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ZES723LCL Evaluation Module User's Guide   Feb.2026

User's Guide Latching Current Limiter (LCL)
ZES723LCL EVM (28V)

Abstract

The User's Guide describes the operation of the Latching Current Limiter (LCL) ZES723LCL EVM evaluation module 'ZES723LCLGEV-EP'. It provides the detail how to set-up, 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 ZES723LCL EVM.

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1.   Introduction

ZES723LCL 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 devices with operating input voltage of 4V to 28V 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.

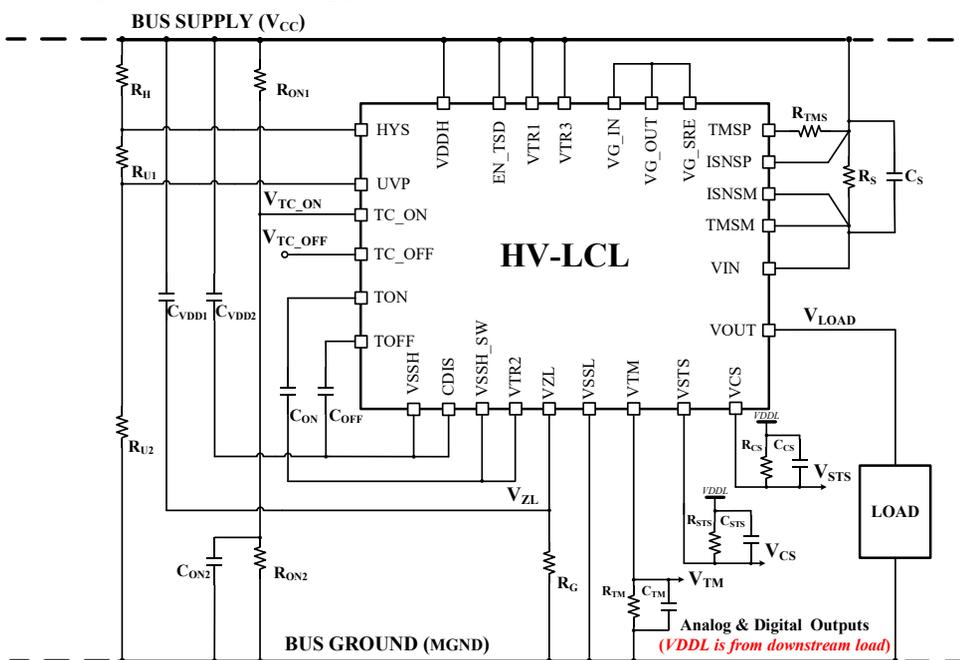The ZES723LCL EVM is equipped with the following featured,
- Configurable trip-off and recovery times
- Configurable undervoltage protection
- Floating ground

2.   Typical Application Circuit

2.1 LCL Configuration (Latch Mode)
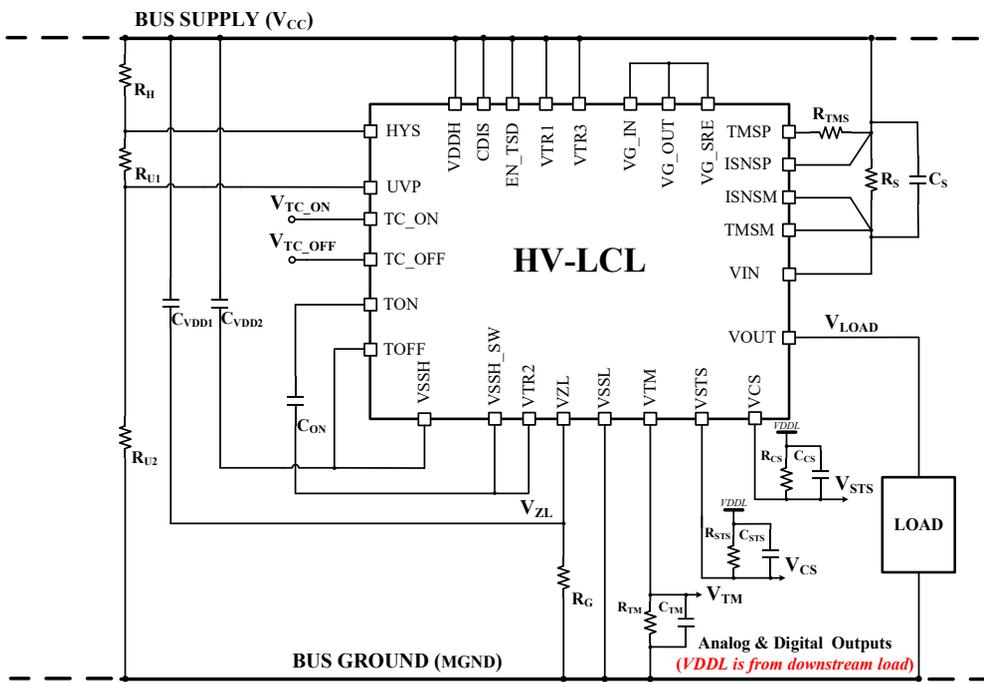
2.2 RLCL Configuration (Re-triggerable Mode)

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3.   **ZES723LCL EVM Operational Range, T$_A$ = 25°C**

Specification	Test Conditions	Min	Typ.	Max	Unit
Power Input Voltage (V$_{CC}$)		4		28	V
Input Voltage control circuit (V$_{DD5V}$)			4.5	5	V
Output Voltage (V$_{OUT}$)		4		28	V
Output current (I$_{OUT}$)				4	A

Limitation Current (Trip Current) is defined by R$_S$ with the following equation.

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

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4.   ZES723LCL EVM Board (Top side and bottom side)

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5.   **List of items Required**
   a.   DC Power supply
   b.   Variable "constant resistance" Electronics-load(E-load)
   c.   Banana plugs cables
   d.   Oscilloscope
   e.   Current probe

6.   **ZES723LCL EVM (strictly for V_CC = 28V only) Set-up connections**
   a.   Ensure VR2 to 10.9k ohm for V_{CC} = 28V only.
   b.   Ensure there is shunt across J5, J6, J9, **J10 at VR** position.
   c.   Selection of J8: Shunt is Latch mode/ J8 shunt removed is Re-triggerable mode.
   d.   Set switch S3 (CS_Disable Switch); S3=1 for Latch mode/ S3=0 for Re-triggerable mode
   e.   Ensure switch S1 (TC_ON) and S2 (TC_OFF) are at "0" position before turn-on DC supply 28V to **V_CC** and 5V to **V_DD5V**.
   f.   Connect banana cable from DC Power Supply to ZES723LCL EVM **V_CC** and **V_DD5V** header-pin (J17).
   g.   Connect J1 and J2 with a thick wire or inductor as per require.
   h.   Connect banana cable from ZES723LCL EVM **V_LOAD** connector to Electronics load(E-load) constant resistance mode.
   i.   E-Load to configure to CR mode (28 ohm) at 0.02Hz, 1% (2.8 ohm) duty cycle as per below:
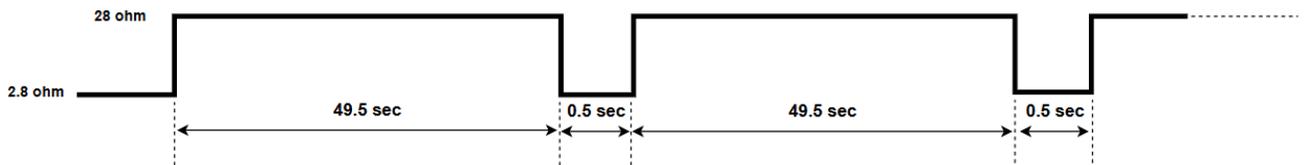
   j.   After turn on **V_CC** and **V_DD5V** then set switch S1 (TC_ON) to "1" position.

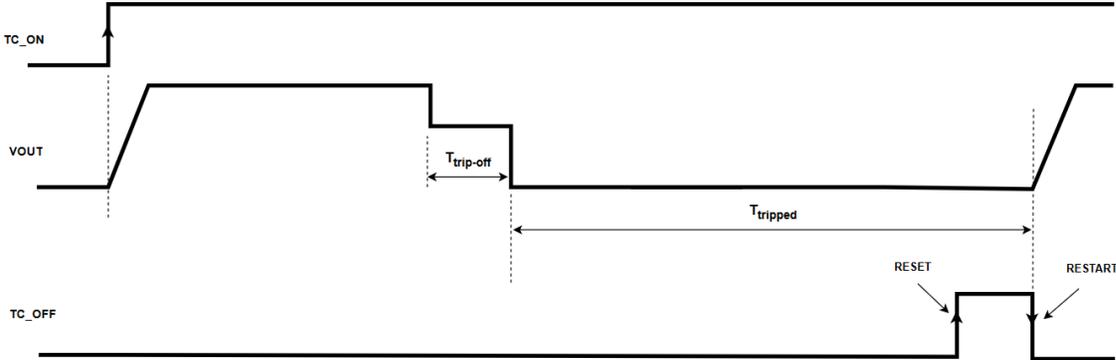# ZES723LCL Evaluation Module User's Guide   Feb.2026
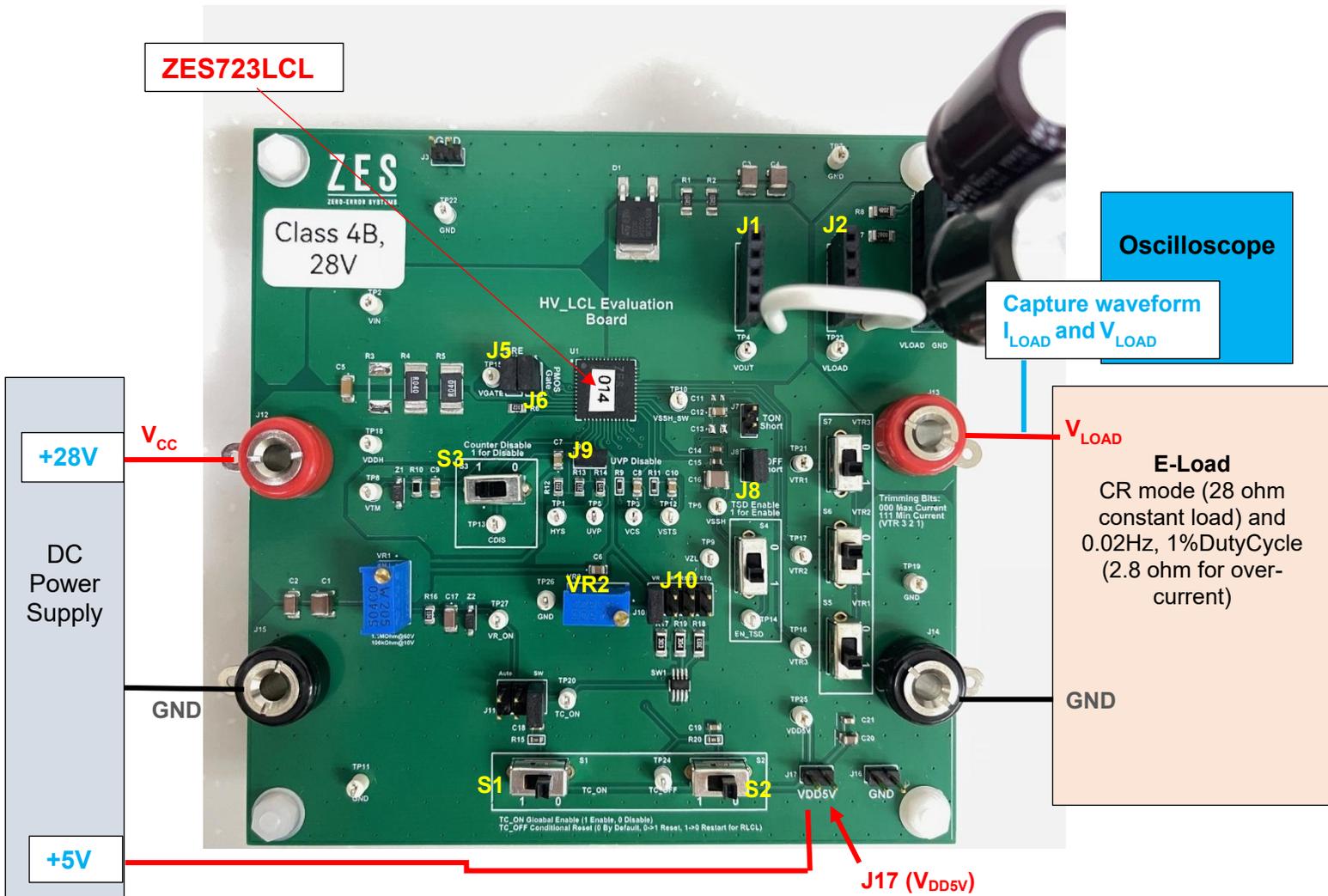
7.   Set-up Procedure

k. With above set-up connections, power on the DC Power supply 28V and 5V to ZES723LCL EVM **V_CC** and **V_DD5V**.

l. Connect oscilloscope and E-load to **V_LOAD**, connector and monitor the output.

8.   LCL Input Telecommands Scheme (Latch Mode)

TC_ON/TC_OFF	TC_ON = 0	*TC_ON = 1
TC_OFF = 0	OFF	ON
TC_OFF = 1	OFF	When LCL is **not tripped**, TC_OFF = 1 is blocked. When LCL is **tripped**, TC_OFF = 1 will reset all internal latches and keeps LCL in **tripped** state and later when switch TC_OFF = 0 will release LCL from trip and turn on VOUT.

Notes: In Latch mode, when TC_ON=1, set CS_Disable Switch (S3) = 1, otherwise TC_OFF will be blocked.

8.1 LCL Input Telecommands Timing diagram

9.   RLCL Input Telecommands Scheme (Re-triggerable Mode)

TC_ON/TC_OFF	TC_ON = 0	**TC_ON = 1
TC_OFF = 0	OFF	ON
TC_OFF = 1	OFF	When LCL is **not tripped or counter counts < 8 times**, TC_OFF = 1 is blocked. When LCL is **tripped and counter counts ≥ 8 times**, TC_OFF = 1 will resets all internal latches and keeps LCL in tripped state and stops the retriggering. If later switch TC_OFF = 0 will release LCL from trip and turn on VOUT.

**Notes: In Re-Triggerable mode, when TC_ON=1, set CS_Disable Switch (S3) = 0, otherwise Counter status invalid.*

9.1 RLCL Input Telecommands Timing diagram

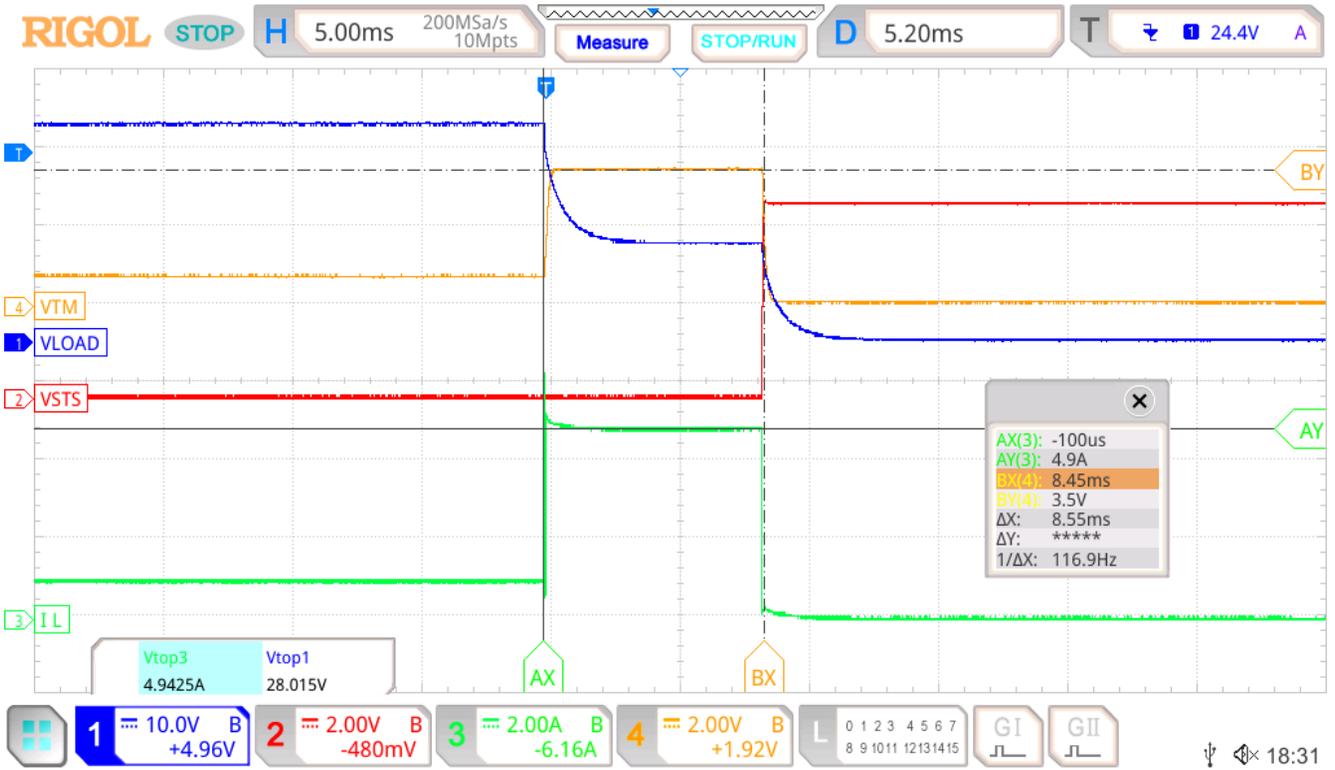# ZES723LCL Evaluation Module User's Guide
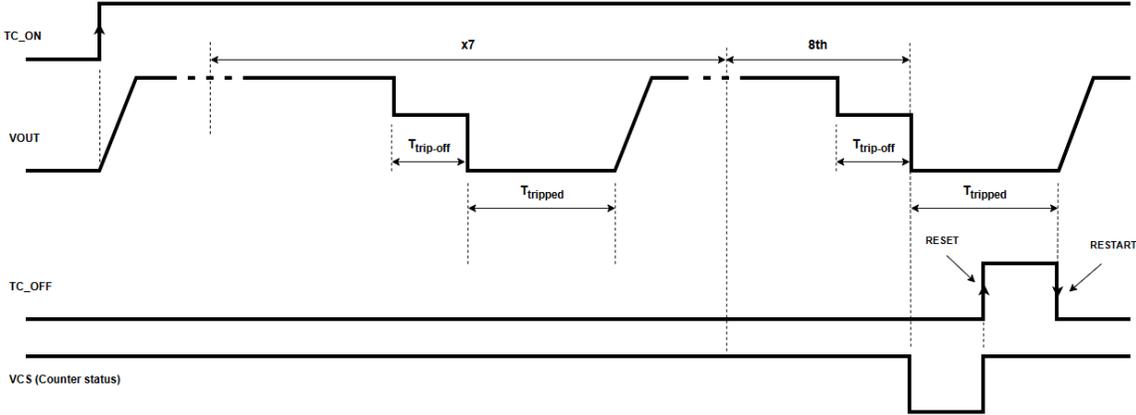
10. **Measuring Output when Over-current (Re-Triggerable mode)**
    a. ZES723LCL EVM rev1.0 of the output waveforms below with oscilloscope V_{OUT}(Blue), I_{OUT}(Green), V_{CS}(Orange) and V_{STS}(Red).

Zoom-in waveform when Trip:

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11.   ZES723LCL EVM Schematic

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12. ZES723LCL EVM PCB layout

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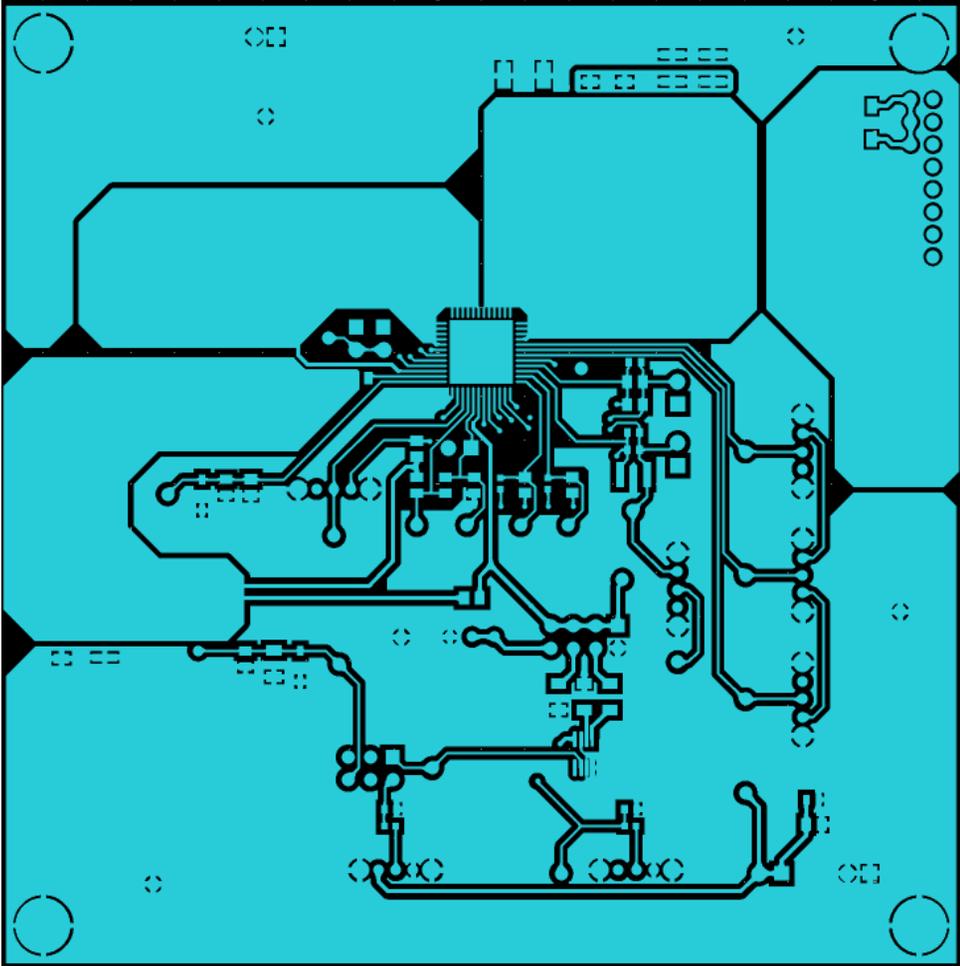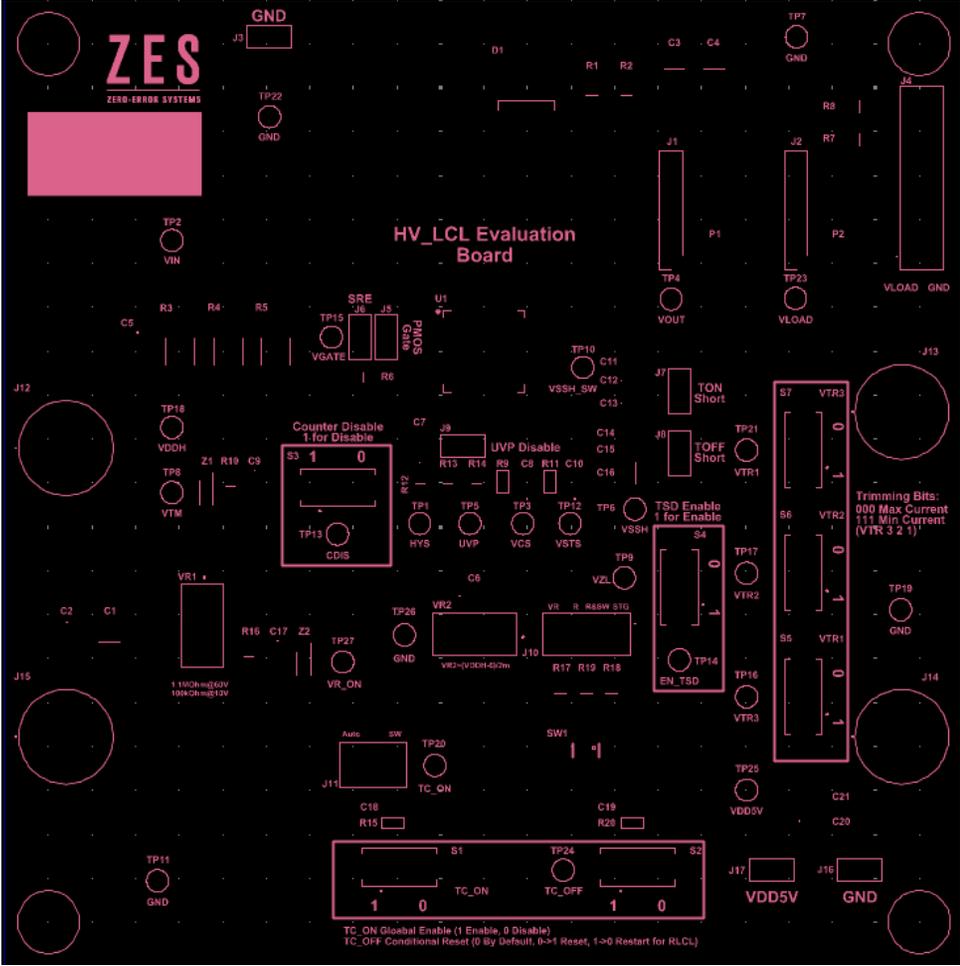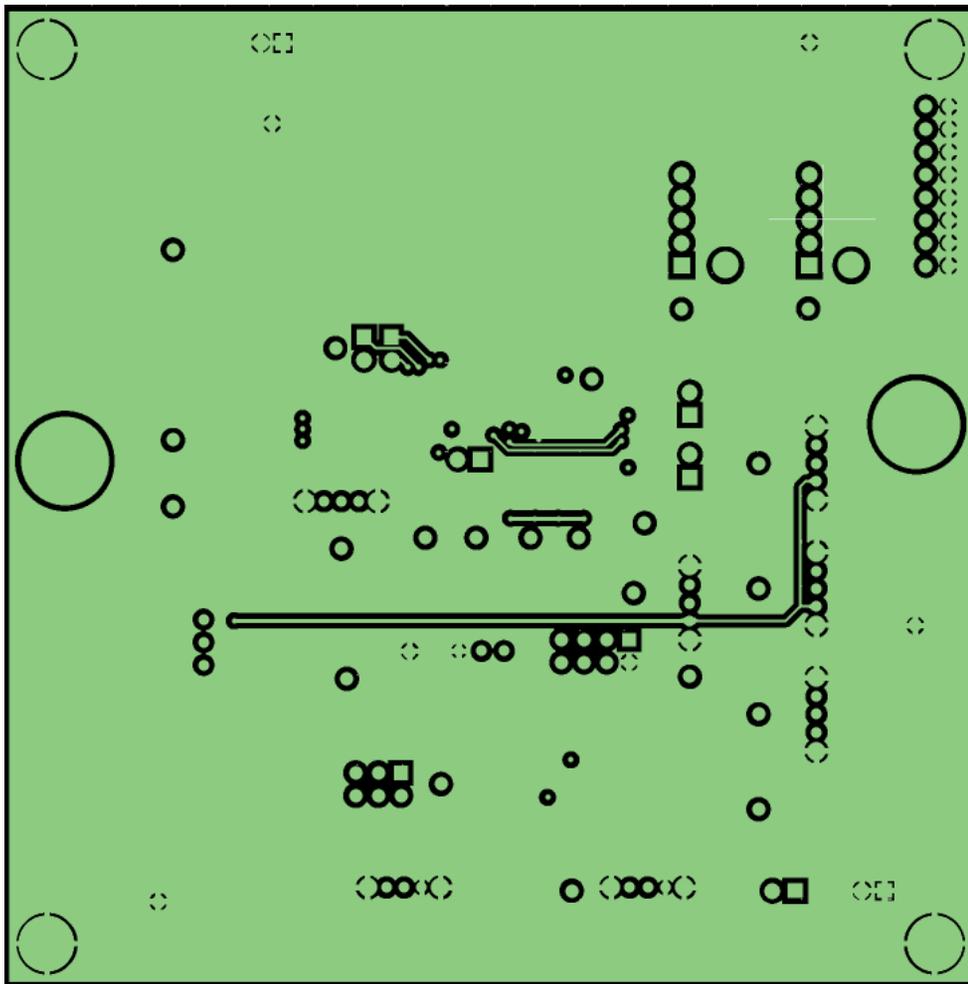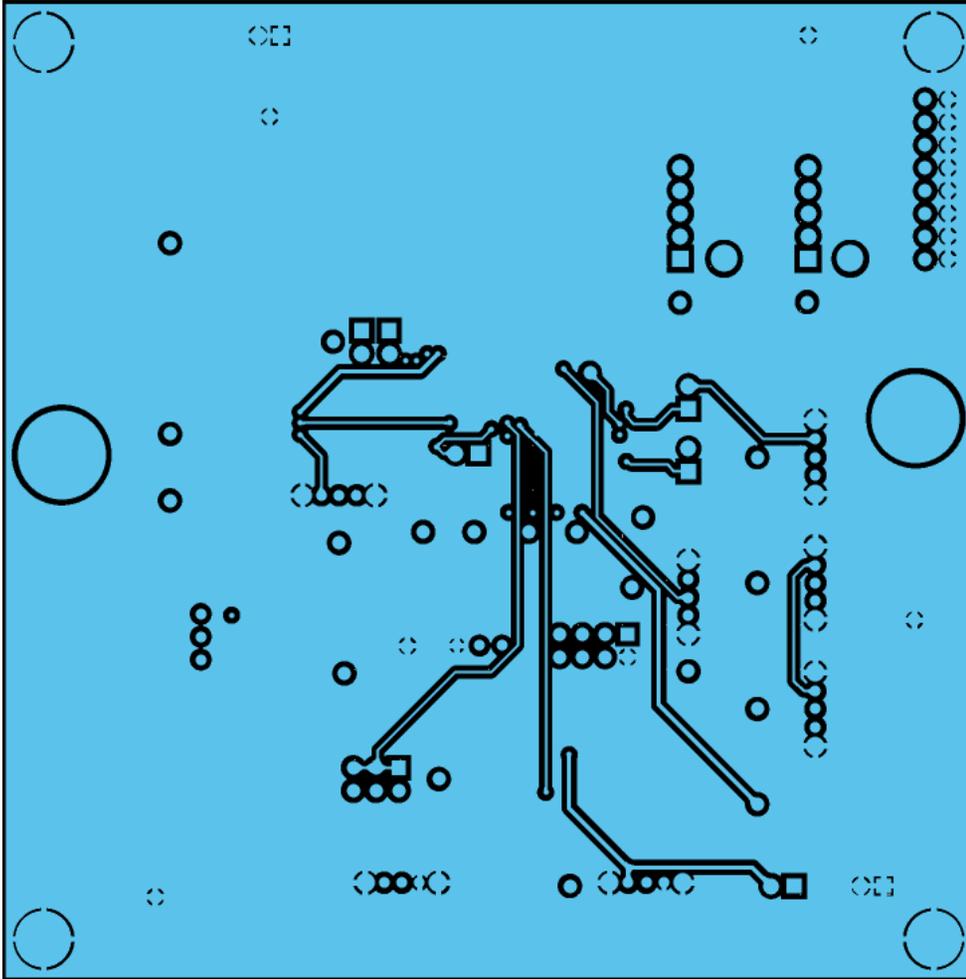
Appendix

Revision History

Revision No.	Notes	Date
Rev 1.0	Preliminary version	Nov, 2025

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

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