

Single Flash LED Driver with Programmable 1.5A Current Source

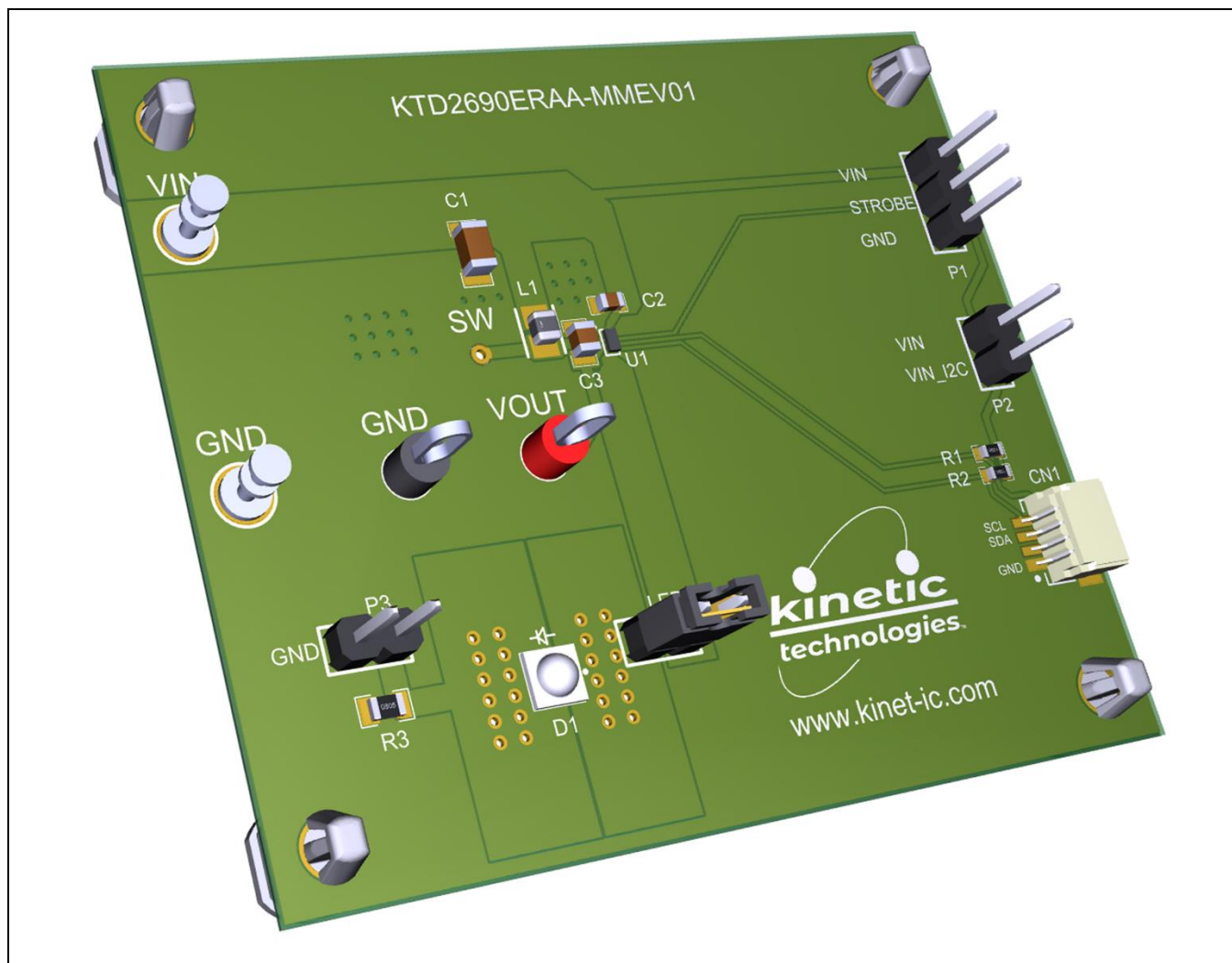
Brief Description

The KTD2690 Evaluation (EVAL) Kit is used to demonstrate and evaluate the KTD2690 in CSP package functionality, performance, and PCB layout. The kit includes a fully assembled and tested PCB with the KTD2690 IC installed, and a printed copy of the Quick-Start Guide (also contained within this document).

Ordering Information

Part Number	Description	IC Package
KTD2690ERAA-MMEV01	KTD2690 EVAL Kit	WLCSP-8



3D CAD Image



EVAL Kit Physical Contents

Item #	Description	Quantity
1	KTD2690 EVAL Kit fully assembled PCB	1
2	MCP2221A Board - General Purpose USB to GPIO I2C - Stemma QT / Qwiic	1
3	Stemma QT / Qwiic JST SH 4-pin Cable - 100mm Long	1
4	Anti-static bag	1
5	KTD2690 EVAL Kit Quick-Start Guide -- printed 1-page (A4 or US Letter)	1
6	EVAL Kit box	1

QR Links for Documents

IC Datasheet	EVAL Kit Landing Page
 https://www.kinet-ic.com/ktd2690/	 https://www.kinet-ic.com/ktd2690eraa-mmev01/

User-Supplied Equipment

Required Equipment

1. Bench Power Supply for VIN 5V and 3A, as needed for the intended application.
2. Digital Multimeter – one or more, used to measure input/output voltages and currents.

Optional Equipment

1. Oscilloscope – for dynamic testing of voltages (and currents with a current probe, if available).
2. Additional Digital Multimeters

Recommended Operating Conditions

Symbol	Description	Value	Units
VIN, VOUT, LED		2.7 to 5.5	V
LX		≤ 6	V

Jumper Descriptions

Designator	Name	Description	Default
P2	VIN_I2C	I2C logic supply <ul style="list-style-type: none"> Open: VIN_I2C should be supplied externally from the MPC2221A board via the 4-wire Stemma cable VIN: with the jumper present, VIN_I2C is supplied from VIN 	open
P1	STROBE	Flash STROBE control input <ul style="list-style-type: none"> GND: STROBE input set low to GND (disabled) VIN: STROBE input set high to VIN (enabled) 	
P4	LED	Jumper to connect the LED (D1). To use the on-board LED (D1), the jumper is present. To use an external LED, the jumper is removed.	on
P3	GND	Jumper to short the 0.1Ω sense resistor (R3). When the jumper is not present, measuring the voltage across P5 testpoints allows to calculate the LED current $I_{LED} = VP5 / 0.1$.	open

Quick-Start Procedures

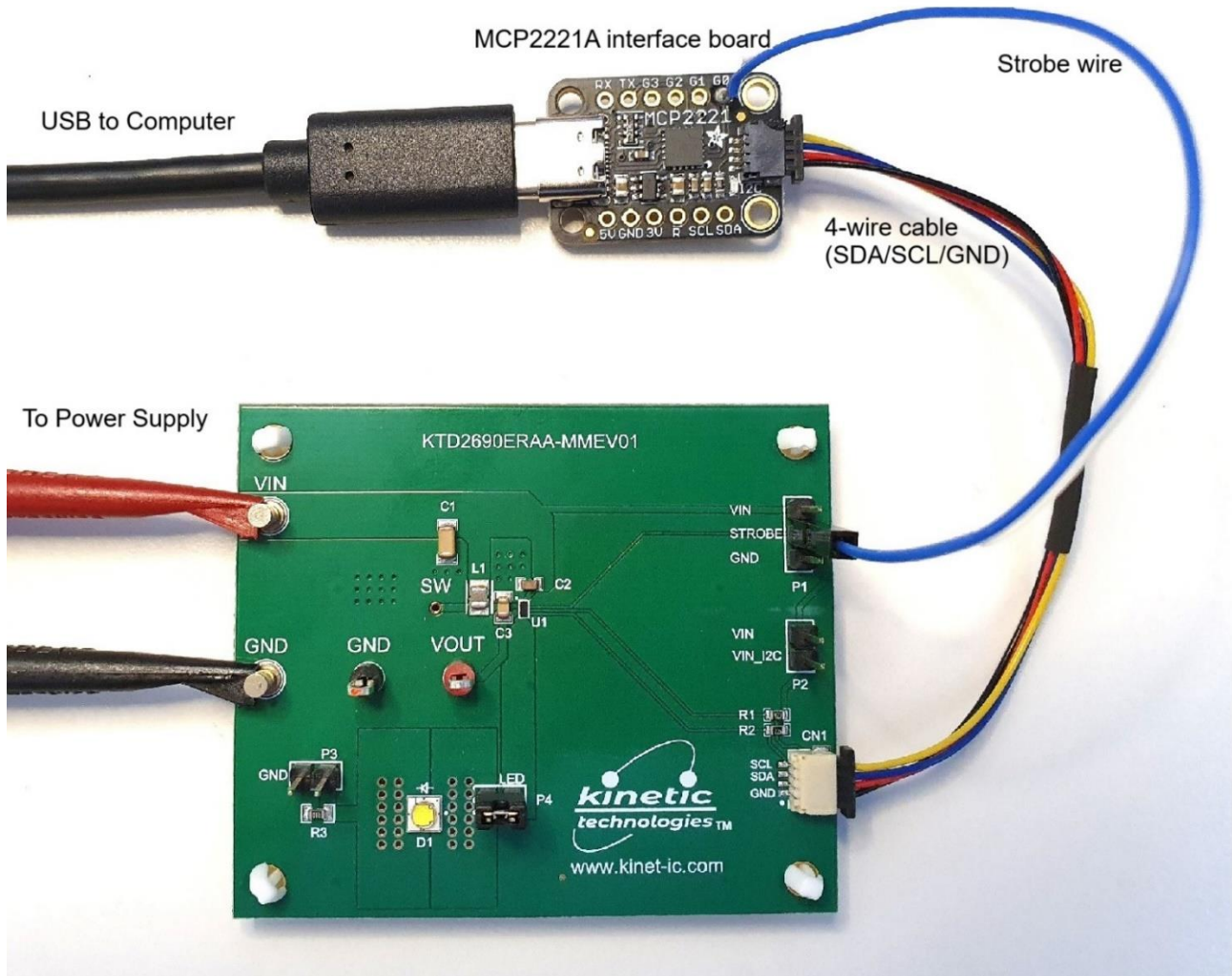
- Connect one pair of Banana-to-clip power cables to the test points at VIN and GND (left side of EVAL Kit).
- Before connecting the EVAL Kit to the VIN bench supply, turn on the supply and adjust the voltage as close to 0V as possible. Then turn off the supply. While off, connect the banana ends of the Banana-to-clip power cables to the VIN bench supply.
- Turn on the VIN bench supply and very slowly ramp its voltage to an appropriate voltage of 3.6V. While ramping VIN slowly, use the bench supply’s output current indication (or a digital multimeter) to monitor the VIN current. If the current becomes high, reduce the VIN voltage quickly to prevent damage. Then inspect the setup for any wiring errors.
- Use a digital multimeter to check the Standby supply current at VIN. For conditions of VIN = 3.6V in Standby mode, it should be below 2μA.
- Connect the Stemma QT 4-wire cable (GND, SDA, SCL) to the KTD2690 evaluation board connector CN1, as shown in the Typical Test Setup Figure below.
- Connect the other end of the Stemma QT 4-wire cable to the MCP2221A USB to I2C interface board.
- Connect the MCP2221A board to a computer via the USB type-C cable.
- Connect the MCP2221A board output G0 to the KTD2690 board STROBE testpoint via the wire (STROBE) cable.
- Install GUI software.

Graphical User Interface (GUI)

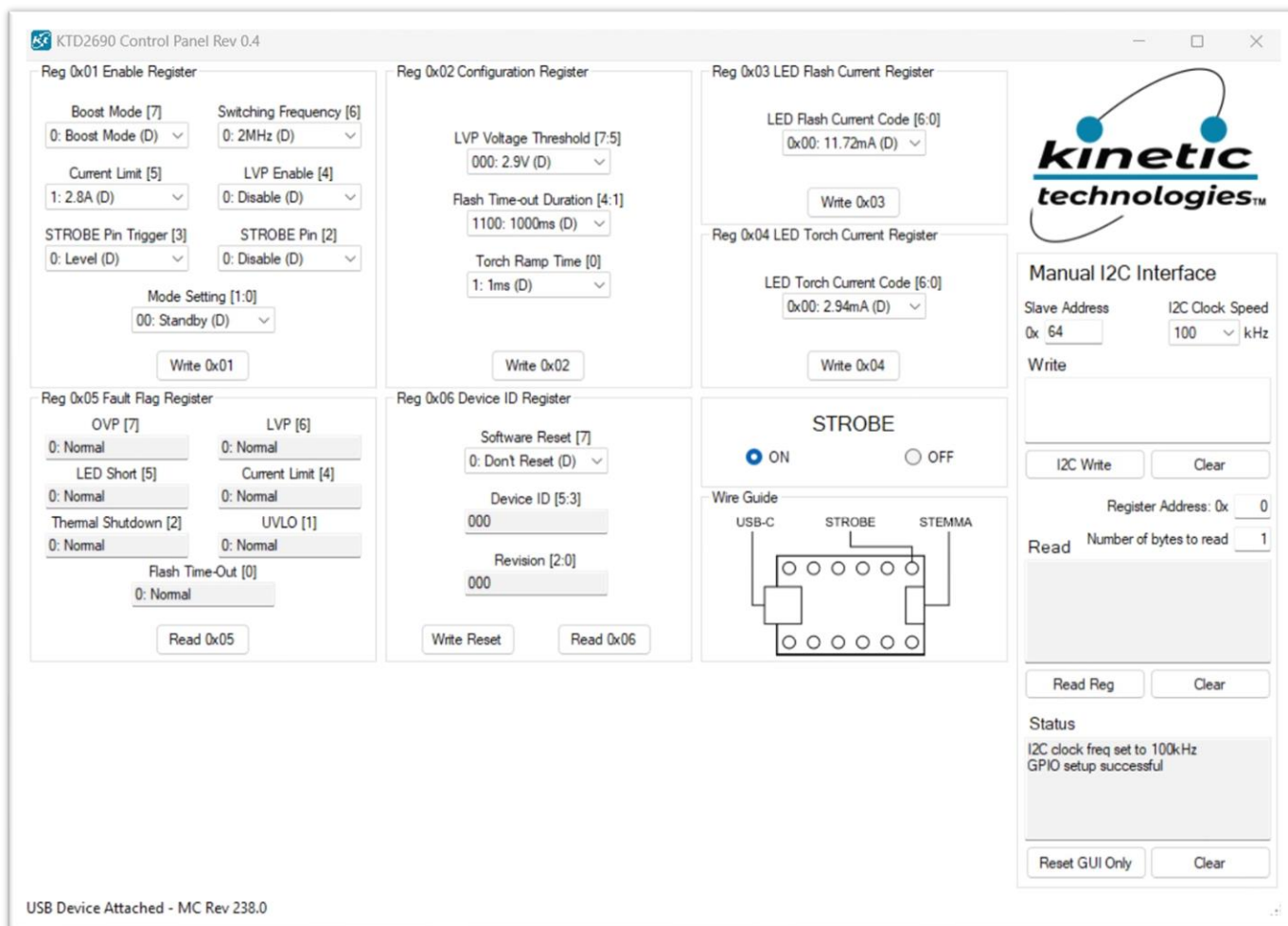
- Download and install GUI software located on EVAL Kit Page (<https://www.kinet-ic.com/ktd2690eraa-mmeev01/>)
- After installing software, the interface will appear with the status message “USB Device Attached” at the bottom left side of the window.
- If the displayed message is “USB Device Detached”, make sure the computer is properly connected to the board.

Typical Test Setup Diagram

Use the following test setup for the Quick-Start Procedures.



Graphical User Interface (GUI) Window



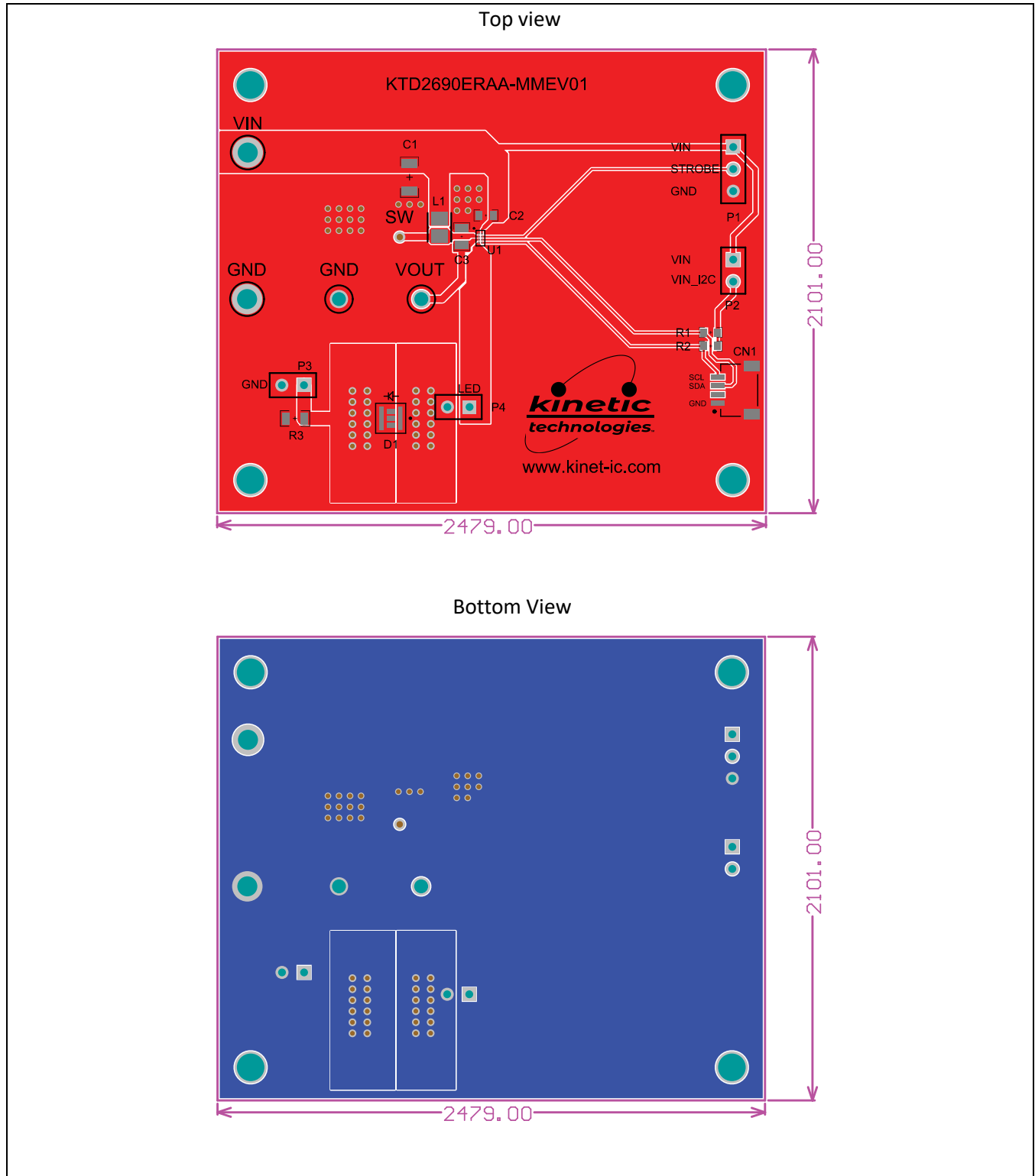
To Check the I²C Connection to the Device

- In the “Reg 0x06 Device ID Register” section, click on the “Read 0x06” button.
- The GUI should display the Device ID equal to 001.
- If the device is not responding (I2C engine timeout), make sure VIN are powered from the 3.6V supply.

To Turn on Flash Mode by I²C Command for 1000ms Duration at 375mA Flash Current

- Set the Flash Current Code in Reg 0x03 register section by selecting “0x1F: 375mA” in the “LED Flash Current Code” list. Then click on “Write 0x03” button.
- Turn on Flash Mode in Reg 0x01 register section by selecting “11: Flash Mode” in the Mode Setting list, and then click on “Write 0x01” button.
- The LED current can be measured briefly by connecting a digital multimeter on P5 header across R3 0.1Ω resistor and GND. For 375mA, the voltmeter should measure a voltage around 38mV.

Printed Circuit Board (PCB)



Additional Test Procedures

To Turn on Torch Mode by I²C Command at 103mA Torch Current

- Set the Torch Current Code in Reg 0x04 register section by selecting “0x22: 103mA” in the “LED Torch Current Code” list. Then click on “Write 0x04” button.
- Turn on Torch Mode in Reg 0x01 register section by selecting “10: Torch Mode” in the Mode Setting list, and then click on “Write 0x01” button.
- The LED current can be measured by connecting a digital multimeter on P5 header across R3 0.1Ω resistor and GND. For 102mA, the voltmeter should measure a voltage around 10mV.
- Turn off Torch Mode in Reg 0x01 register section by selecting “00: Standby” in the Mode Setting list, and then click on “Write 0x01” button.

Evaluating Other ICs

This EVAL Kit is designed for the WLCSP24-8 package option. This EVAL Kit is very similar to the optional KTD2690EVAB-TA (in UDFN22-10 package) Eval kit but has slightly different thermal performance. To evaluate the KTD2690EVAB-TA please contact your local sales representative for availability.

Troubleshooting

Symptom	Root Cause	Solution
“USB Device Detached” displayed on the bottom left of the GUI	MPC2221A board not plugged in to computer or to the EVB	Make sure the MPC2221A board is connected to the computer via the USB cable.
Device is not responding to I2C command	MPC2221A board not plugged in to computer or to the EVB	Make sure the MPC2221A board is connected to EVB SDA/SCL/GND connector header CN3, and the USB cable is plugged into the computer.
Device is not responding to I2C command	KTD2690 evaluation board VIN supply is not powered	Make sure the KTD2690 board VIN testpoint is powered from an external power supply.
LED is not turning on in Flash mode or in Torch mode	LED not connected on the board	If using the on-board LED D1, make sure the jumper P4 is present.

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