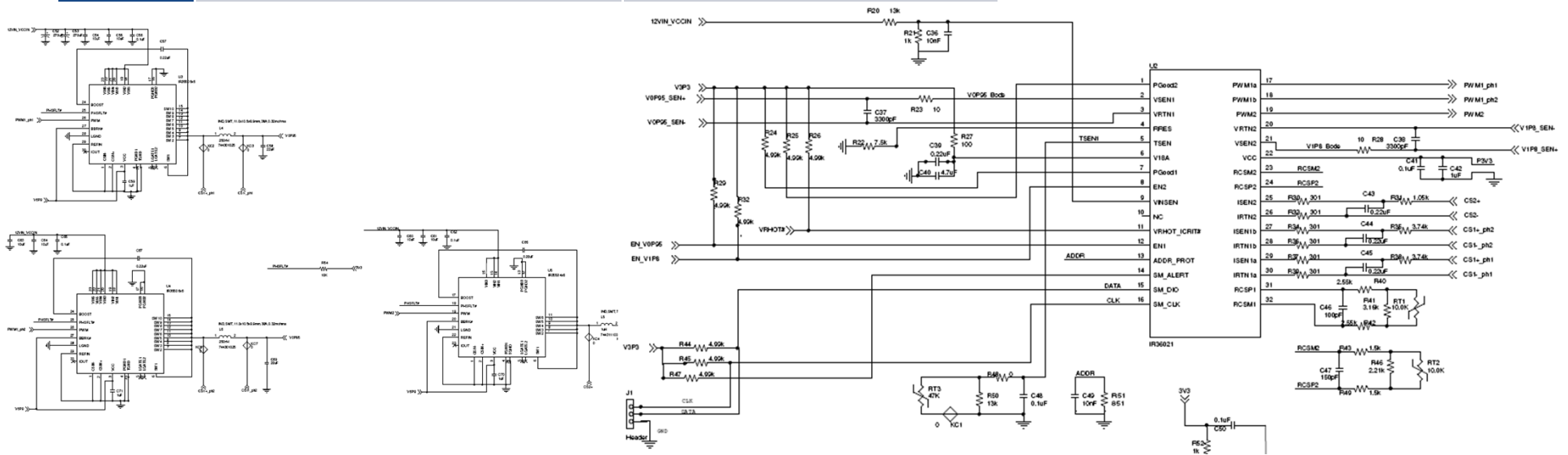


Note: Vcco rails are labeled: Vcco3V3, Vcco1V8 (aka VCC1V8\_FPGA), Vcco3V3 and Vcco1V2 (aka VCC1V2\_FPGA).

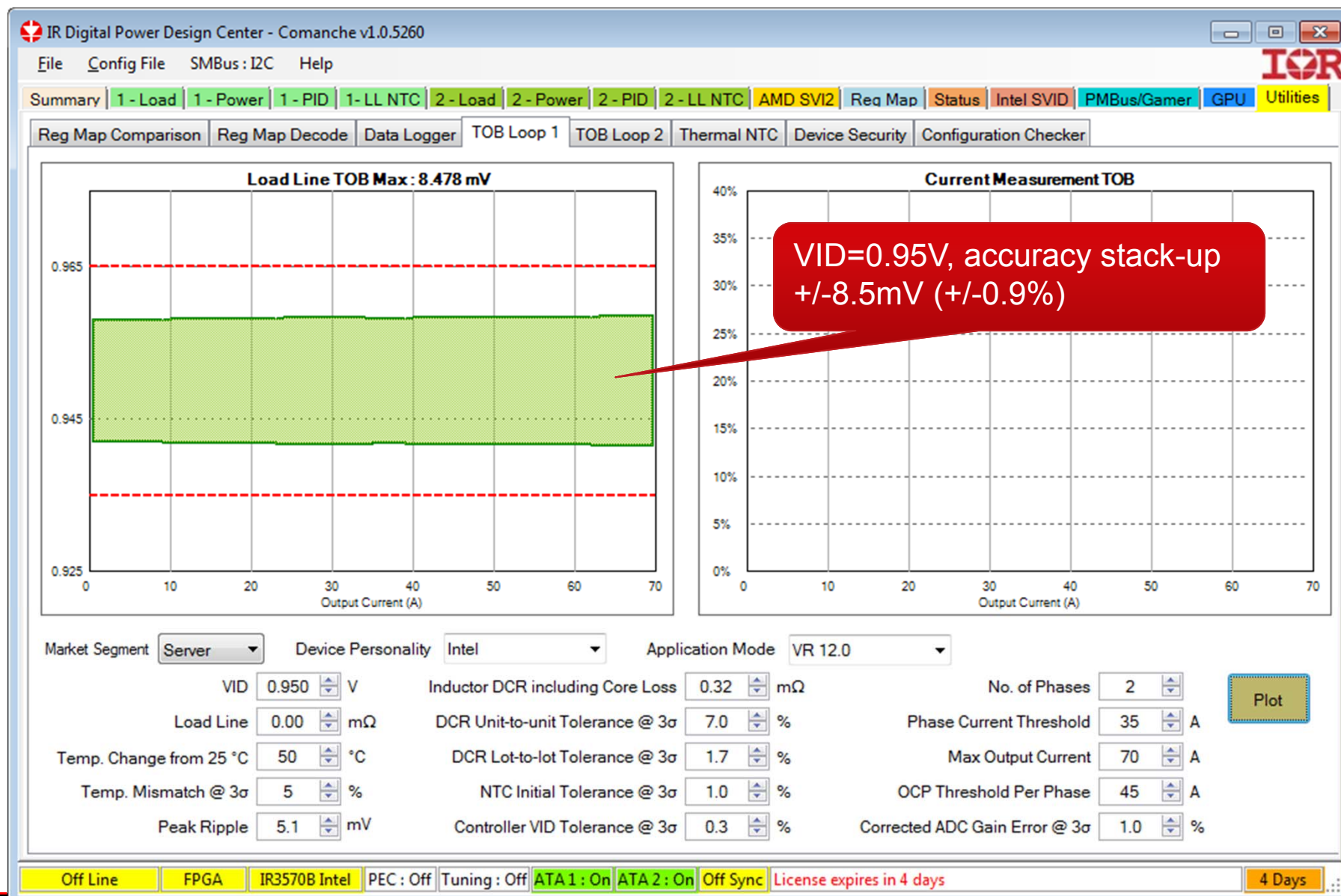
# IR36021 Comanche - VCCINT 0.95V & VCCO 1.8V **IOR**

	Loop 1	Loop 2
<b>VID</b>	0.95V	0.95V
<b>Imax</b>	70A	5A
<b>Phases</b>	2	1
<b>Fsw</b>	500kHz/ph	500kHz
<b>L</b>	Würth 330nH, 0.32mΩ, 38A	Würth 1uH, 1.15mΩ, 21A
<b>Cout</b>	100uF (4) + 22uF (12)	100uF (2) + 22uF (8)
<b>Ripple</b>	~5mVpp	~5mVpp

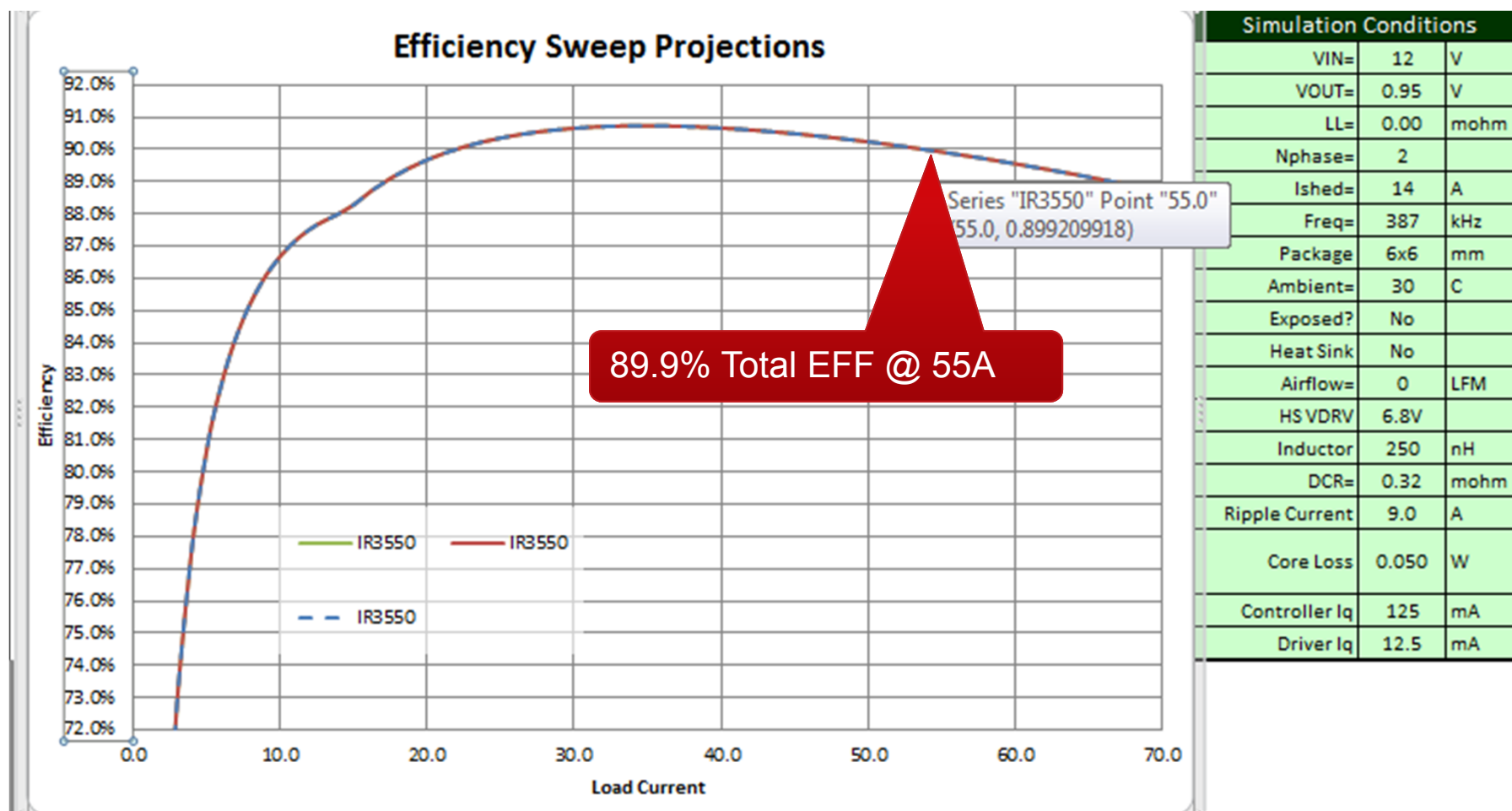


**Full schematics in appendix**

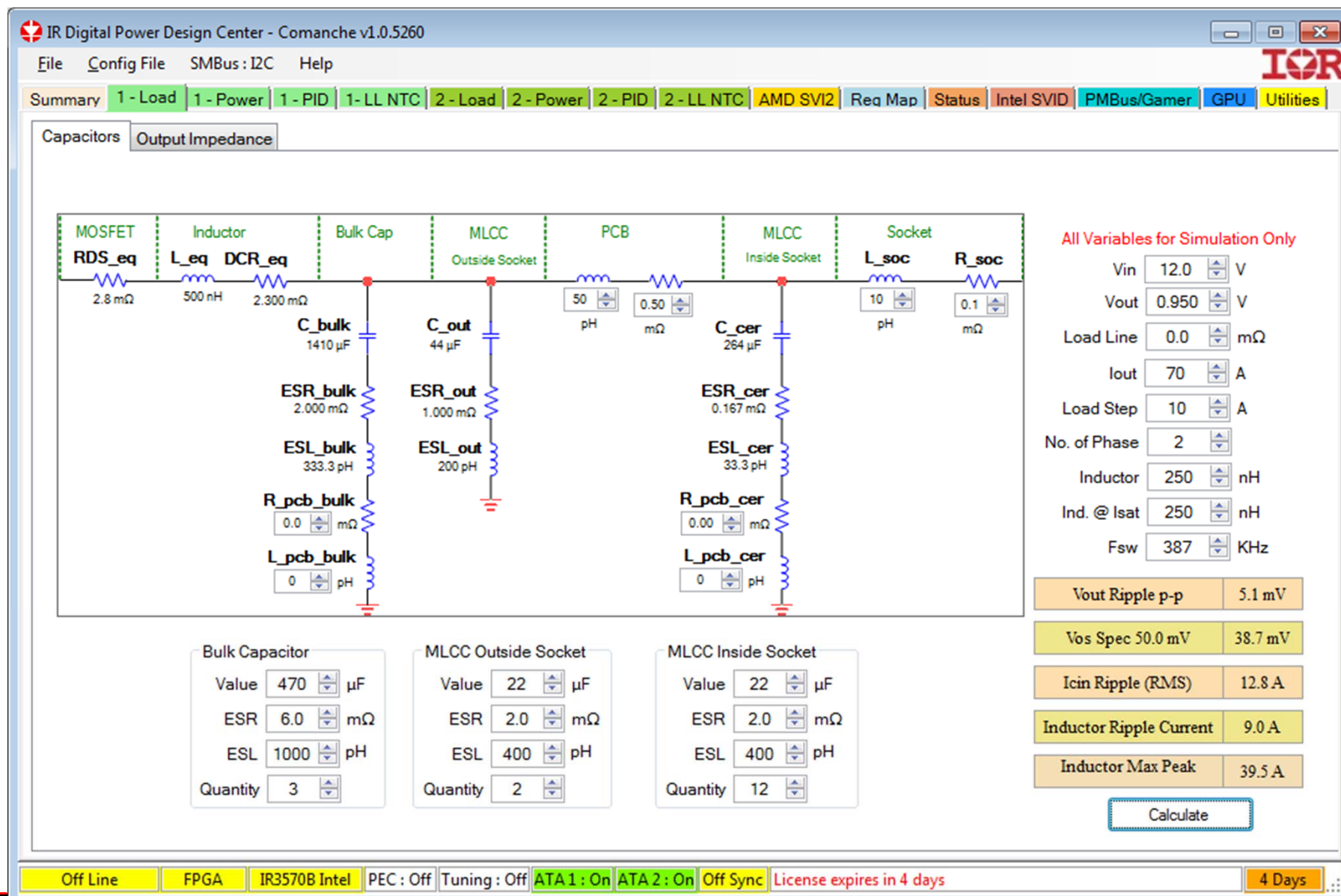
# IR36021 Comanche - ToB Calculation



# IR36021 Comanche - Efficiency Simulation

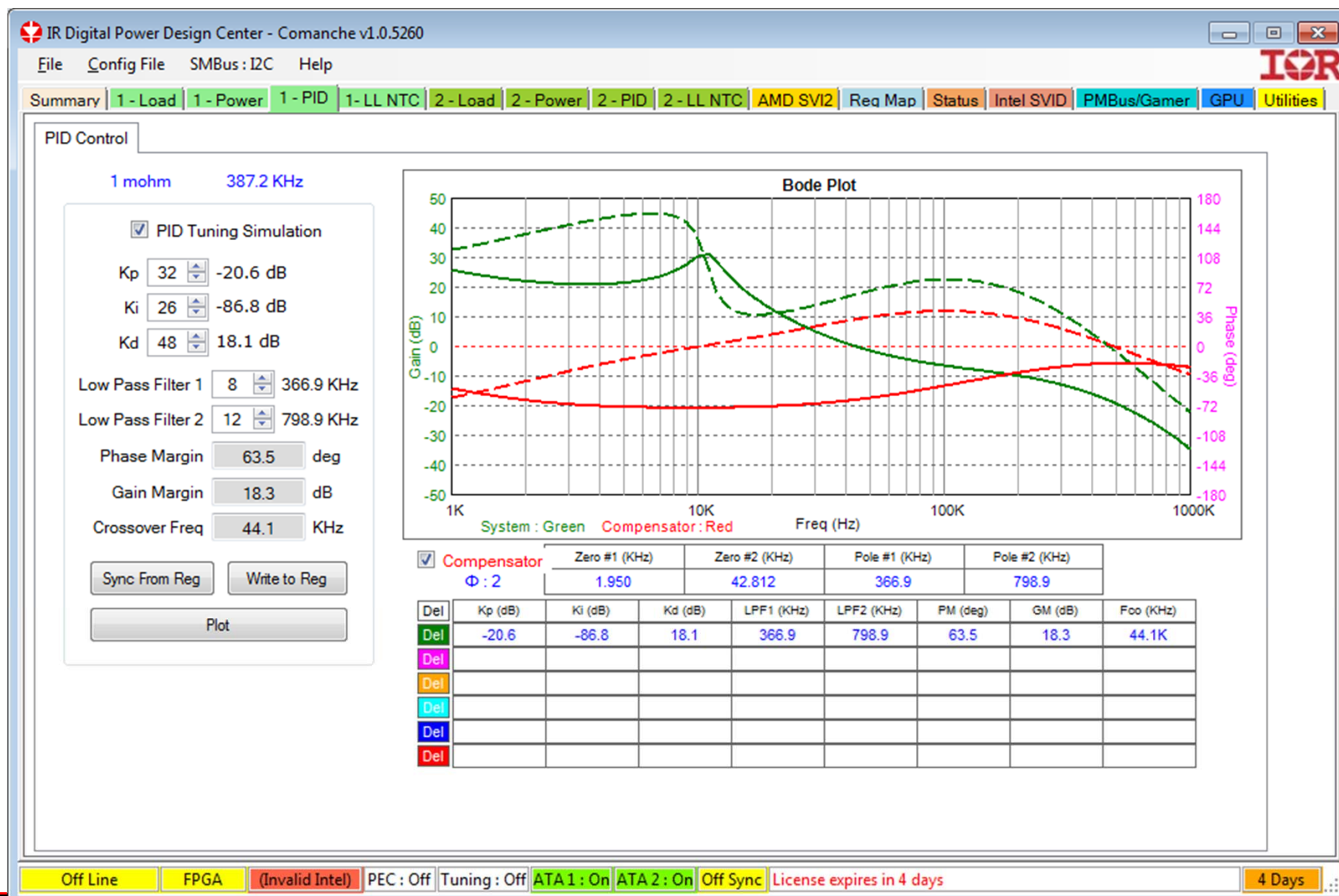


# IR36021 Comanche - PDN Model

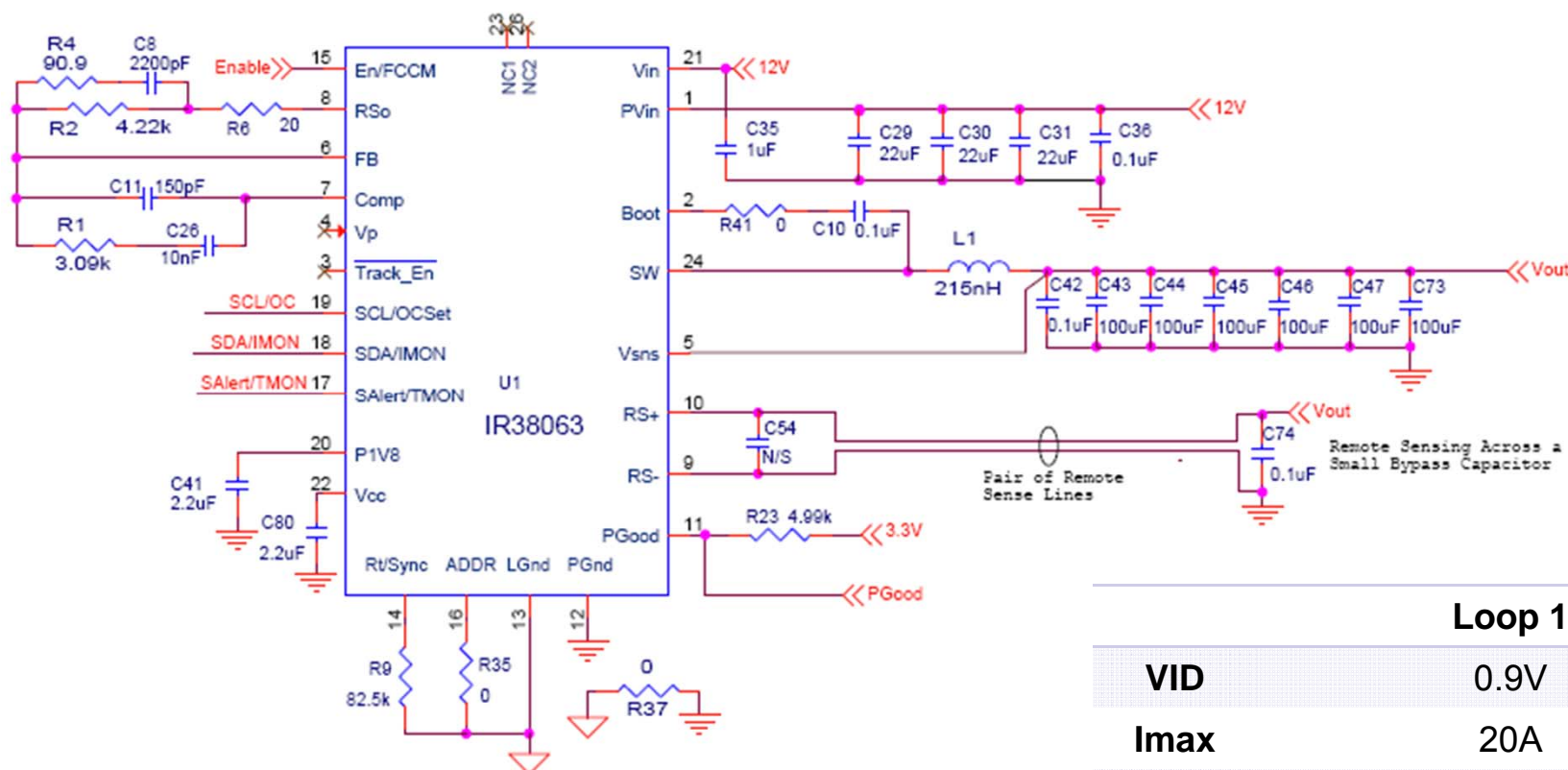




# IR36021 Comanche - PID Tuning / Bode Plot



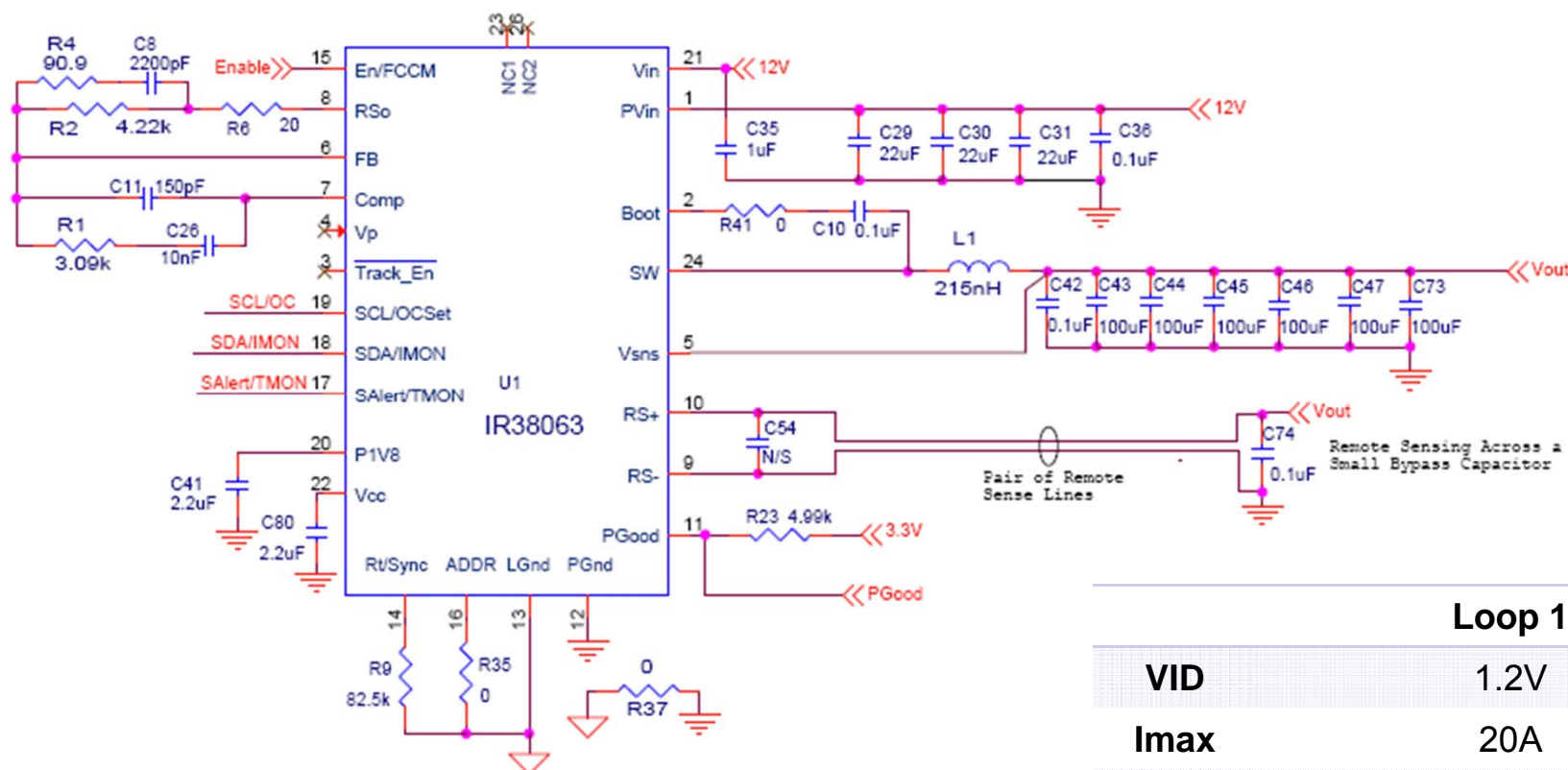
# IR38063 Manhattan – Vmgtavcc 0.9V



## Loop 1

VID	0.9V
I <sub>max</sub>	20A
Phases	1
F <sub>sw</sub>	800kHz
L	Cyntec 215nH, 0.29mΩ
C <sub>out</sub>	100uF (6)
Ripple	6.4mV pk-pk

# IR38063 Manhattan – Vmgtavtt 1.2V

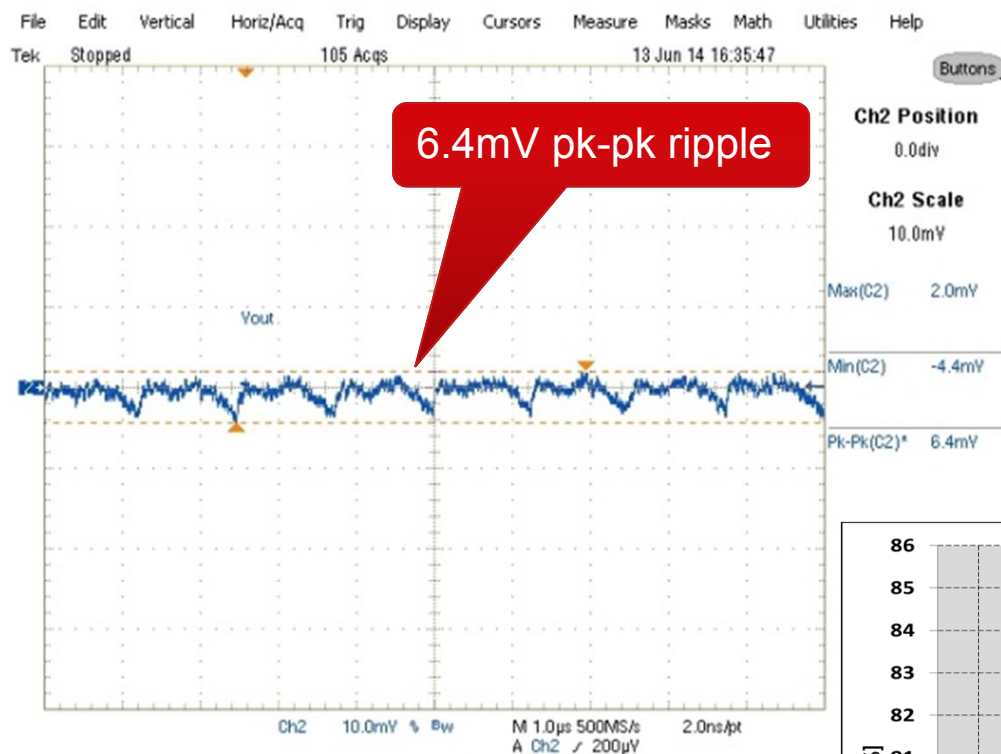


“Power Vendor RFI Jun’14 v0.3” doc shows only 5A required.  
Designed for Kintex to Virtex

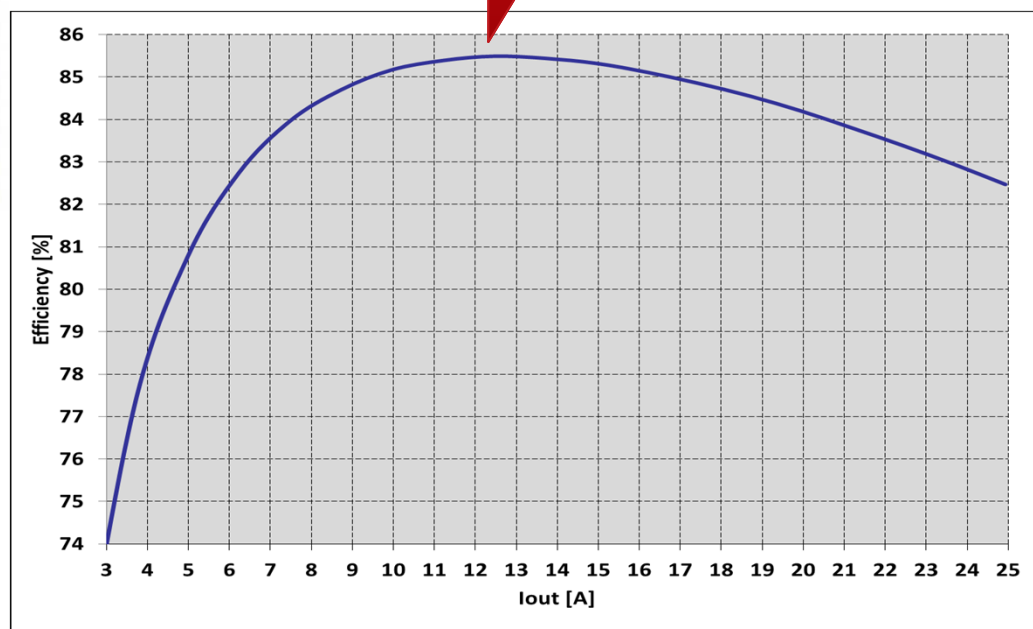
Loop 1	
VID	1.2V
I <sub>max</sub>	20A
Phases	1
F <sub>sw</sub>	800kHz
L	Cyntec 215nH, 0.29mΩ
C <sub>out</sub>	100uF (6)
Ripple	7.5mV pk-pk



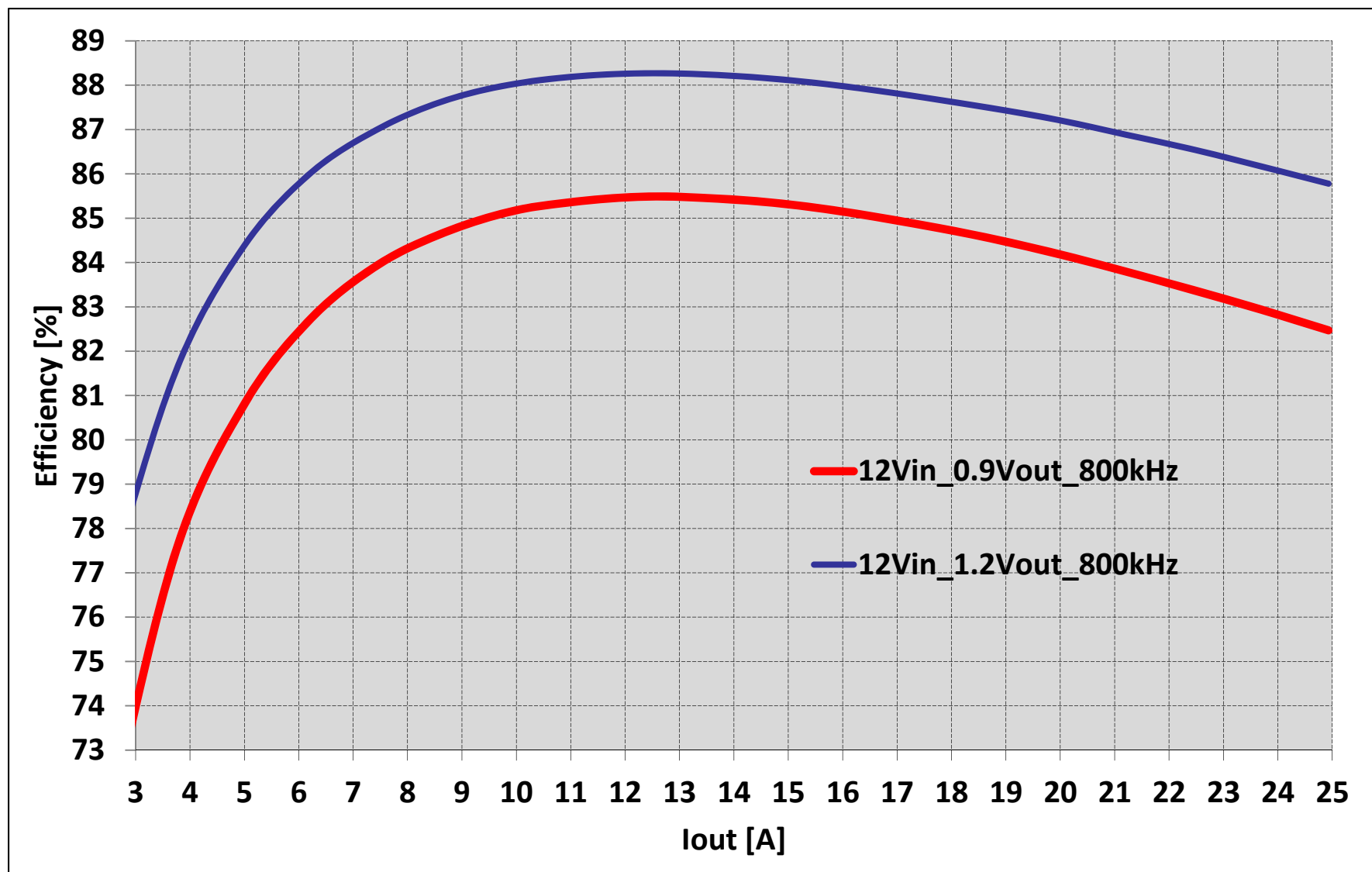
# IR38063 Manhattan – 0.9V Actual Data



85.5% peak efficiency

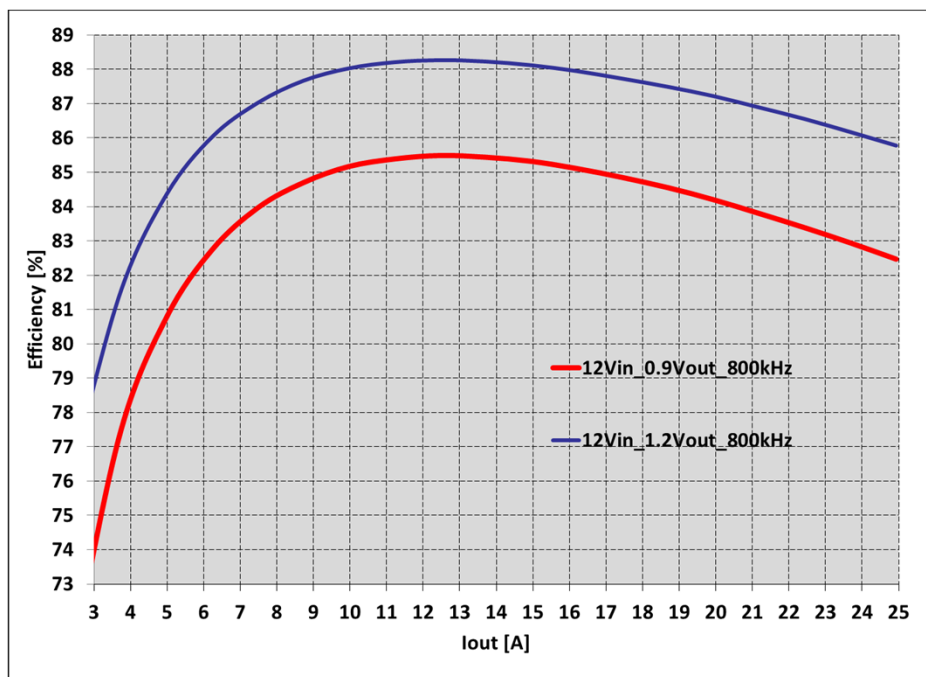


# IR38063 Manhattan – Efficiency 0.9V and 1.2V

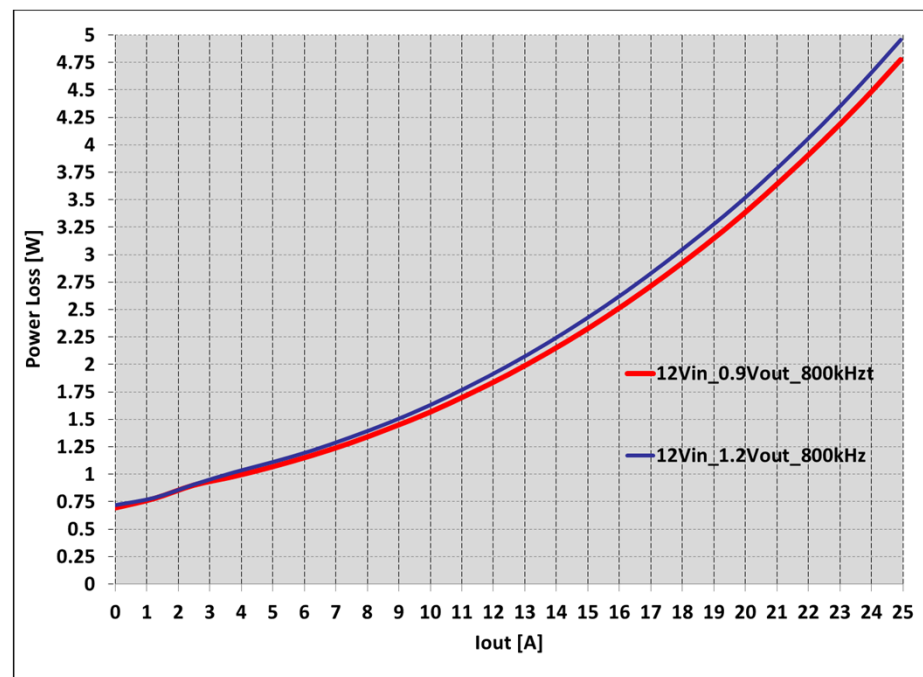


# Efficiency and Ploss

## Efficiency



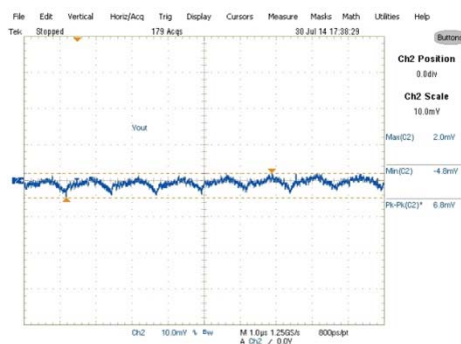
## Ploss



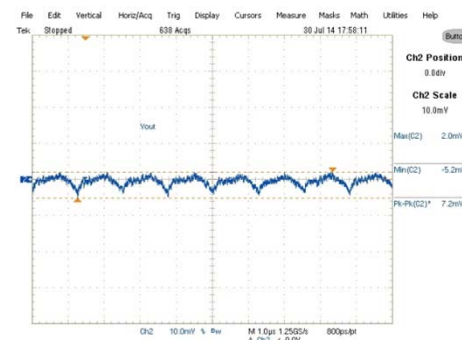
1. Efficiency for 12Vin/0p9Vout, and 12Vin/1p2Vout are measured.

# Vout Ripple at 25A Iout

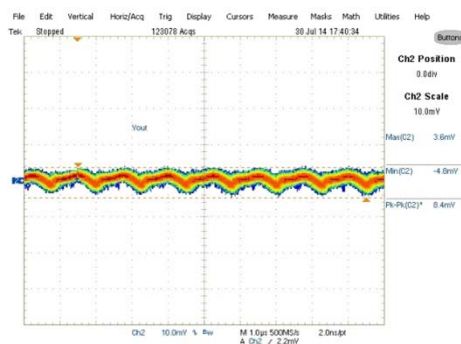
## 12Vin/0p9Vout



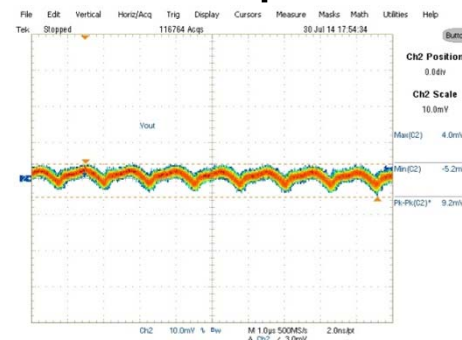
## 12Vin/1p2Vout



## 12Vin/0p9Vout



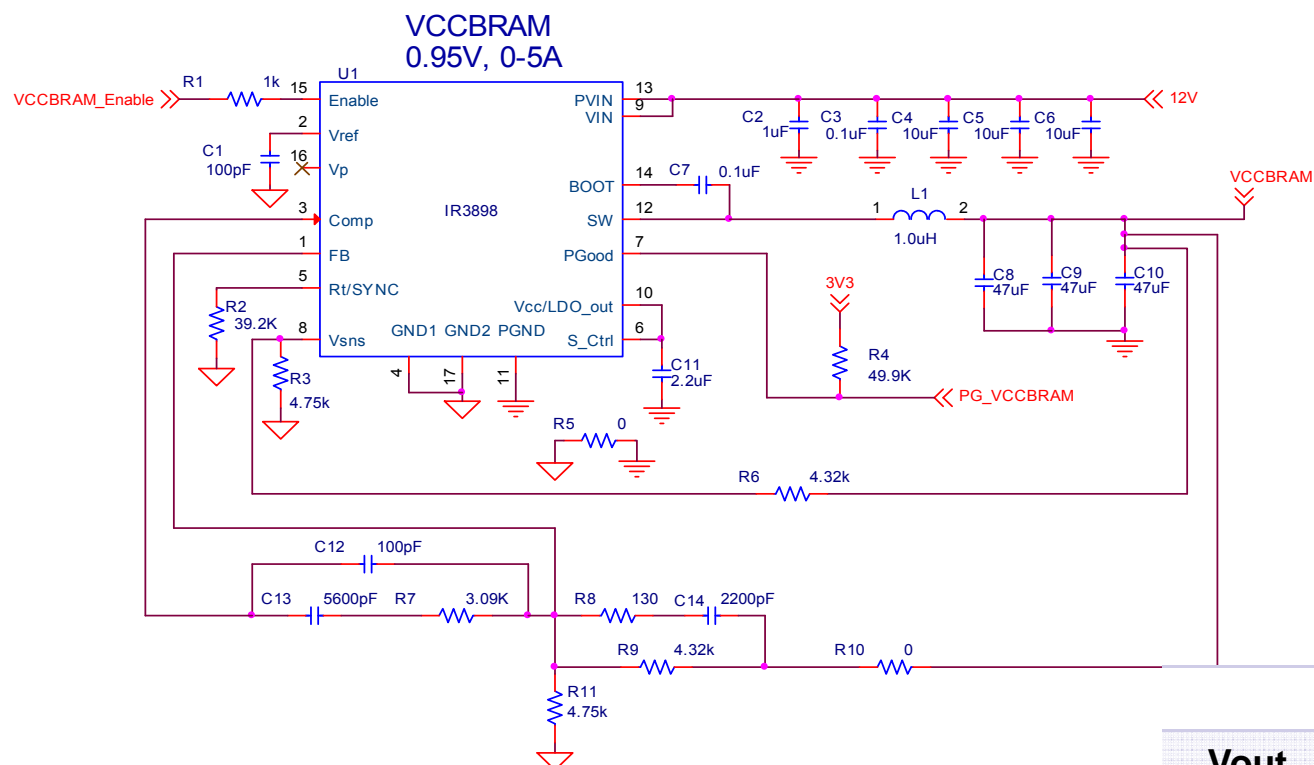
## 12Vin/1p2Vout



- At 25A Iout and with persistence setting, Vout ripples for all three rails <10mV.

Note that output voltage is measured from bottom layer of PCB to minimize the SW noise coupling.

# Sup<sup>IR</sup>Buck IR3898 – Vccbram 0.95V

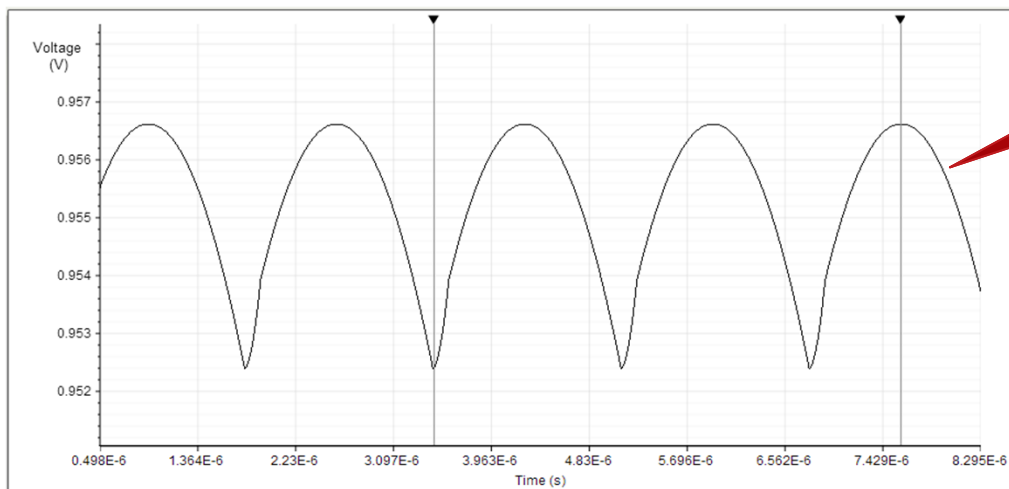


## Loop 1

Vout	0.95V
I <sub>max</sub>	5A
Phases	1
F <sub>sw</sub>	600kHz
L	1uH 4.7mΩ 7x7mm
C <sub>out</sub>	47uF (3)
Ripple	4mV



# Sup<sup>IR</sup>Buck IR3898 – Simulation results



	T1	T2	$\Delta T$	
Marker Times	s	s	s	
	3.45098E-6	7.5835E-6	4.13252E-6	
<input checked="" type="checkbox"/> Vout	V	0.952	0.957	4.233E-3
				Pk2Pk 4.246E-3
<input type="checkbox"/> SW	V	11.966	-0.03	-11.995

