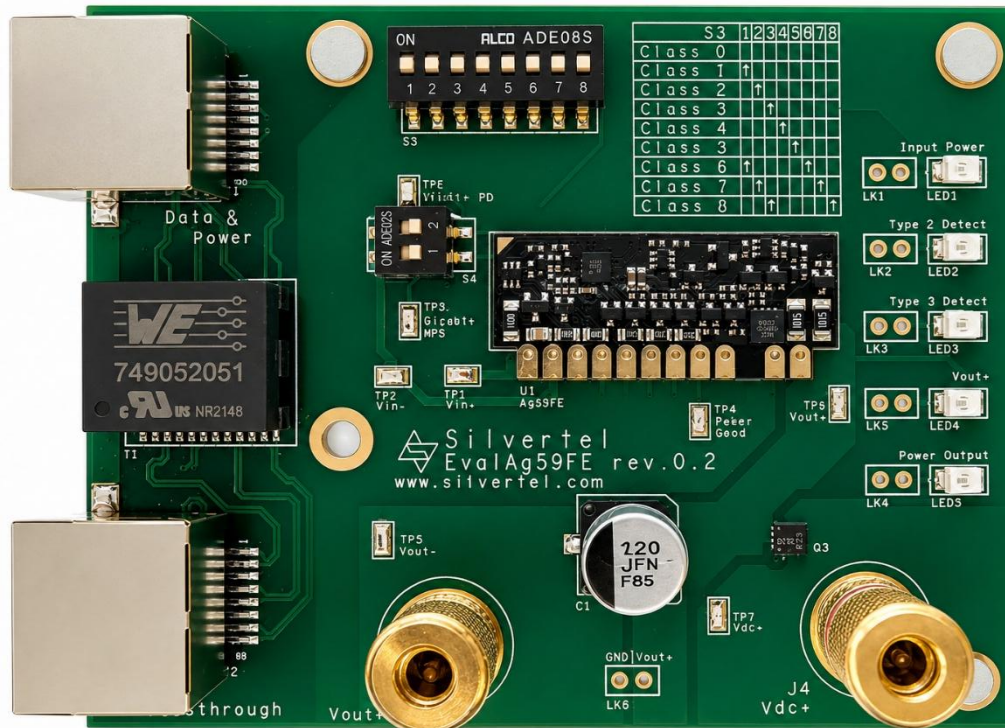




Evaluation Board User Manual



EvalAg59FE Evaluation Board User Manual

Version 1.0 – May 2026

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1 Kit Contents

- EvalAg59FE Evaluation Board
- Ag59FE PD Module

2 Board Layout

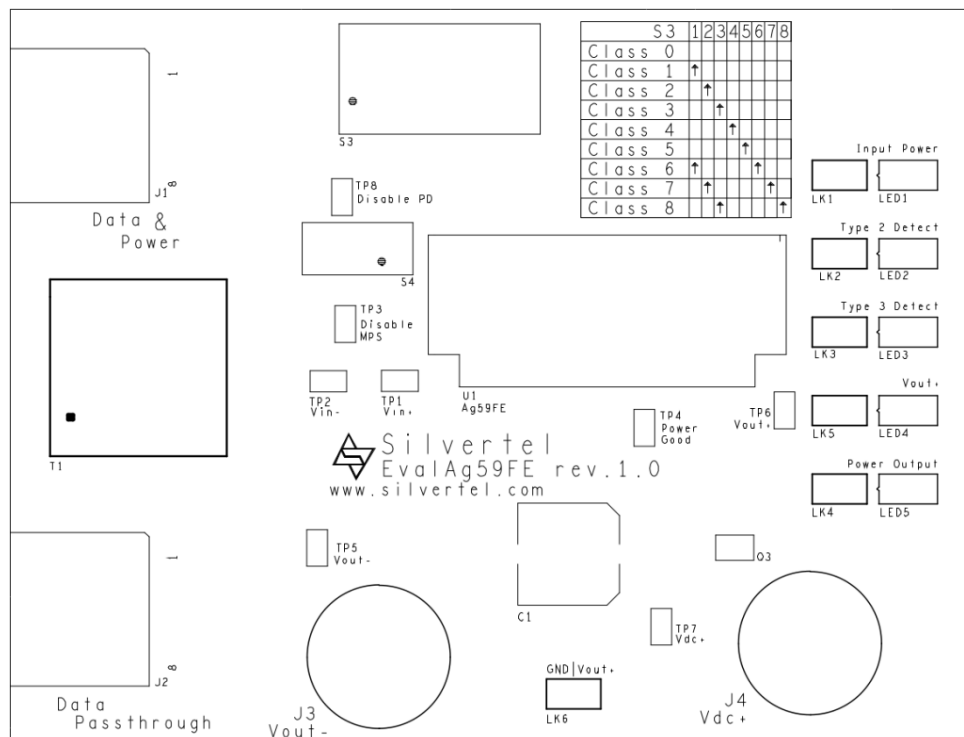


Figure 1: EvalAg59FE Board Layout

2.1 Link Settings

- S3 – Power Classification Select
- S4a – MPS Disable
- S4b – PoE Disable
- LK1-LK5 – Unused LED Disable

2.2 Input Output Connections

- J1 – PoE Enabled RJ45
- J2 – Data Passthrough RJ45
- J3& J4 – Output Load Binding Posts
- LK6 – Output Load header

3 Introduction

This Manual is a guide to using the EvalAg59FE evaluation board fitted with Silvertel Ag59FE configurable Power over Ethernet (PoE) front end module

This board is designed to assist with evaluating the use of Silvertel's Ag59FE in an application; as such it has been designed to pass through Ethernet data signals (10/100/1000BASE-T) from the Midspan PSE (Power Sourcing Equipment) or PoE enabled switch connected to J1, onto the system connected to J2.

While this evaluation board has been designed following Silvertel's recommendations, it should not be considered as a reference design as it features circuitry included solely for the purposes of evaluation that are not be required for proper operation.

4 Operation

To ensure that the PSE does not apply power to a non-PoE enabled device the output port first checks for a valid PoE signature. If the PSE does not see a valid signature, then it will disconnect, wait approximately 2 seconds then try again.

Once a valid signature has been detected the PSE may then perform classification to determine the power requirement of the PD, only after this has occurred will the PSE supply power to the powered device.

The module will provide the 25K signature followed by a configurable power level request to an IEEE802.3 compliant PSE.

If PSE is not capable of supplying the requested power level requested by the Ag59FE, if set to Class 8 while supplied by an IEEE802.3af or IEEE802.3at PSE for example, the PSE should supply the highest power level it is capable of supplying.

4.1 Power

The EvalAg59FE board will extract the power from the data pairsets using the RJ45 connector, J1 alongside the LAN transformer T1. The data is passively passed on to any peripheral equipment via J2, while the power is provided to the Ag59FE module in the correct polarity via the Schottky rectifier diodes BR1, BR2, BR3 and BR4.

4.2 Data passthrough

Any data that is provided over the PI (Ethernet cable) connected to the Data & Power port, J100 will be transposed onto the Data output port, J101 via the data transformer.

The data traces on the evaluation board have been designed to pass through 10/100/1000BASE-T Ethernet data signals. No processing or amplification of this signal will be performed on the evaluation board.

4.3 MPS Disable

The Ag59FE will provide a small load to the PoE link by default, this load is to prevent the PSE from removing power due to not meeting the Maintain Power Signature (MPS) requirement. The MPS requirement stops the PSE from continuing to power a cable/port after the device has been disconnected.

The load profile will always be applied to the PSE, to disable this load profile slide the Dip switch S4a to the “ON” position

4.4 PoE Disable

The Ag59FE can be disabled by pulling the DIS pin low. This is useful for applications with additional power sources. To disable the Ag59FE, slide the Dip switch S4b to the “ON” position. This will turn off the output and disable the signature response.

4.5 Power Classification select

The Ag59FE is a programmable classification front end that can be configured to request any of the power level requests contained in the IEEE802.3 specification, for applications with a maximum power ranging from 4W to 90W. If the Ag59FE is connected to a PSE that cannot output the power request by the Ag59FE, the PSE will recognise the Class request as a valid request beyond maximum output and default to its highest output power level.

The desired power level request can be set using the dip switch S3. Moving the below indicated switch positions to the “ON” position will set the correct power level request.

Requested Class	PSE Output Power (W)	Available PD Power (W)	R1 Value	R2 Value	S3 Switch Position
0	15.4	12.75	Open Circuit	Open Circuit	All OFF
1	4	3.84	910Ω	Open Circuit	1 only
2	7	6.49	430Ω	Open Circuit	2 only
3	15.4	12.75	270Ω	Open Circuit	3 only
4	30	25.5	180Ω	Open Circuit	4 only
5	45	40	Open Circuit	160Ω	5 only
6	60	51	910Ω	220Ω	1 and 6
7	75	62	430Ω	330Ω	2 and 7
8	90	71.3	270Ω	560Ω	3 and 8

Table 1: Classification selection

5 LED Indicators

5.1 Input Power LED

LED1 illuminates when the module is being supplied with greater than 36V. This can be disabled by removing the zero-ohm link R15, removing this link does not affect the power being delivered to the Ag59FE.

5.2 PSE Detect

When the Ag59FE module fitted has detected it is being powered by an IEEE802.3 type 4 (PoE++) or greater PSE, both the 'TYP3-DET' pin and the 'TYP2-DET' pin will be pulled low, and this will cause LED2 and LED 3 to become illuminated on the EvalAg59FE board.

When the Ag59FE module fitted has detected it is being powered by an IEEE802.3 type 3 (PoE++) or greater PSE, the 'TYP3-DET' pin will be pulled low, and this will cause LED3 to become illuminated on the EvalAg59FE board. LED2 will not be illuminated.

When the Ag59FE module fitted has detected it is being powered by an IEEE802.3 type 2 (PoE+) PSE, the 'TYP2-DET' pin will be pulled low, and this will cause LED2 to become illuminated on the EvalAg59FE board. LED3 will not be illuminated.

If an IEEE802.3 Type 1 PSE is detected, neither LED2 nor LED3 will be illuminated

These LEDs can be disabled by removing the zero-ohm links R16 and R17. Removing these links do not affect the power level being delivered to the Ag59FE.

5.3 Output Power LED

LED4 illuminates when the modules output is ON. This can be disabled by removing the zero-ohm link R18, removing this link does not affect the power being supplied by the Ag59FE.

5.4 Power Good LED

LED5 illuminates when the Power Good output of the module has pulled low, turning the MOSFET Q3 ON, supplying power to the Binding Post J4. This LED can be disabled by removing the zero-ohm link R19, removing this link does not affect the power being supplied by the Ag59FE.

6 Test Setup

Figure 2 shows the basic set up using the EvalAg59FE evaluation board powered by Silvertel's EvalAg6810 PSE.

The equipment required: -

- EvalAg59FE fitted with PD Module.
- EvalAg6810 or other IEEE802.3 compliant PSE
- Power supply unit, +52-57V output e.g. 60V bench power supply
- CAT5e or greater cables
- Application Circuit

Optional equipment: -

- Data source e.g. PC

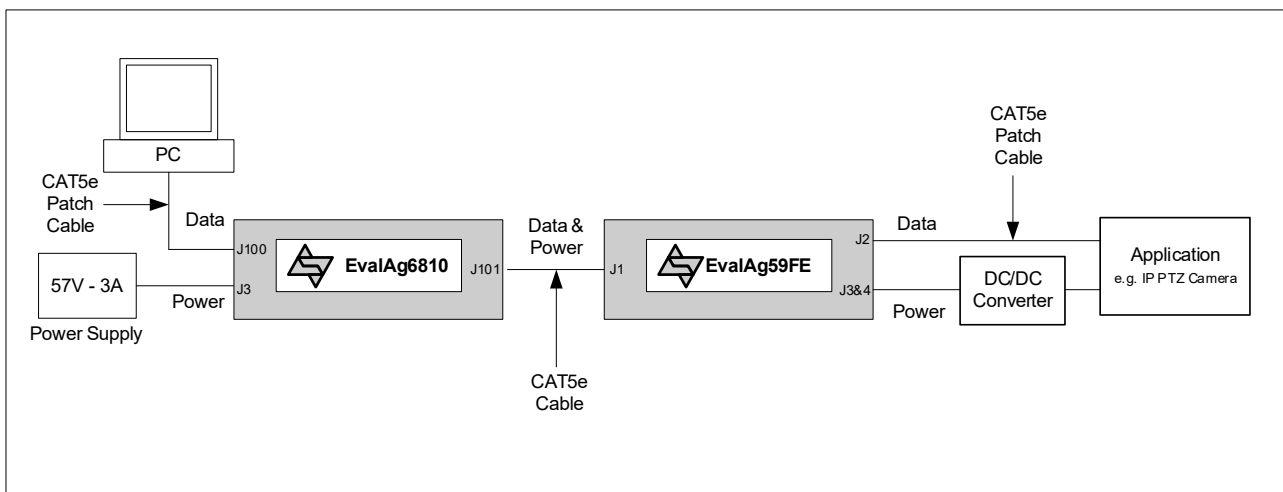


Figure 2 Basic Test Setup

7 Additional information

Full operating conditions and feature set can be found in the Ag59FE product datasheet, available from www.silvertel.com.

8 Schematic

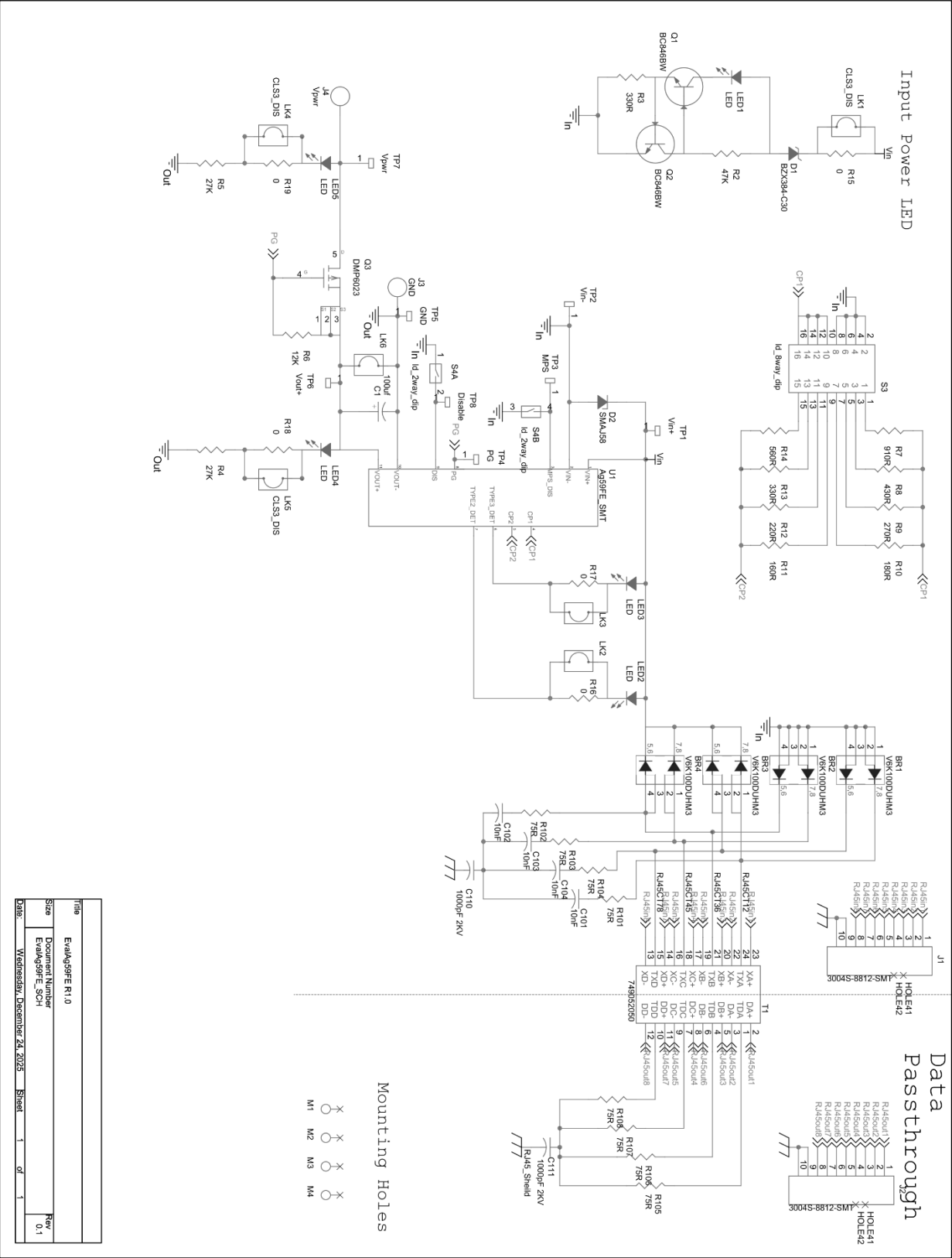


Figure 3: Schematic

9 Bill of Materials

Strictly Private and Company Confidential									
EvalAg59FE Eval Board - Rev.1.0									
Date: 10th February, 2026									
Silver Part No.	Description	Value	Location:	Qty	Package	Rating:	Tol:	Supplier P1 NO:	Comments:
	PD Module	Ag59FE	U1	1	Custom	-	-	Silver Telecom Part	
	Zener Diode	BZX384-C30	D1	1	SOD323	-	-	Vishay	
	Protection Diode	SMAJ58A	D2	1	SMA	-	-	Wurth- 824 500 581 Vishay, ST Micro, Diodes Inc	
	Bridge Rectifiers	V6K100DUH43	BR1-BR4	4	FlatPAK 5x6	-	-	Vishay	
	SMD LED	LED	LED1-LED5	5	SMT	-	-	Wurth - 150 141 RS7 3110 0	
	Transformer - Data	10G BaseT PoE+	T1	1	SMT	-	-	Wurth - 749052050	
	NPN Transistor	BC246BW	Q1, Q2	2	SOT323	60V	-	Infineon, ON-Semi , NXP , Diodes Inc.	
	MOSFET P-Channel	DMP3023L FG	Q3	1	POWERD3333-8	-	-	Diodes Inc.	
	Capacitor Electrolytic	120uF	C1	1	SMT Diam: 10mm	63V	20%	Samsung, NTC, TDK, Murata, Kemet, AVX & Wurth 885342207010	
	Ceramic multi-layer	10nF	C101-C104	1	0805	100V	20%	Samsung, NTC, TDK, Murata, Kemet & AVX, Wurth-885342208024	
		1000pF 2KV	C110, C111	2	1206	2KV	20%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	47K	R2	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	330R	R3	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	27K	R4 R5	2	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	12K	R6	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	910R	R7	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	430R	R8	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	270R	R9	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	180R	R10	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	160R	R11	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	220R	R12	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	330R	R13	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	560R	R14	1	0603	63mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	75R	R101-108	8	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 1206	0R	R109-117, R109-NT	5	1206	250mW	1%	Royal Ohm, Eurohm & Yageo	
	Black Connector	Binding Post	J3	1	Screw Mount	-	-	Switch Electronics 354146	
	Red Connector	Binding Post	J4	1	Screw Mount	-	-	Switch Electronics 354147	
	Ethernet Connector	RJ45	J1, J2	2	SMT	-	-	Toby 3004S-8821-SMT	
	Test Point	HK-1-G	TP-1-TP8	8	1206	-	-	Mac 8	
	Link	2 Way	LK6	1	Through Hole	-	-	Toby LHCS-02S-FR-060-034, Wurth 61300211121	
	Link	2 Way	LK1-LK5	0	Through Hole	-	-	ALCOSWITCH, ADE08S04	
	Dip Switch	8 Way	S3	1	SMT	-	-	ALCOSWITCH, ADE02S04	
	Dip Switch	2 Way	S4	1	SMT	-	-		
	PCB	Rev 0.2 - 99mm x 75mm		1					
	Standoff	M4 Stud	M1, M4	2					
	Standoff	M4 Stud	M2 M3	0					
	Feet	GFR24006A	M1, M2, J1, J2	4				Essentra	
			Total	68					

Figure 4: Bill of Materials

10 Layer Routing

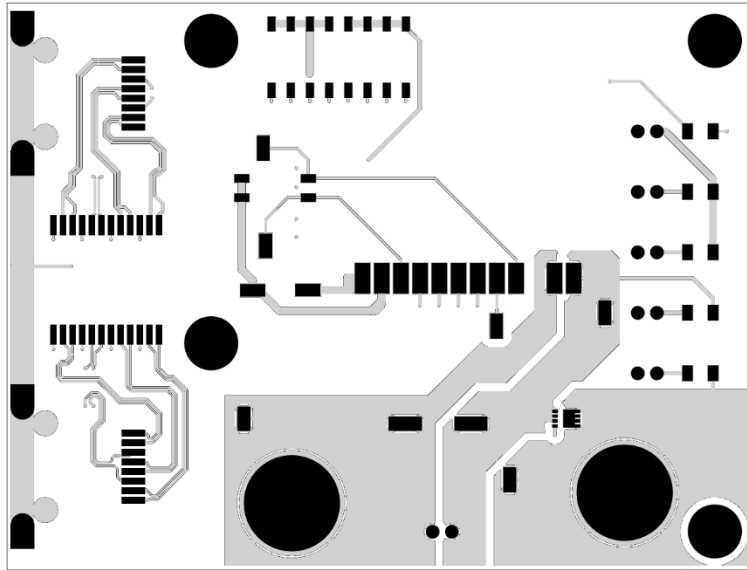


Figure 5: Top Layer Routing

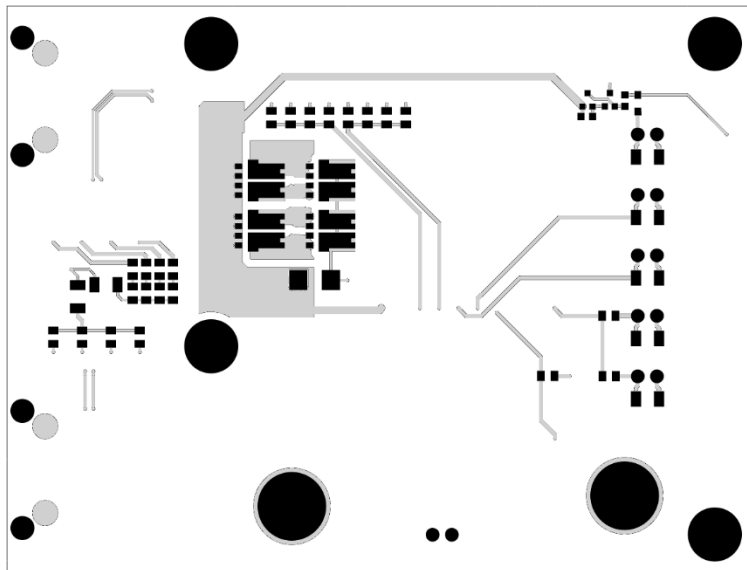


Figure 6: Bottom Layer Routing

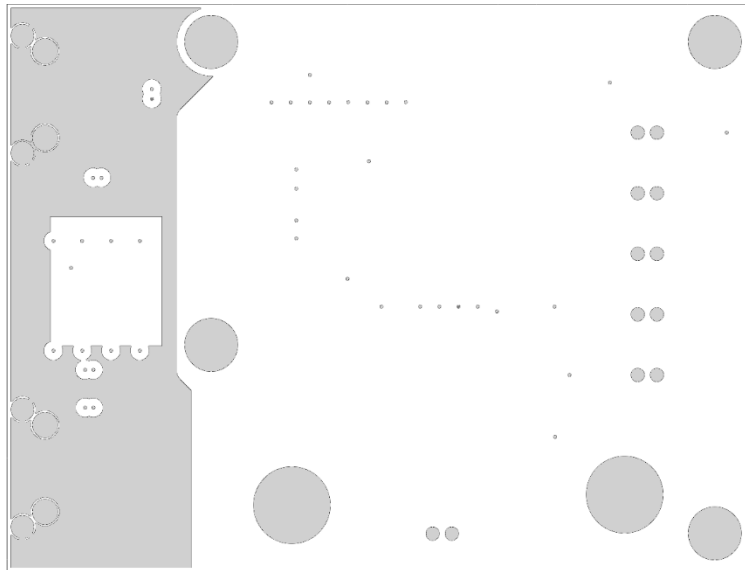


Figure 7: Inner Layer 1 Routing

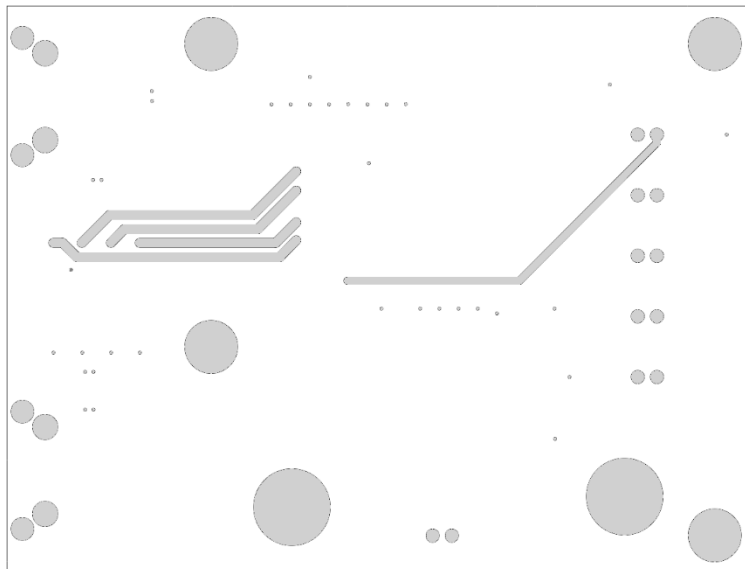


Figure 8: Inner Layer 2 Routing