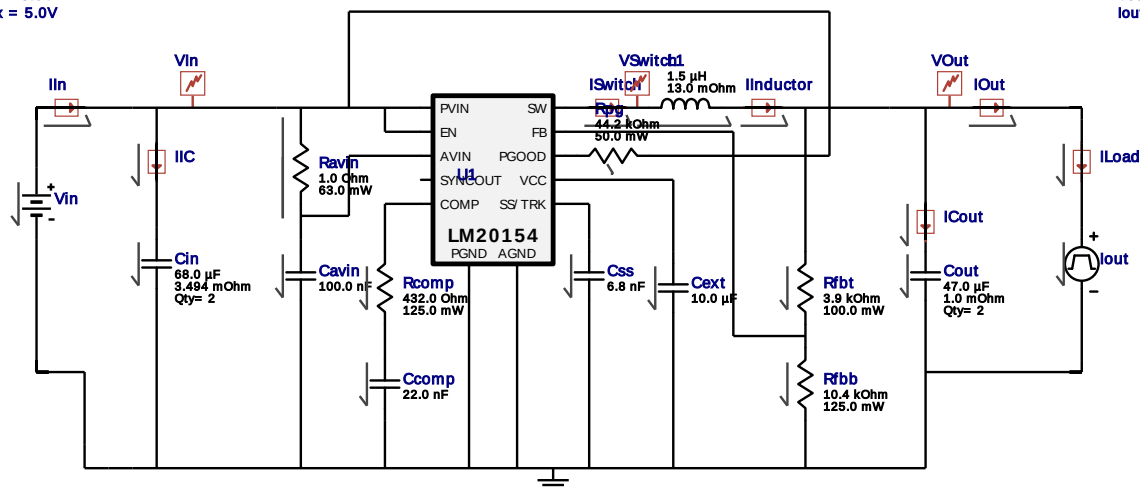


WEBENCH® Electrical Simulation Report

VinMin = 5.0V
VinMax = 5.0V

Vout = 1.1V
Iout = 1.8A



My Comments

No comments

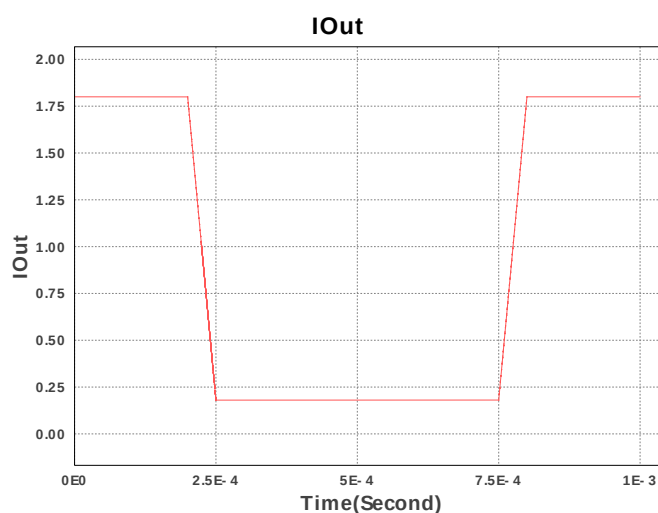
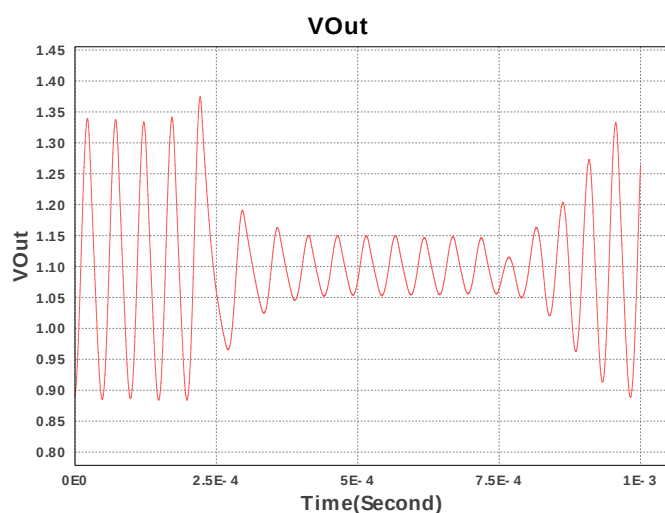
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cavin	AVX	08053C104JAZ2A Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.07	0805 7 mm ²
2.	Ccomp	TDK	CGA4J2C0G1H223J125AA Series= COG/NPO	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.08	0805 7 mm ²
3.	Cext	Samsung Electro-Mechanics	CL10A106MQ8NNNC Series= X5R	Cap= 10.0 µF VDC= 6.3 V IRMS= 0.0 A	1	\$0.02	0603 5 mm ²
4.	Cin	TDK	C3216X5R1A686M160AC Series= X5R	Cap= 68.0 µF ESR= 3.494 mOhm VDC= 10.0 V IRMS= 3.881 A	2	\$0.51	1206_190 11 mm ²
5.	Cout	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 47.0 µF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 6.0 A	2	\$0.10	1210 8 mm ²
6.	Css	TDK	C2012C0G1H682J060AA Series= COG/NPO	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	0805 7 mm ²
7.	L1	TDK	VLP8040T-1R5N	L= 1.5 µH DCR= 13.0 mOhm	1	\$0.22	VLP8040 113 mm ²
8.	Ravin	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
9.	Rcomp	Vishay-Dale	CRCW0805432RFKEA Series= CRCW..e3	Res= 432.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfbb	Yageo	RT0805BRD0710K4L Series= RT0805	Res= 10.4 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.05	 0805 7 mm²
11.	Rfbt	Yageo	RC0603FR-073K9L Series= ?	Res= 3.9 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm²
12.	Rpg	Vishay-Dale	CRCW020144K2FNED Series= ?	Res= 44.2 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²
13.	U1	Texas Instruments	LM20154MH/NOPB	Switcher	1	\$1.80	 MXA16A 59 mm²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Iout	signal_type	Signal Type	PULSE
		I1	Initial Current	1.8 A
		I2	Peak Current	0.18 A
		Td	Initial Delay Time	200u Sec
		Tr	Rise Time	50u Sec
		Tf	Fall Time	50u Sec
		Pw	Pulse Width	500u Sec



Design Inputs

#	Name	Value	Description
1.	Iout	1.8 A	Maximum Output Current
2.	VinMax	5.0 V	Maximum input voltage
3.	VinMin	5.0 V	Minimum input voltage
4.	Vout	1.1 V	Output Voltage
5.	base_pn	LM20154	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.	BOM Count	15		Total Design BOM count
2.	Total BOM	\$3.536		Total BOM Cost
3.	Cin IRMS	764.43 mA	Capacitor	Input capacitor RMS ripple current
4.	Cin Pd	1.021 mW	Capacitor	Input capacitor power dissipation
5.	Cout IRMS	177.205 mA	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	15.701 μ W	Capacitor	Output capacitor power dissipation
7.	IC Ipk	2.107 A	IC	Peak switch current in IC
8.	IC Iq Pd	17.5 mW	IC	IC Iq Pd
9.	IC Pd	240.57 mW	IC	IC power dissipation
10.	IC Tj	39.142 degC	IC	IC junction temperature

#	Name	Value	Category	Description
11.	IC Tolerance	12.0 mV	IC	IC Feedback Tolerance
12.	ICThetaJA	38.0 degC/W	IC	IC junction-to-ambient thermal resistance
13.	Iin Avg	454.85 mA	IC	Average input current
14.	L Ipp	613.855 mA	Inductor	Peak-to-peak inductor ripple current
15.	L Pd	52.65 mW	Inductor	Inductor power dissipation
16.	M Irms	874.619 mA	Mosfet	MOSFET RMS current
17.	M Vds Act	32.896 mV	Mosfet	Voltage drop across the MosFET
18.	M1 PdCond	28.772 mW	Mosfet	M1 MOSFET switching losses
19.	M1 PdSw	90.0 mW	Mosfet	M1 MOSFET switching losses
20.	M2 PdCond	82.701 mW	Mosfet	M2 MOSFET switching losses
21.	M2 Pdbody	21.6 mW	Mosfet	Power dissipation through lower FET
22.	Cin Pd	1.021 mW	Power	Input capacitor power dissipation
23.	Cout Pd	15.701 μ W	Power	Output capacitor power dissipation
24.	IC Drive Pd	20.0 mW	Power	Driver power dissipation
25.	IC Pd	240.57 mW	Power	IC power dissipation
26.	L Pd	52.65 mW	Power	Inductor power dissipation
27.	M1 PdCond	28.772 mW	Power	M1 MOSFET switching losses
28.	M1 PdSw	90.0 mW	Power	M1 MOSFET switching losses
29.	M2 PdCond	82.701 mW	Power	M2 MOSFET switching losses
30.	M2 Pdbody	21.6 mW	Power	Power dissipation through lower FET
31.	Total Pd	294.265 mW	Power	Total Power Dissipation
32.	Cross Freq	12.574 kHz	System	Bode plot crossover frequency
				Information
33.	Duty Cycle	23.61 %	System	Duty cycle
				Information
34.	Efficiency	87.061 %	System	Steady state efficiency
				Information
35.	FootPrint	272.0 mm ²	System	Total Foot Print Area of BOM components
				Information
36.	Frequency	1000.0 kHz	System	Switching frequency
				Information
37.	Gain Marg	-56.612 dB	System	Bode Plot Gain Margin
				Information
38.	Iout	1.8 A	System	Iout operating point
				Information
39.	Low Freq Gain	67.983 dB	System	Gain at 1Hz
				Information
40.	Mode	CCM	System	Conduction Mode
				Information
41.	Phase Marg	61.744 deg	System	Bode Plot Phase Margin
				Information
42.	Pout	1.98 W	System	Total output power
				Information
43.	Vin	5.0 V	System	Vin operating point
				Information
44.	Vout	1.1 V	System	Operational Output Voltage
				Information
45.	Vout Actual	1.1 V	System	Vout Actual calculated based on selected voltage divider resistors
				Information
46.	Vout Tolerance	1.805 %	System	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
				Information
47.	Vout p-p	1.123 mV	System	Peak-to-peak output ripple voltage
				Information

Design Assistance

1. LM20154 Product Folder : <http://www.ti.com/product/LM20154> : contains the data sheet and other resources.

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