



Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cbp	Kemet	C0603C104K5RACTU Series= X7R	1	\$0.01	Cap= 100.0 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0603 10mm2
2.	Ccc	MuRata	GRM155R61A224KE19D Series= X5R	1	\$0.01	Cap= 220.0 nF ESR= 0.0 Ohm VDC= 10.0 V IRMS= 0.0 A	 0402 8mm2
3.	Ccomp	MuRata	GRM155C80G184KE01D Series= 379	1	\$0.02	Cap= 180.0 nF ESR= 0.0 Ohm VDC= 4.0 V IRMS= 0.0 A	 0402 8mm2
4.	Ccomp2	MuRata	GRM1885C1H162JA01D Series= C0G/NP0	1	\$0.02	Cap= 1.6 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0603 10mm2
5.	Cin	TDK	C3225X7R1E106M Series= X7R	3	\$0.18	Cap= 10.0 µF ESR= 2.7 mOhm VDC= 25.0 V IRMS= 3.0 A	 1210 23mm2
6.	Cout	Nippon Chemi-Con	APXA160ARA151MJ80G Series= PXA	3	\$0.38	Cap= 150.0 µF ESR= 26.0 mOhm VDC= 16.0 V IRMS= 3.43 A	 CAPSMT_62_J80 156mm2
7.	Cramp	Yageo America	CC0805KRX7R9BB561 Series= X7R	1	\$0.01	Cap= 560.0 pF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2

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8.	Csep	TDK	C3225X7R1E106M Series= X7R	4	\$0.18	Cap= 10.0 μ F ESR= 2.7 mOhm VDC= 25.0 V IRMS= 3.0 A	 1210 23mm2
9.	D1	Vishay-Semiconductor	12CWQ10FNPBF	1	\$0.69	VF@Io= 950.0 mV VRRM= 100.0 V	 DPAK 102mm2
10.	Lin	Coilcraft	XAL1060-152MEB	1	\$0.99	L= 1.5 μ H DCR= 1.5 mOhm	 XAL1060 160mm2
11.	Lout	Coilcraft	XAL1010-153MEB	1	\$1.05	L= 15.0 μ H DCR= 20.0 mOhm	 XAL1010 160mm2
12.	M1	Infineon Technologies	BSZ097N04LS G	1	\$0.30	VdsMax= 40.0 V IdsMax= 40.0 Amps	 PG-TSDSON-8 29mm2
13.	Rbp	Vishay-Dale	CRCW040220R0FKED Series= CRCW..e3	1	\$0.01	Res= 20.0 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
14.	Rcomp	Vishay-Dale	CRCW04021K58FKED Series= CRCW..e3	1	\$0.01	Res= 1.58 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
15.	Rfadj	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	1	\$0.01	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
16.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	1	\$0.01	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
17.	Rfb2	Vishay-Dale	CRCW040284K5FKED Series= CRCW..e3	1	\$0.01	Res= 84.5 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
18.	Rramp	Vishay-Dale	CRCW0402100R0FKED Series= CRCW..e3	1	\$0.01	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
19.	Rsense	Stackpole Electronics Inc	CSNL1206FT2L00 Series= 478	1	\$0.19	Res= 2.0 mOhm Power= 1.0 W Tolerance= 1.0%	 1206 19mm2
20.	Rvlo1	Vishay-Dale	CRCW040268K1FKED Series= CRCW..e3	1	\$0.01	Res= 68.1 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
21.	Rvlo2	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	1	\$0.01	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
22.	U1	Texas Instruments	LM3481MM	1	\$0.95	Switcher	 MSOP-10 34mm2

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	723.585 m A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	9.023 A	Current	Output capacitor RMS ripple current
3.	Csep IRMS	9.054 A	Current	SEPIC capacitor RMS ripple current
4.	D1 Irms	10.282 A	Current	D1 Irms
5.	IC Ipk	9.988 m A	Current	Peak switch current in IC
6.	Iin Avg	17.145 A	Current	Average input current
7.	Iin Ipk	18.33 A	Current	Iin peak current
8.	Iin Ipp	3.427 A	Current	Peak-to-peak input inductor ripple current
9.	Iin Irms	16.738 A	Current	Iin ripple current
10.	Lout Ipk	5.13 A	Current	Lout peak current

#	Name	Value	Category	Description
11.	Lout Ipp	348.632 m A	Current	Peak-to-peak output inductor ripple current
12.	Lout Irms	4.982 A	Current	Lout ripple current
13.	M1 Irms	19.129 A	Current	M1 MOSFET Irms
14.	BOM Count	29.0	General	Total Design BOM count
15.	FootPrint	1.244 k mm2	General	Total Foot Print Area of BOM components
16.	Frequency	580.0 k Hz	General	Switching frequency
17.	IC Tolerance	19.0 m V	General	IC Feedback Tolerance
18.	Mode	CCM	General	Conduction Mode
19.	Total BOM	\$6.72	General	Total BOM Cost
20.	D1 Tj	82.426 degC	Op_Point	D1 junction temperature
21.	SEPIC Resonance Freq	7.004 k Hz	Op_Point	SEPIC Resonance Frequency
22.	V SEPIC damping factor	109.906 m	Op_Point	V SEPIC damping factor
23.	Vin p-p	18.217 m V	Op_Point	Peak-to-peak input voltage
24.	Vsep p-p	181.908 m V	Op_Point	Peak-to-peak sepic voltage
25.	Cross Freq	2.899 k Hz	Op_point	Bode plot crossover frequency
26.	Duty Cycle	77.5 %	Op_point	Duty cycle
27.	Efficiency	77.77 %	Op_point	Steady state efficiency
28.	Gain Marg	15.163 db	Op_point	Bode Plot Gain Margin
29.	IC Tj	63.959 degC	Op_point	IC junction temperature
30.	IOUT_OP	5.0 A	Op_point	Iout operating point
31.	M1 TjOP	30.3 degC	Op_point	M1 MOSFET junction temperature
32.	Phase Marg	71.067 deg	Op_point	Bode Plot Phase Margin
33.	Phase Shift	71.759 deg	Op_point	Bode Plot Phase Shift
34.	VIN_OP	4.5 V	Op_point	Vin operating point
35.	Vout p-p	203.279 m V	Op_point	Peak-to-peak output ripple voltage
36.	Cin Pd	471.218 μ W	Power	Input capacitor power dissipation
37.	Cout Pd	705.635 m W	Power	Output capacitor power dissipation
38.	Csep Pd	55.338 m W	Power	SEPIC capacitor power dissipation
39.	D1 Pd	4.766 W	Power	Diode power dissipation
40.	D1 PdCond	4.75 W	Power	Diode conduction losses
41.	D1 PdSw	15.975 m W	Power	Diode switching losses
42.	IC Pd	169.796 m W	Power	IC power dissipation
43.	Lin Pd	614.829 m W	Power	Lin power dissipation
44.	Lout Pd	498.09 m W	Power	Lout power dissipation
45.	M1 Pd	6.934 W	Power	M1 MOSFET total power dissipation
46.	M1 PdCond	5.358 W	Power	M1 MOSFET conduction losses
47.	M1 PdSw	1.575 W	Power	M1 MOSFET switching losses
48.	Rsense Pd	731.852 m W	Power	LED Current Rsns Power Dissipation
49.	Total Pd	17.15 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	5.0 A	Maximum Output Current
2.	Iout1	5.0 Amps	Output Current #1
3.	VinMax	17.0 V	Maximum input voltage
4.	VinMin	4.5 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	LM3481	National Based Product Number
8.	Ta	30.0 degC	Ambient temperature
9.	UserFsw	580.0 kHz	Customer Selected Frequency

Design Assistance

1. **LM3481** Product Folder : <http://www.national.com/pf/LM/LM3481.html> : contains the data sheet and other resources.

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