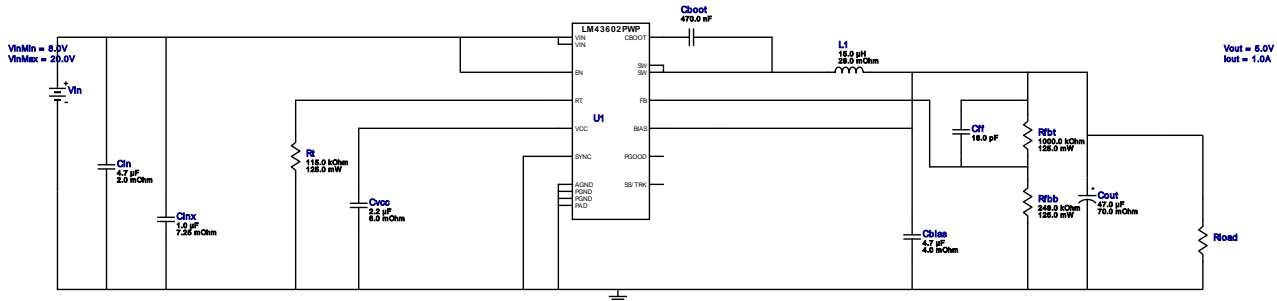






## WEBENCH<sup>®</sup> Design Report

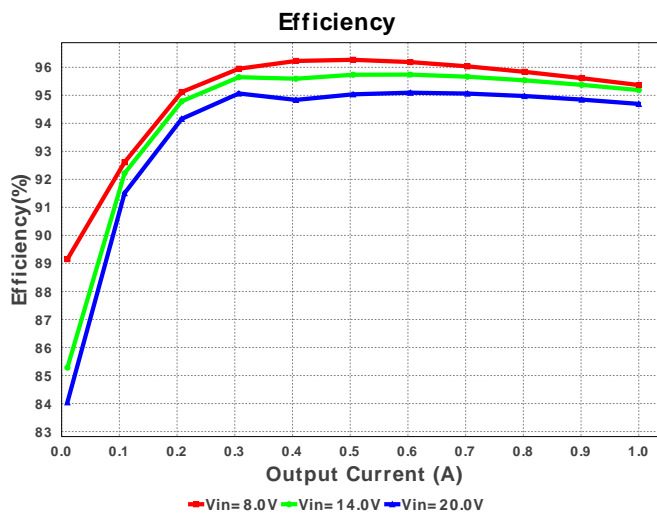
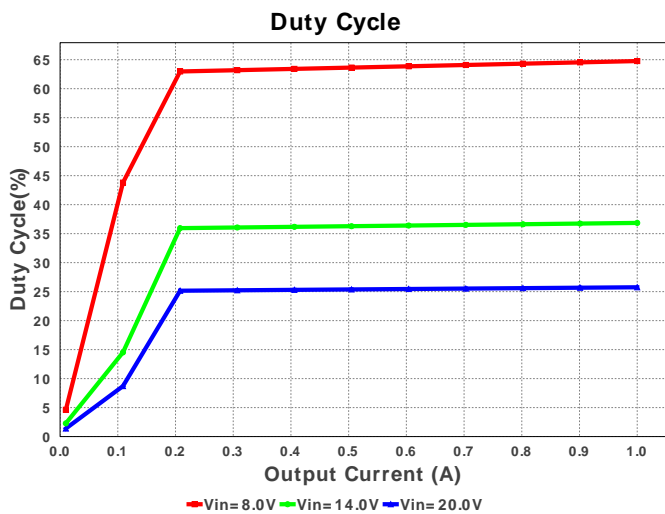
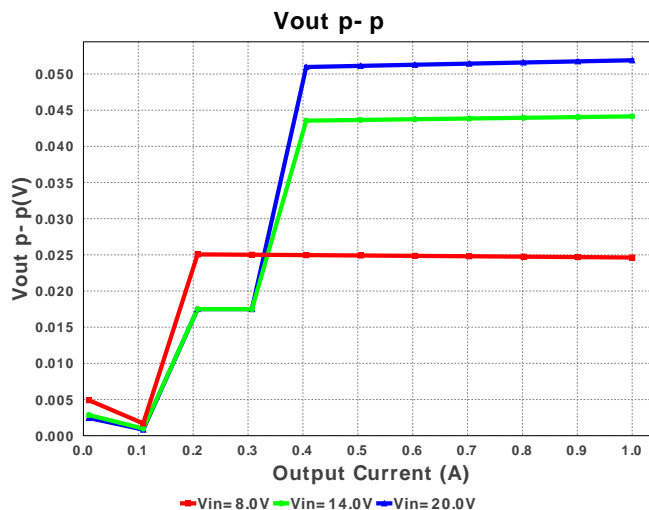
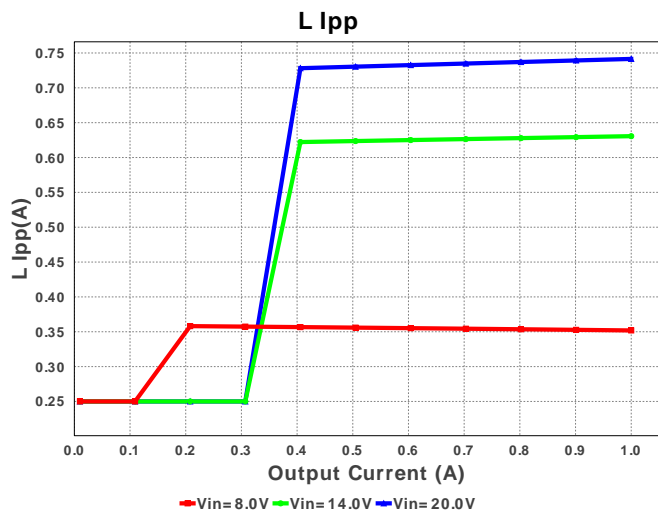
 Design : 3931741/2 LM43602PWPR  
 LM43602PWPR 8.0V-20.0V to 5.00V @ 1.0A


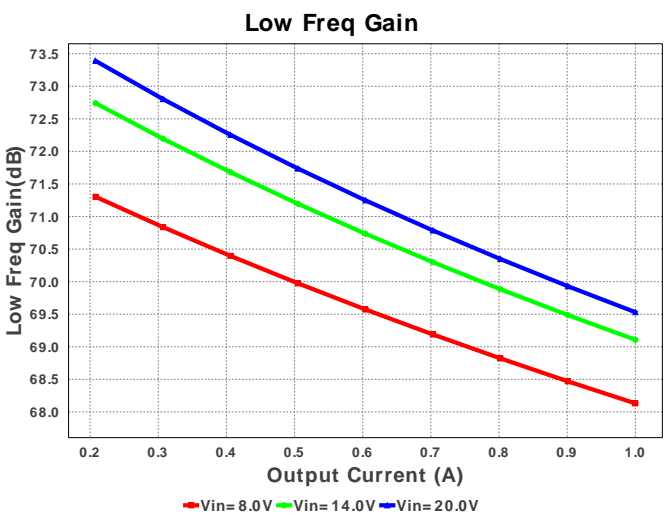
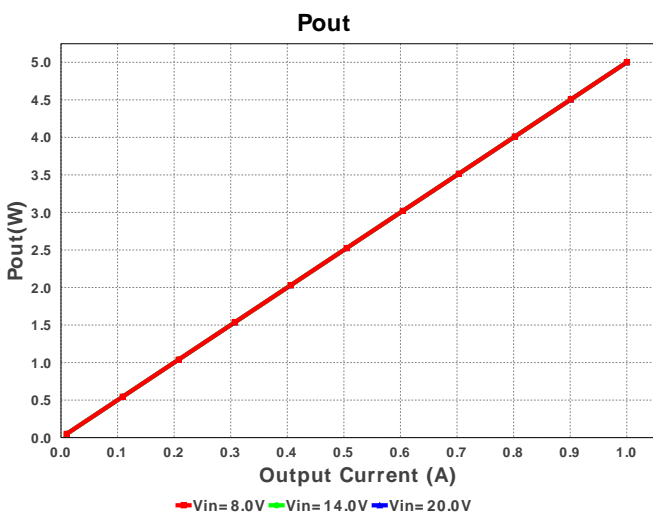
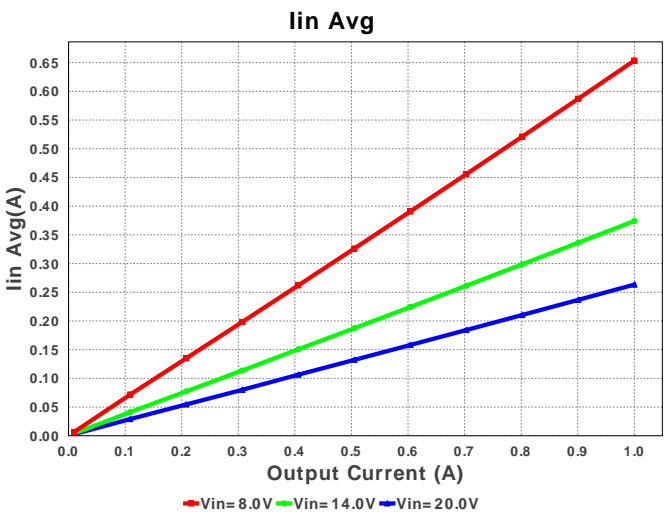
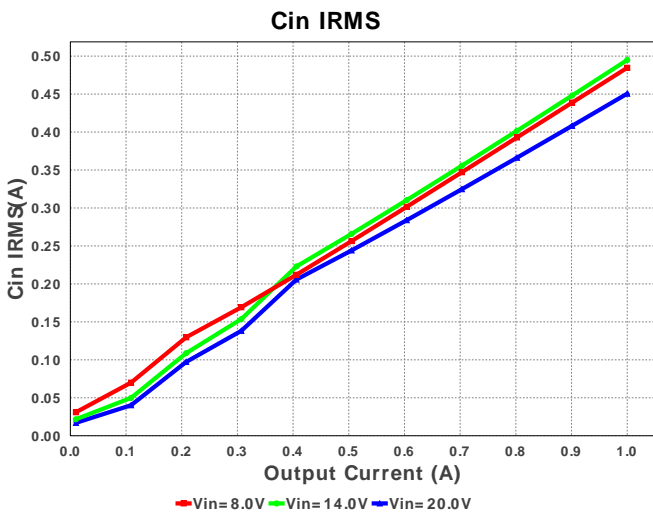
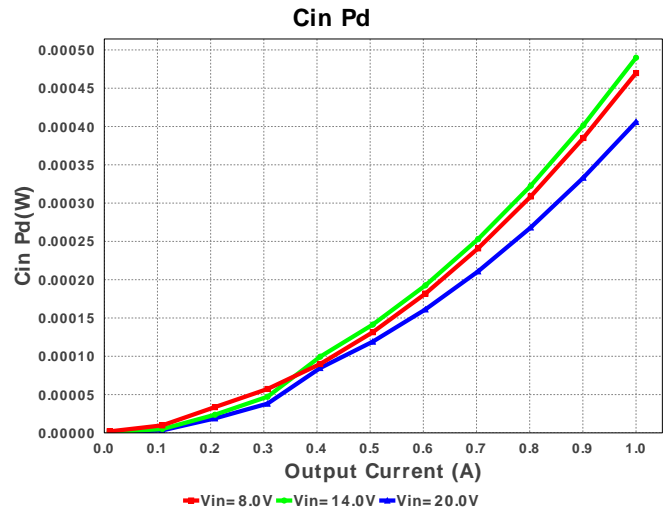
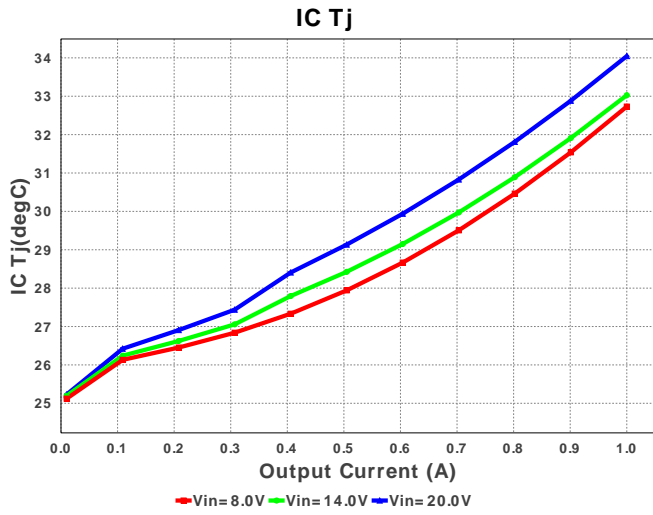
- The input capacitor included in the BOM only contains a small filter capacitor that should be placed near the IC. Depending on where the power supply is laid out in the system additional bulk capacitance may need to be added to filter the line ripple.
- If there is no VinTyp specified, WEBENCH will use the VinMax value. To change the VinTyp value, click on the "Change Design Inputs" button under the Optimization Tuning knob. In some applications, while the design requires the input voltage to be a wide range, for a majority of the time, it is operating at a much lower voltage than the maximum input voltage. Sizing the inductor based on the maximum input voltage may yield an inductance much larger than typically needed, causing a larger footprint for the overall design. At the same time, components such as the input capacitor must be rated based on the maximum input voltage. WEBENCH now supports the use of this additional input voltage specification.

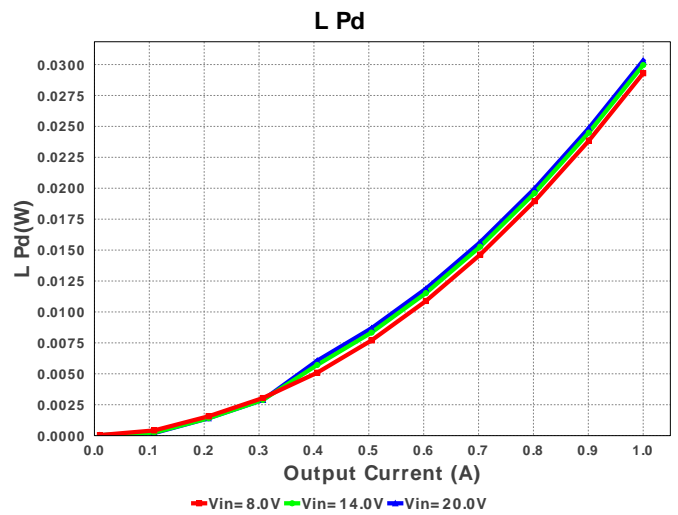
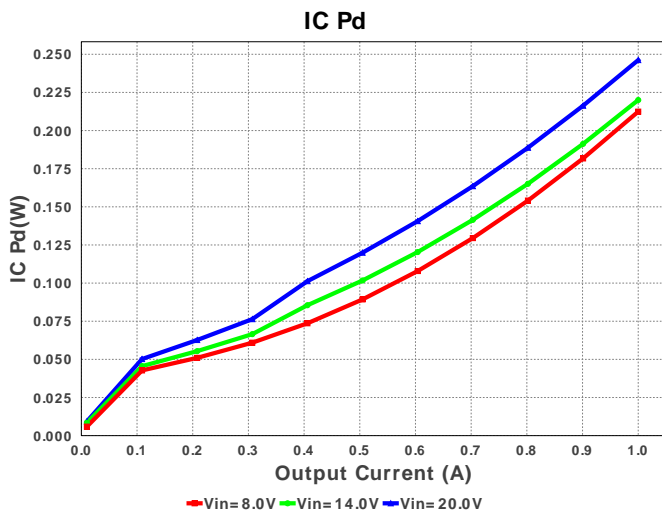
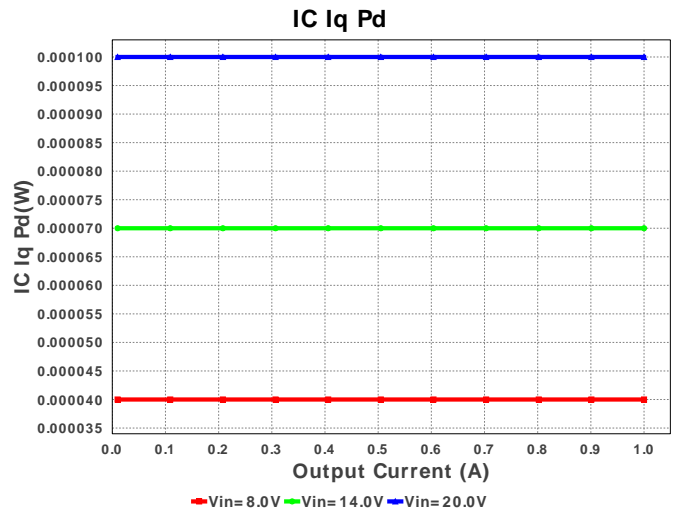
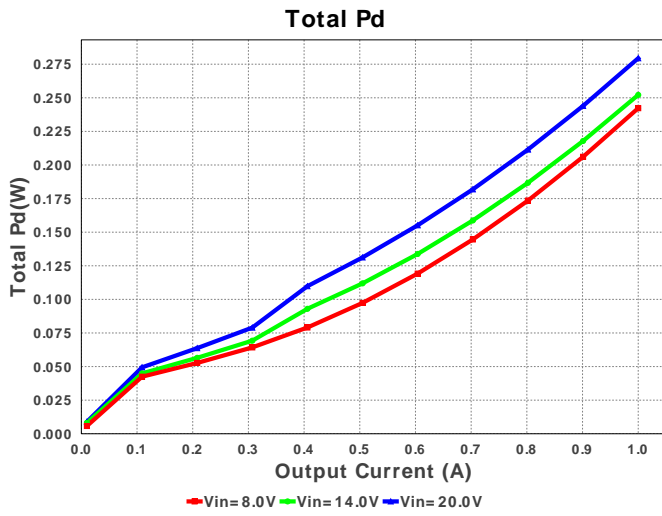
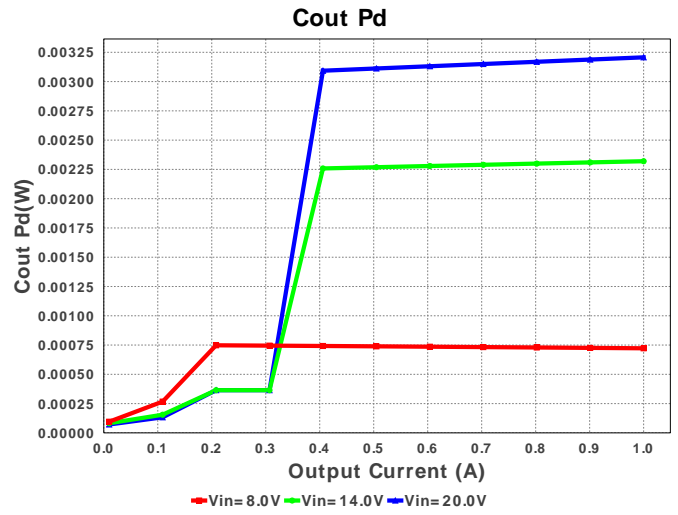
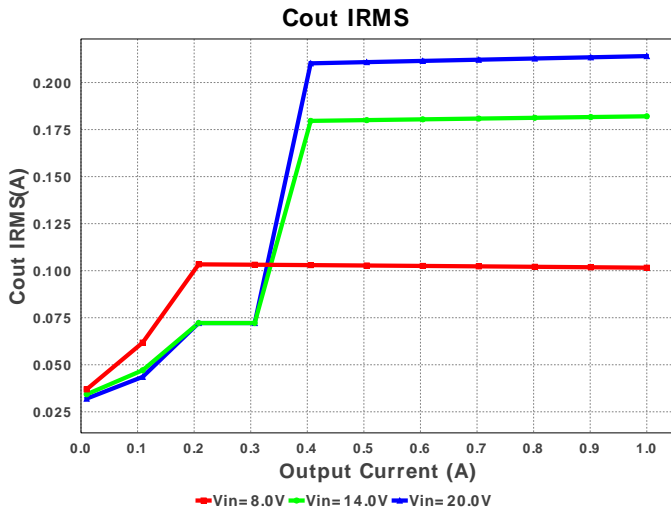
### Electrical BOM

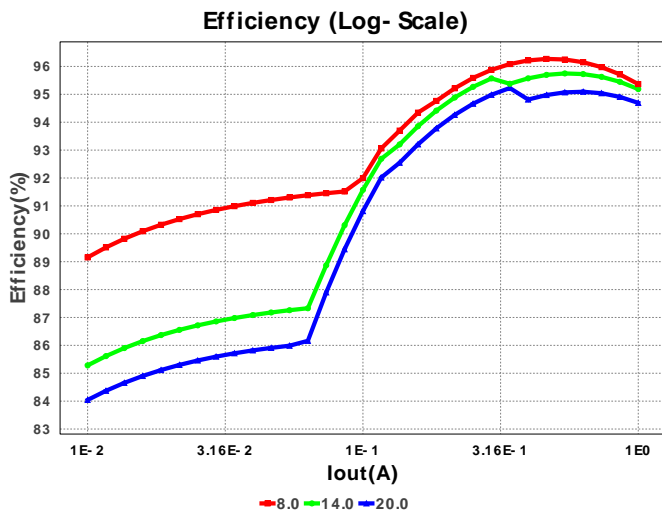
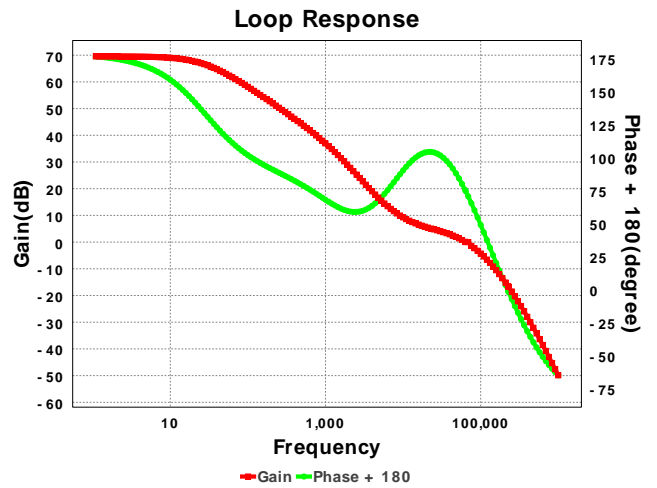
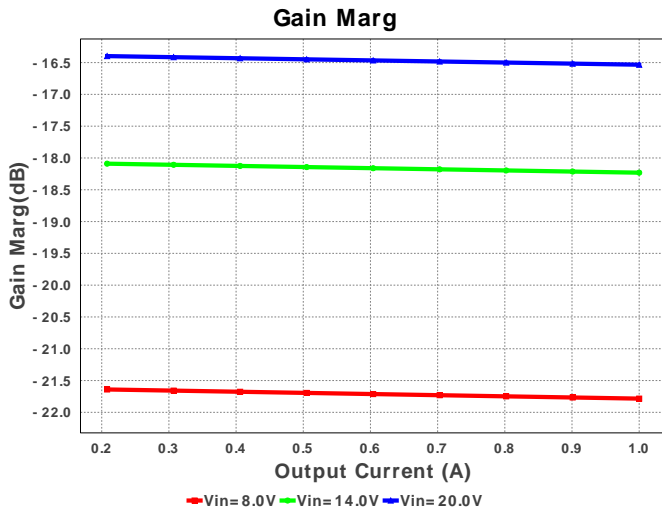
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbias	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 uF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	\$0.03	 0805 7 mm <sup>2</sup>
2.	Cboot	MuRata	GRM155C80J474KE19D Series= 379	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm <sup>2</sup>
3.	Cff	Kemet	C0805C180M3GACTU Series= C0G/NP0	Cap= 18.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	1	\$0.29	 1210 15 mm <sup>2</sup>
5.	Cinx	TDK	C2012X5R1E105K Series= X5R	Cap= 1.0 uF ESR= 7.25 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
6.	Cout	Panasonic	10TPB47M Series= 1356	Cap= 47.0 uF ESR= 70.0 mOhm VDC= 10.0 V IRMS= 1.1 A	1	\$0.36	 3528-20 17 mm <sup>2</sup>
7.	Cvcc	Kemet	C0805C225K8RACTU Series= X7R	Cap= 2.2 uF ESR= 8.0 mOhm VDC= 10.0 V IRMS= 15.55 A	1	\$0.03	 0805 7 mm <sup>2</sup>
8.	L1	Bourns	SRU1048-150Y	L= 15.0 uH DCR= 29.0 mOhm	1	\$0.33	 SRU1048 144 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Rfbb	Panasonic	ERJ-6ENF2493V Series= 225	Res= 249.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
10.	Rfbt	Panasonic	ERJ-6ENF1004V Series= 225	Res= 1000.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
11.	Rt	Panasonic	ERJ-6ENF1153V Series= 225	Res= 115.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
12.	U1	Texas Instruments	LM43602PWPR	Switcher	1	\$1.75	 PWP0016F 59 mm <sup>2</sup>









### Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	450.374 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	212.669 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	263.35 mA	Current	Average input current
4.	L Ipp	736.71 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	285.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
7.	Frequency	350.0 kHz	General	Switching frequency
8.	Pout	5.0 W	General	Total output power
9.	Total BOM	\$2.87	General	Total BOM Cost
10.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
11.	Cross Freq	64.131 kHz	Op_point	Bode plot crossover frequency
12.	Duty Cycle	25.749 %	Op_point	Duty cycle
13.	Efficiency	94.684 %	Op_point	Steady state efficiency
14.	Gain Marg	-16.61 dB	Op_point	Bode Plot Gain Margin
15.	IC Tj	34.067 degC	Op_point	IC junction temperature
16.	ICThetaJA	38.9 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	1.0 A	Op_point	Iout operating point
18.	Phase Marg	75.826 deg	Op_point	Bode Plot Phase Margin
19.	VIN_OP	20.0 V	Op_point	Vin operating point
20.	Vout p-p	51.57 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	405.673 μW	Power	Input capacitor power dissipation
22.	Cout Pd	3.166 mW	Power	Output capacitor power dissipation
23.	IC Iq Pd	100.0 μW	Power	IC Iq Pd
24.	IC Pd	246.846 mW	Power	IC power dissipation
25.	L Pd	30.312 mW	Power	Inductor power dissipation
26.	Total Pd	279.994 mW	Power	Total Power Dissipation
27.	Low Freq Gain	69.549 dB	Unknown	Gain at 10Hz

### Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	Iout1	1.0	Output Current #1
3.	VinMax	20.0	Maximum input voltage
4.	VinMin	8.0	Minimum input voltage
5.	Vout	5.0	Output Voltage
6.	Vout1	5.0	Output Voltage #1
7.	base_pn	LM43602	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	25.0	Ambient temperature

## Design Assistance

1. **LM43602** Product Folder : <http://www.ti.com/product/LM43602> : contains the data sheet and other resources.

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