

- 12. Pattern – II
- 13. Error Detection

Note: In Alphanumeric Flashing Pattern, you can control the speed only.
In Super Car Scanning Effect – I, Super Car Scanning Effect – II, Animation – 3D, Pattern – I and Pattern – II you cannot control brightness as the ALED1262ZT PWM (7-bit individual channel control) feature is enabled.

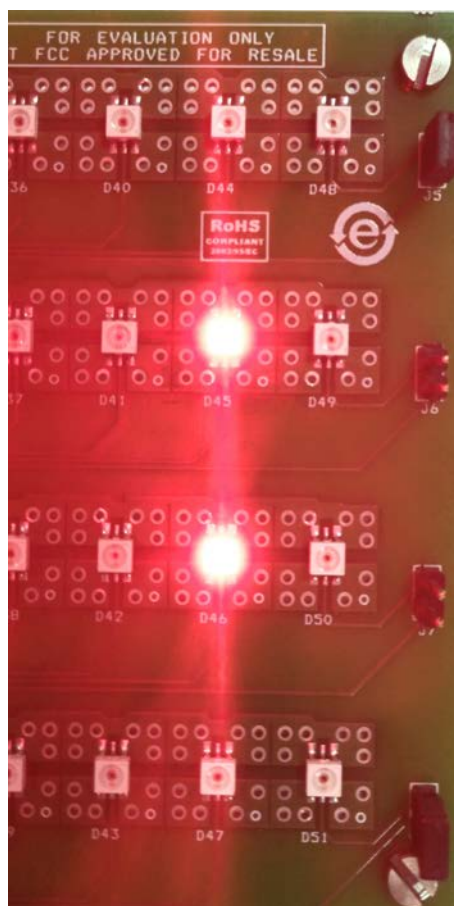
3.1.3 Error detection

ALED1262ZT driver is capable of detecting error for open circuit.
The STEVAL-LLL002V1 evaluation kit provides the option to simulate and detect errors by entering the error detection mode using FWD or BCK buttons.
Removing jumpers J5, J6, J7 and J8 causes LED open circuit error in D48, D49, D50 and D51 respectively.
The defective LED is signaled by switching on the adjacent LED.

Table 2. STEVAL-LLL002V1 error detection mode

Jumper	Error in LED	Shown on LED
J5	D48	D44
J6	D49	D45
J7	D50	D46
J8	D51	D47

Figure 7. STEVAL-LLL002V1 evaluation kit: error detection mode (J6 and J7 removed)



3.2 Standalone mode (SAM)

The **STEVAL-LLL002V1** enters the SAM mode when the driver supply falls below 3 V (removing jumper J4 that is disconnecting the **ALED1262ZT** LED driver).

In standalone mode configuration, the device is not controlled by the MCU or a controller board.

You can select two possible output configurations using OTP ½ SPDT switch (SW2).

Figure 8. STEVAL-LLL002V1 evaluation kit: standalone mode (configuration 1)

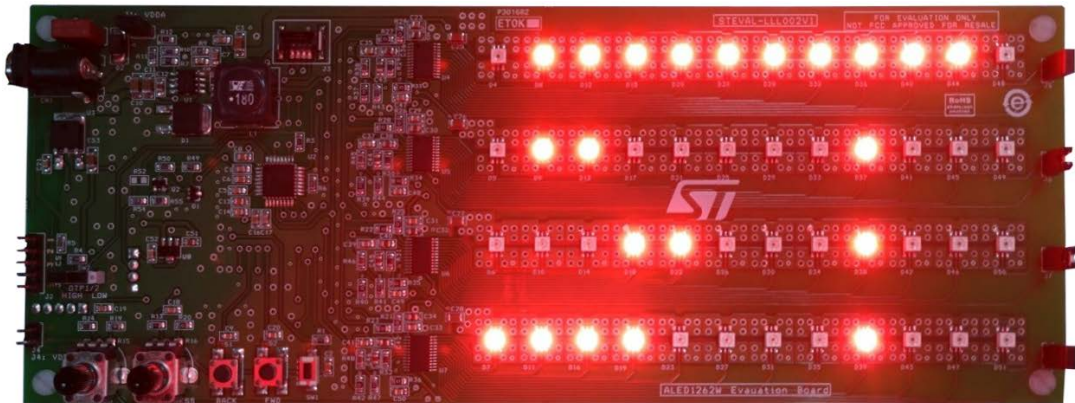


Figure 9. STEVAL-LLL002V1 evaluation kit: standalone mode (configuration 2)



3.2.1 Features

The board enters the standalone mode by removing J4.

This mode mainly features:

- **ALED1262ZT** working without external controller
- Two different outputs
- OTP ½ switch (SW2) to choose a configuration

3.3 GUI mode

The board can be connected to a PC through a USB-UART bridge using the graphical user interface (GUI) to control and evaluate the **ALED1262ZT** driver features.

3.3.1 Features

All the bus driven mode features can also be controlled via GUI that manages also:

- Global brightness control to change the brightness of all the channels
- Frame programming mode and four predefined presets with variable transition time between frames

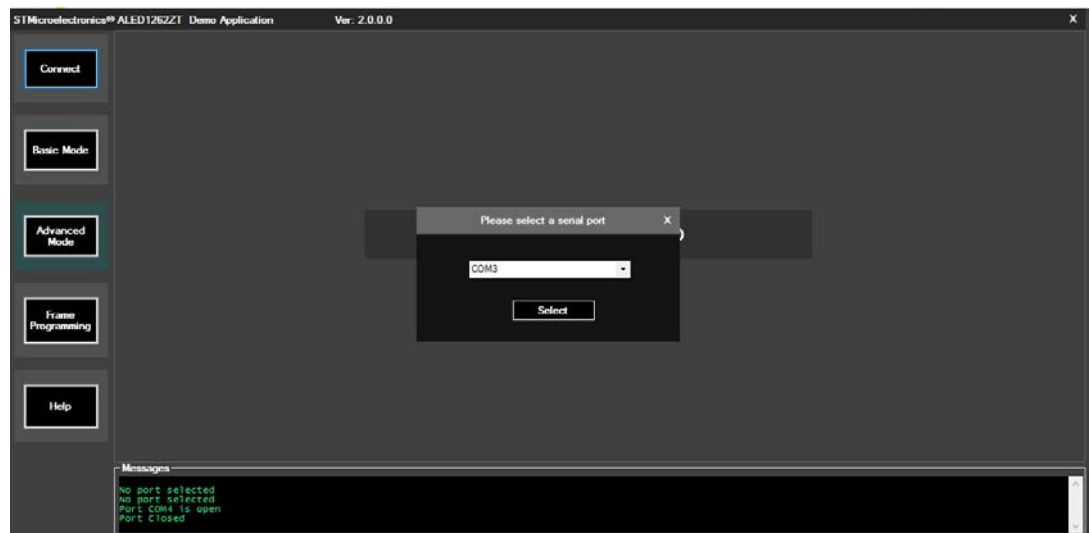
- Open circuit error detection in "no loop" and in 1 s and 2 s (approx.) loops
- Read/write configuration register
- Individual channel brightness control

3.3.2 GUI setup

To use the [STEVAL-LLL002V1](#) GUI, you have to install the virtual COM port (VCP) driver on your PC/laptop by following the procedure below.

- Step 1.** Install the .exe file on your PC.
The GUI appears in your program list.
- Step 2.** If the VCP driver is not installed, install it from ...*\Program Files\STMicroelectronics\LED Driver Demo\ST VCP Driver*. A 32-bit version and a 64-bit version are included in the setup.
On launching the GUI, the initial screen appears as shown below.

Figure 10. STEVAL-LLL002V1 evaluation kit: GUI initial screen



- Step 3.** Connect the STEVAL-LLL002M1 to the PC and power it up.
- Step 4.** Press **[Connect]**.
The GUI identifies the board and automatically establishes a connection (COM3 is shown as an example in the picture above), otherwise it prompts the user to select the port to which the board is connected.
- Step 5.** If the GUI does not automatically identify the board, choose the port manually and press **[Select]**.
When the GUI is able to interact with the board, a "Port is open" message is shown.

3.3.3 Modes
3.3.3.1 Basic mode

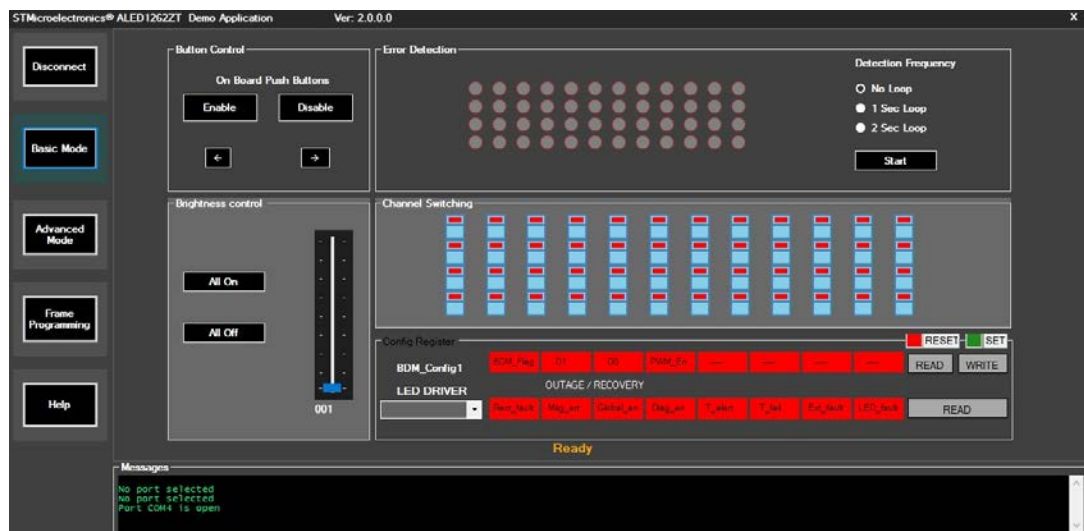
The STSW-LLL002GUI basic mode mainly features:

- Replication of on-board control buttons to select different modes from the GUI
- Buttons to enable/disable on-board push buttons
- Open circuit error detection with different frequencies
- Adjustable global brightness for all the channels
- Control registers write/read (BDM_Conf 1)
- Various flag status reading (BDM_status)

The basic mode has five sections to address different requirements:

- Button control
- Error detection
- Brightness control for all channels
- Configuration registers
- Individual channel ON/OFF control

Figure 11. STSW-LLL002GUI basic mode



3.3.3.1.1 Button control

The control buttons replicate the on-board BCK and FWD buttons and are used to toggle among preconfigured demos.

The on-board buttons can be enabled or disabled by pressing **[Enable]** or **[Disable]** respectively.

3.3.3.1.2 Error detection

The error detection section demonstrates open circuit error (if any) present in the 12x4 LED matrix.

Error detection frequency can be selected from three options:

- No loop - error detection is performed just once and the results are displayed till any other button is pressed
- 1 second loop - error detection is performed every 1 s by the drivers and the results are updated in real-time
- 2 second loop - same as 1 second loop but error detection is performed every 2 s

3.3.3.1.3 Brightness control for all channels

Brightness of all the channels is simultaneously changed by varying brightness control for all channel slider. Brightness can be varied in 256 steps (5% to 100%).

3.3.3.1.4 Configuration registers

The configuration register section represents two registers for the ALED1262ZT LED driver:

- **BDM_Conf 1:** is common for all ALED1262ZT LED drivers. You can set or reset different bits of the registers.
- **BDM_status:** gives the status information for a particular LED driver selected from the drop down bar.

For further details, refer to the ALED1262ZT datasheet on www.st.com.

Figure 12. ALED1262ZT configuration register



3.3.3.2 Advanced mode

The advanced mode section displays the individual channel brightness control (0% to 100%).

The brightness of each channel can be adjusted through a 7 bit PWM grayscale brightness control according to local dimming register PWM_gain_x.

You can change the brightness using the scroll bars put in a 12x4 pattern.

Figure 13. STSW-LLL002GUI advanced mode



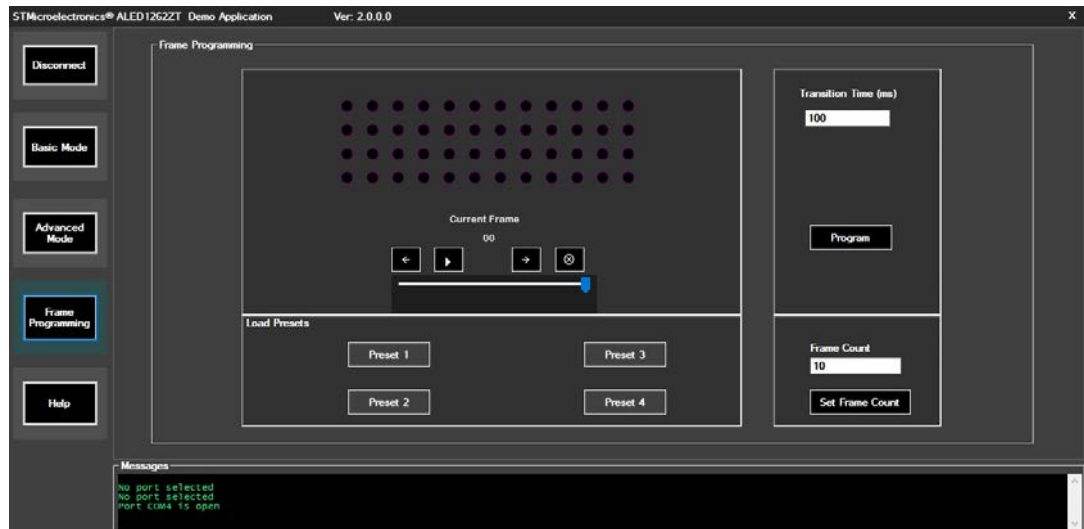
3.3.3.3 Frame programming mode

This mode features:

- Frame programming to display any arbitrary pattern up to 20 frames with variable transition speed
- Four preconfigured patterns for quick visualization of frame programming mode on the [STEWAL-LLL002V1](#) evaluation kit

Frame programming displays user defined patterns in round robin sequence on the evaluation board. This mode contains a set of 20 (maximum) independent frames and each frame represents one instance of the board LEDs. The frames can be designed by the user or you can select preconfigured frame patterns using [**Presets**]. Transition time among frames in milliseconds is set by the value in the [**Transition Time**] text box.

Figure 14. STSW-LLL002GUI frame programming mode



3.3.3.3.1 Frame design

A frame on the STSW-LLL002GUI represents LEDs on the evaluation board in a similar fashion. There are a maximum of 20 frames (00 to 19) to be set using [Set Frame Count]. To design the frames and demonstrate them on the evaluation board follow the procedure below.

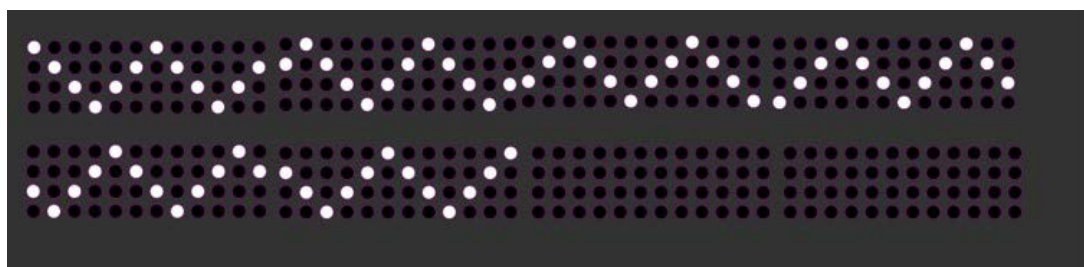
- Step 1.** Click on the LEDs to configure them.
- Step 2.** Select the desired brightness using [Frame Brightness].
- Step 3.** Press the [Play] button for the STSW-LLL002GUI sequence of frames to visualize the whole pattern to be displayed on the board.
- Step 4.** Set the required transition time between the frames and press [Program].

Note: Transition time has to be set between 10 to 10000 milliseconds. If a wrong value is entered in the box, the color of the text box changes to red and no command is sent to the board.

3.3.3.3.2 Using preconfigured frame patterns

In frame programming mode, four preconfigured frame patterns called Presets are provided. Preset1, Preset2, Preset3 and Preset4 can be loaded by clicking on the corresponding preset button.

Figure 15. STSW-LLL002GUI frame programming mode Preset1



7 Thermal behavior

The [ALED1262ZT](#) is available in a TSSOP24-EP package (mounted on the evaluation board) with 37.5 °C/W thermal resistance.

The average forward voltage drop of red channels is 2 V and the maximum channel current is configured for 42.5 mA.

The [STEVAL-LLL002V1](#) evaluation kit thermal image at the ≈ 45 mA current in all the channels are shown below.

Figure 23. STEVAL-LLL002V1 thermal layout at 12 V DC input (top side)

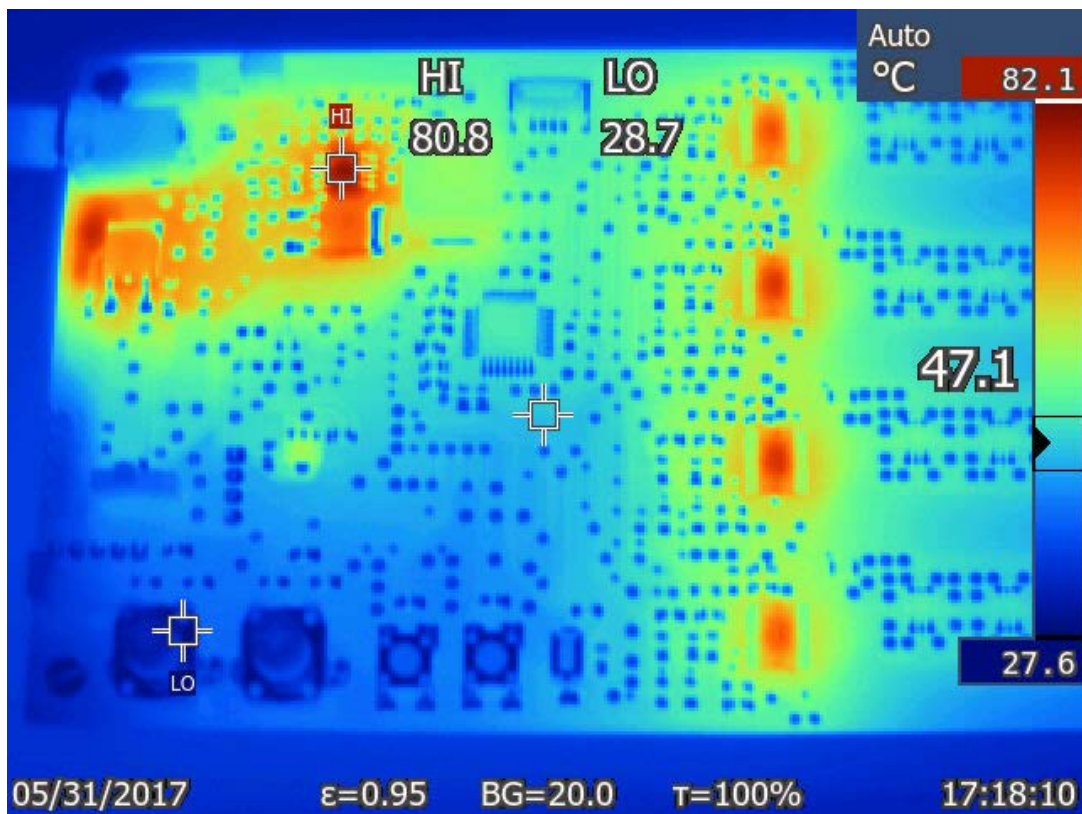


Figure 24. STEVAL-LLL002V1 thermal layout at 12 V DC input (bottom side)

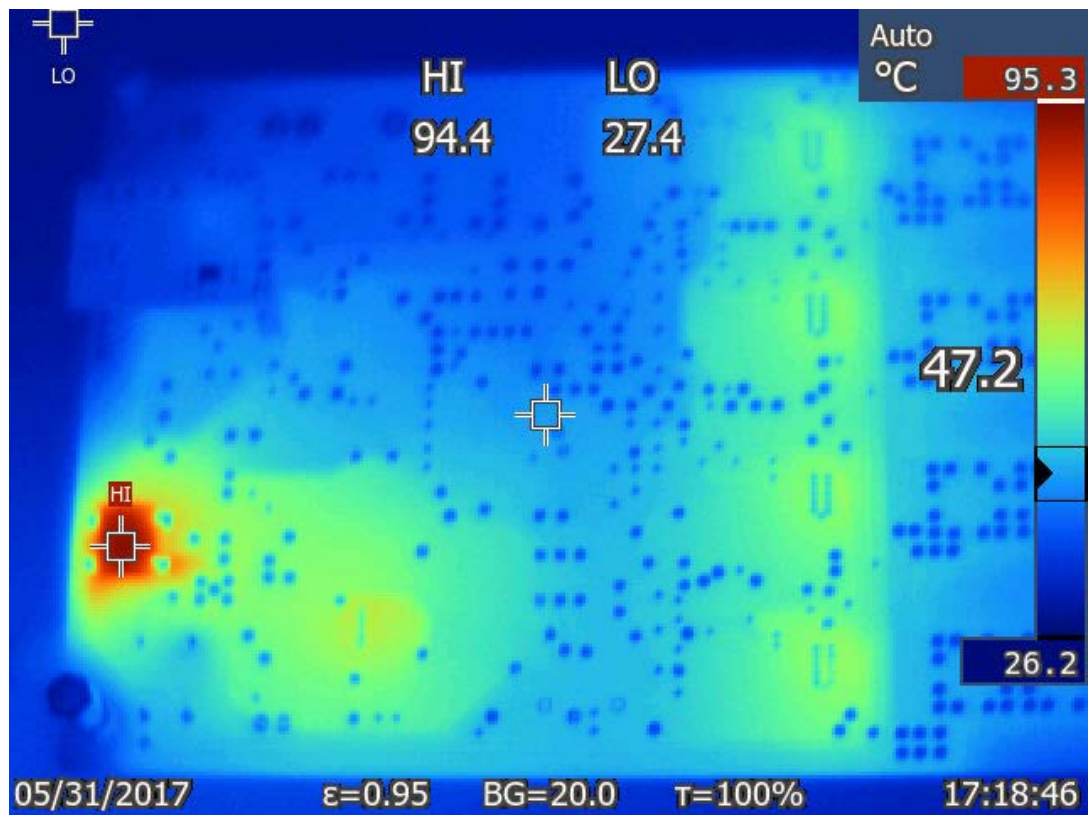


Figure 25. STEVAL-LLL002V1 thermal layout at 20 V DC input (top side)

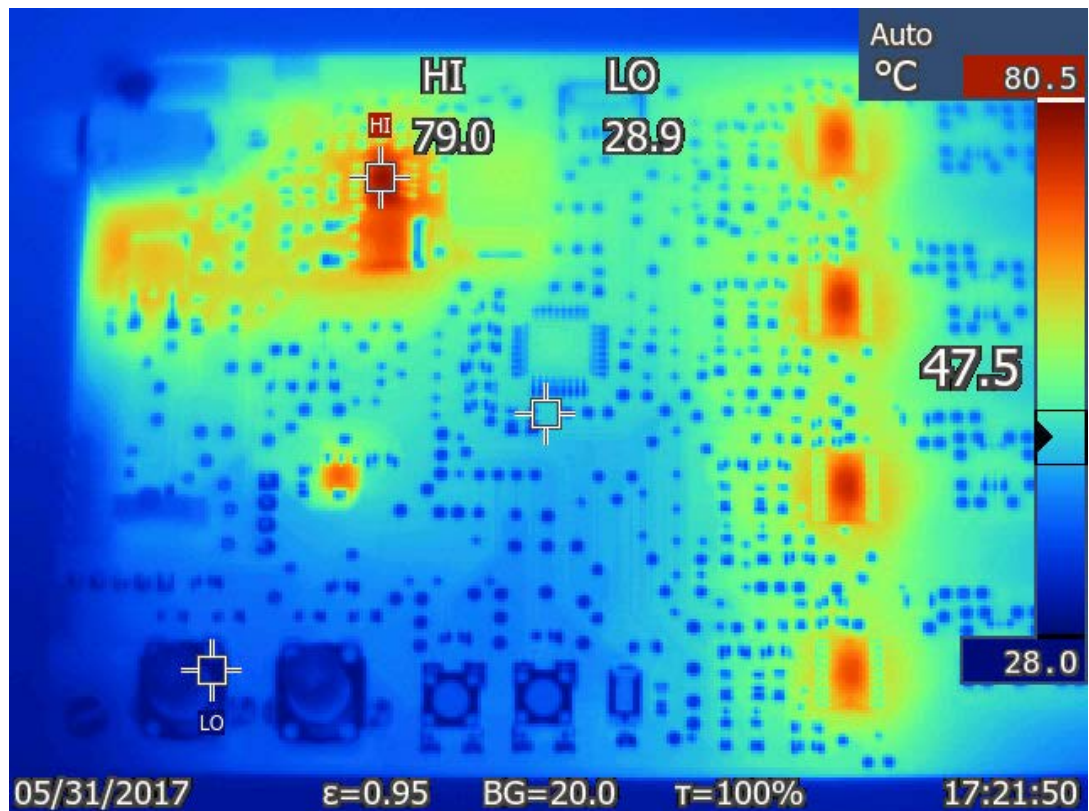


Figure 26. STEVAL-LLL002V1 thermal layout at 20 V DC input (bottom side)

