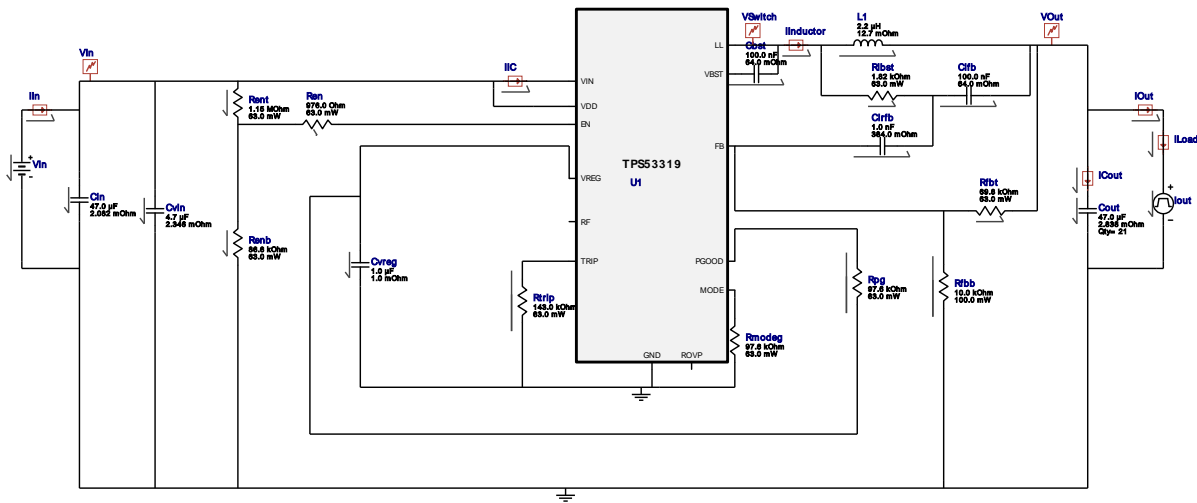


WEBENCH® Electrical Simulation Report


My Comments
No comments

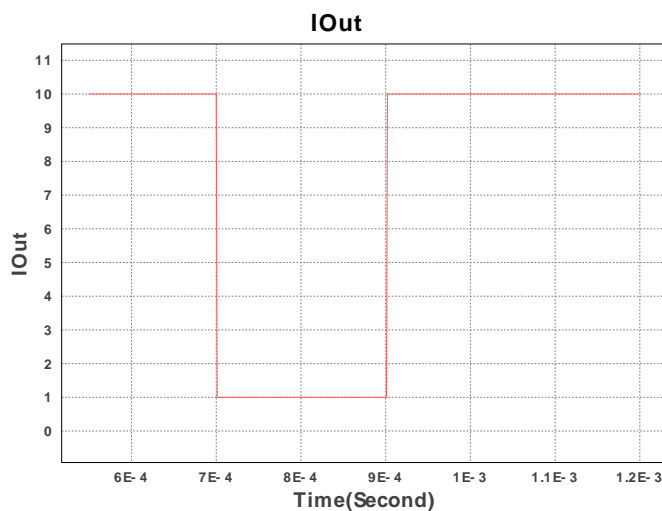
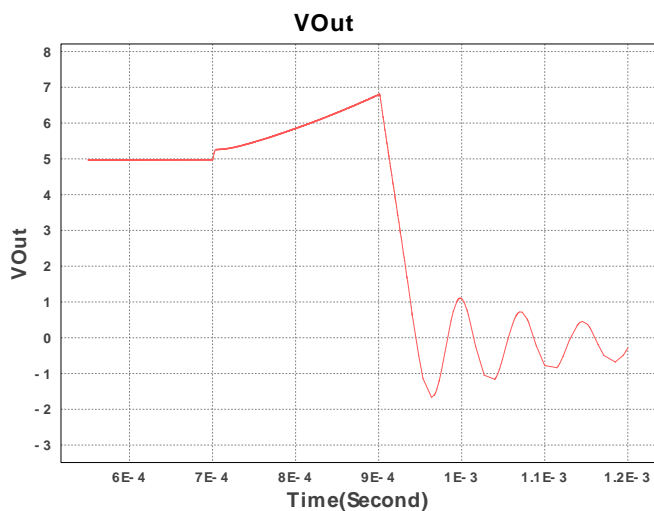
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb1	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
2.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 μF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.028 A	1	\$0.40	1206 11 mm ²
3.	Cf1b	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
4.	Cf2b	Kemet	C0805C102K5RACTU Series= X7R	Cap= 1.0 nF ESR= 384.0 mOhm VDC= 50.0 V IRMS= 214.0 mA	1	\$0.01	0805 7 mm ²
5.	Cout	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 47.0 μF ESR= 2.838 mOhm VDC= 10.0 V IRMS= 4.307 A	21	\$0.10	1210 5 mm ²
6.	Cvin	TDK	C2012X7R1V475K125AC Series= X7R	Cap= 4.7 μF ESR= 2.346 mOhm VDC= 35.0 V IRMS= 4.26 A	1	\$0.18	0805 7 mm ²
7.	Cvreg	Taiyo Yuden	TMK212B7105KG-T Series= X7R	Cap= 1.0 μF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.02	0805 7 mm ²
8.	L1	Coilcraft	XAL6030-222MEB	L= 2.2 μH DCR= 12.7 mOhm	1	\$0.65	XAL6030 72 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Ren	Vishay-Dale	CRCW0402976RFKED Series= CRCW...e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	Renb	Vishay-Dale	CRCW040286K6FKED Series= CRCW...e3	Res= 86.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	Rent	Vishay-Dale	CRCW04021M15FKED Series= CRCW...e3	Res= 1.15 MOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rfbb	Susumu Co Ltd	RR1220P-103-D Series= RR12	Res= 10.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	\$0.01	0805 7 mm ²
13.	Rfbt	Vishay-Dale	CRCW040269K8FKED Series= CRCW...e3	Res= 69.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
14.	Rlbst	Vishay-Dale	CRCW04021K82FKED Series= CRCW...e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
15.	Rmodeg	Vishay-Dale	CRCW040297K6FKED Series= CRCW...e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
16.	Rpg	Vishay-Dale	CRCW040297K6FKED Series= CRCW...e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
17.	Rtrip	Vishay-Dale	CRCW0402143KFKED Series= CRCW...e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
18.	U1	Texas Instruments	TPS53319DQPR	Switcher	1	\$3.00	DQP0022A 56 mm ²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cout	IC		5.0 V
2.	Iout	signal_type	Signal Type	PULSE
		I1	Initial Load Current	10.0 A
		I2	Minimum Load Current	1.0 A
		Td	Initial Time Delay	700u s
		Tf	Fall Time	0.000001 s
		Tr	Rise Time	0.000001 s
		Pw	Pulse Width	200u s



Design Inputs

#	Name	Value	Description
1.	Iout	10.0 A	Maximum Output Current
2.	VinMax	19.0 V	Maximum input voltage
3.	VinMin	19.0 V	Minimum input voltage
4.	Vout	5.0 V	Output Voltage
5.	base_pn	TPS53319	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	Total BOM	\$6.47		Total BOM Cost
2.	Cin IRMS	4.454 A	Current	Input capacitor RMS ripple current
3.	Cout IRMS	1.002 A	Current	Output capacitor RMS ripple current
4.	IC Ipk	11.736 A	Current	Peak switch current in IC
5.	Iin Avg	2.793 A	Current	Average input current
6.	L Ipp	3.472 A	Current	Peak-to-peak inductor ripple current
7.	BOM Count	1	General	Total Design BOM count
8.	FootPrint	432.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	Mode	CCM	General	Conduction Mode
11.	Pout	50.0 W	General	Total output power
12.	Duty Cycle	27.281 %	Op Point	Duty cycle
13.	Efficiency	94.221 %	Op Point	Steady state efficiency
14.	IC Tj	69.11 degC	Op Point	IC junction temperature
15.	ICThetaJA	27.2 degC/W	Op Point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	10.0 A	Op Point	Iout operating point
17.	VIN_OP	19.0 V	Op Point	Vin operating point
18.	Vout Actual	4.788 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout OP	5.0 V	Op Point	Operational Output Voltage
20.	Vout Tolerance	2.332 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
21.	Vout p-p	17.367 mV	Op Point	Peak-to-peak output ripple voltage
22.	Cin Pd	41.304 mW	Power	Input capacitor power dissipation
23.	Cout Pd	135.771 μ W	Power	Output capacitor power dissipation
24.	IC Iq Pd	7.98 mW	Power	IC Iq Pd
25.	IC Pd	1.438 W	Power	IC power dissipation
26.	L Pd	1.588 W	Power	Inductor power dissipation
27.	Total Pd	3.067 W	Power	Total Power Dissipation

Design Assistance

1. TPS53319 Product Folder : <http://www.ti.com/product/TPS53319> : contains the data sheet and other resources.

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