVM was designed to show the implementation of these devices on a 6-layer board.

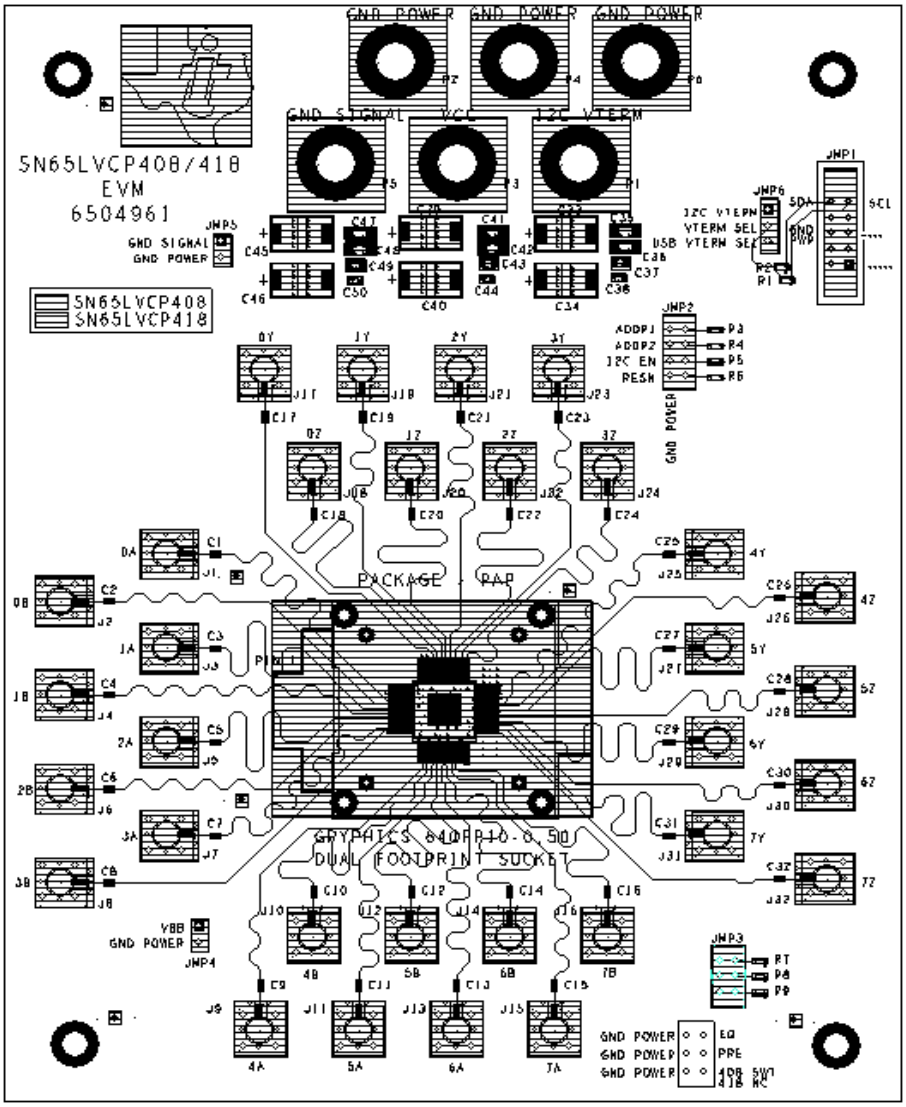

Figure 10. SN65LVCP408_418 EVM Top Layer 1

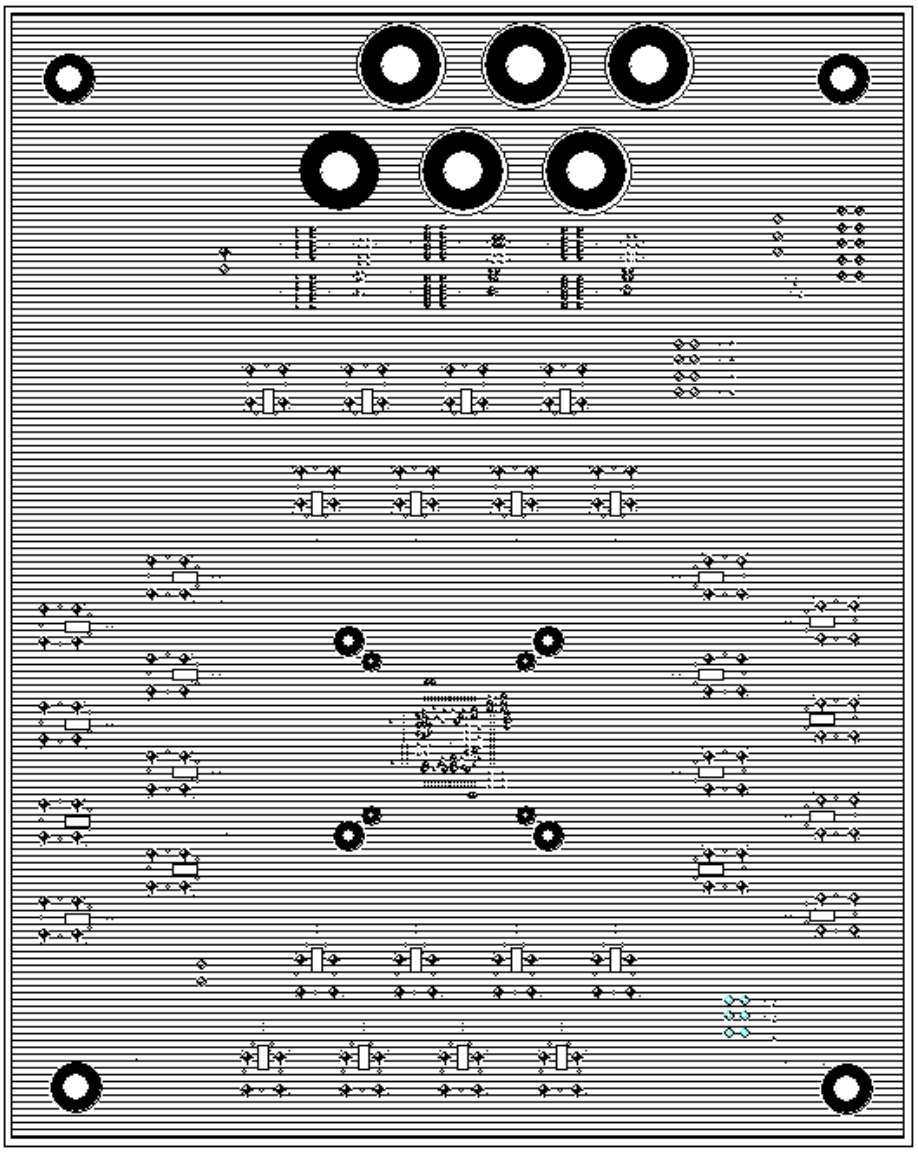

Figure 11. SN65LVCP408_418 EVM Ground Layer 2

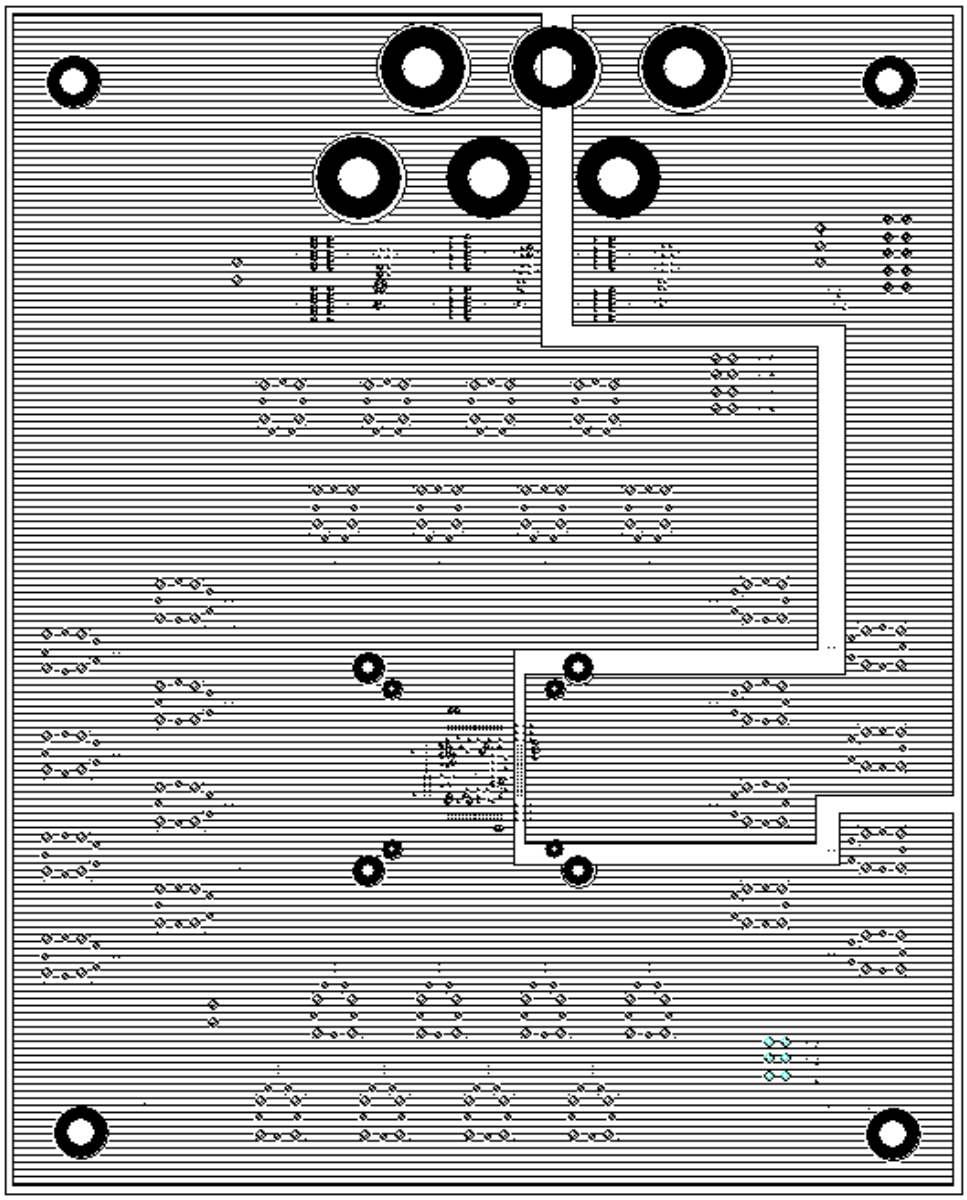

Figure 12. SN65LVCP408_418 EVM Power Layer 3

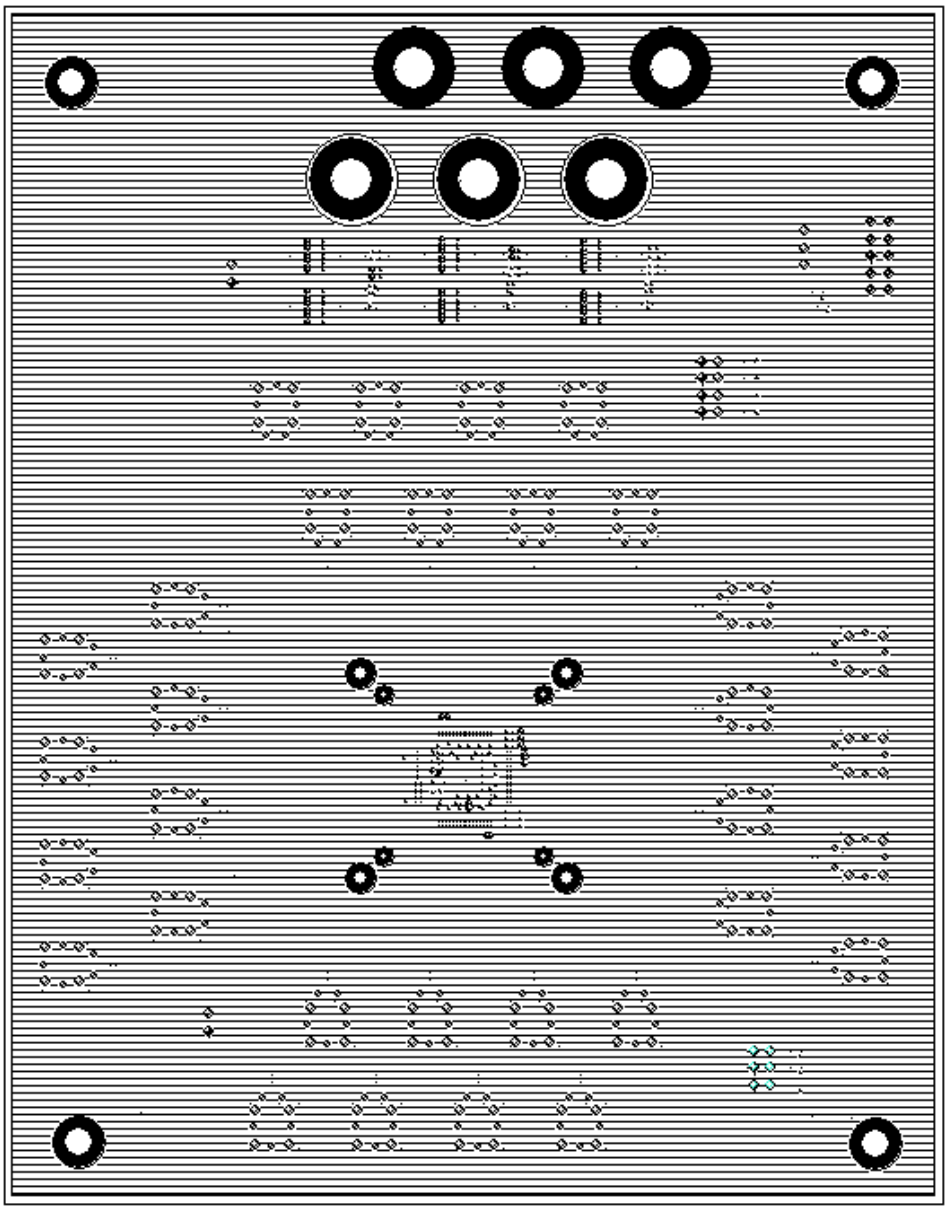

Figure 13. SN65LVCP408_418 EVM Ground Layer 4

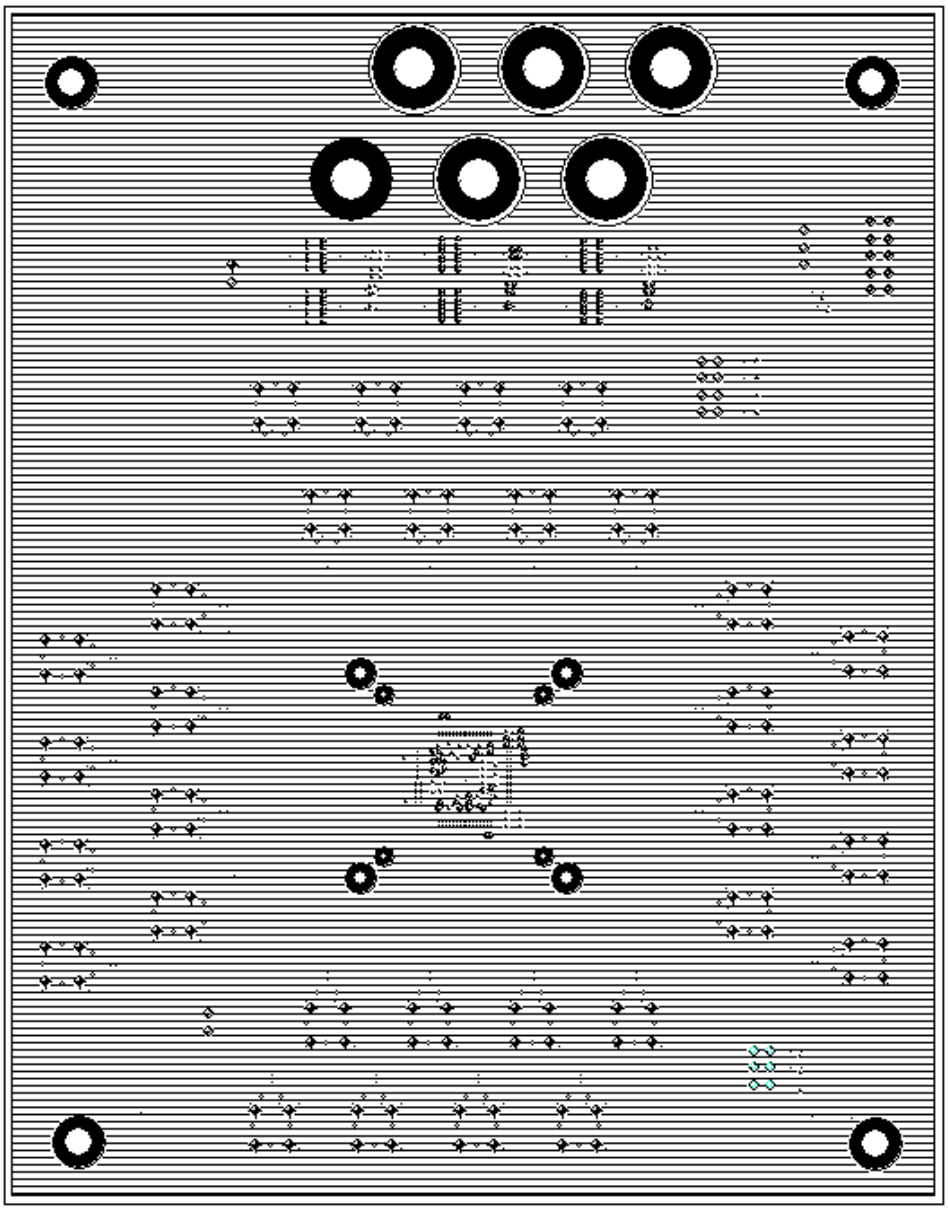

Figure 14. SN65LVCP408_418 EVM Ground Layer 5

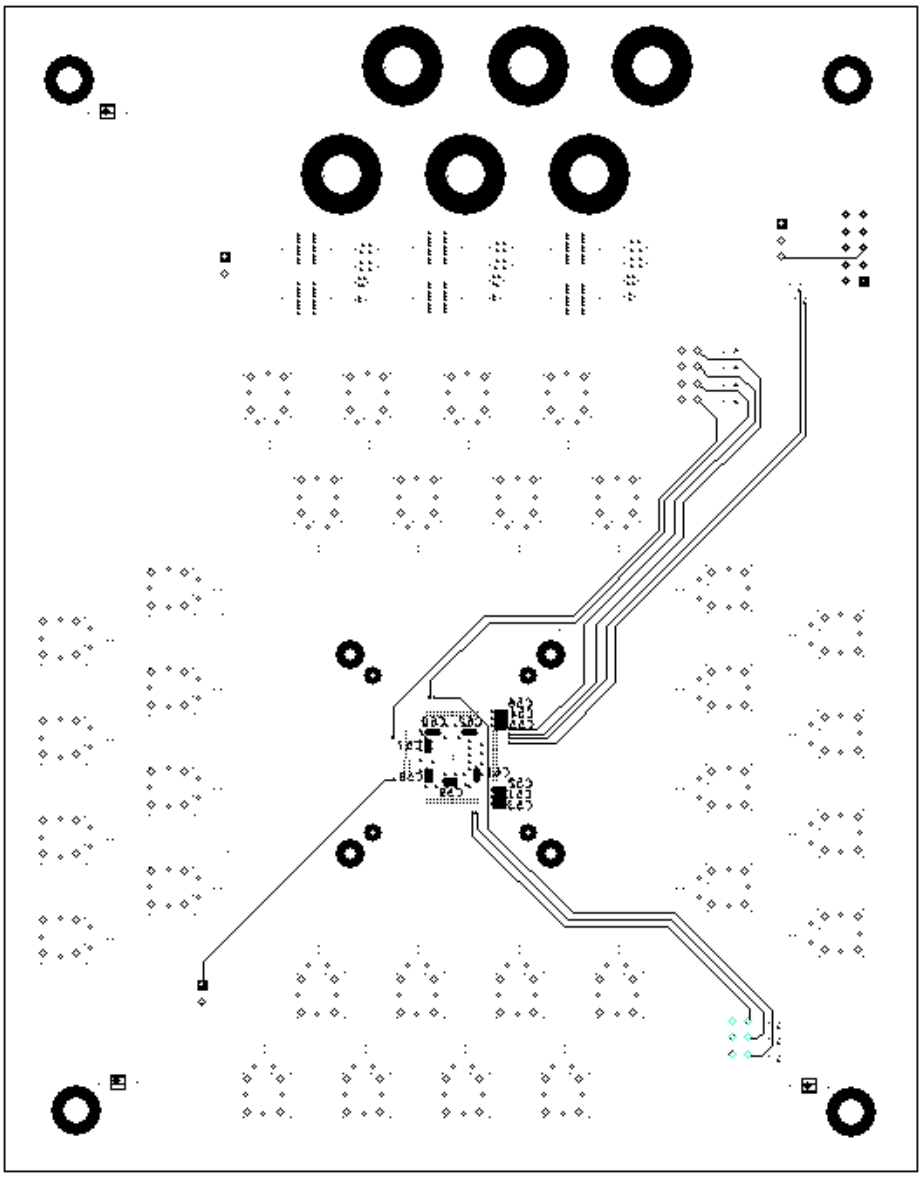

Figure 15. SN65LVCP408_418 EVM Bottom Layer 6

SN65LVCP408_418 EVM Material Listing

The complete Bill of Material for the EVM is listed in Appendix A.

SN65LVCP408_418 EVM Board Construction

The SN65LVCP408_418 EVM board is a 6-layer board constructed of FR-4 TurboClad 370 material. The board stackup consists of a signal layer on top, a ground layer, power, two additional ground layers and a signal layer on bottom.

Figure 16. EVM Layer Stack-up

Appendix A – Bill of Materials

Below is a table of the complete BOM for the SN65LVCP408_418 EVM.

Item	Quantity	Reference	Value
1	32	C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30,C31,C32	0.1uF
2	3	C33,C39,C45	68uf
3	3	C34,C40,C46	10uf
4	3	C35,C41,C47	1.0uf
5	3	C36,C42,C48	0.1uf
6	3	C37,C43,C49	.01uf
7	3	C38,C44,C50	0.001uf
8	4	C51,C54,C57,C60	0.1uf
9	4	C52,C55,C58,C61	.01uf
10	4	C53,C56,C59,C62	0.001uf
11	1	JMP1	Tyco Keyed Connector 5x2
12	1	JMP2	Header 4x2
13	1	JMP3	Header 3x2
14	1	JMP4	DNI_Header 2x1
15	1	JMP5	Header 2x1
16	1	JMP6	Header 3x1
17	32	J1,J2,J3,J4,J5,J6,J7,J8,J9,J10,J11,J12,J13,J14,J15,J16,J17,J18,J19,J20,J21,J22,J23,J24,J25,J26,J27,J28,J29,J30,J31,J32	sma_surface
18	6	P1,P2,P3,P4,P5,P6	Banana-Jack
19	2	R1,R2	2K
20	7	R3,R4,R5,R6,R7,R8,R9	4.7K
21	1	U1	LVCP408_418

Table 2. SN65LVCP408_418 EVM Bill of Materials