ACT88911EVK1-101 User's Guide

Description

This document describes the characteristic and operation of the Qorvo ACT88911EVK1-101 evaluation kit (EVK). It provides setup and operation instructions, schematic, layout, BOM, and test data. This EVK demonstrates the ACT88911-101 Qorvo PMU power management IC. Other ACT88911-xxx options can be evaluated on this EVK by replacing the IC and any other necessary components.

Features

The EVK can be used as a standalone board if desired. However, to access the internal registers and to take full advantage of the IC's capability, the user must connect the EVK kit to a PC with Qorvo's USB-TO-I2C interface dongle and use the GUI software. The EVK provides full access to each converter's input and output voltage, as well as all the digital control signals. This gives the user the flexibility to configure the EVK to match their real-world system.

Note that the ACT88911EVK1-101 is specifically configured for the ACT88911-101.

Figure 1 – EVK Picture

Setup

Required Equipment

ACT88911 EVK

USB-TO-I2C Dongle

Power supply – 3.8V @ 8A for full power operation

Oscilloscope – >100MHz, >4 channels

Loads – Electronic or resistive. 12A minimum current capability.

Digital Multi-meters (DMM)

Windows compatible computer with spare USB port.

EVK Setup

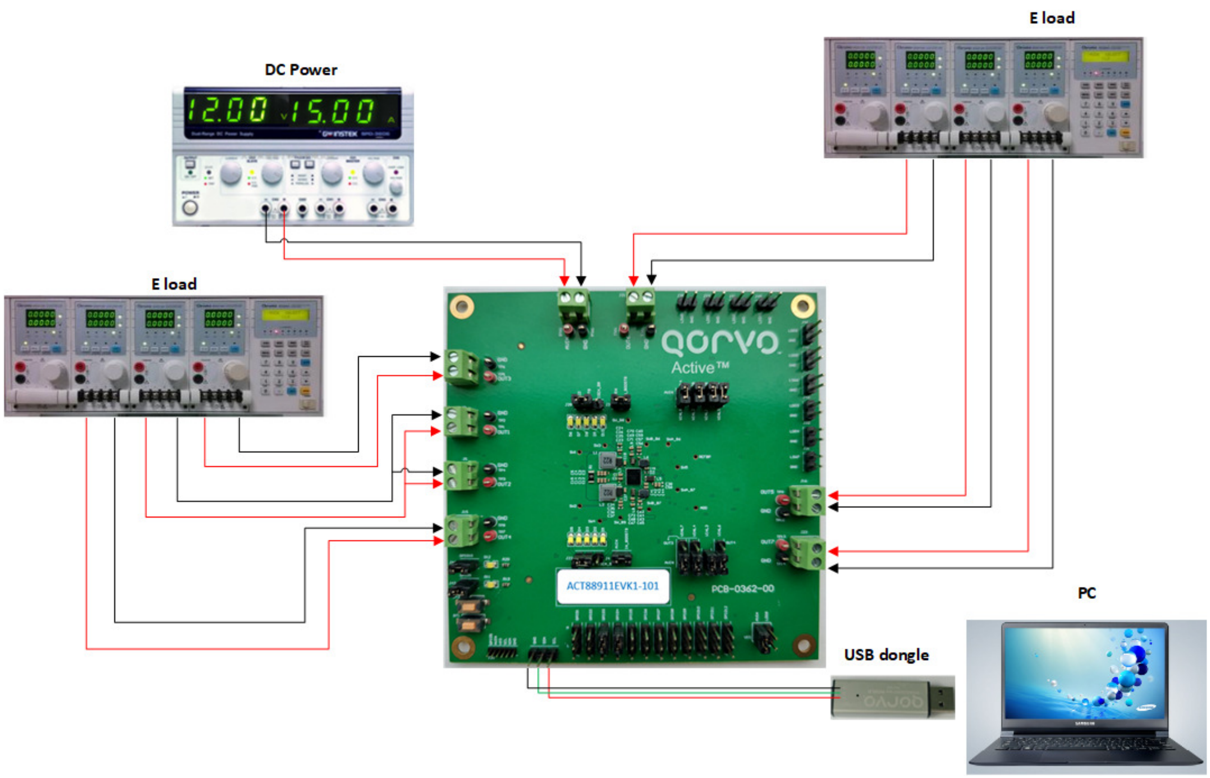


Figure 2 – EVK Setup

Hardware Setup

1. Decide which voltage will power VIO_IN. Qorvo recommends powering VIO from the AVIN input. Connect a shorting jumper between J49-1 and J49-2 header to power VIO from the AVIN input voltage.
2. Connect a jumper between J6-1 and J6-2 header to power VIN_LDO1 from AVIN input voltage.
3. Connect a jumper between J8-1 and J8-2 header to power VIN_LDO2 from AVIN input voltage.
4. Connect a jumper between J10-1 and J10-2 header to power VIN_LDO3 from AVIN input voltage.
5. Connect a jumper between J13-1 and J13-2 header to power VIN_LDO4 from AVIN input voltage.
6. Connect a jumper between J7-1 and J7-2 header to power VIN_LDO5 from AVIN input voltage.
7. Connect a jumper between J9-1 and J9-2 header to power VIN_LDO6 from AVIN input voltage.
8. Connect a jumper between J11-1 and J11-2 header to power VIN_LSW7 from AVIN input voltage.
9. Connect a jumper between J14-1 and J14-2 header to power VIN_LSW8 from AVIN input voltage.
10. Connect a jumper between J3-1 and J3-2 header to power VIN_BOOST8 from AVIN input voltage.
11. Connect a jumper between J4-1 and J4-2 header to power VIN_BOOST9 from AVIN input voltage.
12. Connect a jumper between J28-1 and J28-2 header to OUT8 for LED.
13. Connect a jumper between J22-1 and J22-2 header to OUT9 for LED.
14. Connect a jumper between J43-1 and J43-2 header for GPIO9 for D11.
15. Connect a jumper between J44-1 and J44-2 header for GPIO10 for D12.
16. Connect a jumper between J25-1 and J25-2 header for GPIO6.
17. Connect a jumper between J36-1 and J36-2 header for GPIO4.
18. Connect a jumper between J37-1 and J37-2 header for GPIO3.
19. No jumpers are needed for GPIO1/2/5/7/8.
20. Connect an appropriate load to each power supply output.
21. Note that the typical setup is to apply the same 3.8V input voltage to all inputs. Using different input voltage sources requires careful consideration of startup sequencing.

Figure 3 – Shorting Jumper Settings

GUI Setup (optional)

1. Refer to the end of this document for detailed instructions to install the ACT88911 GUI.
2. Connect the USB-TO-I2C dongle to the computer via a USB cable.
3. Connect the USB-TO-I2C dongle to the EVK J42 connector. Refer to Figure 4 to ensure the correct polarity of the connection. As a guide, use the "Active-Semi" logo on the top of the dongle so the black wire is connected toward the lower left corner of the Dongle.

Dongle Cable Connctor (black wire connected to GND of the J42 I2C jumper on the **ACT88911** EVK board)

Figure 4 – USB-TO-I2C Dongle Connection

EVK Design Parameters

The ACT88911EVK1-101 is designed for a 3.8V input voltage. Table1 shows the Regulators' output voltage and the current supply capability.

Table 1. EVK Design Parameters

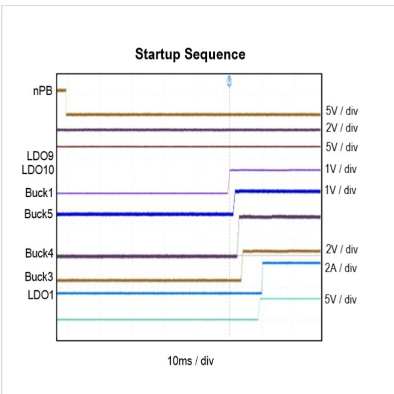
Parameter	Description	Min	Typ	Max	Unit
VIN	Operation Input range of Power Supply	2.7	3.8	5	V
OUT1/2	Buck1/2 output voltage (Turned on by BT1)		0.725		V
OUT3	Buck3 output voltage		1.8		V
OUT4	Buck4 output voltage		1.2		V
OUT5	Buck5 output voltage		0.725		V
BB6	BB6 output voltage (Controlled by GPIO4)		3.3		V
BB7	BB7 output voltage		3.3		V
Boost8	Boost8 output voltage (Turned on by ON Bit)		13		V
Boost9	Boost9 output voltage (Turned on by ON Bit)		18		V
LDO1	LDO1 output voltage		1.9		V
LDO2	LDO2 output voltage (Turned on by ON Bit)		1.8		V
LDO3	LDO3 output voltage (LSW)		/		V
LDO4	LDO4 output voltage		1.8		V
LDO5	LDO5 output voltage		1.05		V
LDO6	LDO6 output voltage (LSW) (Turned on by ON Bit)		/		V
LSW7	LSW7 output voltage (Controlled by GPIO3)		/		V
LSW8	LSW8 output voltage (Turned on by ON Bit)		/		V
LDO9	LDO9 output voltage		1.8		V
LDO10	LDO10 output voltage		3.3		V
Io_OUT1	Buck1 load current		5		A
Io_OUT2	Buck2 load current		5		A
Io_OUT3	Buck3 load current		1		A
Io_OUT4	Buck4 load current		1		A
Io_OUT5	Buck5 load current		1		A
Io_OUT6	BB6 load current		1		A
Io_OUT7	BB7 load current		1		A
Io_OUT8	Boost8 load current		0.025		A
Io_OUT9	Boost9 load current		0.025		A
Io_LDO1	LDO1 load current		0.1		A
Io_LDO2	LDO2 load current		0.1		A
Io_LDO3	LDO3 load current		/		A
Io_LDO4	LDO4 load current		0.05		A
Io_LDO5	LDO5 load current		0.05		A
Io_LDO6	LDO6 load current		/		A
Io_LSW7	LSW7 load current		/		A
Io_LSW8	LSW8 load current		/		A
Io_LDO9	LDO9 load current		0.01		A
Io_LDO10	LDO10 load current		0.005		A

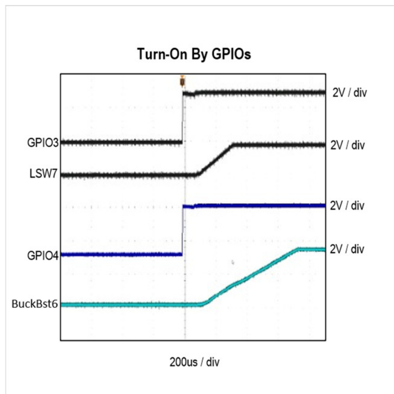
EVK Operation

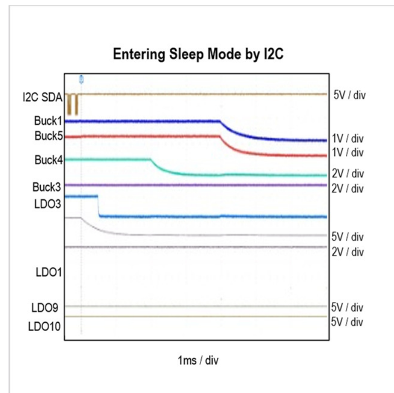
Turn-on

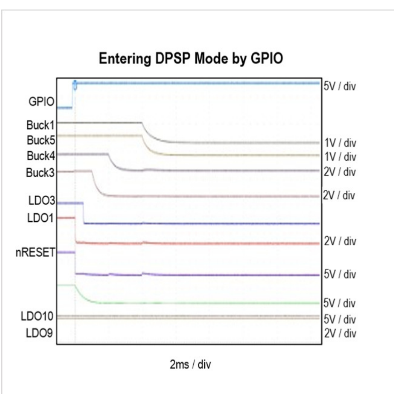
Apply the 3.8V input voltage. Press the push button B11 and All outputs rails automatically turn on with the programmed startup sequence. LSW7 and BuckBoost6 can be turned on by a logic high signal on GPIO3 and GPIO4 respectively, Other rails that are off by default can be turned on by setting the ON bit to 1 in their respective register using the GUI.

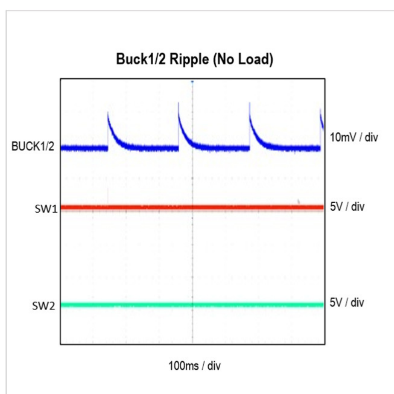
Test Results

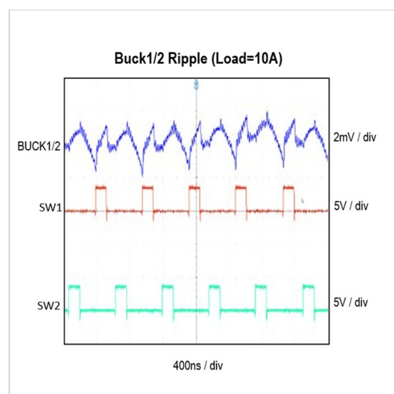


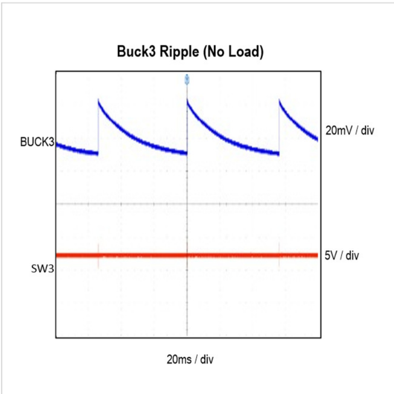


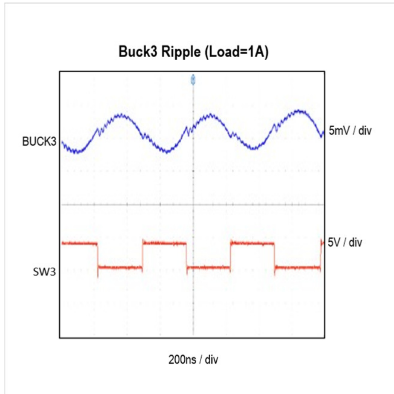


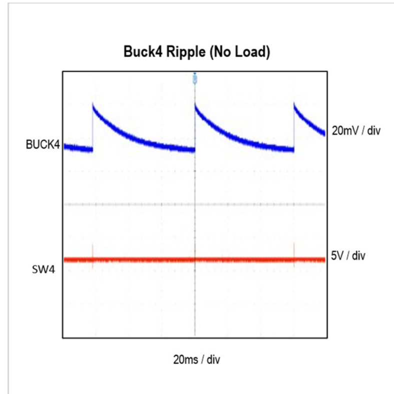







Buck3 Ripple (No Load)
BUCK3
20mV / div
SW3
5V / div
20ms / div


Buck3 Ripple (Load=1A)
BUCK3
5mV / div
SW3
5V / div
200ns / div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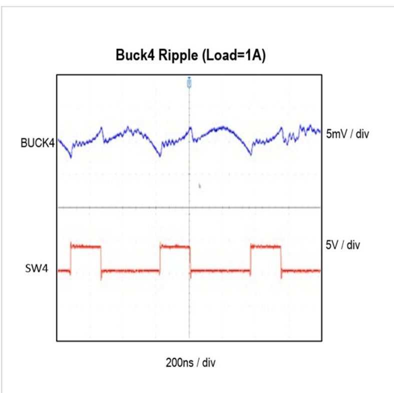
SW4
5V / div
20ms / div


Buck4 Ripple (Load=1A)
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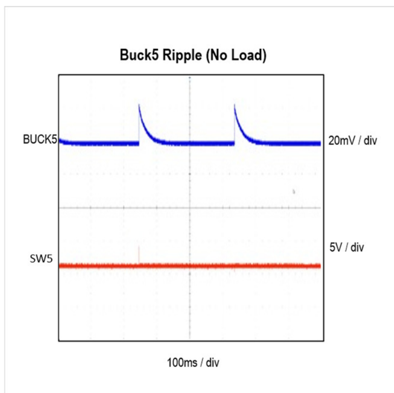
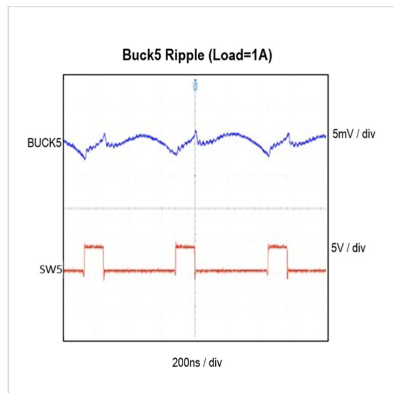
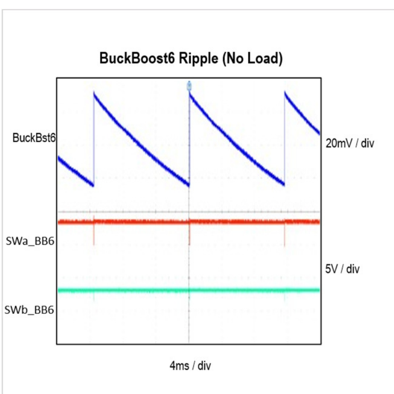
5mV / div
SW4
5V / div
200ns / div


Buck5 Ripple (No Load)
BUCK5
20mV / div
SW5
5V / div
100ns / div


Buck5 Ripple (Load=1A)
BUCK5
5mV / div
SW5
5V / div
200ns / div


BuckBoost6 Ripple (No Load)
BuckBst6
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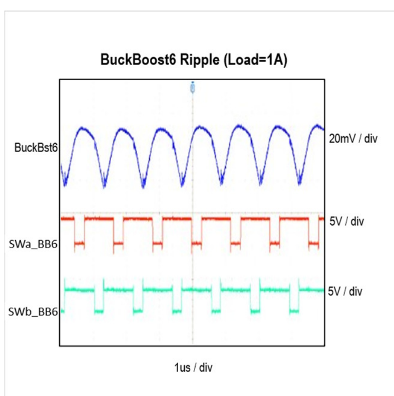
SWa_BB6
5V / div
SWb_BB6
4ms / div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BuckBst6
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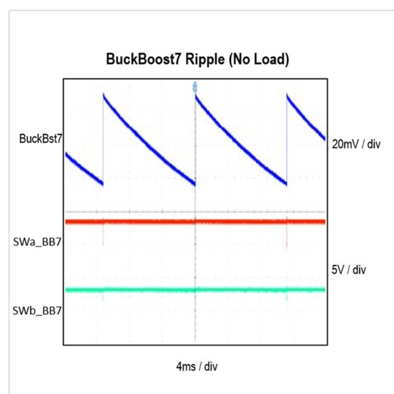
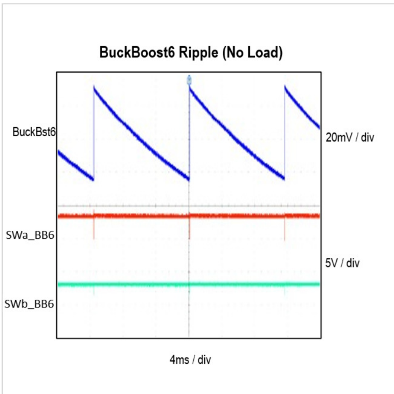
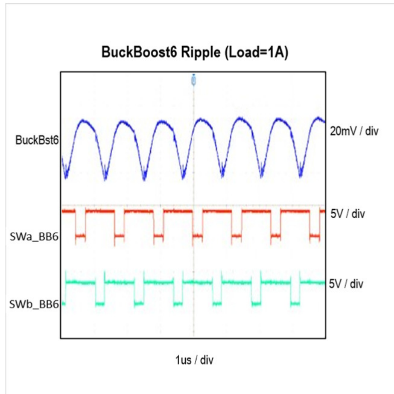
SWa_BB6
5V / div
SWb_BB6
5V / div
1us / div


BuckBoost7 Ripple (No Load)
BuckBst7
20mV / div
SWa_BB7
5V / div
SWb_BB7
4ms / div


BuckBoost6 Ripple (No Load)
BuckBst6
20mV / div
SWa_BB6
SWb_BB6
5V / div
4ms / div


BuckBoost6 Ripple (Load=1A)
BuckBst6
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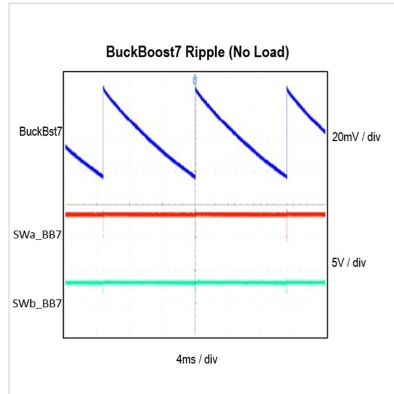
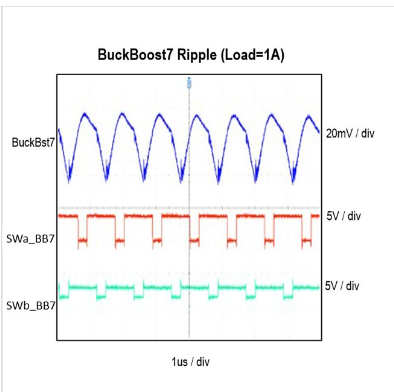
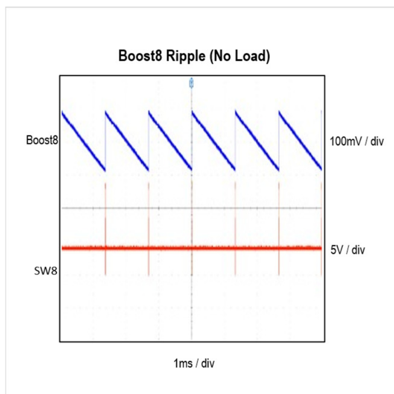
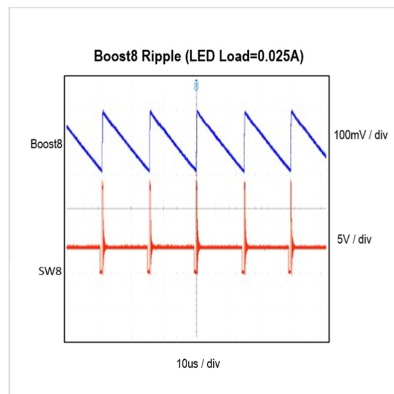
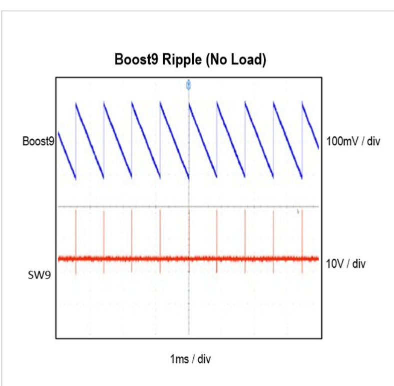
SWa_BB6
5V / div
SWb_BB6
5V / div
1us / div

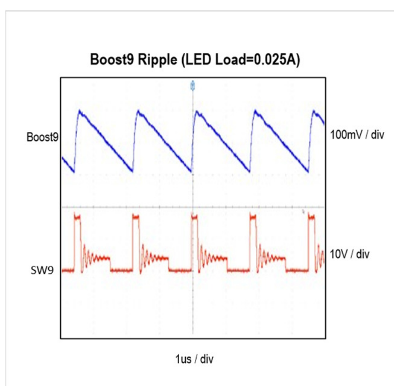

BuckBoost7 Ripple (No Load)
BuckBst7
20mV / div
SWa_BB7
SWb_BB7
5V / div
4ms / div

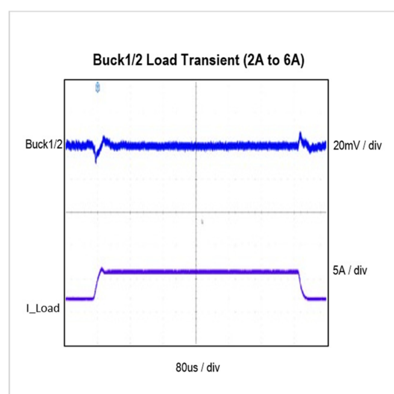

BuckBoost7 Ripple (Load=1A)
BuckBst7
20mV / div
SWa_BB7
5V / div
SWb_BB7
5V / div
1us / div

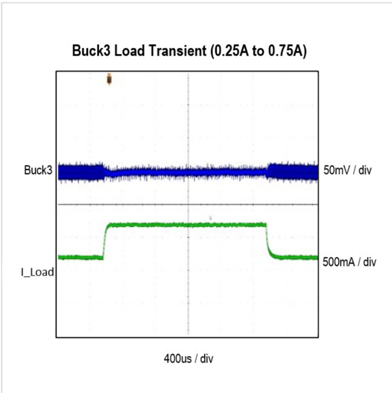

Boost8 Ripple (No Load)
Boost8
100mV / div
SW8
5V / div
1ms / div

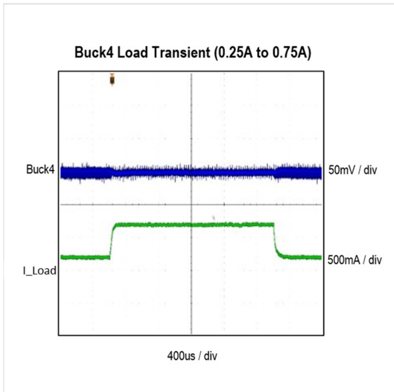

Boost8 Ripple (LED Load=0.025A)
Boost8
100mV / div
SW8
5V / div
10us / div

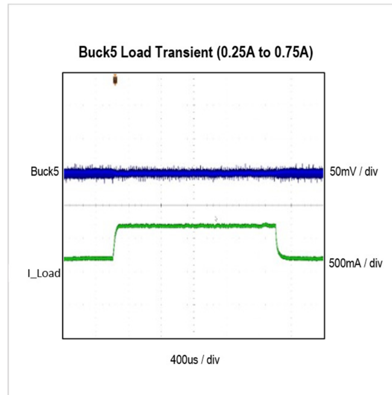

Boost9 Ripple (No Load)
Boost9
100mV / div
SW9
10V / div
1ms / div

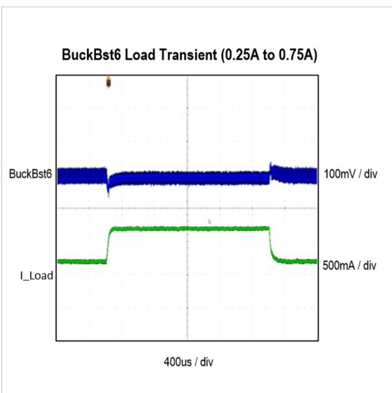

Boost9 Ripple (LED Load=0.025A)
Boost9
100mV / div
SW9
10V / div
1us / div

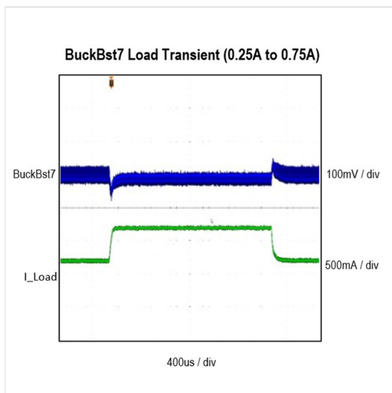

Buck1/2 Load Transient (2A to 6A)
Buck1/2
20mV / div
I_Load
5A / div
80us / div

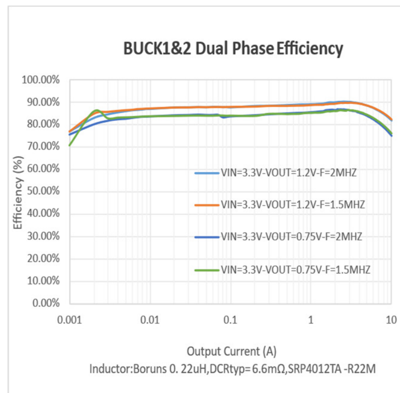

Buck3 Load Transient (0.25A to 0.75A)
Buck3
50mV / div
I_Load
500mA / div
400us / div

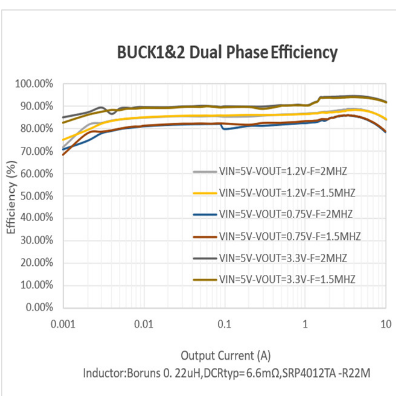

Buck4 Load Transient (0.25A to 0.75A)
Buck4
50mV / div
I_Load
500mA / div
400us / div

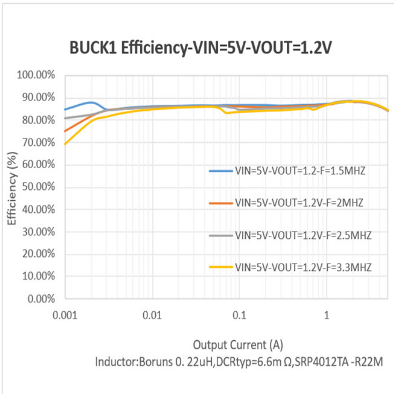

Buck5 Load Transient (0.25A to 0.75A)
Buck5
50mV / div
I_Load
500mA / div
400us / div

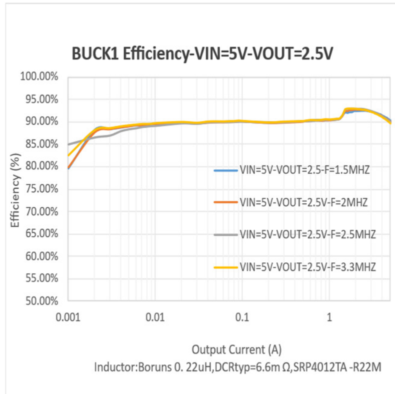

BuckBst6 Load Transient (0.25A to 0.75A)
BuckBst6
100mV / div
I_Load
500mA / div
400us / div

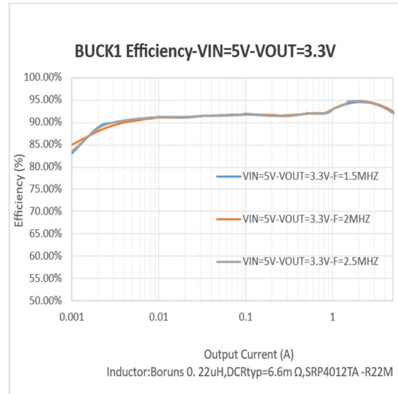

BuckBst7 Load Transient (0.25A to 0.75A)
BuckBst7
100mV / div
I_Load
500mA / div
400us / div

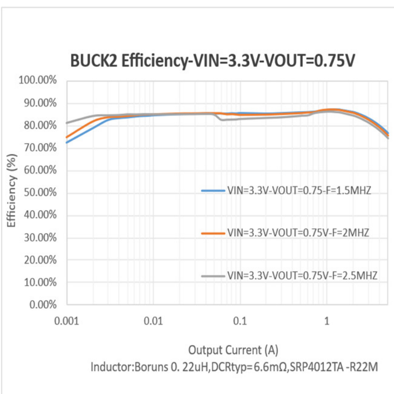

BUCK1&2 Dual Phase Efficiency
Efficiency (%)
VIN=3.3V-VOUT=1.2V-F=2MHZ
VIN=3.3V-VOUT=1.2V-F=1.5MHZ
VIN=3.3V-VOUT=0.75V-F=2MHZ
VIN=3.3V-VOUT=0.75V-F=1.5MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6mΩ,SRP4012TA -R22M

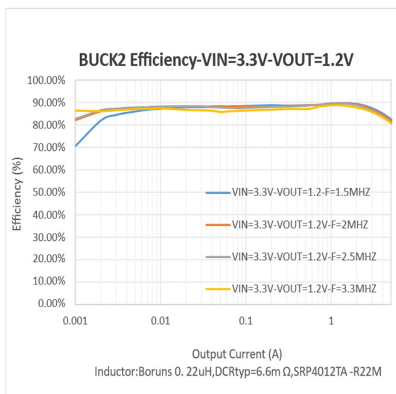

BUCK1&2 Dual Phase Efficiency
Efficiency (%)
VIN=5V-VOUT=1.2V-F=2MHZ
VIN=5V-VOUT=1.2V-F=1.5MHZ
VIN=5V-VOUT=0.75V-F=2MHZ
VIN=5V-VOUT=0.75V-F=1.5MHZ
VIN=5V-VOUT=3.3V-F=2MHZ
VIN=5V-VOUT=3.3V-F=1.5MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6mΩ,SRP4012TA -R22M

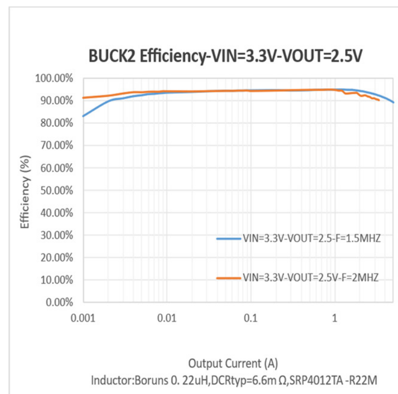

BUCK1 Efficiency-VIN=5V-VOUT=1.2V
Efficiency (%)
VIN=5V-VOUT=1.2-F=1.5MHZ
VIN=5V-VOUT=1.2V-F=2MHZ
VIN=5V-VOUT=1.2V-F=2.5MHZ
VIN=5V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

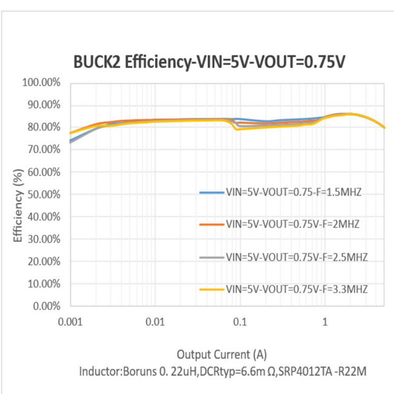

BUCK1 Efficiency-VIN=5V-VOUT=2.5V
Efficiency (%)
VIN=5V-VOUT=2.5-F=1.5MHZ
VIN=5V-VOUT=2.5V-F=2MHZ
VIN=5V-VOUT=2.5V-F=2.5MHZ
VIN=5V-VOUT=2.5V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

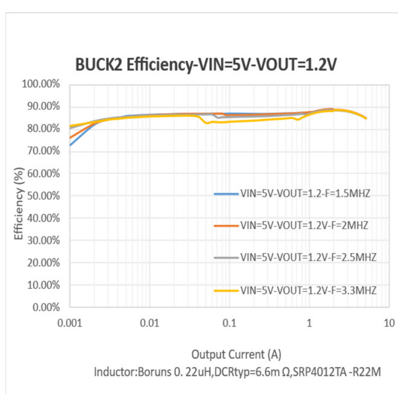

BUCK1 Efficiency-VIN=5V-VOUT=3.3V
Efficiency (%)
VIN=5V-VOUT=3.3V-F=1.5MHZ
VIN=5V-VOUT=3.3V-F=2MHZ
VIN=5V-VOUT=3.3V-F=2.5MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

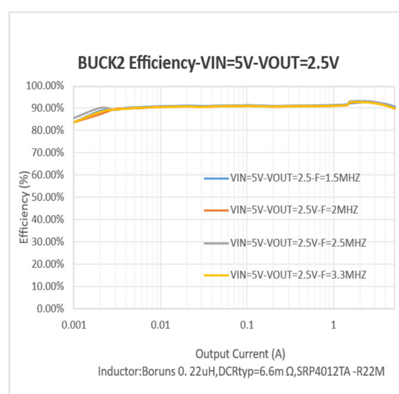

BUCK2 Efficiency-VIN=3.3V-VOUT=0.75V
Efficiency (%)
VIN=3.3V-VOUT=0.75-F=1.5MHZ
VIN=3.3V-VOUT=0.75V-F=2MHZ
VIN=3.3V-VOUT=0.75V-F=2.5MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6mΩ,SRP4012TA -R22M

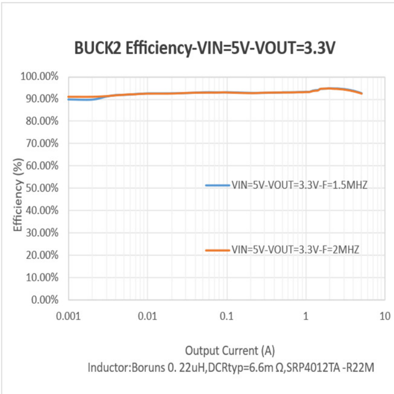

BUCK2 Efficiency-VIN=3.3V-VOUT=1.2V
Efficiency (%)
VIN=3.3V-VOUT=1.2-F=1.5MHZ
VIN=3.3V-VOUT=1.2V-F=2MHZ
VIN=3.3V-VOUT=1.2V-F=2.5MHZ
VIN=3.3V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

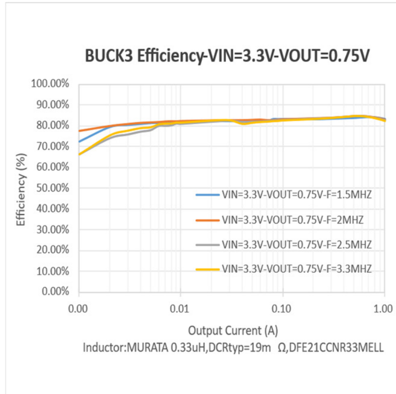

BUCK2 Efficiency-VIN=3.3V-VOUT=2.5V
Efficiency (%)
VIN=3.3V-VOUT=2.5-F=1.5MHZ
VIN=3.3V-VOUT=2.5V-F=2MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

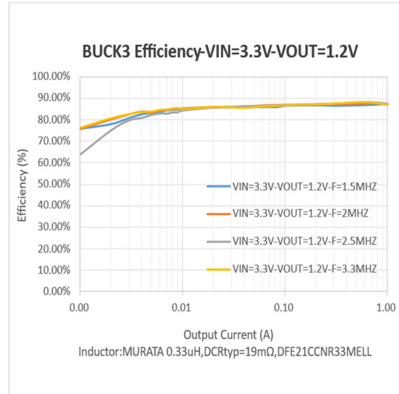

BUCK2 Efficiency-VIN=5V-VOUT=0.75V
Efficiency (%)
VIN=5V-VOUT=0.75-F=1.5MHZ
VIN=5V-VOUT=0.75V-F=2MHZ
VIN=5V-VOUT=0.75V-F=2.5MHZ
VIN=5V-VOUT=0.75V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

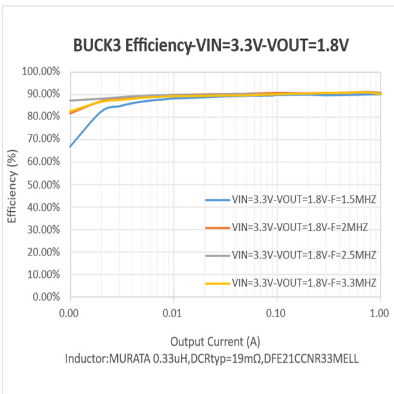

BUCK2 Efficiency-VIN=5V-VOUT=1.2V
Efficiency (%)
VIN=5V-VOUT=1.2-F=1.5MHZ
VIN=5V-VOUT=1.2V-F=2MHZ
VIN=5V-VOUT=1.2V-F=2.5MHZ
VIN=5V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

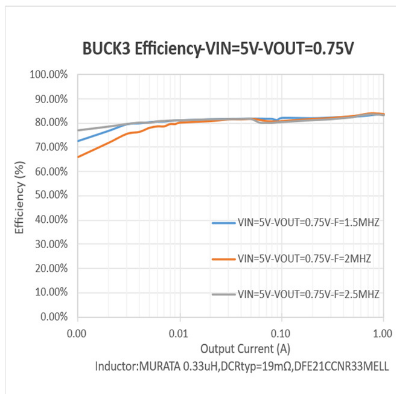

BUCK2 Efficiency-VIN=5V-VOUT=2.5V
Efficiency (%)
VIN=5V-VOUT=2.5-F=1.5MHZ
VIN=5V-VOUT=2.5V-F=2MHZ
VIN=5V-VOUT=2.5V-F=2.5MHZ
VIN=5V-VOUT=2.5V-F=3.3MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6m Ω,SRP4012TA -R22M

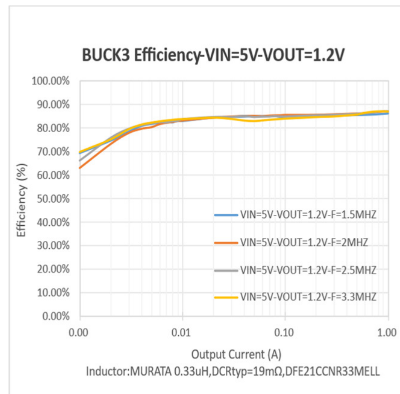

BUCK2 Efficiency-VIN=5V-VOUT=3.3V
Efficiency (%)
VIN=5V-VOUT=3.3V-F=1.5MHZ
VIN=5V-VOUT=3.3V-F=2MHZ
Output Current (A)
Inductor:Boruns 0. 22uH,DCRtyp=6.6mΩ,SRP4012TA -R22M

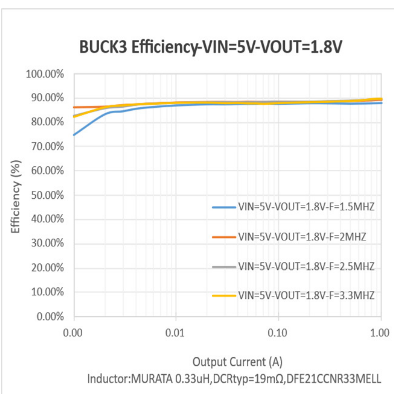

BUCK3 Efficiency-VIN=3.3V-VOUT=0.75V
Efficiency (%)
VIN=3.3V-VOUT=0.75V-F=1.5MHZ
VIN=3.3V-VOUT=0.75V-F=2MHZ
VIN=3.3V-VOUT=0.75V-F=2.5MHZ
VIN=3.3V-VOUT=0.75V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19m Ω,DFE21CCNR33MELL

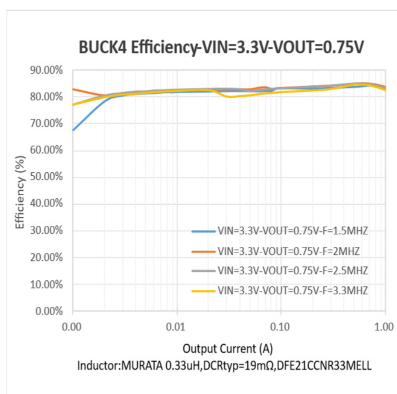

BUCK3 Efficiency-VIN=3.3V-VOUT=1.2V
Efficiency (%)
VIN=3.3V-VOUT=1.2V-F=1.5MHZ
VIN=3.3V-VOUT=1.2V-F=2MHZ
VIN=3.3V-VOUT=1.2V-F=2.5MHZ
VIN=3.3V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

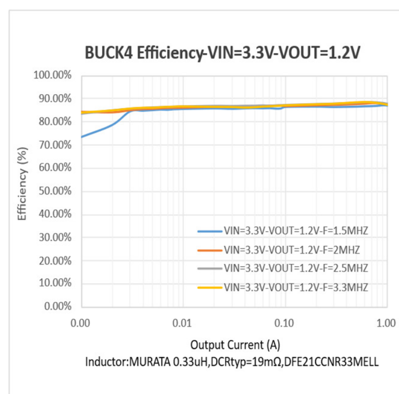

BUCK3 Efficiency-VIN=3.3V-VOUT=1.8V
Efficiency (%)
VIN=3.3V-VOUT=1.8V-F=1.5MHZ
VIN=3.3V-VOUT=1.8V-F=2MHZ
VIN=3.3V-VOUT=1.8V-F=2.5MHZ
VIN=3.3V-VOUT=1.8V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

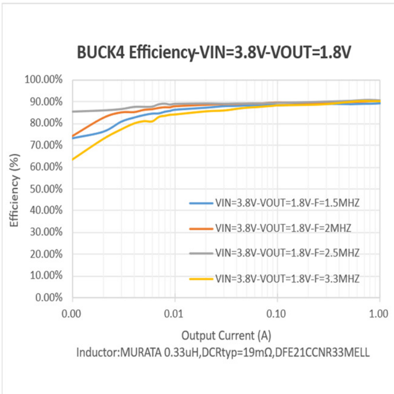

BUCK3 Efficiency-VIN=5V-VOUT=0.75V
Efficiency (%)
VIN=5V-VOUT=0.75V-F=1.5MHZ
VIN=5V-VOUT=0.75V-F=2MHZ
VIN=5V-VOUT=0.75V-F=2.5MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

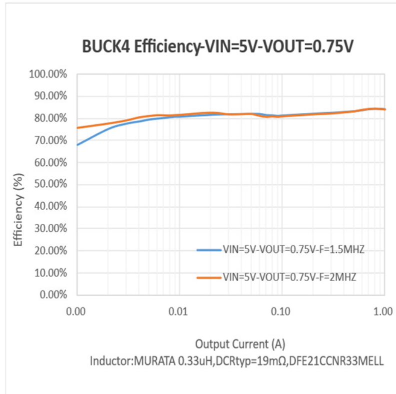

BUCK3 Efficiency-VIN=5V-VOUT=1.2V
Efficiency (%)
VIN=5V-VOUT=1.2V-F=1.5MHZ
VIN=5V-VOUT=1.2V-F=2MHZ
VIN=5V-VOUT=1.2V-F=2.5MHZ
VIN=5V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

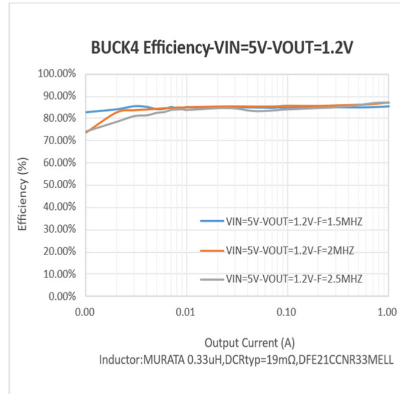

BUCK3 Efficiency-VIN=5V-VOUT=1.8V
Efficiency (%)
VIN=5V-VOUT=1.8V-F=1.5MHZ
VIN=5V-VOUT=1.8V-F=2MHZ
VIN=5V-VOUT=1.8V-F=2.5MHZ
VIN=5V-VOUT=1.8V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

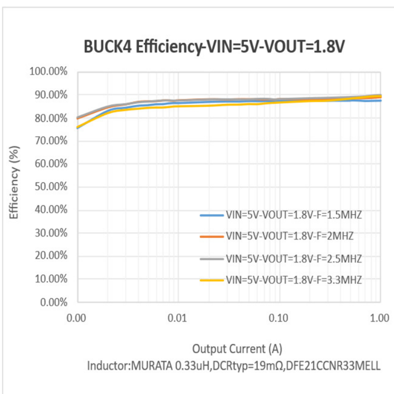

BUCK4 Efficiency-VIN=3.3V-VOUT=0.75V
Efficiency (%)
VIN=3.3V-VOUT=0.75V-F=1.5MHZ
VIN=3.3V-VOUT=0.75V-F=2MHZ
VIN=3.3V-VOUT=0.75V-F=2.5MHZ
VIN=3.3V-VOUT=0.75V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

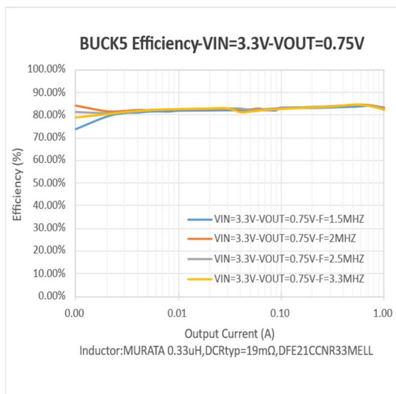

BUCK4 Efficiency-VIN=3.3V-VOUT=1.2V
Efficiency (%)
VIN=3.3V-VOUT=1.2V-F=1.5MHZ
VIN=3.3V-VOUT=1.2V-F=2MHZ
VIN=3.3V-VOUT=1.2V-F=2.5MHZ
VIN=3.3V-VOUT=1.2V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

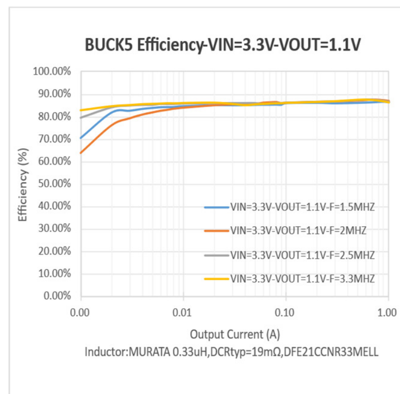

BUCK4 Efficiency-VIN=3.8V-VOUT=1.8V
Efficiency (%)
VIN=3.8V-VOUT=1.8V-F=1.5MHZ
VIN=3.8V-VOUT=1.8V-F=2MHZ
VIN=3.8V-VOUT=1.8V-F=2.5MHZ
VIN=3.8V-VOUT=1.8V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

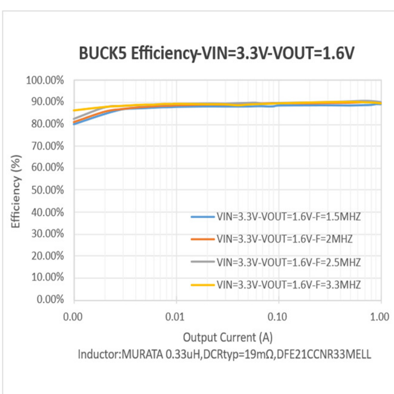

BUCK4 Efficiency-VIN=5V-VOUT=0.75V
Efficiency (%)
VIN=5V-VOUT=0.75V-F=1.5MHZ
VIN=5V-VOUT=0.75V-F=2MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

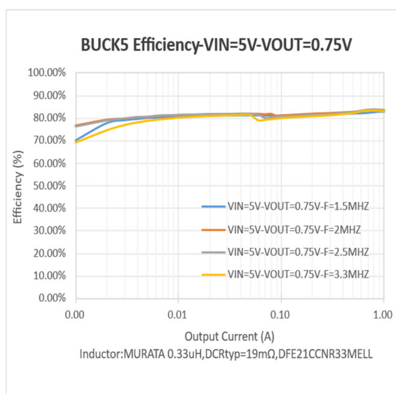

BUCK4 Efficiency-VIN=5V-VOUT=1.2V
Efficiency (%)
VIN=5V-VOUT=1.2V-F=1.5MHZ
VIN=5V-VOUT=1.2V-F=2MHZ
VIN=5V-VOUT=1.2V-F=2.5MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

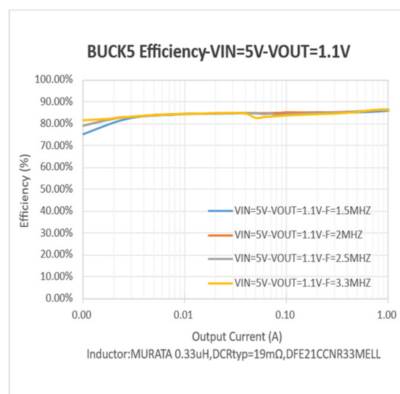

BUCK4 Efficiency-VIN=5V-VOUT=1.8V
Efficiency (%)
VIN=5V-VOUT=1.8V-F=1.5MHZ
VIN=5V-VOUT=1.8V-F=2MHZ
VIN=5V-VOUT=1.8V-F=2.5MHZ
VIN=5V-VOUT=1.8V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

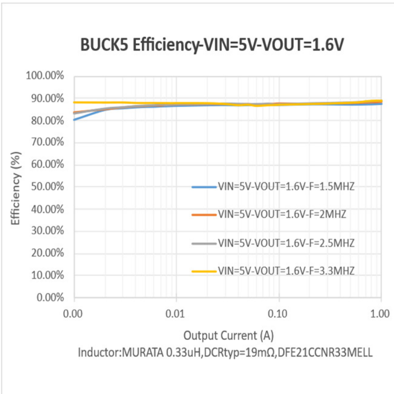

BUCK5 Efficiency-VIN=3.3V-VOUT=0.75V
Efficiency (%)
VIN=3.3V-VOUT=0.75V-F=1.5MHZ
VIN=3.3V-VOUT=0.75V-F=2MHZ
VIN=3.3V-VOUT=0.75V-F=2.5MHZ
VIN=3.3V-VOUT=0.75V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

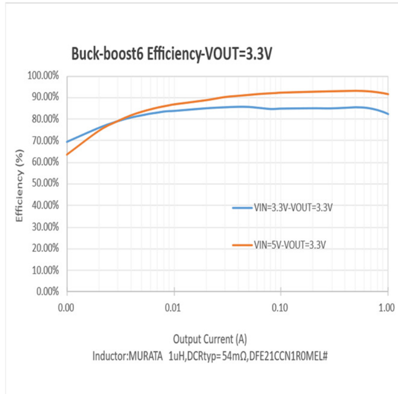

BUCK5 Efficiency-VIN=3.3V-VOUT=1.1V
Efficiency (%)
VIN=3.3V-VOUT=1.1V-F=1.5MHZ
VIN=3.3V-VOUT=1.1V-F=2MHZ
VIN=3.3V-VOUT=1.1V-F=2.5MHZ
VIN=3.3V-VOUT=1.1V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

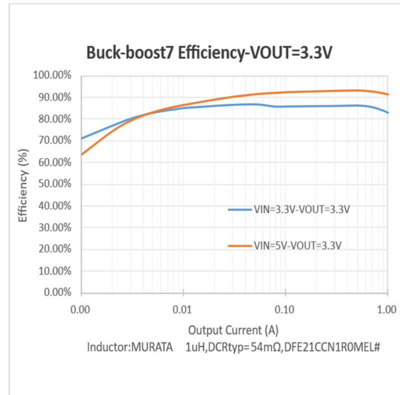

BUCK5 Efficiency-VIN=3.3V-VOUT=1.6V
Efficiency (%)
VIN=3.3V-VOUT=1.6V-F=1.5MHZ
VIN=3.3V-VOUT=1.6V-F=2MHZ
VIN=3.3V-VOUT=1.6V-F=2.5MHZ
VIN=3.3V-VOUT=1.6V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

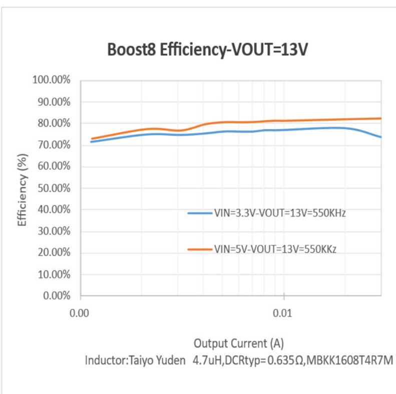

BUCK5 Efficiency-VIN=5V-VOUT=0.75V
Efficiency (%)
VIN=5V-VOUT=0.75V-F=1.5MHZ
VIN=5V-VOUT=0.75V-F=2MHZ
VIN=5V-VOUT=0.75V-F=2.5MHZ
VIN=5V-VOUT=0.75V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL

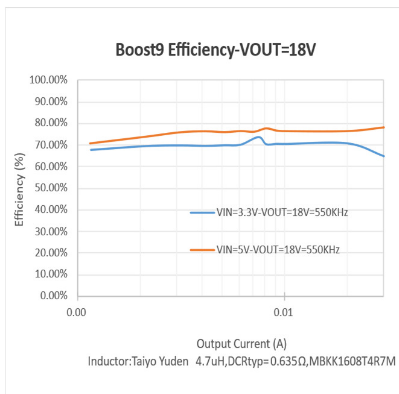

BUCK5 Efficiency-VIN=5V-VOUT=1.1V
Efficiency (%)
VIN=5V-VOUT=1.1V-F=1.5MHZ
VIN=5V-VOUT=1.1V-F=2MHZ
VIN=5V-VOUT=1.1V-F=2.5MHZ
VIN=5V-VOUT=1.1V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL


BUCK5 Efficiency-VIN=5V-VOUT=1.6V
Efficiency (%)
VIN=5V-VOUT=1.6V-F=1.5MHZ
VIN=5V-VOUT=1.6V-F=2MHZ
VIN=5V-VOUT=1.6V-F=2.5MHZ
VIN=5V-VOUT=1.6V-F=3.3MHZ
Output Current (A)
Inductor:MURATA 0.33uH,DCRtyp=19mΩ,DFE21CCNR33MELL


Buck-boost6 Efficiency-VOUT=3.3V
Efficiency (%)
VIN=3.3V-VOUT=3.3V
VIN=5V-VOUT=3.3V
Output Current (A)
Inductor:MURATA 1uH,DCRtyp=54mΩ,DFE21CCN1R0MEL#


Buck-boost7 Efficiency-VOUT=3.3V
Efficiency (%)
VIN=3.3V-VOUT=3.3V
VIN=5V-VOUT=3.3V
Output Current (A)
Inductor:MURATA 1uH,DCRtyp=54mΩ,DFE21CCN1R0MEL#


Boost8 Efficiency-VOUT=13V
Efficiency (%)
VIN=3.3V-VOUT=13V=550KHz
VIN=5V-VOUT=13V=550KKz
Output Current (A)
Inductor:Taiyo Yuden 4.7uH,DCRtyp=0.635Ω,MBKK1608T4R7M


Boost9 Efficiency-VOUT=18V
Efficiency (%)
VIN=3.3V-VOUT=18V=550KHz
VIN=5V-VOUT=18V=550KHz
Output Current (A)
Inductor:Taiyo Yuden 4.7uH,DCRtyp=0.635Ω,MBKK1608T4R7M

Schematic

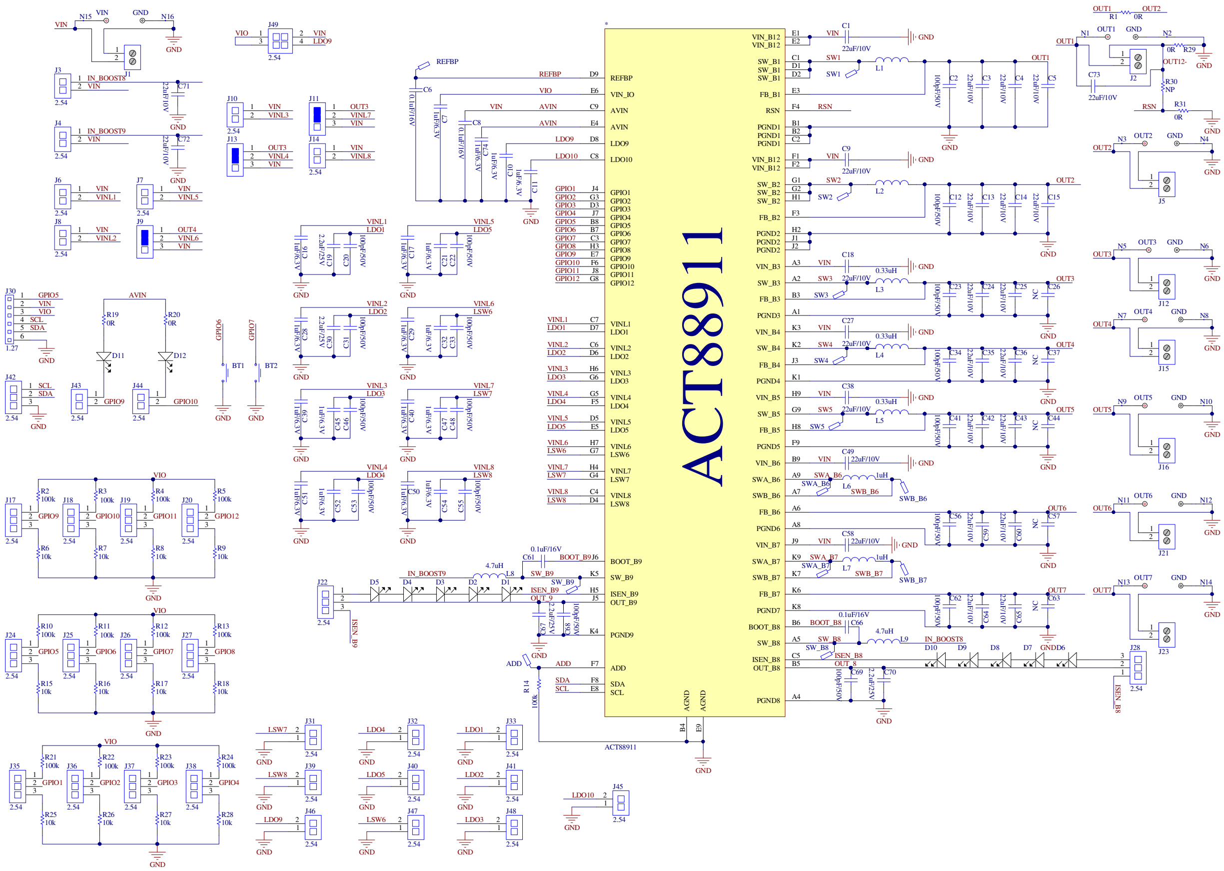


Figure 5 – ACT88911EVK1-101 Schematic

Bill of Materials

Table 2 - BOM

Item	Designator	Quantity	Description	Manu-facturer	Part Number
1	C1, C3, C4, C5,C9, C13, C14, C15,C18, C24, C25, C27, C35, C36, C38, C42, C43, C49, C58, C59, C60, C64, C65, C71, C72, C73	26	Capacitor, Ce-ramic,22uF/10V/X7R, 0402	Murata	GRM158R61A226ME15D
2	C2, C12, C20, C22, C23, C31, C33, C34, C41, C46, C48, C53, C55, C56, C62, C68, C69	17	Capacitor, Ceramic, 100pF/50V, 0201	Murata	GRM033R71H101KA12D
3	C26, C37, C44, C57, C63	0	Capacitor, Ceramic, NC , 0402	Murata	GRM158R61A226ME15D
4	C67,C70,C19,C30	4	Capacitor, Ceramic 2.2uF+/-10% X5R 25V SMD0402	SAM-SUNG	CL05A225KA5NUNC
5	C39,C45,C51,C52,C17,C21,C29,C32,C40,C41,C50,C54,C10,C11,C7,C74,C16,C28	18	Capacitor, Ceramic 1uF+/-20% X5R 6.3V SMD0201	Murata	GRM033R60J105MEA2D
6	C6,C8,C61,C66	4	Capacitor, Ceramic 0.1uF+/-20% X5R 16V SMD0201	Murata	GRM033R61C104KE14D
7	J1, J2, J5, J12, J15, J16, J21, J23	8	Connector, Screw Terminal, 3.50, 2P	Wurth	691214110002S
8	J9, J11, J13,,J17, J18, J19, J20, J22, J24, J25, J26, J27, J28, J35, J36, J37, J38, J42	18	Connector, Jumper, 2.54, 3p	Wurth	61300311121
9	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12	12	SMD Mono-color Chip LED, body 2.0x1.25mm ,0805	std	std
10	J30	1	Header, Unshrouded , 1.27, Male, 6P	Wurth	GRPB061VWVN-RC
11	J3, J4, J6, J7, J8, J10, J14, J31, J32, J33, J39, J40, J41, J43, J44, J45, J46, J47, J48	19	Header, Unshrouded , 2.54, Male, 2P	Wurth	61300211121
12	J49	1	Header, Unshrouded , 2.54, Male, 2x2P	Wurth	61300421121
13	L1, L2	2	Inductor,0.22uH	Boruns	SRP4012TA-R22M
14	L3, L4, L5,	3	Inductor,0.33uH	MU-RATA	DFE21CCNR33MELL
15	L6, L7	2	Inductor,1uH	MU-RATA	DFE21CCN1R0MEL#
16	L8, L9	2	Inductor,4.7uH	Taiyo Yuden	MBKK1608T4R7M
17	R19, R20, R31	3	Resistor,0603 0R +/-1%	Stand-ard	Standard
18	R1, R29	2	Resistor,1206 0R +/-1%	Stand-ard	Standard
19	R6, R7, R8, R9, R15, R16, R17, R18, R25, R26, R27, R28	12	Resistor,0603 10kR +/-1%	Stand-ard	Standard
20	R2, R3, R4, R5, R10, R11, R12, R13, R14, R21, R22, R23, R24	13	Resistor,0603 100kR +/-1%	Stand-ard	Standard
21	R30	0	Resistor,0603 NC	Stand-ard	Standard
22	BT1, BT2	2	WURTH-434123043836 50mA, 12VDC	WURTH	WURTH-434123043836
23	U1	1	IC, ACT88911	Qorvo	ACT88911

24	Label	1	ACT88911EVK1-101,Arial,6	3cm*1cm	
25	TP1(for OUT1), TP3(for OUT2), TP5(for OUT3), TP7(for OUT4), TP9(for OUT5), TP11(for OUT6), TP13(for OUT7), TP15(for VIN),	8	TEST POINT PC MINI .040"D RED	Key-Stone	5000
26	TP2(for GND), TP4(for GND), TP6(for GND), TP8(for GND), TP10(for GND), TP12(for GND), TP14(for GND), TP16(for GND),	8	TEST POINT PC MINI .040"D BLK	Key-Stone	5001

Layout

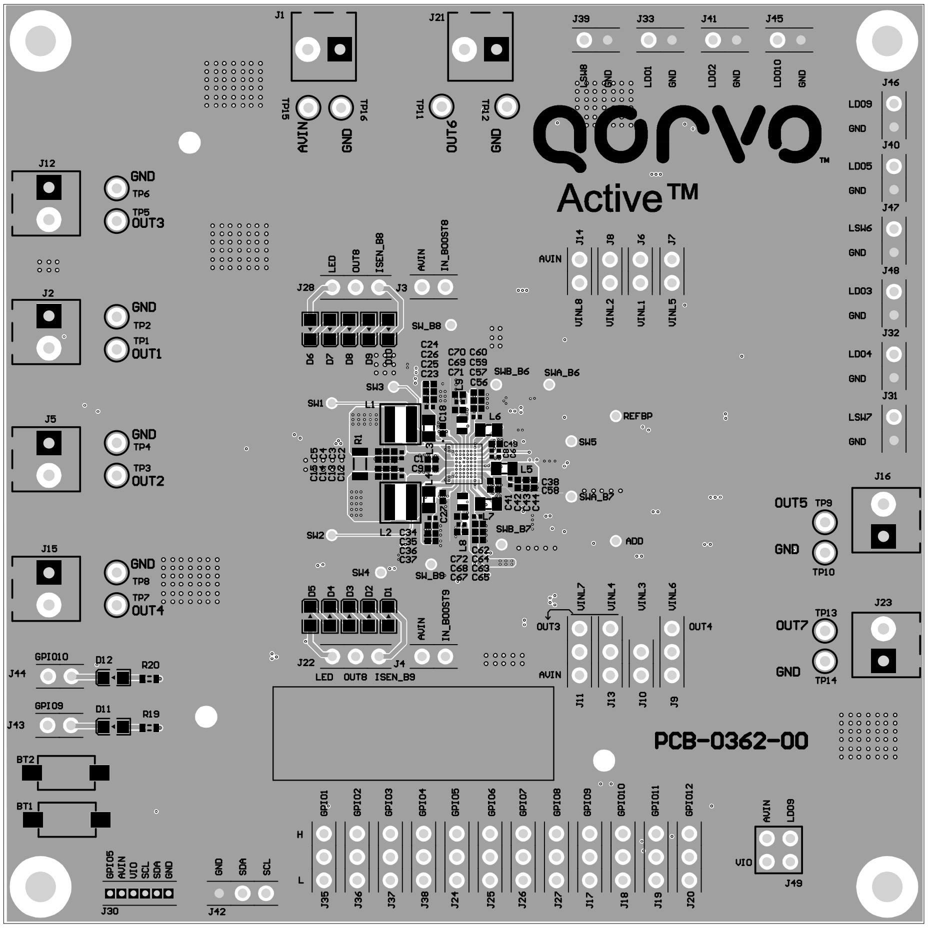


Figure 6 – Layout Top Assembly

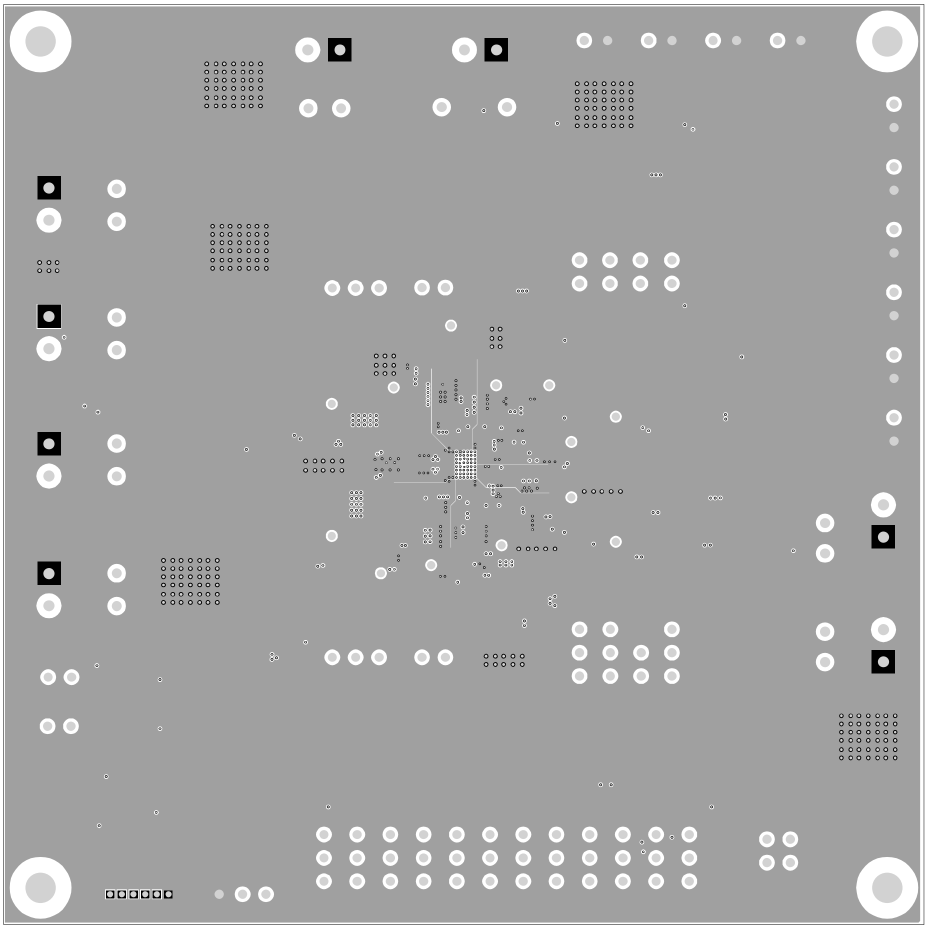


Figure 7 – Layout Sig1 Layer

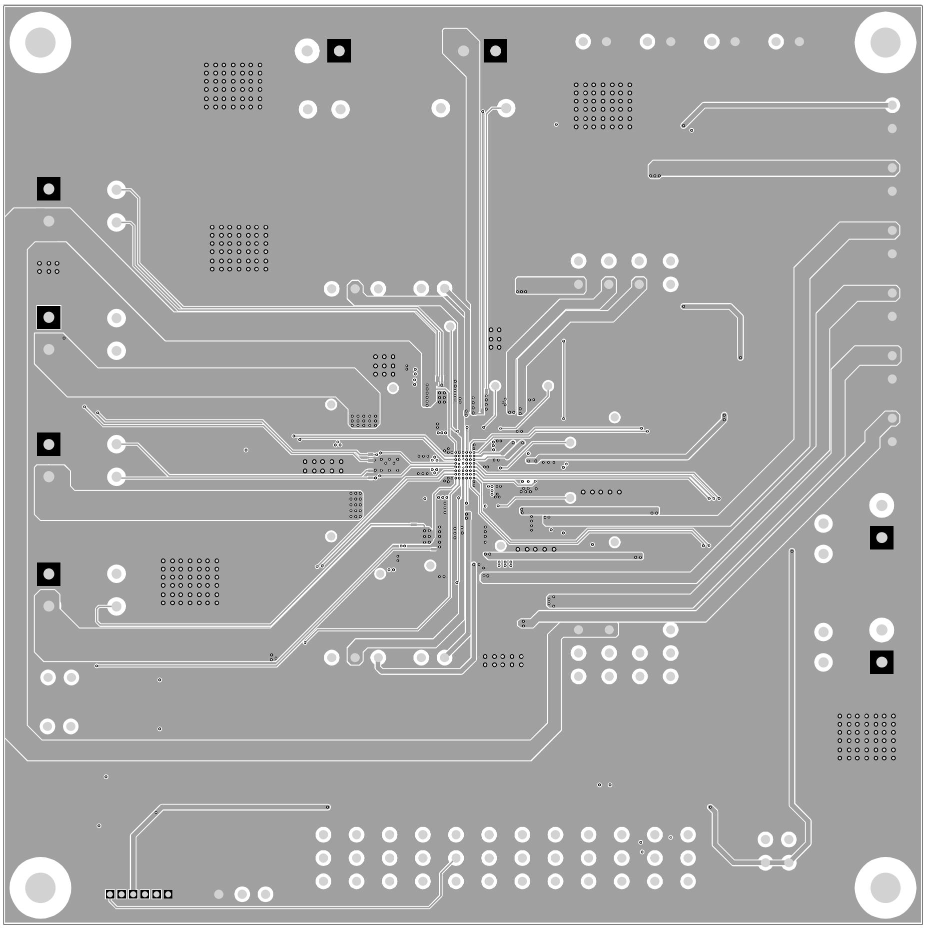


Figure 8 – Layout Sig2 Layer

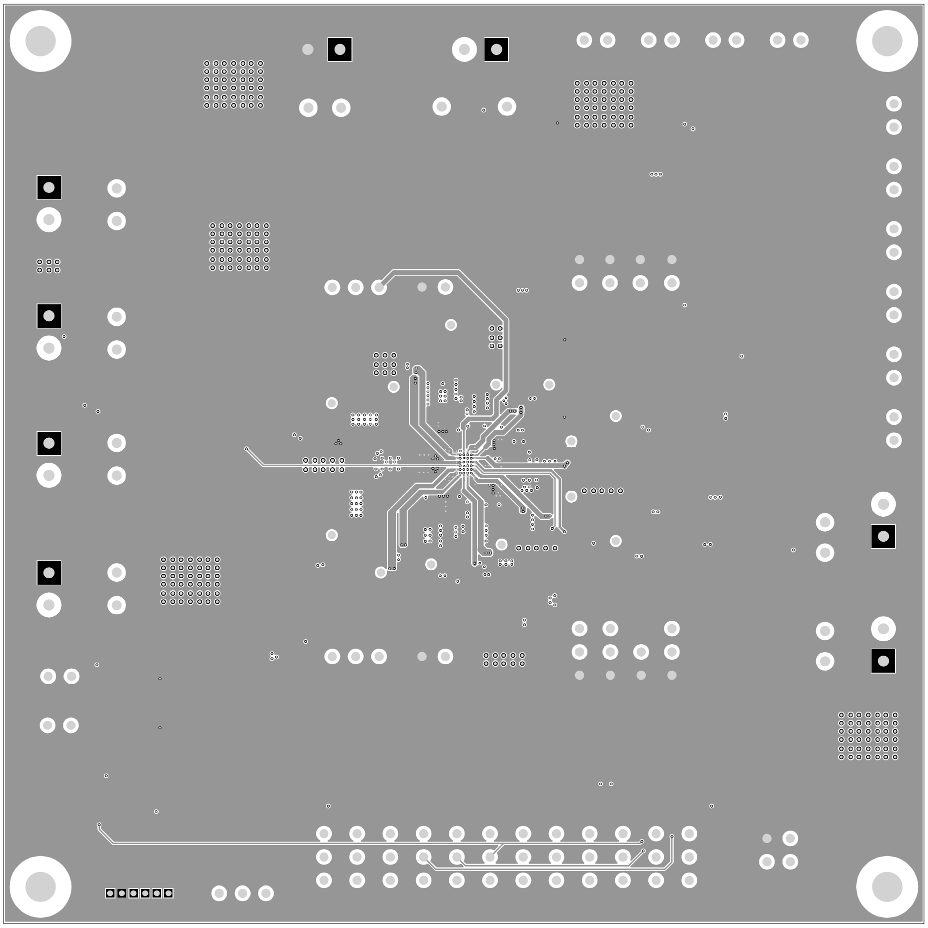


Figure 8.1 – Layout Sig3 Layer

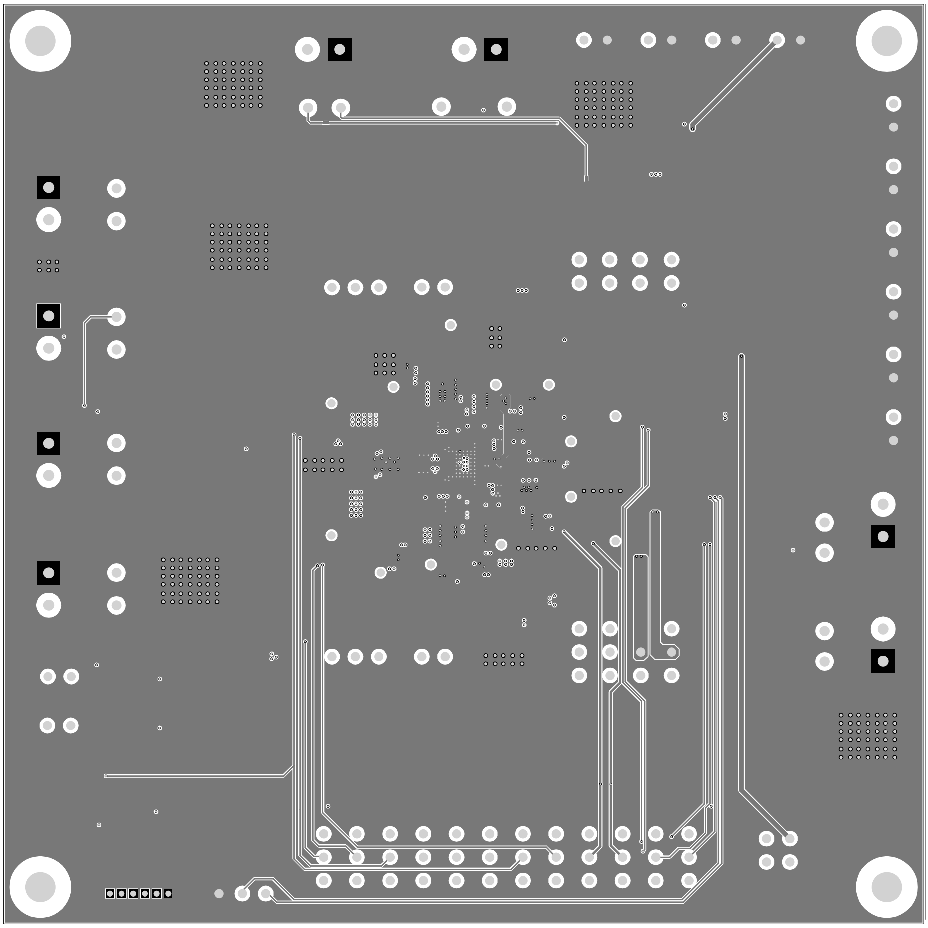


Figure 8.2 – Layout Sig4 Layer

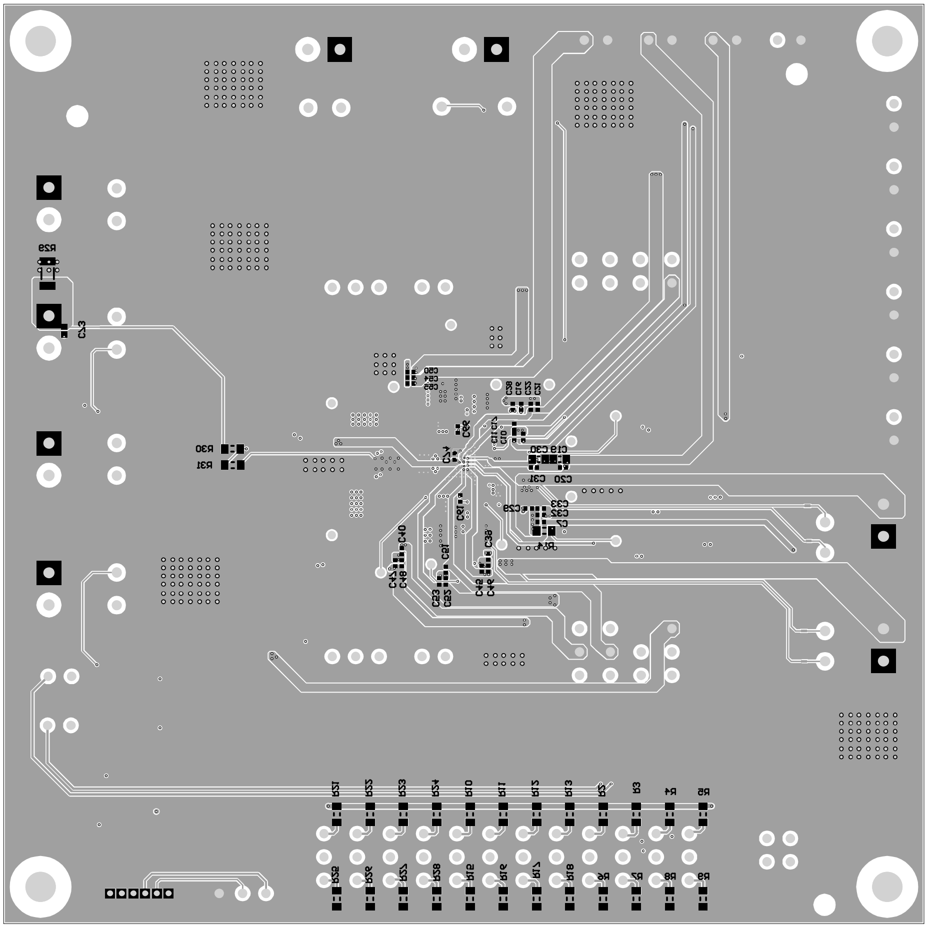


Figure 9 – Layout Bottom Layer

GUI Installation

1. Download the GUI files from Qorvo's website and save them on your computer.
2. Plug the USB-TO-I2C dongle into a free USB port.
3. Double click on the ACT88911 GUI.exe to start the ACT88911 GUI.

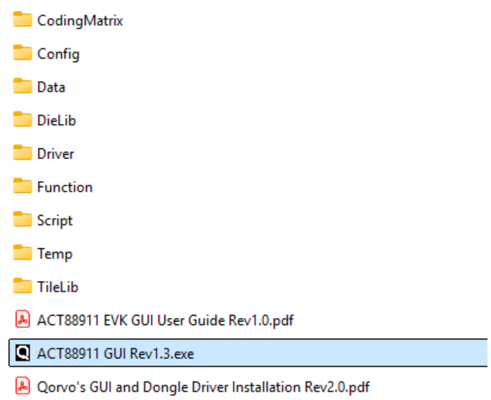


Figure 10 – Dongle Driver

GUI Overview

The GUI has 2 basic function buttons allocated in top-left of the Tool Bar which are Read and Write I2C. The GUI contains 2 setting modes: Configuration Mode and Regulator Mode. In Configuration Mode screen it displays each regulator's basic information on a single page, all the information is user configurable via the drop-down boxes. Regulator Mode allows the user to view and change the IC's advanced internal registers of each regulator.

Configuration Mode

Click the "Configuration" button in the left of the GUI screen to see the basic user programmable options. This display mode allows user to change some basic settings of each regulator (voltages, current…). User can use either the mouse scroll or the right-side scroll bar to navigate to other regulators. Using drop-boxes, left-click the small arrow next to the value, then a selection pop-up displays all possible options to choose from. Scroll up/down to find the target value and left-click to select it. After the required parameters are changed, click the "Write" button to transfer the changes from the GUI to the IC.

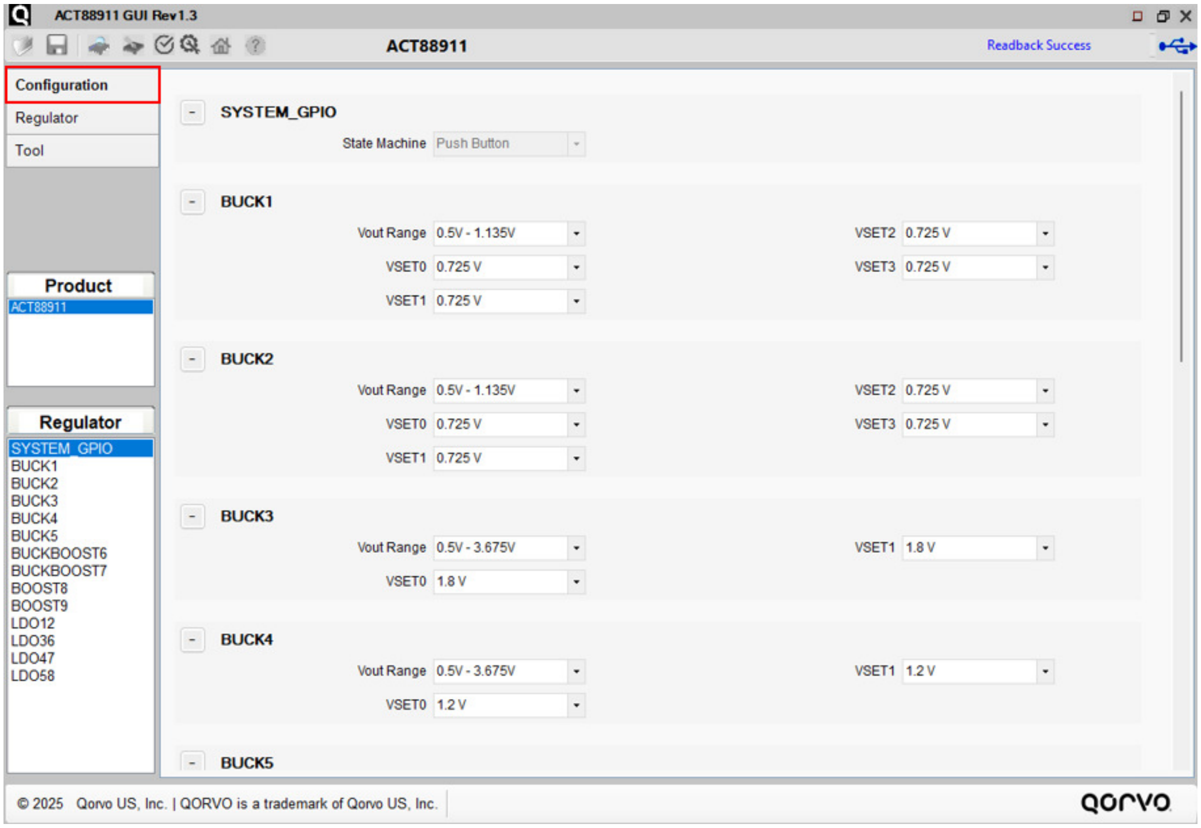


Figure 11 – GUI Configuration Mode

Regulator Mode

Click the “Regulator” button in the left of the GUI screen to see all available user programmable options. In the left side of the screen, click on the Tiles Selector to choose which regulator or LDO’s to show. There are two tabs for each tile, “Setting “and “Register”.

The “Settings” tab is easy to read and has drop down menus that show the available choices. The “Registers” tab shows the actual register values required to achieve a desired setting.

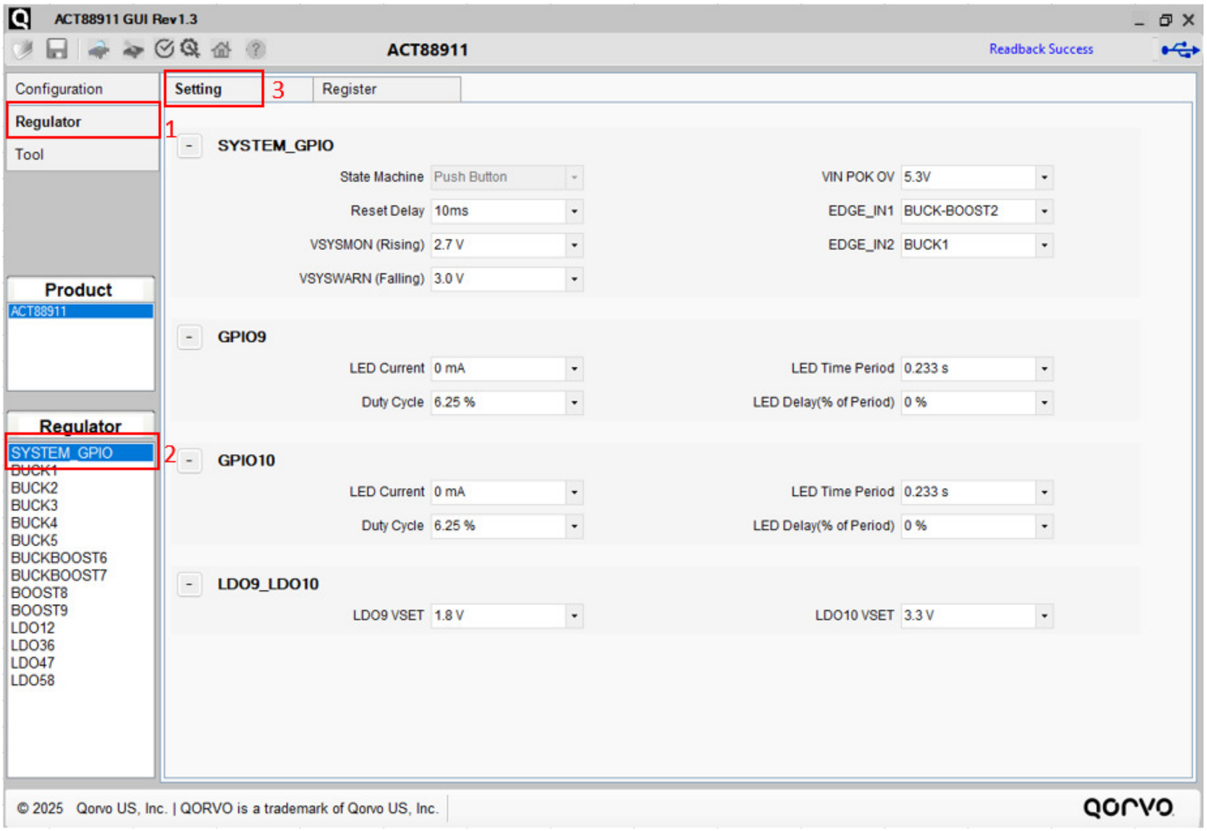


Figure 12 – GUI Setting Tab of Regulator Mode

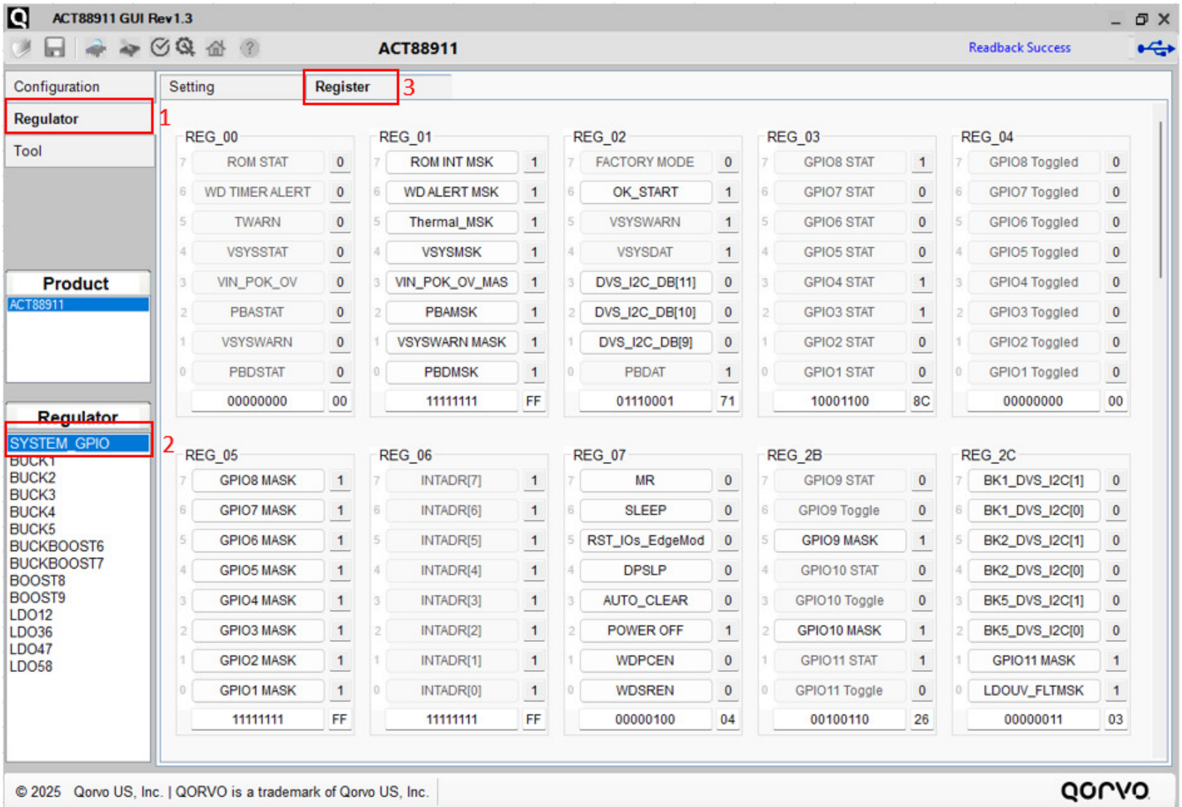


Figure 13 – GUI Register Tab of Regulator Mode

Button Descriptions

Read: Clicking on this button reads the ACT88911 registers and displays them in the GUI. Note that this reads all registers. Active-Semi recommends reading registers each time the ACT88911 powers-up to acquire the initial register settings. Qorvo also recommends reading registers after making changes to them. Immediately reading the registers after a write confirms the changes were properly stored. This also updates the SYSTEM STATUS box to ensure that one of the changes did not generate a fault condition.

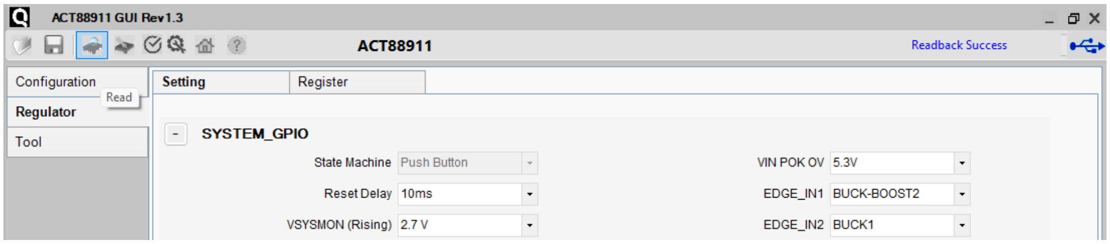


Figure 14 – Read Button

Write: Clicking on this button writes the GUI settings to the ACT88911's registers. All registers are written, regardless of whether or not they were changed.

Note: Remember that changes to the GUI settings are not transferred into the IC until the GUI's "Write" button is pressed.

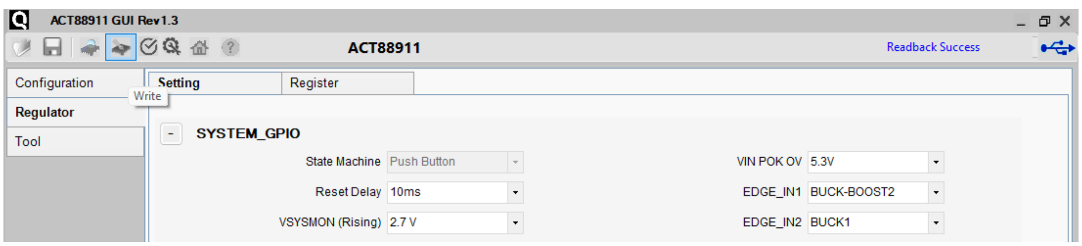


Figure 15 – Write Button

Confirm: Confirm function allows user to compare the ACT88911's registers information on GUI with the values read from IC.

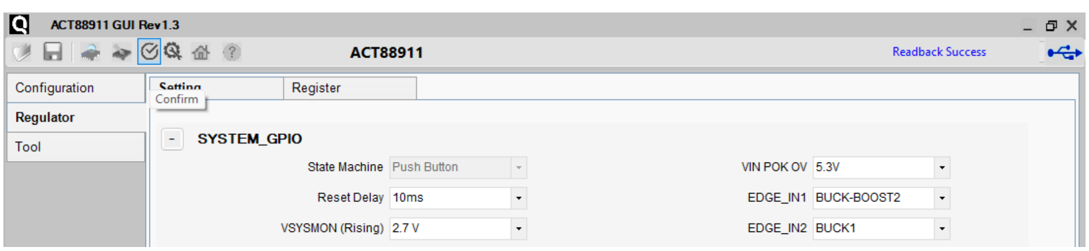


Figure 16 – Confirm Button

I2C Configuration: I2C configuration function allows user to select one of the ACT88911's I2C addresses for Read/Write function.

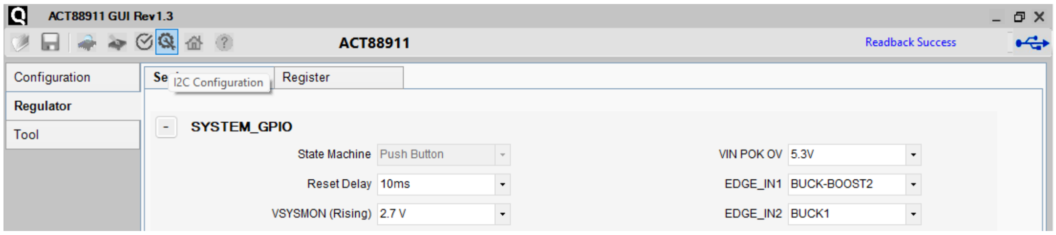


Figure 17 – I2C Configuration Button

Dongle Connection Status: The GUI also contains a dongle is connected status which indicates that Active-Semi's USB-TO-I2C dongle is connected to the USB port of the driver installed. The figure below shows the two possible indication status graphics.

Dongle Connected **Dongle Disconnected**

Figure 18 – Dongle Connection Status