

User's Guide Latching Current Limiter (LCL) ZES744LCL EVM

Abstract

The User's Guide describes the operation of the Latching Current Limiter (LCL) ZES44LCL EVM evaluation module. It provides the detail how to setup, configure the Latching Current Limiter as designed to monitor the supply current into an electronics system, the LCL disconnects the power to the electronics system when the supply current exceeds a preconfigured threshold. This document applies only to the ZES744LCL EVM.

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1. Introduction

ZES744LCL EVM, Latching Current Limiter (LCL) is designed based on ECSS-E-ST-20-20C, offering in current limiter switching of the power supply lines to COTS with operating input voltage of 4V to 60V with integrated power transistors that withstand up to 4A of output current, with very low quiescent current at 2mA.

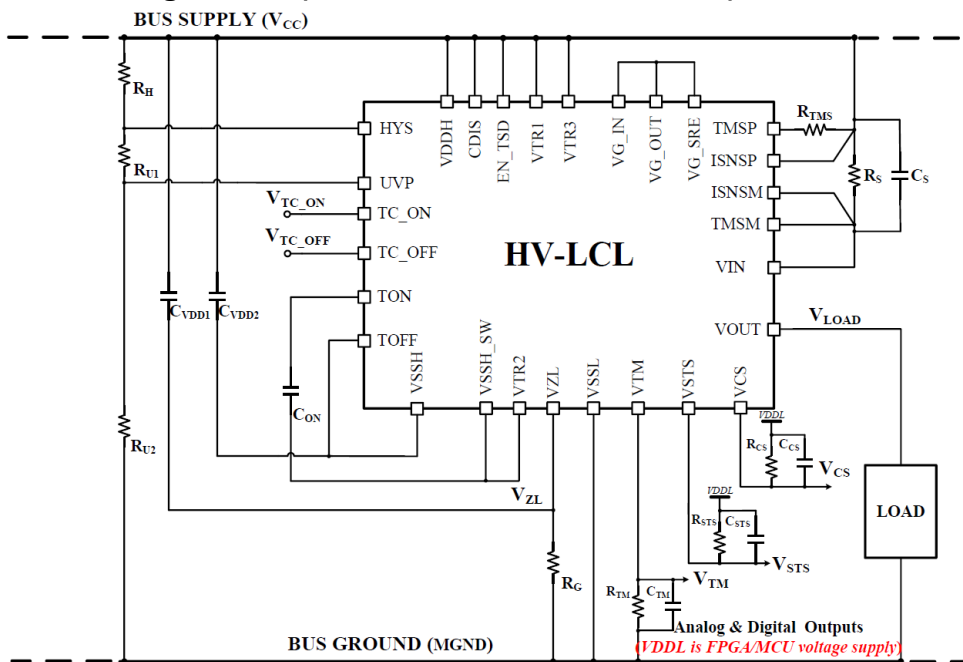
The control system embodies a unique Smart-monitor with two types of operations: Latched or Re-triggerable, with built-in Smart current limitation for repetitive overloads, with Embedded current sense and Digital status for system monitoring.

The ZES744LCL EVM is equipped with the following featured,

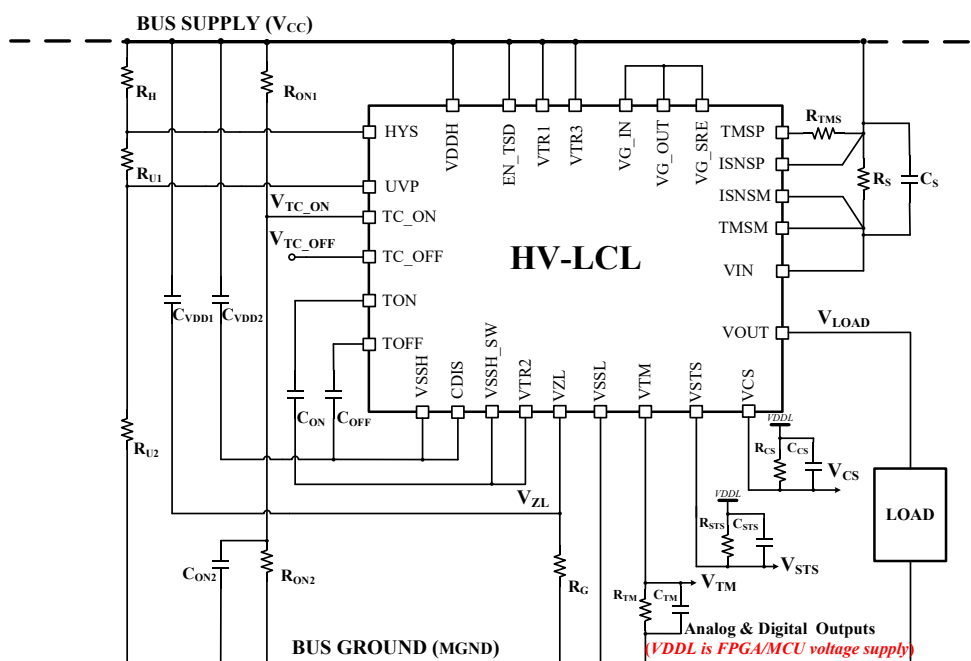
- Configurable trip-off and recovery times
- Configurable undervoltage protection
- Floating ground

2. Typical Application Circuit

2.1 LCL Configuration (Latch Mode, $5V < V_{CC} \leq 60V$)



2.2 RLCL Configuration (Re-triggerable Mode, $5V < V_{CC} \leq 60V$)



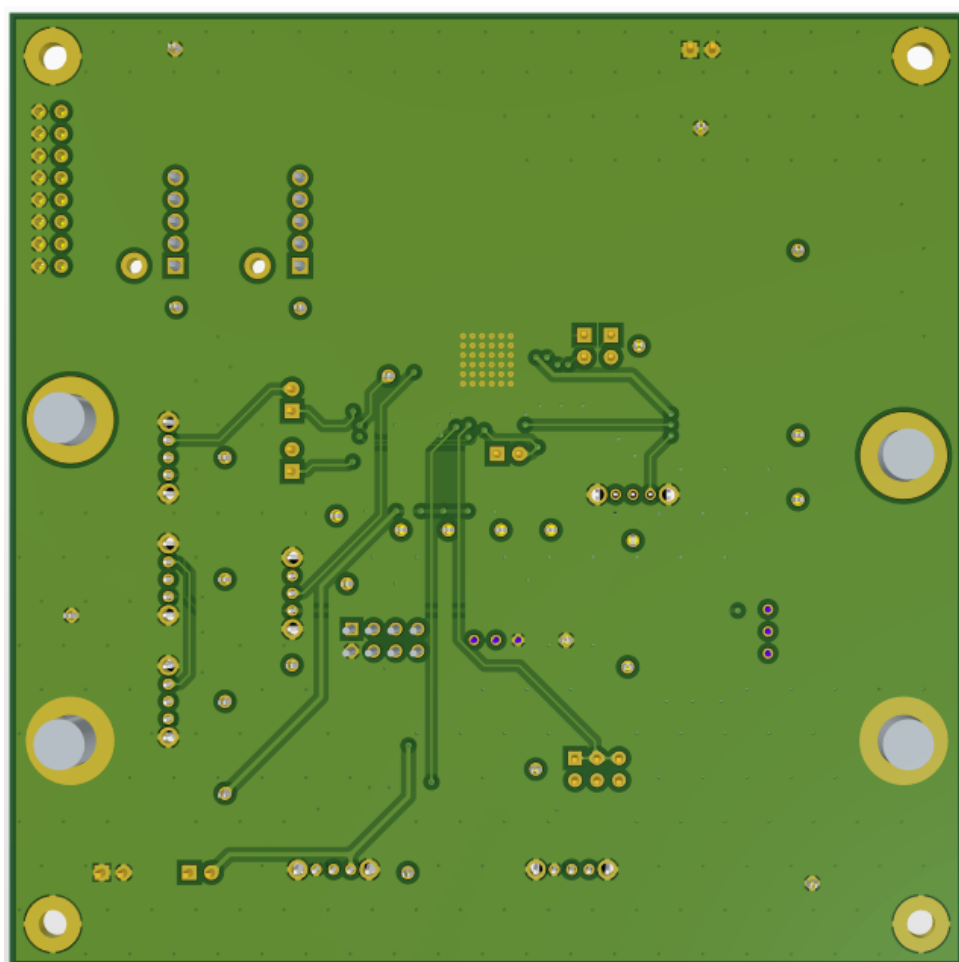
3. ZES744LCL EVM Operational Range, T_A = 25 degC

Specification	Test Conditions	Min	Typ	Max	Unit
Power Input Voltage (V _{DDH})		4		60	V
Input Voltage control circuit (V _{DD5V})			4.5	5	V
Output Voltage (V _{OUT})		4		60	V
Output current (I _{OUT})				4	A

Limitation Current (Trip Current) is defined by R_S with the following equation.

$$I_{limitation\ (Trip)} = \frac{100 \times 10^{-3}\ V}{R_S}\ A$$

TC_OFF	CS_Disable Switch(S3)	Description settings
Latched (J8 shunt)	1	TC_OFF reset after LCL latched
Re-Triggerable (J8 open)	0	LCL trip 8th times, TC_OFF can reset

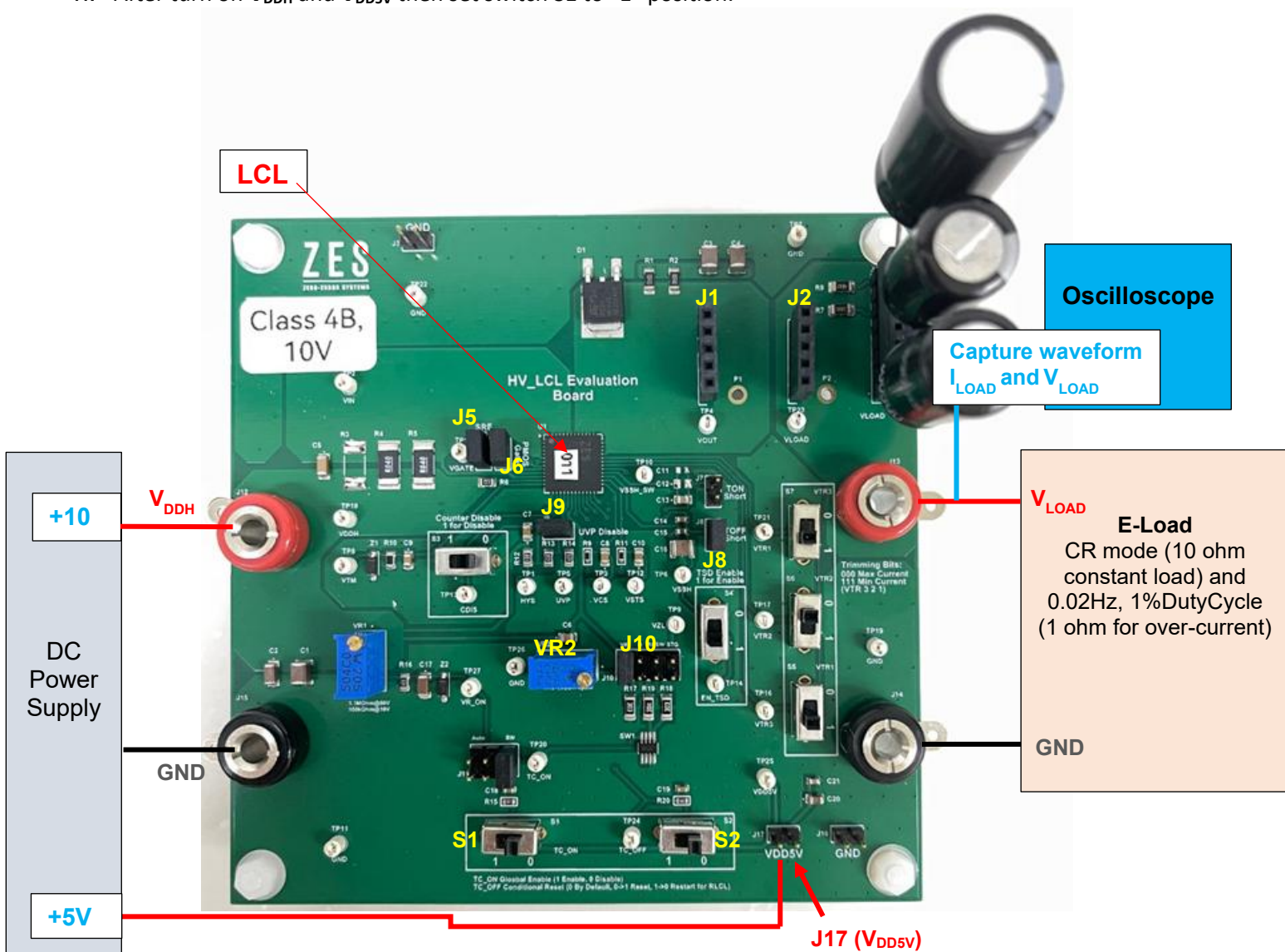


5. List of items Required

- DC Power supply
- Variable “constant resistance” Electronics-load(E-load)
- Banana plugs cables
- Oscilloscope
- Current probe

6. ZES744LCL EVM (strictly for $V_{DDH} = 10V$ only) Set-up connections

- Ensure VR2 to 2k ohm.
- Ensure there is shunt across J5, J6, J9, **J10 at VR** position.
- Selection of J8: Shunt is Latched mode/ J8 shunt removed is Re-trigger mode.
- Ensure switch S1 and S2 are at “0” position before turn on DC supply 10V to V_{DDH} and 5V to V_{DD5V} .
- Connect banana cable from DC Power Supply to ZES744LCL EVM V_{DDH} and V_{DD5V} header-pin (J17).
- Connect J1 and J2 with a thick wire or inductor as per require.
- Connect banana cable from ZES744LCL EVM V_{LOAD} connector to Electronics load(E-load) constant resistance mode.
- After turn on V_{DDH} and V_{DD5V} then set switch S1 to “1” position.

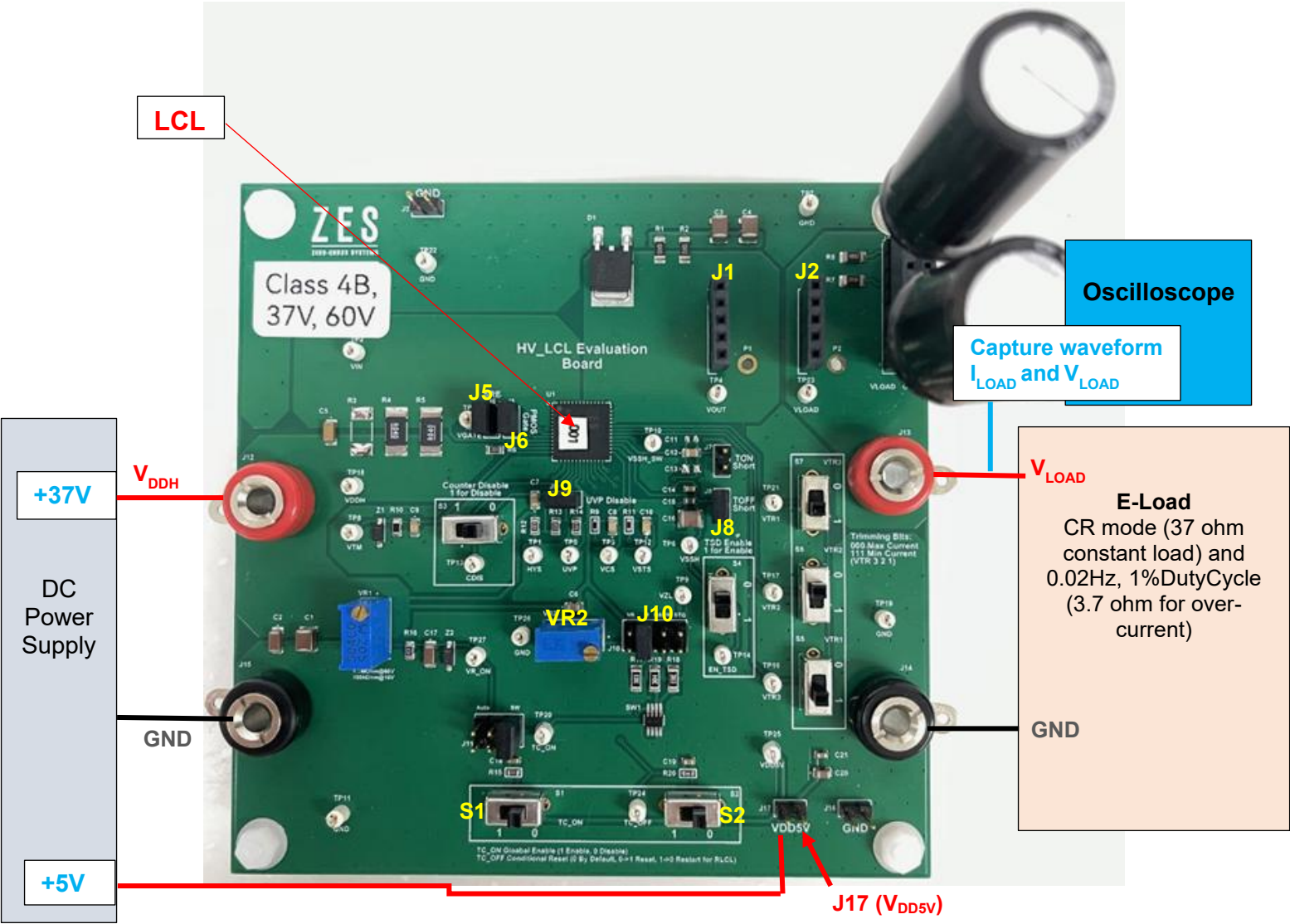


7. Power-up Procedure

- With above set-up connections, power on the DC Power supply 10V and 5V to ZES744LCL EVM V_{DDH} and V_{DD5V} .
- Connect oscilloscope and E-load to V_{LOAD} , connector and monitor the output.

8. ZES744LCL EVM (strictly for $V_{DDH} = 37V$ only) Set-up connections

- Ensure VR2 to 15.5k ohm.
- Ensure there is shunt across J5, J6, J9, **J10** at VR position.
- Selection of J8: Shunt is Latched mode/ J8 shunt removed is Re-trigger mode.
- Ensure switch S1 and S2 are at "0" position before turn on DC supply 37V to V_{DDH} and 5V to V_{DD5V} .
- Connect banana cable from DC Power Supply to ZES744LCL EVM V_{DDH} and V_{DD5V} header-pin (J17).
- Connect J1 and J2 with a thick wire or inductor as per require.
- Connect banana cable from ZES744LCL EVM V_{LOAD} connector to Electronics load(E-load) constant resistance mode.
- After turn on V_{DDH} and V_{DD5V} then set switch S1 to "1" position.

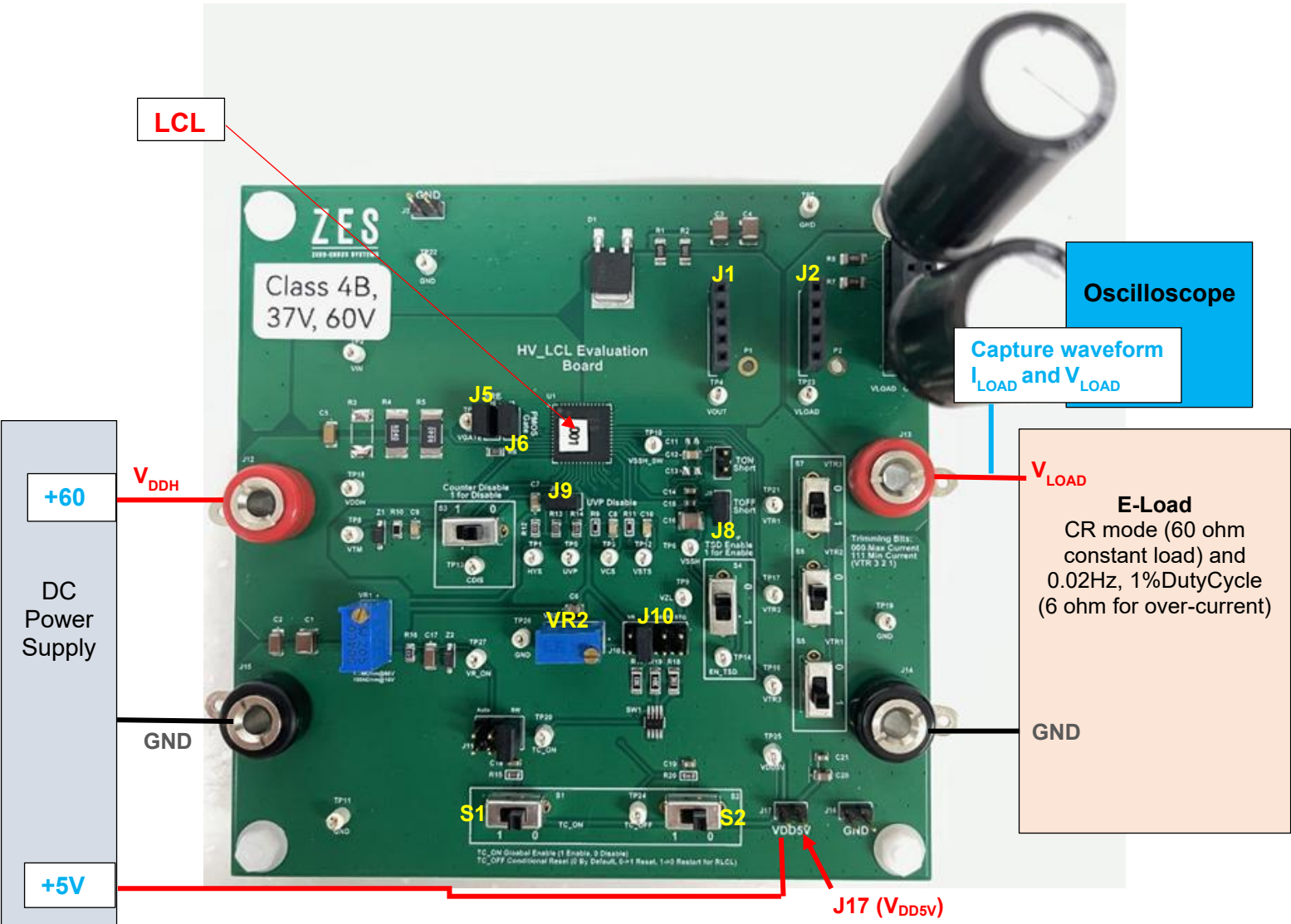


9. Set-up Procedure

- With above set-up connections, power on the DC Power supply 37V and 5V to ZES744LCL EVM V_{DDH} and V_{DD5V} .
- Connect oscilloscope and E-load to V_{LOAD} , connector and monitor the output.

10. ZES744LCL EVM (strictly for $V_{DDH} = 60V$ only) Set-up connections

- Ensure there is shunt across J5, J6, J9, J10 at R position.
- Selection of J8: Shunt is Latched mode/ J8 shunt removed is Re-trigger mode.
- Ensure switch S1 and S2 are at "0" position before turn on DC supply 60V to V_{DDH} and 5V to V_{DD5V} .
- Connect banana cable from DC Power Supply to ZES744LCL EVM V_{DDH} and V_{DD5V} header-pin (J17).
- Connect J1 and J2 with a thick wire or inductor as per require.
- Connect banana cable from ZES744LCL EVM V_{LOAD} connector to Electronics load(E-load) constant resistance mode.
- After turn on V_{DDH} and V_{DD5V} then set switch S1 to "1" position.



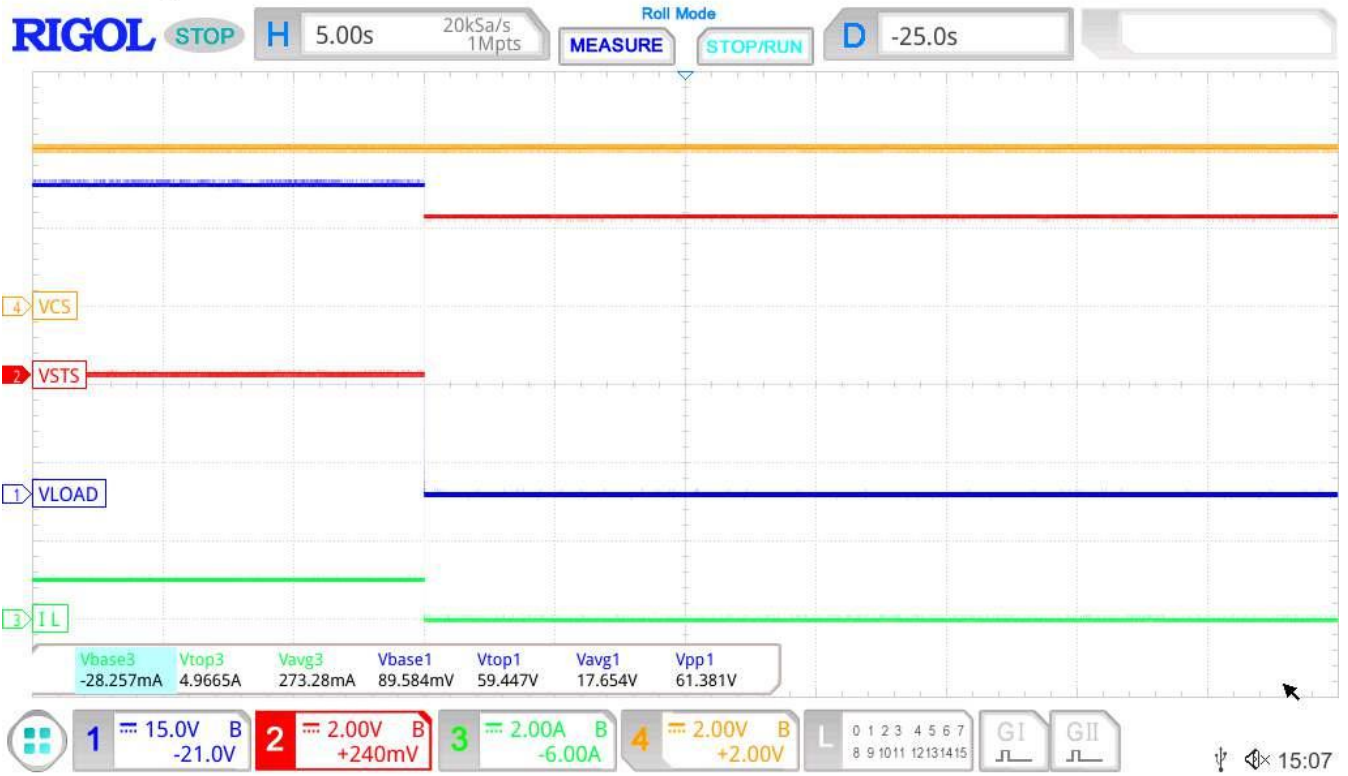
11. Set-up Procedure

- With above set-up connections, power on the DC Power supply 60V and 5V to ZES744LCL EVM V_{DDH} and V_{DD5V} .
- Connect oscilloscope and E-load to V_{LOAD} , connector and monitor the output.

12. Measuring Output when Over-current

- a. ZES744LCL EVM rev1.0 of the output waveforms below with oscilloscope V_{OUT} (Blue), I_{OUT} (Green), V_{CS} (Orange) and V_{STS} (Red).

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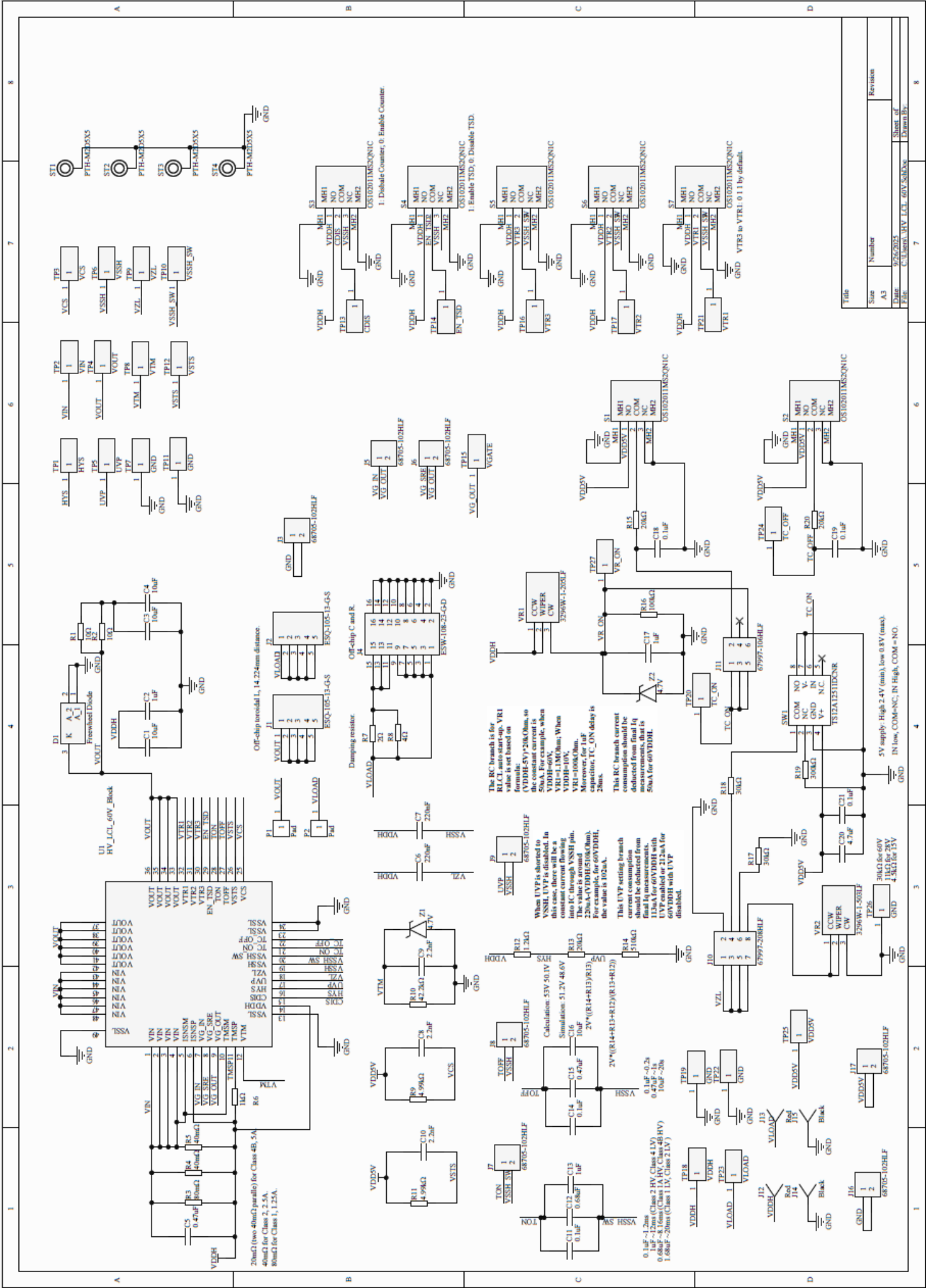


Zoom-in

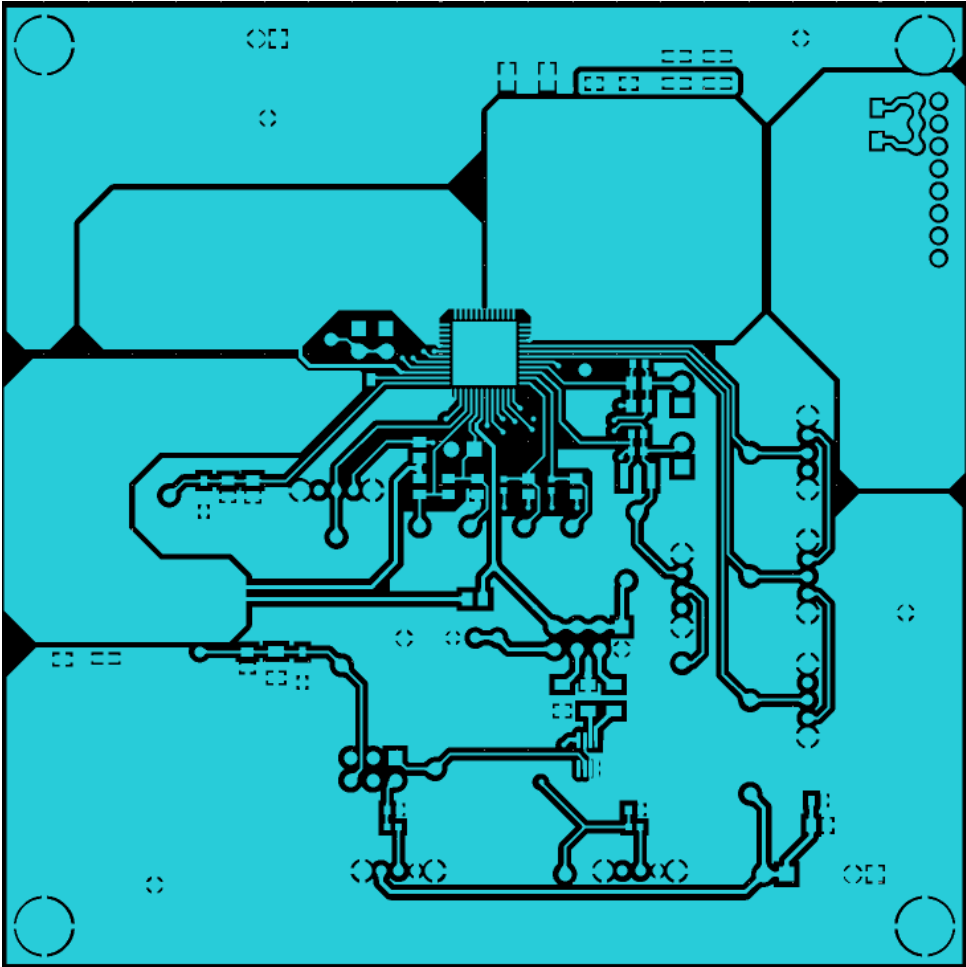
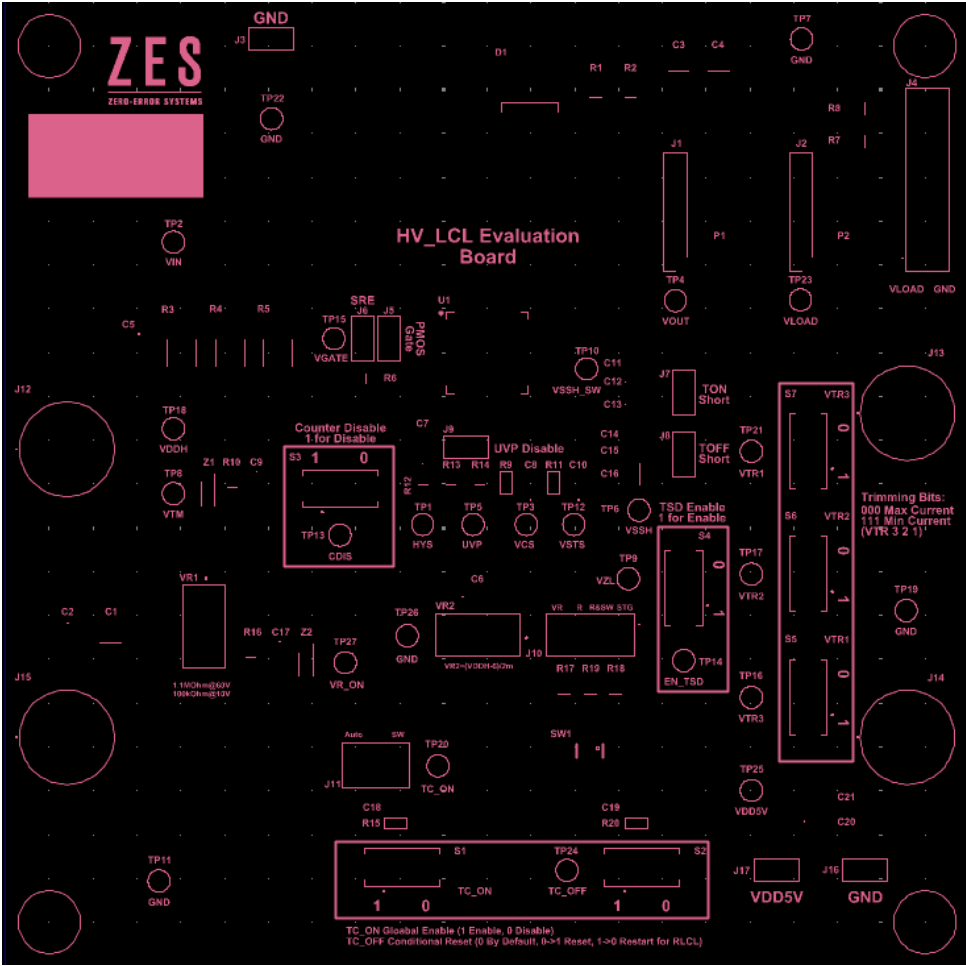
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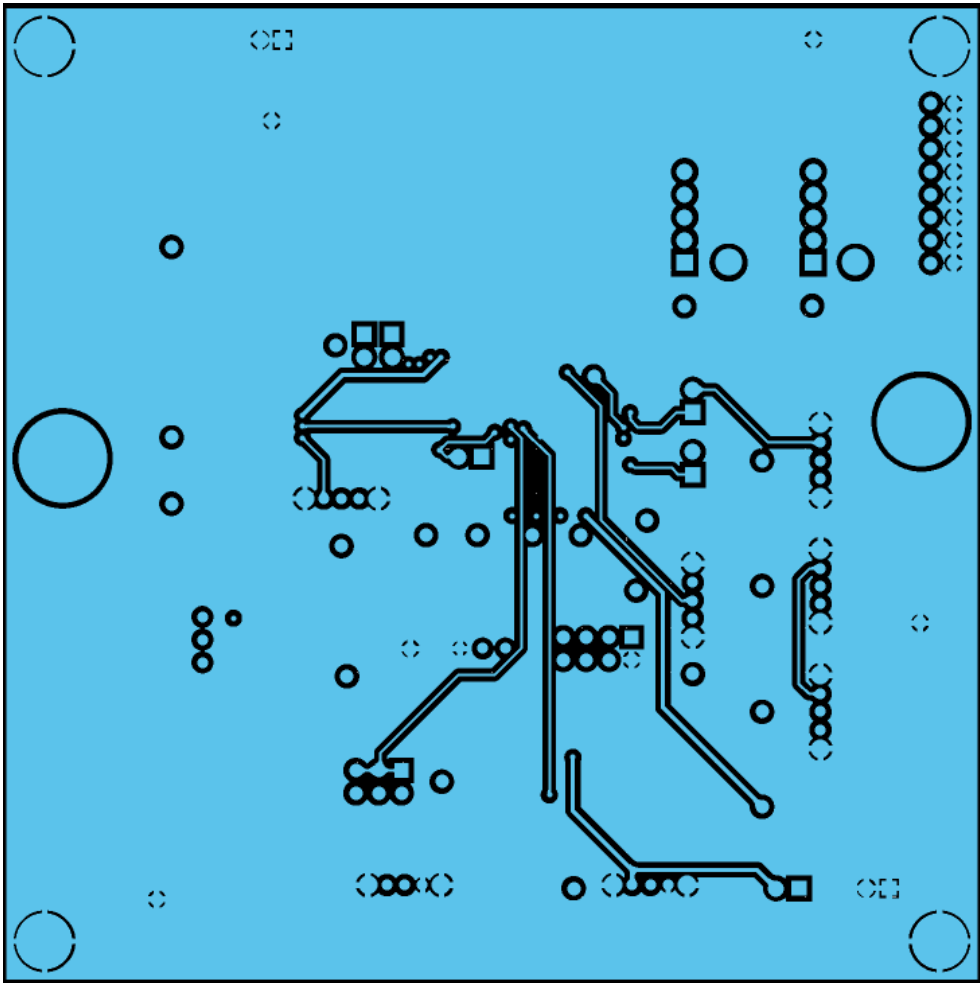
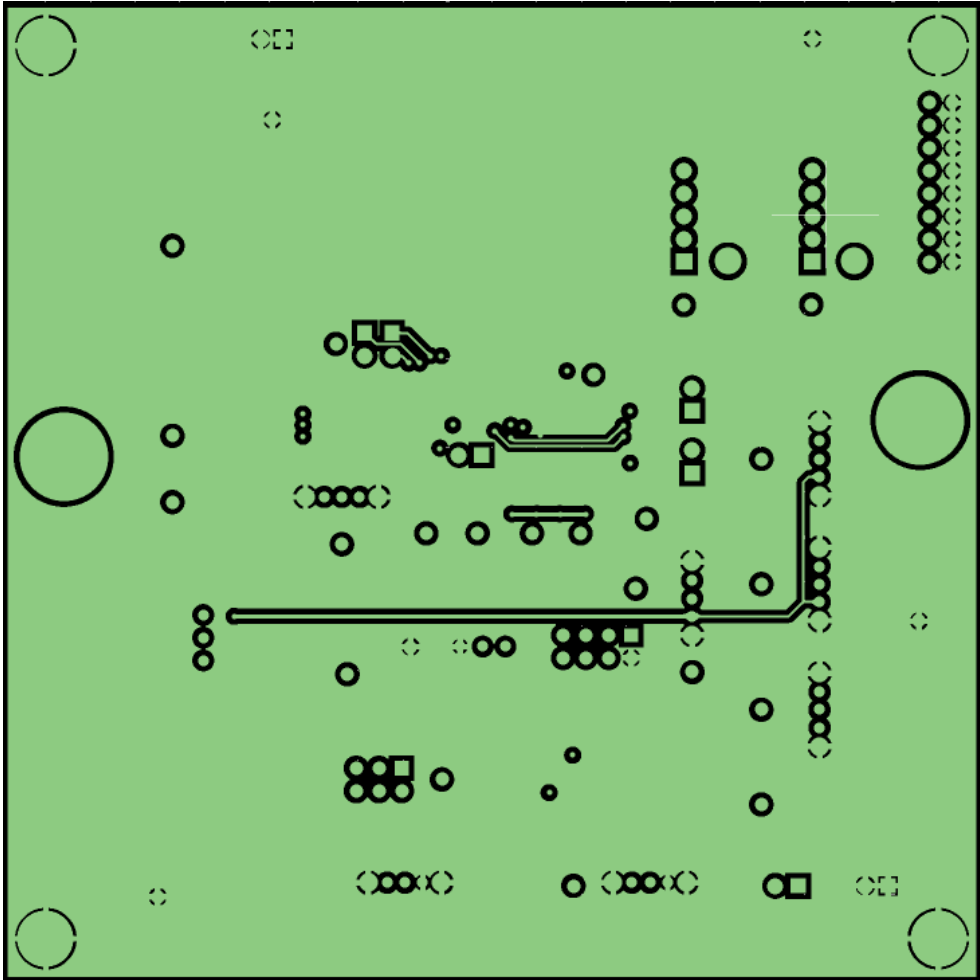


13. ZES744LCL EVM Schematic



14. ZES744LCL EVM PCB layout





Appendix

Revision History

Revision No.	Notes	Date
Rev 1.0	Preliminary version	Feb, 2026
Rev 2.0	Amended V _{CS} and V _{STS} typo	Aug, 2026

For price, delivery, and ordering information please contact sales@zero-errorsystems.com

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