

Test Procedure for the "M-DrAGON" LV8806QAGEVK Evaluation Kit

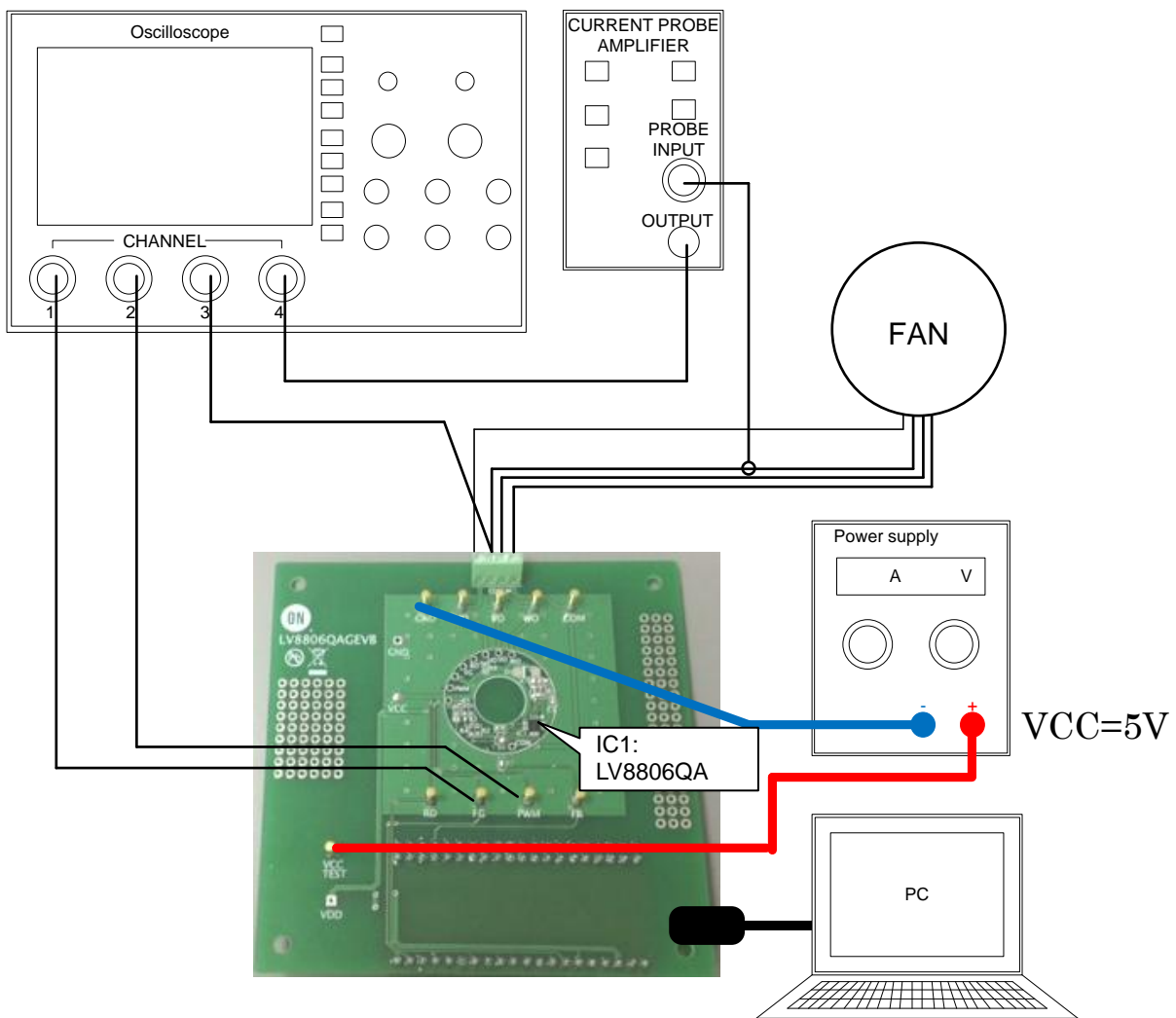


Figure 1. Setup for motor control

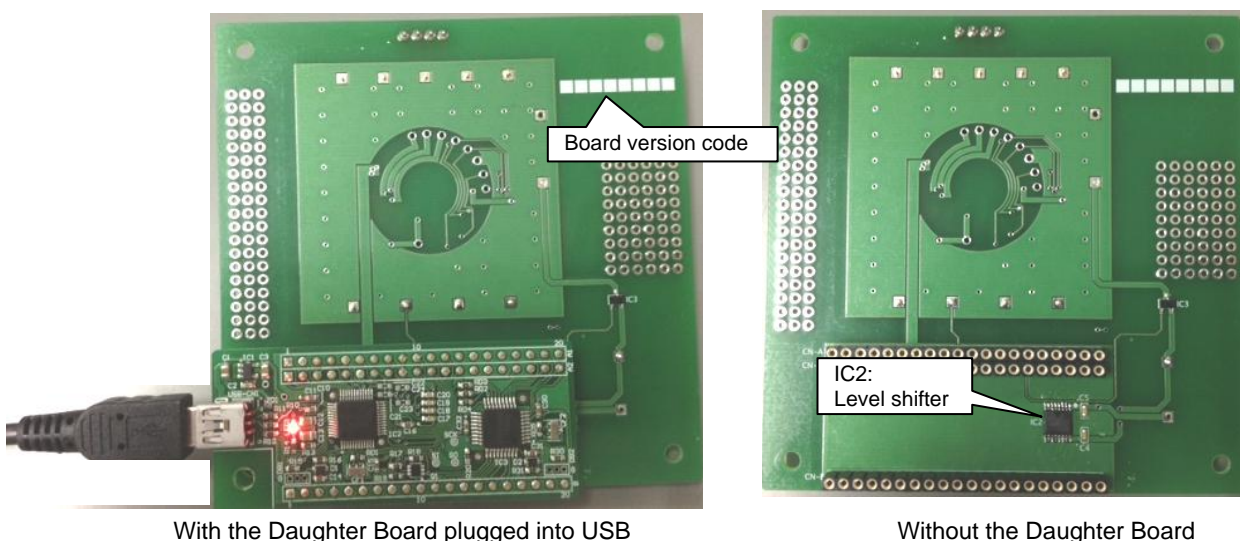


Figure 2. Bottom view of the Evaluation Board

Table1: Reference Equipment

| Equipment | Specifications |
|------------------------------------|--|
| DC Power supply | 5V |
| Oscilloscope | 4 channel |
| BLDC Motor | 3 phase sensorless FAN motor 5V-0.4A |
| Current probe | |
| LV8829LFQAGEVB Evaluation Board | |
| MOTOR DRIVER DAUGHTER BOARD | |
| USB Type A to Type mini-B cable | |
| PC with M-DrAGON* GUI installed | 32bit: Windows XP(SP3) / 7 / 8 64bit: Windows 7 |

*) It means “Motor- Driver And GUI produced by ON semiconductor”.

Test Procedure

- Connect the test setup as shown Figure 1.
- It is important to follow the order shown for starting the system:
 1. Plug a USB cable into the Daughter Board.
 2. Start up the GUI for LV8805.
 3. Apply input voltage to the terminal “VCCTEST”.
 4. Apply drive signals with GUI (See below).
- Always remove Vcc before unplugging the daughter board.

GUI Operation

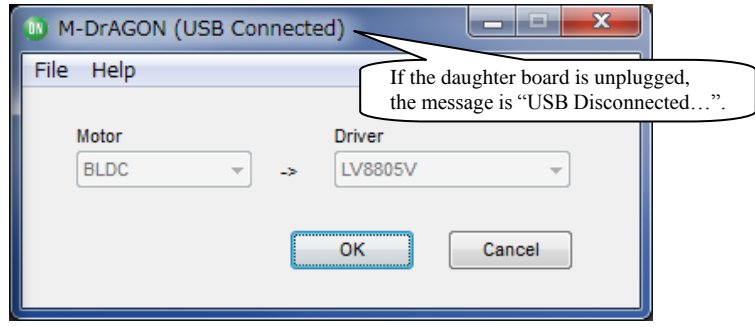


Figure 3. The first window of M-DrAGON

When you double click the icon the above window appears.

1. Select "BLDC" in Motor Type.
2. Select "LV8806" in Driver type.
3. Push the "OK" button.
4. The following windows should appear:

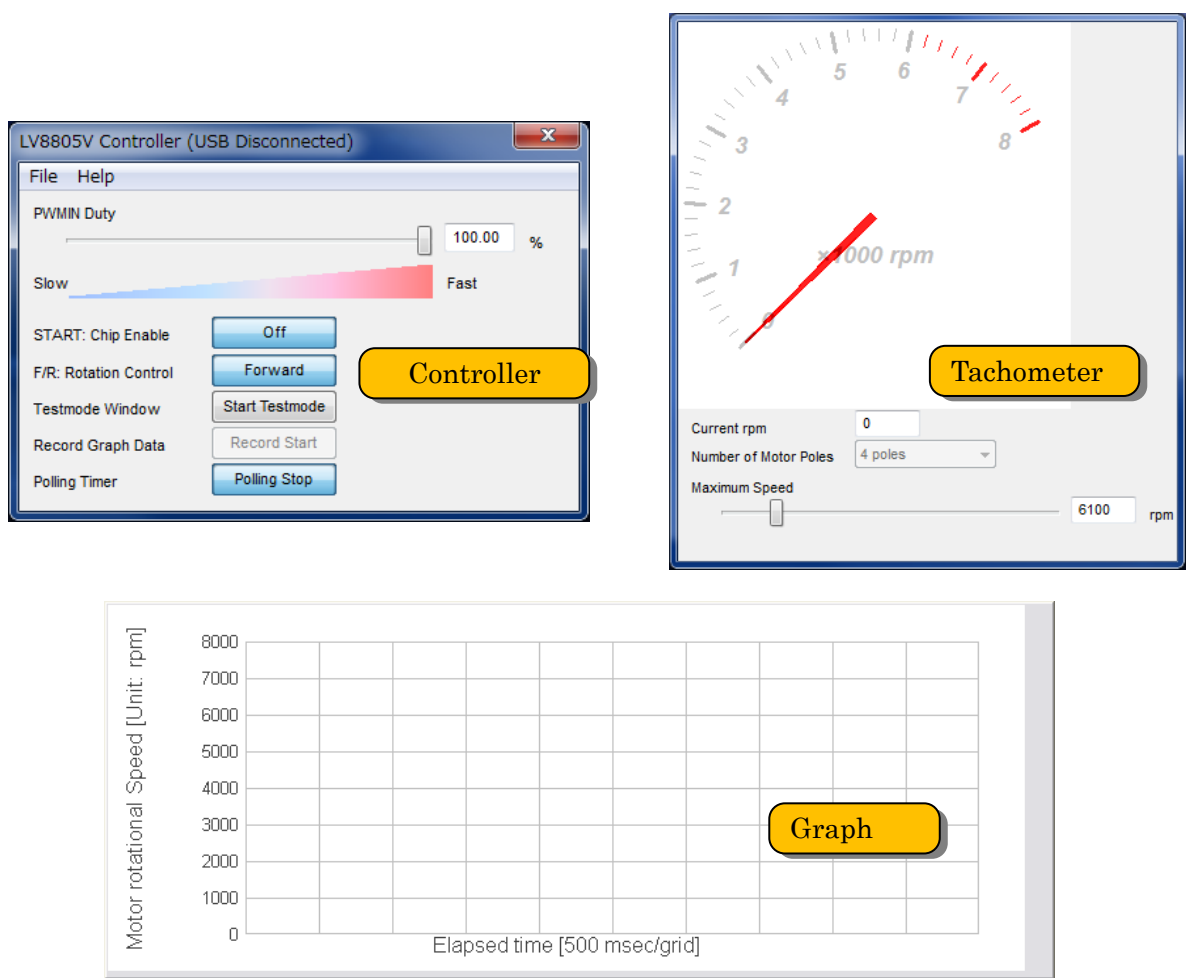


Figure 4. GUI windows for LV8806

- Controller window

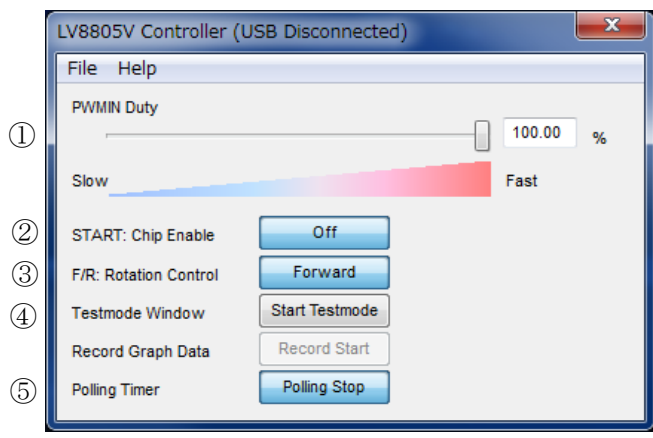


Figure 5. Controller window

- ① PWMIN Duty : It can control Duty 0 % ~ 100% of the PWM input signal.
Please input directly in the box or drag & slide the control bar.

- ② S/S: Chip Enable : It change the start and stop of the motor.
 - ◇ "Start" indicate when the fan stop. And this button push then the fan start.
 - ◇ "Stop" indicate when the fan start. And this button push then the fan stop.

- ③ F/R : It change the forward rotation and reverse rotation of the motor.

- ④ Test mode Window : It open the test mode window.
The operation procedure of Test mode window explain at the following

- ⑤ Polling Timer : It is pushed then the change of the number of the fan rotation is displayed in real time in the graph.

- Tachometer window

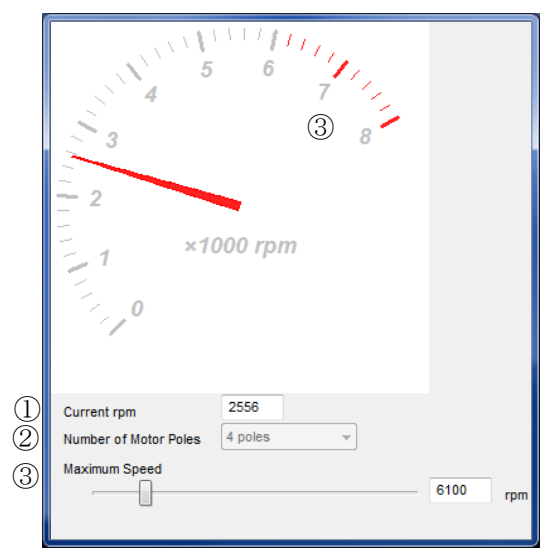


Figure 6. The tachometer window

①Current rpm : This displays fan RPM.
 The calculation formula is given below.

$$rpm = \left(FG_frequency \times \frac{2}{N} \right) \times 60$$

*N=② Number of motor poles

②Number of motor poles : Set up the number of poles of the fan.

- Choose "N/A" when you don't know the number of poles of the fan.

③Maximum Speed : Adjust the range of the graph axis and tachometer when you input directly in the box or drag & slide the control bar.

- Graph window

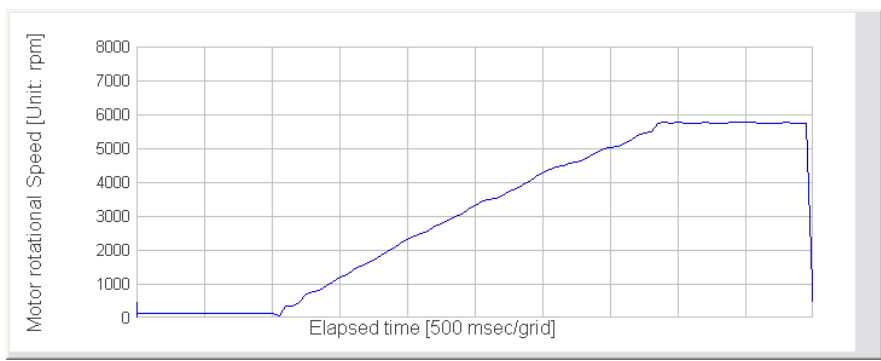
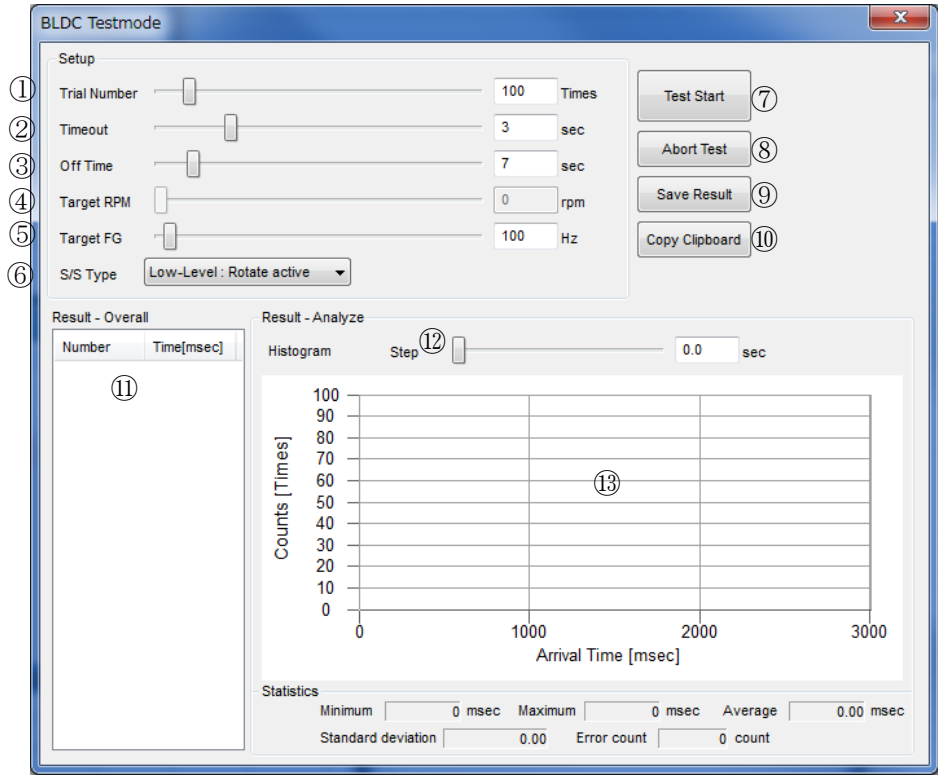


Figure 7. The graph window

This graph shows X-axis:time and vertical-axis:rotations speed.

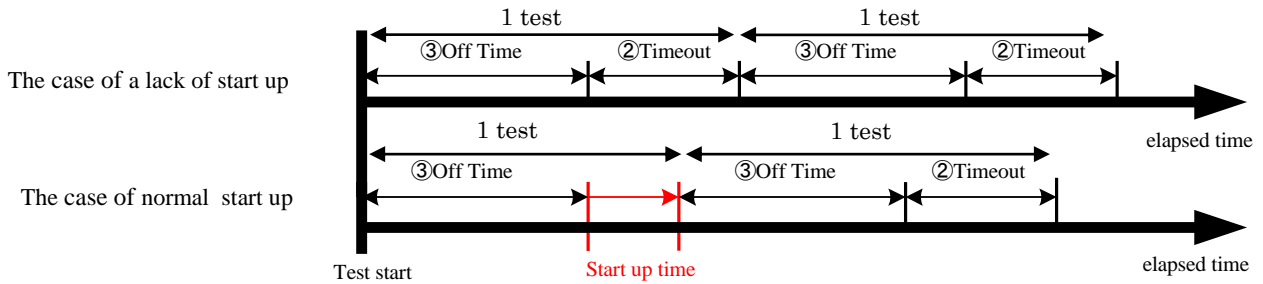
• Test mode window



Each parameter setup

- ① Trial Number : The test number of trials
- ② Timeout : This is the time allocated for startup.
- ③ Off time : This is the minimal time the fan will remain off prior to beginning a test.

The relation between ② and ③ is shown below.



*It change ② to ③ immediately When the fan starting up is detected to within a time.

④,⑤Target number-of-rotations setup

(Tachometer window: Setup ④ when you chose xx poles and setup ⑤ when you chose N/A at the ② Number of motor poles.)

- ④ Target RPM: When the motor reaches the Target RPM the startup mode is complete.
- ⑤ Target FG : Similar to target RPM but accounts for the number of poles. Generally 70% of maximum FG.

⑥S/SType : Choose “Low-Level: Rotate active”.

- ⑥ Test Start : Start a test.
- ⑦ Abort Test : Abort a test.
- ⑧ Save Result : This saves the result of the test as a data file.
- ⑨ Copy Clipboard : This copies the result of the test as a text file on the clip board.

Test result is displayed at ⑪,⑬.

⑩ Test times and start up time are displayed.

⑬The histogram(y-axis:times/ x-axis:start up time) is displayed.

⑫Slide the control bar to adjust the step of x-axis in the histogram

Table2: Example 1

| INPUT | OUTPUT |
|---|---|
| VCC=5V (Power Supply) PWMIN duty= 100% F/R= forward | Motor rotational speed = approx. 4000rpm |

Waveforms during the motor rotation (5mSec/div)

Zoom in the red box area in the left fig (20uSec/div)

Figure 8. The image of waveforms for example 1

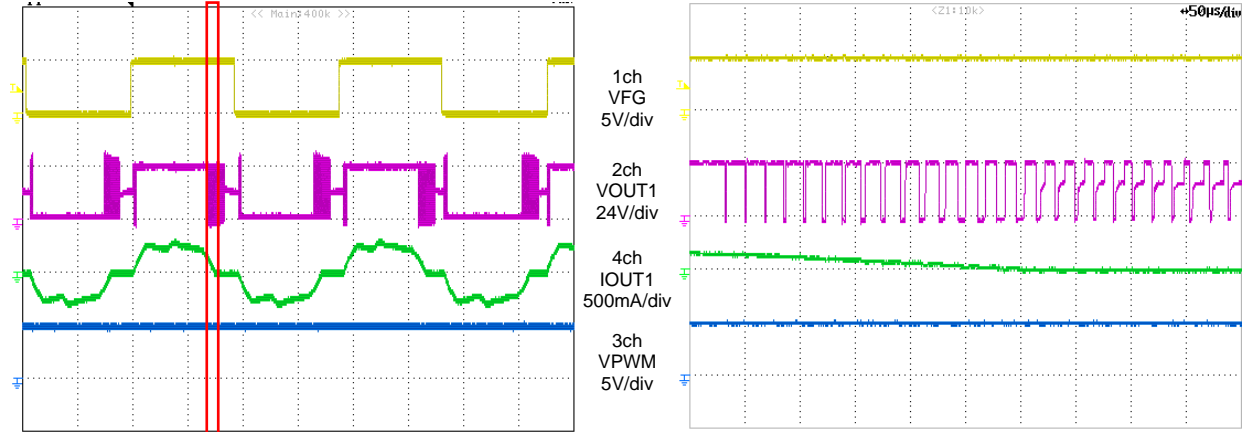


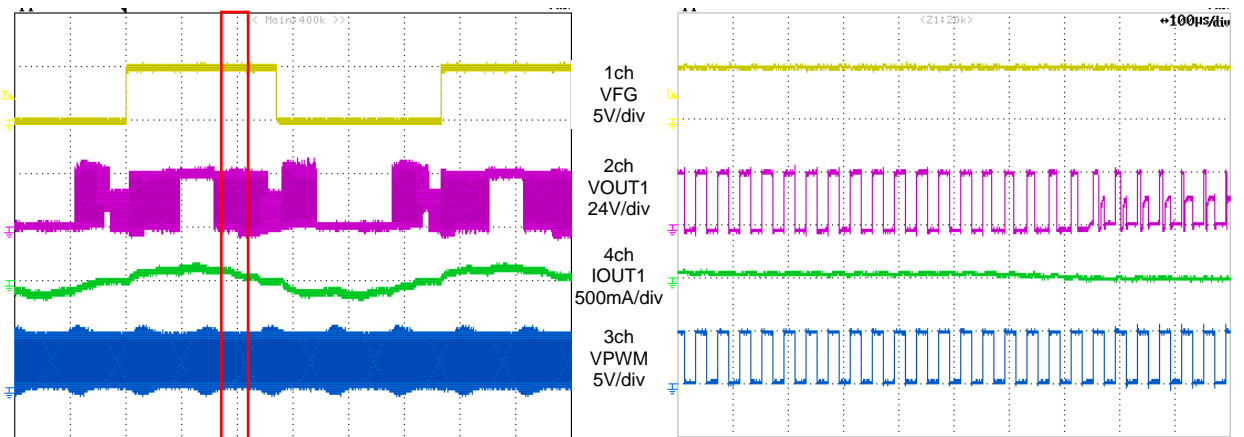
Table3: Example 2

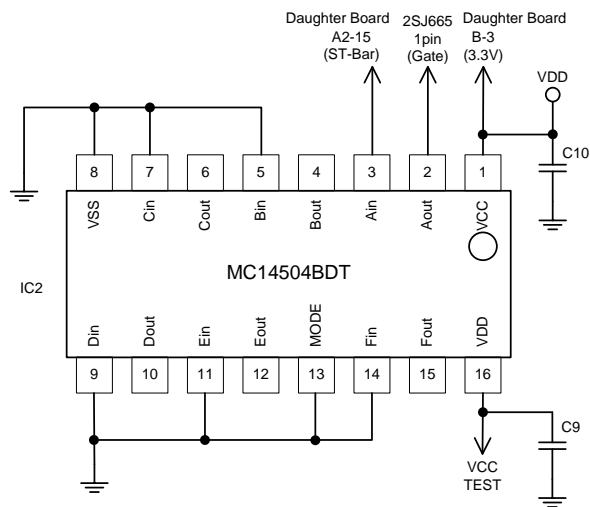
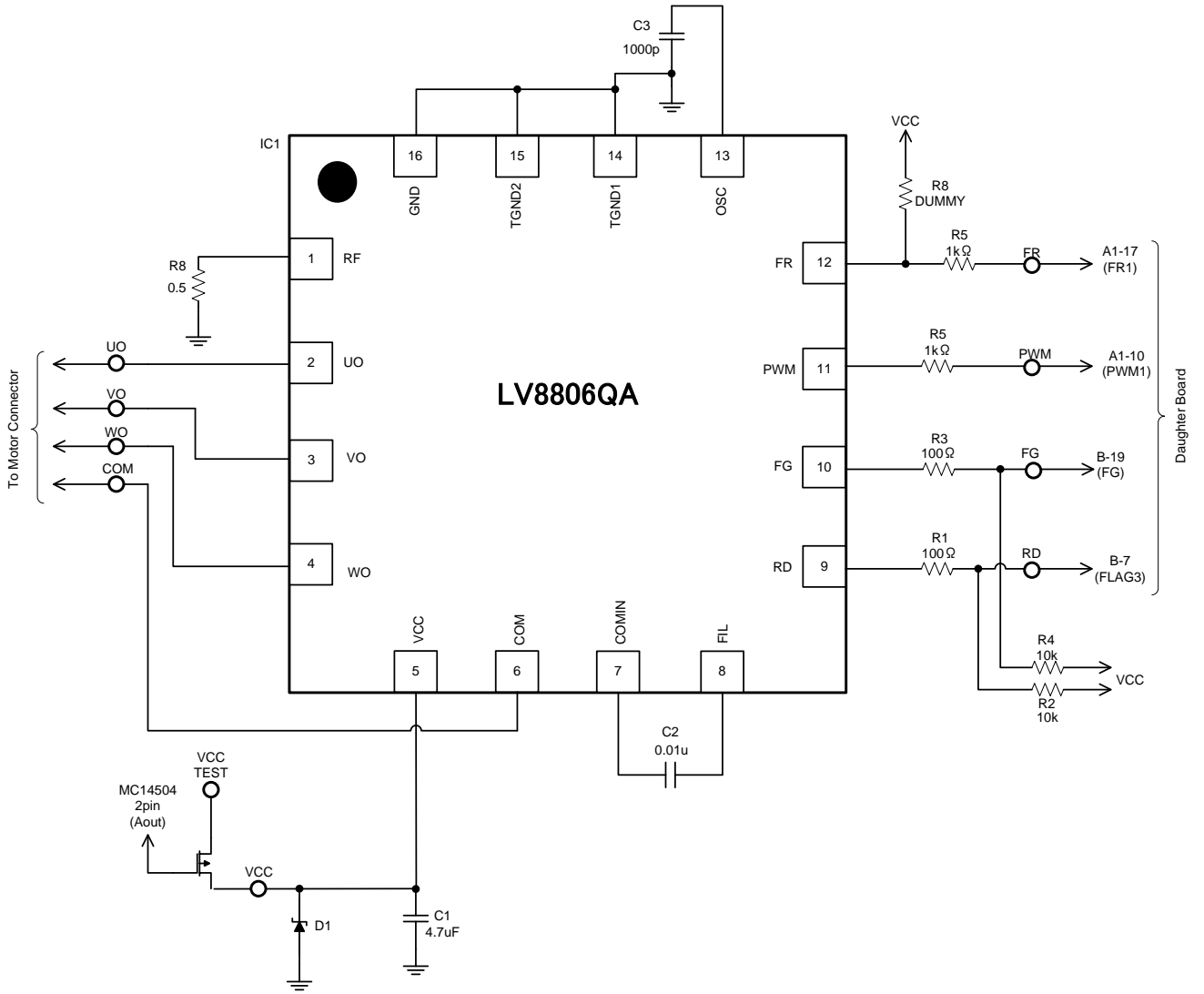
| INPUT | OUTPUT |
|--|--|
| VCC=5V (Power Supply) PWMIN duty= 50% F/R= forward | Motor rotational speed =approx. 2700rpm |

Waveforms during the motor rotation (2mSec/div)

Zoom in the red box area in the left fig (20uSec/div)

Figure 9. The image of waveforms example 2





**Cautions**

- This system is intended for an initial evaluation of LV8806QA. We will not guarantee measured values as full evaluation and validation must be performed on your system independently.
- Never hold the motor with the lead wire or shaft. The motor should be affixed to a stand prior to operation.
- Attach all motor leads prior to application of power.

Safety

- Do not touch the rotating part when the motor is powered. Doing so may result in injury.
- Do not touch conductive parts such as connectors when the motor is powered. Doing so may result in electric shocks.



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