Solution Brief

Space Constrained DC-DC Power Solutions for FPGAs

The µPOL™ Technology - DC/DC power products for FPGAs

TDK has DC/DC power products for Xilinx FPGA/SoC families: Artix 7, Spartan 7, Zynq 7, Zynq UltraScale+ MPSoC, Zynq RFSoC, and some of the rails for Kintex UltraScale+, Virtex UltraScale+ and the new Versal ACAP.

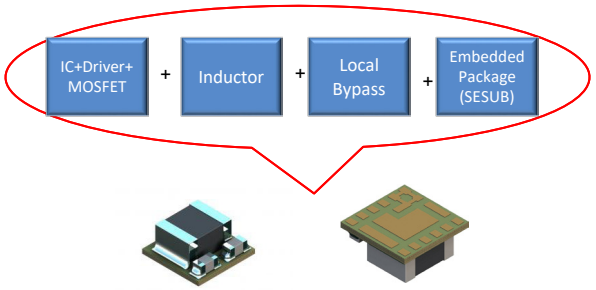
TDK's µPOL Technology provides endless opportunities to save space, design time without compromising in performance.

Matching MOSFET, Driver, Inductor and package make it possible to provide the most optimum solution without comprising performance, while reducing the number of external components to reduce the overall system cost.

Plug and Play concept saves design time and will allow system designer to work on system solution vs. fine tuning individual components

Shown below is a power design for Xilinx Zynq UltraScale+ MPSoC family.

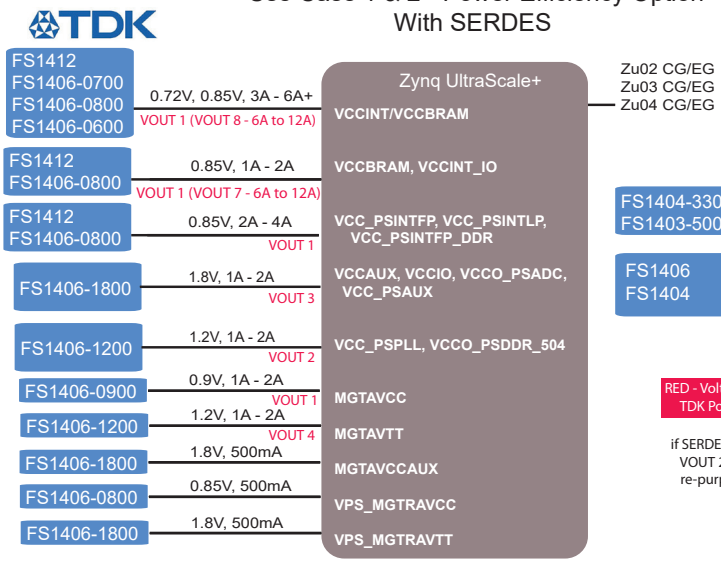
TDK Power for FPGA of Xilinx Zynq® UltraScale+



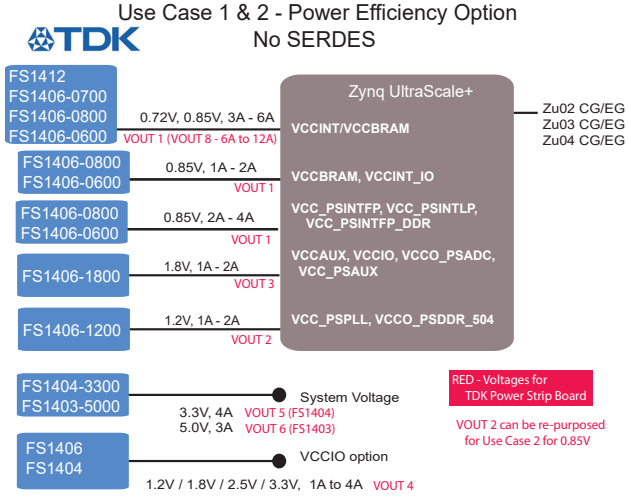
Highlights

- µPOL™ Technology Includes Inductor in a Thermally Enhanced Package
- Small Size 3.3mm x 3.3mm with a height of 1.5mm
- Plug & Play (No External Compensation Required)
- Digital Communication, I2C Serial Bus
- Scalable Output Current, same footprint (3A – 6A)
- Wide Input Voltage Range (2.5-16V)
- Adjustable Output Voltage, ±0.5% Initial accuracy
- -40°C to 125°C Operating Temperature

TDK µPOL™ Power
Xilinx Zynq UltraScale+
(Zu02 / Zu03 / Zu04 CG & EG Series)
Use Case 1 & 2 - Power Efficiency Option
With SERDES



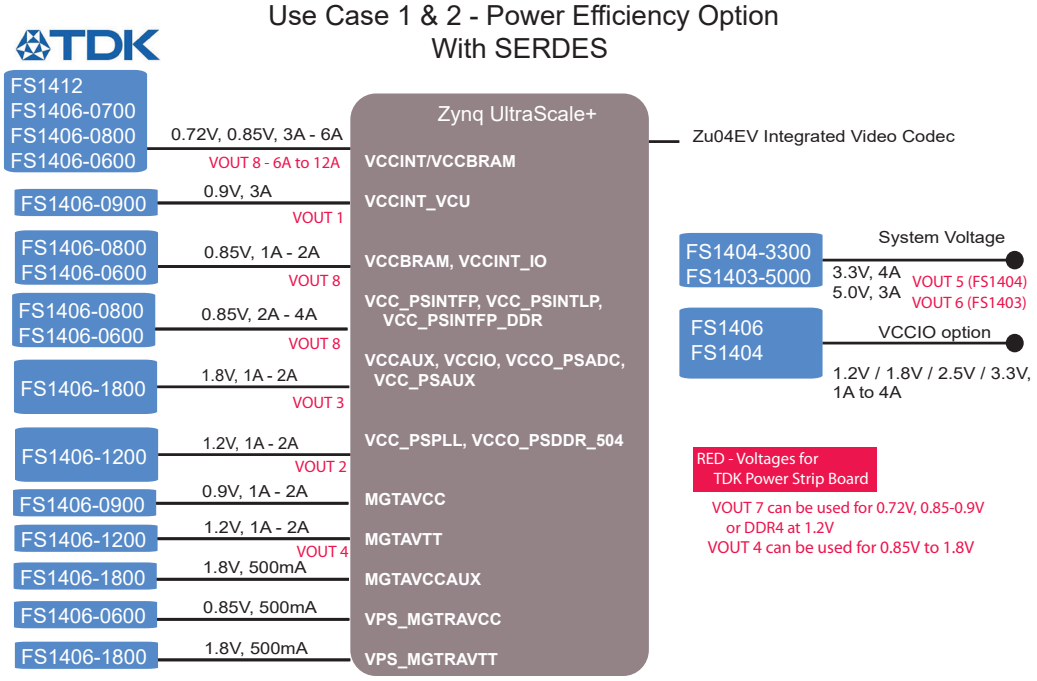
TDK µPOL™ Power
Xilinx Zynq UltraScale+
(Zu02 / Zu03 / Zu04 CG & EG Series)
Use Case 1 & 2 - Power Efficiency Option
No SERDES



DC-DC Power Solutions for FPGAs

TDK Power: Xilinx Zynq® UltraScale+™

TDK µPOL™ Power
Xilinx Zynq UltraScale+
(Zu04 EV Series)
Use Case 1 & 2 - Power Efficiency Option
With SERDES



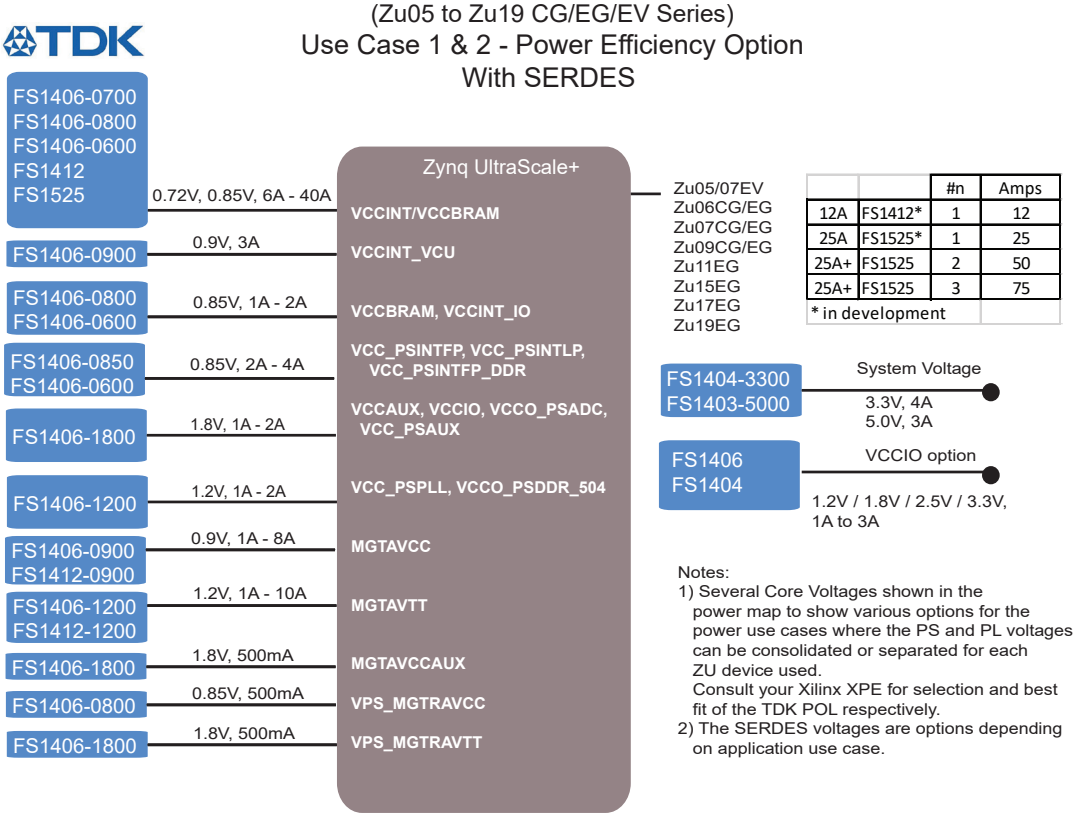
Ease of Design



Check with TDK Faradaysemi on the latest update on our Xilinx Power Strip (Power Macros) under Power Solutions for FPGAs

www.tdk.com/POL

TDK µPOL™ Power
Xilinx Zynq UltraScale+
(Zu05 to Zu19 CG/EG/EV Series)
Use Case 1 & 2 - Power Efficiency Option
With SERDES



		#n	Amps
12A	FS1412*	1	12
25A	FS1525*	1	25
25A+	FS1525	2	50
25A+	FS1525	3	75
* in development			

Notes:
1) Several Core Voltages shown in the power map to show various options for the power use cases where the PS and PL voltages can be consolidated or separated for each ZU device used.
Consult your Xilinx XPE for selection and best fit of the TDK POL respectively.
2) The SERDES voltages are options depending on application use case.

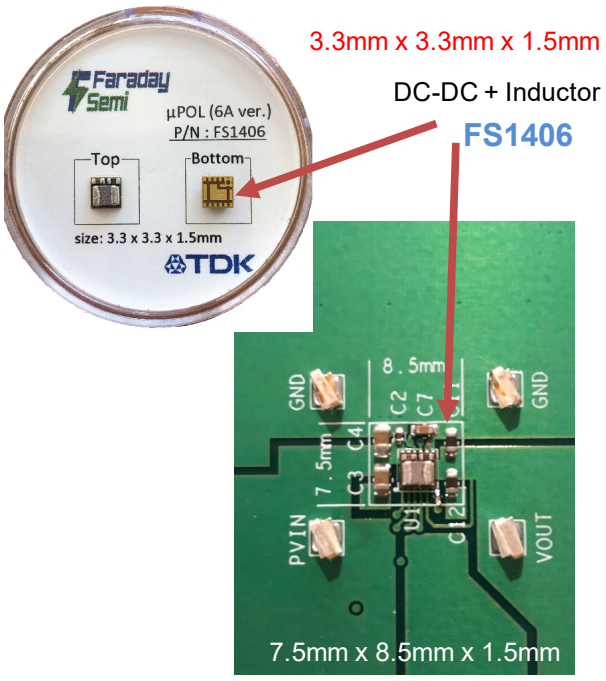
DC-DC Power Solutions for FPGAs

TDK Power: Xilinx Zynq® UltraScale+™

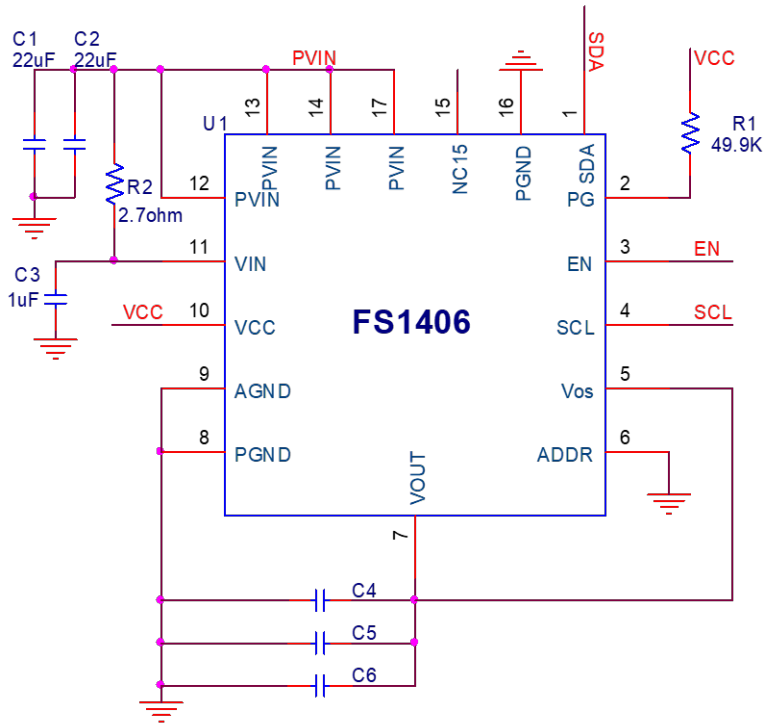
Device Options

TDK micro-POL™ Power Modules	MOQ Reel Qty	Voltage	Current Range
FS1406-0600	250, 4k	0.6V to 2.5V	1A to 6A
FS1406-0700	250, 4k	0.7V	1A to 6A
FS1406-0750	250, 4k	0.75V	1A to 6A
FS1406-0800	250, 4k	0.8V	1A to 6A
FS1406-0900	250, 4k	0.9V	1A to 6A
FS1406-1000	250, 4k	1.0V	1A to 6A
FS1406-1050	250, 4k	1.05V	1A to 6A
FS1406-1100	250, 4k	1.1V	1A to 6A
FS1406-1200	250, 4k	1.2V	1A to 6A
FS1406-1800	250, 4k	1.8V	1A to 6A
FS1406-2500	250, 4k	2.5V	1A to 6A
FS1404-2500	250, 4k	2.5V	1A to 4A
FS1404-3300	250, 4k	3.3V	1A to 4A
FS1403-3300	250, 4k	3.3V	1A to 3A
FS1403-5000	250, 4k	5.0V	1A to 3A

Best Performance & Current Density



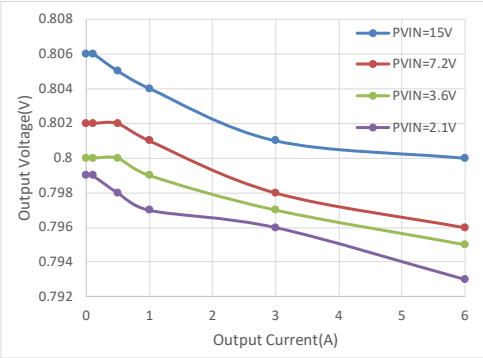
Typical Schematic for FS1406



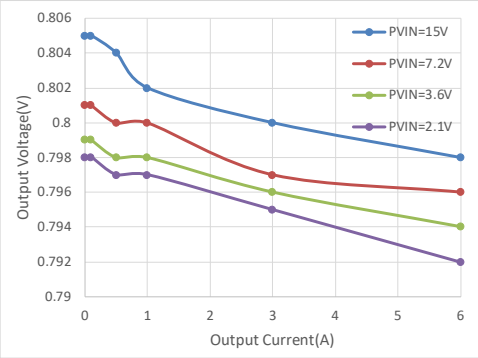
DC-DC Power Solutions for FPGAs

TDK Power: Xilinx Zynq® UltraScale+™

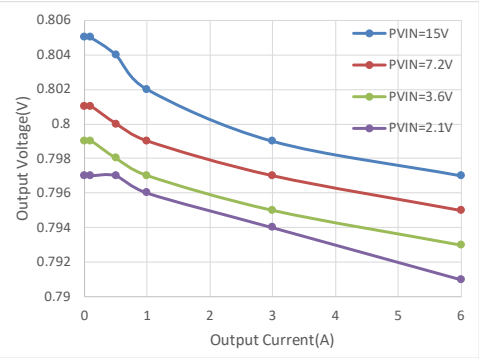
Performance Data



@ -40˚C

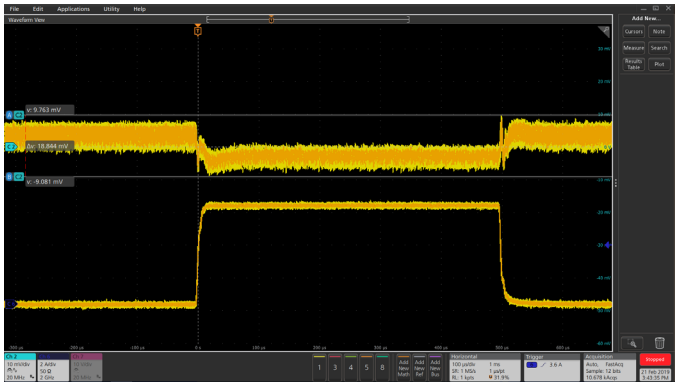


@ 25˚C

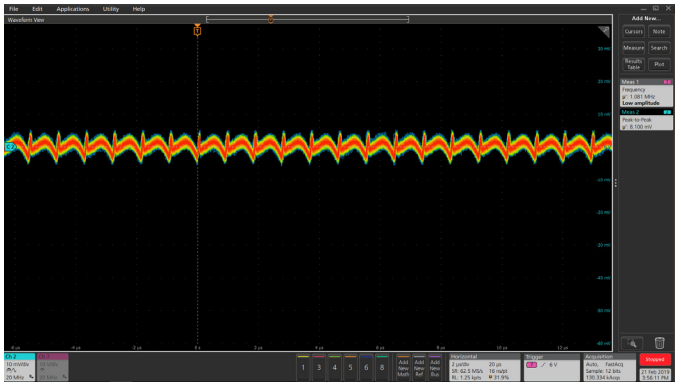


@ 85˚C

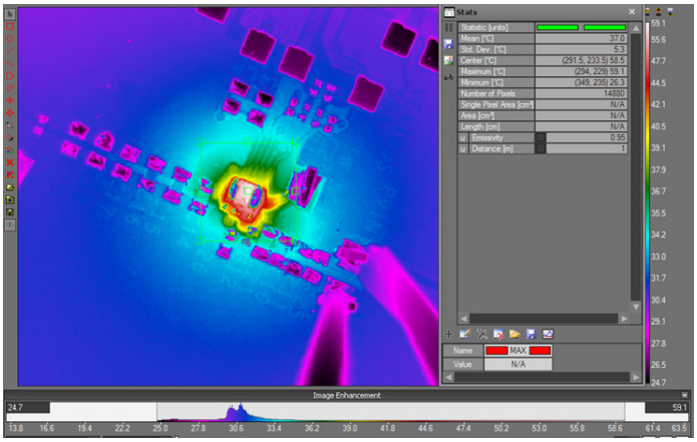
Line & Load Regulation



Load Transient 0A to 6A
V_O peak-peak = 19mV (±1.2%)



V_O ripple = 8mV @ 6A
(±0.51%)



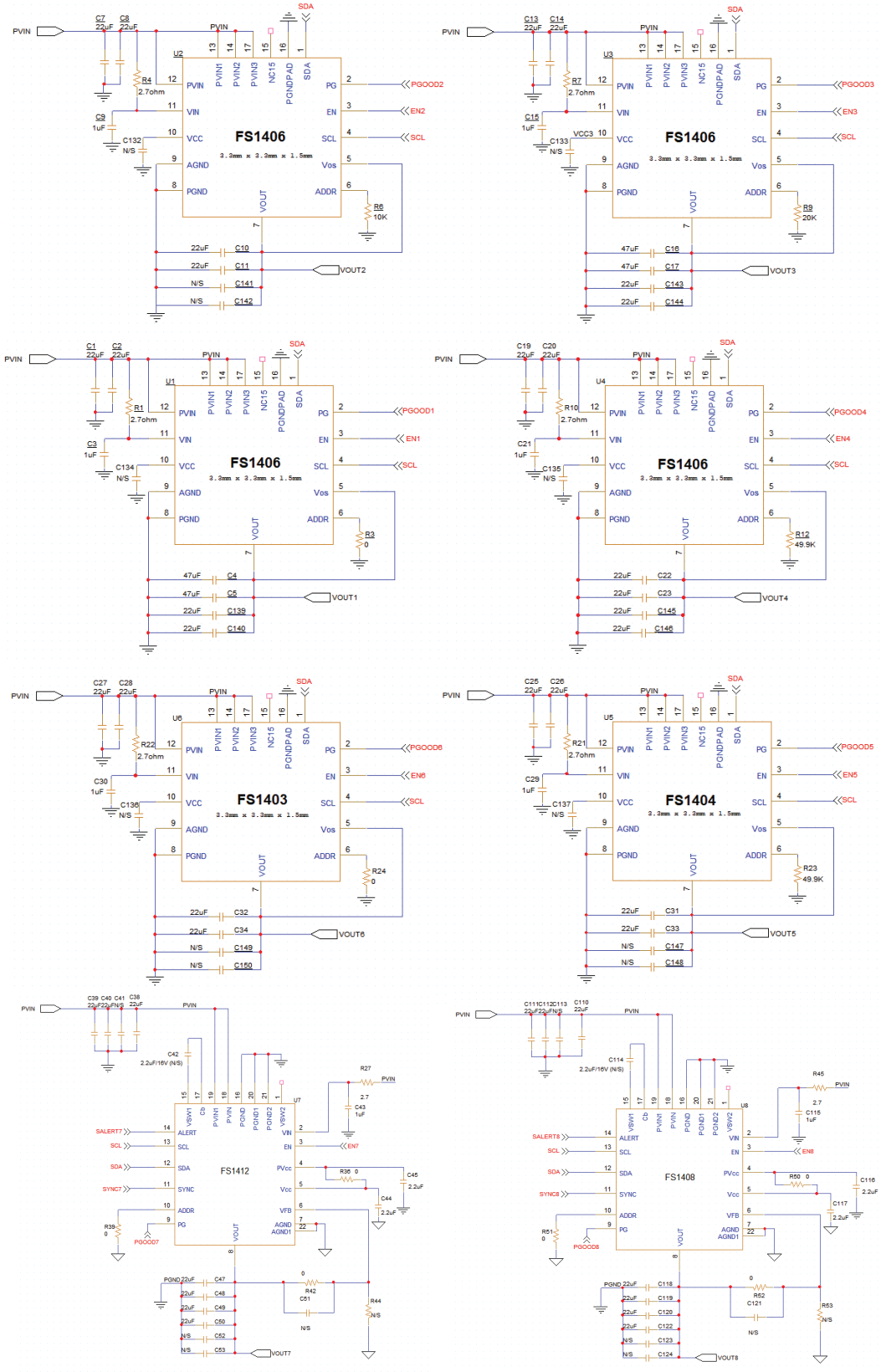
Typical Operating Waveforms
PVin=12.0V, Vo=0.8V, Io=0-6A,
Room Temperature,
No airflow

Io = 6A, 35˚C rise

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TDK Power: Xilinx Zynq® UltraScale+™

Schematic

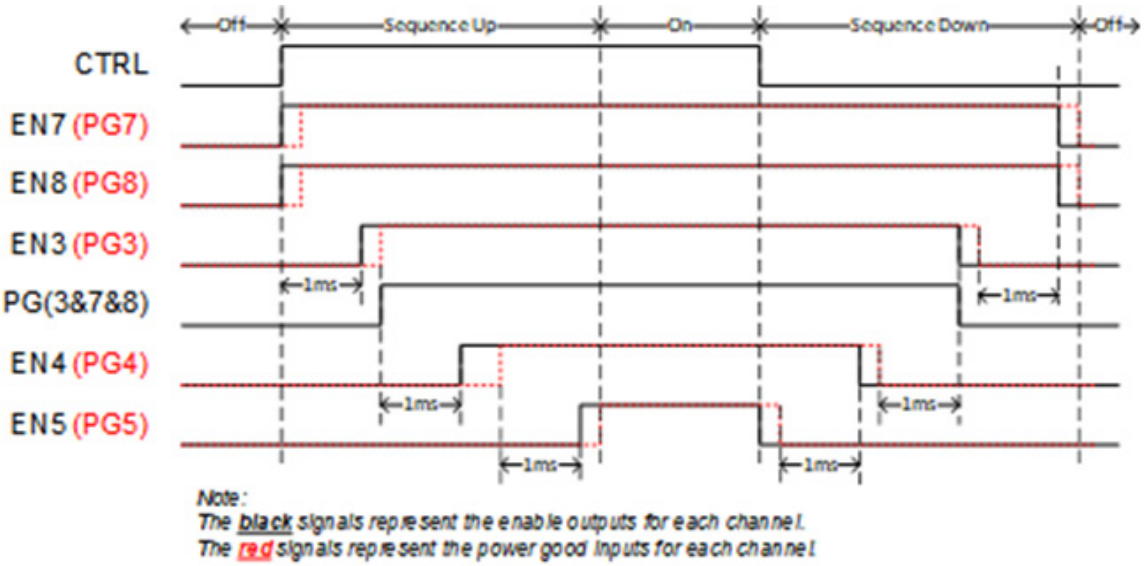


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Power Sequencing - TDK Power Modules - Example

TDK's μPOL power modules with simple, low cost sequencers. Shown below is an example of implementation using Dialog Semiconductors, GreenPAK devices. Both normal and crash sequencing can be easily implemented. See TDK's Power Strip Power Macro Evaluation Boards for examples. DK and Dialog collaboration includes a TDK custom sequencer with Dialog for the Zynq UltraScale, part number and design, SLG7TD43744. The flexibility of the power sequencer provides a flexible and configurable baseline design for sequencing the Zynq UltraScale+.



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