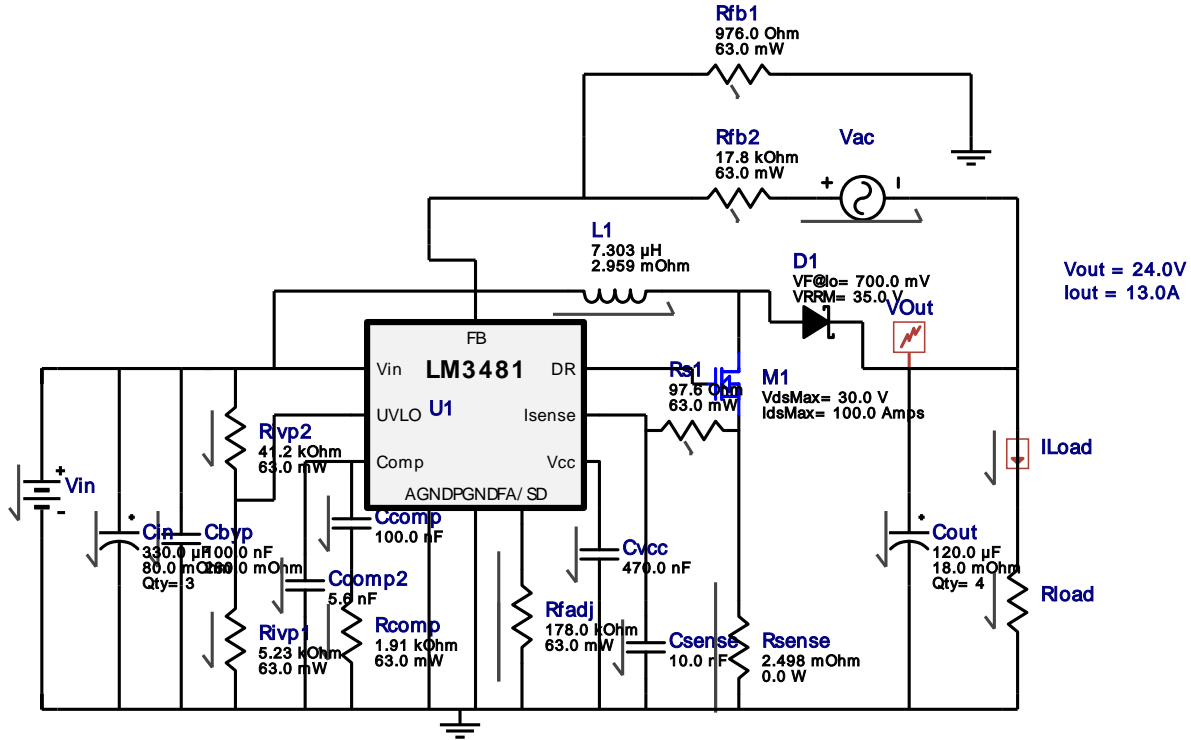


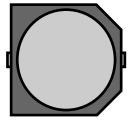
WEBENCH® Electrical Simulation Report









My Comments

No comments

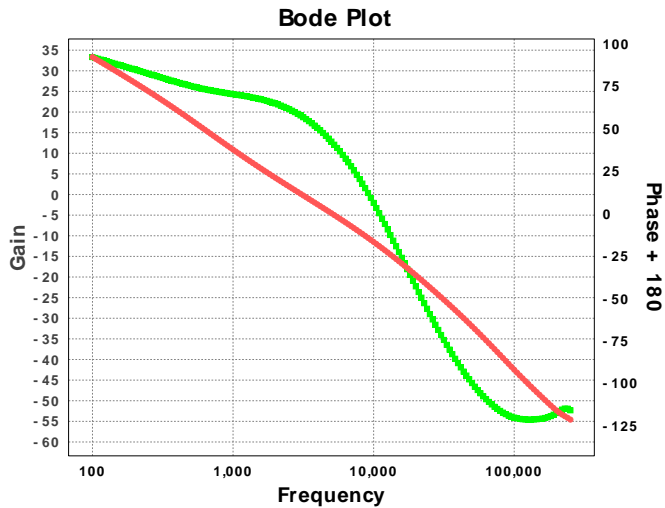
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R8BB104 Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB562 Series= X7R	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	Panasonic	EEE-FK1V331P Series= FK	Cap= 330.0 μF ESR= 80.0 mOhm VDC= 35.0 V IRMS= 850.0 mA	3	\$0.24	 SM_RADIAL_G 172 mm ²
5.	Cout	Panasonic	35SVPF120M Series= SVPF	Cap= 120.0 μF ESR= 18.0 mOhm VDC= 35.0 V IRMS= 4.4 A	4	\$0.74	 CAPSMT_62_F12 151 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	Csense	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.	Cvcc	MuRata	GRM155R60J474KE19D Series= X5R	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
8.	D1	Vishay-Semiconductor	M3035S-E3/4W	VF@Io= 700.0 mV VRRM= 35.0 V	1	\$0.63	 TO-220AB 79 mm ²
9.	L1	CUSTOM	CUSTOM	L= 7.303 µH DCR= 2.959 mOhm	1	NA	CUSTOM 0 mm ²
10.	M1	Texas Instruments	CSD17303Q5	VdsMax= 30.0 V IdsMax= 100.0 Amps	1	\$0.64	 TRANS_NexFET_Q5 55 mm ²
11.	Rcomp	Vishay-Dale	CRCW04021K91FKED Series= CRCW..e3	Res= 1.91 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
12.	Rfadj	Vishay-Dale	CRCW0402178KFKED Series= CRCW..e3	Res= 178.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	Rfb1	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rfb2	Vishay-Dale	CRCW040217K8FKED Series= CRCW..e3	Res= 17.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rivp1	Vishay-Dale	CRCW04025K23FKED Series= CRCW..e3	Res= 5.23 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rivp2	Vishay-Dale	CRCW040241K2FKED Series= CRCW..e3	Res= 41.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rs1	Vishay-Dale	CRCW040297R6FKED Series= CRCW..e3	Res= 97.6 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	Rsense	CUSTOM	CUSTOM Series= ?	Res= 2.498 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
19.	U1	Texas Instruments	LM3481MM/NOPB	Switcher	1	\$0.80	 MUB10A 24 mm ²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cinj	C	Injection Isolation Capacitance	10 F
2.	Linj	L	Injection Isolation Inductance	10 H
3.	Vinj	AC	AC Voltage Source Amplitude	1 V
4.	Rload	R	Load Resistance	1.8461538461538463 Ohm



Design Inputs

#	Name	Value	Description
1.	Iout	13.0 A	Maximum Output Current
2.	VinMax	20.0 V	Maximum input voltage
3.	VinMin	14.0 V	Minimum input voltage
4.	Vout	24.0 V	Output Voltage
5.	base_pn	LM3481	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	2.034 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	11.676 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	23.305 A	Current	Average input current
4.	L Ipp	7.046 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	23.397 A	Current	Inductor ripple current
6.	M1 Irms	18.647 A	Current	M1 MOSFET Irms
7.	SW Ipk	26.832 A	Current	Peak switch current
8.	BOM Count	24	General	Total Design BOM count
9.	FootPrint	2.136 k mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	119.82 kHz	General	Switching frequency
11.	IC Tolerance	19.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	49.356 mV	General	M Vds
13.	M1 Rdson	2.647 mOhm	General	Drain-Source On-resistance
14.	M1 ThetaJA	50.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
15.	Mode	CCM	General	Conduction Mode
16.	Pout	312.0 W	General	Total output power
17.	Total BOM	\$0.0	General	Total BOM Cost
18.	D1 Tj	30.0 degC	Op_Point	D1 junction temperature
19.	Low Freq Gain	47.721 dB	Op_Point	Gain at 10Hz
20.	Vout Actual	24.24 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
21.	Vout OP	24.0 V	Op_Point	Operational Output Voltage
22.	Cross Freq	1.765 kHz	Op_point	Bode plot crossover frequency
23.	Duty Cycle	44.226 %	Op_point	Duty cycle
24.	Efficiency	95.626 %	Op_point	Steady state efficiency
25.	Gain Marg	-14.7 dB	Op_point	Bode Plot Gain Margin
26.	IC Tj	48.458 degC	Op_point	IC junction temperature
27.	ICThetaJA	200.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
28.	IOUT_OP	13.0 A	Op_point	Iout operating point
29.	M1 TjOP	119.02 degC	Op_point	M1 MOSFET junction temperature
30.	Phase Marg	51.03 deg	Op_point	Bode Plot Phase Margin
31.	VIN_OP	14.0 V	Op_point	Vin operating point
32.	Vout p-p	189.0 mV	Op_point	Peak-to-peak output ripple voltage
33.	Cin Pd	110.324 mW	Power	Input capacitor power dissipation
34.	Cout Pd	613.432 mW	Power	Output capacitor power dissipation
35.	Diode Pd	9.1 W	Power	Diode power dissipation
36.	IC Pd	92.288 mW	Power	IC power dissipation
37.	L Pd	1.944 W	Power	Inductor power dissipation
38.	M1 Pd	1.78 W	Power	M1 MOSFET total power dissipation
39.	M1 PdCond	920.364 mW	Power	M1 MOSFET conduction losses
40.	M1 PdSw	859.94 mW	Power	M1 MOSFET switching losses
41.	Rfb Pd	30.678 mW	Power	Rfb Power Dissipation

#	Name	Value	Category	Description
42.	Rsense Pd	1.317 W	Power	LED Current Rsns Power Dissipation
43.	Total Pd	14.271 W	Power	Total Power Dissipation
44.	Vout Tolerance	3.452 %	Unknown	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Assistance

1. **LM3481** Product Folder : <http://www.ti.com/product/LM3481> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).