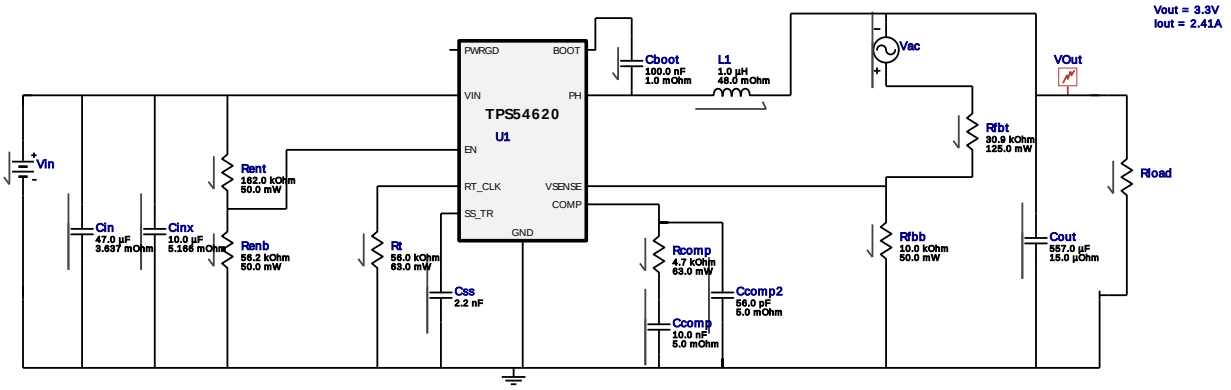
WEBENCH® Electrical Simulation Report

VinMin = 5.0V
VinMax = 5.0V
Vout = 3.3V
Iout = 2.41A

Device = TPS54620RHLR
Topology = Buck
Created = 2018-10-23 00:28:28.529
User ID = 4748671
Design Id = 389
eSim Id = 3
Simulation Type = Bode Plot



My Comments

No comments

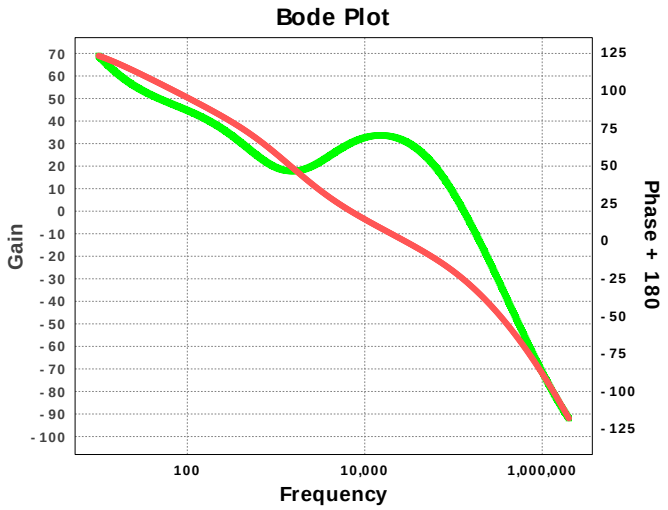
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0603C104Z3VACTU Series= Y5V	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
2.	Ccomp	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 10.0 nF ESR= 5.0 mOhm VDC= 50.0 V IRMS= 1.0 A	1	$0.10	1210 14 mm²
3.	Ccomp2	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 56.0 pF ESR= 5.0 mOhm VDC= 50.0 V IRMS= 1.0 A	1	$0.10	1210 0 mm²
4.	Cin	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 47.0 µF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.565 A	1	$0.10	1210 5 mm²
5.	Cinx	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 10.0 µF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.035 A	1	$0.10	1210 3 mm²
6.	Cout	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 557.0 µF ESR= 15.0 µOhm VDC= 4.0 V IRMS= 3.296 A	1	$0.10	1210 3 mm²
7.	Css	TDK	C2012C0G1H222K060AA Series= C0G/NP0	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
8.	L1	CUSTOM	CUSTOM_INDUCTOR_MD	L= 1.0 µH DCR= 48.0 mOhm	1	$0.10	PA4332 18 mm²
9.	Rcomp	CUSTOM	CUSTOM_RESISTOR_MD Series= CUSTOM	Res= 4.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.10	0805 1 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Renb	Yageo	RC0201FR-0756K2L Series= ?	Res= 56.2 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
11.	Rent	Yageo	RC0201FR-07162KL Series= ?	Res= 162.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
12.	Rfbb	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
13.	Rfbt	Vishay-Dale	CRCW080530K9FKEA Series= CRCW..e3	Res= 30.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
14.	Rt	CUSTOM	CUSTOM_RESISTOR_MD Series= CUSTOM	Res= 56.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.10	0805 1 mm²
15.	U1	Texas Instruments	TPS54620RHLR	Switcher	1	$1.99	S-PVQFN-N14 22 mm²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cout	IC	initial condition	no values
2.	Cinj	C	no description	10000000 F
3.	Linj	L	no description	10000000 H
4.	Vinj	AC	no description	1 V
5.	Rload	R	Load Resistance	1.3670256835128416 Ohm



Design Inputs

#	Name	Value	Description
1.	Iout	2.414 A	Maximum Output Current
2.	VinMax	5.0 V	Maximum input voltage
3.	VinMin	5.0 V	Minimum input voltage
4.	Vout	3.3 V	Output Voltage
5.	base_pn	TPS54620	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	15		Total Design BOM count
2.	Total BOM	$2.87		Total BOM Cost
3.	Cin IRMS	1.116 A	Capacitor	Input capacitor RMS ripple current

#	Name	Value	Category	Description
4.	Cin Pd	4.526 mW	Capacitor	Input capacitor power dissipation
5.	Cout IRMS	408.115 mA	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	2.498 µW	Capacitor	Output capacitor power dissipation
7.	IC Ipk	3.121 A	IC	Peak switch current in IC
8.	IC Iq Pd	3.0 mW	IC	IC Iq Pd
9.	IC Pd	396.27 mW	IC	IC power dissipation
10.	IC Tj	42.681 degC	IC	IC junction temperature
11.	IC Tolerance	8.0 mV	IC	IC Feedback Tolerance
12.	ICThetaJA	32.0 degC/W	IC	IC junction-to-ambient thermal resistance
13.	Iin Avg	1.73 A	IC	Average input current
14.	L Ipp	1.414 A	Inductor	Peak-to-peak inductor ripple current
15.	L Pd	349.64 mW	Inductor	Inductor power dissipation
16.	M1 Irms	2.007 A	Mosfet	Q Iavg
17.	Cin Pd	4.526 mW	Power	Input capacitor power dissipation
18.	Cout Pd	2.498 µW	Power	Output capacitor power dissipation
19.	IC Pd	396.27 mW	Power	IC power dissipation
20.	L Pd	349.64 mW	Power	Inductor power dissipation
21.	Total Pd	750.474 mW	Power	Total Power Dissipation
22.	Cross Freq	112.556 kHz	System Information	Bode plot crossover frequency
23.	Duty Cycle	69.091 %	System Information	Duty cycle
24.	Efficiency	91.323 %	System Information	Steady state efficiency
25.	FootPrint	129.0 mm^2	System Information	Total Foot Print Area of BOM components
26.	Frequency	844.487 kHz	System Information	Switching frequency
27.	Gain Marg	-6.596 dB	System Information	Bode Plot Gain Margin
28.	Iout	2.414 A	System Information	Iout operating point
29.	Low Freq Gain	72.254 dB	System Information	Gain at 1Hz
30.	Mode	CCM	System Information	Conduction Mode
31.	Phase Marg	27.005 deg	System Information	Bode Plot Phase Margin
32.	Pout	7.899 W	System Information	Total output power
33.	Vin	5.0 V	System Information	Vin operating point
34.	Vout	3.272 V	System Information	Operational Output Voltage
35.	Vout Actual	3.272 V	System Information	Vout Actual calculated based on selected voltage divider resistors
36.	Vout Tolerance	2.542 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
37.	Vout p-p	9.12 mV	System Information	Peak-to-peak output ripple voltage

Design Assistance

1. **TPS54620** Product Folder : http://www.ti.com/product/TPS54620 : contains the data sheet and other resources.