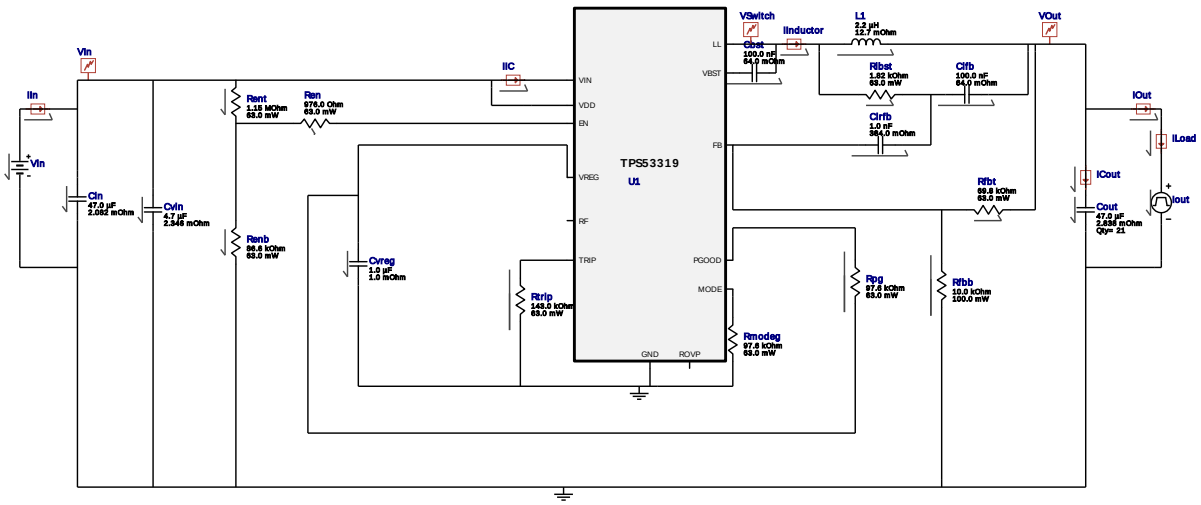
VinMin = 19.0V
VinMax = 19.0V
Vout = 5.0V
Iout = 10.0A

Device = TPS53319DQPR
Topology = Buck
Created = 2018-02-23 04:34:31.063
User ID = 4748671
Design Id = 308
eSim Id = 3
Simulation Type = Load Transient

WEBENCH® Electrical Simulation Report



My Comments

No comments

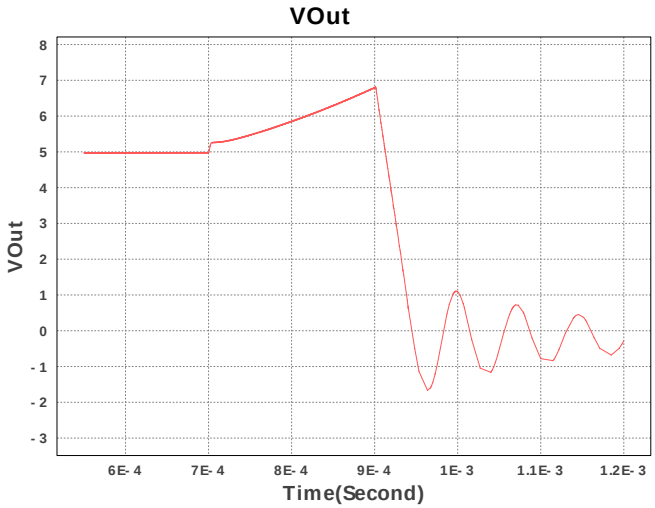
Electrical BOM

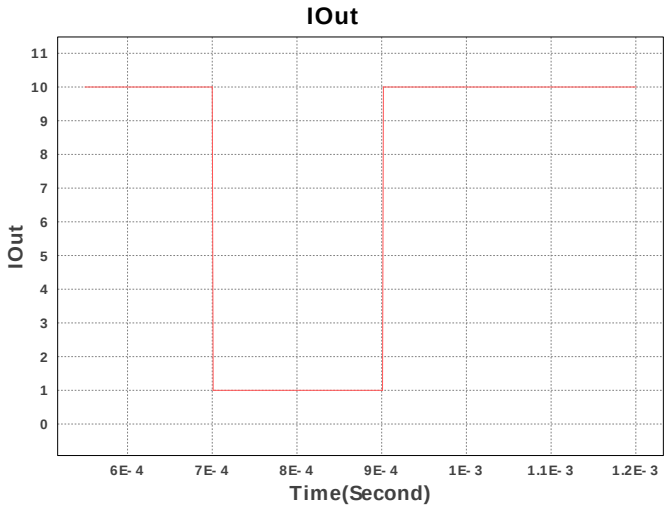
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 µF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.028 A	1	$0.40	1206 11 mm²
3.	Clfb	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 mm²
4.	Clrfb	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 mm²
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 mm²
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 mm²
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 mm²
8.	L1	Coilcraft	XAL6030-222MEB	L= 2.2 µH DCR= 12.7 mOhm	1	$0.65	XAL6030 72 mm²

#	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 mm²
10.	Renb	Vishay-Dale	CRCW040286K6FKED Series= CRCW..e3	Res= 86.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rent	Vishay-Dale	CRCW04021M15FKED Series= CRCW..e3	Res= 1.15 MOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
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 mm²
13.	Rfbt	Vishay-Dale	CRCW040269K8FKED Series= CRCW..e3	Res= 69.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
14.	Rlbst	Vishay-Dale	CRCW04021K82FKED Series= CRCW..e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
15.	Rmodeg	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
16.	Rpg	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
17.	Rtrip	Vishay-Dale	CRCW0402143KFKED Series= CRCW..e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
18.	U1	Texas Instruments	TPS53319DQPR	Switcher	1	$3.00	DQP0022A 56 mm²

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 μW	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.