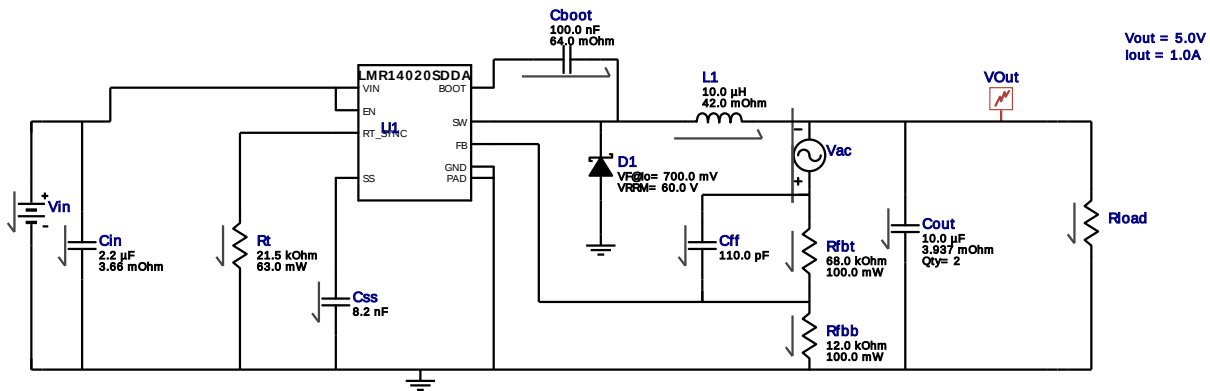


WEBENCH® Electrical Simulation Report



My Comments

No comments

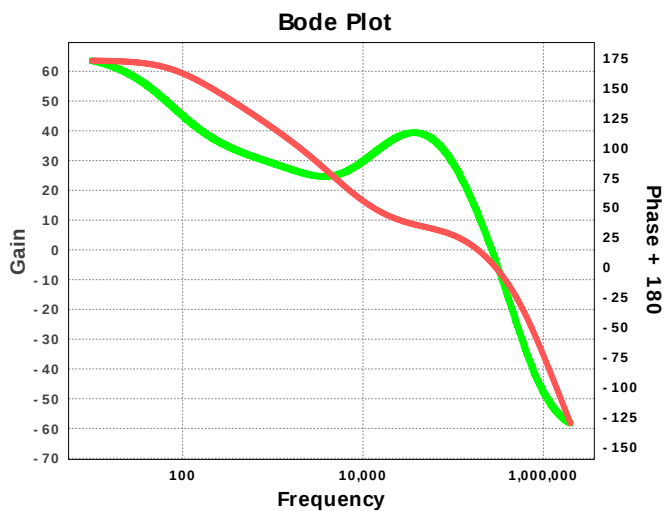
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	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.	Cff	Samsung Electro-Mechanics	CL21C111JBANNNC Series= C0G/NP0	Cap= 110.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Cin	TDK	C2012X7R1H225K125AC Series= X7R	Cap= 2.2 µF ESR= 3.66 mOhm VDC= 50.0 V IRMS= 3.412 A	1	\$0.13	 0805 7 mm ²
4.	Cout	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 µF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.771 A	2	\$0.03	 0805 7 mm ²
5.	Css	MuRata	GRM155R71C822KA01D Series= X7R	Cap= 8.2 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
6.	D1	Fairchild Semiconductor	SS26FL	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.10	 SOD-123F 12 mm ²
7.	L1	Bourns	SRR7045-100M	L= 10.0 µH DCR= 42.0 mOhm	1	\$0.27	 SRR7045 81 mm ²
8.	Rfbb	Yageo America	RC0603FR-0712KL Series= ?	Res= 12.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
9.	Rfbb	Yageo America	RC0603FR-0768KL Series= ?	Res= 68.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
10.	Rt	Vishay-Dale	CRCW040221K5FKED Series= CRCW..e3	Res= 21.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	LMR14020SDDAR	Switcher	1	\$1.30	 DDA0008E_N 57 mm ²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cinj	C	Injection Capacitor	10000000
2.	Linj	L	Injection L	10000000 F
3.	Vinj	AC	AC source	1 V
4.	Rload	R	Load Resistance	5.0 Ohm



Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	VinMax	33.0 V	Maximum input voltage
3.	VinMin	7.0 V	Minimum input voltage
4.	Vout	5.0 V	Output Voltage
5.	base_pn	LMR14020S	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	375.005 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	123.803 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.214 A	Current	Peak switch current in IC
4.	Iin Avg	188.18 mA	Current	Average input current
5.	L Ipp	428.87 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	411.444 mA	Current	Q Iavg
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	199.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	1.104 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	29.244 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	5.0 W	General	Total output power
14.	Total BOM	\$1.92	General	Total BOM Cost
15.	D1 Tj	30.0 degC	Op_Point	D1 junction temperature
16.	Low Freq Gain	62.16 dB	Op_Point	Gain at 1Hz
17.	Vout Actual	5.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
19.	Cross Freq	191.209 kHz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	16.929 %	Op_point	Duty cycle
21.	Efficiency	80.515 %	Op_point	Steady state efficiency
22.	Gain Marg	-6.711 dB	Op_point	Bode Plot Gain Margin

#	Name	Value	Category	Description
23.	IC Tj	54.124 degC	Op_point	IC junction temperature
24.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
25.	IOUT_OP	1.0 A	Op_point	Iout operating point
26.	Phase Marg	43.351 deg	Op_point	Bode Plot Phase Margin
27.	VIN_OP	33.0 V	Op_point	Vin operating point
28.	Vout p-p	4.23 mV	Op_point	Peak-to-peak output ripple voltage
29.	Cin Pd	514.7 μ W	Power	Input capacitor power dissipation
30.	Cout Pd	30.172 μ W	Power	Output capacitor power dissipation
31.	Diode Pd	0.0 W	Power	Diode power dissipation
32.	IC Pd	574.382 mW	Power	IC power dissipation
33.	L Pd	53.305 mW	Power	Inductor power dissipation
34.	Total Pd	1.21 W	Power	Total Power Dissipation
35.	Vout Tolerance	4.158 %	Unknown	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Assistance

1. **LMR14020S** Product Folder : <http://www.ti.com/product/LMR14020> : contains the data sheet and other resources.

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