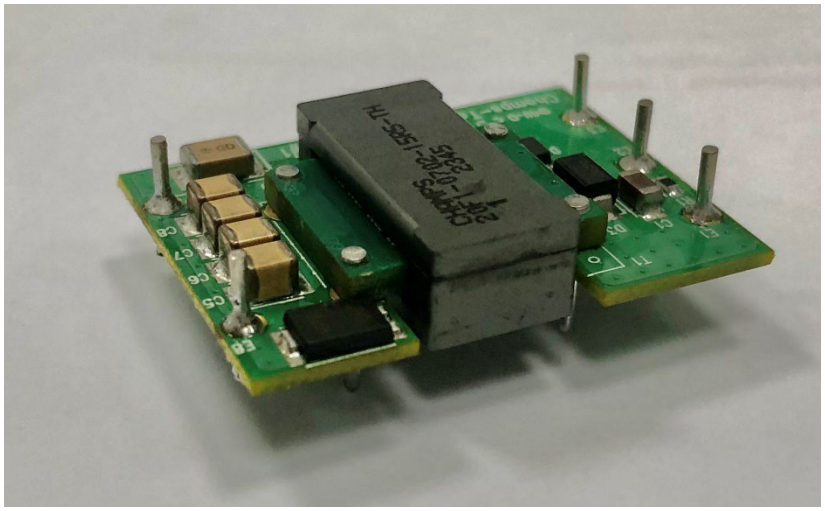
CHAMPS Technology

20F1 Series DC-DC Power Module & Base-Board
Isolated Boundary Mode Flyback Converter



DC-DC Main Module Features:

- Wide Input Voltage Range (10V – 38 Volts)
- Up to 20W Isolated output power
- 90% efficiency Typical, 92% Peak
- Quasi-Resonant Boundary Mode at Load
- Positive Logic On/Off control option
- Low output ripple and noise
- RoHS compliant
- Temperature Range –40°C to +85°C
- Flyback Topology Boundary Mode

Description

- Champs-Tech Main Module contains the planar transformer and incorporated power components to complete a high efficiency, robust, low component count and low-cost DC-DC converter. It is intended to be supplied with a companion Base-Board in order to facilitate evaluation. Additional filtering and protection circuit and components may be added.

- Champs-Tech will build the module for any customer in any mechanical configuration that works best for the customer – embedded or discrete – open or encapsulated.

- Champs-Tech will supply the planar transformer.

- Champs-Tech will configure any possible options:

1. Input Voltage Range.
2. Output Voltage – Single or Multiple.
3. Output Power.
4. Discrete planar turns ratios and size.

- Output power is a function of Input Voltage and transformer turns ratio. Consult Champs-Tech prior to evaluation for any application to ensure proper use.

Champs Technologies USA | http://www.champs-tech.com | Ph: +1-347-349-0768 | Harold.eicher@champs-tech.com

- The heart of the circuit is the LT8302 IC and extreme “low-leakage” inductance planar magnetics which maximizes the 3.6A 65V switch internal to the LT8302.. The output voltage is sampled from the reflected flyback waveform at the Vds node and is programmed with [3] resistors, so it doesn’t require a third winding or opto-isolator for regulation.

- The converter offers features based on the LT8302 function and features inherent to the IC: - positive logic (Remote on/off), over current, over temperature & under voltage protection.

Under Voltage Lock Out (UVLO):

Additional features of the LT8302 and circuit provide input under voltage lockout. The unit will shut down when the input voltage drops below the threshold programmed.

Modules provide voltage isolation from input to output of up to 2250Vdc & can operate over the ambient Temperature Range from -40°C to +85°C. It delivers full output power at +70°C with no airflow. Alternative pcb configuration allows for optimized thermal conduction for different applications and environment.

Over Voltage Protection:

The over-voltage protection consists of a Zener diode that will limit the output voltage within the rated or specified range.

Remote On/Off:

The 20F1 series allows the user to switch the module on and off electronically with the remote on/off feature. All models are available in “positive logic” versions. The converter turns on if the Remote On/Off pin is high (greater than 5 Volts) or open circuit.

Summary Performance Characteristics

Champs PN	Input Voltage	Output Voltage	Output Current	Output Power	Efficiency %	Mode	Dimension (mm)
20F1-0706-15R5	10-36 Vin	12 Vout	1.5 A	18 W	87.4 – 91.4	BCM	26 x 35 x 7.0
20F1-0702-15R5	10-36 Vin	5 Vout	2.5 A	12.5 W	84.6 – 87.2	BCM	26 x 35 x 7.0

Notes:

1. Contact factory for additional options and complete ordering part numbers.
2. All specifications are at nominal line voltage and full load, +25 °C. Unless otherwise noted.
3. See detailed specifications below for maximum conditions.
4. Output Power is a function of Input Voltage and transformer turns ratio. Consult Champs-Tech prior to evaluation for any application to ensure proper use.

FUNCTIONAL SPECIFICATIONS 12 Vout

ABSOLUTE MAX RATINGS	Conditions	Minimum	Nominal	Maximum	Units
Operating Input Voltage Range	Derated Power Operation over Input Voltage Range	10	28	36	Vdc
Isolation Voltage	Input to Output tested 100 ms, IEC/EN/UL 60950-1,			2250	Vdc
On/Off Remote Control	Power on or off, referred to -Vin	0		15	Vdc
Output Power		0		20	W
Output Current	Current Limit, no damage, short circuit protected	0		1.67	A
Storage Temperature Range	Vin = Zero (no power)	-55		+130	C
INPUT	**Conditions**	**Minimum**	**Nominal**	**Maximum**	**Units**
Start-Up Threshold	Rising Input Voltage		10		Vdc
Under-voltage Shutdown	Falling Input Voltage		9.5		Vdc

FUNCTIONAL SPECIFICATIONS 5 Vout

ABSOLUTE MAX RATINGS	Conditions	Minimum	Nominal	Maximum	Units
Operating Input Voltage Range	Derated Power Operation over Input Voltage Range	10	28	36	Vdc
Isolation Voltage	Input to Output tested 100 ms, IEC/EN/UL 60950-1,			2250	Vdc
On/Off Remote Control	Power on or off, referred to -Vin	0		15	Vdc
Output Power		0		15	W
Output Current	Current Limit, no damage, short circuit protected	0		3.0	A
Storage Temperature Range	Vin = Zero (no power)	-55		+130	C
INPUT	**Conditions**	**Minimum**	**Nominal**	**Maximum**	**Units**
Start-Up Threshold	Rising Input Voltage		10		Vdc
Under-voltage Shutdown	Falling Input Voltage		9.5		Vdc

Efficiency- 12 Vout

Vin	Iin	Vout	Pout	Efficiency	Pin - Pout
32	0.425	12.230	12.430	91.41%	1.17
32	0.644	12.240	18.560	90.46%	1.96
28	0.740	12.240	18.540	90.04%	2.05
28	0.486	12.220	12.400	91.43%	1.16
20	0.688	12.200	12.400	90.61%	1.29
15	0.934	12.190	12.380	89.23%	1.49
12	1.194	12.170	12.370	87.43%	1.78
10	1.471	12.130	12.330	85.36%	2.11

Efficiency- 5 Vout

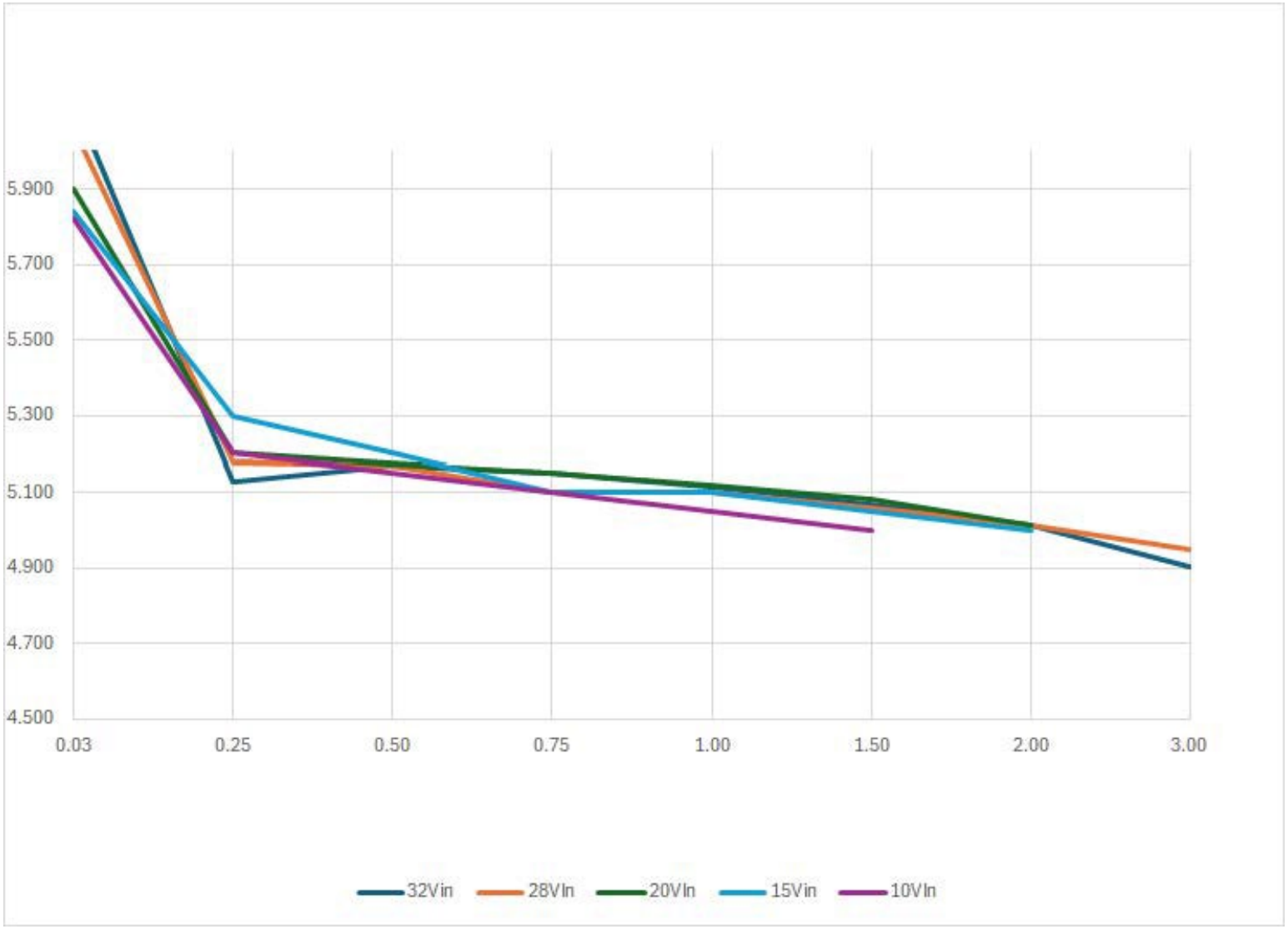
Vin	Iin	Vout	Efficiency	Pin - Pout	Pout	Ripple [mv]
20.0	0.309	5.260	85.73%	0.88	5.300	
20.0	0.646	5.290	86.50%	1.74	11.140	
20.0	0.457	5.280	87.18%	1.17	7.950	34.63
28.0	0.459	5.290	86.82%	1.69	11.140	24.88
32.0	0.291	5.270	85.29%	1.37	7.930	38.75
32.0	0.581	5.300	85.86%	2.62	15.930	35.75
15.0	0.611	5.270	87.06%	1.18	7.950	
10.0	0.944	5.250	84.62%	1.44	7.930	

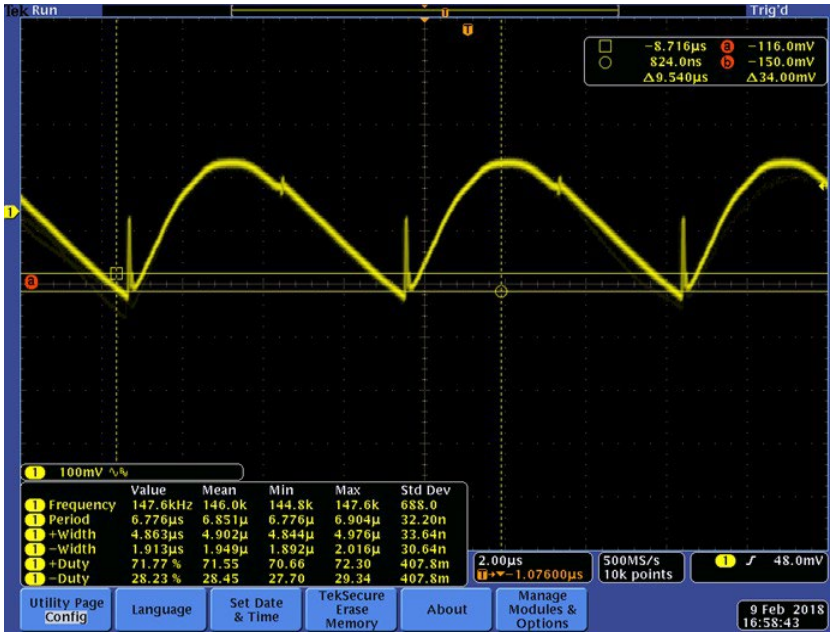
Notes:

1. The efficiency and regulation performance data reported are for the Main Module as implemented in this Reference Design. Please make sure that the product has been evaluated and confirmed against your specifications when it is utilized in any fashion in your product.

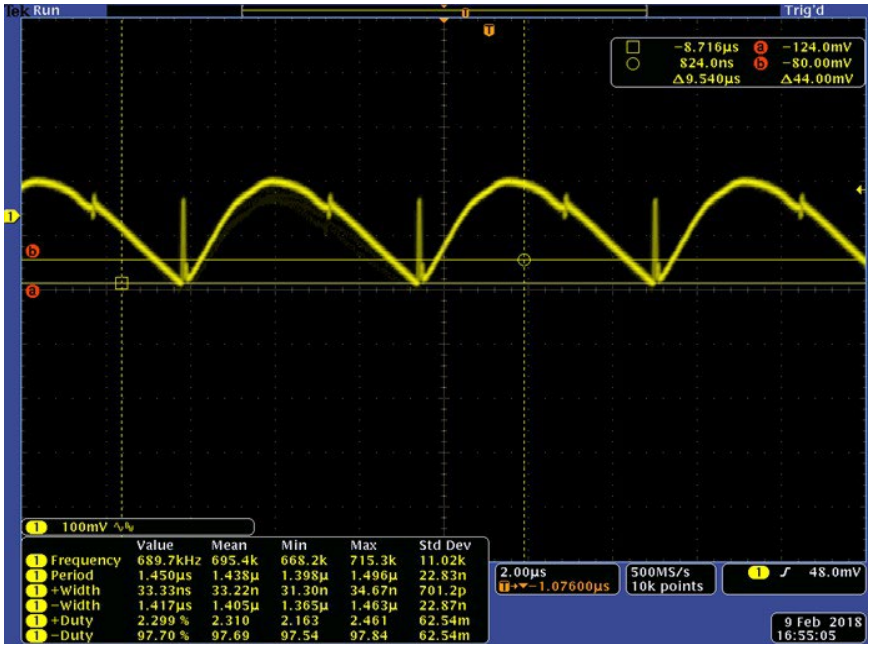
2. There is no warranty implied or otherwise. Additionally, it is not appropriate to assume terms or other conditions that are not expressly addressed and confirmed by written agreement with Champs-Tech prior to use and evaluation. Such terms include matters such as warranties, product liability, intellectual property, or any other possible term or condition that is not explicitly addressed prior to use.

Regulation- 5Vout

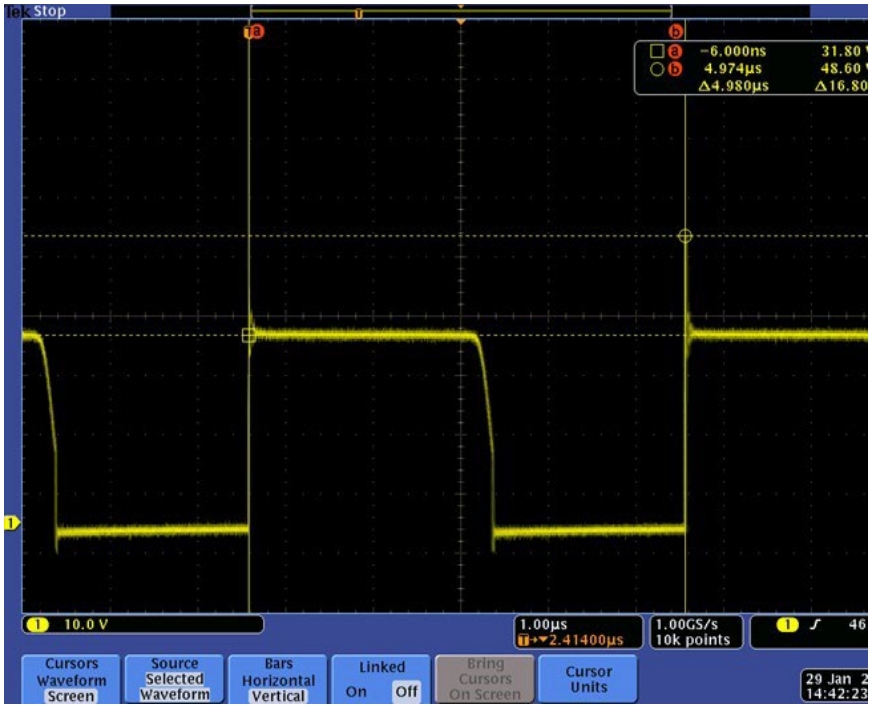




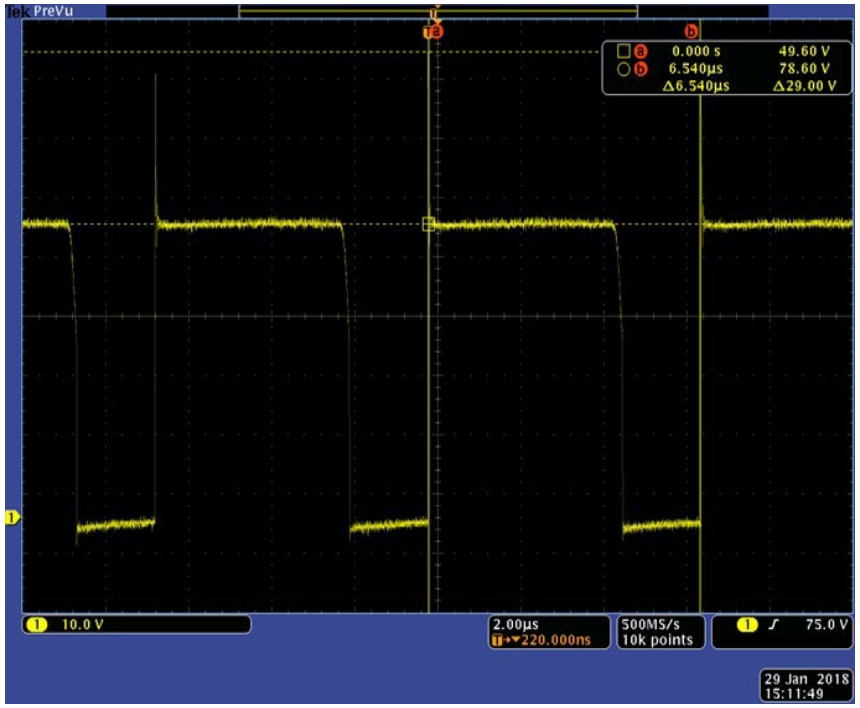
Vin=18V, Iout=1.25A, Ta=+25°C
12V Output Voltage Ripple



Vin=36V, Iout=1.25A, Ta=+25°C
12V Output Voltage Ripple

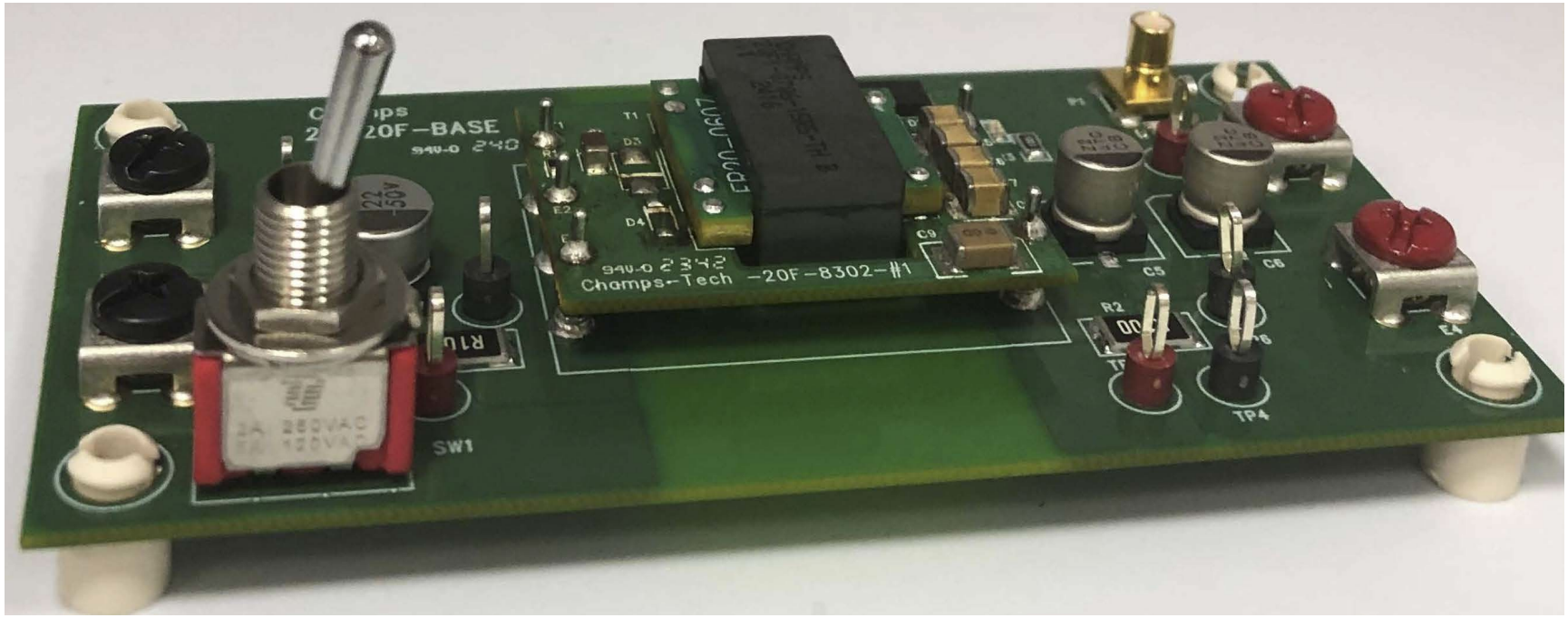


Vin=18V, Iout=1.25A, Ta=+25°C
Vds Switch Node Waveform

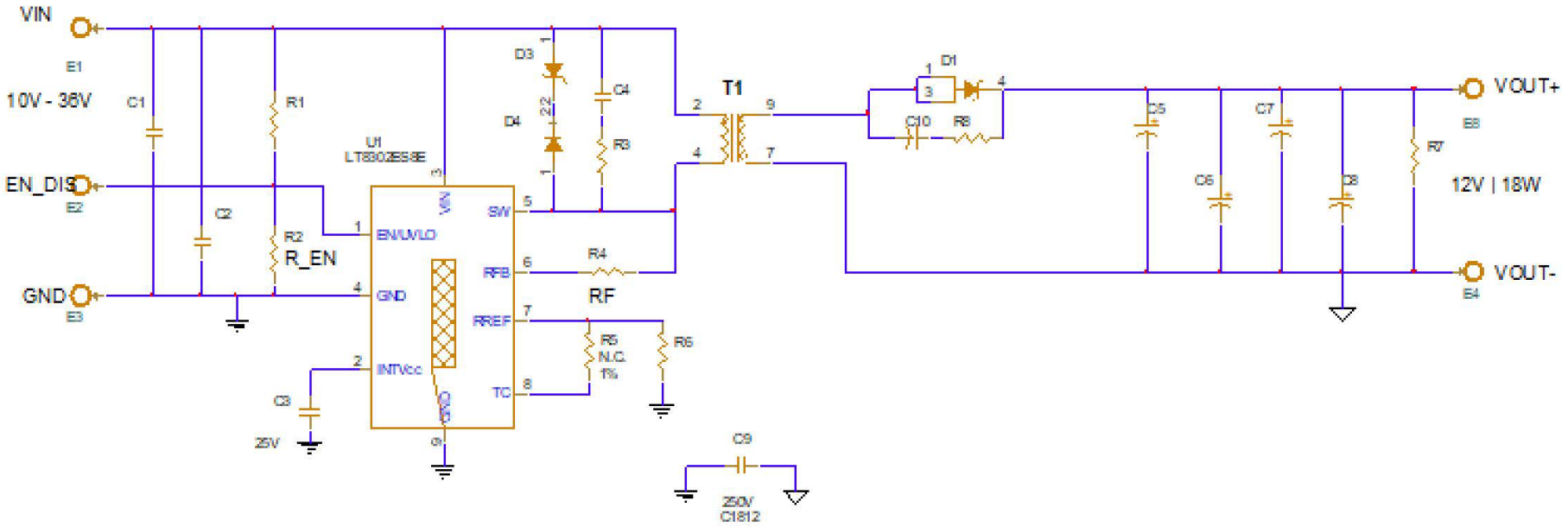


Vin=36V, Iout=1.25A, Ta=+25°C
Vds Switch Node Waveform

20F1 Base-Board & Module



20F1 Series Main Board Schematic 12V 18W

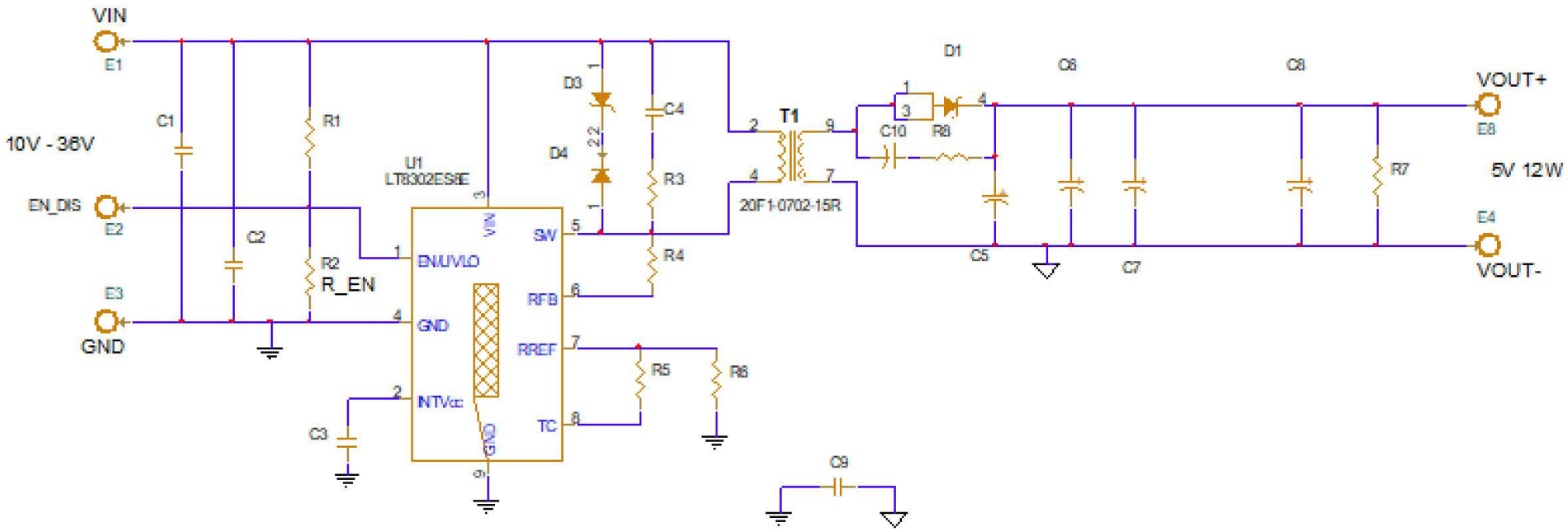


Notes:

1. Components and circuit shown are representative of the Reference Design. Consult Champs-Tech for values and complete data sheet as pertains this or any application under consideration for use.

2. Output Power is a function of Input Voltage and transformer turns ratio. Consult Champs-Tech prior to evaluation for any application to ensure proper use.

20F1 Series Main Board Schematic 5V 12W

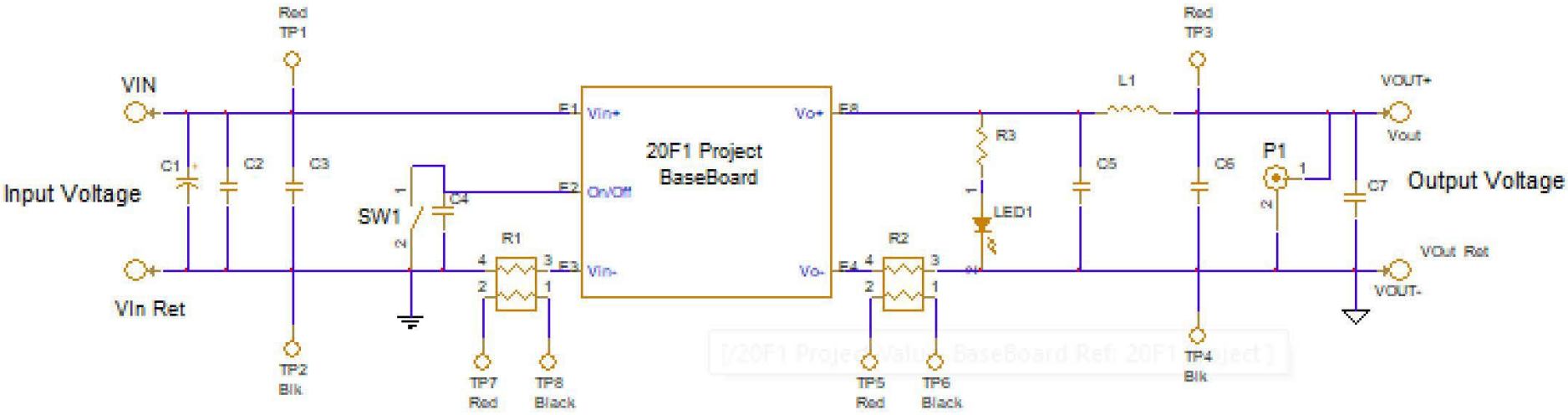


Notes:

1. Components and circuit shown are representative of the Reference Design. Consult Champs-Tech for values and complete data sheet as pertains this or any application under consideration for use.

2. Output Power is a function of Input Voltage and transformer turns ratio. Consult Champs-Tech prior to evaluation for any application to ensure proper use.

20F1 Series Base-Board Schematic



Notes:

1. Components and circuit shown are representative of the Reference Design. Consult Champs-Tech for values and complete data sheet as pertains this or any application under consideration for use.

2. Output Power is a function of Input Voltage and transformer turns ratio. Consult Champs-Tech prior to evaluation for any application to ensure proper use.