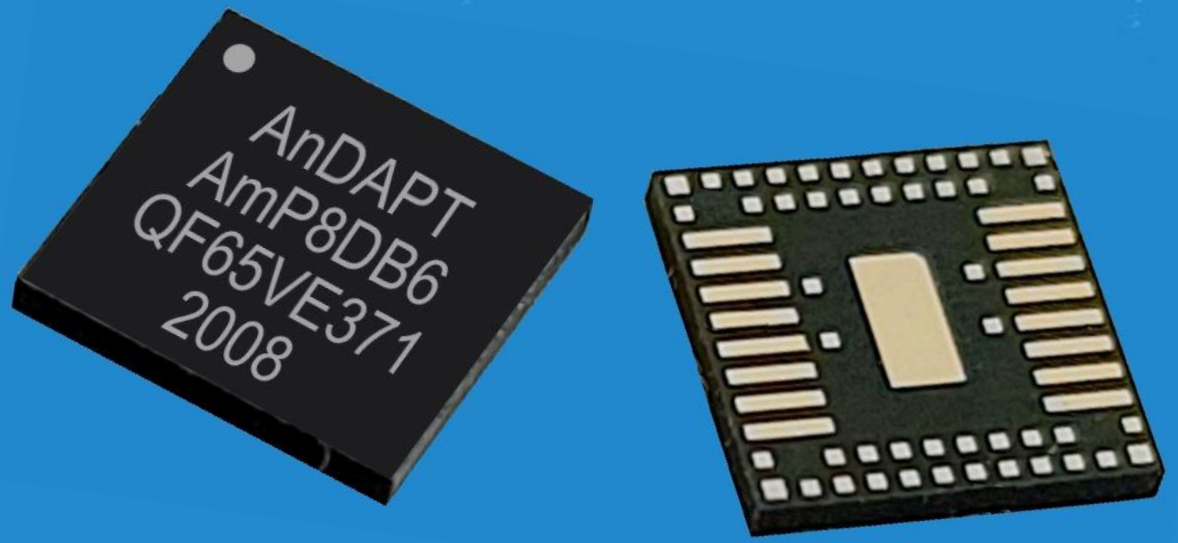

Artix UltraScale+ (Minimum Rails)

Mappings & Test Data

AnDAPT Marketing Team

AnDAPT

Contents

- Xilinx Artix UltraScale+ family of devices SKUs (minimum rails/rail consolidation)
- Artix US+ power maps
- AnDAPT integrated power supply design
- Bench data including efficiency, transients, ripple for each power rail
- AnDAPT PMICs meet or exceed all power performance specs provided by Xilinx for Artix US+ family FPGAs

*Xilinx document: https://www.xilinx.com/support/documentation/user_guides/ug583-ultrascale-pcb-design.pdf

Artix UltraScale+ (US+) Device SKUs Covered

Supported SKUs
AU10P
AU15P
AU20P
AU25P

Artix UltraScale+ (Minimum Rails)

Can be combined if voltage same

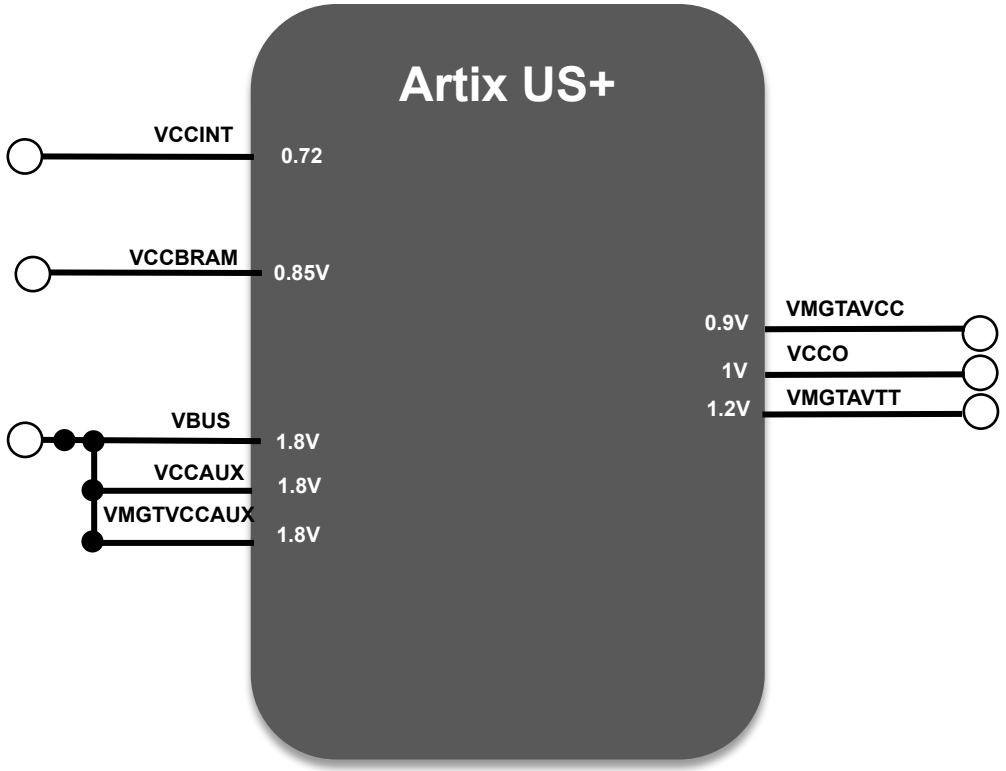

Image courtesy Xilinx: https://www.xilinx.com/support/documentation/user_guides/ug583-ultrascale-pcb-design.pdf

Power Tree: Artix UltraScale+ (Minimum Rails)

PVIN = 12V

#	Rail	Seq	Vout (V)	Iout (A)
1	VCCINT	1	0.72/0.85	4-6
2	VCCBRAM/INT_IO	2	0.85	0.35
3	VCCAUX/ADC	3	1.8	0.35
4	VMGTAVTT	4	1.2	3.5
5	VMGTVCCAUX	5	1.8	0.2
6	VMGTAVCC	6	0.9	0.75
7	VCCO	9	1.1-3.3, 1-1.8	1.5

Power Tree Mapping: Artix UltraScale+ (Minimum Rails)

PVIN = 12V

#	Rail	Seq	Power Component	Type	Upstream Rail	Vinput (V)	Vout (V)	Iout (A)	AnDAPT PMIC
1	VCCINT	1	C150	Async Buck	PVIN	12	0.72	6	ARD_X_AUP_A1
2	VBUS	1	C150	Async Buck	PVIN	12	1.8	0.35 + 0.35 + 0.75	ARD_X_AUP_A1
3	VCCBRAM/INT_IO	2	C710	LDO	VBUS	1.8	0.85	0.35	ARD_X_AUP_A1
4	VCCAUX/ADC	3	C750	Load Switch	VBUS	1.8	1.8	0.35	ARD_X_AUP_A1
5	VMGTAVTT	4	C150	Async Buck	PVIN	12	1.2	3	ARD_X_AUP_A1
6	VMGTVCCAUX	5	C750	Load Switch	PVIN	12	1.8	0.15	ARD_X_AUP_A1
7	VMGTAVCC	6	C710	LDO	VBUS	1.8	0.9	0.75	ARD_X_AUP_A1
8	VCCO	7	C150	Async Buck	PVIN	12	1.1-3.3, 1-1.8	1.5	ARD_X_AUP_A1

Estimated total area estimated = 1114.31 mm^2

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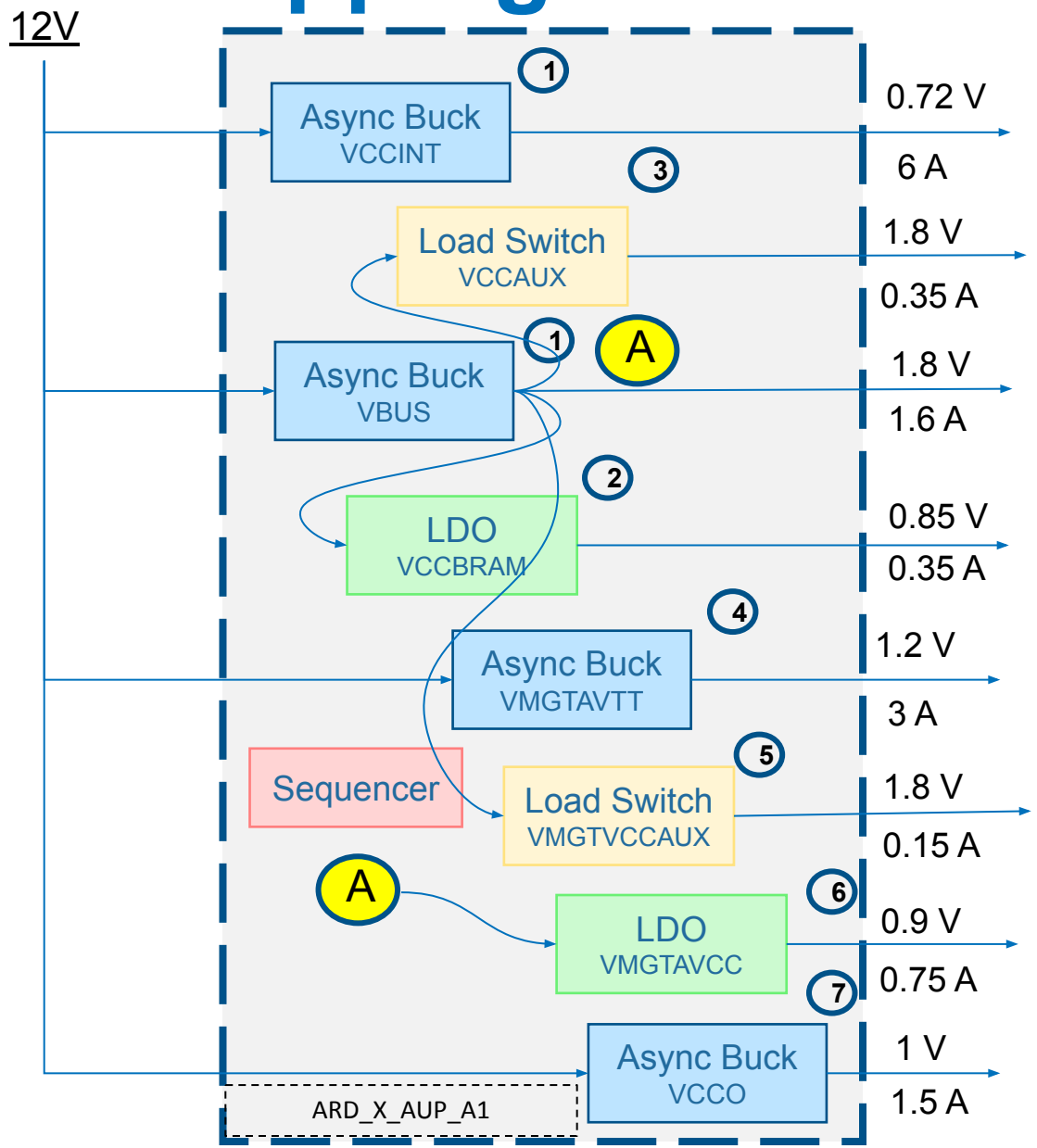
Power Tree Mapping



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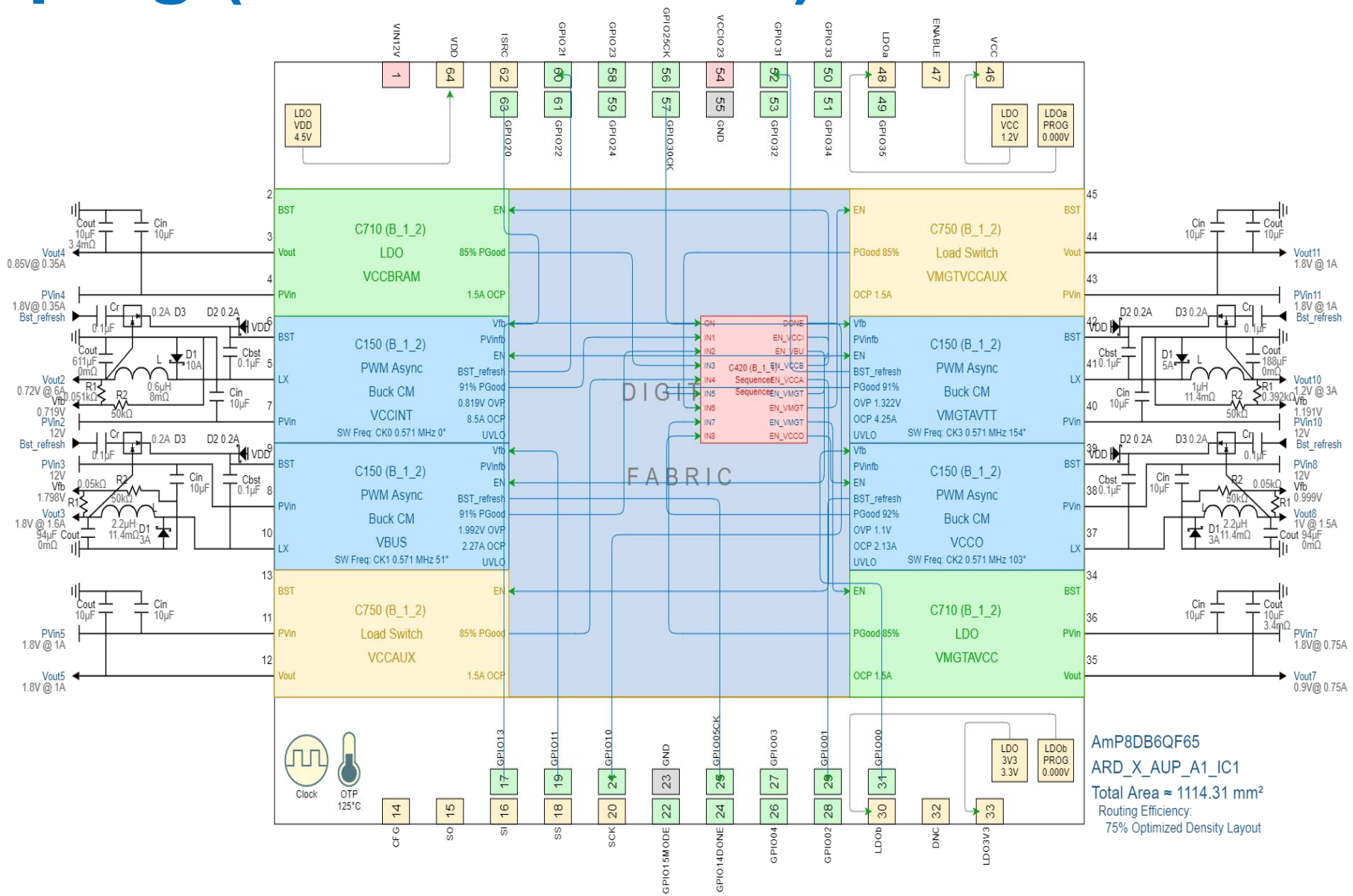
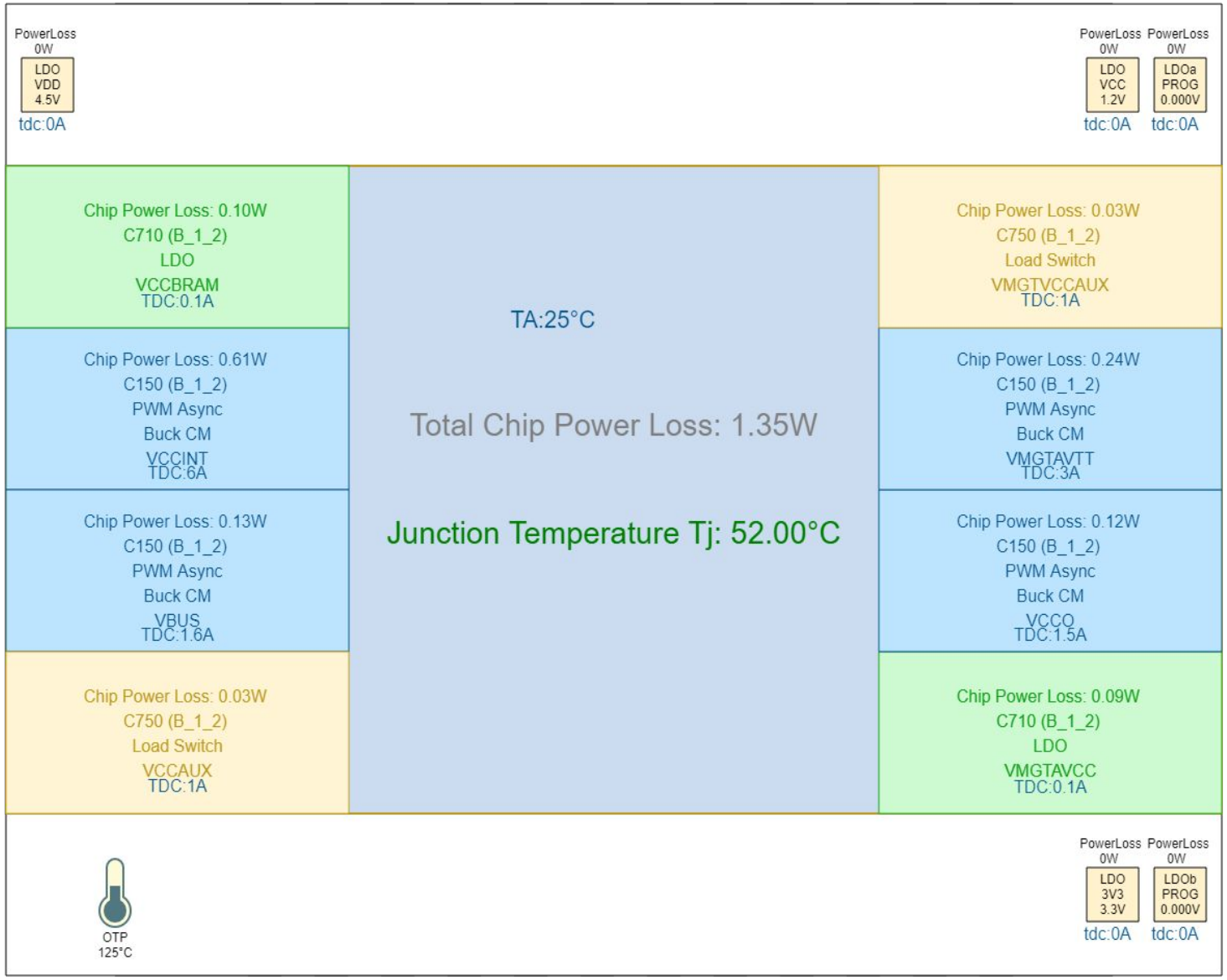
Mapping (WebAmP View)



Mapping (Thermal View)



AmP8DB6QF65
ARD_X_AUP_A1_IC1
Total Area ≈ 1114.31 mm²
Routing Efficiency:
75% Optimized Density Layout

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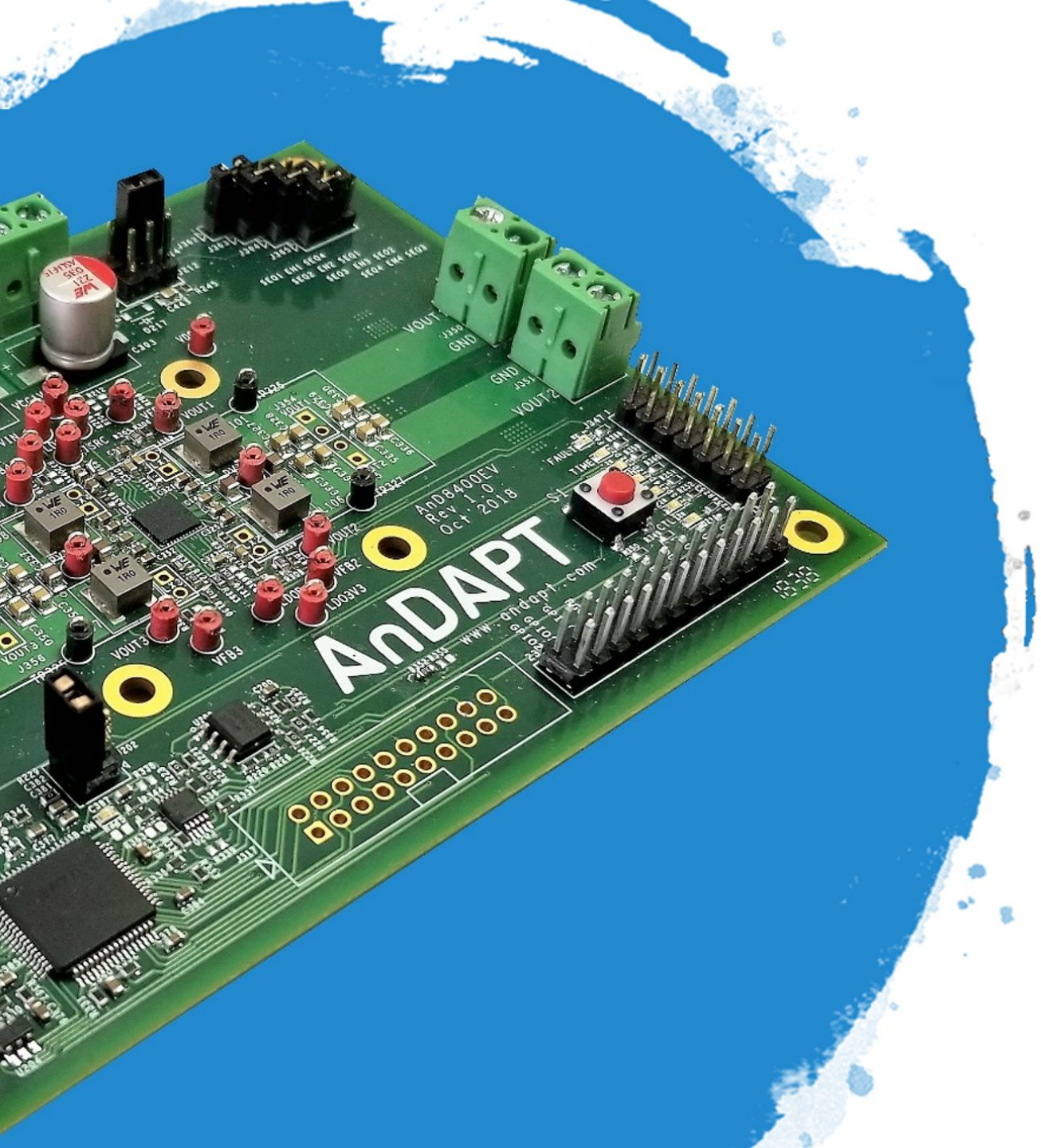

Test Data

Artix UltraScale+ (Minimum Rails)

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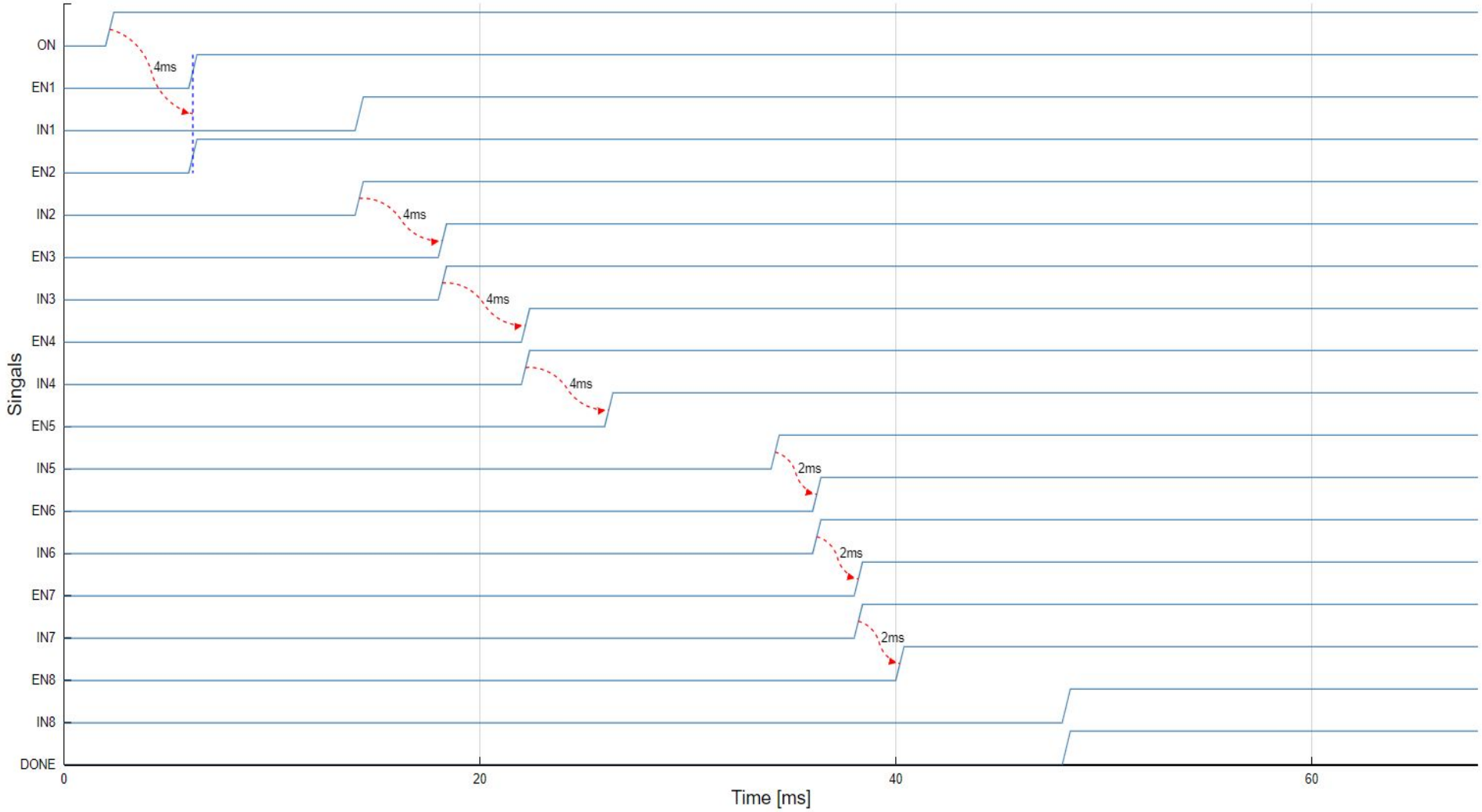
Integrated Sequencer Graphic (Turn ON)



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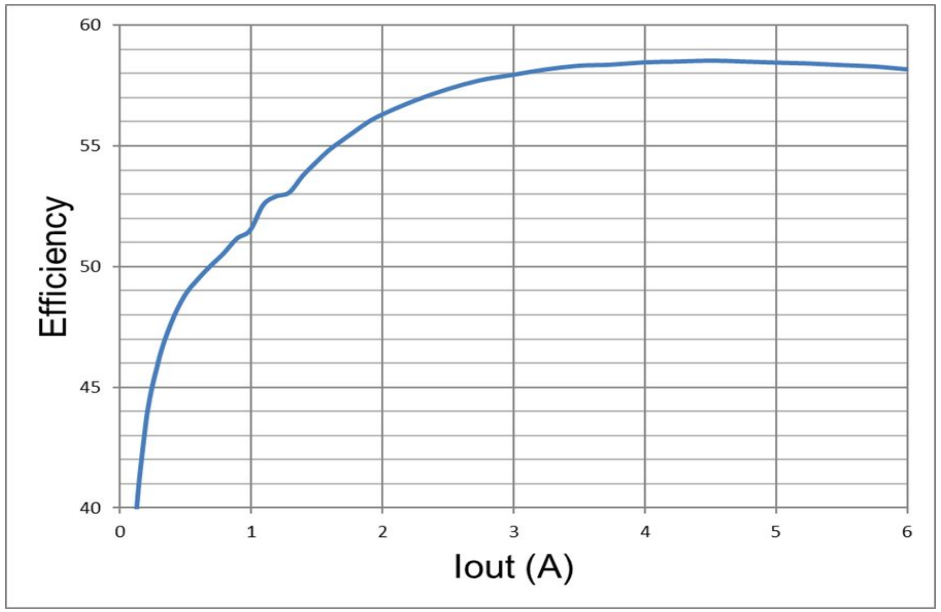
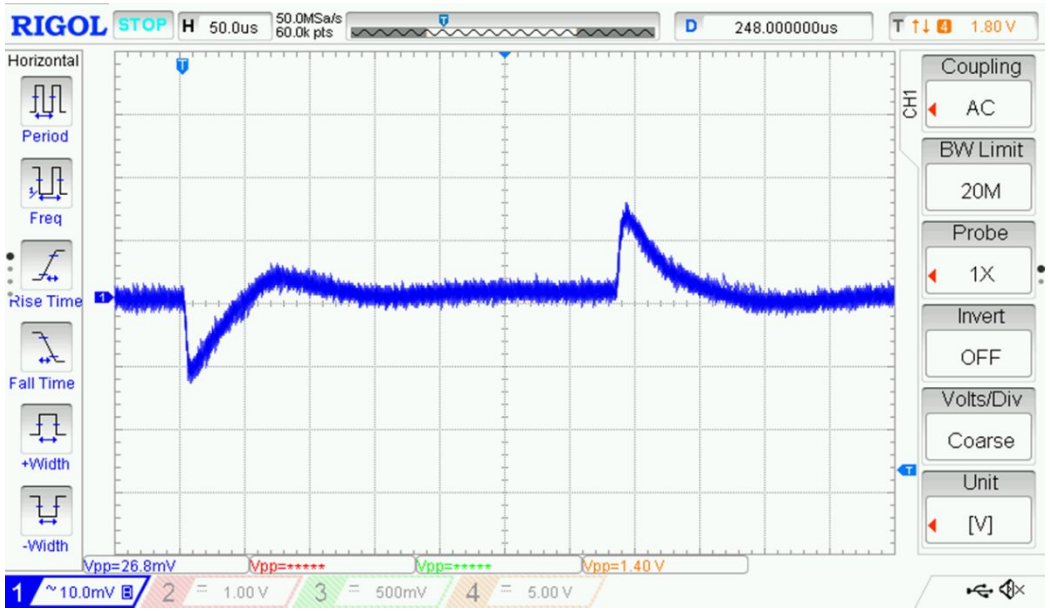
VCCINT
0.72 V / 6 A

- C150 Async Buck
- Fsw = 571 kHz
- L = 0.56 µH, P/N Wurth 744393440056
- C = 13x47 uF

Efficiency & Transient





Vout = 0.72 V
Transient 4.5A – 6 A @ 100 A/µs
V_{PP} = 26.8 mV
Fsw = 571 kHz
Lout = 0.56 µH, Cout = 13 x 47 µF

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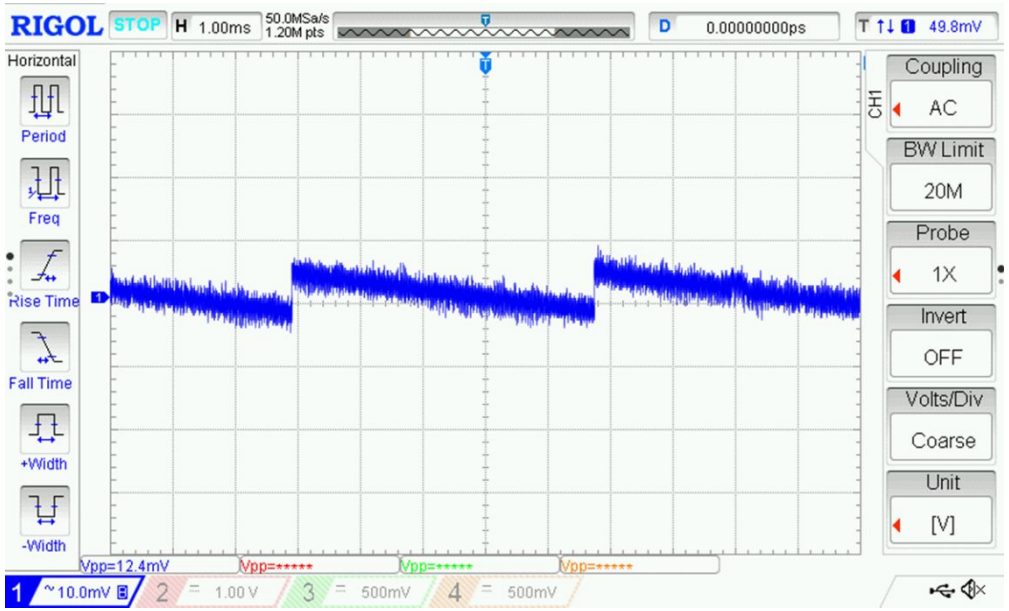
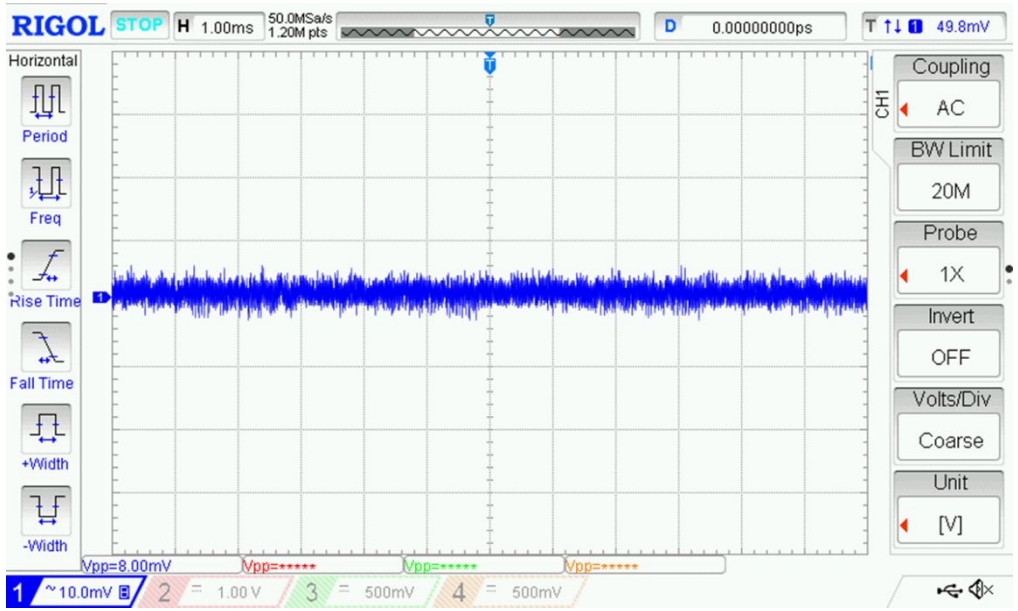
Ripple



No Load
V_{PP} = 12.4 mV



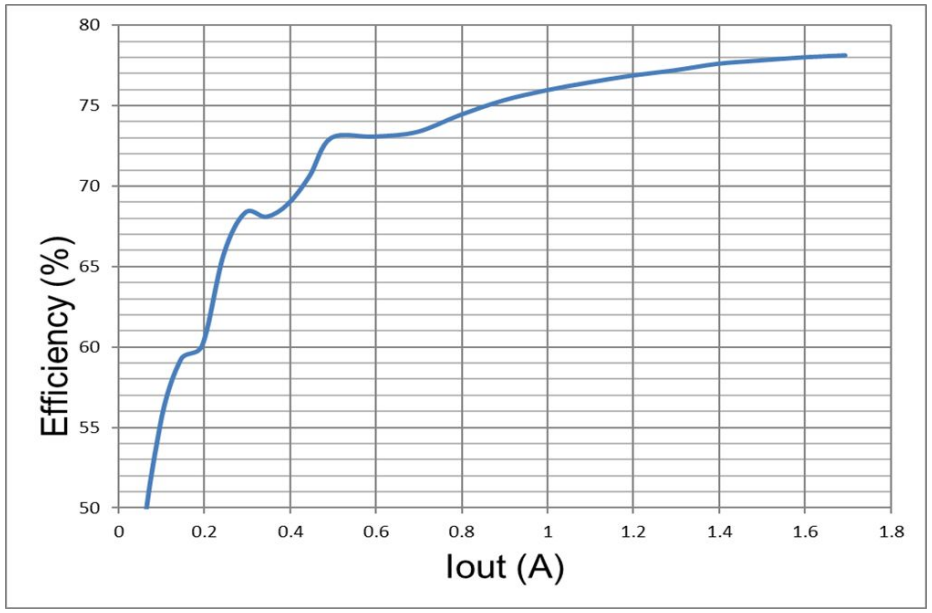
Vout = 0.72 V

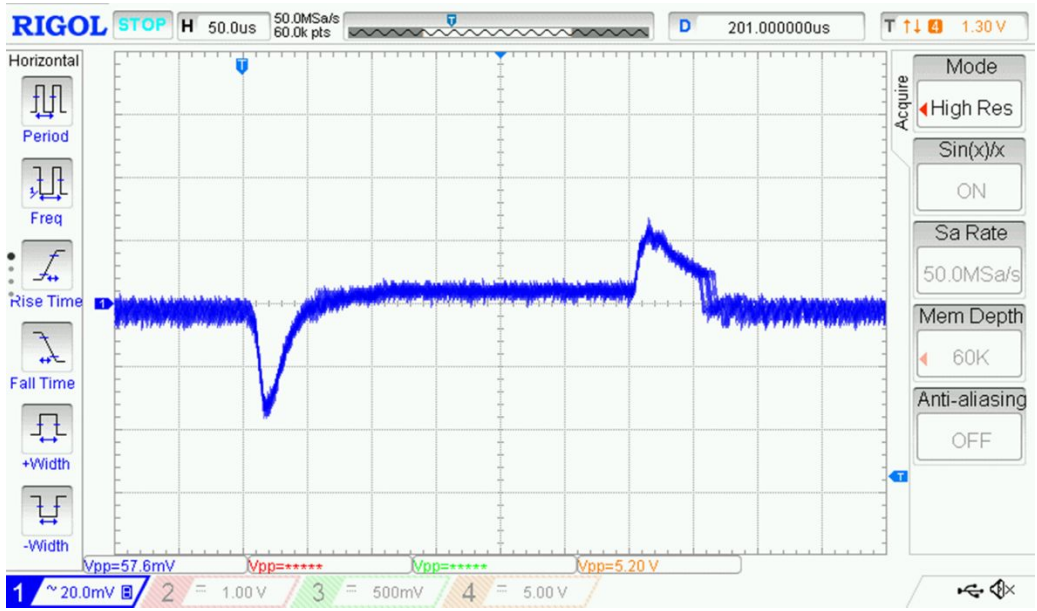
6A Load
V_{PP} = 8 mV

VBUS
1.8 V / 1.6 A

- C150 Async Buck
- Fsw = 571 kHz
- L = 2.2 µH, P/N Wurth 744311220
- C = 2x47 uF

Efficiency & Transient





Vout = 1.8 V
Transient 0.16 A – 1.6 A @ 2.5 A/µs
V_{PP} = 57.6 mV
Fsw = 571 kHz
Lout = 2.2 µH, Cout = 2 x 47 µF

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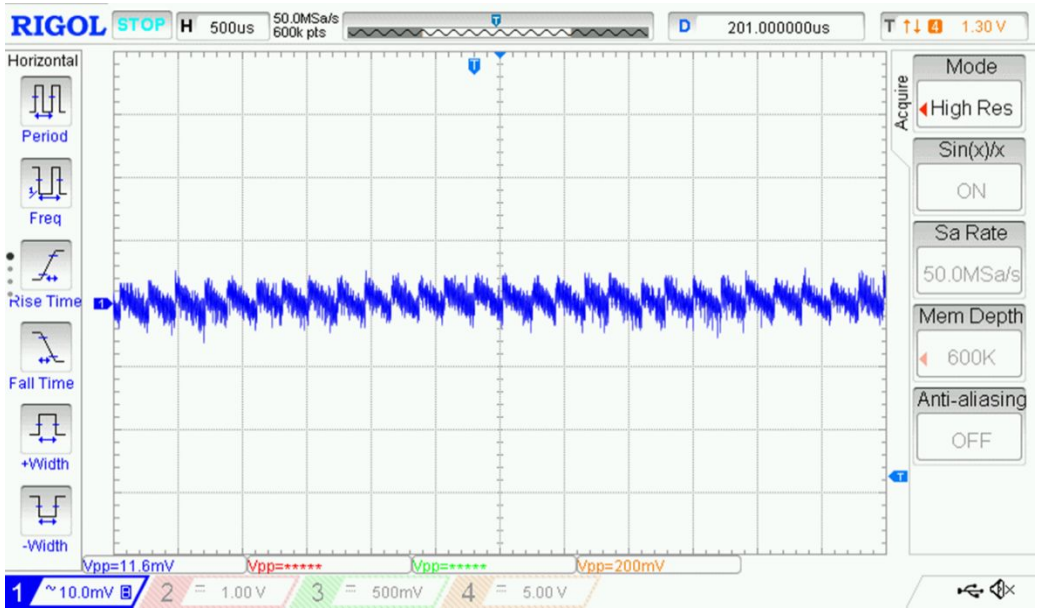
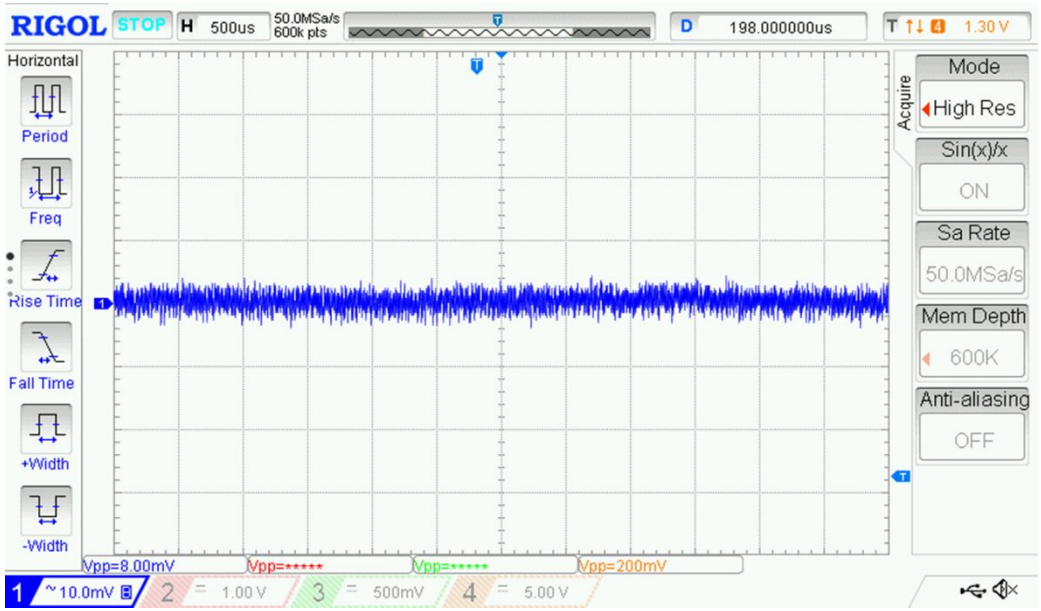
Ripple



No Load
V_{PP} = 11.6 mV

Vout = 1.8 V



1.6 A Load
V_{PP} = 8 mV

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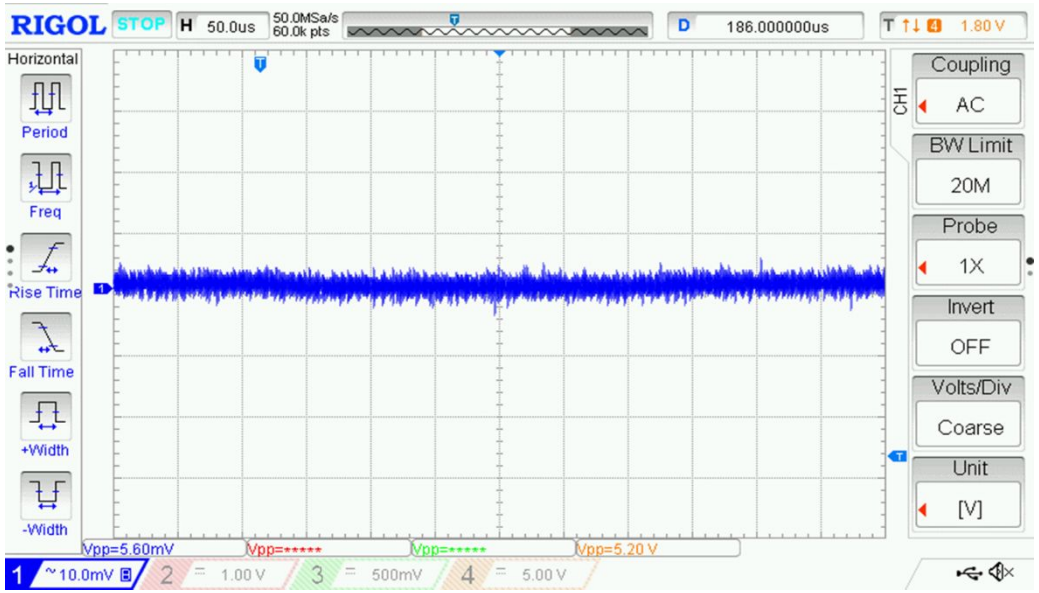
VCCBRAM/INT_IO
0.85 V / 0.35 A

- C710 LDO

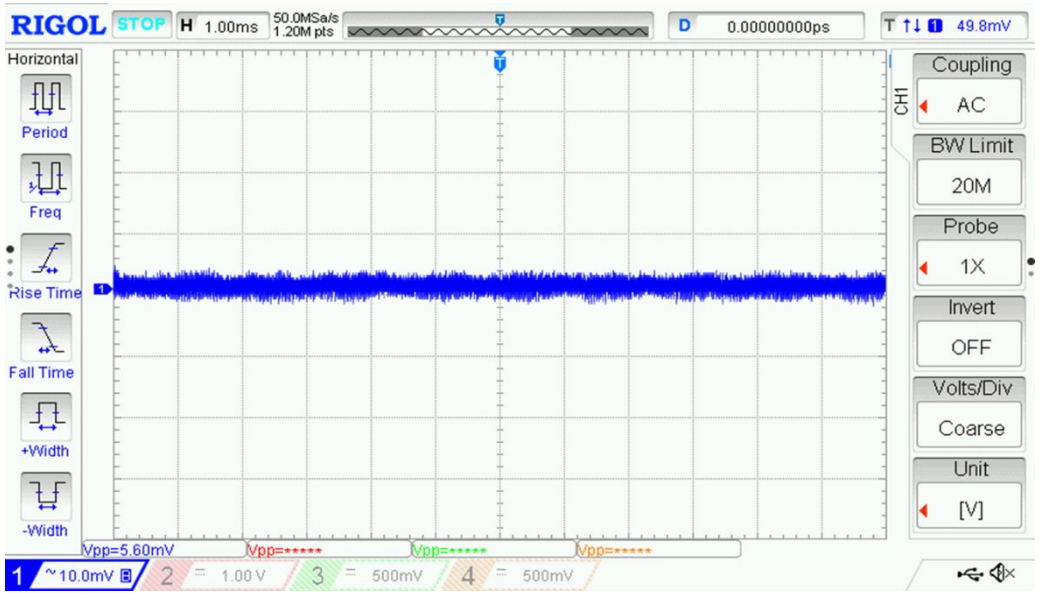
Transient



Vout = 0.85 V
Transient 0.21 A – 0.35 A @ 2.5 A/µs
V_{PP} = 5.6 mV

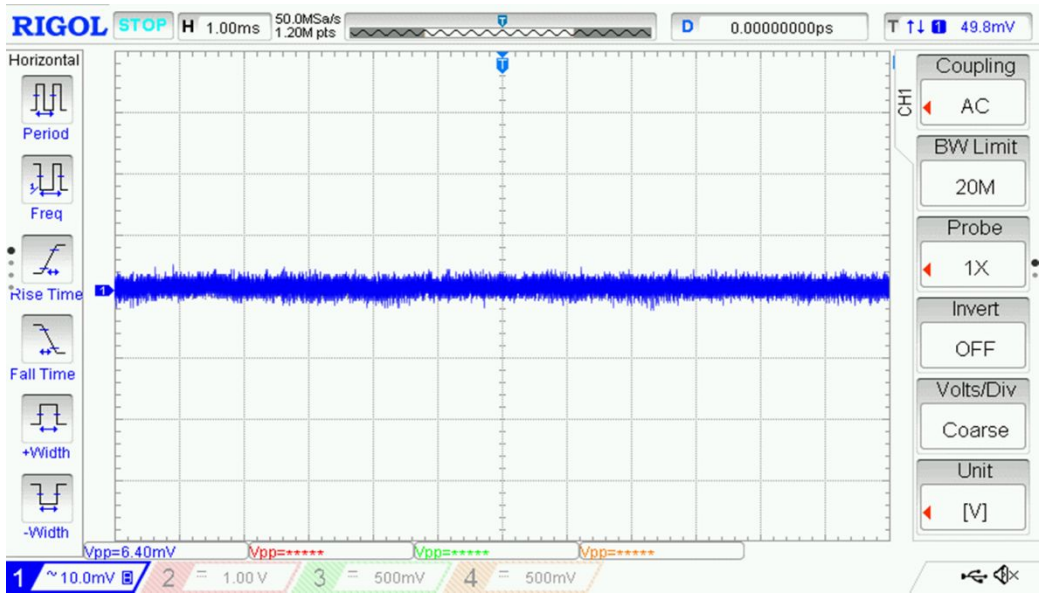
AnDAPT

Ripple



No Load
V_{PP} = 5.6 mV

Vout = 0.85 V



0.35 A Load
V_{PP} = 6.4 mV

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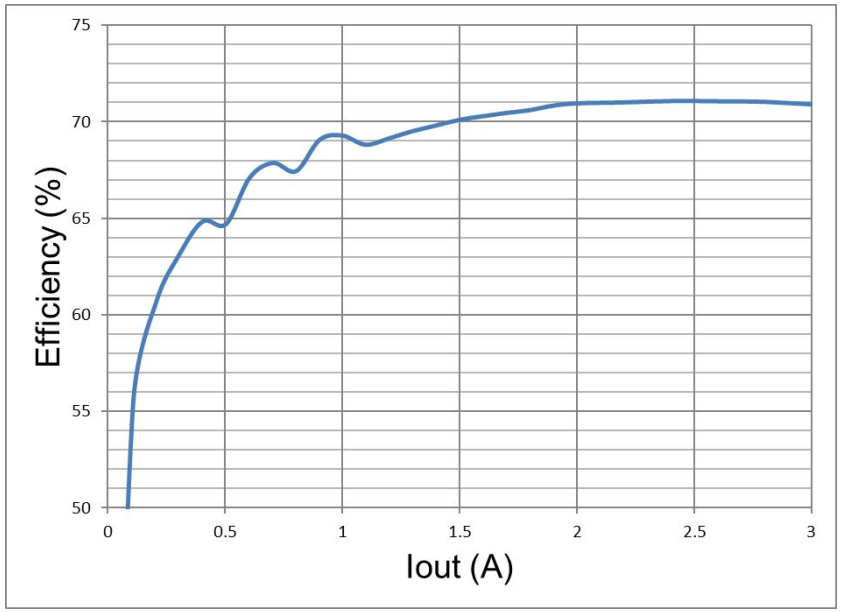
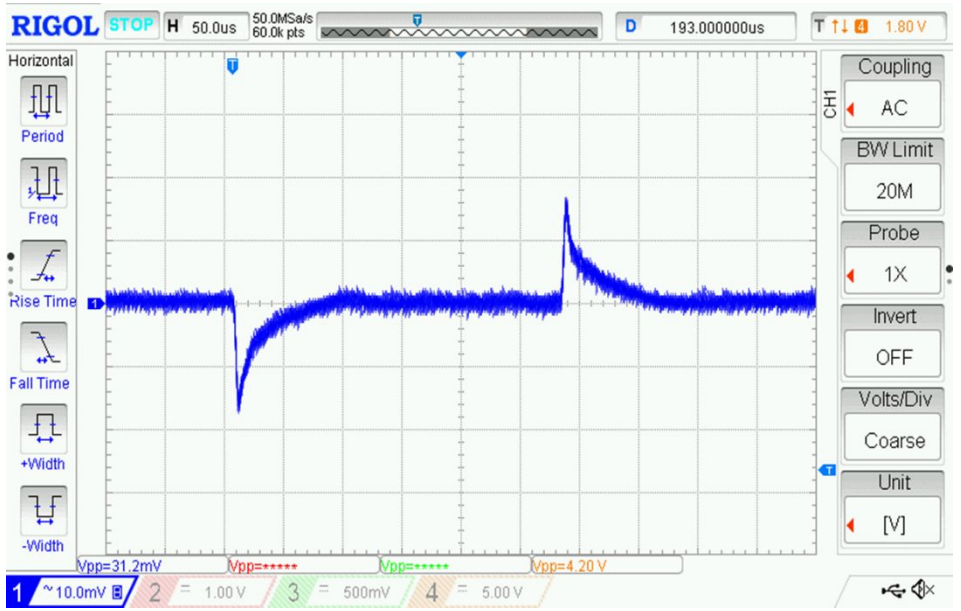
VMGTAVTT
1.2 V / 3 A

- C150 Async Buck
- Fsw = 571 kHz
- L = 1 µH, P/N Wurth 74438356010
- C = 4x47 uF

Efficiency & Transient





Vout = 1.2 V
Transient 2.25A – 3 A @ 2.5 A/µs
V_{PP} = 31.2 mV
Fsw = 571 kHz
Lout = 1 µH, Cout = 4 x 47 µF

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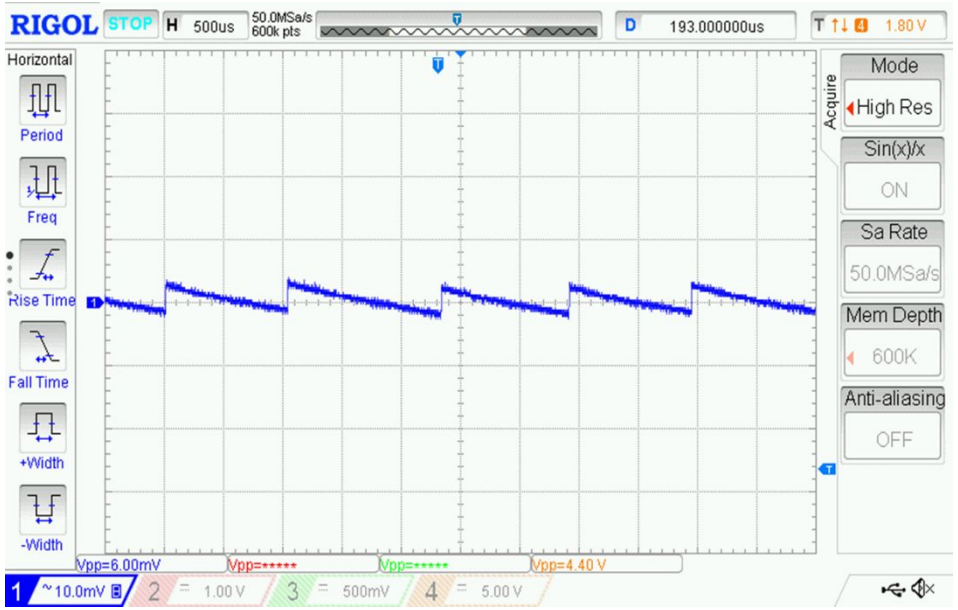
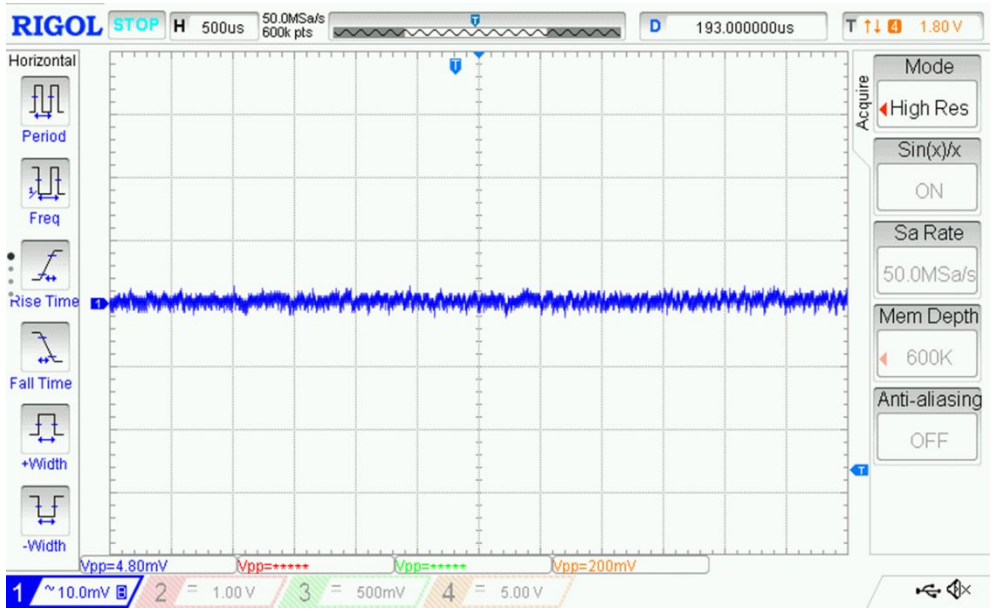
Ripple



No Load
V_{PP} = 6 mV

Vout = 1.2 V



3A Load
V_{PP} = 4.8 mV

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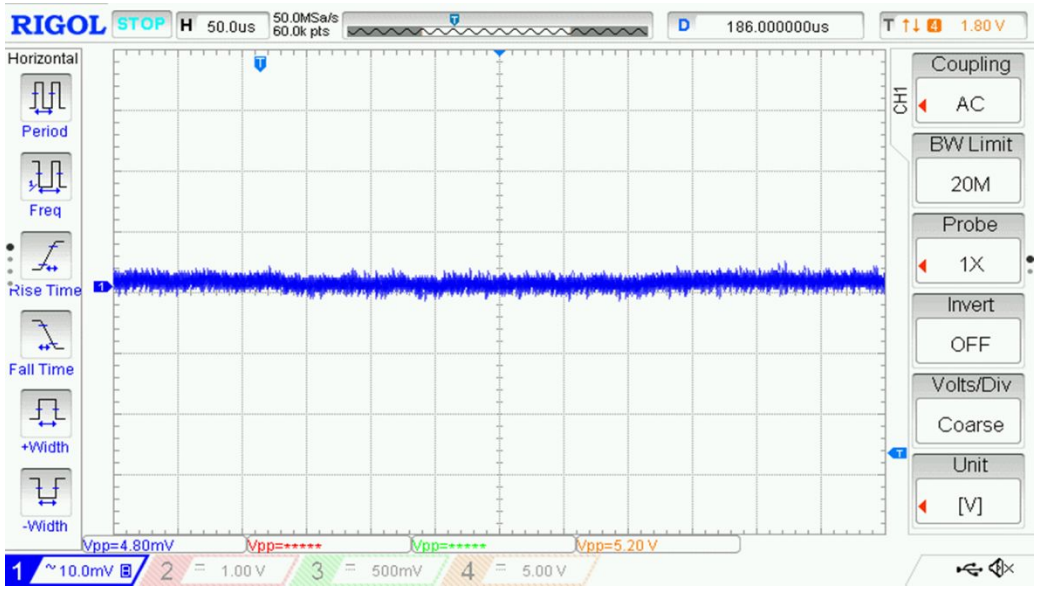
VMGTAVCC
0.9 V / 0.75 A

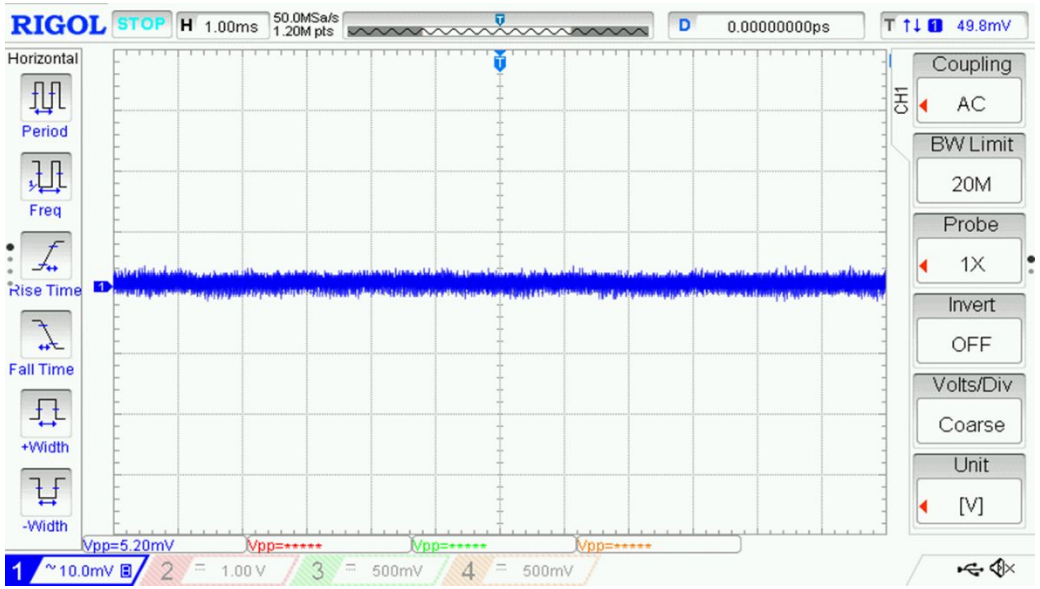
- C710 LDO

Transient



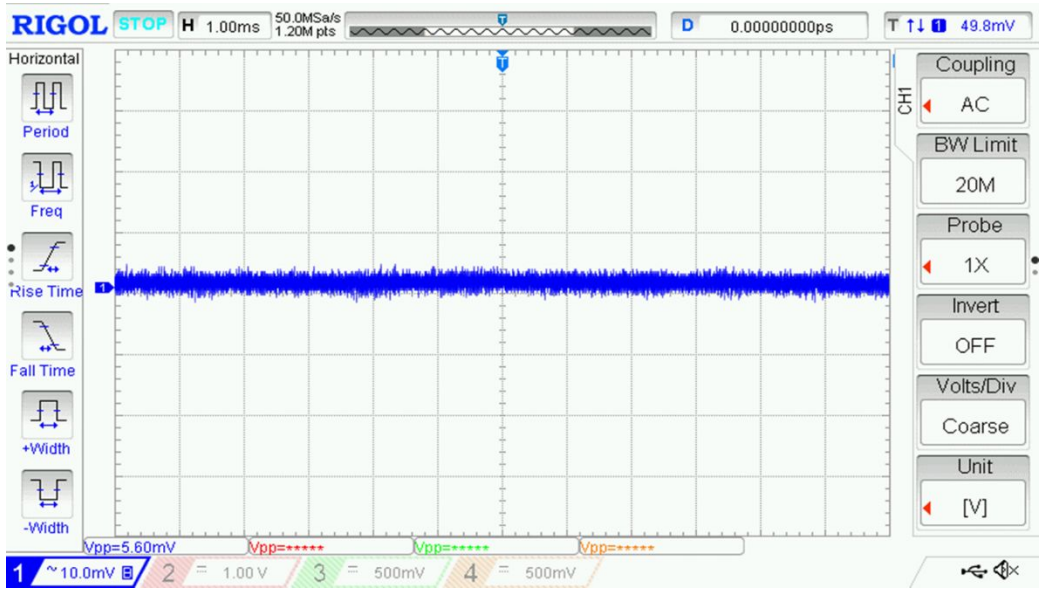
Vout = 0.9 V
Transient 0.5625 A – 0.75 A @ 2.5 A/µs
V_{PP} = 4.8 mV

Ripple



No Load
V_{PP} = 5.2 mV

Vout = 0.9 V



0.75 A Load
V_{PP} = 5.6 mV

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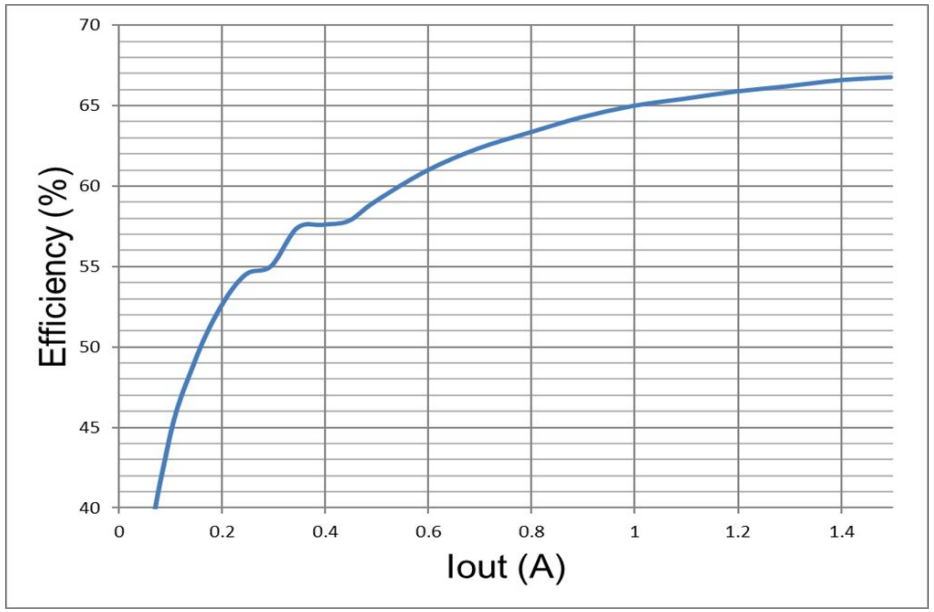
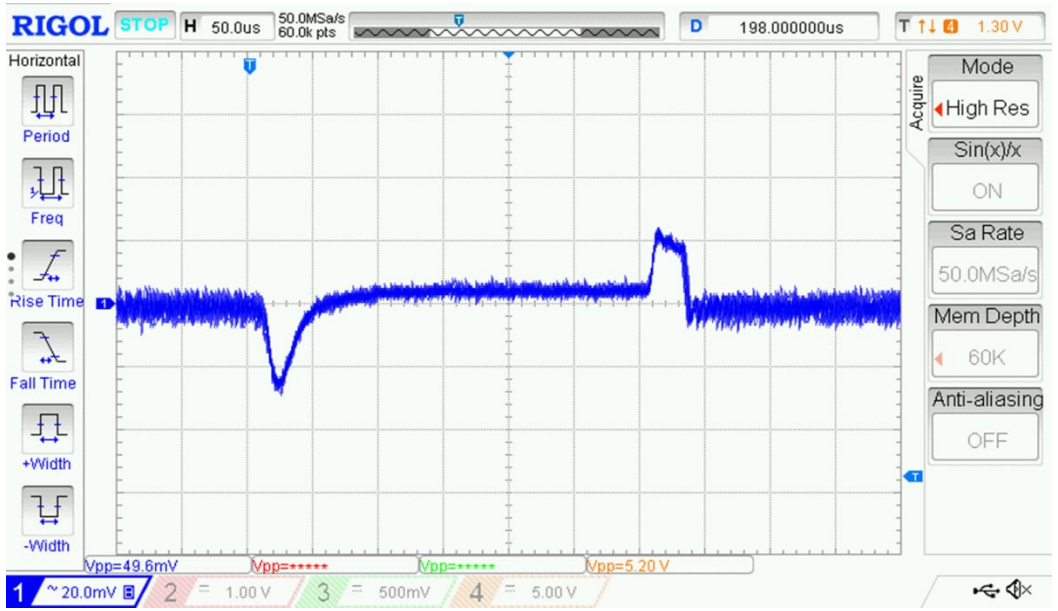
VCCO
1 V / 1.5 A

- C150 Async Buck
- Fsw = 571 kHz
- L = 2.2 µH, P/N Wurth 744311220
- C = 2x47 µF

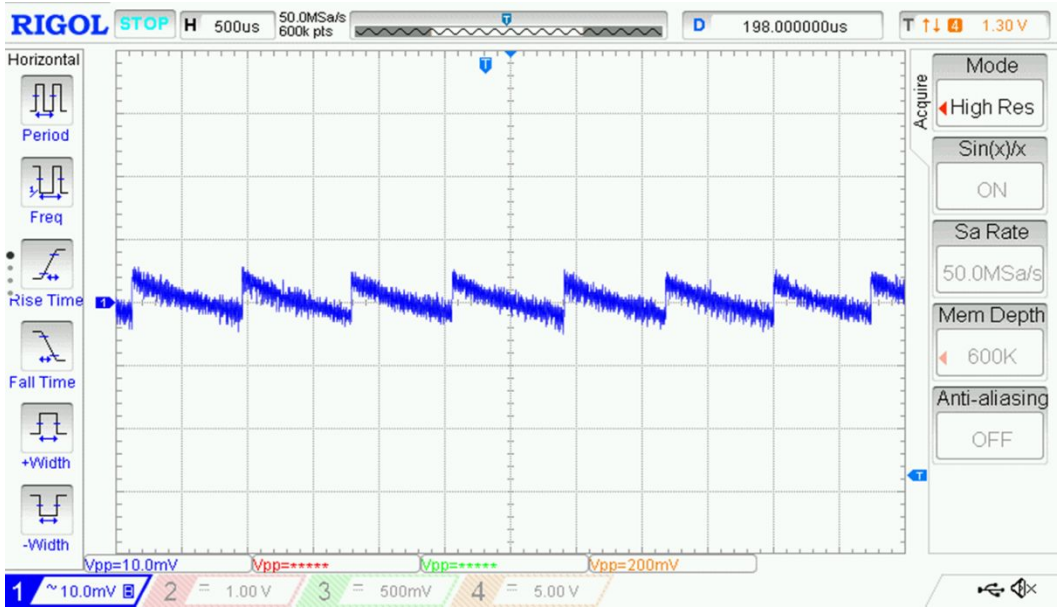
Efficiency & Transient





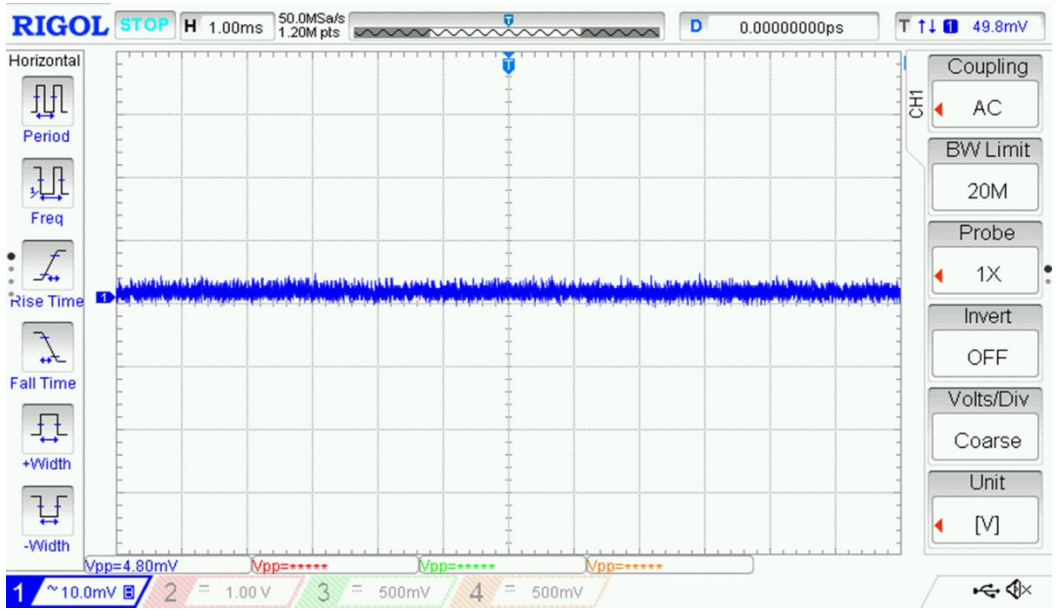
Vout = 1 V
Transient 0.15A – 1.5 A @ 2.5 A/µs
V_{PP} = 49.6 mV
Fsw = 571 kHz
Lout = 2.2 µH, Cout = 2 x 47 µF

Ripple



No Load
V_{PP} = 10.0 mV

Vout = 1 V



1.5 A Load
V_{PP} = 4.8 mV

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Thank You

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