

**i9CxxA-C03-EVK-S1**

*Evaluation Kit Manual for i9C Non-Isolated DC-DC Series*

**Contents**

1.	Introduction .....	2
2.	Ordering Information .....	2
3.	General Features .....	3
4.	Turn-ON / Turn-OFF module by switch S1 .....	4
5.	Mode selections by switches S2 and S3 .....	4
6.	Adjusting the Output Voltage.....	4
7.	Change Output Current Limit by potentiometer VR3 .....	5
8.	Power GOOD .....	5
9.	Capture output ripple/noise waveform .....	5
10.	Schematic.....	6
11.	Mechanical Outline – i9CxxA-C03-EVK-S1 (with 1” Heatsink)* .....	7
12.	PCB Layout (Top view) .....	8
13.	Parts List.....	11

## 1. Introduction

This evaluation kit is designed to simplify the process of characterizing product performance and its features. It aids customers in assessing the product's suitability for their target applications. The evaluation board includes all necessary external components to demonstrate complete functionality and additional elements such as test points, trim potentiometers, and others to ensure a successful user test experience. However, not all external components are required if certain product features are not needed. The provided documentation includes detailed information on external components, schematics, and PCB layout for reference purposes only. Final design and qualification must be verified at the customer's end system level.

## 2. Ordering Information

TDK-Lambda offers a wide variety of non-isolated dc-dc power modules in the i9C series. Not every product is currently available in an evaluation kit. The table below includes descriptions and ratings which should help in selecting the most applicable evaluation kit.

Evaluation Kit Part Number	Non-Isolated DC-DC Module (Included and Mounted on the Evaluation Board)			
	DC-DC Module Part Number	Input Range	Output Range	Output Power***
I9C30A-C03-EVK-S1	I9C4W030A480V-0C3-R	Vin: 9.0 – 80 V ***Iin: 50A(max)	Vout: 12 – 60V	***1500W (max)

\*\*\* Maximum current and power are determined by the thermal capability of the power modules and will vary based on input voltage applied, output voltage setting, ambient temperature, airflow, and actual customer system installation. Please refer to the full product specification for more details.



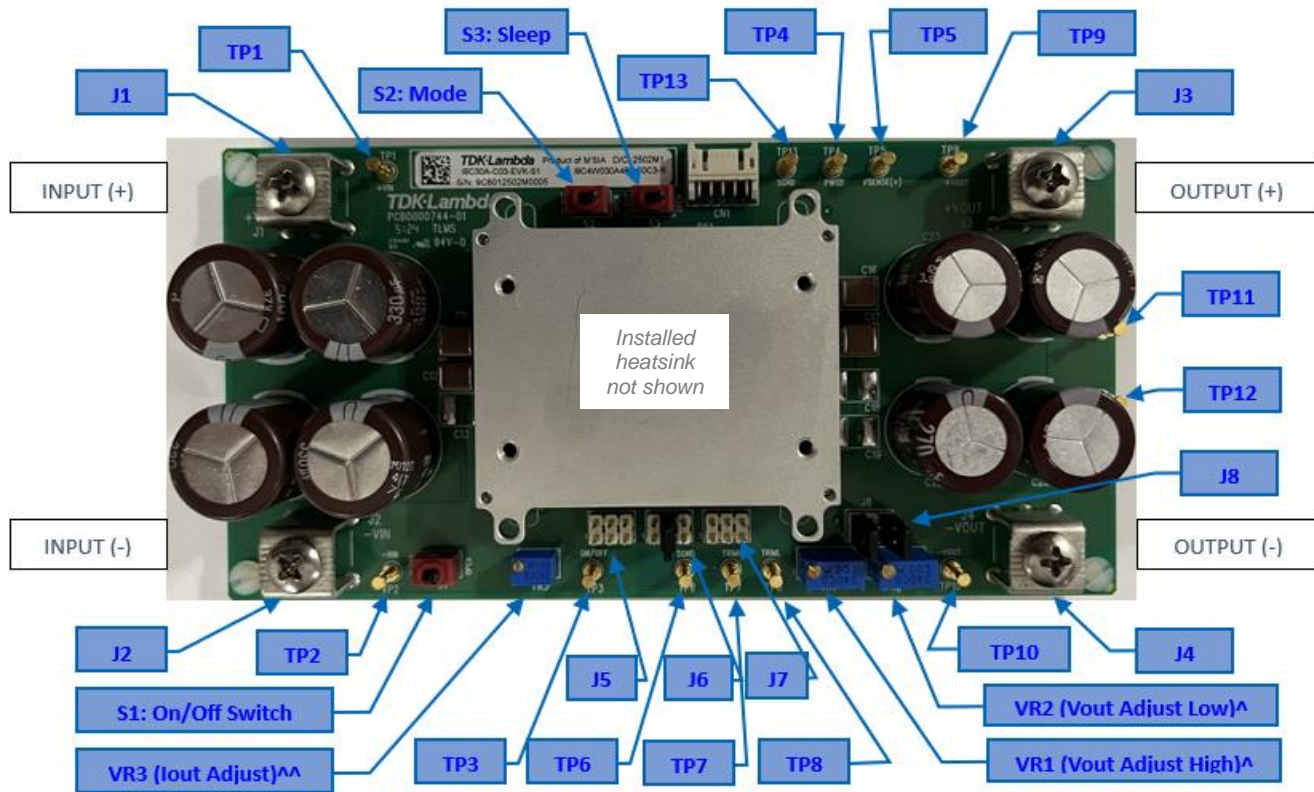
### IMPORTANT INFORMATION

- Observe proper safety and laboratory procedures when testing electronic products. This list serves as general guide only and not a substitute for common sense and best practices.
- Before applying power, double-check and ensure all connections to the evaluation board interface are correct (e.g., Input source polarity connections, etc...).
- This evaluation board is not populated with an input fuse. Input fuse(s) can be populated in PCB locations F1 and F2 once shorting jumpers are removed. Check the product specifications for the input fuse ratings and the evaluation board schematics included in this manual.
- Although highly efficient, these high-power density modules can dissipate significant amounts of power, especially under heavy loads. Ensure proper cooling is provided and the i9C module operates within the thermal specifications outlined in the product data sheets. The standard i9C module configuration includes a pre-installed baseplate for demanding environments. The additional heatsink mounted on the i9C module offers extra thermal support during prolonged heavy load operation in laboratory bench testing.
- This evaluation kit is designed for general laboratory use. It is not intended for installation in end-customer product or equipment.
- Please check the pertinent i9C product datasheets and specifications for complete information.

## 3. General Features

- Screw Terminals for secured input and output connections
- Toggle switch for Remote ON/OFF
- Test points for ease of measurement
- Pre-set Trim jumpers
- Component PCB pad provisions for: additional input and output capacitance\*, output header connector for optional features and signals.


\* Note the output capacitor value may need to be adjusted to meet transient response or ripple requirements of the final application. Refer to product data sheet for a range of acceptable values.



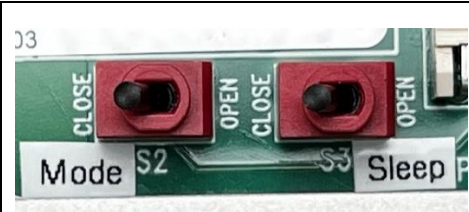
Test Point	Description	Test Point	Description
TP1	Vin (+)	TP7	Vout Trim High (Trim H)
TP2	Vin (-) / GND	TP8	Vout Trim Low (Trim L)
TP3	On / Off	TP9	Vout (+)
TP4	Power Good	TP10	Vout (-) / GND
TP5	Vsense (+)	TP11	Vout (+) - for Output Ripple Measurement
TP6	Signal GND (SGND)	TP12	Vout (-) / GND – for Output Ripple Measurement
		TP13	Signal GND (SGND)

Screw Terminal	Description	Screw Terminal	Description
J1	Vin (+)	J3	Vout (+)
J2	Vin (-) / GND	J4	Vout (-) / GND

## 4. Turn-ON / Turn-OFF module by switch S1



	S1	STATE
	OPEN	The module is on Standby
	CLOSE	The module is in operation





## 5. Mode selections by switches S2 and S3

	S2 (Mode)	S3 (Sleep)	OPERATING MODE
	CLOSE	CLOSE	Fully Regulated Output Mode
	CLOSE	OPEN	Sleep Mode – light load only
	<b>OPEN</b>	<b>CLOSE</b>	<b>UNDEFINED STATE - DO NOT USE</b>
	OPEN	OPEN	PHEPT Mode (Programmable High Efficiency Pass-Through)


## 6. Adjusting the Output Voltage

The i9C module offers a wide output adjustment range. The evaluation kit includes jumper connectors (J5, J6, J7) for presetting the output voltage or its pass-through range. Potentiometers, VR1 and VR2, enabled through jumper J8, offer additional trim range. Refer to the jumper configuration table for details.


DEFAULT CONFIGURATION		OUTPUT BEHAVIOUR
		<ul style="list-style-type: none"> <li>Jumpers in Neutral Position</li> <li>When the evaluation kit is turned ON, the output voltage will be around 9.5V.</li> </ul>

JUMPER SETTING	Mode Selection (See Sec 5)	OUTPUT BEHAVIOUR
<b>PRESET TO 54V (via J5)</b> 	PHEPT Mode	48V – 60V
	FULLY REGULATED O/P Mode	54V
<b>PRESET TO 48V (via J6)</b> 	PHEPT Mode	42V – 54V
	FULLY REGULATED O/P Mode	48V
<b>PRESET TO 24V (via J7)</b> 	PHEPT Mode	20V – 28V
	FULLY REGULATED O/P Mode	24V
<b>SET FROM 12V to 60V (via J8)</b> 	PHEPT Mode	Set through VR
	FULLY REGULATED O/P Mode	Set through VR


## 7. Change Output Current Limit by potentiometer VR3

	<p>Adjust Range: 21.0A to 38.0A            VR3 (20 Turn): Clockwise to decrease OCP Trip point            Counterclockwise to increase OCP Trip point</p>
---	---

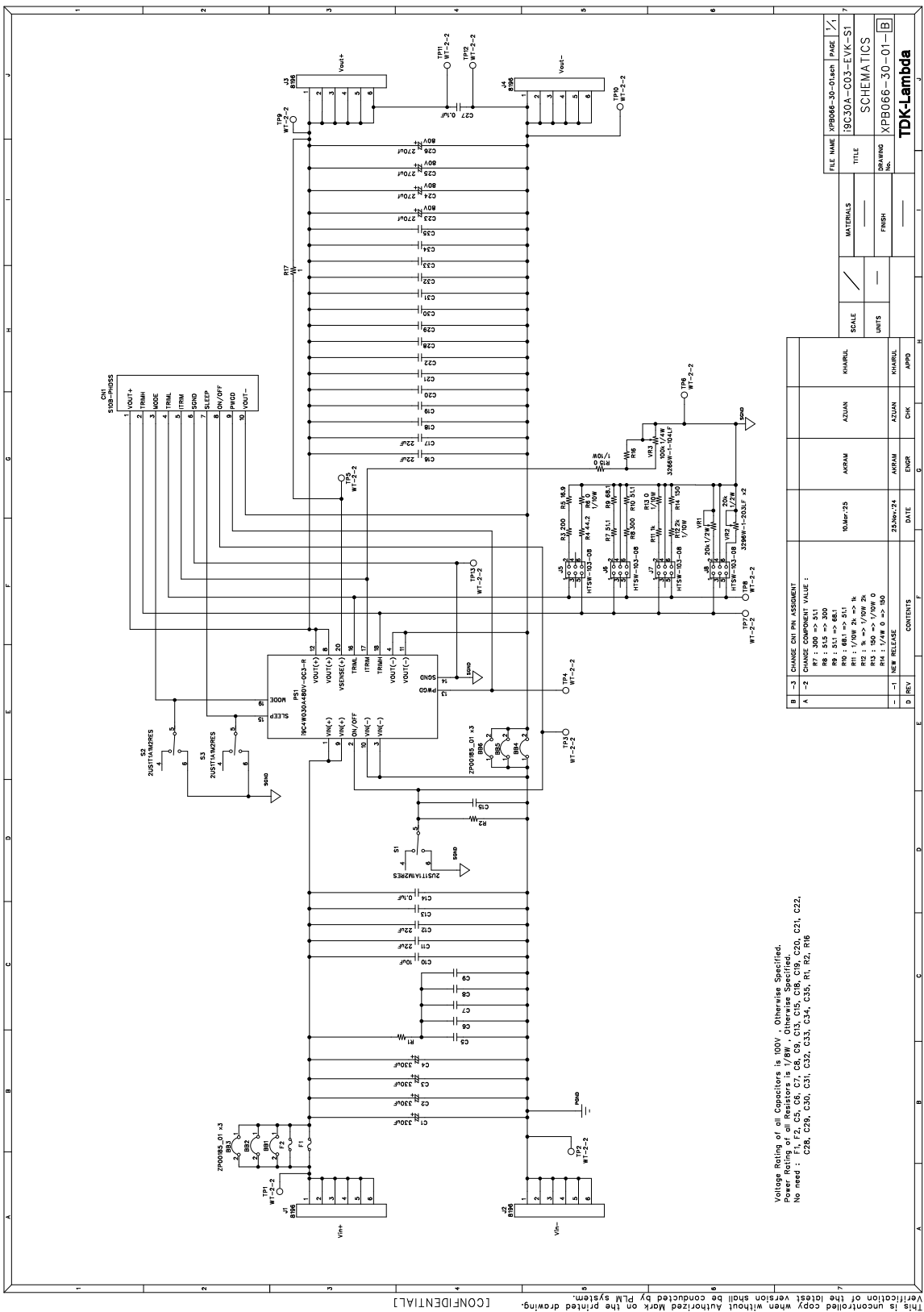
## 8. Power GOOD

	<p>Power GOOD pin is open drain. When power is applied to the module, and the output voltage is more than <math>\pm 12\%</math> away from the nominal voltage set point the Power Good will be pulled to ground through a 250-ohm maximum impedance. When the voltage is within the range, the Power Good pin will revert to a high impedance state and will be internally lightly pulled up to 3.3V through a diode.</p>
---	---

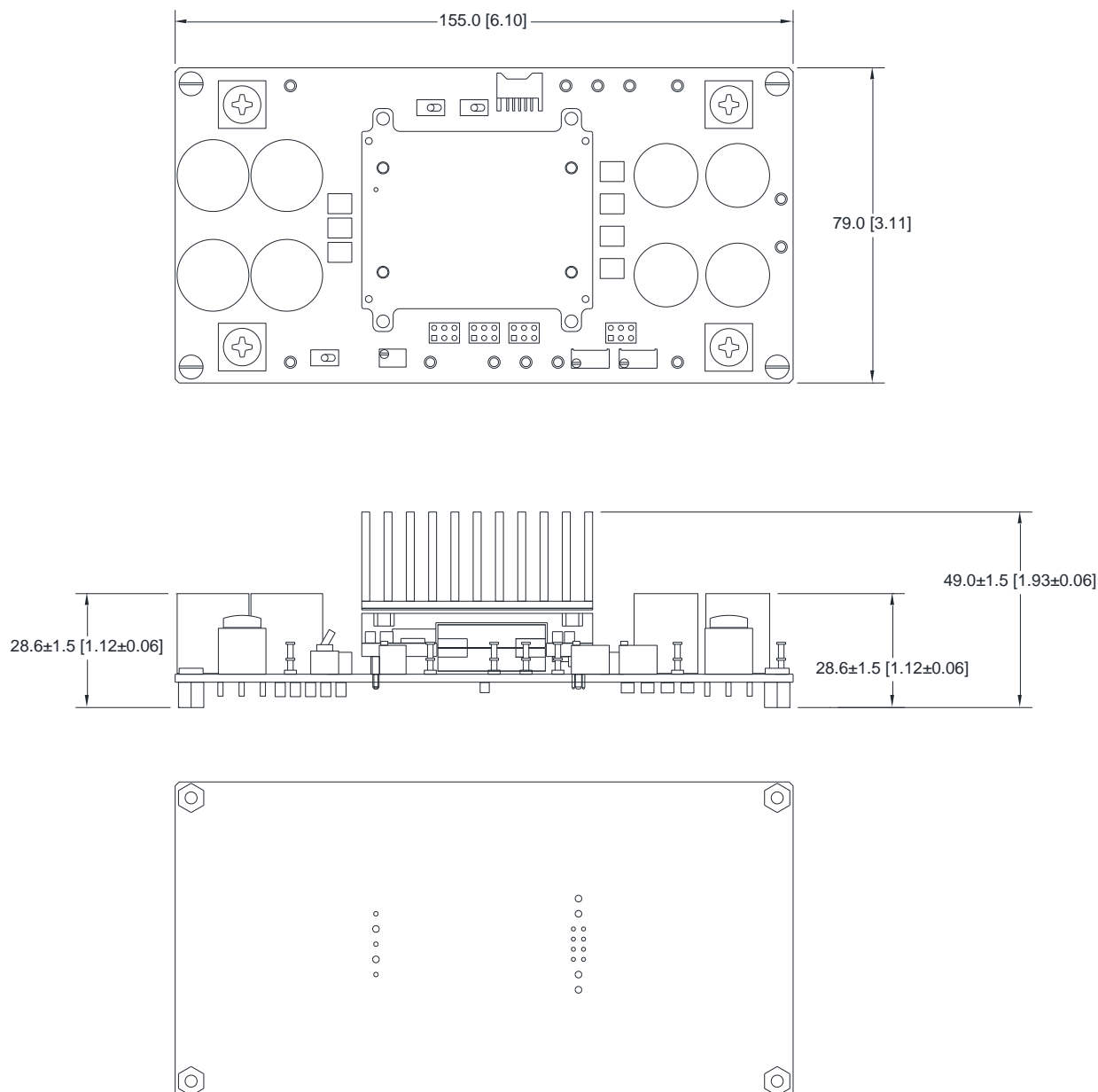
## 9. Capture output ripple/noise waveform

	<p>Use TP11 and TP12 to measure output ripple/spike. Wired GND clips may pick up higher spike noise. Use bare probes instead. Please ensure proper polarity when connecting. TP11 is Vout (+). TP12 is Vout (-) / GND.</p> <p style="background-color: yellow; border: 1px solid black; padding: 2px; display: inline-block;">Recommended</p>
--	---

10. Schematic



## 11. Mechanical Outline – i9CxxA-C03-EVK-S1 (with 1” Heatsink)\*



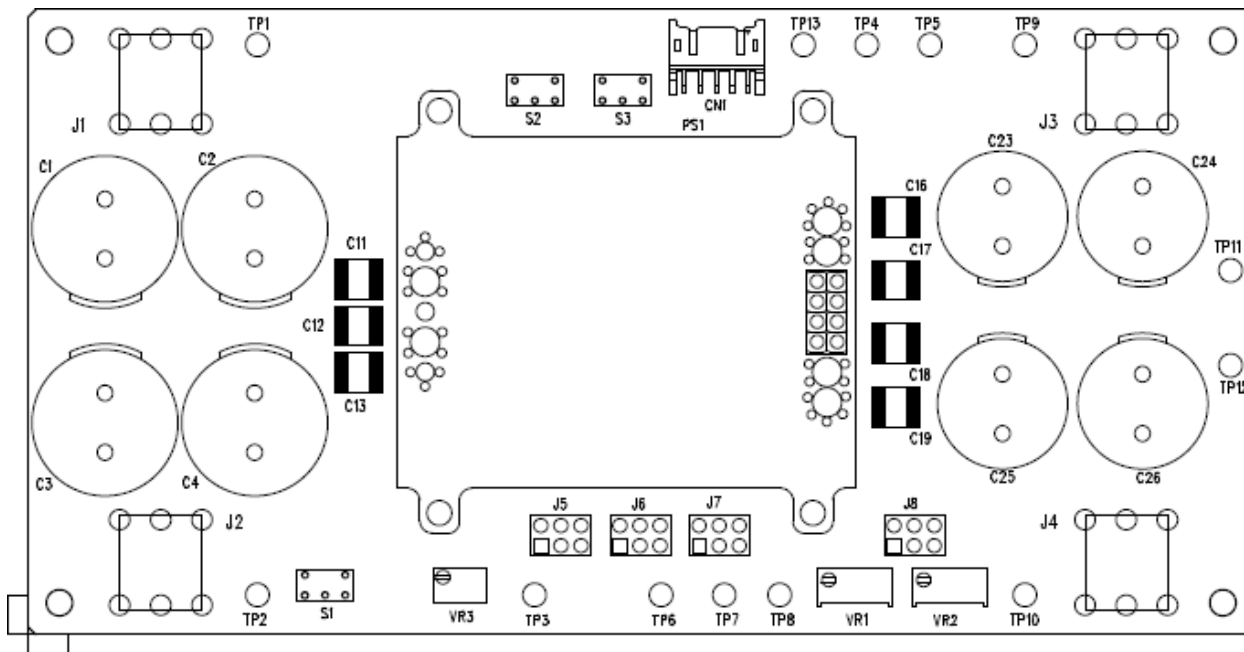
\* The overall height of the evaluation kit is provided for reference purposes only. The actual height may vary depending on the heatsink installed on the i9C power module.

Please note that the i9C power module series includes a pre-installed baseplate (NO Heatsink).

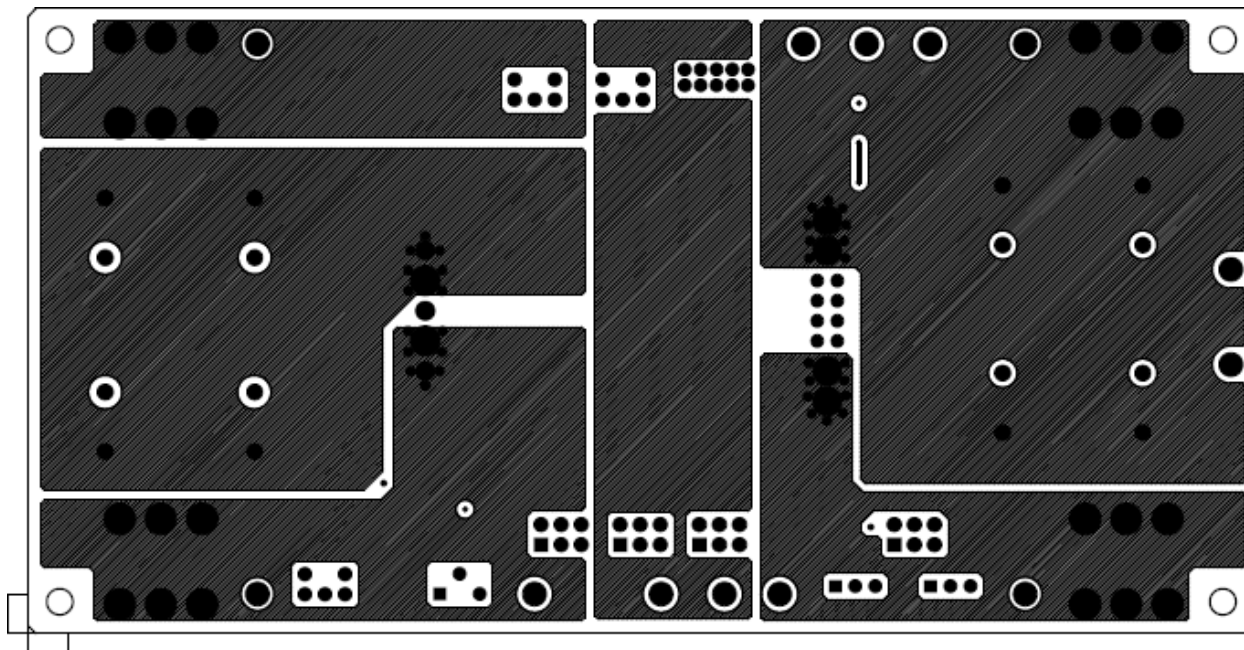


## 12. PCB Layout (Top view)

Top Layer



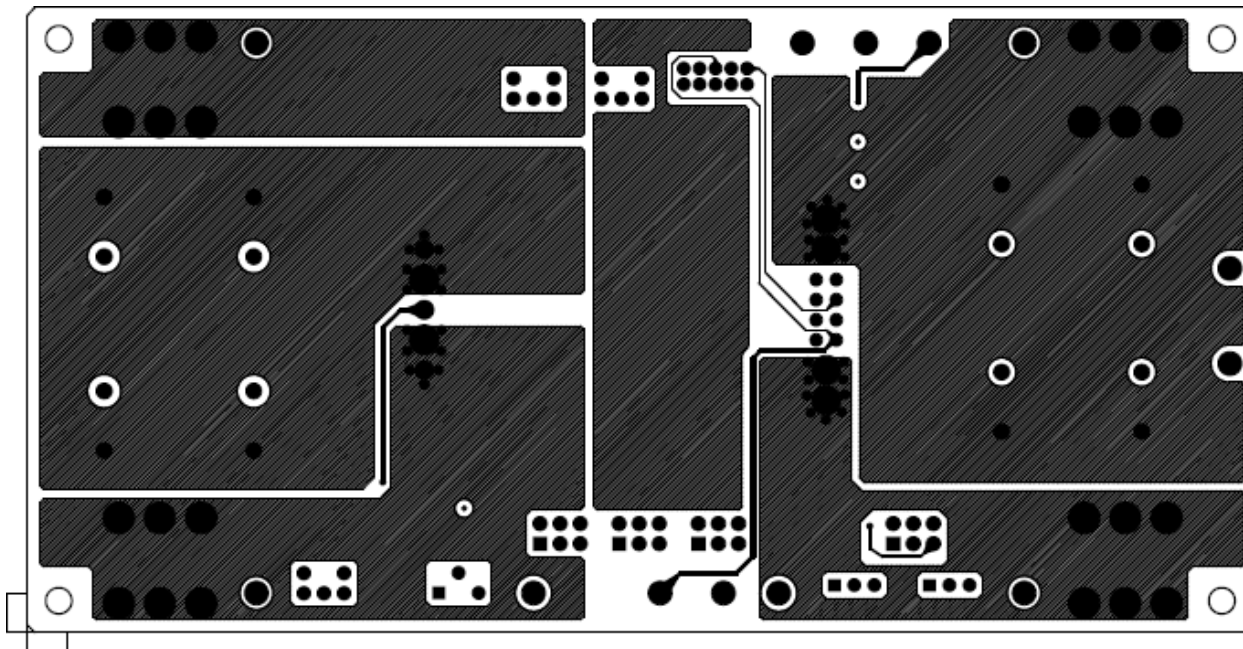
Layer 2



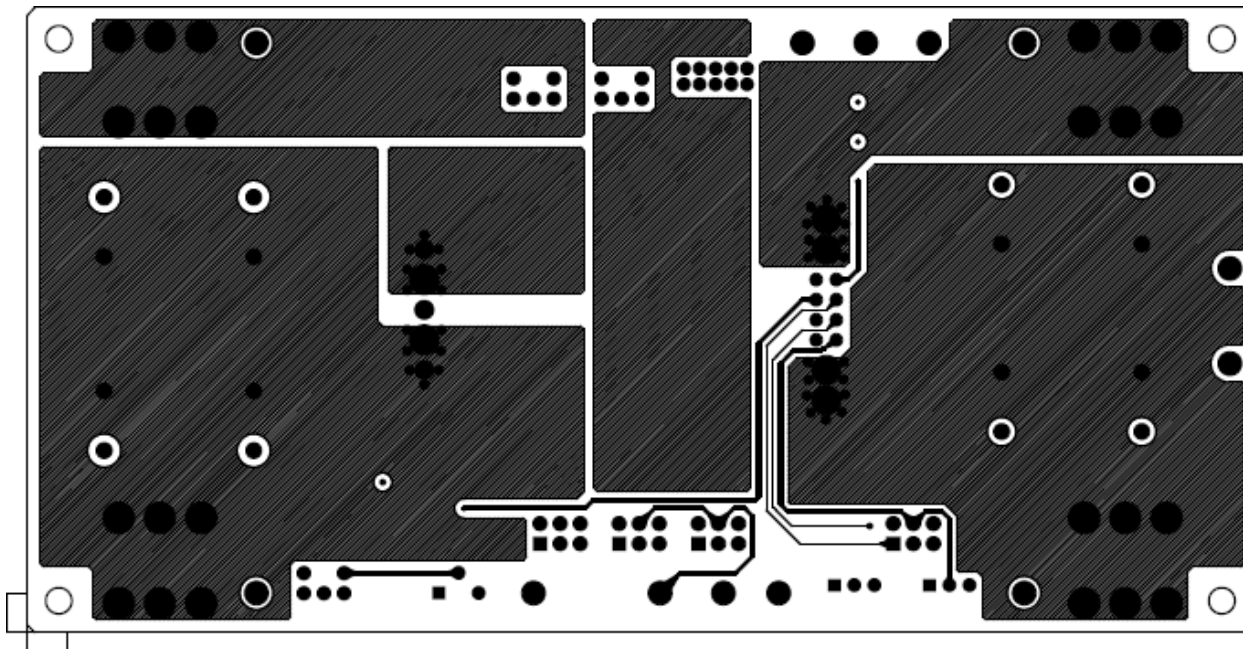


## PCB Layout (continued)

Layer 3

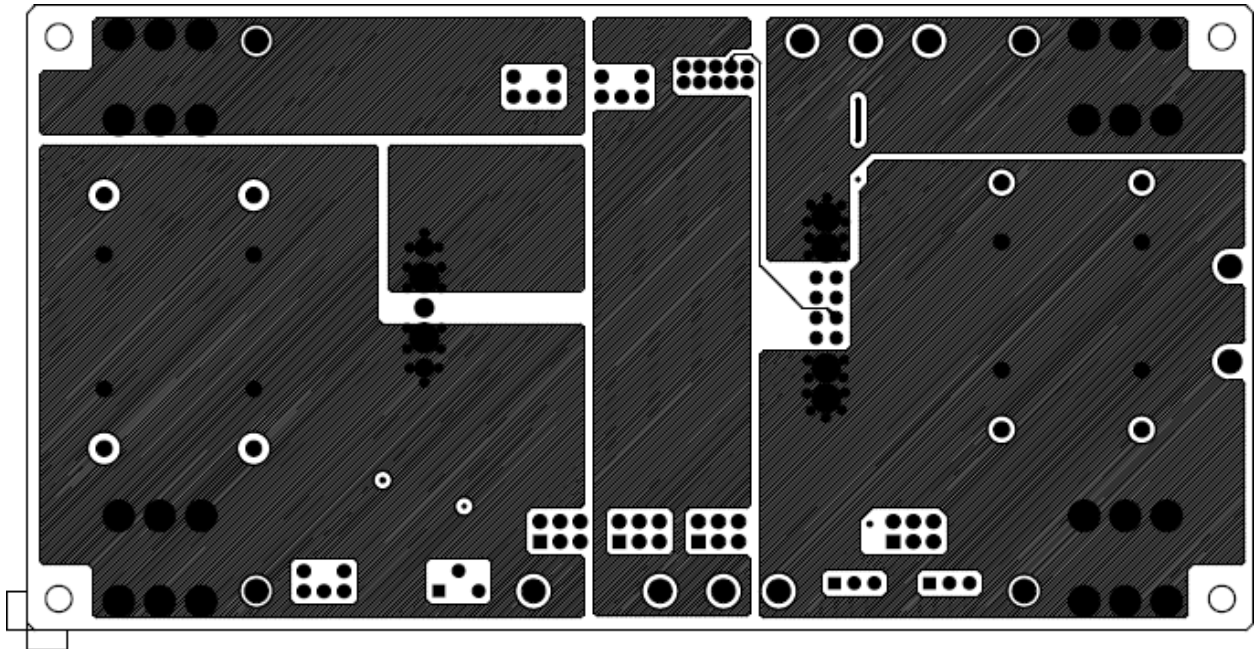


Layer 4

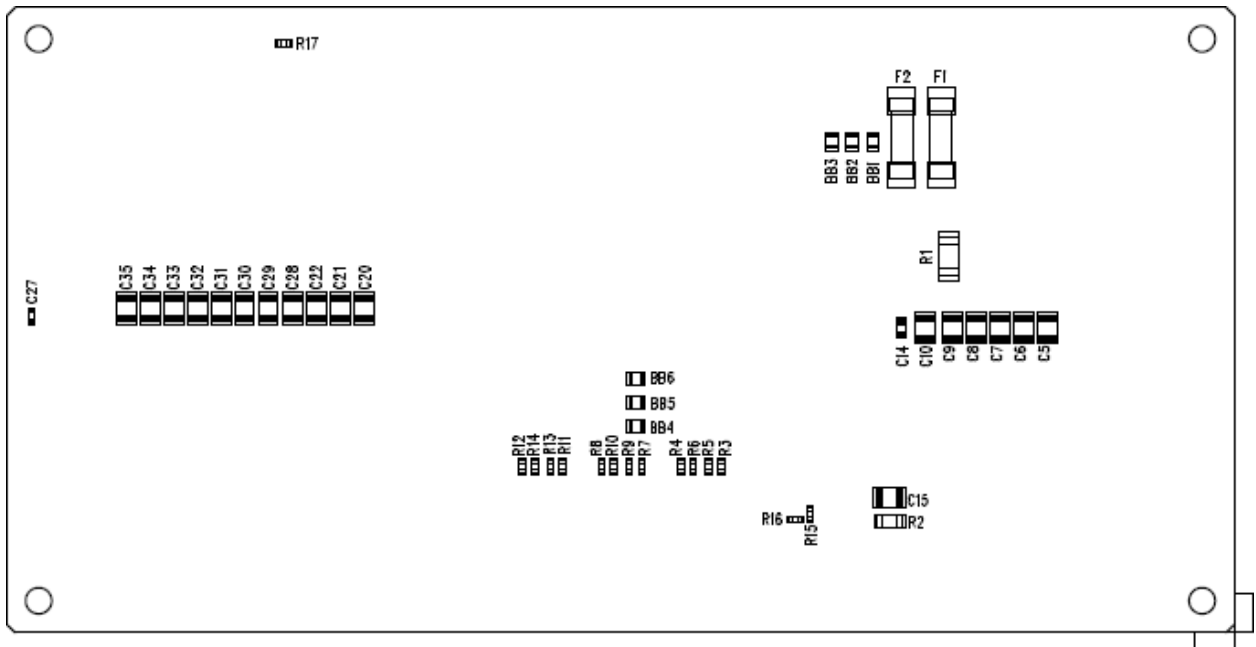


## PCB Layout (continued)

Layer 5



Bottom Layer



## 13. Parts List

Evaluation Kit Parts Number		i9C30A-C03-EVK-S1	
Reference Designator	Quantity	Mfr Part No.	Manufacturer
PS1	1	i9C4W030A480V-0C3-R	TDK-Lambda
C1,C2,C3,C4	4	EKZE101ELL331MM20S	NI-CHEMI
C10	1	C3225X7R2A106KT	TDK
C11,C12,C16,C17	4	CKG57NX7S2A226M500JH	TDK
C14	1	C2012X7R2A104KT	TDK
C27	1	C1608X7S2A104KT	TDK
C23,C24,C25,C26	4	ELXV800ELL271ML20S	NI-CHEMI
BB1,BB2,BB3,BB4,BB5,BB6	6	ZP00185_01	ROWLEY SPRINGS
VR1,VR2	2	3296W-1-203LF	BOURNS
VR3	1	3266W-1-104LF	BOURNS
R3	1	RK73H1JTTD2000F	KOA
R4	1	RK73H1JTTD44R2F	KOA
R5	1	RK73H1JTTD16R9F	KOA
R6,R13,R15	3	RK73Z1JTTD	KOA
R7,R10	1	RK73H1JTTD51R1F	KOA
R8	1	RK73H1JTTD3000F	KOA
R9	1	RK73H1JTTD68R1F	KOA
R11	1	RK73H1JTTD1001F	KOA
R12	1	RK73H1JTTD2001F	KOA
R14	1	RK73H1JTTD1500F	KOA
R17	1	RK73H1JTTD1R00F	KOA
CN1	1	S10B-PHDSS	JST
S1,S2,S3	3	2US1T1A1M2RES	LIGHT COUNTRY
J1,J2,J3,J4	4	8196	KEYSTONE
J5,J6,J7,J8	4	HTSW-103-08-T-D	SAMTEC
TP1,TP2,TP3,TP4,TP5,TP6,TP7, TP8,TP9,TP10,TP11,TP12,TP13	13	WT-2-2	MAC8
KM1	4	1902A	KEYSTONE
KM2	4	9427	KEYSTONE
J9,J10,J11	3	SNT-100-BK-G-H	SAMTEC