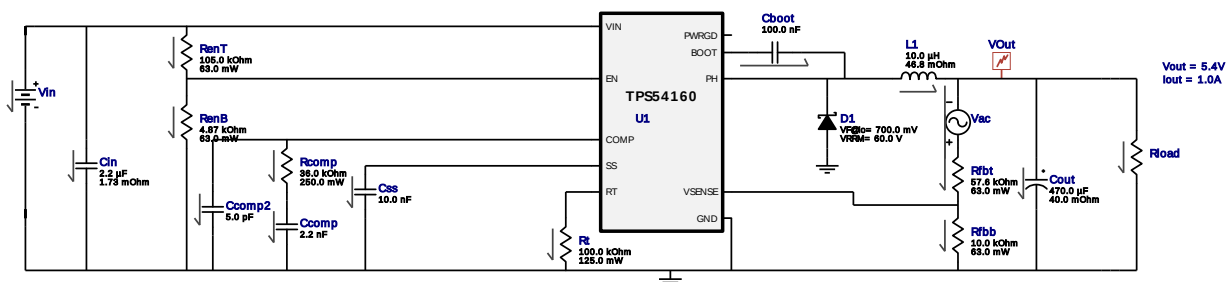


WEBENCH® Electrical Simulation Report



My Comments

No comments

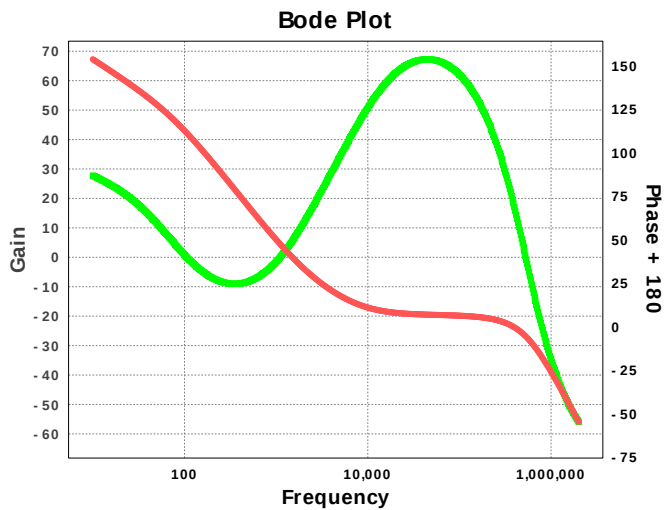
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB222 Series= X7R	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	MuRata	GQM2195C2A5R0CB01D Series= C0G/NP0	Cap= 5.0 pF VDC= 100.0 V IRMS= 0.0 A	1	\$0.16	0805 7 mm ²
4.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 μF ESR= 1.73 mOhm VDC= 100.0 V IRMS= 5.593 A	1	\$0.20	1210_250 15 mm ²
5.	Cout	Kemet	T495E477K010ATE040 Series= T495	Cap= 470.0 μF ESR= 40.0 mOhm VDC= 10.0 V IRMS= 2.012 A	1	\$4.32	7260-38 74 mm ²
6.	Css	Yageo America	CC0805KRX7R9BB103 Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	D1	Fairchild Semiconductor	SS26FL	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.09	SOD-123F 12 mm ²
8.	L1	TDK	SLF6045T-100M1R6-3PF	L= 10.0 μH DCR= 46.8 mOhm	1	\$0.43	SLF6045 64 mm ²
9.	Rcomp	Yageo America	RC1206FR-0736KL Series= ?	Res= 36.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	1206 11 mm ²
10.	RenB	Vishay-Dale	CRCW04024K87FKED Series= CRCW..e3	Res= 4.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	RenT	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	Rfbt	Vishay-Dale	CRCW040257K6FKED Series= CRCW..e3	Res= 57.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
14.	Rt	Panasonic	ERJ-6ENF1003V Series= ERJ-6E	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
15.	U1	Texas Instruments	TPS54160DGQR	Switcher	1	\$1.35	 S-PDSO-G10 24 mm²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cinj	C	Injection Capacitance	10000000 F
2.	Linj	L	Injection Inductance	10000000 H
3.	Vinj	AC	AC signal	1 V
4.	Rload	R	Load Resistance	5.4 Ohm



Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	VinMax	48.0 V	Maximum input voltage
3.	VinMin	32.0 V	Minimum input voltage
4.	Vout	5.4 V	Output Voltage
5.	base_pn	TPS54160	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	\$6.64		Total BOM Cost
3.	Cin IRMS	319.501 mA	Current	Input capacitor RMS ripple current
4.	Cout IRMS	139.698 mA	Current	Output capacitor RMS ripple current
5.	IC Ipk	1.242 A	Current	Peak switch current in IC
6.	Iin Avg	153.36 mA	Current	Average input current
7.	L Ipp	483.929 mA	Current	Peak-to-peak inductor ripple current
8.	FootPrint	241.0 mm²	General	Total Foot Print Area of BOM components
9.	Frequency	1.106 MHz	General	Switching frequency
10.	Mode	CCM	General	Conduction Mode
11.	Pout	5.4 W	General	Total output power
12.	D1 Tj	66.724 degC	Op_Point	D1 junction temperature
13.	Low Freq Gain	83.906 dB	Op_Point	Gain at 10Hz
14.	Vout Actual	5.408 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	5.4 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
16.	Cross Freq	1.503 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	12.561 %	Op_point	Duty cycle
18.	Efficiency	73.357 %	Op_point	Steady state efficiency
19.	Gain Marg	-41.271 dB	Op_point	Bode Plot Gain Margin
20.	IC Tj	111.05 degC	Op_point	IC junction temperature
21.	ICThetaJA	62.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	1.0 A	Op_point	Iout operating point
23.	Phase Marg	49.602 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	48.0 V	Op_point	Vin operating point
25.	Vout p-p	19.357 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	176.6 μ W	Power	Input capacitor power dissipation
27.	Cout Pd	780.623 μ W	Power	Output capacitor power dissipation
28.	Diode Pd	612.072 mW	Power	Diode power dissipation
29.	IC Pd	1.297 W	Power	IC power dissipation
30.	L Pd	51.48 mW	Power	Inductor power dissipation
31.	Total Pd	1.961 W	Power	Total Power Dissipation
32.	Vout Tolerance	2.739 %	Unknown	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Assistance

1. **TPS54160** Product Folder : <http://www.ti.com/product/TPS54160> : contains the data sheet and other resources.

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